

FEDERAL HOME LOAN BANKS

Combined Financial Report for the Year Ended December 31, 2018

This Combined Financial Report provides financial information on the Federal Home Loan Banks. The Federal Home Loan Banks issue consolidated bonds and consolidated discount notes (collectively referred to as consolidated obligations). Consolidated obligations are joint and several obligations of all Federal Home Loan Banks, which means that each individual Federal Home Loan Bank is responsible for the payment of principal and interest on all consolidated obligations. Each Federal Home Loan Bank is a separately chartered entity with its own board of directors and management. There is no centralized, system-wide management or oversight by a single board of directors of the Federal Home Loan Banks.

Federal Home Loan Bank consolidated obligations are not obligations of the United States and are not guaranteed by either the United States or any government agency.

The Securities Act of 1933, as amended, does not require the registration of consolidated obligations; therefore, no registration statement has been filed with the U.S. Securities and Exchange Commission. Neither the U.S. Securities and Exchange Commission, nor the Federal Housing Finance Agency, nor any state securities commission has approved or disapproved of these consolidated obligations or determined if this report is truthful or complete.

Carefully consider the risk factors provided in this and other Combined Financial Reports of the Federal Home Loan Banks (collectively referred to as Combined Financial Reports). Neither the Combined Financial Reports nor any offering materials provided by, or on behalf of, the Federal Home Loan Banks describe all the risks of investing in consolidated obligations. Investors should consult with their financial and legal advisors about the risks of investing in consolidated obligations.

This Combined Financial Report is available on the Federal Home Loan Banks Office of Finance web site at fhlb-of.com. This web site address is provided as a matter of convenience only, and its contents are not made part of or incorporated by reference into this report.

Investors should direct questions about consolidated obligations or the Combined Financial Reports to the Federal Home Loan Banks Office of Finance at (703) 467-3600.

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EXPLANATORY STATEMENT ABOUT FEDERAL HOME LOAN BANKS COMBINED FINANCIAL REPORT

The Federal Home Loan Banks (FHLBanks) are government-sponsored enterprises (GSEs), federally-chartered but privately capitalized and independently managed. The FHLBanks together with the Federal Home Loan Banks Office of Finance (Office of Finance) comprise the FHLBank System.

The Office of Finance is responsible for preparing the Combined Financial Reports of the FHLBanks. Each FHLBank is responsible for the financial information and underlying data it provides to the Office of Finance for inclusion in the Combined Financial Reports. The Office of Finance is responsible for combining the financial information it receives from each of the FHLBanks.

The Combined Financial Reports are intended to be used by investors in consolidated obligations (consolidated bonds and consolidated discount notes) of the FHLBanks as these are joint and several obligations of all FHLBanks. This Combined Financial Report is provided using combination accounting principles generally accepted in the United States of America. This combined presentation in no way indicates that these assets and liabilities are under joint management and control as each individual FHLBank manages its operations independently. Therefore, each FHLBank's business, risk profile, financial condition, and results of operations will vary from FHLBank to FHLBank.

Because of the FHLBank System's structure, the Office of Finance does not prepare consolidated financial statements. Consolidated financial statements are generally considered to be appropriate when a controlling financial interest rests directly or indirectly in one of the enterprises included in the consolidation, which is the case in a typical holding company structure where there is a parent corporation that owns, directly or indirectly, one or more subsidiaries. However, the FHLBanks do not have a parent company that controls each of the FHLBanks. Instead, each of the FHLBanks is owned by its respective members and certain former members.

Each FHLBank is a separately chartered cooperative with its own board of directors and management and is responsible for establishing its own accounting and financial reporting policies in accordance with accounting principles generally accepted in the United States of America (GAAP). Although the FHLBanks work together in an effort to achieve consistency on significant accounting policies, the FHLBanks' accounting and financial reporting policies and practices may vary because alternative policies and presentations are permitted under GAAP in certain circumstances. Statements in this report may be qualified by a term such as "generally," "primarily," "typically," or words of similar meaning to indicate that the statement is generally applicable, but may not be applicable to all FHLBanks or their transactions as a result of their different business practices and accounting and financial reporting policies under GAAP.

An investor may not be able to obtain easily a system-wide view of the FHLBanks' business, risk profile, and financial information because there is no centralized, system-wide management or centralized board of director oversight of the individual FHLBanks. This decentralized structure is not conducive to preparing disclosures from a system-wide view in the same manner as is generally expected of U.S. Securities and Exchange Commission (SEC) registrants. For example, a conventional Management's Discussion and Analysis is not provided in this Combined Financial Report; instead, this report includes a "Financial Discussion and Analysis" prepared by the Office of Finance using information provided by each FHLBank.

Each FHLBank is subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, and must file periodic reports and other information with the SEC. Each FHLBank prepares an annual financial report, filed on SEC Form 10-K, quarterly financial reports, filed on SEC Form 10-Q, and current reports, filed on SEC Form 8-K. Those reports contain additional information that is not contained in this Combined Financial Report. An investor should review those reports and other available information on individual FHLBanks to obtain additional detail on each FHLBank's business, risk profile, financial condition, results of operations, and accounting and financial reporting policies. Periodic reports and other information filed by each FHLBank with the SEC are made available on its web site and on the SEC's web site at sec.gov. References to web sites and to reports and other information filed by individual FHLBanks with the SEC are provided as a matter of convenience only, and their contents are not made part of or incorporated by reference into this report.

FORWARD-LOOKING INFORMATION

Statements contained in this report, including statements describing the objectives, projections, estimates, or future predictions of the FHLBanks and Office of Finance, may be "forward-looking statements." These statements may use forward-looking terminology, such as "anticipates," "believes," "could," "estimates," "expects," "may," "should," "will," "would," or their negatives or other variations on these terms. Investors should note that forward-looking statements, by their nature, involve risks or uncertainties, including those set forth in the [Risk Factors](#) section of this report. Therefore, the actual results could differ materially from those expressed or implied in these forward-looking statements or could affect the extent to which a particular objective, projection, estimate, or prediction is realized.

These forward-looking statements involve risks and uncertainties including, but not limited to, the following:

- changes in the general economy, money and capital markets, the rate of inflation (or deflation), employment rates, housing market activity and housing prices, the size and volatility of the residential mortgage market, and uncertainty regarding the global economy;
- levels and volatility of market prices, interest rates, and indices or other factors that could affect the value of investments or collateral held by the FHLBanks resulting from the effects of, and changes in, various monetary or fiscal policies and regulations, including those determined by the Federal Reserve Board and the Federal Deposit Insurance Corporation (FDIC), or a decline in liquidity in the financial markets;
- political events, including legislative, regulatory, judicial, or other developments that affect the FHLBanks, their members, counterparties, dealers of consolidated obligations, or investors in consolidated obligations, including changes in the Federal Home Loan Bank Act of 1932, as amended (FHLBank Act), housing finance and government-sponsored enterprise (GSE) reform, Federal Housing Finance Agency (FHFA) actions, or regulations that affect FHLBank operations, regulatory oversight, and changes to, and replacement of, the London Interbank Offered Rate (LIBOR) benchmark interest rate;
- competitive forces, including other sources of funding available to FHLBank members and other entities borrowing funds in the capital markets;
- disruptions in the credit and debt markets and the effect on the FHLBanks' funding costs, sources, and availability;
- demand for FHLBank advances resulting from changes in FHLBank members' deposit flows and credit demands;
- loss of members and repayment of advances made to those members due to institutional failures, consolidations, voluntary withdrawals, or involuntary terminations from FHLBank membership, and changes in the financial health of members;
- changes in domestic and foreign investor demand for consolidated obligations, including short-term funding, or the terms of derivative transactions and similar transactions, including changes in the relative attractiveness of consolidated obligations as compared to other investment opportunities, changes in the availability of other investment opportunities, changes in support from dealers of consolidated obligations, and changes resulting from any modification of the credit ratings of the U.S. government or the FHLBanks;
- the availability of acceptable institutional counterparties for business transactions, including derivative transactions used to manage interest-rate risk;
- the ability to introduce new products and services and successfully manage the risks associated with those products and services, including new types of collateral used to secure advances;
- the pace of technological change and the ability to develop, secure, and support technology and information systems to effectively manage the risks, including information security; and
- the effect of new accounting guidance, including the development of supporting systems and related internal controls.

Neither the FHLBanks nor the Office of Finance undertakes any obligation to publicly update or revise any forward-looking statements contained in this Combined Financial Report, whether as a result of new information, future events, changed circumstances, or any other reason.

BUSINESS

General Information

The 11 FHLBanks are GSEs, organized under the authority of the Federal Home Loan Bank Act of 1932, as amended (FHLBank Act). The Office of Finance is a joint office of the FHLBanks established to facilitate the issuance and servicing of debt instruments for the FHLBanks, known as consolidated obligations, and to prepare the quarterly and annual Combined Financial Reports of the FHLBanks. The FHLBanks and the Office of Finance are regulated by the Federal Housing Finance Agency (FHFA). (See [Business - Audits and Examinations - FHLBanks' Regulator](#) for more information regarding the FHFA.)

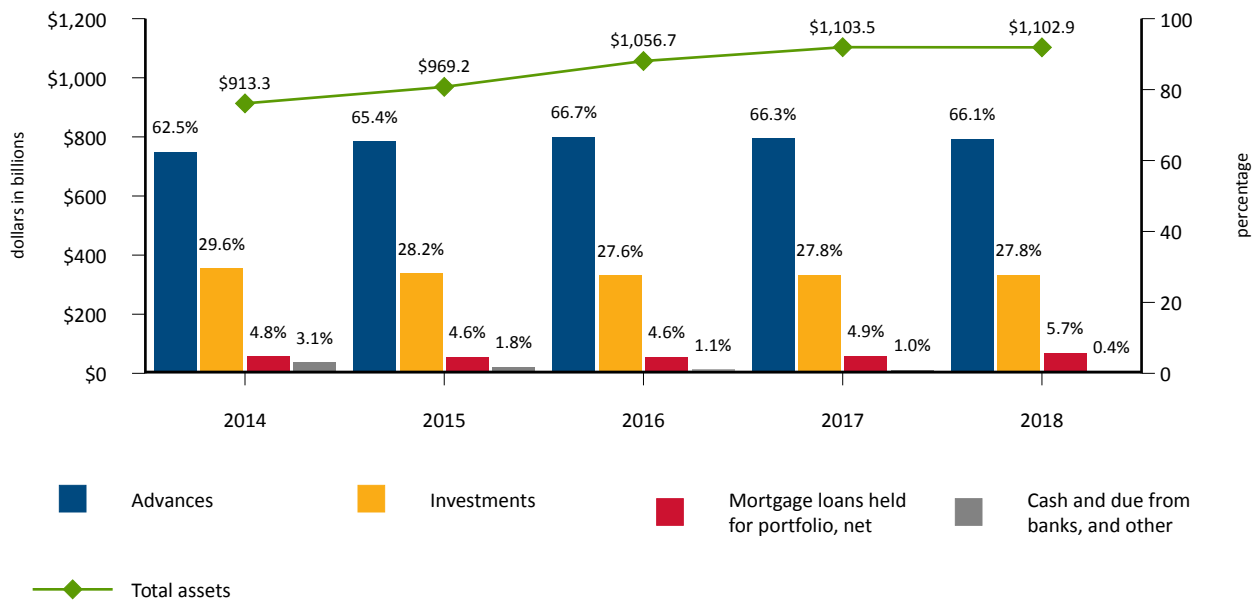
The mission of the FHLBanks is to provide financial products and services to their members and housing associates, including, but not limited to, secured loans known as advances, that assist and enhance their financing of: (1) housing, including single-family and multi-family housing serving consumers at all income levels; and (2) community lending. (See [Business - Other Mission-Related Activities](#) for additional information.) FHFA regulations require each FHLBank's board of directors to have in effect, at all times, a strategic business plan that describes how the business activities of that FHLBank will achieve its mission and meet the FHFA's regulatory guidance related to core mission achievement. (See [Supplemental Information - Individual FHLBanks Selected Financial Data and Financial Ratios](#) for more information on each FHLBank's core mission asset ratio at December 31, 2018).

The FHLBanks serve the public by providing a readily available, low-cost source of funds to FHLBank members through advances. These funds may be used for residential mortgages, community investments, and other services for housing and community development. In addition, the FHLBanks may provide members and housing associates with a means of enhancing liquidity by purchasing home mortgage loans through mortgage programs developed for their members. Members can also borrow from an FHLBank to fund low-income housing, thereby helping the members satisfy their regulatory requirements under the Community Reinvestment Act. Finally, the FHLBanks may offer their members a variety of other products and services, such as:

- correspondent banking, which includes security safekeeping, wire transfers, and settlements;
- cash management;
- letters of credit; and
- derivative intermediation.

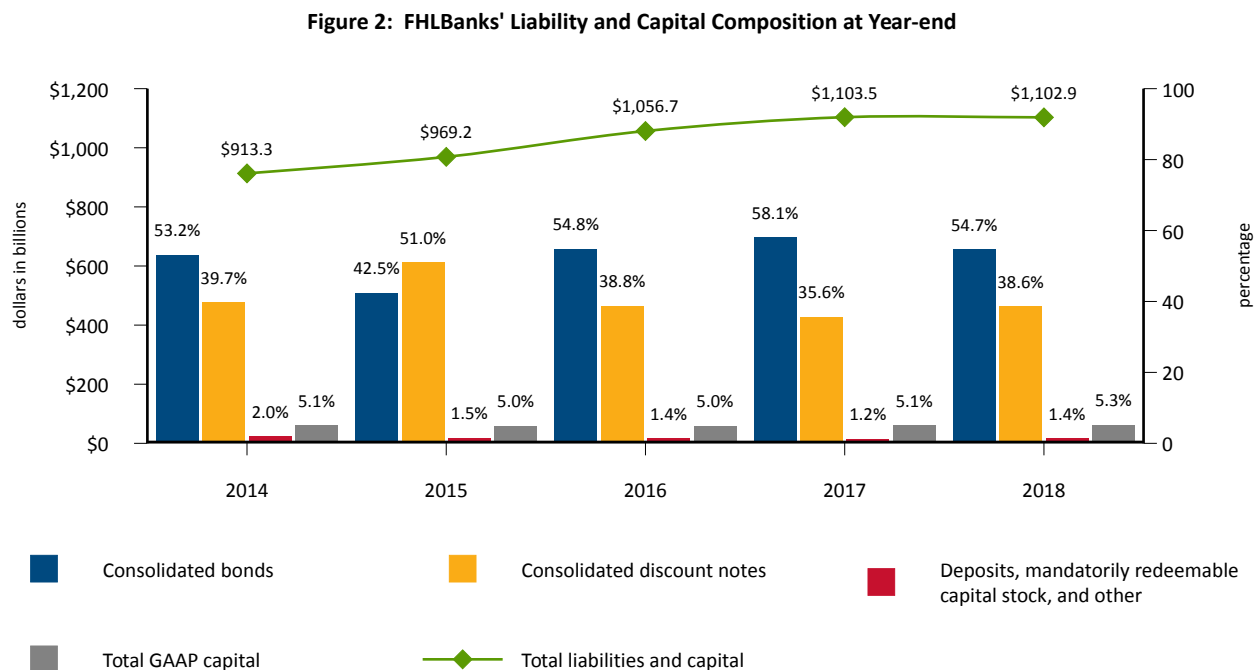
Figure 1 presents the FHLBanks' total asset composition for the most recent five years.

Figure 1: FHLBanks' Asset Composition at Year-end



Each FHLBank's funding is principally obtained from consolidated obligations, which are debt instruments issued through the Office of Finance on behalf of the FHLBanks. Each FHLBank is jointly and severally liable with the other FHLBanks for all consolidated obligations issued. Consolidated obligations are not obligations of the United States and are not guaranteed by either the United States or any government agency. Each FHLBank also raises funds through member deposits and the issuance of capital stock.

Figure 2 presents the FHLBanks' total liability and capital composition for the most recent five years.



The FHLBanks are cooperatives that are privately and wholly owned by their members and certain former members (including non-members that own FHLBank capital stock as a result of merger or acquisition, relocation, charter termination, voluntary termination, or involuntary termination of an FHLBank member). Each FHLBank operates as a separate entity within a defined geographic region of the country, known as its district, with its own board of directors, management, and employees. As a condition of membership, each FHLBank member must purchase and maintain capital stock of its FHLBank. To the extent declared by an FHLBank's board of directors, a stockholder may receive dividends on its investment in its FHLBank's capital stock.

Membership in an FHLBank is voluntary and is generally limited to federally-insured depository institutions, insurance companies, and community development financial institutions. A community development financial institution is eligible to become a member if it has been certified by the U.S. Department of the Treasury (U.S. Treasury). Eligible community development financial institutions include community development loan funds, community development venture capital funds, and state-chartered credit unions without federal share insurance. (See [Market for Capital Stock and Related Stockholder Matters - Table 3 - Regulatory Capital Stock Held and Membership by Type of Member](#), which presents FHLBank membership by membership type.) Eligible institutions may generally only become a member of the FHLBank whose district includes the location of the institution's principal place of business. Financial institution holding companies may have one or more subsidiaries, each of which may be a member of the same or a different FHLBank.

Each FHLBank conducts its credit and mortgage program businesses almost exclusively with its members and housing associates. An FHLBank may also have investments in interest-bearing deposits, securities purchased under agreements to resell, federal funds sold, and certificates of deposit, and may also execute mortgage-backed securities and derivative transactions, with members, former members, or their affiliates. All investments are transacted at then-current market prices without preference to the status of the counterparty or the issuer of the investment as a member, former member, or affiliate.

The FHLBanks seek to manage their primary objective of fulfilling their public purpose by enhancing the value of membership for member institutions. The value of membership includes access to readily available credit and other services from the FHLBanks and the value of the cost differential between an FHLBank's advances and other potential sources of funds, as well as the potential for dividends received on a member's investment in an FHLBank's capital stock.

Due to the FHLBanks' cooperative structures, the FHLBanks generally earn a narrow net interest spread and historically have returned a portion of their net income to their stockholders in the form of dividends. Accordingly, the FHLBanks' net income and balance of retained earnings are relatively small as compared to total assets and total liabilities. (See [Selected Financial Data](#) for additional information.)

The primary source of revenue for the FHLBanks is interest income earned on advances, mortgage loans held for portfolio, and investments. The primary items of expense for the FHLBanks are interest paid on consolidated obligations; operating expenses, including employee compensation and benefits; and Affordable Housing Program assessments. The FHLBanks may also recognize non-interest gains and losses, such as gains and losses on derivatives and hedging activities and gains and losses on investment securities.

Advances

The FHLBanks provide funding to members and housing associates through secured loans known as advances. Each FHLBank makes advances based on the creditworthiness and financial condition of the borrowing institutions and the security of mortgage loans and other types of eligible collateral pledged by these institutions. (See [Financial Discussion and Analysis - Risk Management - Credit Risk - Advances](#) for additional information on advances collateral.) Access to FHLBank advances can reduce the amount of low-yielding liquid assets a member would otherwise hold to ensure the same amount of liquidity. Advances, FHLBanks' largest asset category on a combined basis, were \$728.8 billion and \$731.5 billion, and represented 66.1% and 66.3% of combined total assets, at December 31, 2018 and 2017. Because members may originate loans that are not sold in the secondary mortgage market, FHLBank advances can serve as a funding source for a variety of mortgages, including those focused on very low-, low-, and moderate-income households. In addition, FHLBank advances can provide interim funding for those members that choose to sell or securitize their mortgages. FHLBank advances can also be a source of funding to smaller lenders that may not have access to all of the funding options available to large financial institutions.

FHLBank credit products also aid members in asset and liability management. Each FHLBank develops its advance programs to meet the particular needs of its members and offers a wide range of fixed- and variable-rate advance products, with different maturities, interest rates, payment characteristics, and optionality. For example, an FHLBank may offer advances that have amortization schedules that are structured to match the maturity and payment characteristics of mortgage loans. These advances can reduce a member's interest-rate risk associated with holding long-term, fixed-rate mortgages. In addition, an FHLBank may make commitments for advances to a member covering a predefined period, which aids a member and an FHLBank in cash flow planning and enables members to reduce funding risk.

Each FHLBank may also offer specialized programs that provide members with access to below-market interest rate advances to create affordable homeownership and rental opportunities, and for commercial and economic development activities. (See [Business - Other Mission-Related Activities](#) for more information.)

Advance Products

- **Fixed-Rate Advances.** These advances are available over a variety of terms and are used to fund both the short- and long-term liquidity needs of borrowers. Typically, interest is paid monthly or quarterly and the principal is paid at maturity.
- **Variable-Rate Advances.** These advances are available over a variety of terms and are used to fund both short- and long-term liquidity needs of borrowers. Variable-rate advances have interest rates that reset periodically based on LIBOR or other standard indices, or consolidated obligation yields. Typically, interest is paid monthly or quarterly and the principal is paid at maturity.

- Hybrid Advances. These advances contain a one-time option to embed either a floor or cap at any time during the life of the advance and may be either fixed- or variable-rate at the time of issuance.
- Convertible Advances. These advances allow an FHLBank to convert an advance from one interest-payment term structure to another. Fixed-rate to variable-rate convertible advances have a defined lockout period after which they convert to the current market rate or another structure. A convertible advance generally carries a lower initial interest rate than a comparable-maturity fixed-rate advance without the conversion feature. Variable- to fixed-rate convertible advances have a defined lockout period during which the interest rates adjust based on a spread to LIBOR or other specified index. At the end of the lockout period, these advances may convert to fixed-rate advances.
- Amortizing Advances. These advances are medium- or long-term loans with amortization schedules. In addition, certain amortizing advances have amortization schedules that are structured to match the payment characteristics of a mortgage loan or portfolio of mortgage loans. The principal and interest are repaid monthly, quarterly, semi-annually, or annually over the term of the advances. Amortizing advances may be fully amortizing to the maturity date, or may have a balloon payment due at maturity.
- Overnight Advances. These advances are used primarily to fund the short-term liquidity needs of borrowers. An overnight advance may automatically renew until the member pays down the advance, or it may mature on the next business day. Interest rates are set daily.

In addition to these advance products, the FHLBanks' advance programs may include products with embedded option features, such as interest-rate caps, floors, and call and put options, advances with non-standard interest-rate indices, forward starting advances, and advances with a combination of these, or other, features.

Advances to Housing Associates

The FHLBanks are permitted to provide advances to housing associates (including state and local housing authorities) that are approved mortgagees under Title II of the National Housing Act and that meet the following requirements:

- is a chartered institution having succession;
- is subject to the inspection and supervision of some governmental agency;
- its principal activity in the mortgage field consists of lending its own funds;
- its financial condition is such that advances may be safely made to the housing associate; and
- if the non-member is a state housing financing agency (as defined by FHFA regulation), it shall provide satisfactory evidence that it functions as a source of mortgage loan financing in that state or for the Indian or Alaskan Native community.

Housing associates are not subject to certain provisions applicable to members under the FHLBank Act. For example, they are not required or permitted to purchase capital stock in an FHLBank. However, the regulatory lending requirements that apply to members generally also apply to housing associates. Advances to housing associates were \$995 million and \$895 million at December 31, 2018 and 2017.

Standby Letters of Credit

An FHLBank issues standby letters of credit on behalf of its members to support certain obligations of the members (or member's customers) to third-party beneficiaries. These standby letters of credit are subject to the same collateralization and borrowing limits that are applicable to advances. Standby letters of credit may be offered to assist members in facilitating residential housing finance, community lending, and asset-liability management, and to provide liquidity. In particular, members often use standby letters of credit as collateral for deposits from federal, state, and local government agencies. Standby letters of credit are executed for members for a fee. If an FHLBank is required to make a payment for a beneficiary's draw, the member either reimburses the FHLBank for the amount drawn or, subject to the applicable FHLBank's discretion, the amount drawn may be converted into a collateralized advance to the member. The notional amounts of outstanding standby letters of credit were \$165.8 billion and \$149.4 billion at December 31, 2018 and 2017.

Investments

The FHLBanks maintain investment portfolios for liquidity purposes and to generate additional earnings. The income from these investment portfolios also bolsters the FHLBanks' capacity to support affordable housing and community investment. Investments were \$306.8 billion and \$307.3 billion, and both represented 27.8% of the FHLBanks' combined total assets, at December 31, 2018 and 2017.

The FHLBanks maintain short-term investment portfolios, the proceeds of which may provide funds to meet the credit needs of their members and to maintain liquidity. Within the portfolio of short-term investments, the FHLBanks have unsecured credit exposure on certain investments. These portfolios may include:

- interest-bearing deposits;
- securities purchased under agreements to resell;
- federal funds sold;
- certificates of deposit;
- U.S. obligations; and
- GSE obligations.

The FHLBanks maintain long-term investment portfolios as an additional source of liquidity and to earn interest income. These investments generally provide the FHLBanks with higher returns than those available on short-term investments. These portfolios may include:

- U.S. obligations;
- GSE obligations;
- Agency obligations; and
- Other MBS and ABS.

FHFA regulations prohibit the FHLBanks from investing in certain types of securities and limit the FHLBanks' investment in mortgage-backed securities (MBS) and asset-backed securities (ABS). (See [Financial Discussion and Analysis - Risk Management - Credit Risk - Investments](#) and [Financial Discussion and Analysis - Combined Financial Condition - Investments](#) for information on these restrictions and limitations.)

Mortgage Loans

An FHLBank may have programs to purchase mortgage loans from members or housing associates called participating financial institutions (PFIs). The primary programs are the Mortgage Purchase Program (MPP) and the Mortgage Partnership Finance® (MPF®) Program ("Mortgage Partnership Finance," "MPF," and "MPF Xtra" are registered trademarks of the FHLBank of Chicago). Through the MPP and MPF Program, an FHLBank invests principally in qualifying 15-year to 30-year conventional and government-guaranteed or -insured fixed-rate mortgage loans and participations in pools of these mortgage loans, secured by one-to-four family residential properties. Government-guaranteed or -insured mortgage loans are guaranteed or insured by the Federal Housing Administration, the Department of Veterans Affairs, the Rural Housing Service of the Department of Agriculture, or the U.S. Department of Housing and Urban Development (HUD). Mortgage loans held for portfolio were \$62.5 billion and \$53.8 billion, and represented 5.7% and 4.9% of the FHLBanks' combined total assets, at December 31, 2018 and 2017.

An FHLBank may purchase mortgage loans to support the FHLBank's housing mission, provide an additional source of liquidity to its members, diversify its investments, and generate additional earnings. As such, these programs serve as a secondary mortgage structure for those FHLBank members originating mortgage loans that they choose to sell into the secondary mortgage market rather than hold in their own loan portfolios.

Under the MPP and MPF Program, each FHLBank manages the interest-rate risk, prepayment option risk, and liquidity risk of the fixed-rate mortgage loans in which it holds an interest, while the PFI manages the origination and servicing activities. For conventional mortgage loans held in an FHLBank's portfolio, the FHLBank and the PFI share in the credit risk pursuant to a master commitment because the PFI is required to provide a measure of credit-loss protection to the FHLBank(s) holding interests in loans generated by the PFI. For government-guaranteed or -insured mortgage loans, the servicer provides and

maintains a guarantee or insurance from the applicable government agency. The servicer is responsible for compliance with all government agency requirements and for obtaining the benefit of the applicable guarantee or insurance with respect to defaulted government-guaranteed or -insured mortgage loans. Any losses incurred on these government-guaranteed or -insured mortgage loans that are not recovered from the issuer or the guarantor are absorbed by the servicer. (See [Note 10 - Allowance for Credit Losses - Credit Enhancements](#) to the accompanying combined financial statements and [Financial Discussion and Analysis - Risk Management - Credit Risk - Mortgage Loans Held for Portfolio](#) for a detailed discussion of the credit enhancement and risk sharing arrangements and loan product information for these programs.)

MPP

Each FHLBank participating in the MPP (MPP FHLBank) may acquire mortgage loans from its approved PFIs, which can also be third-party servicers for the FHLBank's MPP. Each MPP FHLBank is responsible for operating its own program, including the marketing and funding of acquired loans, and establishing the loan origination, underwriting, and servicing criteria of the loans. An MPP FHLBank neither services the acquired loans, nor owns any servicing rights. However, an MPP FHLBank must approve any servicer, including a member-servicer, and any transfers of servicing to third parties. Each MPP FHLBank has engaged BNY Mellon as the master servicer for its MPP.

MPF Program

Each FHLBank participating in the MPF Program (MPF FHLBank) may acquire or participate in all or a portion of the acquired mortgage loans from a PFI of another MPF FHLBank. The FHLBank of Chicago acts as the administrator of the MPF Program and provides programmatic and operational support to the MPF FHLBanks and each of their PFIs. In this regard, the FHLBank of Chicago has engaged a vendor for master servicing, Wells Fargo Bank, National Association, which monitors the PFIs' compliance with the MPF Program requirements and issues periodic reports to the FHLBank of Chicago. As of December 31, 2018, there were four MPF Program portfolio products (MPF Original, MPF 125, MPF 35, and MPF Government) in which an MPF FHLBank purchases loans that have been acquired or have already been closed by the PFI with its own funds.

The FHLBank of Chicago purchases eligible MPF loans from PFIs located in its district, and in other MPF FHLBank districts, under the MPF Xtra, the MPF Direct, and the MPF Government MBS products. PFIs are not required to provide credit enhancement and do not receive credit enhancement fees in connection with these three off-balance sheet mortgage loan products. Upon purchase from PFIs, the FHLBank of Chicago concurrently sells mortgage loans to Fannie Mae under the MPF Xtra product and to third-party investors under the MPF Direct product. Under the MPF Government MBS product, the FHLBank of Chicago aggregates government-guaranteed or -insured mortgage loans, which are classified as mortgage loans held for sale for a short period of time until securitized as Ginnie Mae MBS.

Consolidated Obligations

Consolidated obligations consist of consolidated bonds and consolidated discount notes, which are joint and several obligations of all FHLBanks, issued through the Office of Finance. Consolidated obligations are the principal funding source used by the FHLBanks to make advances and to purchase mortgage loans and investments. Consolidated obligations outstanding were \$1,029.5 billion and \$1,033.1 billion, and represented 98.6% and 98.7% of the FHLBanks' total liabilities, at December 31, 2018 and 2017.

The debt structures and maturities of consolidated obligations issued by the FHLBanks are generally driven by market conditions, cost of specific debt issuance, or desired maturity terms. All consolidated obligations are issued through the Office of Finance on behalf of the FHLBanks. The Office of Finance can issue consolidated obligations only when an FHLBank provides a request for and agrees to accept the funds. An FHLBank is generally prohibited by regulation from purchasing, directly or indirectly, securities issued through the Office of Finance upon their initial issuance. The FHFA and the Secretary of the Treasury have oversight over the issuance of FHLBank debt.

The capital markets have generally considered the FHLBanks' consolidated obligations to be agency debt. As a result, although the U.S. government does not guarantee the FHLBanks' debt securities, the FHLBanks have traditionally had ready access to funding at relatively favorable rates. The FHLBanks' ability to access the capital markets through the issuance of consolidated obligations, using a variety of debt structures and maturities, allows the FHLBanks to manage their balance sheets effectively and efficiently.

Credit Ratings. At March 15, 2019, consolidated obligations are rated Aaa/P-1 by Moody's Investors Service (Moody's) and AA+/A-1+ by S&P Global Ratings (S&P). These ratings reflect the FHLBanks' status as GSEs and indicate that these rating agencies believe the FHLBanks have the capacity to meet their commitments to pay principal and interest on consolidated obligations. The FHLBanks' consolidated obligations have historically received the same credit rating as the government bond credit rating of the United States, even though the consolidated obligations are not obligations of the United States. Moody's, S&P, or other rating organizations could downgrade or upgrade the credit rating of the U.S. government and GSEs, including the FHLBanks and their consolidated obligations. Investors should note that a rating issued by a nationally recognized statistical rating organization is not a recommendation to buy, sell, or hold securities, and that the ratings may be revised or withdrawn by a nationally recognized statistical rating organization at any time. Investors should evaluate the rating of each nationally recognized statistical rating organization independently. Investors should not take the historical or current ratings of the FHLBanks and their consolidated obligations as an indication of future ratings for FHLBanks and their consolidated obligations.

Interest Rates. Consolidated obligations can be issued with either fixed-rate coupon payment terms or variable-rate coupon payment terms that are indexed primarily to LIBOR. The FHLBanks may issue variable-rate consolidated bonds and simultaneously execute interest-rate swaps to hedge the basis risk of the variable-rate debt. (See [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements.)

Derivative Transactions. To meet the specific needs of certain investors in consolidated obligations, both fixed-rate and variable-rate consolidated bonds may contain features that result in complex coupon payment terms and call options. When these consolidated bonds are issued, the FHLBanks typically enter into derivatives containing offsetting features that effectively convert the terms of these consolidated bonds to better match the interest-rate risk management objectives of the issuing FHLBank(s). Each FHLBank transacts most of its derivatives with large banks and major broker-dealers. Some of these banks and broker-dealers, or their affiliates, may buy, sell, and distribute consolidated obligations.

Other Transactions and Services. Certain securities dealers and banks or their affiliates enter into other transactions with, and perform other services for, the FHLBanks. These services include the purchase and sale of investment securities. In some cases, some or all of the net proceeds from an issue of consolidated obligations may be loaned to a member that is affiliated with the securities dealer involved in underwriting that issue.

Joint and Several Liability. Although each FHLBank is primarily liable for its portion of consolidated obligations (i.e., those issued on its behalf), each FHLBank is also jointly and severally liable with the other FHLBanks for the payment of principal and interest on all consolidated obligations of each of the FHLBanks. The FHFA, at its discretion, may require any FHLBank to make principal or interest payments due on any consolidated obligation whether or not the consolidated obligation represents a primary liability of that FHLBank. Although an FHLBank has never paid the principal or interest payments due on a consolidated obligation on behalf of another FHLBank, if that event should occur, FHFA regulations provide that the paying FHLBank is entitled to reimbursement from the FHLBank that is primarily liable for that consolidated obligation for any payments and other associated costs, including interest to be determined by the FHFA. If, however, that FHLBank is unable to satisfy its repayment obligations, then the FHFA may allocate the outstanding liabilities of that FHLBank among the remaining FHLBanks on a pro-rata basis in proportion to each FHLBank's participation in all consolidated obligations outstanding or in any other manner it may determine to ensure that the FHLBanks operate in a safe and sound manner.

Regulatory Requirements. FHFA regulations require that each FHLBank maintain the following types of assets, free from any lien or pledge, in an amount at least equal to that FHLBank's participation in all consolidated obligations outstanding:

- cash;
- obligations of, or fully guaranteed by, the United States;
- secured advances;
- mortgages, which have any guaranty, insurance, or commitment from the United States or any agency of the United States; and
- investments described in Section 16(a) of the FHLBank Act (i.e., securities that a fiduciary or trust fund may purchase under the laws of the state in which the FHLBank is located).

Any assets subject to a lien or pledge for the benefit of the holders of any issue of consolidated obligations are treated as if they were free from lien or pledge for purposes of compliance with these regulations. In addition, each FHLBank must adhere to the leverage limits set by the FHLBank Act and the regulatory limits set by the FHFA. At December 31, 2018, each FHLBank was in compliance with these requirements.

Consolidated Discount Notes

Investor demand for short-term securities (one year or less) may be met through FHLBank discount note programs. Discount notes are offered to the market through the discount note window or through regularly scheduled competitive auctions. Discount notes outstanding were \$426.0 billion and \$391.5 billion, and represented 41.4% and 37.9% of total consolidated obligations outstanding, at December 31, 2018 and 2017.

Discount Note Window. On a daily basis, through the discount note window, FHLBanks may request that specific amounts of consolidated discount notes with specific maturity dates be offered by the Office of Finance for sale through approved dealers, or directly to approved institutional investors without the use of a dealer of consolidated obligations. Discount notes issued through the discount note window are generally available with same day, next business day, and two or more business days settlement. Consolidated discount notes have a maturity range of one day to one year, are generally issued below face value, and mature at face value. Rates and maturity categories for the discount note window are set frequently and announced to dealers of consolidated obligations on Reuters and through other major wire services. The Office of Finance commits to issue consolidated discount notes on behalf of the requesting FHLBanks after dealers submit orders for the specific consolidated discount notes offered for sale. The FHLBanks receive funding based on the time of their request, the rate requested for issuance, the trade date, the settlement date, and the maturity date. However, an FHLBank may receive less than requested funding (or may not receive any funding) because of investor demand and competing FHLBank requests for the particular funding that the FHLBank is requesting.

Auctions. Twice weekly, one or more of the FHLBanks may also request that specific amounts of consolidated discount notes with fixed maturities of 4, 8, 13, and 26 weeks be offered by the Office of Finance through single-price (Dutch) auctions conducted with securities dealers in the consolidated discount note selling group. Issuance is contingent on FHLBank demand for funding with these terms. Discount notes issued through the auction are available with next business day settlement. Auction sizes and maturity categories are announced to dealers of consolidated obligations during the auction process on Reuters and through other major wire services. The consolidated discount notes offered for sale through Dutch auctions are not subject to a limit on the maximum costs the FHLBanks are willing to pay. Bids will be accepted from the lowest bid rate until the auction size is met, and all winning bids will be awarded at the highest bid rate accepted. The FHLBanks receive funding based on their requests at the highest bid rate accepted. If the bids submitted are less than the total of the FHLBanks' requests, an FHLBank receives funding based on that FHLBank's regulatory capital relative to the regulatory capital of other FHLBanks offering consolidated discount notes.

Consolidated Bonds

Consolidated bonds may be issued to raise short-, intermediate-, or long-term funds for the FHLBanks. Consolidated bonds generally carry fixed- or variable-rate payment terms and have maturities ranging from three months to 30 years. They can be issued and distributed through negotiated or competitive bidding (auction) transactions with approved dealers or directly to approved institutional investors without the use of a dealer of consolidated obligations. Consolidated bonds outstanding were \$603.5 billion and \$641.6 billion, and represented 58.6% and 62.1% of total consolidated obligations outstanding, at December 31, 2018 and 2017.

Negotiated Transactions

Reverse Inquiry. The FHLBanks issue fixed-rate noncallable (bullet), floating rate, callable, step-up/step-down, and other types of bonds through negotiated bond transactions. These transactions are flexible and can be investor-customized with different interest-rate characteristics, terms, and, for bonds issued under the Global Debt Program, currencies. Dealers of consolidated obligations contact the Office of Finance or the FHLBanks directly if there is a bond structure they need to meet investor demand.

Mandated Global. The FHLBanks issue large, liquid bullet bonds through the Global Debt Program (mandated global bullets) to expand their pool of investors, while diversifying their funding sources. Mandated global bullets are issued through a formal dealer syndicate following pre-announced calendar issuance dates. The FHLBanks and the Office of Finance maintain a debt issuance process for scheduled issuance of mandated global bullets. As part of this process, management from each FHLBank will determine and communicate a firm commitment to the Office of Finance for an amount of scheduled mandated global bullet debt to be issued on its behalf. If the FHLBanks' commitments do not meet the minimum debt issue size, each FHLBank

receives an allocation of proceeds equal to either the larger of the FHLBank's commitment or the ratio of the individual FHLBank's regulatory capital to total regulatory capital of all of the FHLBanks. If the FHLBanks' commitments exceed the minimum debt issue size, then the proceeds are allocated based on relative regulatory capital of the FHLBanks, with the allocation limited to either the lesser of the allocation amount or the actual commitment amount. The FHLBanks can, however, pass on any scheduled calendar slot and decline to issue any mandated global bullet consolidated bonds upon agreement of at least eight of the FHLBanks.

Competitive Bidding (Auction) Transactions

TAP Issue Program. The FHLBanks use the TAP Issue Program to issue fixed-rate, noncallable bonds. This program uses consolidated bonds with specific maturities that may be reopened daily through a single-price (Dutch) award method through a designated TAP bidding group. The goal of the TAP Issue Program is to aggregate frequent smaller fixed-rate funding needs into a larger bond issue that may have greater market liquidity.

Callables. American-style, and potentially other callable bonds, may be auctioned through the callable bidding group.

Mandated Global Reopenings. Individual mandated global bullet bonds may be reopened on any pre-announced calendar issuance date through a single-price (Dutch) award method through a designated bidding group.

Deposits

The FHLBanks offer demand and overnight deposit programs to members and qualifying non-members. In addition, certain FHLBanks offer short-term interest-bearing deposit programs to members, and in certain cases, qualifying non-members. The FHLBank Act allows each FHLBank to accept deposits from:

- its members;
- any institution for which it is providing correspondent services;
- other FHLBanks; and
- other U.S. government instrumentalities.

Deposit programs, although not as significant as other funding sources, provide some of the funding resources for the FHLBanks including funding for advances, mortgage loans, and investments. At the same time, they offer members a low-risk earning asset that satisfies their regulatory liquidity requirements. Deposits were \$7.6 billion and \$7.8 billion, and represented 0.7% of the FHLBanks' total liabilities, at both December 31, 2018 and 2017.

Capital, Capital Rules, and Dividends

Capital Structure

Each FHLBank is permitted to issue one or two classes of capital stock, each with sub-classes. Class A capital stock (Class A stock) is redeemable on six-months written notice from a member and Class B capital stock (Class B stock) is redeemable on five-years written notice from a member. If a member withdraws its membership from an FHLBank, it may not acquire shares of any FHLBank for five years after the date on which its divestiture of capital stock is completed. This restriction does not apply if the member is transferring its membership from one FHLBank to another FHLBank on an uninterrupted basis. The FHFA's regulation that implements a capital structure for the FHLBanks also establishes risk-based and leverage capital requirements for the FHLBanks. (See [Note 16 - Capital](#) to the accompanying combined financial statements.)

Capital Adequacy

Each FHLBank is required to ensure that it operates in a safe and sound manner, with sufficient permanent capital and reserves to manage risks that arise in the operations and management of that FHLBank. Each FHLBank is subject to these three regulatory capital requirements: risk-based capital, total regulatory capital, and leverage capital. The FHFA may require an FHLBank to maintain greater minimum capital levels than are required based on FHFA rules and regulations. Each FHLBank was in compliance with FHFA regulatory capital requirements at December 31, 2018.

Risk-Based Capital. Permanent capital for each FHLBank is defined as the amount paid-in for Class B stock, plus the amount of an FHLBank's retained earnings, as determined in accordance with GAAP. Mandatorily redeemable capital stock is considered capital for regulatory purposes. Each FHLBank must maintain at all times permanent capital in an amount at least equal to the sum of its credit risk, market risk, and operations risk capital requirements, all of which are calculated in accordance with the rules and regulations of the FHFA.

Credit Risk. Each FHLBank's credit risk capital must at all times equal the sum of its credit risk capital charges for all assets, off-balance sheet items, and derivative contracts. These computations are based on, among other requirements, the credit risk percentages assigned to each item as required by the FHFA.

Market Risk. Each FHLBank's market risk capital must at all times equal the sum of the market value of its portfolio at risk from market movements, primarily interest rates, that could occur during times of market stress plus the amount, if any, by which the current market value of its total capital is less than 85% of its book value of total capital. Each FHLBank must calculate the market value of its portfolio at risk and the current market value of its total capital by using either an internal market risk model or internal cash flow model approved by the FHFA. Although each FHLBank models its own market risk, the FHFA has reviewed and approved the modeling approach and underlying assumptions used by each FHLBank and reviews these modeling approaches on an ongoing basis.

Operations Risk. Each FHLBank's operations risk capital must at all times equal 30% of the sum of its credit risk and market risk capital requirements. The FHFA can approve a reduction in this percentage if an FHLBank meets alternative requirements.

Total Regulatory Capital. Each FHLBank must maintain at all times a total regulatory capital-to-assets ratio of at least four percent. Capital for regulatory capital adequacy purposes is defined as the sum of each FHLBank's:

- permanent capital;
- amounts paid-in for Class A stock;
- general loss allowance, if consistent with GAAP and not established for specific assets; and
- other amounts from sources determined by the FHFA as available to absorb losses.

Leverage Capital. Each FHLBank must maintain at all times a leverage capital-to-assets ratio of at least five percent. Leverage capital is defined as the sum of permanent capital weighted 1.5 times and all other capital without a weighting factor.

Summary of Individual FHLBank's Capital Plan Structure

Single Class of Class B Stock. Each of the FHLBanks of Cincinnati and San Francisco offers a single class of Class B stock. Each of these FHLBanks requires its members to maintain a membership and/or activity-based stock balance based on the terms of the respective FHLBank's capital plan.

Sub-Classes of Class B Stock. Each of the FHLBanks of New York, Pittsburgh, Atlanta, Indianapolis, Chicago, Des Moines, and Dallas offers two sub-classes of Class B stock, which represent either membership or activity-based stock requirements based on the terms of the respective FHLBank's capital plan. The two sub-class Class B stockholders may or may not have the same voting rights and dividend rates, which are based on the terms of the respective FHLBank's capital plan.

Class A and Class B Stock. Each of the FHLBanks of Boston and Topeka may offer a single series of Class A stock and a single series of Class B stock, although the FHLBank of Boston has not issued, and does not intend to issue, any Class A stock at this time. Usage of Class A stock and Class B stock to meet membership and activity-based requirements, as well as dividend rates and voting rights for each class of stock, are determined based on the terms of the respective FHLBank's capital plan.

Capital Classification Determination

In accordance with the Housing and Economic Recovery Act of 2008, as amended (Housing Act), the FHFA defines four capital classifications for the FHLBanks: adequately capitalized, undercapitalized, significantly undercapitalized, and critically undercapitalized. It also defines the prompt corrective action provisions that apply to an FHLBank that is deemed to be not adequately capitalized. The FHFA determines each FHLBank's capital classification on at least a quarterly basis. If an FHLBank is determined to be other than adequately capitalized, that FHLBank becomes subject to additional supervisory authority by the FHFA. Before implementing a reclassification, the Director of the FHFA is required to provide that FHLBank with written notice of the proposed action and an opportunity to submit a response. Each FHLBank is classified by the FHFA as adequately capitalized as of the date of the FHFA's most recent notification to each FHLBank.

Mandatorily Redeemable Capital Stock

An FHLBank generally reclassifies capital stock subject to redemption from capital to a mandatorily redeemable capital stock liability upon expiration of a grace period, if applicable, after a member exercises a written redemption right, or gives notice of intent to withdraw from membership, or attains non-member status by merger or acquisition, relocation, charter termination, or involuntary termination of membership. Shares of capital stock meeting these conditions are reclassified to mandatorily redeemable capital stock at fair value. The fair value of capital stock subject to mandatory redemption is generally equal to its par value as indicated by contemporaneous member purchases and sales at par value. Fair value also includes an estimated dividend earned at the time of reclassification from capital to a liability, until such amount is paid, and any subsequently declared dividend. Dividends related to capital stock classified as mandatorily redeemable capital stock are accrued at the expected dividend rate and reported as interest expense on the Combined Statement of Income.

Statutory and Regulatory Restrictions on Capital Stock Redemptions and Repurchases

Each class of FHLBank stock is considered puttable by the member, and an FHLBank may repurchase, at its sole discretion, any member's stock investments that exceed the required minimum amount. However, there are significant statutory and regulatory restrictions on the obligation to redeem, or right to repurchase, the outstanding stock. As a result, whether or not a member may have its capital stock in an FHLBank repurchased (at an FHLBank's discretion at any time before the end of the redemption period) or redeemed (at a member's request, completed at the end of a redemption period) will depend on whether the applicable FHLBank is in compliance with the following restrictions.

- An FHLBank may not redeem or repurchase any capital stock if, following such redemption or repurchase, the FHLBank would fail to satisfy any of its minimum capital requirements. No FHLBank stock may be redeemed or repurchased if the FHLBank becomes undercapitalized.
- An FHLBank may not redeem or repurchase any capital stock without approval of the FHFA if either its board of directors or the FHFA determines that it has incurred, or is likely to incur, losses resulting, or expected to result, in a charge against capital while such charges are continuing or expected to continue.
- An FHLBank's board of directors can suspend redemptions of stock if it finds that redemptions would result in the FHLBank failing to maintain adequate capital considering risks faced by the FHLBank or would otherwise prevent the FHLBank from operating in a safe and sound manner.

These restrictions apply even if an FHLBank is in compliance with its minimum capital requirements. As a result, repurchases or redemptions of a member's capital stock in an FHLBank may only happen when the FHLBank is in compliance with its three regulatory capital requirements (risk-based capital, total regulatory capital, and leverage capital). In addition, an individual FHLBank may, at its discretion, institute a higher capital requirement to meet internally-established thresholds or to address supervisory matters, limit dividend payments, or restrict excess capital stock repurchases as part of its retained earnings policies.

Additionally, an FHLBank may not redeem or repurchase shares of capital stock from any of its members if:

- the principal or interest due on any consolidated obligation has not been paid in full when due;
- the FHLBank fails to certify in writing to the FHFA that it will remain in compliance with its liquidity requirements and will remain capable of making full and timely payment of all of its current obligations;
- the FHLBank notifies the FHFA that it cannot provide the foregoing certification, projects it will fail to comply with statutory or regulatory liquidity requirements, or will be unable to timely and fully meet all of its obligations; or
- the FHLBank actually fails to comply with statutory or regulatory liquidity requirements, or to timely and fully meet all of its current obligations, or enters or negotiates to enter into an agreement with one or more FHLBanks to obtain financial assistance to meet its current obligations.

If an FHLBank is liquidated, after payment in full to the FHLBank's creditors, the FHLBank's stockholders will be entitled to receive the par value of their capital stock. The rights of the Class A stockholders and the Class B stockholders in connection with a liquidation, merger, or other consolidation with another FHLBank shall be determined in accordance with the capital plan of the affected FHLBank, subject to any terms and conditions imposed by the FHFA.

In addition to possessing the authority to suspend stock redemptions, in certain situations, an FHLBank's board of directors has the right to call for the FHLBank's members, as a condition of membership, to make additional capital stock purchases as needed to satisfy statutory and regulatory capital requirements.

Each FHLBank's board of directors has a statutory obligation to review and adjust member capital stock requirements in order to comply with the FHLBank's minimum capital requirements, and each member must comply promptly with any such requirement. However, in certain scenarios, a member could reduce its outstanding business with an FHLBank as an alternative to purchasing stock.

If, during the period between receipt of a stock redemption notification from a member and the actual redemption (which may last indefinitely if an FHLBank is undercapitalized), an FHLBank is either liquidated or forced to merge with another FHLBank, the redemption value of the stock will be established after the settlement of all senior claims. Generally, no claims would be subordinated to the rights of FHLBank stockholders.

Dividends and Retained Earnings

According to FHFA regulations and the terms of the Joint Capital Enhancement Agreement, as amended (Capital Agreement), an FHLBank's board of directors may declare and pay dividends, in either cash or capital stock, from unrestricted retained earnings. An FHLBank is prohibited from paying a dividend if it has failed to meet any capital requirements or would fail to meet any such requirements after paying the dividend. FHFA regulations also limit the ability of an FHLBank to create excess capital stock under certain circumstances. Excess capital stock is defined as the amount of stock held by a member (or former member) in excess of that institution's minimum stock ownership requirement. An FHLBank may not pay dividends in the form of capital stock or issue new excess capital stock to members if that FHLBank's excess capital stock exceeds one percent of its total assets, or if the issuance of excess capital stock would cause that FHLBank's excess capital stock to exceed one percent of its total assets.

The Capital Agreement is intended to enhance the capital position of each FHLBank. The Capital Agreement provides that each FHLBank will allocate 20% of its net income each quarter to a separate restricted retained earnings account. (See [Note 16 - Capital](#) - *Restricted Retained Earnings* to the accompanying combined financial statements.)

Use of Derivatives

The use of derivatives is an integral part of each FHLBank's financial and risk management strategy to reduce identified risks inherent in its lending, investing, and funding activities. The FHLBanks are exposed to interest-rate risk primarily from the effect of interest rate changes on their interest-earning assets and their interest-bearing liabilities that finance these assets. To mitigate the risk of loss, each FHLBank has established policies and procedures, which include guidelines on the amount of exposure to interest rate changes it is willing to accept. In addition, each FHLBank monitors the risk to its interest income, net interest margin, and average maturity of interest-earning assets and interest-bearing liabilities. FHFA regulation and each FHLBank's risk management policy prohibit the speculative use of derivative instruments and limit credit risk arising from these instruments. The FHLBanks primarily use the following derivative instruments: interest-rate swaps, options, swaptions, interest-rate cap and floor agreements, and futures and forward contracts. The most common ways in which an FHLBank uses derivatives are to:

- reduce the interest-rate sensitivity and repricing gaps of assets and liabilities;
- preserve a favorable interest-rate spread between the yield of an asset (e.g., an advance) and the cost of the related liability (e.g., the consolidated obligation used to fund the advance);
- mitigate the adverse earnings effects of the shortening or extension of certain assets (e.g., advances or mortgage assets) and liabilities;
- manage embedded options in assets and liabilities;
- reduce funding costs by combining a derivative with a consolidated obligation because the cost of a combined funding structure can be lower than the cost of a comparable consolidated obligation; and
- protect the value of existing asset or liability positions or of anticipated transactions.

Each FHLBank transacts most of its derivatives with large banks and major broker-dealers. Some of these banks and broker-dealers, or their affiliates, buy, sell, and distribute consolidated obligations. An FHLBank may enter into derivative transactions concurrently with the issuance of consolidated obligations. This strategy of issuing consolidated obligations while simultaneously entering into derivatives enables an FHLBank to offer a wider range of attractively-priced advances to its members and may allow an FHLBank to reduce its funding costs and manage its interest-rate risk. The continued attractiveness of this strategy depends on the yield relationship between the consolidated obligations and the derivatives market. If conditions change, an FHLBank may alter the types or terms of the consolidated obligations that it issues. (See [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements, [Financial Discussion and Analysis - Risk Management - Credit Risk - Derivative Counterparties](#) for information on credit exposure on derivatives, and [Quantitative and Qualitative Disclosures about Market Risk - Use of Derivatives to Manage Interest-Rate Risk](#) for information on the use of derivatives to manage interest-rate risk.)

Audits and Examinations

FHLBanks' Regulator

The Federal Housing Finance Agency (FHFA), an independent agency in the executive branch of the U.S. government, supervises and regulates the FHLBanks and the Office of Finance. The FHFA has regulatory authority over FHLBank matters such as: board of director composition, executive compensation, risk-based capital standards and prompt corrective action enforcement provisions, membership eligibility, and low-income housing goals. The FHFA's mission, with respect to the FHLBanks, is to ensure that the FHLBanks operate in a safe and sound manner so that the FHLBanks serve as a reliable source of liquidity and funding for housing finance and community investment. (See [Note 16 - Capital](#) to the accompanying combined financial statements and [Financial Discussion and Analysis - Legislative and Regulatory Developments](#) for more information on the FHFA's current and proposed regulatory requirements.)

The FHFA is headed by a Director appointed by the President of the United States, by and with the advice and consent of the U.S. Senate, to serve a five-year term. The Director of the FHFA must have a demonstrated understanding of financial management or oversight, and have a demonstrated understanding of capital markets, including the mortgage securities markets and housing finance.

The Federal Housing Finance Oversight Board advises the Director of the FHFA about overall strategies and policies for executing the duties of the Director of the FHFA. The Federal Housing Finance Oversight Board is comprised of four board members: the Secretary of the Treasury, the Secretary of HUD, the Chairman of the SEC, and the Director of the FHFA, who serves as the chairman of the board.

The FHFA is financed by assessments from the entities it regulates, including the FHLBanks. No tax dollars or other government appropriations are directed to support the operations of the FHFA or the FHLBanks. To assess the safety and soundness of the FHLBanks, the FHFA conducts annual on-site examinations, interim on-site visits, and off-site analyses of each FHLBank and the Office of Finance. The FHFA is required to present the findings of the agency's annual examinations of the FHLBanks and the Office of Finance to the U.S. Congress. In addition, each FHLBank is required to submit monthly financial information on its financial condition and results of operations to the FHFA.

The principal duties of the Director of the FHFA, with respect to the FHLBanks, are the following:

- to oversee the prudential operations of the FHLBanks;
- to ensure that each FHLBank operates in a safe and sound manner, including maintenance of adequate capital and internal controls;
- to ensure that the operations and activities of each FHLBank foster liquid, efficient, competitive, and resilient national housing finance markets (including activities relating to mortgages on housing for low- and moderate-income families involving a reasonable economic return that may be less than the return earned on other activities);
- to ensure that each FHLBank complies with the applicable rules, regulations, guidelines, and orders;
- to ensure that each FHLBank carries out its statutory mission; and
- to ensure that the activities of each FHLBank and the manner in which each FHLBank is operated are consistent with the public interest.

The FHFA is located at 400 7th Street, SW, Washington, D.C. 20219, and its web site is fhfa.gov. This web site is provided as a matter of convenience only, and its contents are not made part of or incorporated by reference into this report.

Government Corporation Control Act

The Government Corporation Control Act provides that, before a government corporation issues and offers obligations to the public, the Secretary of the Treasury shall prescribe the form, denomination, maturity, interest rate, and conditions to which the obligations will be subject; the method and time issued; and the selling price. The FHLBanks meet the definition of government corporations under the Government Corporation Control Act.

Each FHLBank and the Office of Finance has an internal audit department and an audit committee of its board of directors. An independent registered public accounting firm audits the annual financial statements of each FHLBank and the annual combined financial statements of the FHLBanks prepared by the Office of Finance. The accounting firm conducts the audit of each FHLBank in accordance with the standards of the Public Company Accounting Oversight Board and the standards applicable to financial audits contained in Government Auditing Standards, issued by the Comptroller General of the United States. The accounting firm conducts the audit of the annual combined financial statements in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in Government Auditing Standards, issued by the Comptroller General of the United States.

Each FHLBank is required to submit an annual management report to the U.S. Congress, which includes its financial statements, the report of its independent accounting firm on its financial statements, a statement on its internal accounting and administrative control systems, and other comments and information necessary to inform the U.S. Congress about its operations and financial condition. In addition, each FHLBank is required to provide a copy of that report to the President of the United States, the Director of the Office of Management and Budget, and the Comptroller General of the United States.

The Government Corporation Control Act provides that the Comptroller General of the United States may review any audit of the financial statements of an FHLBank conducted by an independent registered public accounting firm and shall report to the U.S. Congress, the Director of the Office of Management and Budget, and the FHLBank under review regarding the results of the review and make any recommendation the Comptroller General of the United States considers appropriate. The Comptroller General of the United States may also audit the financial statements of an FHLBank at the discretion of the Comptroller General or at the request of a committee of the U.S. Congress.

Other Mission-Related Activities

In addition to supporting residential mortgage lending, one of the FHLBanks' core missions is to support community development through affordable housing and community investment. A number of programs administered by the FHLBanks are targeted to fulfill that mission. These programs have provided affordable homeownership and rental opportunities for hundreds of thousands of very low- to moderate-income families and have provided community lending, which is intended to strengthen communities across the United States and its territories.

Community Investment Cash Advance Programs

The FHLBanks offer funding to members, often at below-market interest rates and for long terms, through Community Investment Cash Advance programs. Under these programs, in general, each FHLBank:

- shall offer an Affordable Housing Program;
- shall offer a Community Investment Program;
- may offer a Rural Development Funding Program;
- may offer an Urban Development Funding Program; and
- may offer other programs that have been approved by the FHFA for targeted community lending.

Community Investment Cash Advance programs provide financing for projects that target affordable housing and certain economic development activities, including commercial, industrial, manufacturing, social service, infrastructure, and public facility projects and activities. Lending under these programs targets specific beneficiaries, which are determined by the geographical area in which a project is located, by the individuals who benefit from a project as employees or service recipients, or by projects that qualify as small businesses. Members may use the proceeds of Community Investment Cash Advance funding to finance targeted affordable housing and economic development projects through loan originations and participations, through lending to other lenders for eligible purposes, or by purchasing eligible mortgage-backed securities, mortgage revenue bonds, and low-income housing tax credits. Approved housing associates may also use certain Community Investment Cash Advance programs.

Affordable Housing Program (AHP). An AHP subsidizes the cost of owner-occupied housing provided that the household's income does not exceed 80% of the area median income, and in the case of rental housing, the household's income in at least 20% of the units does not exceed 50% of the area median income. The subsidy may be in the form of a grant or an advance with a reduced interest rate. AHP funds are primarily available through a competitive application program at each of the FHLBanks.

In an AHP competitive application program, members submit applications on behalf of one or more sponsors of eligible housing projects. Proposed AHP projects must meet certain eligibility requirements and are approved based on scoring guidelines established by each FHLBank in order to obtain funding under an AHP competitive application program. AHP funds are also awarded through a homeownership set-aside program. Under this type of program, an FHLBank may set aside annually up to the greater of \$4.5 million or 35% of its annual required AHP funds to assist low- and moderate-income households to purchase homes, provided that at least one-third of the FHLBank's set-aside allocation is made available to assist first-time home buyers. Members obtain AHP homeownership set-aside funds from the FHLBank and then use those funds as grants to eligible households. Set-aside funds may be used for down payment, closing costs, counseling, or rehabilitation assistance in connection with a household's purchase or rehabilitation of an owner-occupied unit. Each FHLBank sets its own maximum grant amount, which may not exceed \$15,000 per household. All of the FHLBanks have AHP homeownership set-aside programs.

If an FHLBank fails to use or commit the full amount it is required to contribute to an AHP in any year, then 90% of the unused or uncommitted amount shall be deposited by the FHLBank in an Affordable Housing Reserve Fund established and administered by the FHFA. The remaining 10% of the unused and uncommitted amount retained by that FHLBank should be fully used or committed by that FHLBank during the following year, and any remaining portion must be deposited in the Affordable Housing Reserve Fund. As of December 31, 2018, an Affordable Housing Reserve Fund has never been required to be established. AHP advances outstanding were \$185 million and \$193 million at December 31, 2018 and 2017.

Community Investment Program. The Community Investment Program for housing is a lending program that allows members to borrow at a discounted rate of interest, or to obtain letters of credit, from an FHLBank. An advance under the Community Investment Program for housing is offered to a member at an FHLBank's cost of funds plus reasonable administrative costs. If an FHLBank discounts the interest rates on these advances, then it may require the member to pass through this discount to its own borrowers.

Members use the Community Investment Program for housing advances to fund the purchase, construction, rehabilitation, refinancing, or pre-development financing of owner-occupied and rental housing for households whose income does not exceed 115% of the area median income. The FHLBanks had \$12.7 billion of Community Investment Program housing advances outstanding at both December 31, 2018 and 2017.

In addition to housing, this program can be used for commercial and economic development activities that benefit low- or moderate-income households with incomes at 80% or less of area median income and in neighborhoods where at least 51% of households are low- or moderate-income. The FHLBanks had \$284 million and \$286 million of Community Investment Program commercial and economic development advances outstanding at December 31, 2018 and 2017.

Rural Development Funding Program. The Rural Development Funding Program provides advances or grants for targeted community lending in rural areas for targeted beneficiaries with incomes at or below 115% of the area median income.

Urban Development Funding Program. The Urban Development Funding Program provides advances or grants for targeted community lending in urban areas for targeted beneficiaries with incomes at or below 100% of the area median income.

Community Investment Cash Advance Program Status and Funding. Currently, each FHLBank offers an AHP and a Community Investment Program and may offer either a Rural Development Funding Program, an Urban Development Funding Program, or both. Some FHLBanks also have other community lending programs designed to retain or create jobs, or to otherwise improve the economic status of communities. Each FHLBank has a Targeted Community Lending Plan that describes its program objectives for economic development.

For the year ended December 31, 2018, the FHLBanks have contributed \$404 million to the AHP and have disbursed \$354 million through the AHP. (See [Note 14 - Affordable Housing Program \(AHP\)](#) to the accompanying combined financial statements.)

For the year ended December 31, 2018, the FHLBanks have funded \$3.3 billion in Community Investment Program advances, including housing advances and economic development advances. For the year ended December 31, 2018, the FHLBanks have also funded \$3.2 billion in Community Investment Cash Advance economic development advances.

Community Support Program

To retain access to long-term credit from an FHLBank, each member that is subject to community support review is required to meet standards of community support activities, which it documents by submitting a Community Support Statement to the FHFA every two years. These standards take into account each member's performance under the Community Reinvestment Act of 1977, as amended, and the member's record of lending to first-time home buyers.

Competition

Advances

Demand for FHLBank advances is affected by, among other things, the availability and cost of other sources of liquidity available to FHLBank members, including deposits. Each FHLBank individually competes with its members' depositors as well as suppliers of secured and unsecured wholesale funding. These competitors may include investment banks, commercial banks, Federal Reserve Banks, and, in certain circumstances, one or more other FHLBanks when affiliates of their members are members of other FHLBanks. Both small and large FHLBank members typically have access to brokered deposits and repurchase agreements, each of which presents a competitive alternative to advances. Larger members also have greater access to other competitive sources of funding and asset and liability management facilitated by the domestic and global credit markets. These sources may include debt issued in the capital markets, interbank loans, interest-rate swaps, options, bank notes, and commercial paper. In addition, the FHLBanks' competitive environment may be impacted by various legislative and regulatory initiatives. (See [Risk Factors - Business Risk-Legislative and Regulatory](#) and [Risk Factors - Business Risk-Strategic](#) for more information.)

The availability of alternative funding sources to members can significantly influence the demand for FHLBank advances. This availability can vary as a result of a variety of factors, including:

- market conditions;
- products and structures available in the marketplace;
- member creditworthiness;
- availability of collateral; and
- new government programs and regulations or changes to existing ones.

Mortgage Loans

The FHLBanks' mortgage loan programs are subject to significant competition in purchasing conventional fixed-rate mortgage and government-guaranteed or -insured loans. The FHLBanks face competition in customer service, the prices paid for these assets, and ancillary services, such as automated underwriting. The most direct competition for mortgages comes from other housing GSEs that also purchase conventional fixed-rate mortgage loans, specifically Fannie Mae and Freddie Mac, which are the dominant purchasers of residential fixed-rate conventional mortgages. The FHLBanks primarily compete on the basis of transaction structure, price, products, and services offered.

Debt Issuance

The FHLBanks compete primarily with the U.S. Treasury, Fannie Mae, Freddie Mac, and other GSEs, as well as corporate, state and local, sovereign, sub-sovereign, and supranational entities, for funds raised through the issuance of unsecured debt in the domestic and global debt markets. If the supply of competing debt products increases without a corresponding increase in demand, or if certain investors change their view of investing in FHLBank debt, debt costs may rise, or less debt may be issued at the same cost. In addition, certain regulatory initiatives may adversely affect the availability and cost of funds raised through the issuance of certain types of unsecured debt. Although the available supply of funds has kept pace with the funding needs of the FHLBanks' members (as expressed through FHLBank debt issuance), investors should not expect that this will necessarily continue to be the case in the future.

The issuance of callable debt and the simultaneous execution of callable derivative transactions that mirror the debt issued has been an important source of competitive funding for the FHLBanks. As such, the availability of markets for callable debt and derivative transactions may be an important factor in determining the FHLBanks' relative cost of funds. There is considerable competition in the markets for callable debt and for derivative transactions with high credit quality entities. Investors should not expect that these markets will necessarily be available in the future based on their availability to date. (See [Risk Factors - Business Risk-Legislative and Regulatory](#) for more information.)

Tax Status and Assessments

The FHLBanks are exempt from all corporate federal, state, and local taxation, except for local real estate tax. However, by regulation, each FHLBank is required to contribute to its Affordable Housing Program the greater of 10% of its annual income subject to assessment, or the prorated sum required to ensure the aggregate contribution by the FHLBanks is no less than \$100 million for each year. Required Affordable Housing Program assessments were \$404 million, \$384 million, and \$392 million for the years ended December 31, 2018, 2017, and 2016. In addition to the required Affordable Housing Program assessment, an FHLBank's board of directors may elect to make voluntary contributions to the Affordable Housing Program. (See [Note 14 - Affordable Housing Program \(AHP\)](#) to the accompanying combined financial statements.)

Cash dividends received by FHLBank members from the FHLBanks are taxable to the members and do not benefit from the exclusion for corporate dividends received.

Office of Finance

The Office of Finance is a joint office of the FHLBanks established to:

- facilitate the issuance and servicing of all FHLBank consolidated obligations;
- prepare the quarterly and annual combined financial reports of the FHLBanks;
- function as the fiscal agent of the FHLBanks; and
- administer the Resolution Funding Corporation and the Financing Corporation, two tax-exempt government corporations created during the savings and loan crisis of the 1980s.

In addition, the Office of Finance performs research and serves as a source of information for the FHLBanks on capital markets developments; manages relationships with the rating agencies and the U.S. Treasury as they relate to the consolidated obligations; and performs various debt marketing activities, including investor presentations and conferences.

Pursuant to FHFA regulations, the Office of Finance, in conjunction with the FHLBanks, has adopted policies and procedures for consolidated obligations. These policies and procedures relate to, among other things, the frequency and timing of consolidated obligations issuance, issue size, minimum denomination, selling concessions, approved dealer qualifications and selection, issuance currency, coupon features, call or put features, and principal amortization features. The Office of Finance has responsibility for facilitating and approving the issuance of the consolidated obligations in accordance with these policies and procedures. In addition, the Office of Finance has the authority to redirect, limit, or prohibit the FHLBanks' requests to issue consolidated obligations if it determines that the proposed issuance is inconsistent with FHFA regulations or these policies or procedures. The FHFA requires consolidated obligations to be issued efficiently and at the lowest all-in funding costs over time, consistent with:

- prudent risk-management practices, prudential debt parameters, short- and long-term market conditions, and the FHLBanks' role as GSEs;
- maintaining reliable access to the short- and long-term capital markets; and
- positioning the issuance of debt to take advantage of current and future capital market opportunities.

Employees

Table 1 - Employees

FHLBank	December 31, 2018			December 31, 2017			Full-time Employees
	Full-time	Part-time	Total	Full-time	Part-time	Total	Change
Boston	197	1	198	201	1	202	(4)
New York	314	—	314	308	—	308	6
Pittsburgh	220	4	224	212	3	215	8
Atlanta	319	3	322	322	3	325	(3)
Cincinnati	225	4	229	226	—	226	(1)
Indianapolis	246	3	249	238	3	241	8
Chicago	462	6	468	447	13	460	15
Des Moines	355	7	362	317	6	323	38
Dallas	197	—	197	205	—	205	(8)
Topeka	231	3	234	229	5	234	2
San Francisco	279	3	282	284	3	287	(5)
Office of Finance	116	—	116	112	—	112	4
Total	3,161	34	3,195	3,101	37	3,138	60

RISK FACTORS

The following discussion summarizes risks and uncertainties facing the FHLBank System as they potentially affect investors in consolidated obligations. There may be other risks and uncertainties, including those discussed elsewhere in this Combined Financial Report, that are not described here in these risk factors. If any of these risks or uncertainties is realized, it could negatively affect an FHLBank's, and possibly the entire FHLBank System's, financial condition, results of operations, reputation, strategies, or prospects. As a result, there could be a reduction in the value of FHLBank membership or an adverse effect on an FHLBank's, or the entire FHLBank System's, ability to pay its obligations when due. (See each FHLBank's 2018 SEC Form 10-K under *Part I. Item 1A - Risk Factors* for a discussion regarding its risk factors.)

Business Risk-General

A prolonged downturn in the U.S. housing market, along with other economic conditions and related U.S. government monetary policies, could adversely affect the FHLBanks' business activities and results of operations.

The FHLBanks' businesses and results of operations are sensitive to the U.S. economy and the U.S. housing market. A prolonged period of slow growth in the U.S. economy, deterioration in general economic conditions, or a downturn in the housing markets could adversely affect FHLBanks' borrowers, particularly those whose businesses are concentrated in the mortgage industry. For example, if home prices decline or the unemployment rate increases, the value of collateral securing member credit to each FHLBank may decline, which could in turn increase the possibility of under-collateralization and the risk of loss if an FHLBank member defaults. Deterioration in the residential mortgage markets could also affect the value of the FHLBanks' mortgage-backed securities and mortgage loan portfolios, increasing the risk of loss due to additional credit impairment or allowance charges, as well as possible additional realized losses if the FHLBanks are forced to liquidate their assets.

Volatility and uncertainty in global economic and political conditions can also significantly affect U.S. economic conditions and financial markets. Negative trends in the global economy and political climate could influence, among other business activities, member borrowing activity and FHLBank investment patterns. Additionally, investors' negative perceptions of the state of the U.S. economy could lead to a decline in investor demand for consolidated obligations. Any of these factors could adversely affect the FHLBanks' business activities and results of operations.

In addition, the FHLBanks' businesses and results of operations are significantly affected by the monetary policies of the U.S. government and its agencies, including the Federal Reserve. The Federal Reserve Board's policies directly and indirectly influence the yield on interest-earning assets and the yield on interest-bearing liabilities and could adversely affect the demand for advances and for consolidated obligations. These policies could also adversely affect the FHLBanks through lower yields on their investments, higher yields on their debt, or both, which could then adversely affect the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis. In addition, the FHLBanks currently play a predominant role as lenders in the federal funds market; therefore, any disruption in the federal funds market or any related regulatory or policy change may adversely affect the FHLBanks' cash management activities, results of operations, and reputation.

Business Risk-Legislative and Regulatory

Changes in the legislative and regulatory environment could restrict the FHLBanks' business operations and negatively affect their results of operations and the value of FHLBank membership.

As GSEs, the FHLBanks are organized under the authority of the FHLBank Act and governed by U.S. federal laws and regulations as adopted and applied by the FHFA. Congress could amend the FHLBank Act or other statutes in ways that significantly affect the rights and obligations of the FHLBanks or the manner in which the FHLBanks carry out their mission and business operations. New or modified legislation enacted by Congress or changes in the statutory or regulatory requirements applied or imposed by the FHFA or other financial services regulators could result in, among other things: an increase in the FHLBanks' cost of funding and regulatory compliance; a change in membership or permissible business activities; additional capital and liquidity requirements; demand for advances or limitations on advances made to FHLBank members; or a decrease in the size, scope, or nature of the FHLBanks' lending, investment, or mortgage financing activities. These factors could restrict the FHLBanks' business operations and negatively affect the FHLBanks' results of operations and the value of FHLBank membership.

Additionally, potential legislative and regulatory changes governing or affecting the FHLBanks' members, investors, and dealers of consolidated obligations could adversely affect the business activities, financial condition, and results of operations of an FHLBank and the FHLBanks on a combined basis.

(See [Financial Discussion and Analysis - Legislative and Regulatory Developments](#) for more information about recent legislative and regulatory developments.)

Changes in the perception, regulation, or status of the GSEs and the related effect on debt issuance could reduce demand for, or increase the cost of, the FHLBanks' debt and adversely affect their financial condition and results of operations.

The FHLBanks are GSEs organized under the authority of the FHLBank Act and are authorized to issue debt securities to finance housing and community investments. In the past, negative announcements by any of the housing GSEs, concerning topics such as accounting problems, risk-management issues, or regulatory enforcement actions, have created pressure on debt pricing for all GSEs, as investors have perceived such instruments as bearing increased risk. Any such negative information or other factors could result in the FHLBanks having to pay a higher rate of interest on consolidated obligations to make them attractive to investors, which could negatively affect the FHLBanks' results of operations and access to funding.

Given the FHLBanks' shared status as GSEs, the scope, timing, and effect of any regulatory reform affecting the GSEs, including the ultimate resolution to the conservatorship of Fannie Mae and Freddie Mac and resulting changes in the regulation or status of the GSEs, could have a significant effect on the FHLBank System. While there are significant differences between the FHLBank System and Fannie Mae and Freddie Mac, including the FHLBanks' focus on lending as opposed to guaranteeing mortgages and their distinctive cooperative business model, legislation or other regulatory reform affecting the GSEs could inadequately account for these differences, which could negatively change the perception of the risks associated with the GSEs and their debt securities. This change in the perception of risk could adversely affect the FHLBanks' funding costs, access to funding, competitive position, and the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis.

Changes to and replacement of the LIBOR benchmark interest rate could adversely affect the FHLBanks' businesses, financial condition, and results of operations.

In July 2017, the United Kingdom's Financial Conduct Authority, which regulates LIBOR, announced that after 2021 it will no longer persuade or compel banks to submit rates for the calculation of LIBOR. The announcement indicates that the continuation of LIBOR on the current basis cannot and will not be guaranteed after 2021. It is impossible to predict whether and to what extent banks will continue to provide LIBOR submissions to the administrator of LIBOR, whether LIBOR rates will cease to be published or supported before or after 2021, or whether any additional reforms to LIBOR may be enacted in the United Kingdom or elsewhere.

In the United States, the Federal Reserve Board and the Federal Reserve Bank of New York convened the Alternative Reference Rates Committee to identify a set of alternative reference interest rates for possible use as market benchmarks. This committee has proposed the Secured Overnight Financing Rate (SOFR) as its recommended alternative to U.S. dollar LIBOR, and the Federal Reserve Bank of New York began publishing SOFR rates in the second quarter of 2018. SOFR is based on a broad segment of the overnight Treasury repurchase market and is intended to be a measure of the cost of borrowing cash overnight collateralized by Treasury securities. In the third quarter of 2018, several market participants began utilizing SOFR through the issuance of variable-rate debt securities indexed to SOFR. In the fourth quarter of 2018, the FHLBanks offered their first SOFR linked consolidated obligations and certain FHLBanks began offering SOFR linked advances.

Many of the FHLBanks' assets and liabilities are indexed to LIBOR. The FHLBanks are currently evaluating and planning for the potential effect of the eventual replacement of the LIBOR benchmark interest rate in the United States, including the possibility of SOFR as the dominant replacement. The market transition away from LIBOR and towards SOFR or another alternate reference rate is expected to be complicated, including the development of term and credit adjustments to accommodate differences between LIBOR and SOFR or any other alternate reference rate. Introduction of an alternate reference rate also may introduce additional basis risk and increased volatility for the FHLBanks and other market participants. There can be no guarantee that SOFR will become widely used and any other alternative reference rate may or may not be developed. The FHLBanks are not able to predict whether LIBOR will cease to be published or supported before or after 2021, whether SOFR will become a widely accepted benchmark in place of LIBOR, or what the effect of a possible transition to SOFR or another alternate reference rate will have on the business, financial condition, and results of operations of an FHLBank or the FHLBanks on a combined basis.

A failure to meet minimum regulatory capital requirements could affect the FHLBanks' ability to pay dividends or repurchase or redeem FHLBank members' capital stock, which may cause a decrease in members' demand for advances or difficulties in retaining existing members and attracting new members.

Each FHLBank is subject to minimum capital requirements under the FHLBank Act, as amended, and FHFA rules and regulations, including total capital, leverage capital, and risk-based capital requirements. If an FHLBank were unable to satisfy its minimum capital requirements, that FHLBank would be subject to capital restoration requirements. Until the minimum capital levels have been restored, that FHLBank would also be prohibited from paying dividends and redeeming or repurchasing capital stock without the prior approval of the FHFA, which could adversely affect that FHLBank members' investment in FHLBank capital stock. Furthermore, to the extent that current and prospective members determine that FHLBank's dividend is insufficient or its ability to pay future dividends or repurchase excess capital stock becomes limited, the FHLBank may be unable to expand its membership and may experience decreased member demand for advances or increased member requests for withdrawals. These factors may cause a decline in the value of FHLBank membership and make it difficult to retain existing members or to attract new members.

In addition, any capital shortfall by an FHLBank could be perceived by investors as an increased level of risk or deterioration in the performance of that FHLBank, which could result in a downgrade in that FHLBank's outlook or its short- or long-term credit ratings. This, in turn, could negatively affect investors' perception of the FHLBank System and potentially increase the FHLBanks' cost of funding or otherwise negatively affect the FHLBanks' access to funding.

(See [Note 16 - Capital](#) to the accompanying combined financial statements and [Business - Capital, Capital Rules, and Dividends](#) for additional information on the FHLBanks' capital requirements.)

Business Risk-Strategic

Increased competition or reduced demand could adversely affect the FHLBanks' financial condition, results of operations, and primary business activity, which is to provide financial products and services to members and housing associates.

The FHLBanks' primary business is to provide financial products and services, which primarily relate to secured loans known as advances, to assist and enhance the financing of members and housing associates. Each FHLBank competes with other suppliers of wholesale funding, including, but not limited to, investment banks, commercial banks, Federal Reserve Banks, and, in certain circumstances, other FHLBanks. The availability of alternative funding sources to FHLBank members, such as growth in deposits from members' banking customers, could significantly decrease the demand for FHLBanks' advances, tighten net interest margin, and negatively affect the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis.

The FHLBanks may be required by new legislation or regulations or other factors to change policies, programs, and agreements affecting members' access to advances, mortgage purchase programs, affordable housing programs, and other credit programs that could cause members to obtain financing from alternative sources. New or modified legislation or regulations could also create alternative funding sources for FHLBank members. Some competitors may not be subject to the regulations that apply to the FHLBanks, which may enable those competitors to offer products and terms that the FHLBanks are not able to offer. Additionally, some of the FHLBanks compete with Fannie Mae and Freddie Mac, as well as other FHLBanks, to purchase mortgage loans from members or affiliates of members. This competition may reduce the amount of available mortgage loans that FHLBanks can purchase, resulting in lower income from this part of their businesses.

The FHLBanks also compete with the U.S. Treasury, Fannie Mae, Freddie Mac, and other GSEs, as well as corporate, state, local, sovereign, sub-sovereign, and supranational entities, for funds raised through the issuance of unsecured debt in the U.S. and global capital markets. Increases in the supply of competing debt products, such as an increase in the supply of Treasury securities in response to the U.S. government's fiscal budget deficit or statutory debt limits, could result in higher debt costs and negatively affect the demand for consolidated obligations. Any of these factors could adversely affect the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis, as well as the value of FHLBank membership.

A loss or change of business activities with large members, consolidation of membership, or regulatory changes in membership rules could adversely affect the FHLBanks' financial condition and results of operations.

Due to the nature of the FHLBanks' charters, membership in an FHLBank is generally limited to federally-insured depository institutions, insurance companies, and community development financial institutions in its district. Given this limitation in membership eligibility, a loss of members or decreased business activities with large members due to withdrawal from membership, acquisition by a non-member, or failure could result in a reduction of an FHLBank's total assets, capital, and net income. Additionally, regulatory changes in membership eligibility could make current members ineligible for FHLBank membership, which could affect FHLBanks' business activities, as well as the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis.

Some FHLBanks have a high concentration of advances to and capital with large members, and certain large members have affiliates that are members of other FHLBanks. As the financial industry continues to consolidate into a smaller number of institutions, this could further lead to the concentration of large members in some FHLBank districts and a related decrease in membership and significant loss of business for other FHLBanks. If advances are concentrated in a smaller number of members, an FHLBank's risk of loss resulting from a single event could become greater. Industry consolidation could also cause an FHLBank to lose members whose business and stock investments are so substantial that their loss could threaten the viability of that FHLBank. Moreover, as mortgage financing continues to shift towards financial institutions that are currently ineligible for FHLBank membership, the FHLBanks could experience a decrease in demand for advances or a decrease in volume of mortgage loans available for purchase from their members, which could negatively affect the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis.

(See [Financial Discussion and Analysis - Combined Financial Condition - Advances](#) and [Financial Discussion and Analysis - Risk Management - Business Risk](#) for more discussion regarding the FHLBanks' exposure to member concentration risk.)

Credit Risk

Increased loan delinquency and default rates could result in additional credit losses on mortgage-backed security investments and adversely affect the yield or value of these FHLBank investments.

The FHLBanks have invested in both U.S. agency and private-label mortgage-backed securities that are backed by prime, subprime, and Alt-A mortgage loans. Although the FHLBanks only invested in senior tranches of those private-label mortgage-backed securities having the highest long-term debt rating at the time of purchase, many of those securities were subsequently downgraded and sustained realized or projected credit losses due to deteriorated economic conditions and housing markets. Although market prices for many of these private-label mortgage-backed securities have improved, future weakening of economic and housing market conditions, either in the U.S. as a whole or in specific regions of the country, could result in rising mortgage loan delinquencies and defaults. The increased loss severity could result in additional credit losses relating to other-than-temporary impairments that may adversely affect the yield or value of FHLBanks' private-label mortgage-backed securities and U.S. agency mortgage-backed securities. (See [Financial Discussion and Analysis - Risk Management - Credit Risk - Investments](#) for more discussion and analysis about the FHLBanks' credit risk exposure to investments and their management of this risk.)

Increased credit risk exposure from defaults on advances, mortgage loans, or other credit products or FHLBank member failures could adversely affect the FHLBanks' financial condition and results of operations.

The FHLBanks are exposed to credit risk as part of their normal business operations through funding advances, purchasing mortgage loans, and extending other credit products, such as lines of credit, standby letters of credit, and other commitments.

The FHLBanks require advances and other extensions of credit to be fully secured with collateral and require borrowers to pledge additional collateral when deemed necessary. The FHLBanks evaluate the types of collateral pledged by the member and assign a borrowing capacity to the collateral, based on the risk associated with that type of collateral. If borrowers are unable to pledge additional collateral to fully secure their obligations with an FHLBank, it could cause that FHLBank's advance levels to decrease or credit risk to increase. If an FHLBank has insufficient collateral before or after an event of payment default/failure of the member or the FHLBank is unable to liquidate the collateral for the value assigned to it in the event of a payment default/failure of a member, that FHLBank could experience a credit loss. This, in turn, could adversely affect the financial condition and results of operations of that FHLBank and the FHLBanks on a combined basis.

During economic downturns, the number of FHLBank members exhibiting significant financial stress may increase, which may expose the FHLBanks to additional member credit risk. If an FHLBank's member defaults on its obligations or the FDIC (or other receiver) fails to either promptly repay all of that failed institution's obligations or assume the outstanding advances, then that FHLBank may be required to liquidate the collateral pledged by the failed institution. If the proceeds realized from the liquidation of pledged collateral are not sufficient to fully satisfy the amount of the failed institution's obligations and the operational cost of liquidating the collateral, that FHLBank could incur losses. In addition, a default by a member with significant unsecured obligations to an FHLBank could result in significant losses, which would adversely affect the financial condition and results of operations of that FHLBank and the FHLBanks on a combined basis.

The FHLBanks are also exposed to credit risk from their mortgage loans held in portfolios. While the FHLBanks' mortgage loan assets are collateralized by the underlying real estate and may also be credit-enhanced to further mitigate credit risk, natural disasters or a deterioration in economic conditions could result in declines in residential real estate values or increased levels of unemployment. These factors could lead to increased borrower defaults and cause the FHLBanks to incur credit losses on their mortgage loans.

(See [Financial Discussion and Analysis - Risk Management - Credit Risk](#) for more discussion and analysis about the FHLBanks' exposure to credit risk and their management of this risk.)

Defaults by one or more institutional counterparties on their obligations to the FHLBanks could adversely affect the financial condition and results of operations of one or more FHLBanks and the FHLBanks on a combined basis.

The FHLBanks face the risk that their institutional counterparties may fail to fulfill their contractual obligations. The primary exposures to institutional counterparty credit risk are with:

- unsecured money market transactions, including federal funds sold, or short-term investments with domestic and foreign counterparties;
- derivative counterparties, including Derivative Clearing Organizations and Futures Commission Merchants;
- mortgage servicers that service loans purchased under the MPP and MPF Program; and
- third-party providers of credit enhancements on private-label MBS investments, including mortgage insurers, bond insurers, and financial guarantors.

A counterparty default could result in losses if an FHLBank's credit exposure to that counterparty were unsecured or under-collateralized, or if an FHLBank's credit obligations associated with derivative positions were over-collateralized. The insolvency or other inability of a significant counterparty to perform its obligations under these transactions or other agreements could have an adverse effect on the financial condition and results of operations of one or more FHLBanks and the FHLBanks on a combined basis.

The FHLBanks have both direct and indirect exposure to foreign credit risk through their various counterparties. Adverse economic, political, or other trends that may occur within, across, or among various regions or countries could have direct adverse effects on an FHLBank's institutional counterparties and on the U.S. economy. In turn, the FHLBanks could also experience adverse effects on their credit performance given their relationship with these counterparties.

In addition, the FHLBanks' ability to engage in routine derivatives, funding, and other transactions could be adversely affected by the actions and commercial soundness of other financial institutions. Financial services institutions are inter-related as a result of trading, clearing, counterparty, and other relationships. As a result, actual and potential defaults of one or more financial services institutions could lead to market-wide disruptions, making it difficult for the FHLBanks to find counterparties for transactions. (See [Financial Discussion and Analysis - Risk Management - Credit Risk](#) for more discussion and analysis about the FHLBanks' exposure to credit risk and their management of this risk.)

Financial difficulties at one FHLBank could require the other FHLBanks to make payment of principal and interest on the consolidated obligations issued on that FHLBank's behalf, which could adversely affect the FHLBanks' financial condition and results of operations.

Under the FHLBank Act and the FHFA regulations, the FHLBanks are jointly and severally liable with the other FHLBanks for the consolidated obligations issued by the FHLBanks through the Office of Finance. As such, while each FHLBank is primarily liable for its portion of consolidated obligations (i.e., those issued on its behalf), each FHLBank is also jointly and severally

liable with the other FHLBanks for the payment of principal and interest on all consolidated obligations of each of the FHLBanks. Although it has never occurred, the FHFA, at its discretion, may require any FHLBank to make principal or interest payments due on any consolidated obligation whether or not the consolidated obligation represents a primary liability of that FHLBank. Additionally, if an FHLBank were to default on its obligation to pay principal or interest on any consolidated obligations, the FHFA may allocate the outstanding liabilities of that FHLBank among the remaining FHLBanks on a pro rata basis or on any other basis determined by the FHFA. Accordingly, the FHLBanks could incur significant liability beyond their primary obligations due to the failure of an FHLBank to meet its obligations. This could adversely affect the financial condition and results of operations of one or more FHLBanks and the FHLBanks on a combined basis.

Market Risk

Changes in interest rates or an inability to successfully manage interest-rate risk could have a material adverse effect on the FHLBanks' net interest income.

The FHLBanks realize net interest income primarily from the spread between interest earned on their outstanding advances and investments less the interest paid on their consolidated obligations and other liabilities. The FHLBanks' businesses and results of operations are significantly affected by the monetary policies of the U.S. government and its agencies. Therefore, an FHLBank's ability to prepare for changes regarding the direction and speed of interest-rate changes or to use derivatives to hedge related exposures, such as basis risk arising from a shift in the relationship of interest rates in different financial markets or on different financial instruments, significantly affects the success of its asset and liability management activities and its level of net interest income. If an FHLBank is unable to enter into derivative instruments on acceptable terms, that FHLBank may be unable to effectively manage its interest-rate and other risks, which could adversely affect the financial condition and results of operations of that FHLBank and the FHLBanks on a combined basis.

An FHLBank may use a number of measures to monitor and manage interest-rate risk, including income simulations and duration or market value sensitivity analyses. Given the unpredictability of the financial markets, capturing all potential outcomes in these analyses is extremely difficult. Key assumptions include, but are not limited to, loan volumes and pricing, market conditions for consolidated obligations, interest-rate spreads and prepayment speeds, implied volatility of options contracts, and cash flows on mortgage-related assets. These assumptions are inherently uncertain and they cannot precisely estimate net interest income and the market value of equity. Actual results may differ from simulated results due to the timing, magnitude, and frequency of interest-rate changes and changes in market conditions and management strategies, among other factors. Volatility and disruption in the credit markets may result in a higher level of volatility in an FHLBank's interest-rate risk profile and could negatively affect that FHLBank's ability to manage interest-rate risk effectively.

Interest-rate changes can exacerbate prepayment and extension risks. Decreases in interest rates typically cause mortgage prepayments to increase and may result in lower interest income and substandard performance in an FHLBank's mortgage portfolio, as there are generally limited reinvestment opportunities at similar interest rates. In addition, while these prepayments would reduce the asset balance, the associated debt may remain outstanding and at above-market rates. Conversely, when interest rates increase, an FHLBank may experience extension risk, which is the risk that the mortgage-related investments will remain outstanding longer than expected at below-market yields. Therefore, any changes in interest rates could adversely affect an FHLBank's net interest income. (See [Quantitative and Qualitative Disclosures about Market Risk](#) for additional discussion and analysis regarding the FHLBanks' sensitivity to interest-rate changes and the use of derivatives to manage their exposure to interest-rate risk.)

Changes to the credit ratings of consolidated obligations could adversely affect the FHLBanks' ability to access the capital markets, their primary source of funding, on acceptable terms.

The FHLBanks' consolidated obligations are rated Aaa/P-1 with a stable outlook by Moody's and AA+/A-1+ with a stable outlook by S&P. Rating agencies may from time to time change a rating or outlook or issue negative reports. Investors should not take the FHLBanks' historical or current ratings as an indication of future ratings for FHLBanks' consolidated obligations. Because the FHLBanks are jointly and severally liable for consolidated obligations, negative developments at any FHLBank may affect these credit ratings or result in the issuance of a negative report regardless of the financial condition and results of operations of the other FHLBanks. In addition, because of the FHLBanks' GSE status, the credit ratings of the FHLBank System, the FHLBanks, and consolidated obligations are directly influenced by the sovereign credit rating of the United States. For example, downgrades to the U.S. sovereign credit rating or outlook may occur if the U.S. government fails to adequately address, based on the credit rating agencies' criteria, its fiscal budget deficit or statutory debt limits. As a result, if the U.S.

sovereign credit ratings or outlook were downgraded, similar downgrades in the credit ratings or outlook of the FHLBanks and consolidated obligations would most likely occur, even though the consolidated obligations are not obligations of, or guaranteed by, the United States.

Future downgrades in credit ratings or outlook may result in higher funding costs or disruptions in the FHLBanks' access to capital markets, including additional collateral posting requirements under certain derivative instrument arrangements. (See [Note 11 - Derivatives and Hedging Activities - Managing Credit Risk on Derivatives](#) to the accompanying combined financial statements for more information about the FHLBanks' additional collateral requirements.) Furthermore, member demand for certain FHLBank products could weaken. To the extent that the FHLBanks cannot access funding when needed on acceptable terms to effectively manage their cost of funds, the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis and the value of FHLBank membership could be negatively affected.

Liquidity Risk

Disruptions in the short-term capital markets or changes to the regulatory environment could have an adverse effect on the FHLBanks' ability to refinance their consolidated obligations or to manage their liquidity positions to meet members' needs on acceptable terms.

Each FHLBank's ability to operate its business, meet its obligations, and generate net interest income depends primarily on its ability to issue debt continuously to meet member demand and to refinance existing outstanding debt at attractive rates, maturities, and call features when needed. The FHLBanks' primary source of funds is the sale of consolidated obligations in the capital markets through the Office of Finance. The FHLBanks' ability to obtain funds through the sale of consolidated obligations generally depends on prevailing conditions in the capital markets, and, in particular, their ability to access the short-term capital markets due to their preference for short-term funding.

Access to short-term debt markets has been supported by continued demand as investors, driven by increased liquidity preferences and risk aversion, have sought the FHLBanks' short-term debt as an asset of choice. This has led to advantageous funding opportunities and increased utilization of debt maturing in one year or less. There are inherent risks in utilizing short-term funding to support longer-dated assets and the FHLBanks may be exposed to refinancing risk. Refinancing risk includes the risk that the FHLBanks could have difficulty rolling over short-term obligations when market conditions change or investor confidence in short-term consolidated obligations declines. In managing and monitoring the amounts of financial assets that require refinancing, the FHLBanks consider their contractual maturities, as well as certain assumptions regarding expected cash flows (i.e., estimated prepayments, embedded call optionality, and scheduled amortizations).

The FHLBanks are also exposed to liquidity risk if there is any significant disruption in the short-term debt markets. Without access to the short-term debt markets, the alternative longer-term funding, if available, would increase funding costs and interest-rate risk exposure and could cause the FHLBanks to increase advance rates, potentially affecting demand for advances. If this disruption is prolonged, the FHLBanks may not be able to obtain funding on acceptable terms and this could adversely affect their ability to support and continue their operations. As a result, an FHLBank's inability to manage its liquidity position or its contingency liquidity plan to meet its obligations, as well as the credit and liquidity needs of its members, could adversely affect the financial condition and results of operations of that FHLBank and the FHLBanks on a combined basis as well as the value of FHLBank membership.

Additionally, changes to the regulatory environment that affect FHLBanks' investors and dealers of consolidated obligations, particularly changes related to capital and liquidity requirements and money market fund reform, have affected, and will continue to affect, the FHLBanks' ability to access the capital markets. For example, money market fund reform resulted in a significant increase in demand for U.S. government and agency debt, including FHLBanks' short-term consolidated obligations. While this increased demand benefited the FHLBanks' ability to raise short-term liquidity at attractive costs, this demand could change if money market investor risk and return preferences and money market regulatory requirements shift over time. A decrease in this demand could, due to the FHLBanks' concentration in money market investors, lead to significant investor outflows and unfavorable market conditions. As such, any reversal of these regulatory requirements or reform could have a negative effect on FHLBank short-term funding costs and adversely affect the financial condition and results of operations of an FHLBank and the FHLBanks on a combined basis.

(See [Financial Discussion and Analysis - Liquidity and Capital Resources](#) for more discussion regarding the FHLBanks' liquidity requirements.)

Operational Risk

A failure of FHLBanks' business and financial models to produce reliable results could adversely affect FHLBanks' businesses, financial condition, results of operations, and risk management.

Each FHLBank makes significant use of business and financial models for managing, measuring, and monitoring different risks, including interest rate, prepayment, and other market risks, as well as credit risk. Each FHLBank also uses models in determining the fair value of financial instruments when independent price quotations are not available or reliable. The information provided by these models is also used in making business decisions relating to strategies, initiatives, risk management, transactions and products, and for financial reporting. Because models use assumptions to project future trends and performance, they are inherently imperfect predictors of actual results.

Changes in business or financial models or in their underlying assumptions, judgments, or estimates may cause the results generated by the models to be materially different. If the models are not reliable, an FHLBank could make poor business decisions, including poor asset and liability management decisions, that could result in an adverse financial effect on that FHLBank's business. Furthermore, strategies that an FHLBank employs to manage the risks associated with the use of models may not be effective. The models used by each FHLBank to determine the fair values of its assets and liabilities, including derivatives, may differ from the models used by the other FHLBanks. The use of different models or assumptions by individual FHLBanks, as well as changes in market conditions, could result in materially different valuation estimates or other estimates even when similar or identical assets and liabilities are being measured, and could have materially different effects on the net income and retained earnings of each of the FHLBanks.

Although each FHLBank adjusts its internal models when necessary to reflect changes in economic conditions, housing markets, and other key factors, the risk remains that an FHLBank's internal models could produce unreliable results or estimates that vary materially from actual results. (See [Financial Discussion and Analysis - Critical Accounting Estimates](#) for more discussion about the FHLBanks' use of financial models in determining critical accounting estimates.)

A failure, breach, or cyber-attack of the information systems of the FHLBanks or the Office of Finance could disrupt the FHLBanks' businesses or result in significant losses or reputational damage.

Each of the FHLBanks and the Office of Finance relies heavily on its information systems and technology to conduct and manage its business. A failure, breach, or cyber-attack of these systems or technologies could disrupt and prevent the FHLBanks and the Office of Finance from conducting and managing their businesses effectively. Moreover, such failure or breach could result in significant losses, including a loss of data, intellectual property, or confidential information, reputational damage, or other harm.

Although each of the FHLBanks and the Office of Finance takes measures designed to protect the security of its information systems, these actions may not be able to prevent or mitigate certain failures, breaches, or attacks, or the negative effects of certain failures, breaches, or attacks.

Failures of critical vendors and other third parties could disrupt the FHLBanks' and the Office of Finance's ability to conduct and manage their businesses.

Each of the FHLBanks and the Office of Finance relies on vendors and other third parties to perform certain critical services. For instance, due to their reliance on the book-entry system of the Federal Reserve Banks for debt issuance and servicing operations, the FHLBanks and the Office of Finance have critical dependency on certain third parties, including their fiscal agent, the Federal Reserve Bank of New York, and one or more settlement agents to issue and make payments of principal and interest on consolidated obligations.

A failure or interruption of one of more of those services, including breaches as a result of cyber-attacks or technological risks, could negatively affect the business operations of the FHLBanks and the Office of Finance. If one or more of these key external parties were not able to perform their functions for a period of time, at an acceptable service level, or for increased volumes, the FHLBanks' and the Office of Finance's business operations could be constrained, disrupted, or otherwise negatively affected. Additionally, the use of vendors and other third parties also exposes the FHLBanks and the Office of Finance to the risk of a loss of data, intellectual property, or confidential information, or other harm. To the extent that vendors do not conduct their activities under appropriate standards, the FHLBanks and the Office of Finance could also be exposed to reputational risk.

While each of the FHLBanks and the Office of Finance has a business continuity plan in place, the FHLBanks' and the Office of Finance's ability to conduct and manage their businesses may be constrained by a critical vendor or a third-party failure.

Failures at the Office of Finance could disrupt the FHLBanks' ability to conduct and manage their businesses.

The Office of Finance is a joint office of the FHLBanks established to facilitate, among other things, the issuance and servicing of consolidated obligations. Pursuant to FHFA regulations, the Office of Finance, in conjunction with the FHLBanks, has adopted policies and procedures for the purposes of facilitating and approving the issuance of consolidated obligations. In addition, the Office of Finance has the authority to redirect, limit, or prohibit an FHLBank's request to issue consolidated obligations if it determines that the proposed issuance is inconsistent with FHFA regulations or these policies or procedures.

A failure or interruption of the Office of Finance's services as a result of breaches, cyber-attacks, or technological risks could disrupt the FHLBanks' access to these funds. Although the Office of Finance has a business continuity plan in place, the FHLBanks' funding and business operations could be constrained, disrupted, or otherwise negatively affected if the Office of Finance were not able to perform its functions for any period of time. Additionally, operational failures at the Office of Finance could also expose the FHLBanks to the risk of a loss of data or confidential information or other harm, including reputational damage.

Failures or circumventions of the financial reporting controls and procedures that each of the FHLBanks and the Office of Finance maintains, and that the Office of Finance relies upon to prepare the Combined Financial Report, could adversely affect the accuracy and meaningfulness of the information contained in this Combined Financial Report.

Each FHLBank is responsible for establishing and maintaining disclosure controls and procedures and internal control over financial reporting with respect to the information and financial data provided to the Office of Finance. The Office of Finance is not required to establish and maintain disclosure controls and procedures and internal control over financial reporting in the same manner as those maintained by each FHLBank. Instead, the Office of Finance relies on each FHLBank management's certification and representation regarding the accuracy and completeness, in all material respects, of its data submitted to the Office of Finance. The Office of Finance has established controls and procedures concerning: (1) each FHLBank's submission of information and financial data to the Office of Finance, (2) the process of combining the financial statements of the individual FHLBanks, and (3) the review of such information. However, an FHLBank's or the Office of Finance's failure to detect material weaknesses or circumventions of its respective key controls could have an adverse effect on the accuracy and meaningfulness of the Combined Financial Reports. (See [Controls and Procedures](#) for more information regarding each FHLBank's management assessment of its individual internal control over financial reporting and evaluation of its disclosure controls and procedures, and the Office of Finance's controls and procedures that apply to the preparation of the Combined Financial Reports.)

The inability to attract and retain skilled key personnel could adversely affect the businesses and operations of the FHLBanks and the Office of Finance.

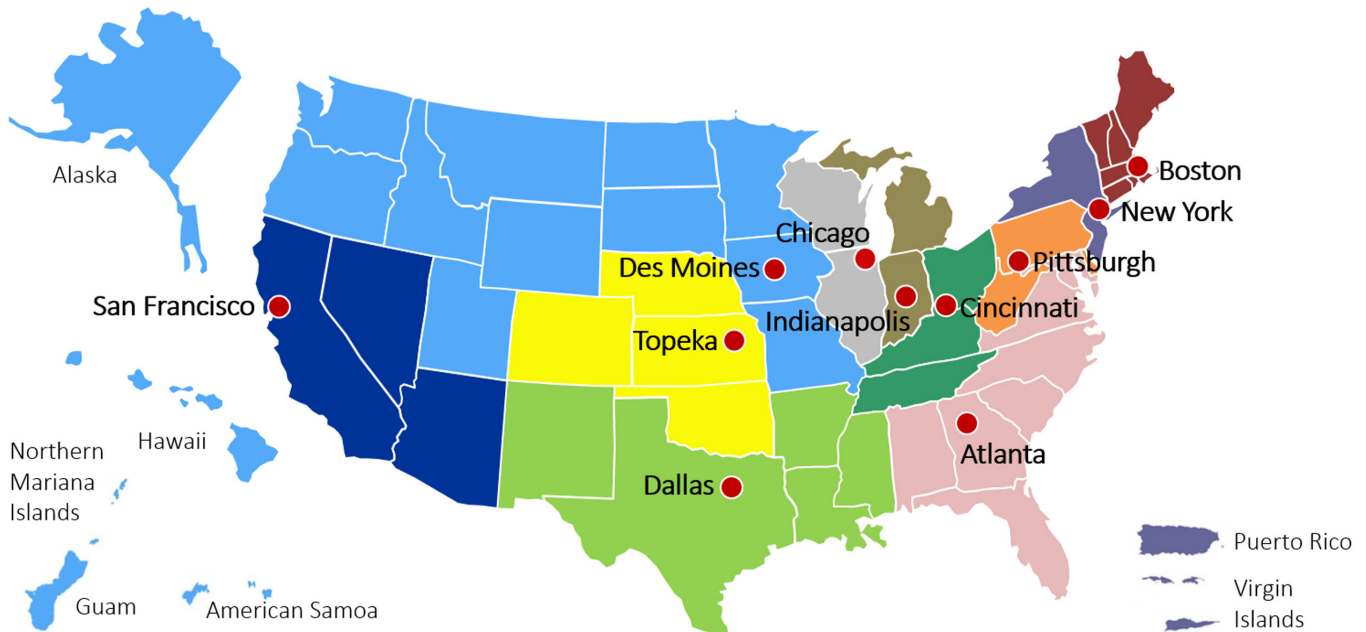
The FHLBanks and the Office of Finance rely on key personnel to manage their businesses and conduct their operations. Failure to attract and retain skilled key personnel, or failure to develop and implement an effective succession plan, could adversely affect the businesses and operations of the FHLBanks and the Office of Finance.

PROPERTIES AND GEOGRAPHIC DISTRIBUTION

The FHLBanks operate in all 50 states, the District of Columbia, and U.S. territories, and had 6,863 members at December 31, 2018. See [Market for Capital Stock and Related Stockholder Matters](#) for more information on FHLBank members. Each FHLBank serves members whose principal place of business is located in its specifically-defined geographic district. In addition to their principal business location, each of the FHLBanks and the Office of Finance also maintain leased, off-site, back-up facilities, and may also maintain additional office space.

Table 2 - Properties and Geographic Distribution

FHLBank	Principal Business Address	Owned/ Leased	States and Territories	Number of Members
Boston	800 Boylston Street 9th Floor Boston, MA 02199	Leased	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	439
New York	101 Park Avenue New York, NY 10178-0601	Leased	New Jersey, New York, Puerto Rico, U.S. Virgin Islands	328
Pittsburgh	601 Grant Street Pittsburgh, PA 15219	Leased	Delaware, Pennsylvania, West Virginia	291
Atlanta	1475 Peachtree St., N.E. Atlanta, GA 30309	Owned	Alabama, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia	848
Cincinnati	221 East Fourth St. Suite 600 Cincinnati, OH 45202	Leased	Kentucky, Ohio, Tennessee	646
Indianapolis	8250 Woodfield Crossing Blvd. Indianapolis, IN 46240	Owned	Indiana, Michigan	379
Chicago	200 East Randolph Dr. 18th Floor Chicago, IL 60601	Leased	Illinois, Wisconsin	705
Des Moines	909 Locust Street Des Moines, IA 50309	Owned	Alaska, American Samoa, Guam, Hawaii, Idaho, Iowa, Minnesota, Missouri, Montana, North Dakota, Commonwealth of the Northern Mariana Islands, Oregon, South Dakota, Utah, Washington, Wyoming	1,365
Dallas	8500 Freeport Parkway South Irving, TX 75063	Owned	Arkansas, Louisiana, Mississippi, New Mexico, Texas	810
Topeka	500 SW Wanamaker Road Topeka, KS 66606-2444	Owned	Colorado, Kansas, Nebraska, Oklahoma	721
San Francisco	600 California Street Suite 300 San Francisco, CA 94108	Leased	Arizona, California, Nevada	331
Office of Finance	1818 Library Street Suite 420 Reston, VA 20190	Leased	n/a	n/a



LEGAL PROCEEDINGS

The FHLBanks are subject to various pending legal proceedings arising in the normal course of business. The FHLBanks and the Office of Finance do not believe they are a party to, or subject to, any pending legal proceedings where the ultimate liability of the FHLBanks, if any, arising out of these proceedings is likely to have a material effect on the results of operations, financial condition, or liquidity of the FHLBanks on a combined basis or that are otherwise material to the FHLBanks on a combined basis. (See each FHLBank's 2018 SEC Form 10-K under *Part I. Item 3-Legal Proceedings* for additional information, including updates, to its legal proceedings.)

Legal Proceedings Relating to the Purchase of Certain Private-label MBS

As of December 31, 2018, each of the FHLBanks of Boston, Chicago, and Des Moines is a plaintiff in continued legal proceedings that relate to the purchases of certain private-label MBS. Defendants in these lawsuits include entities and their affiliates that buy, sell, or distribute the FHLBanks' consolidated obligations or are derivative counterparties. These defendants and their affiliates may be members or former members of the plaintiff FHLBanks or other FHLBanks.

MARKET FOR CAPITAL STOCK AND RELATED STOCKHOLDER MATTERS

As a cooperative, each FHLBank conducts its advances business and mortgage loan programs almost exclusively with its members. Members and certain former members own all of the FHLBanks' capital stock. There is no established marketplace for the FHLBanks' stock and it is not publicly traded. FHLBank stock is purchased by members at the stated par value of \$100 per share and may be redeemed/repurchased at its stated par value of \$100 per share, subject to applicable redemption periods and certain conditions and limitations. (See [Business - Capital, Capital Rules, and Dividends](#) for more information on the restrictions on capital stock redemptions and repurchases.)

At December 31, 2018, the FHLBanks had 396 million shares of capital stock outstanding, including mandatorily redeemable capital stock. The FHLBanks are not required to register their securities under the Securities Act of 1933, as amended; however, each FHLBank is required to register a class of its stock under the Securities Exchange Act of 1934, as amended. (See [Note 16 - Capital](#) to the accompanying combined financial statements for additional information on regulatory capital stock and mandatorily redeemable capital stock.)

Table 3 presents combined regulatory capital stock, which includes mandatorily redeemable capital stock, held by type of member and FHLBank membership by type of member.

Table 3 - Regulatory Capital Stock Held and Membership by Type of Member
(dollars in millions)

	December 31, 2018		December 31, 2017	
	Regulatory Capital Stock Amount	Number of Members	Regulatory Capital Stock Amount	Number of Members
Commercial banks	\$ 24,864	4,186	\$ 23,848	4,367
Savings institutions	4,859	691	5,238	733
Insurance companies	4,675	436	4,331	405
Credit unions	4,088	1,490	4,231	1,436
Community development financial institutions	12	60	9	48
Total	38,498	6,863	37,657	6,989
Mandatorily redeemable capital stock	1,062		1,272	
Total combined regulatory capital stock	\$ 39,560		\$ 38,929	

Figures 3 and 4 present the percentage of regulatory capital stock held, and membership, by type of member at December 31, 2018.

Figure 3: Percentage of Regulatory Capital Stock Held by Type of Member

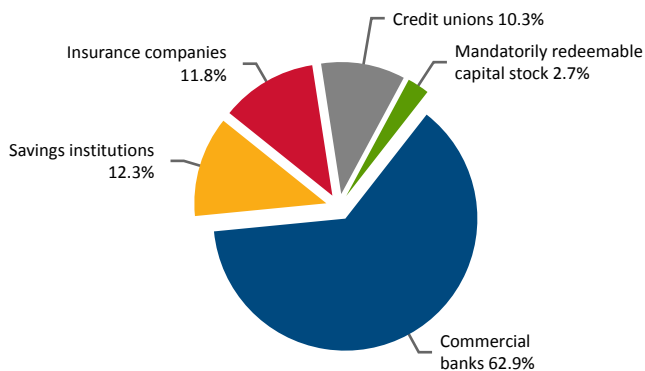
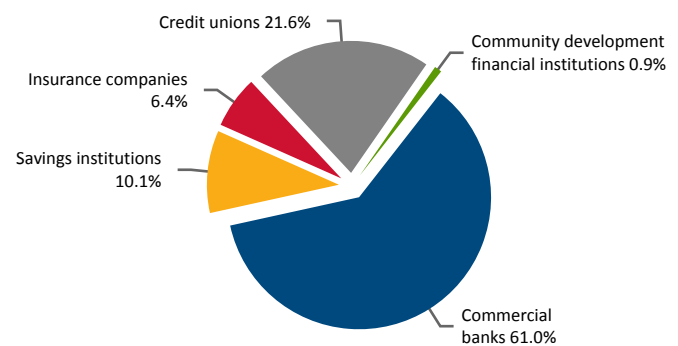


Figure 4: Percentage of Membership by Type of Member



The information on regulatory capital stock presented in Table 4 is accumulated at the holding-company level. The percentage of total regulatory capital stock identified in Table 4 for each holding company was computed by dividing all regulatory capital stock owned by subsidiaries of that holding company by total combined regulatory capital stock. These percentage concentrations do not represent ownership concentrations in an individual FHLBank.

Table 4 - Top 10 Regulatory Capital Stockholders by Holding Company at December 31, 2018

(dollars in millions)

Holding Company Name(1)	FHLBank Districts(2)	Regulatory Capital Stock(3)	Percentage of Total Regulatory Capital Stock	Mandatorily Redeemable Capital Stock
Wells Fargo & Company	Des Moines, Dallas, Topeka, San Francisco	\$ 2,152	5.4%	\$ 19
JPMorgan Chase & Co.	Pittsburgh, Cincinnati, Chicago, Des Moines, San Francisco	2,104	5.3%	482
Citigroup Inc.	New York, Dallas	1,114	2.8%	—
The PNC Financial Services Group, Inc.	Pittsburgh, Atlanta, Cincinnati	962	2.4%	15
Ally Financial Inc.	Pittsburgh	904	2.3%	—
Bank of America Corporation	Boston, Atlanta, Des Moines, San Francisco	883	2.2%	5
MetLife, Inc.	Boston, New York, Pittsburgh, Des Moines	821	2.1%	44
U.S. Bancorp	Cincinnati, Des Moines, Topeka	798	2.0%	1
New York Community Bancorp, Inc.	New York	645	1.6%	—
Navy Federal Credit Union	Atlanta	570	1.4%	—
		<u>\$ 10,953</u>	<u>27.5%</u>	<u>\$ 566</u>

(1) Holding company information was obtained from the Federal Reserve System's web site, the National Information Center (NIC), and SEC filings. The NIC is a central repository of data about banks and other institutions for which the Federal Reserve System has a supervisory, regulatory, or research interest, including both domestic and foreign banking organizations operating in the United States.

(2) At December 31, 2018, each holding company had subsidiaries with regulatory capital stock holdings in these FHLBank districts.

(3) Includes FHLBank capital stock that is considered to be mandatorily redeemable, which is classified as a liability under GAAP.

Table 5 presents information on the five largest regulatory capital stockholders by FHLBank at December 31, 2018. The information presented on capital stock in Table 5 is for individual FHLBank regulatory capital stockholders. The data is not aggregated to the holding-company level. Some of the institutions listed may be affiliates of the same holding company, and some of the institutions listed may have affiliates that are regulatory capital stockholders that are not listed in the table. Each FHLBank describes its risk management policies, including disclosures about its concentration risk, if any, in its periodic reports filed with the SEC. (See [Explanatory Statement about Federal Home Loan Banks Combined Financial Report](#).)

Table 5 - Top 5 Regulatory Capital Stockholders by FHLBank at December 31, 2018

(dollars in millions)

District	Name	Holding Company Name(1)	Regulatory Capital Stock	Percentage of FHLBank Regulatory Capital Stock(2)	Mandatorily Redeemable Capital Stock
Boston	Citizens Bank, National Association		\$ 339	13.2%	\$ —
	People's United Bank, National Association		124	4.9%	—
	State Street Bank and Trust Company		105	4.1%	—
	Webster Bank, National Association		98	3.9%	—
	Massachusetts Mutual Life Insurance Company		74	2.9%	—
			<u>\$ 740</u>	<u>29.0%</u>	<u>\$ —</u>
New York	Citibank, N.A.	Citigroup Inc.	\$ 1,114	18.4%	\$ —
	Metropolitan Life Insurance Company	MetLife, Inc.	724	11.9%	—
	New York Community Bank(3)	New York Community Bancorp, Inc.	645	10.6%	—
	Manufacturers and Traders Trust Company		293	4.8%	—
	Signature Bank		265	4.4%	—
			<u>\$ 3,041</u>	<u>50.1%</u>	<u>\$ —</u>

District	Name	Holding Company Name(1)	Regulatory Capital Stock	Percentage of FHLBank Regulatory Capital Stock(2)	Mandatorily Redeemable Capital Stock
Pittsburgh	PNC Bank, National Association(3)	The PNC Financial Services Group, Inc.	\$ 947	23.4 %	\$ —
	Ally Bank	Ally Financial Inc.	904	22.3 %	—
	Chase Bank USA, National Association	JPMorgan Chase & Co.	537	13.3 %	—
	Santander Bank, N.A.(3)		230	5.6 %	—
	First National Bank of Pennsylvania		209	5.2 %	—
			<u>\$ 2,827</u>	<u>69.8 %</u>	<u>\$ —</u>
Atlanta	Bank of America, National Association	Bank of America Corporation	\$ 855	15.5 %	\$ —
	Navy Federal Credit Union	Navy Federal Credit Union	570	10.4 %	—
	Capital One, National Association		410	7.5 %	—
	TIAA, FSB		405	7.4 %	—
	Regions Bank		377	6.9 %	—
			<u>\$ 2,617</u>	<u>47.7 %</u>	<u>\$ —</u>
Cincinnati	JPMorgan Chase Bank, National Association	JPMorgan Chase & Co.	\$ 1,085	25.0 %	\$ —
	U.S. Bank National Association	U.S. Bancorp	796	18.3 %	—
	The Huntington National Bank(3)		248	5.7 %	—
	Fifth Third Bank		184	4.2 %	—
	KeyBank National Association		148	3.5 %	—
			<u>\$ 2,461</u>	<u>56.7 %</u>	<u>\$ —</u>
Indianapolis	Flagstar Bank, FSB		\$ 302	14.4 %	\$ —
	The Lincoln National Life Insurance Company		140	6.6 %	—
	Jackson National Life Insurance Company		125	6.0 %	—
	Chemical Bank		124	5.9 %	—
	Old National Bank		82	3.9 %	—
			<u>\$ 773</u>	<u>36.8 %</u>	<u>\$ —</u>
Chicago	The Northern Trust Company		\$ 246	12.3 %	\$ —
	One Mortgage Partners Corp.	JPMorgan Chase & Co.	245	12.2 %	245
	BMO Harris Bank, National Association		224	11.1 %	—
	Associated Bank, National Association		173	8.6 %	—
	State Farm Bank, FSB		172	8.5 %	—
			<u>\$ 1,060</u>	<u>52.7 %</u>	<u>\$ 245</u>
Des Moines	Wells Fargo Bank, National Association	Wells Fargo & Company	\$ 1,994	35.2 %	\$ —
	Zions Bancorporation, National Association(3)		190	3.4 %	—
	Principal Life Insurance Company		150	2.6 %	—
	Truman Insurance Company, LLC		148	2.6 %	148
	Transamerica Life Insurance Company		133	2.4 %	—
			<u>\$ 2,615</u>	<u>46.2 %</u>	<u>\$ 148</u>

District	Name	Holding Company Name(1)	Regulatory Capital Stock	Percentage of FHLBank Regulatory Capital Stock(2)	Mandatorily Redeemable Capital Stock
Dallas	Texas Capital Bank, National Association		\$ 167	6.5 %	\$ —
	Comerica Bank		163	6.4 %	—
	American General Life Insurance Company		139	5.4 %	—
	NexBank SSB		103	4.0 %	—
	IBERIABANK		95	3.7 %	—
			<u>\$ 667</u>	<u>26.0 %</u>	<u>\$ —</u>
Topeka	BOKF, National Association		\$ 298	19.5 %	\$ —
	MidFirst Bank		295	19.3 %	—
	Capitol Federal Savings Bank		101	6.6 %	—
	United of Omaha Life Insurance Company		39	2.5 %	—
	Colorado Federal Savings Bank		31	2.1 %	—
			<u>\$ 764</u>	<u>50.0 %</u>	<u>\$ —</u>
San Francisco	MUFG Union Bank, National Association		\$ 456	14.4 %	\$ —
	First Republic Bank		273	8.6 %	—
	JPMorgan Chase Bank, National Association(4)	JPMorgan Chase & Co.	226	7.1 %	226
	Bank of the West		202	6.3 %	—
	Wells Fargo Financial National Bank		135	4.3 %	—
			<u>\$ 1,292</u>	<u>40.7 %</u>	<u>\$ 226</u>

- (1) The holding company name is only shown for each Top 5 regulatory capital stockholder that has its holding company listed in Table 4 - Top 10 Regulatory Capital Stockholders by Holding Company at December 31, 2018.
- (2) For consistency with the individual FHLBank's presentation of its Top 5 regulatory capital stockholders at December 31, 2018, amounts used to calculate percentages of FHLBank regulatory capital stock may be based on numbers in thousands. Accordingly, recalculations using the amounts in millions as presented in Table 5 may not produce the same results.
- (3) Indicates that an officer or director of the stockholder was an FHLBank director at December 31, 2018.
- (4) Non-member stockholder that is holding legacy capital stock due to out-of-district acquisition, merger, or relocation.

SELECTED FINANCIAL DATA

<i>(dollars in millions)</i>	2018	2017	2016	2015	2014
Selected Statement of Condition Data at December 31,					
Investments(1)	\$ 306,790	\$ 307,280	\$ 292,017	\$ 273,684	\$ 270,217
Advances	728,767	731,544	705,225	634,022	570,726
Mortgage loans held for portfolio	62,549	53,843	48,494	44,575	43,582
Allowance for credit losses on mortgage loans	(15)	(16)	(18)	(18)	(52)
Total assets	1,102,850	1,103,451	1,056,712	969,239	913,310
Consolidated obligations					
Discount notes	426,034	391,480	409,815	494,045	362,303
Bonds	603,491	641,601	578,927	411,851	486,031
Total consolidated obligations	1,029,525	1,033,081	988,742	905,896	848,334
Mandatorily redeemable capital stock	1,062	1,272	1,704	745	2,631
Subordinated notes(2)	—	—	—	944	944
Capital					
Total capital stock(3)	38,498	37,657	36,234	34,185	33,705
Additional capital from merger(4)	—	—	52	194	—
Retained earnings	19,504	18,099	16,330	14,297	13,211
Accumulated other comprehensive income (loss)	342	724	(157)	(634)	54
Total capital	58,344	56,480	52,459	48,042	46,970
Selected Statement of Income Data for the year ended December 31,					
Net interest income	\$ 5,256	\$ 4,481	\$ 3,835	\$ 3,553	\$ 3,532
Provision (reversal) for credit losses	2	—	6	4	(21)
Net interest income after provision (reversal) for credit losses	5,254	4,481	3,829	3,549	3,553
Non-interest income (loss)	27	615	1,154	843	17
Non-interest expense	1,315	1,336	1,183	1,199	1,046
Affordable Housing Program Assessments	404	384	392	332	269
Net income	\$ 3,562	\$ 3,376	\$ 3,408	\$ 2,861	\$ 2,255
Selected Other Data for the year ended December 31,					
Cash and stock dividends	\$ 2,162	\$ 1,659	\$ 1,517	\$ 1,514	\$ 1,185
Dividend payout ratio(5)	60.70%	49.14%	44.51%	52.92%	52.55%
Return on average equity(6)(7)	6.18%	6.25%	6.90%	6.12%	4.95%
Return on average assets	0.32%	0.31%	0.34%	0.31%	0.26%
Average equity to average assets(7)	5.20%	5.02%	4.88%	5.08%	5.26%
Net interest margin(8)	0.48%	0.42%	0.38%	0.39%	0.41%
Selected Other Data at December 31,					
GAAP capital-to-asset ratio	5.29%	5.12%	4.96%	4.96%	5.14%
Regulatory capital-to-assets ratio(9)	5.36%	5.17%	5.14%	5.10%	5.42%

- (1) Investments consist of interest-bearing deposits, securities purchased under agreements to resell, federal funds sold, trading securities, available-for-sale securities, and held-to-maturity securities.
- (2) The subordinated notes outstanding, issued by the FHLBank of Chicago, matured and were paid in full on June 13, 2016. (See [Note 15 - Subordinated Notes](#) to the accompanying combined financial statements for additional information on subordinated notes.)
- (3) FHLBank capital stock is redeemable at the request of a member subject to the statutory redemption periods and other conditions and limitations. (See [Note 16 - Capital](#) to the accompanying combined financial statements for additional information on the statutory redemption periods and other conditions and limitations.)
- (4) Additional capital from merger resulted from the merger effective May 31, 2015, between the FHLBank of Des Moines and the FHLBank of Seattle, and primarily represented the amount of the FHLBank of Seattle's closing retained earnings balance as of the merger date, adjusted for fair value and other purchase accounting adjustments, and identified intangible assets, and is net of dividends paid by the FHLBank of Des Moines subsequent to the merger date. The balance in additional capital from merger was depleted following the first quarter dividend payment in May 2017.
- (5) Dividend payout ratio is equal to dividends declared in the period expressed as a percentage of net income in the period. This ratio may not be as relevant to the combined balances because there are no shareholders at the FHLBank System-wide level.
- (6) Return on average equity is equal to net income expressed as a percentage of average total capital.
- (7) Mandatorily redeemable capital stock is not included in the calculations of return on average equity or average equity to average assets.
- (8) Net interest margin is equal to net interest income represented as a percentage of average interest-earning assets.
- (9) The regulatory capital-to-assets ratio is calculated based on the FHLBanks' regulatory capital as a percentage of total assets. (See [Note 16 - Capital](#) to the accompanying combined financial statements for a definition and discussion of regulatory capital.)

FINANCIAL DISCUSSION AND ANALYSIS OF COMBINED FINANCIAL CONDITION AND COMBINED RESULTS OF OPERATIONS

Investors should read this financial discussion and analysis of combined financial condition and combined results of operations together with the combined financial statements and the accompanying notes in this Combined Financial Report of the FHLBanks. Each FHLBank discusses its financial condition and results of operations in its periodic reports filed with the SEC. Each FHLBank's Annual Report on SEC Form 10-K and Quarterly Report on SEC Form 10-Q contains, as required by applicable SEC rules, a "Management's Discussion and Analysis of Financial Condition and Results of Operations," commonly called MD&A. The SEC notes that one of the principal objectives of MD&A is "to provide a narrative explanation of a registrant's financial statements that enables investors to see the registrant through the eyes of management." Because there is no centralized management of the FHLBanks that can provide a system-wide "eyes of management" view of the FHLBanks as a whole, this Combined Financial Report does not contain a conventional MD&A. Instead, a "Financial Discussion and Analysis of Combined Financial Condition and Combined Results of Operations" is prepared by the Office of Finance using information provided by each FHLBank. This Financial Discussion and Analysis does not generally include a separate discussion of how each FHLBank's operations affect the combined financial condition and combined results of operations. That level of information about each FHLBank is addressed in each respective FHLBank's periodic reports filed with the SEC. (See [Explanatory Statement about Federal Home Loan Banks Combined Financial Report](#) and [Supplemental Information - Individual Federal Home Loan Bank Selected Financial Data and Financial Ratios](#).)

The combined financial statements include the financial results of the FHLBanks. (See [Condensed Combining Schedules](#) for information regarding each FHLBank's results.) Transactions among the FHLBanks have been eliminated in accordance with combination accounting principles related to consolidation under GAAP. (See [Note 1 - Summary of Significant Accounting Policies](#) to the accompanying combined financial statements and [Interbank Eliminations](#) for more information.)

Unless otherwise stated, dollar amounts disclosed in this Combined Financial Report represent values rounded to the nearest million. Dollar amounts rounding to less than one million are not reflected in this Combined Financial Report.

Executive Summary

This overview highlights selected information and may not contain all of the information that is important to readers of this Combined Financial Report. For a more complete understanding of events, trends, and uncertainties, this executive summary should be read together with the Financial Discussion and Analysis section in its entirety and the FHLBanks' combined financial statements and related notes.

Overview

The FHLBanks are GSEs, federally-chartered, but privately capitalized and independently managed. The FHLBanks together with the Office of Finance, a joint office of the FHLBanks, comprise the FHLBank System. All FHLBanks and the Office of Finance operate under the supervisory and regulatory framework of the FHFA.

The FHLBanks are cooperative institutions, meaning that their stockholders are also the FHLBanks' primary customers. FHLBank capital stock is not publicly traded; it is purchased by members from, and redeemed or repurchased by, an FHLBank at the stated par value of \$100 per share. The FHLBanks expand and contract in asset size as the needs of member financial institutions and their communities change over time.

Each FHLBank's primary business is to serve as a financial intermediary between the capital markets and its members. This intermediation process involves raising funds by issuing debt, known as consolidated obligations, in the capital markets and lending those proceeds to member institutions in the form of secured loans, known as advances. Each FHLBank's funding is principally obtained from consolidated obligations issued through the Office of Finance on behalf of the FHLBanks. Consolidated obligations are joint and several obligations of each FHLBank. FHLBank debt issuance is generally driven by members' needs for advances.

The FHLBanks seek to maintain a balance between their public policy mission and their goal of providing adequate returns on member capital. The FHLBanks strive to achieve this balance by providing value to their members through advances, mortgage loan purchases, other services, and dividend payments. The FHLBanks' primary sources of earnings are the net interest spread between the yield on interest-earning assets and the yield on interest-bearing liabilities, combined with earnings on invested capital. Due to the FHLBanks' cooperative structures, the FHLBanks generally earn a narrow net interest spread.

External Credit Ratings

The FHLBanks' ability to raise funds in the capital markets at narrow spreads to the U.S. Treasury yield curve is due largely to the FHLBanks' status as GSEs, which is reflected in their consolidated obligations receiving the same credit rating as the government bond credit rating of the United States, even though the consolidated obligations are not obligations of the United States and are not guaranteed by either the United States or any government agency. Moody's Investors Service (Moody's), S&P Global Ratings (S&P), or other rating organizations could downgrade or upgrade the credit rating of the U.S. government and GSEs, including the FHLBanks and their consolidated obligations. In addition to ratings on the FHLBanks' consolidated obligations, each FHLBank is rated individually by Moody's and S&P. Investors should note that a rating issued by a nationally recognized statistical rating organization is not a recommendation to buy, sell, or hold securities, and that the ratings may be revised or withdrawn by the rating organization at any time. Investors should evaluate the rating of each nationally recognized statistical rating organization independently. Investors should not take the historical or current ratings of the FHLBanks and their consolidated obligations as an indication of future ratings for the FHLBanks and their consolidated obligations. (See [External Credit Ratings](#) for more information.)

Business Environment

The primary external factors that affect the FHLBanks' combined financial condition and results of operations include (1) the general state of the economy and financial markets; (2) conditions in the U.S. housing markets; (3) interest rate levels and volatility; and (4) the legislative and regulatory environment.

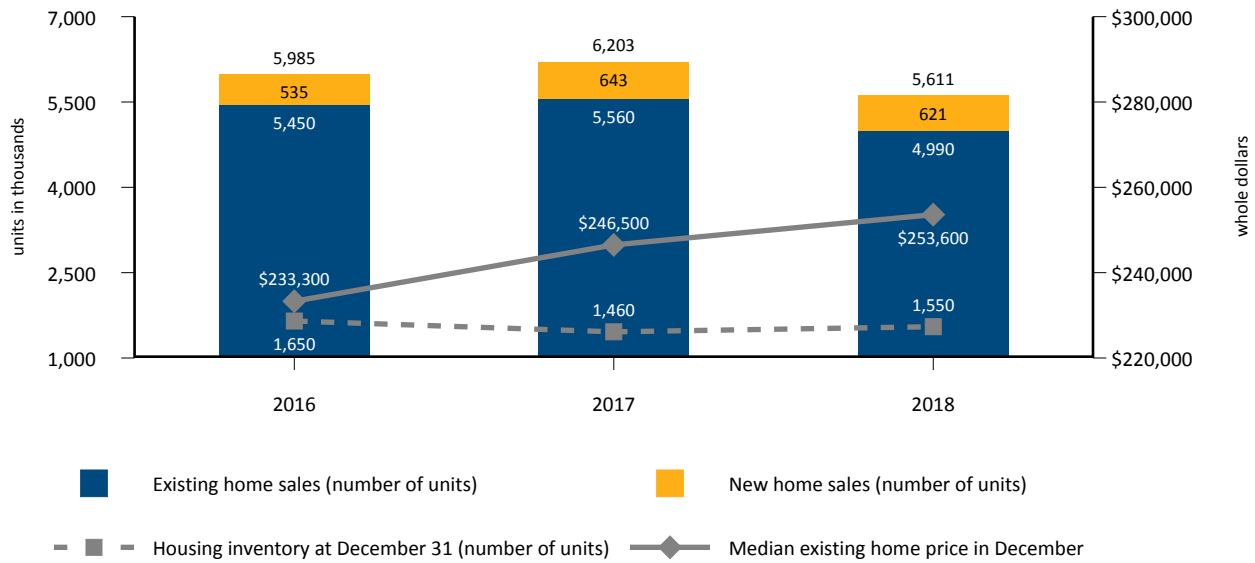
Economy and Financial Markets. The FHLBanks' overall results of operations are influenced by the economy and financial markets, and, in particular, by FHLBank members' demand for advances and the FHLBanks' ability to maintain sufficient access to diverse sources of funding at relatively favorable costs. The FHLBanks' flexibility in utilizing various funding tools, in combination with a diverse investor base and their status as GSEs, have helped ensure reliable market access and demand for consolidated obligations throughout fluctuating market environments and regulatory changes affecting dealers of and investors in consolidated obligations. The FHLBanks continued to meet their funding needs in response to demand for advances during the year ended December 31, 2018.

Economic and market data received by the Federal Reserve, prior to the Federal Open Market Committee meeting in December 2018, indicated that the U.S. labor market continued to strengthen, that U.S. economic activity has been increasing at a strong rate, and on a 12-month basis, inflation remains near two percent. The Federal Open Market Committee has stated that it expects inflation to stabilize around two percent over the medium term.

The Bureau of Labor Statistics reported that the U.S. unemployment rate was 3.9% in December 2018, compared to 4.1% in December 2017. U.S. real gross domestic product increased at an annual rate of 2.6% in 2018, according to the advance estimate reported by the Bureau of Economic Analysis, compared to an annual rate of 2.3% in 2017.

Conditions in U.S. Housing Markets. Conditions in the U.S. housing markets primarily affect the FHLBanks through the creation of demand for, and yield on, advances and mortgage loans, as well as the yield on investments in mortgage-backed securities. Figure 5 presents U.S. home sales, inventory, and prices for the most recent three years. U.S. home sales decreased in 2018, driven by higher interest rates and increases in home prices.

Figure 5: U.S. Home Sales, Inventory, and Prices



Source: National Association of REALTORS® for existing home sales, housing inventory, and median existing home price.
 Source: U.S. Department of Housing and Urban Development for new home sales.

Interest Rate Levels and Volatility. The level and volatility of interest rates affect FHLBank member demand for advances. In addition, credit spreads and the shape of the yield curve affect investor demand for consolidated obligations. These factors also impact the FHLBanks' combined results of operations, primarily affecting net interest income and the valuation of certain assets and liabilities.

The level and volatility of interest rates and credit spreads were affected by several factors during the year ended December 31, 2018. In the United States, overall economic conditions, monetary policy, and financial regulation continue to be influencing factors. Figures 6 and 7 present the quarterly average and quarter-end rates for certain key interest rates. These figures illustrate interest rates trending higher.

Figure 6: Quarterly Average Rates

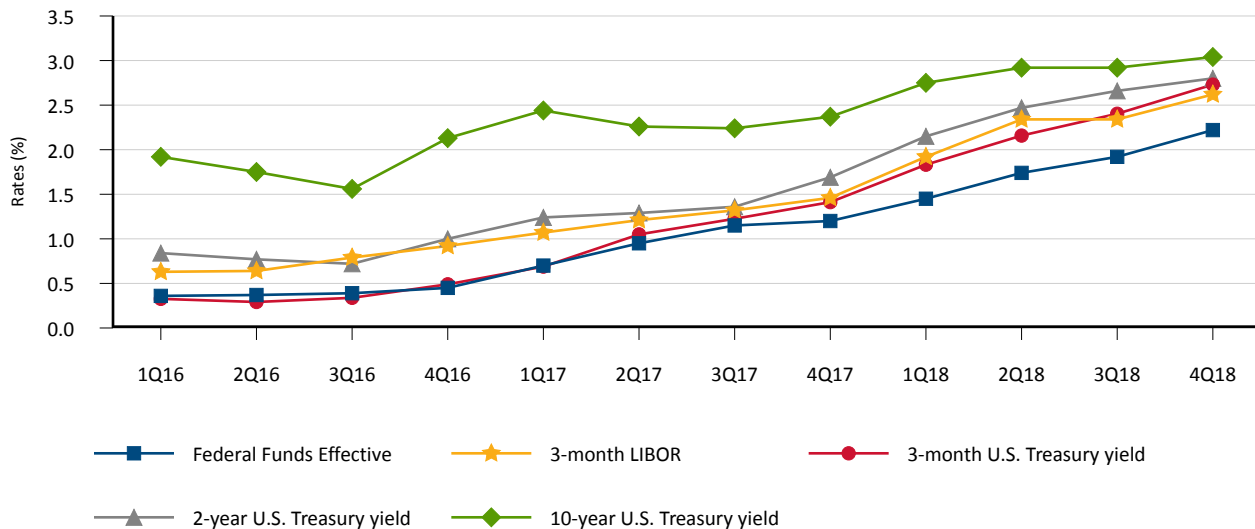
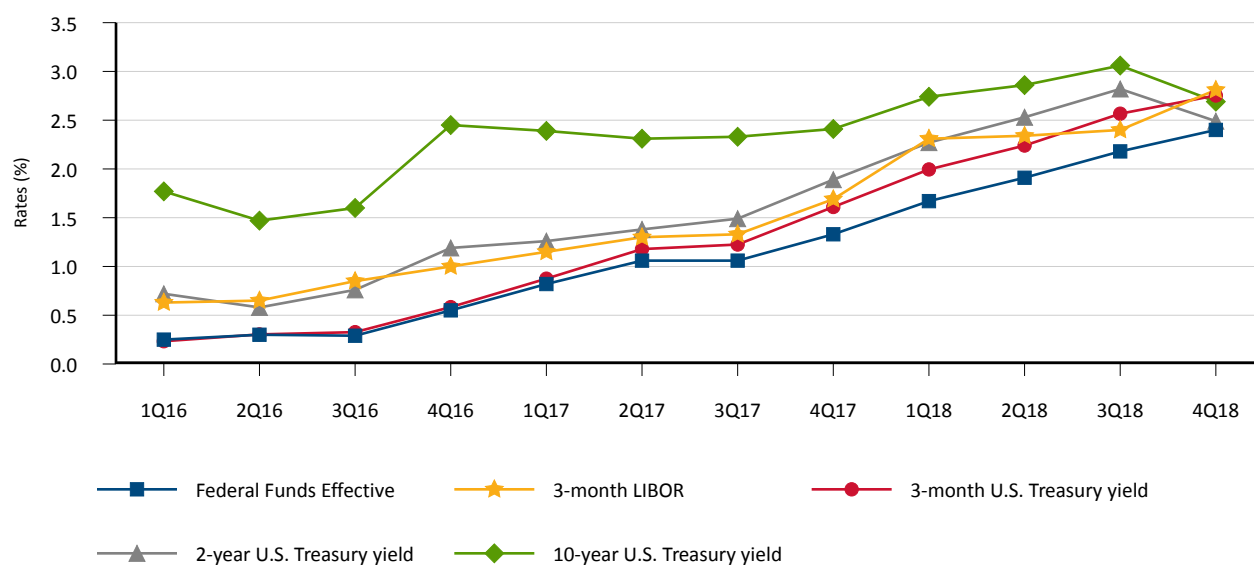


Figure 7: Quarter-End Rates



In December 2018, the Federal Reserve Board, acting through its Federal Open Market Committee, decided to raise the target range for the federal funds rate, for the fourth time in 2018, from a target range of 2.00% to 2.25% to a target range of 2.25% to 2.50%, based on labor market conditions and inflation. The Federal Open Market Committee stated it will assess realized and expected economic conditions relative to its objectives of maximum employment and two percent inflation when determining the timing and size of future adjustments to the target range for the federal funds rate.

During the year ended December 31, 2018, the cost of consolidated obligations improved slightly, as measured by the average spreads to three-month LIBOR, compared to the year ended December 31, 2017.

Table 6 - Funding Spreads to Three-Month LIBOR
(in basis points)

Borrowing Term	Twelve-Month Average		Ending Spread	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
3-months	(31.2)	(28.1)	(33.2)	(28.9)
2-years	(13.4)	(15.8)	(8.9)	(10.9)
5-years	(0.3)	2.1	11.8	4.1
10-years	30.5	43.4	45.4	37.9

Source: Funding spreads are derived using Office of Finance indications compared to LIBOR.

In July 2017, the United Kingdom's Financial Conduct Authority, which regulates LIBOR, announced that after 2021 it will no longer persuade or compel banks to submit rates for the calculation of LIBOR. In response, the Federal Reserve Board and the Federal Reserve Bank of New York convened the Alternative Reference Rates Committee to identify a set of alternative reference interest rates for possible use as market benchmarks. This committee has proposed the Secured Overnight Financing Rate (SOFR) as its recommended alternative to U.S. dollar LIBOR, and the Federal Reserve Bank of New York began publishing SOFR rates in the second quarter of 2018. SOFR is based on a broad segment of the overnight Treasury repurchase market and is intended to be a measure of the cost of borrowing cash overnight collateralized by Treasury securities. Many of the FHLBanks' assets and liabilities are indexed to LIBOR. The FHLBanks are currently evaluating and planning for the potential impact of the eventual replacement of the LIBOR benchmark interest rate, including the possibility of SOFR as the dominant replacement. (See [Risk Factors](#) for more information.) During the fourth quarter of 2018, the FHLBanks issued \$11.6 billion in SOFR-linked consolidated bonds with maturities ranging from six to eighteen months. Since January 1, 2019, the FHLBanks have issued an additional \$27.6 billion in SOFR-linked consolidated bonds with maturities ranging from 3 months to 2 years.

Legislative and Regulatory Environment. Potential legislative and regulatory changes, as well as other rules and regulations issued by the FHFA, could adversely affect the FHLBanks, FHLBank members, counterparties, and dealers of and investors in consolidated obligations. The FHLBanks' business operations, funding costs, rights, obligations, and the environment in which the FHLBanks carry out their mission could be significantly affected by these changes. (See [Legislative and Regulatory Developments](#) for more information.)

FHLBanks' Financial Highlights

Combined Financial Condition. Total assets were nearly flat at \$1,102.9 billion at December 31, 2018, a decrease of \$601 million from \$1,103.5 billion at December 31, 2017.

- Advances totaled \$728.8 billion at December 31, 2018, a decrease of 0.4% from \$731.5 billion at December 31, 2017. Commercial banks were the largest member borrowers with 64.5% of the total principal amount of advances outstanding at December 31, 2018, compared to 63.0% at December 31, 2017. The top 10 advance holding company borrowers represented 34.7% of the total principal amount of advances outstanding at December 31, 2018, compared to 37.3% at December 31, 2017. The FHLBanks protect against credit risk on advances by collateralizing all advances. At December 31, 2018, each FHLBank had rights to collateral with an estimated value greater than the related outstanding advances.
- Investments were \$306.8 billion at December 31, 2018, a decrease of 0.2% from \$307.3 billion at December 31, 2017. The FHLBanks maintain investment portfolios to provide funds to meet the credit needs of their members, maintain liquidity, and earn interest income.
- Mortgage loans held for portfolio, net, grew to \$62.5 billion at December 31, 2018, an increase of 16.2% from \$53.8 billion at December 31, 2017, as mortgage loan purchases of \$15.3 billion outpaced principal repayments of \$6.4 billion. An FHLBank may purchase mortgage loans to support the FHLBank's housing mission, provide an additional source of liquidity to its members, diversify its investments, and generate additional earnings.

Total liabilities were \$1,044.5 billion at December 31, 2018, a decrease of 0.2% from \$1,047.0 billion at December 31, 2017, primarily the result of a decrease in consolidated obligations.

- Consolidated obligations totaled \$1,029.5 billion at December 31, 2018, a decrease of 0.3% from \$1,033.1 billion at December 31, 2017, in line with the decrease in total assets, and consisted of a 5.9% decrease in consolidated bonds, partially offset by an 8.8% increase in consolidated discount notes. Consolidated obligations are the principal funding source used by the FHLBanks to make advances and to purchase mortgage loans and investments.

Total GAAP capital was \$58.3 billion at December 31, 2018, an increase of 3.3% from \$56.5 billion at December 31, 2017. This increase was due primarily to growth in retained earnings and an increase in capital stock. The GAAP capital-to-assets ratio was 5.29% and the regulatory capital-to-assets ratio was 5.36% at December 31, 2018, compared to 5.12% and 5.17% at December 31, 2017. Each FHLBank was in compliance with FHFA regulatory capital requirements at December 31, 2018.

- Retained earnings grew to \$19.5 billion at December 31, 2018, an increase of 7.8% from \$18.1 billion at December 31, 2017, resulting from net income of \$3,562 million, partially offset by dividends of \$2,162 million.
- Capital stock was \$38.5 billion at December 31, 2018, an increase of 2.2% from \$37.7 billion at December 31, 2017, due primarily to the net issuance of capital stock, partially offset by the reclassification of shares to mandatorily redeemable capital stock.

Combined Results of Operations. Net income was \$3,562 million for the year ended December 31, 2018, an increase of \$186 million, or 5.5%, compared to the year ended December 31, 2017, primarily resulting from an increase in net interest income, partially offset by lower net gains in non-interest income.

Net interest income after provision for credit losses was \$5,254 million for the year ended December 31, 2018, an increase of \$773 million, or 17.3%, compared to the year ended December 31, 2017. Net interest margin improved to 0.48% for the year ended December 31, 2018, an increase of 6 basis points compared to the year ended December 31, 2017.

Non-interest income was \$27 million for the year ended December 31, 2018, a decrease of \$588 million, or 95.6%, compared to the year ended December 31, 2017, due primarily to net losses on derivatives and hedging activities, and lower gains on litigation settlements. Non-interest expense was \$1,315 million for the year ended December 31, 2018, a decrease of \$21 million, or 1.6%, compared to the year ended December 31, 2017.

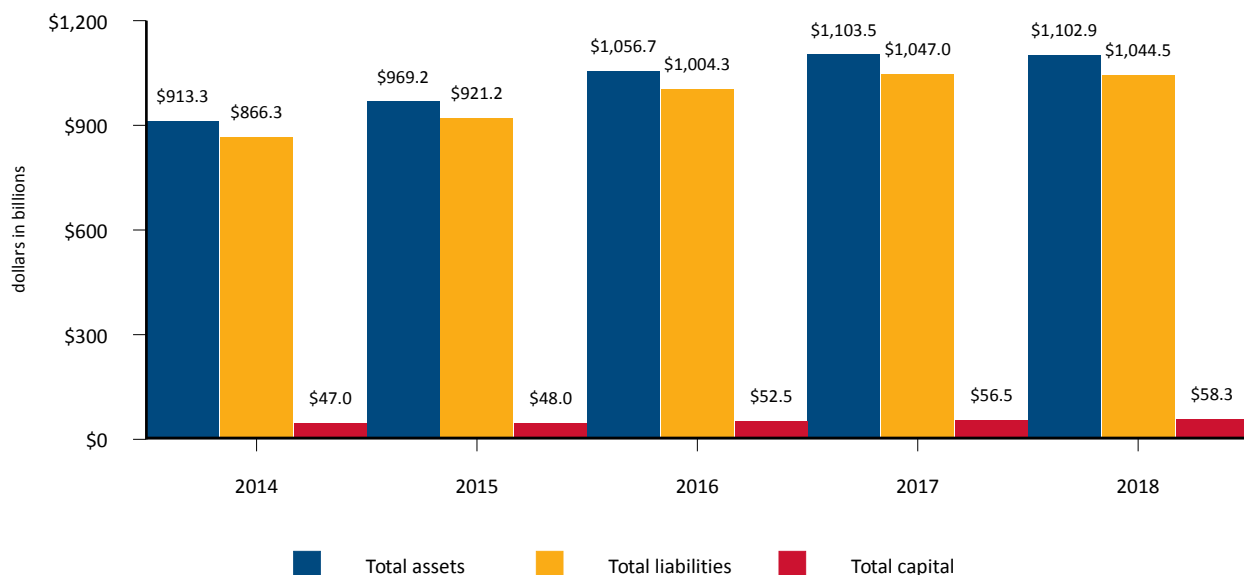
Affordable Housing Program assessments result from individual FHLBank income subject to assessment. Affordable Housing Program assessments were \$404 million for the year ended December 31, 2018, an increase of \$20 million, or 5.2%, compared to the year ended December 31, 2017.

See [Combined Financial Condition](#) and [Combined Results of Operations](#) for further information.

Combined Financial Condition

The FHLBanks' asset composition includes cash and due from banks, investments, advances, mortgage loans held for portfolio, and other assets. The FHLBanks' liability composition includes deposits, consolidated discount notes, consolidated bonds, mandatorily redeemable capital stock, and other liabilities. The FHLBanks' capital composition includes capital stock, retained earnings, and accumulated other comprehensive income (loss) (AOCI). Figure 8 presents the total assets, liabilities, and capital for the most recent five years.

Figure 8: Total Assets, Liabilities, and Capital at Year-end



Figures 9 and 10 present the total assets and total liabilities and capital composition at December 31, 2018.

Figure 9: Total Assets (dollars in billions)

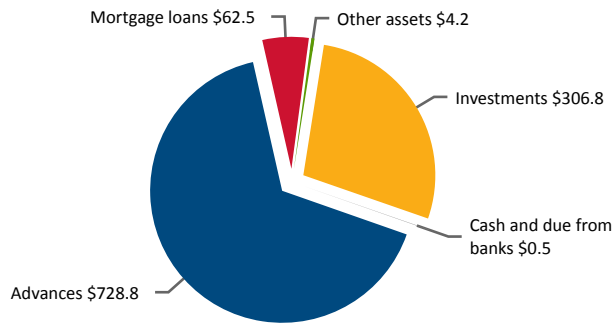
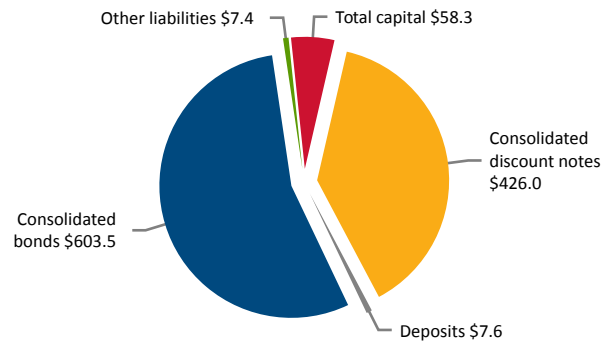


Figure 10: Total Liabilities and Capital (dollars in billions)



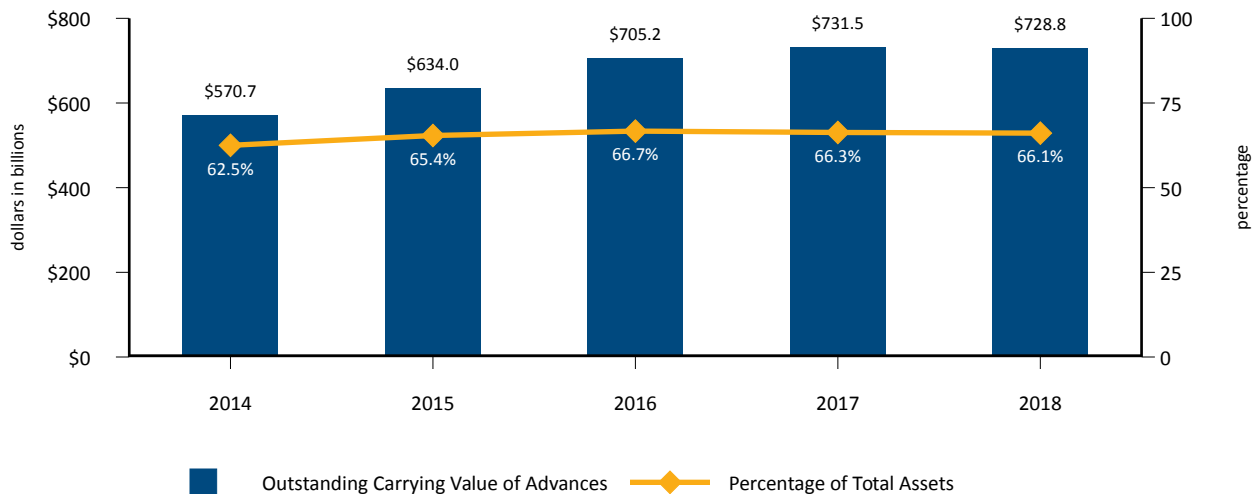
The following discussion contains information on the major categories of the Combined Statement of Condition: advances, investments, mortgage loans, consolidated obligations, deposits, and capital.

- Total assets were \$1,102.9 billion at December 31, 2018, nearly flat compared to \$1,103.5 billion at December 31, 2017.
- Total liabilities were \$1,044.5 billion at December 31, 2018, a decrease of 0.2% from \$1,047.0 billion at December 31, 2017.
- Total GAAP capital was \$58.3 billion at December 31, 2018, an increase of 3.3% from \$56.5 billion at December 31, 2017.

Advances

The FHLBanks provide funding to members and housing associates through secured loans (advances), which may be used for residential mortgages, community investments, and other services for housing and community development. Each FHLBank makes advances based on the security of mortgage loans and other types of eligible collateral pledged by, and the creditworthiness and financial condition of, the borrowing institutions. Figure 11 presents advances for the most recent five years.

Figure 11: Advances Outstanding at Year-end (Carrying Value)



The outstanding carrying value of advances totaled \$728.8 billion at December 31, 2018, a decrease of \$2.8 billion, or 0.4%, from \$731.5 billion at December 31, 2017. The percentage of members with outstanding advances was 56.8% at December 31, 2018, compared to 57.2% at December 31, 2017. Figures 12 and 13 present the principal amount of advances by product type and by redemption term at December 31, 2018 and 2017.

Figure 12: Advances by Product Type

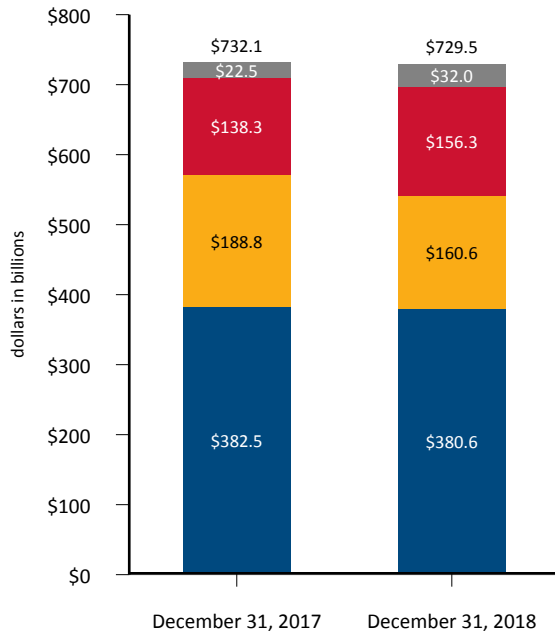
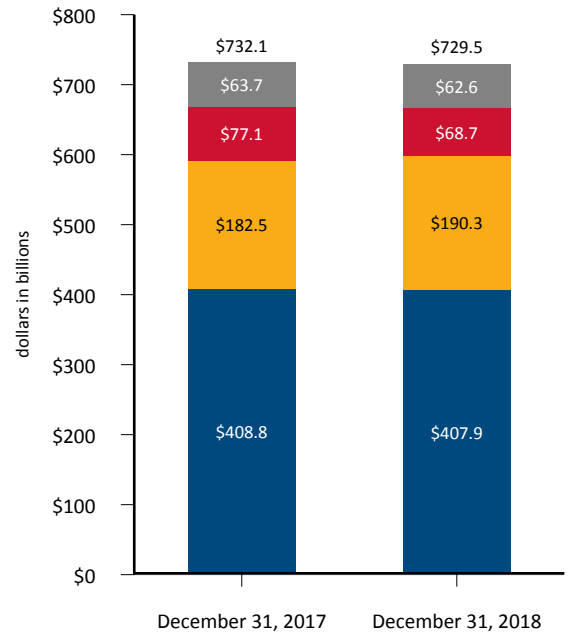


Figure 13: Advances by Redemption Term



- Fixed-rate
- Variable-rate
- Variable-rate, callable or prepayable
- Fixed-rate, puttable and Other

- Due in 1 year or less
- Due after 1 year through 3 years
- Due after 3 years through 5 years
- Thereafter

Table 7 presents advances outstanding by product type and redemption term, some of which include advances that contain embedded put or call options. A member either can sell an embedded option to an FHLBank or it can purchase an embedded option from an FHLBank. (See [Note 8 - Advances](#) to the accompanying combined financial statements for additional information on puttable and callable advances and their potential effects on advance redemptions.)

Table 7 - Types of Advances by Redemption Term
(dollars in millions)

	December 31, 2018		December 31, 2017		Change	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
Fixed-rate						
Due in 1 year or less	\$ 246,428	33.8%	\$ 257,684	35.2%	\$ (11,256)	(4.4)%
Due after 1 year through 3 years	82,834	11.4%	75,933	10.4%	6,901	9.1 %
Due after 3 years through 5 years	35,360	4.8%	33,145	4.5%	2,215	6.7 %
Thereafter	16,009	2.2%	15,716	2.1%	293	1.9 %
Total principal amount	380,631	52.2%	382,478	52.2%	(1,847)	(0.5)%
Fixed-rate, puttable						
Due in 1 year or less	805	0.1%	1,774	0.2%	(969)	(54.6)%
Due after 1 year through 3 years	276	—	183	—	93	50.8 %
Due after 3 years through 5 years	2,211	0.3%	1,470	0.2%	741	50.4 %
Thereafter	15,616	2.1%	5,150	0.7%	10,466	203.2 %
Total principal amount	18,908	2.5%	8,577	1.1%	10,331	120.5 %
Variable-rate						
Due in 1 year or less	113,594	15.6%	117,042	15.9%	(3,448)	(2.9)%
Due after 1 year through 3 years	43,584	6.0%	58,427	8.0%	(14,843)	(25.4)%
Due after 3 years through 5 years	1,978	0.3%	11,971	1.6%	(9,993)	(83.5)%
Thereafter	1,448	0.2%	1,350	0.2%	98	7.3 %
Total principal amount	160,604	22.1%	188,790	25.7%	(28,186)	(14.9)%
Variable-rate, callable or prepayable(1)						
Due in 1 year or less	44,153	6.1%	29,822	4.1%	14,331	48.1 %
Due after 1 year through 3 years	59,346	8.1%	44,377	6.1%	14,969	33.7 %
Due after 3 years through 5 years	26,972	3.7%	27,344	3.7%	(372)	(1.4)%
Thereafter	25,789	3.5%	36,708	5.0%	(10,919)	(29.7)%
Total principal amount	156,260	21.4%	138,251	18.9%	18,009	13.0 %
Other(2)						
Due in 1 year or less	2,881	0.4%	2,495	0.3%	386	15.5 %
Due after 1 year through 3 years	4,264	0.6%	3,563	0.5%	701	19.7 %
Due after 3 years through 5 years	2,139	0.3%	3,187	0.5%	(1,048)	(32.9)%
Thereafter	3,762	0.5%	4,761	0.8%	(999)	(21.0)%
Total principal amount	13,046	1.8%	14,006	2.1%	(960)	(6.9)%
Overdrawn and overnight deposit accounts	52	—	12	—	40	333.3 %
Total principal amount advances	\$ 729,501	100.0%	\$ 732,114	100.0%	\$ (2,613)	(0.4)%
Other adjustments(3)	(734)		(570)			
Total advances	\$ 728,767		\$ 731,544			

- (1) Prepayable advances are those advances that may be contractually prepaid by the borrower on specified dates without incurring prepayment or termination fees.
(2) Includes hybrid, fixed-rate amortizing/mortgage matched, convertible, fixed-rate callable or prepayable, and other advances.
(3) Consists of hedging and fair value option valuation adjustments, unamortized premiums, discounts, and commitment fees.

Table 8 presents cash flows related to advance originations and advance repayments. During the year ended December 31, 2018, advance repayments exceeded originations, resulting in lower advances outstanding. Advance originations and advance repayments increased during the year ended December 31, 2018, compared to the year ended December 31, 2017, driven by an increase in short-term advance activity.

Table 8 - Advance Originations and Repayments
(dollars in millions)

	Year Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Advances originated	\$ 11,268,522	\$ 9,201,402	\$ 6,686,143	\$ 2,067,120	\$ 2,515,259
Advances repaid	11,271,130	9,173,597	6,613,082	2,097,533	2,560,515
Net change	\$ (2,608)	\$ 27,805	\$ 73,061		

The FHLBanks make advances primarily to their members. Table 9 presents the principal amount of advances by type of borrower and member.

Table 9 - Principal Amount of Advances by Type of Borrower and Member
(dollars in millions)

	December 31, 2018		December 31, 2017	
	Principal Amount	Number of Members	Principal Amount	Number of Members
Commercial bank members	\$ 470,382	2,548	\$ 460,904	2,696
Insurance company members(1)	104,322	177	101,602	176
Savings institution members	85,702	499	101,036	522
Credit union members	57,746	649	54,832	580
Community development financial institution members	222	25	162	21
Total	718,374	3,898	718,536	3,995
Non-member borrowers	10,132		12,683	
Housing associates	995		895	
Total principal amount	\$ 729,501		\$ 732,114	
Total members		6,863		6,989

(1) Includes \$20.9 billion and \$24.1 billion of the principal amount of advances outstanding to captive insurance members at December 31, 2018 and 2017.

Figures 14 and 15 present the percentage of principal amount of advances by type of borrower and percentage of member borrowers by type of member at December 31, 2018.

Figure 14: Percentage of Principal Amount of Advances by Type of Borrower

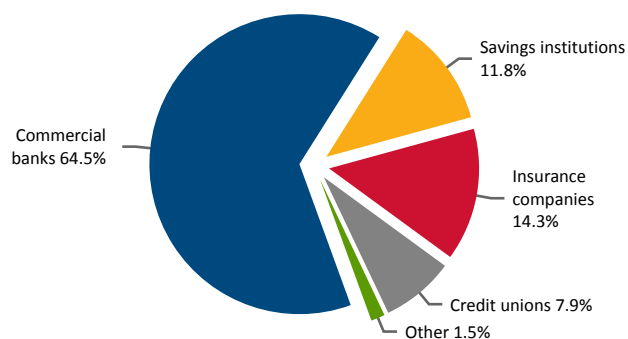


Figure 15: Percentage of Member Borrowers by Type of Member

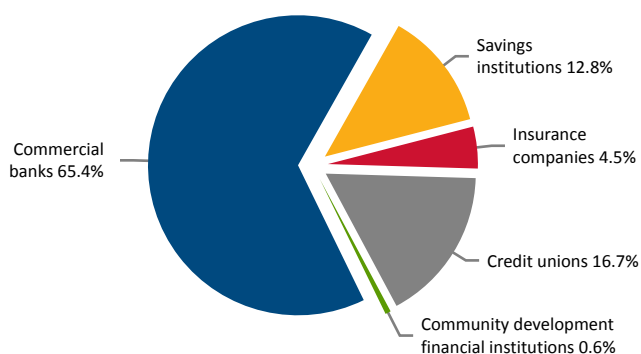


Table 10 presents the FHLBanks' top 10 advance holding borrowers at the holding-company level on a combined basis based on the principal amount of advances outstanding at December 31, 2018. The percentage of total advances for each holding company was computed by dividing the principal amount of advances by subsidiaries of that holding company by the principal amount of total combined advances. These percentage concentrations do not represent borrowing concentrations in an individual FHLBank.

Table 10 - Top 10 Advance Holding Borrowers by Holding Company at December 31, 2018
(dollars in millions)

Holding Company Name(1)	FHLBank Districts(2)	Principal Amount	Percentage of Total Principal Amount of Advances
JPMorgan Chase & Co.	Pittsburgh, Cincinnati, Chicago, Des Moines, San Francisco	\$ 55,826	7.7%
Wells Fargo & Company	Des Moines, San Francisco	54,622	7.5%
Ally Financial Inc.	Pittsburgh	21,825	3.0%
The PNC Financial Services Group, Inc.	Pittsburgh, Atlanta, Cincinnati	21,501	2.9%
Bank of America Corporation	Boston, Atlanta, Des Moines, San Francisco	20,630	2.8%
Citigroup Inc.	New York, Dallas	19,995	2.7%
Mitsubishi UFJ Financial Group, Inc.	San Francisco	16,900	2.3%
MetLife, Inc.	Boston, New York, Pittsburgh, Des Moines	15,970	2.2%
Navy Federal Credit Union	Atlanta	13,058	1.8%
New York Community Bancorp, Inc.	New York	13,054	1.8%
		<u>\$ 253,381</u>	<u>34.7%</u>

(1) Holding company information was obtained from the Federal Reserve System's web site, the National Information Center (NIC), and SEC filings. The NIC is a central repository of data about banks and other institutions for which the Federal Reserve System has a supervisory, regulatory, or research interest, including both domestic and foreign banking organizations operating in the United States.

(2) At December 31, 2018, each holding company had subsidiaries with advance borrowings in these FHLBank districts.

Table 11 presents information on the five largest borrowers from each FHLBank at December 31, 2018. The information presented on borrowings in Table 11 is for individual FHLBank advance holding borrowers. The data is not aggregated to the holding-company level. Some of the institutions listed may be affiliates of the same holding company, and some of the institutions listed may have affiliates that are advance holding borrowers that are not listed in the table. Each FHLBank describes its risk management policies, including disclosures about its concentration risk, if any, in its periodic reports filed with the SEC. (See [Explanatory Statement about Federal Home Loan Banks Combined Financial Report](#).)

Table 11 - Top 5 Advance Holding Borrowers by FHLBank at December 31, 2018
(dollars in millions)

District	Name	Holding Company Name(1)	Principal Amount	Percentage of FHLBank Total Principal Amount of Advances(2)
Boston	Citizens Bank, National Association		\$ 7,656	17.7%
	People's United Bank, National Association		2,391	5.6%
	State Street Bank and Trust Company		2,000	4.6%
	Webster Bank, National Association		1,827	4.2%
	Berkshire Bank		1,428	3.3%
			<u>\$ 15,302</u>	<u>35.4%</u>
New York	Citibank, N.A.	Citigroup Inc.	\$ 19,995	19.0%
	Metropolitan Life Insurance Company	MetLife, Inc.	14,245	13.5%
	New York Community Bank(3)	New York Community Bancorp, Inc.	13,053	12.3%
	Signature Bank		4,970	4.7%
	Investors Bank(3)		4,926	4.7%
			<u>\$ 57,189</u>	<u>54.2%</u>

District	Name	Holding Company Name(1)	Principal Amount	Percentage of FHLBank Total Principal Amount of Advances(2)
Pittsburgh	Ally Bank	Ally Financial Inc.	\$ 21,825	26.5%
	PNC Bank, National Association(3)	The PNC Financial Services Group, Inc.	21,500	26.0%
	Chase Bank USA, National Association	JPMorgan Chase & Co.	13,000	15.7%
	Santander Bank, N.A.(3)		4,850	5.9%
	BNY Mellon, National Association		2,550	3.1%
			<u>\$ 63,725</u>	<u>77.2%</u>
Atlanta	Bank of America, National Association	Bank of America Corporation	\$ 19,759	18.3%
	Navy Federal Credit Union	Navy Federal Credit Union	13,058	12.0%
	Capital One, National Association		9,301	8.6%
	TIAA, FSB		9,181	8.5%
	Regions Bank		8,502	7.8%
			<u>\$ 59,801</u>	<u>55.2%</u>
Cincinnati	JPMorgan Chase Bank, National Association	JPMorgan Chase & Co.	\$ 23,400	42.6%
	U.S. Bank National Association		4,574	8.4%
	Third Federal Savings and Loan Association of Cleveland		3,727	6.8%
	Nationwide Life Insurance Company		2,510	4.6%
	Pinnacle Bank		1,444	2.6%
			<u>\$ 35,655</u>	<u>65.0%</u>
Indianapolis	The Lincoln National Life Insurance Company		\$ 3,930	12.0%
	Flagstar Bank, FSB		3,143	9.6%
	Chemical Bank		2,445	7.5%
	Jackson National Life Insurance Company		2,016	6.1%
	American United Life Insurance Company		1,675	5.1%
			<u>\$ 13,209</u>	<u>40.3%</u>
Chicago	One Mortgage Partners Corp.	JPMorgan Chase & Co.	\$ 11,000	20.9%
	The Northern Trust Company		7,700	14.6%
	BMO Harris Bank, National Association		4,975	9.5%
	State Farm Bank, FSB		3,869	7.3%
	Associated Bank, National Association		3,574	6.8%
			<u>\$ 31,118</u>	<u>59.1%</u>
Des Moines	Wells Fargo Bank, National Association	Wells Fargo & Company	\$ 49,575	46.6%
	Zions Bancorporation, National Association(3)		4,500	4.2%
	Truman Insurance Company, LLC		3,588	3.4%
	Principal Life Insurance Company		3,500	3.3%
	Transamerica Life Insurance Company		3,085	2.9%
			<u>\$ 64,248</u>	<u>60.4%</u>
Dallas	Texas Capital Bank, National Association		\$ 3,900	9.6%
	Comerica Bank		3,800	9.3%
	American General Life Insurance Company		3,148	7.7%
	NexBank SSB		2,428	6.0%
	IBERIABANK		2,152	5.3%
			<u>\$ 15,428</u>	<u>37.9%</u>

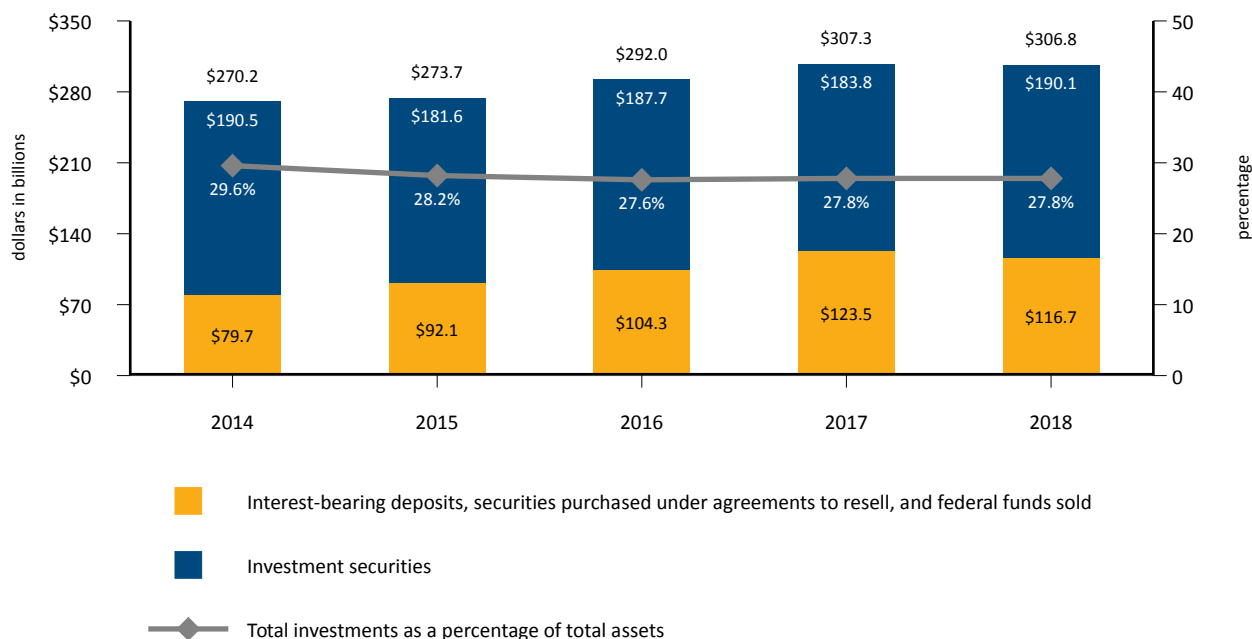
District	Name	Holding Company Name(1)	Principal Amount	Percentage of FHLBank Total Principal Amount of Advances(2)
Topeka	MidFirst Bank		\$ 6,560	22.8%
	BOKF, National Association		6,100	21.2%
	Capitol Federal Savings Bank		2,175	7.6%
	United of Omaha Life Insurance Company		813	2.8%
	Colorado Federal Savings Bank		625	2.2%
			<u>\$ 16,273</u>	<u>56.6%</u>
San Francisco	MUFG Union Bank, National Association	Mitsubishi UFJ Financial Group, Inc.	\$ 16,900	23.0%
	First Republic Bank		8,800	12.0%
	JPMorgan Chase Bank, National Association(4)	JPMorgan Chase & Co.	8,359	11.4%
	Bank of the West		6,707	9.1%
	Wells Fargo Financial National Bank	Wells Fargo & Company	5,000	6.8%
			<u>\$ 45,766</u>	<u>62.3%</u>

- (1) The holding company name is only shown for each Top 5 advance holding borrower that has its holding company listed in Table 10 - Top 10 Advance Holding Borrowers by Holding Company at December 31, 2018.
- (2) For consistency with the individual FHLBank's presentation of its Top 5 advance holders at December 31, 2018, amounts used to calculate percentages of FHLBank advances may be based on numbers in thousands. Accordingly, recalculations using the amounts in millions as presented in Table 11 may not produce the same results.
- (3) Indicates that an officer or director of the member was an FHLBank director at December 31, 2018.
- (4) Non-member advance holding borrower that is holding legacy advances due to out-of-district acquisition or merger.

Investments

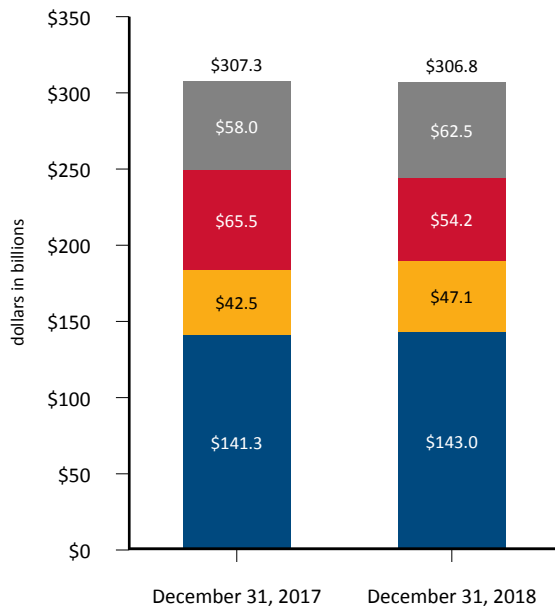
The FHLBanks maintain investment portfolios for liquidity purposes and to generate additional earnings. The income from these investment portfolios also bolsters the FHLBanks' capacity to support affordable housing and community investment. The FHLBanks invest in investment-quality securities to mitigate credit risk inherent in these portfolios. FHFA regulations prohibit the FHLBanks from investing in certain types of securities and limit the FHLBanks' investment in mortgage-backed securities (MBS) and asset-backed securities (ABS). (See [Financial Discussion and Analysis - Risk Management - Credit Risk - Investments](#) for additional information.) Figure 16 presents total investments for the most recent five years.

Figure 16: Total Investments at Year-end (Carrying Value)



Total investments were \$306.8 billion at December 31, 2018, a decrease of \$0.5 billion, or 0.2%, from \$307.3 billion at December 31, 2017. Figures 17 and 18 present the composition of investments by product type and by contractual maturity at December 31, 2018 and 2017.

Figure 17: Investments by Product Type



- Mortgage-backed securities
- Non-mortgage-backed securities
- Federal funds sold
- Securities purchased under agreements to resell and interest-bearing deposits

Figure 18: Investments by Contractual Maturity



- Due in 1 year or less
- Due after 1 year through 5 years
- Due after 5 years through 10 years
- Due after 10 years

The FHLBanks maintain short-term investment portfolios, the proceeds of which may provide funds to meet the credit needs of their members and to maintain liquidity. These portfolios may include:

- interest-bearing deposits;
- securities purchased under agreements to resell;
- federal funds sold;
- certificates of deposit;
- U.S. obligations; and
- GSE obligations.

The yield earned on these short-term investments is highly correlated with short-term market interest rates. At December 31, 2018, the FHLBanks continued to maintain significant short-term investment balances as part of their ongoing investment strategy and to satisfy liquidity needs. (See [Liquidity and Capital Resources](#) for further discussion related to liquidity management.)

The FHLBanks maintain long-term investment portfolios as an additional source of liquidity and to earn interest income. These investments generally provide the FHLBanks with higher returns than those available on short-term investments. These portfolios may include:

- U.S. obligations;
- GSE obligations;
- Agency obligations; and
- Other MBS and ABS.

Table 12 presents the composition of investments, including investment securities, at December 31, 2018, 2017, and 2016.

Table 12 - Total Investments
(dollars in millions)

	December 31,						
	2018				2017	2016	
	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years through 10 years	Due after 10 years	Carrying Value	Carrying Value	Carrying Value
Interest-bearing deposits	\$ 17,182	\$ —	\$ —	\$ —	\$ 17,182	\$ 5,420	\$ 2,878
Securities purchased under agreements to resell	45,325	—	—	—	45,325	52,568	52,771
Federal funds sold	54,216	—	—	—	54,216	65,530	48,633
Trading Securities							
Trading non-mortgage-backed securities							
Certificates of deposit	—	—	—	—	—	585	—
U.S. obligations	9,345	2,386	165	95	11,991	1,785	1,822
GSE and Tennessee Valley Authority obligations	1,819	—	673	179	2,671	3,463	5,693
Other	12	142	72	49	275	293	290
Total trading non-mortgage-backed securities	11,176	2,528	910	323	14,937	6,126	7,805
Trading mortgage-backed securities							
U.S. obligations single-family MBS	—	1	11	—	12	16	20
GSE single-family MBS	—	—	2	74	76	101	127
GSE multifamily MBS	151	356	917	—	1,424	1,493	1,509
Total trading mortgage-backed securities	151	357	930	74	1,512	1,610	1,656
Total trading securities	11,327	2,885	1,840	397	16,449	7,736	9,461
Available-for-Sale Securities							
Available-for-sale non-mortgage-backed securities							
Certificates of deposit	2,350	—	—	—	2,350	900	1,300
U.S. obligations	41	695	2,478	305	3,519	3,765	4,282
GSE and Tennessee Valley Authority obligations	1,180	5,225	5,479	1,423	13,307	14,961	16,243
State or local housing agency obligations	18	179	266	662	1,125	1,262	1,273
Federal Family Education Loan Program ABS	—	—	—	3,781	3,781	4,214	4,572
Other	126	85	592	49	852	922	1,064
Total available-for-sale non-mortgage-backed securities	3,715	6,184	8,815	6,220	24,934	26,024	28,734
Available-for-sale mortgage-backed securities							
U.S. obligations single-family MBS	—	16	—	5,431	5,447	5,010	5,577
U.S. obligations multifamily MBS	—	—	—	361	361	443	563
GSE single-family MBS	—	8	393	6,976	7,377	8,771	9,576
GSE multifamily MBS	2,711	6,531	24,591	6,780	40,613	33,582	30,390
Private-label residential MBS	—	1	—	4,472	4,473	5,730	6,833
Total available-for-sale mortgage-backed securities	2,711	6,556	24,984	24,020	58,271	53,536	52,939
Total available-for-sale securities	6,426	12,740	33,799	30,240	83,205	79,560	81,673

	December 31,						
	2018				2017	2016	
	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years through 10 years	Due after 10 years	Carrying Value	Carrying Value	Carrying Value
Held-to-Maturity Securities							
Held-to-maturity non-mortgage-backed securities							
Certificates of deposit	\$ 700	\$ —	\$ —	\$ —	\$ 700	\$ 675	\$ 1,750
U.S. obligations	675	92	107	475	1,349	1,577	1,751
GSE and Tennessee Valley Authority obligations	225	2,057	590	188	3,060	5,743	6,470
State or local housing agency obligations	10	95	156	1,835	2,096	2,318	2,575
Total held-to-maturity non-mortgage-backed securities	1,610	2,244	853	2,498	7,205	10,313	12,546
Held-to-maturity mortgage-backed securities							
U.S. obligations single-family MBS	—	512	9	6,548	7,069	7,869	8,493
U.S. obligations multifamily MBS	1	—	—	—	1	3	5
GSE single-family MBS	3	106	504	30,099	30,712	33,925	41,116
GSE multifamily MBS	805	9,240	32,482	519	43,046	41,088	30,083
Private-label residential MBS	3	4	30	2,199	2,236	3,080	4,118
Private-label manufactured housing loan ABS	—	—	2	34	36	54	69
Private-label home equity loan ABS	—	—	—	108	108	134	171
Total held-to-maturity mortgage-backed securities	812	9,862	33,027	39,507	83,208	86,153	84,055
Total held-to-maturity securities	2,422	12,106	33,880	42,005	90,413	96,466	96,601
Total investment securities	20,175	27,731	69,519	72,642	190,067	183,762	187,735
Total investments	\$ 136,898	\$ 27,731	\$ 69,519	\$ 72,642	\$ 306,790	\$ 307,280	\$ 292,017
Interest-bearing deposits	\$ 17,182	\$ —	\$ —	\$ —	\$ 17,182	\$ 5,420	\$ 2,878
Securities purchased under agreements to resell	45,325	—	—	—	45,325	52,568	52,771
Federal funds sold	54,216	—	—	—	54,216	65,530	48,633
Total Investment Securities by Major Security Type							
Investment securities non-mortgage-backed securities							
Certificates of deposit	3,050	—	—	—	3,050	2,160	3,050
U.S. obligations	10,061	3,173	2,750	875	16,859	7,127	7,855
GSE and Tennessee Valley Authority obligations	3,224	7,282	6,742	1,790	19,038	24,167	28,406
State or local housing agency obligations	28	274	422	2,497	3,221	3,580	3,848
Federal Family Education Loan Program ABS	—	—	—	3,781	3,781	4,214	4,572
Other	138	227	664	98	1,127	1,215	1,354
Total investment securities non-mortgage-backed securities	16,501	10,956	10,578	9,041	47,076	42,463	49,085
Investment securities mortgage-backed securities							
U.S. obligations single-family MBS	—	529	20	11,979	12,528	12,895	14,090
U.S. obligations multifamily MBS	1	—	—	361	362	446	568
GSE single-family MBS	3	114	899	37,149	38,165	42,797	50,819
GSE multifamily MBS	3,667	16,127	57,990	7,299	85,083	76,163	61,982
Private-label residential MBS	3	5	30	6,671	6,709	8,810	10,951
Private-label manufactured housing loan ABS	—	—	2	34	36	54	69
Private-label home equity loan ABS	—	—	—	108	108	134	171
Total investment securities mortgage-backed securities	3,674	16,775	58,941	63,601	142,991	141,299	138,650
Total investment securities	20,175	27,731	69,519	72,642	190,067	183,762	187,735
Total investments	\$ 136,898	\$ 27,731	\$ 69,519	\$ 72,642	\$ 306,790	\$ 307,280	\$ 292,017

	December 31,					2017	2016
	2018				Carrying Value		
	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years through 10 years	Due after 10 years			
Weighted-average yields on:							
Trading securities	2.21%	2.32%	2.93%	4.09%			
Available-for-sale securities	3.23%	2.67%	2.90%	3.49%			
Held-to-maturity securities	2.53%	2.98%	2.67%	2.87%			
Total investment securities	2.58%	2.77%	2.78%	3.14%			

The FHLBanks classify investment securities as held-to-maturity (HTM), available-for-sale (AFS), or trading securities. The interest-rate and prepayment risks associated with these investment securities are managed through a combination of debt issuance and derivatives. An FHLBank may manage the prepayment and interest-rate risks by funding investment securities with consolidated obligations that have call features or by hedging the prepayment risk with caps or floors, callable swaps, or swaptions. An FHLBank may manage prepayment and duration risk by funding investment securities with consolidated obligations that contain call features. An FHLBank may also manage the risk arising from changing market prices and volatility of investment securities by matching the cash outflow on the derivatives with the cash inflow on the investment securities. Derivatives held by an FHLBank that are associated with trading and HTM securities are designated as economic hedges, and derivatives held by an FHLBank associated with AFS securities may qualify as either a fair value hedge or a cash flow hedge, or may be designated as an economic hedge. (See [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements and [Quantitative and Qualitative Disclosure About Market Risk - Use of Derivatives to Manage Interest-Rate Risk](#) for additional information.)

Table 13 presents the interest-rate payment terms of investment securities at December 31, 2018 and 2017.

Table 13 - Interest-Rate Payment Terms of Investment Securities
(dollars in millions)

	December 31, 2018	December 31, 2017
Trading Securities at Fair Value		
Trading non-mortgage-backed securities		
Fixed-rate	\$ 13,673	\$ 3,811
Variable-rate	1,264	2,315
Total trading non-mortgage-backed securities	<u>14,937</u>	<u>6,126</u>
Trading mortgage-backed securities		
Fixed-rate	1,424	1,493
Variable-rate	88	117
Total trading mortgage-backed securities	<u>1,512</u>	<u>1,610</u>
Total trading securities	<u>\$ 16,449</u>	<u>\$ 7,736</u>
Available-for-Sale Securities at Amortized Cost		
Available-for-sale non-mortgage-backed securities		
Fixed-rate	\$ 18,693	\$ 18,900
Variable-rate	5,908	6,708
Total available-for-sale non-mortgage-backed securities	<u>24,601</u>	<u>25,608</u>
Available-for-sale mortgage-backed securities		
Fixed-rate	37,086	29,343
Variable-rate	20,775	23,246
Total available-for-sale mortgage-backed securities	<u>57,861</u>	<u>52,589</u>
Total available-for-sale securities	<u>\$ 82,462</u>	<u>\$ 78,197</u>
Held-to-Maturity Securities at Amortized Cost		
Held-to-maturity non-mortgage-backed securities		
Fixed-rate	\$ 2,591	\$ 4,797
Variable-rate	4,614	5,516
Total held-to-maturity non-mortgage-backed securities	<u>7,205</u>	<u>10,313</u>
Held-to-maturity mortgage-backed securities		
Fixed-rate	25,556	33,670
Variable-rate	57,920	52,823
Total held-to-maturity mortgage-backed securities	<u>83,476</u>	<u>86,493</u>
Total held-to-maturity securities	<u>\$ 90,681</u>	<u>\$ 96,806</u>

Limits on Certain Investments. FHFA regulations prohibit an FHLBank from purchasing MBS/ABS if its investment in these securities exceeds 300% of that FHLBank's previous month-end regulatory capital on the day it intends to purchase the securities. At December 31, 2018, each of the FHLBanks was in compliance with this regulatory requirement. On a combined basis, the FHLBanks' percentage of MBS/ABS (net of regulatory excluded MBS) was 248% of total combined regulatory capital at December 31, 2018.

Investment Security Holdings Issuer Concentration. Table 14 summarizes each individual FHLBank's investment security holdings by issuer with a carrying value exceeding 10% of the FHLBank's total capital at December 31, 2018. An FHLBank may have investments in mortgage-backed and non-mortgage-backed securities with members, former members, or their affiliates. All investment securities are transacted at then-current market prices without preference for the status of the issuer as a member, former member, or affiliate.

Table 14 - Issuers of Investment Securities Greater than 10% of Total Capital at December 31, 2018
(dollars in millions)

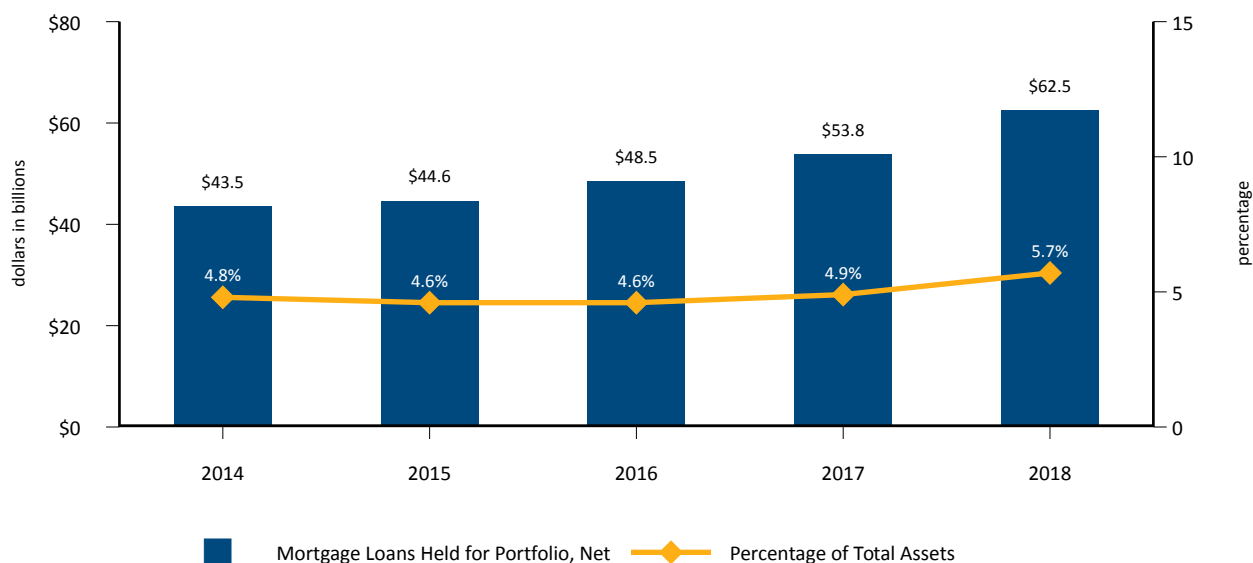
FHLBank	Name of Issuer	Carrying Value	Fair Value
Boston	Federal Home Loan Mortgage Corporation	\$ 2,811	\$ 2,815
	Federal National Mortgage Association	2,648	2,652
	Government National Mortgage Association	434	434
	Inter-American Development Bank	405	405
		<u>\$ 6,298</u>	<u>\$ 6,306</u>
New York	Federal Home Loan Mortgage Corporation	\$ 11,902	\$ 11,900
	United States Department of the Treasury	5,304	5,304
	Federal National Mortgage Association	4,842	4,811
	New York City Housing Development Corporation	1,105	1,083
		<u>\$ 23,153</u>	<u>\$ 23,098</u>
Pittsburgh	Federal National Mortgage Association	\$ 4,190	\$ 4,198
	Federal Home Loan Mortgage Corporation	3,034	3,042
	Federal Farm Credit Banks	1,704	1,704
	United States Department of the Treasury	997	997
		<u>\$ 9,925</u>	<u>\$ 9,941</u>
Atlanta	Federal Home Loan Mortgage Corporation	\$ 12,649	\$ 12,617
	Federal National Mortgage Association	8,172	8,163
	Federal Farm Credit Banks	2,577	2,582
		<u>\$ 23,398</u>	<u>\$ 23,362</u>
Cincinnati	Federal National Mortgage Association	\$ 7,607	\$ 7,512
	Federal Home Loan Mortgage Corporation	6,108	6,034
	Government National Mortgage Association	1,688	1,640
		<u>\$ 15,403</u>	<u>\$ 15,186</u>
Indianapolis	Federal National Mortgage Association	\$ 6,089	\$ 6,081
	Government National Mortgage Association	3,469	3,478
	Federal Farm Credit Banks	1,852	1,852
	Federal Home Loan Mortgage Corporation	1,795	1,796
		<u>\$ 13,205</u>	<u>\$ 13,207</u>
Chicago	Federal National Mortgage Association	\$ 8,604	\$ 8,625
	United States Department of the Treasury	3,460	3,460
	Federal Home Loan Mortgage Corporation	2,129	2,138
	Small Business Administration	1,769	1,785
	SLM Student Loan Mortgage SLMA 2009-1 A	1,020	1,020
	Government National Mortgage Association	967	970
	SLM Student Loan Mortgage SLMA 2009-2 A	862	862
	SLCLT 2009-1 Student Loan ABS	806	806
	SLC 2009-3 Student Loan ABS	578	578
		<u>\$ 20,195</u>	<u>\$ 20,244</u>

FHLBank	Name of Issuer	Carrying Value	Fair Value
Des Moines	Federal National Mortgage Association	\$ 10,272	\$ 10,263
	Government National Mortgage Association	4,492	4,492
	Federal Home Loan Mortgage Corporation	2,539	2,531
	Export-Import Bank of the United States	2,518	2,518
	CF Secured, LLC	1,000	1,000
	Daiwa Capital Markets America Inc.	1,000	1,000
		<u>\$ 21,821</u>	<u>\$ 21,804</u>
Dallas	Federal National Mortgage Association	\$ 11,637	\$ 11,640
	Federal Farm Credit Banks	2,628	2,628
	Federal Home Loan Mortgage Corporation	2,190	2,191
	United States Department of the Treasury	1,818	1,818
		<u>\$ 18,273</u>	<u>\$ 18,277</u>
Topeka	Federal National Mortgage Association	\$ 5,638	\$ 5,631
	Federal Home Loan Mortgage Corporation	1,471	1,471
	Federal Farm Credit Banks	450	450
	United States Department of the Treasury	252	252
		<u>\$ 7,811</u>	<u>\$ 7,804</u>
San Francisco	Federal National Mortgage Association	\$ 7,708	\$ 7,708
	Federal Home Loan Mortgage Corporation	5,857	5,825
	Federal Farm Credit Banks	656	656
		<u>\$ 14,221</u>	<u>\$ 14,189</u>

Mortgage Loans Held for Portfolio, Net

An FHLBank may purchase mortgage loans to support the FHLBank's housing mission, provide an additional source of liquidity to FHLBank members, diversify its investments, and generate additional earnings. The two primary programs are the Mortgage Purchase Program (MPP) and the Mortgage Partnership Finance® (MPF) Program. (See [Business - Mortgage Loans](#) and [Risk Management - Credit Risk - Mortgage Loans Held for Portfolio](#) for more information.) Figure 19 presents mortgage loans held for portfolio, net, for the most recent five years.

Figure 19: Mortgage Loans Held for Portfolio, Net, at Year-end (Carrying Value)



Mortgage loans grew to \$62.5 billion at December 31, 2018, an increase of 16.2% from \$53.8 billion at December 31, 2017. Mortgage loan purchases of \$15.3 billion outpaced principal repayments of \$6.4 billion, as several FHLBanks had strong growth in their mortgage loan portfolios. The allowance for credit losses on mortgage loans was \$15 million at December 31, 2018, a decrease of 6.3% from \$16 million at December 31, 2017.

Table 15 - Mortgage Loans Held for Portfolio, Net
(dollars in millions)

	December 31, 2018	December 31, 2017	Change
Mortgage loans held for portfolio	\$ 62,549	\$ 53,843	\$ 8,706
Allowance for credit losses on mortgage loans	(15)	(16)	1
Mortgage loans held for portfolio, net	\$ 62,534	\$ 53,827	\$ 8,707

Mortgage Loans Held for Portfolio. At December 31, 2018, the FHLBank of Atlanta was not accepting additional master commitments to acquire loans for its own portfolio. The FHLBank of Des Moines was not accepting additional master commitments to purchase mortgage loans under the MPP at December 31, 2018, and expects the balance of its existing MPP loans, acquired through the merger with the FHLBank of Seattle, to decrease as they are paid off. The remaining FHLBanks participating in the MPP and MPF Program continue to have the ability to purchase both conventional and government-guaranteed or -insured fixed-rate mortgage loans.

Allowance for Credit Losses on Mortgage Loans. Table 16 presents the risk elements and credit losses of mortgage loans held for portfolio. Periodically, each FHLBank evaluates the allowance for credit losses for its mortgage loans based on its policies and procedures to determine if an allowance for credit losses is necessary.

Table 16 - Mortgage Loans Held for Portfolio - Risk Elements and Credit Losses
(dollars in millions)

Unpaid Principal Balance	December 31,				
	2018	2017	2016	2015	2014
Total past due 90 days or more and still accruing interest	\$ 87	\$ 105	\$ 126	\$ 138	\$ 228
Non-accrual loans	\$ 135	\$ 194	\$ 241	\$ 335	\$ 438
Troubled debt restructurings (TDRs), performing	\$ 84	\$ 93	\$ 103	\$ 117	\$ 114

	Year Ended December 31,				
	2018	2017	2016	2015	2014
Allowance for credit losses, beginning of period	\$ 16	\$ 18	\$ 18	\$ 52	\$ 88
Charge-offs, net of recoveries(1)	(3)	(2)	(6)	(38)	(15)
Provision (reversal) for credit losses	2	—	6	4	(21)
Allowance for credit losses, end of period	\$ 15	\$ 16	\$ 18	\$ 18	\$ 52

Interest shortfall on nonaccrual and TDR loans(2)	\$ 5	\$ 7	\$ 10	\$ 15	\$ 17
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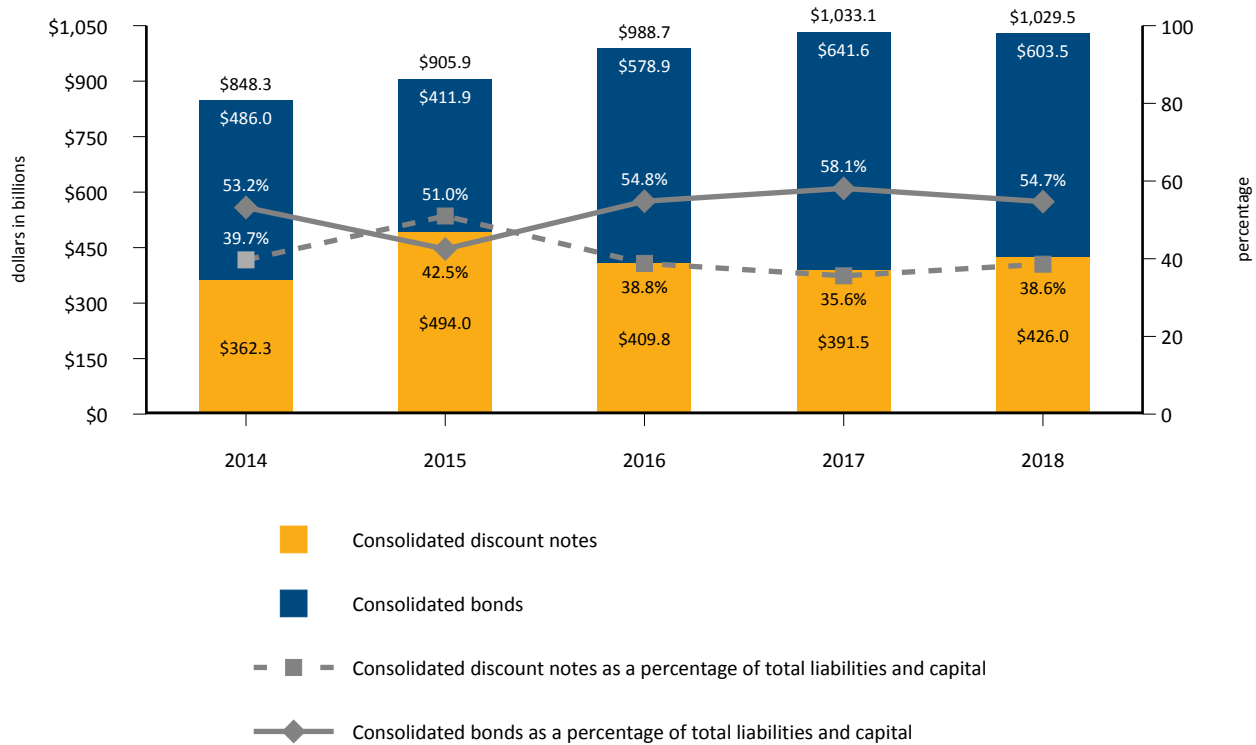
- (1) Net charge-offs for the year ended December 31, 2015, includes \$21 million of one-time charge-offs due to the adoption of FHFA Advisory Bulletin 2012-02.
(2) Represents the amount of interest that would have been recorded based on original terms less the interest actually recognized in income during the period.

See [Note 1 - Summary of Significant Accounting Policies](#) and [Note 10 - Allowance for Credit Losses](#) to the accompanying combined financial statements for more information.

Consolidated Obligations

Consolidated obligations consist of consolidated bonds and consolidated discount notes, which are joint and several obligations of all FHLBanks. The FHLBanks issue consolidated obligations through the Office of Finance as their agent. Consolidated obligations are the principal funding source used by the FHLBanks to make advances and to purchase mortgage loans and investments. Figure 20 presents consolidated bonds and consolidated discount notes for the most recent five years.

Figure 20: Consolidated Obligations Outstanding at Year-end (Carrying Value)



The carrying value of consolidated obligations totaled \$1,029.5 billion at December 31, 2018, a decrease of \$3.6 billion, or 0.3%, from \$1,033.1 billion at December 31, 2017, in line with the decrease in total assets, and consisted of a 5.9% decrease in consolidated bonds, partially offset by an 8.8% increase in consolidated discount notes.

Consolidated bonds may be issued to raise short-, intermediate-, or long-term funds. Consolidated bonds are issued with either fixed-rate or variable-rate coupon payment terms and have maturities ranging from three months to 30 years. The carrying value of consolidated bonds was \$603.5 billion at December 31, 2018, a decrease of \$38.1 billion, or 5.9%, from \$641.6 billion at December 31, 2017, consisting primarily of a decrease in variable-rate consolidated bonds with contractual maturities of one year or less. Consolidated bonds represented 58.6% and 62.1% of total consolidated obligations outstanding at December 31, 2018 and 2017.

Consolidated discount notes are issued to provide short-term funding and have a maturity range of one day to one year. They are generally issued below face value and mature at face value. A significant portion of consolidated discount note activity typically results from the refinancing of maturing discount notes. The carrying value of consolidated discount notes was \$426.0 billion at December 31, 2018, an increase of \$34.6 billion, or 8.8%, from \$391.5 billion at December 31, 2017. Consolidated discount notes represented 41.4% and 37.9% of total consolidated obligations outstanding at December 31, 2018 and 2017.

Figures 21 and 22 present the principal amount of consolidated obligations by product type and by contractual maturity at December 31, 2018 and 2017.

Figure 21: Consolidated Obligations by Product Type

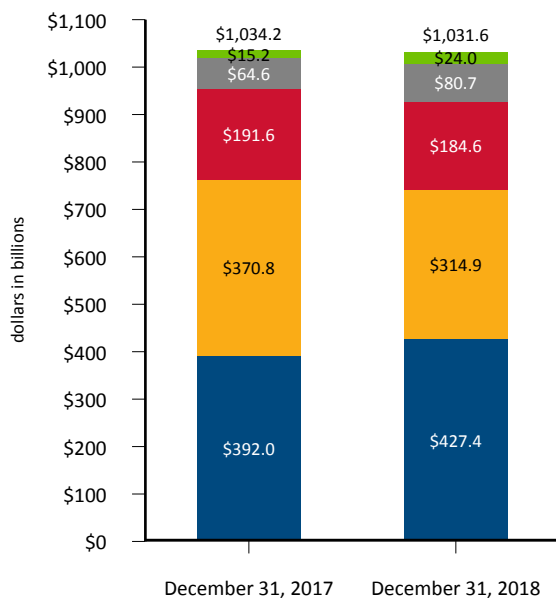
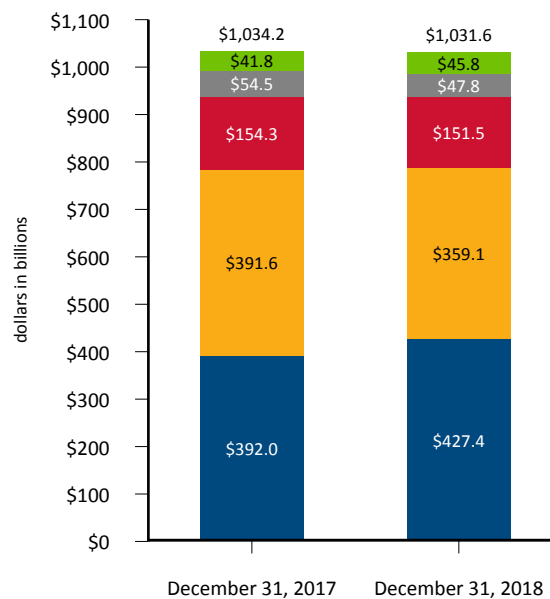


Figure 22: Consolidated Obligations by Contractual Maturity



- Discount notes
- Variable-rate bonds (non-capped)
- Fixed-rate, non-callable bonds
- Fixed-rate, callable bonds
- Other

- Discount notes
- Bonds due in 1 year or less
- Bonds due after 1 year through 3 years
- Bonds due after 3 years through 5 years
- Bonds due thereafter

Table 17 presents the composition of consolidated obligations by product type and by contractual maturity at December 31, 2018 and 2017.

Table 17 - Types of Consolidated Obligations by Contractual Maturity
(dollars in millions)

	December 31, 2018		December 31, 2017		Change	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
Consolidated Discount Notes						
Overnight	\$ 18,397	1.8%	\$ 10,575	1.0%	\$ 7,822	74.0 %
Due after 1 day through 30 days	162,924	15.8%	166,737	16.2%	(3,813)	(2.3)%
Due after 30 days through 90 days	196,289	19.0%	191,591	18.5%	4,698	2.5 %
Due after 90 days through 1 year	49,757	4.8%	23,146	2.2%	26,611	115.0 %
Total principal amount	427,367	41.4%	392,049	37.9%	35,318	9.0 %
Consolidated Bonds						
Fixed-rate, non-callable						
Due in 1 year or less	73,303	7.1%	62,812	6.1%	10,491	16.7 %
Due after 1 year through 3 years	72,139	7.0%	85,502	8.3%	(13,363)	(15.6)%
Due after 3 years through 5 years	22,012	2.1%	27,248	2.6%	(5,236)	(19.2)%
Thereafter	17,161	1.6%	15,975	1.5%	1,186	7.4 %
Total principal amount	184,615	17.8%	191,537	18.5%	(6,922)	(3.6)%
Fixed-rate, callable						
Due in 1 year or less	6,194	0.6%	7,172	0.7%	(978)	(13.6)%
Due after 1 year through 3 years	30,569	3.0%	17,094	1.7%	13,475	78.8 %
Due after 3 years through 5 years	20,634	2.0%	20,135	1.9%	499	2.5 %
Thereafter	23,372	2.3%	20,223	2.0%	3,149	15.6 %
Total principal amount	80,769	7.9%	64,624	6.3%	16,145	25.0 %
Variable-rate (non-capped)						
Due in 1 year or less	272,116	26.4%	321,287	31.1%	(49,171)	(15.3)%
Due after 1 year through 3 years	42,533	4.1%	49,533	4.8%	(7,000)	(14.1)%
Due after 3 years through 5 years	250	—	—	—	250	—
Thereafter	—	—	—	—	—	—
Total principal amount	314,899	30.5%	370,820	35.9%	(55,921)	(15.1)%
Step-up/step-down, callable						
Due in 1 year or less	7,085	0.7%	240	—	6,845	2,852.1 %
Due after 1 year through 3 years	5,704	0.6%	2,110	0.2%	3,594	170.3 %
Due after 3 years through 5 years	4,713	0.5%	6,815	0.7%	(2,102)	(30.8)%
Thereafter	4,220	0.4%	4,605	0.4%	(385)	(8.4)%
Total principal amount	21,722	2.2%	13,770	1.3%	7,952	57.7 %
Other						
Due in 1 year or less	435	—	48	—	387	806.3 %
Due after 1 year through 3 years	590	0.1%	95	—	495	521.1 %
Due after 3 years through 5 years	195	—	300	—	(105)	(35.0)%
Thereafter	1,024	0.1%	1,019	0.1%	5	0.5 %
Total principal amount	2,244	0.2%	1,462	0.1%	782	53.5 %
Total principal amount consolidated bonds	604,249	58.6%	642,213	62.1%	(37,964)	(5.9)%
Total principal amount	1,031,616	100.0%	1,034,262	100.0%	\$ (2,646)	(0.3)%
Other adjustments(1)	(2,091)		(1,181)			
Total consolidated obligations	\$ 1,029,525		\$ 1,033,081			

(1) Consists of hedging and fair value option valuation adjustments, unamortized premiums and discounts, and combining adjustments.

Table 18 presents cash flows related to consolidated obligations, which illustrates payments exceeding proceeds for the year ended December 31, 2018, resulting in lower consolidated obligations outstanding. The volume of both net proceeds and total payments of consolidated obligations increased during the year ended December 31, 2018, as compared to the year ended December 31, 2017. This was due to increased short-term funding activity.

Table 18 - Net Proceeds and Payments for Consolidated Obligations
(dollars in millions)

	Year Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net proceeds from issuance of consolidated obligations					
Discount notes	\$ 7,369,878	\$ 6,310,301	\$ 3,863,143	\$ 1,059,577	\$ 2,447,158
Bonds	477,225	482,691	524,098	(5,466)	(41,407)
Net proceeds	7,847,103	6,792,992	4,387,241	\$ 1,054,111	\$ 2,405,751
Payments for maturing and retiring consolidated obligations					
Discount notes	7,335,962	6,328,904	3,947,549	\$ 1,007,058	\$ 2,381,355
Bonds	515,126	419,478	355,683	95,648	63,795
Total payments	7,851,088	6,748,382	4,303,232	\$ 1,102,706	\$ 2,445,150
Net change	\$ (3,985)	\$ 44,610	\$ 84,009		

Table 19 presents consolidated obligations outstanding with original maturities of one year or less (short-term consolidated obligations) for the years ended December 31, 2018, 2017, and 2016. The daily average balance outstanding for consolidated notes and short-term consolidated obligations increased during the year ended December 31, 2018, as compared to the year ended December 31, 2017, due to increased short-term funding activity.

Table 19 - Short-Term Consolidated Obligations Outstanding
(dollars in millions)

	Consolidated Discount Notes(1)			Consolidated Bonds With Original Maturities of One Year or Less(2)		
	2018	2017	2016	2018	2017	2016
Outstanding at end of the period	\$ 426,034	\$ 391,480	\$ 409,815	\$ 191,338	\$ 215,223	\$ 194,194
Weighted-average interest rate at end of the period	2.33%	1.22%	0.48%	2.33%	1.29%	0.65%
Daily average outstanding for the period	\$ 404,452	\$ 403,807	\$ 448,448	\$ 215,152	\$ 191,575	\$ 158,048
Weighted-average interest rate for the period	1.88%	0.93%	0.45%	1.91%	0.90%	0.54%
Highest outstanding at any month-end	\$ 445,839	\$ 428,684	\$ 498,898	\$ 234,761	\$ 215,223	\$ 194,194

(1) Values are derived using the carrying value of the consolidated discount notes.

(2) Values are derived using the principal amount of the consolidated bonds.

Consolidated bonds often have investor-determined features. The decision to issue a consolidated bond using a particular structure is based on the desired amount of funding and the ability of the FHLBank(s) receiving the proceeds of the consolidated bond issued to hedge the risks. This strategy of issuing consolidated obligations while simultaneously entering into derivative transactions enables an FHLBank to offer a wider range of attractively priced advances to its members and may allow an FHLBank to reduce its funding costs. The continued attractiveness of this strategy depends on yield relationships between the FHLBanks' consolidated obligations and the derivatives markets. If conditions change, an FHLBank may alter the types or terms of the consolidated obligations that it issues. The increase in funding alternatives available to the FHLBanks through negotiated debt/swap transactions is beneficial to the FHLBanks because it may diversify the investor base, reduce funding costs, and/or provide additional asset/liability management tools.

The types of consolidated bonds issued can fluctuate based on comparative changes in their cost levels, supply and demand conditions, advance demand, and the FHLBanks' individual balance sheet management strategies. During the years ended December 31, 2018, 2017, and 2016, investors preferred variable-rate consolidated obligations to fixed-rate consolidated obligations as investors sought interest-rate protection in a rising interest-rate environment. Table 20 presents the bond types the FHLBanks relied on for their bond funding needs.

Table 20 - Percentage of Total Consolidated Bonds Issued by Bond Type

	Year Ended December 31,		
	2018	2017	2016
Single-index, variable-rate	81.2%	81.4%	63.4%
Fixed-rate, noncallable	11.1%	11.1%	23.3%
Fixed-rate, callable	5.6%	6.3%	10.3%
Step-up/step-down(1)	2.1%	1.2%	2.7%
Other	—%	—%	0.3%
Total	100.0%	100.0%	100.0%

(1) Primarily consists of callable step-up bonds.

The FHLBanks may use callable swaps to hedge against the interest-rate risk associated with callable bonds. The hedged callable bond is generally called if the call feature of the derivative is exercised. These call features could result in the need for FHLBanks to refinance a substantial portion of outstanding liabilities during times of decreasing interest rates. Call options on unhedged callable bonds generally are exercised when the bond can be replaced at a lower cost. Callable bonds enable an FHLBank to meet its funding needs at costs not otherwise directly attainable solely through the issuance of non-callable debt.

The FHLBanks have diversified sources and channels of funding from the capital markets based on the need for funding. Consolidated bonds can be negotiated individually or auctioned competitively through approved dealers, or issued directly to investors without the use of a dealer of consolidated obligations. The FHLBanks issue large, liquid bullet bonds through the Global Debt Program (mandated global bullets) to expand their pool of investors, while diversifying their funding sources. Mandated global bullets are issued through a formal dealer syndicate following pre-announced calendar issuance dates. For other negotiated bond transactions, approved dealers contact the Office of Finance or the FHLBanks directly if there is a bond structure they need to meet investor demand. These transactions are flexible and can be investor-customized with different interest-rate characteristics, terms, and currencies (for bonds issued under the Global Debt Program). Competitively-bid transactions are generally initiated when an FHLBank needs funds of a particular structure and size. Consolidated bonds can also be offered through auction and include fixed-rate, noncallables (through the TAP Issue Program), American-style callables, and mandated global reopenings.

Table 21 - Percentage of Total Consolidated Bonds Issued by Transaction Type

	Year Ended December 31,		
	2018	2017	2016
Negotiated transactions	94.0%	93.7%	92.2%
Competitive bid	6.0%	6.3%	7.8%
Total	100.0%	100.0%	100.0%

Deposits

The FHLBanks offer demand and overnight deposit programs to members and to qualifying non-members. In addition, certain FHLBanks offer short-term interest-bearing deposit programs to members, and in certain cases, to qualifying non-members. Deposits represent a relatively small portion of the FHLBanks' funding, totaling \$7.6 billion at December 31, 2018, a decrease of \$0.2 billion, or 2.9%, from December 31, 2017. Deposit balances vary depending on market factors, such as the attractiveness of the FHLBanks' deposit pricing relative to the rates available on alternative money market instruments, FHLBank members' investment preferences with respect to the maturity of their investments, and FHLBank members' liquidity. Interest-bearing demand and overnight deposits represented 89.9% and 89.4% of deposits at December 31, 2018 and 2017, with the remaining deposits primarily being term deposits and non-interest-bearing deposits.

Interest-bearing demand and overnight deposits pay interest based on a daily interest rate. Term deposits pay interest based on a fixed rate determined at the issuance of the deposit. The average balances of interest-bearing deposits were \$7.6 billion, \$8.5 billion, and \$8.5 billion, and the weighted-average interest rates paid on those interest-bearing deposits were 1.65%, 0.82%, and 0.20% during the years ended December 31, 2018, 2017, and 2016.

Table 22 presents term deposits issued in amounts of \$100 thousand or more at December 31, 2018 and 2017.

Table 22 - Term Deposits Issued in Amounts of \$100 Thousand or More
(dollars in millions)

	December 31, 2018	December 31, 2017
3 months or less	\$ 252	\$ 314
Over 3 months through 6 months	50	74
Over 6 months through 12 months	87	90
Over 12 months	4	3
Total	<u>\$ 393</u>	<u>\$ 481</u>

Capital

GAAP capital consists of capital stock, retained earnings, and accumulated other comprehensive income (loss). Figure 23 presents GAAP capital and the GAAP capital-to-assets ratio for the most recent five years.

Figure 23: GAAP Capital at Year-end

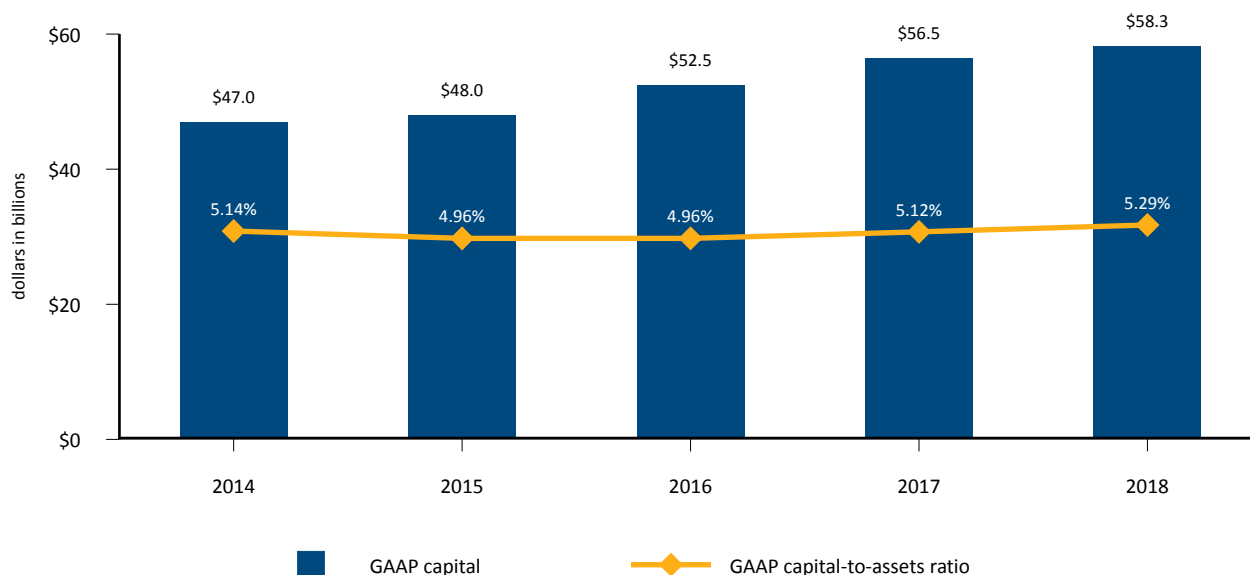


Table 23 - Total Capital and Capital-to-Assets Ratios
(dollars in millions)

	December 31, 2018	December 31, 2017	Change
Capital stock	\$ 38,498	\$ 37,657	\$ 841
Retained earnings	19,504	18,099	1,405
AOCI	342	724	(382)
Total GAAP capital	58,344	56,480	1,864
Exclude: AOCI	(342)	(724)	382
Add: Mandatorily redeemable capital stock	1,062	1,272	(210)
Other(1)	—	(1)	1
Total combined regulatory capital(2)	\$ 59,064	\$ 57,027	\$ 2,037
Total assets	\$ 1,102,850	\$ 1,103,451	\$ (601)
Combined GAAP capital-to-assets ratio	5.29%	5.12%	
Combined regulatory capital-to-assets ratio(3)	5.36%	5.17%	

(1) Represents rounding adjustments.

(2) Regulatory capital requirements apply to individual FHLBanks, and the combined amounts are for analysis only. The sum of the individual FHLBank regulatory capital amounts does not agree to the total combined regulatory capital due to combining adjustments.

(3) The combined regulatory capital-to-assets ratio is calculated based on the FHLBanks' combined regulatory capital as a percentage of combined total assets. (See [Note 16 - Capital](#) to the accompanying combined financial statements for a definition and discussion of regulatory capital.)

GAAP Capital. Total GAAP capital was \$58.3 billion at December 31, 2018, an increase of 3.3% from \$56.5 billion at December 31, 2017. This increase was due primarily to growth in retained earnings and an increase in capital stock. The combined GAAP capital-to-assets ratio was 5.29% at December 31, 2018, an increase of 17 basis points from 5.12% at December 31, 2017.

Capital Stock. Capital stock was \$38.5 billion at December 31, 2018, an increase of 2.2% from \$37.7 billion at December 31, 2017, due primarily to the net issuance of capital stock, partially offset by the reclassification of shares to mandatorily redeemable capital stock.

Retained Earnings. Retained earnings grew to \$19.5 billion at December 31, 2018, an increase of 7.8% from \$18.1 billion at December 31, 2017, resulting from net income of \$3,562 million, partially offset by dividends of \$2,162 million. Unrestricted retained earnings were \$15.2 billion at December 31, 2018, a growth of 4.8% from \$14.5 billion at December 31, 2017. Restricted retained earnings were \$4.3 billion at December 31, 2018, a growth of 20.1% from \$3.6 billion at December 31, 2017.

Figures 24 and 25 present the components of capital as a percentage of total GAAP capital at December 31, 2018 and 2017.

Figure 24: Capital Components as a Percentage of Total GAAP Capital at December 31, 2018

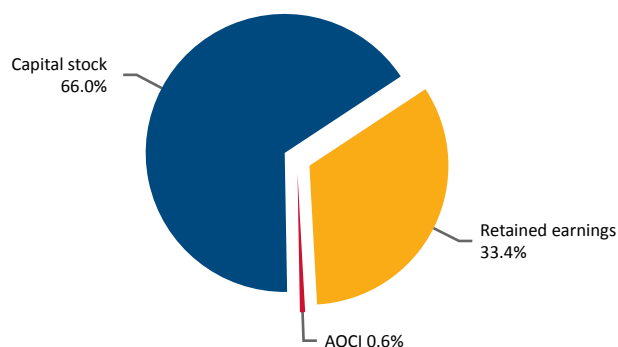
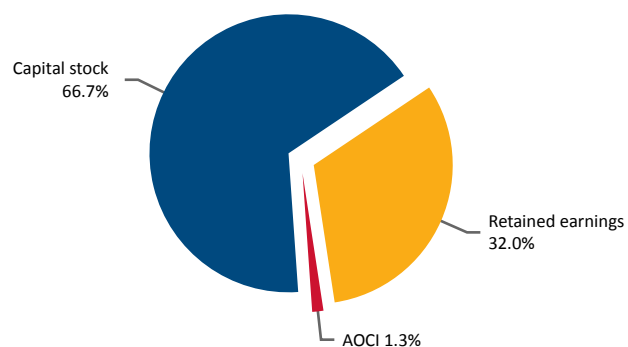


Figure 25: Capital Components as a Percentage of Total GAAP Capital at December 31, 2017



Regulatory Capital. Total combined regulatory capital was \$59.1 billion at December 31, 2018, an increase of 3.6% from \$57.0 billion at December 31, 2017, resulting from growth in retained earnings and an increase in capital stock, partially offset by a decrease in mandatorily redeemable capital stock.

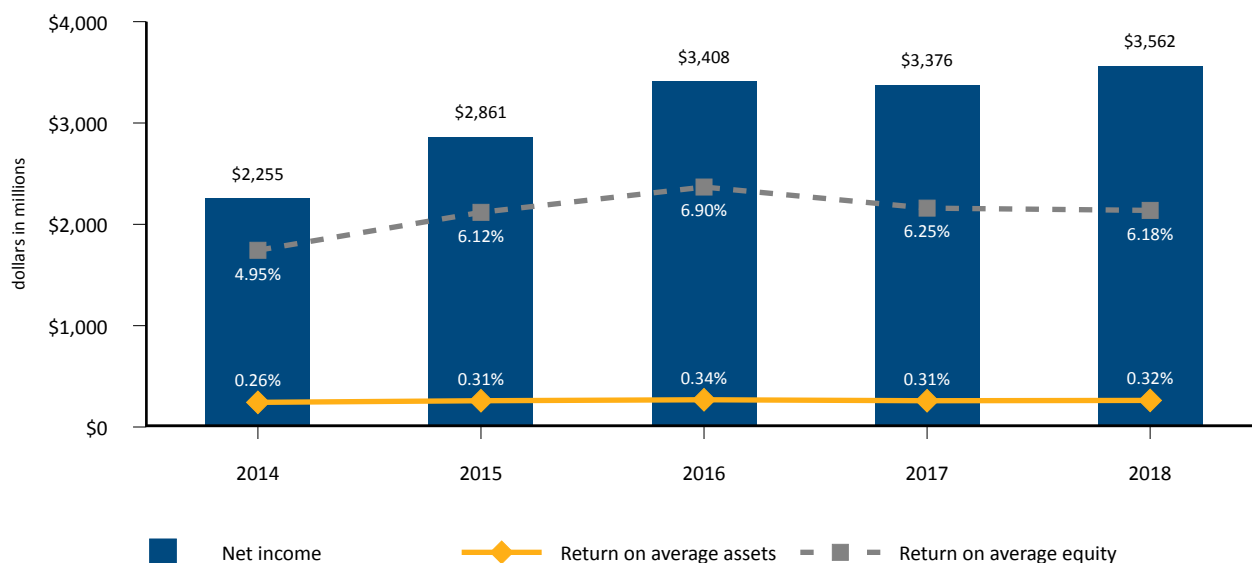
Combined Results of Operations

Net Income

The primary source of revenue for the FHLBanks is interest income earned on advances, mortgage loans held for portfolio, and investments. The primary items of expense for the FHLBanks are interest paid on consolidated obligations; operating expenses, including employee compensation and benefits; and Affordable Housing Program assessments. The FHLBanks may also recognize non-interest gains and losses, such as gains and losses on derivatives and hedging activities and gains and losses on trading securities.

Due to the FHLBanks' cooperative structures, the FHLBanks generally earn a narrow net interest spread. Accordingly, the FHLBanks' net income is relatively small compared to total assets and total liabilities. Figure 26 presents net income, return on average assets, and return on average equity for the most recent five years.

Figure 26: Net Income



Net income was \$3,562 million for the year ended December 31, 2018, an increase of 5.5% compared to the year ended December 31, 2017, resulting primarily from an increase in net interest income, partially offset by lower net gains in non-interest income. Net income was \$3,376 million for the year ended December 31, 2017, a decrease of 0.9% compared to the year ended December 31, 2016. This decrease was due primarily to lower net gains in non-interest income, partially offset by an increase in net interest income.

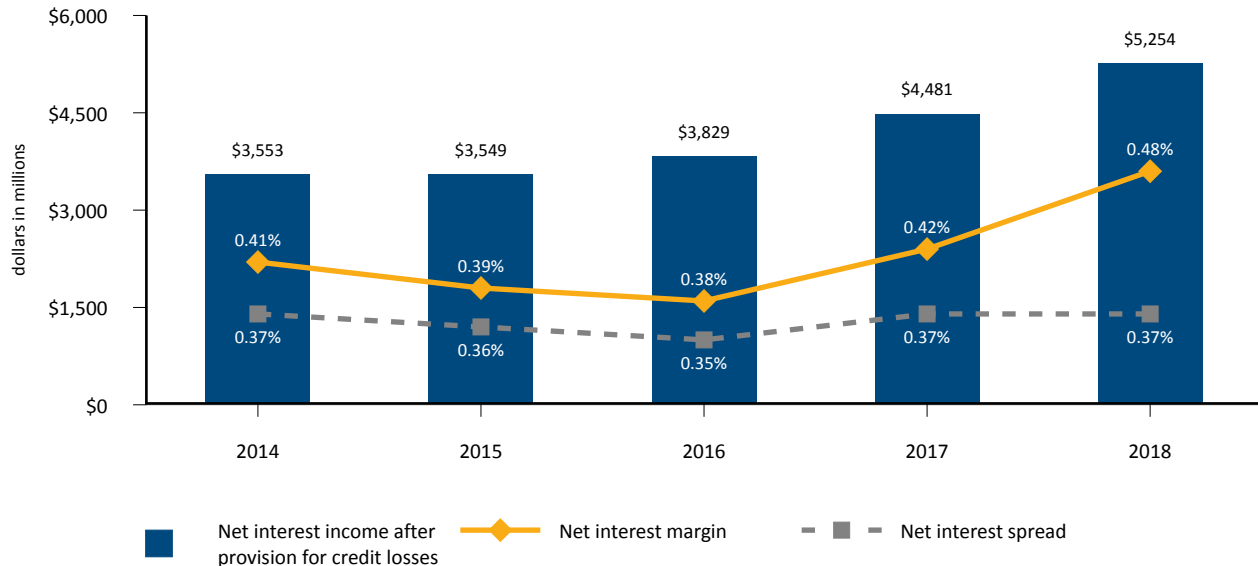
Table 24 - Changes in Net Income
(dollars in millions)

	Year Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net interest income after provision (reversal) for credit losses	\$ 5,254	\$ 4,481	\$ 3,829	\$ 773	\$ 652
Non-interest income	27	615	1,154	(588)	(539)
Non-interest expense	1,315	1,336	1,183	(21)	153
Affordable Housing Program assessments	404	384	392	20	(8)
Net income	\$ 3,562	\$ 3,376	\$ 3,408	\$ 186	\$ (32)

Net Interest Income after Provision (Reversal) for Credit Losses

The primary source of each FHLBank's earnings is net interest income, which is the interest income on advances, mortgage loans, and investments, less the interest expense on consolidated obligations, deposits, and mandatorily redeemable capital stock. Figure 27 presents net interest income after provision for credit losses, net interest margin, and net interest spread for the most recent five years.

Figure 27: Net Interest Income after Provision for Credit Losses



Net interest income after provision (reversal) for credit losses was \$5,254 million for the year ended December 31, 2018, an increase of 17.3% compared to the year ended December 31, 2017. Net interest margin was 0.48% for the year ended December 31, 2018, an increase of 6 basis points compared to the year ended December 31, 2017. Net interest income after provision (reversal) for credit losses was \$4,481 million for the year ended December 31, 2017, an increase of 17.0% compared to the year ended December 31, 2016. Net interest margin for the year ended December 31, 2017, was 0.42%, an increase of 4 basis points compared to the year ended December 31, 2016.

Table 25 - Net Interest Income after Provision (Reversal) for Credit Losses
(dollars in millions)

	Year Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Interest income					
Advances	\$ 16,031	\$ 9,043	\$ 5,359	\$ 6,988	\$ 3,684
Investments and other	7,697	5,240	3,992	2,457	1,248
Mortgage loans held for portfolio	1,989	1,719	1,579	270	140
Total interest income	25,717	16,002	10,930	9,715	5,072
Interest expense					
Consolidated obligations - Discount notes	7,605	3,759	2,020	3,846	1,739
Consolidated obligations - Bonds	12,657	7,620	4,931	5,037	2,689
Total consolidated obligations	20,262	11,379	6,951	8,883	4,428
Deposits and mandatorily redeemable capital stock(1)	199	142	144	57	(2)
Total interest expense	20,461	11,521	7,095	8,940	4,426
Net interest income	5,256	4,481	3,835	775	646
Provision (reversal) for credit losses	2	—	6	2	(6)
Net interest income after provision (reversal) for credit losses	\$ 5,254	\$ 4,481	\$ 3,829	\$ 773	\$ 652

(1) Year ended December 31, 2016 amount includes interest expense of subordinated notes.

Table 26 presents average balances of and yields on the major categories of interest-earning assets and interest-bearing liabilities; net interest spread, which is the difference between the annualized yield on total interest-earning assets and the annualized yield on total interest-bearing liabilities; and net interest margin, which is net interest income expressed as a percentage of the average balance of total interest-earning assets. Due to the FHLBanks' cooperative structures, the FHLBanks generally earn a narrow net interest spread.

Table 26 - Spread and Yield Analysis
(dollars in millions)

	Year Ended December 31,								
	2018			2017			2016		
	Average Balance	Interest	Yield	Average Balance	Interest	Yield	Average Balance	Interest	Yield
Interest-bearing deposits and other	\$ 11,957	\$ 245	2.05%	\$ 5,592	\$ 71	1.27%	\$ 8,136	\$ 43	0.53%
Securities purchased under agreements to resell	34,681	678	1.95%	18,958	179	0.94%	24,661	92	0.37%
Federal funds sold	84,859	1,561	1.84%	91,344	950	1.04%	68,092	274	0.40%
Investment securities(1)(2)	184,119	5,213	2.83%	182,369	4,040	2.22%	187,698	3,583	1.91%
Advances	728,245	16,031	2.20%	718,675	9,043	1.26%	672,737	5,359	0.80%
Mortgage loans	57,618	1,989	3.45%	50,745	1,719	3.39%	45,949	1,579	3.44%
Total interest-earning assets	1,101,479	25,717	2.33%	1,067,683	16,002	1.50%	1,007,273	10,930	1.09%
Other non-interest-earning assets	6,254			6,967			6,215		
Fair-value adjustment on investment securities(2)	2,424			2,315			(398)		
Total assets	<u>\$1,110,157</u>			<u>\$1,076,965</u>			<u>\$1,013,090</u>		
Liabilities and Capital									
Consolidated obligations - Discount notes	404,452	7,605	1.88%	403,807	3,759	0.93%	448,448	2,020	0.45%
Consolidated obligations - Bonds	631,434	12,657	2.00%	601,536	7,620	1.27%	493,927	4,931	1.00%
Deposits and mandatorily redeemable capital stock(3)	8,742	199	2.28%	9,960	142	1.43%	10,635	144	1.35%
Total interest-bearing liabilities	1,044,628	20,461	1.96%	1,015,303	11,521	1.13%	953,010	7,095	0.74%
Non-interest-bearing liabilities	7,846			7,608			10,660		
Total liabilities	1,052,474			1,022,911			963,670		
Capital	57,683			54,054			49,420		
Total liabilities and capital	<u>\$1,110,157</u>			<u>\$1,076,965</u>			<u>\$1,013,090</u>		
Net interest income		<u>\$ 5,256</u>			<u>\$ 4,481</u>			<u>\$ 3,835</u>	
Net interest spread			0.37%			0.37%			0.35%
Net interest margin			0.48%			0.42%			0.38%
Total interest-earning assets to total interest-bearing liabilities	105.44%			105.16%			105.69%		

(1) Investment securities consist of Trading, AFS, and HTM securities.

(2) The average balances of AFS securities and HTM securities are reflected at amortized cost; therefore, the resulting yields do not give effect to changes in fair value or the non-credit component of previously recognized other-than-temporary impairment (OTTI) reflected in AOCI.

(3) Year ended December 31, 2016 amounts include the average balance and interest expense of subordinated notes.

Changes in both interest rates and average balances of interest-earning assets and interest-bearing liabilities have a direct influence on changes in net interest income, net interest margin, and net interest spread. Table 27 presents changes in interest income and interest expense due to rate-related and volume-related factors. Changes in interest income and interest expense not identifiable as either rate-related or volume-related, but rather attributable to both rate and volume changes, have been allocated to the rate and volume categories based on the proportion of the absolute value of the rate and volume changes.

Table 27 - Rate and Volume Analysis
(dollars in millions)

	2018 vs. 2017			2017 vs. 2016		
	Volume	Rate	Total	Volume	Rate	Total
Interest Income						
Interest-bearing deposits and other	\$ 113	\$ 61	\$ 174	\$ (16)	\$ 44	\$ 28
Securities purchased under agreements to resell	218	281	499	(25)	112	87
Federal funds sold	(71)	682	611	119	557	676
Investment securities(1)	40	1,133	1,173	(105)	562	457
Advances	123	6,865	6,988	391	3,293	3,684
Mortgage loans	239	31	270	163	(23)	140
Total interest income	662	9,053	9,715	527	4,545	5,072
Interest Expense						
Consolidated obligations - Discount notes	6	3,840	3,846	(219)	1,958	1,739
Consolidated obligations - Bonds	401	4,636	5,037	1,201	1,488	2,689
Deposits and mandatorily redeemable capital stock(2)	(19)	76	57	(10)	8	(2)
Total interest expense	388	8,552	8,940	972	3,454	4,426
Changes in net interest income	\$ 274	\$ 501	\$ 775	\$ (445)	\$ 1,091	\$ 646

(1) Investment securities consist of Trading, AFS, and HTM securities.

(2) Year ended December 31, 2016 amounts include the average balance and interest expense of subordinated notes.

Net interest income was \$5,256 million for the year ended December 31, 2018, an increase of 17.3% compared to the year ended December 31, 2017. Interest income grew to \$25,717 million for the year ended December 31, 2018, an increase of 60.7% compared to the year ended December 31, 2017, due primarily to an 83 basis point increase in the yield on interest-earning assets, principally advances. Interest expense was \$20,461 million for the year ended December 31, 2018, an increase of 77.6% compared to the year ended December 31, 2017, due primarily to an 83 basis point increase in the yield on interest-bearing liabilities.

Net interest income was \$4,481 million for the year ended December 31, 2017, an increase of 16.8% compared to the year ended December 31, 2016. Interest income was \$16,002 million for the year ended December 31, 2017, an increase of 46.4% compared to the year ended December 31, 2016, due primarily to a 41 basis point increase in the yield on interest-earning assets, principally advances. Interest expense was \$11,521 million for the year ended December 31, 2017, an increase of 62.4% compared to the year ended December 31, 2016, due primarily to a 39 basis point increase in the yield on interest-bearing liabilities, and a 6.5% increase in the average balance of interest-bearing liabilities.

Factors Affecting Net Interest Income.

Advances. Interest income on advances was \$16,031 million for the year ended December 31, 2018, an increase of 77.3% compared to the year ended December 31, 2017, resulting primarily from a 94 basis point increase in the yield on advances. Interest income on advances was \$9,043 million for the year ended December 31, 2017, an increase of 68.7% compared to the year ended December 31, 2016, resulting primarily from a 46 basis point increase in the yield on advances. The increases in yields on advances were the result of higher interest rates on advances and the effect of derivatives and hedging activities on interest income from advances driven by the higher interest-rate environment. (See *Table 28* for additional information regarding the effect of derivatives and hedging activities on net interest income.)

Mortgage Loans. Interest income on mortgage loans was \$1,989 million for the year ended December 31, 2018, an increase of 15.7% compared to the year ended December 31, 2017, resulting primarily from a 13.5% increase in the average balance of mortgage loans. Interest income on mortgage loans was \$1,719 million for the year ended December 31, 2017, an increase of 8.9% compared to the year ended December 31, 2016, resulting primarily from a 10.4% increase in the average balance of mortgage loans.

Total Investments. Interest income on investments was \$7,697 million for the year ended December 31, 2018, an increase of 46.9% compared to the year ended December 31, 2017, resulting primarily from a 61 basis point increase in the yield on investment securities and an 80 basis point increase in the yield on federal funds sold. Interest income on investments was \$5,240 million for the year ended December 31, 2017, an increase of 31.3% compared to the year ended December 31, 2016, resulting principally from a 31 basis point increase in the yield on investment securities and a 64 basis point increase in the yield on federal funds sold. These increases in the yields on investment securities and federal funds sold were driven by increases in market interest rates.

Consolidated Obligations. Interest expense on consolidated obligations was \$20,262 million for the year ended December 31, 2018, an increase of 78.1% compared to the year ended December 31, 2017, resulting from a 73 basis point increase in the yield on consolidated bonds and a 95 basis point increase in the yield on consolidated discount notes. The increases in the yields on consolidated bonds and consolidated discount notes were due to the higher interest rate environment, including the effect of derivatives and hedging activities on interest expense from consolidated obligations. (See *Table 28* for additional information regarding the effect of derivatives and hedging activities on net interest income.)

Interest expense on consolidated obligations was \$11,379 million for the year ended December 31, 2017, an increase of 63.7% compared to the year ended December 31, 2016, resulting from a 48 basis point increase in the yield on consolidated discount notes and a 27 basis point increase in the yield on consolidated bonds, as well as a 21.8% increase in the average balance of consolidated bonds. The increases in the yields on consolidated discount notes and consolidated bonds were due to the higher interest rate environment, including the effect of derivatives and hedging activities on interest expense from consolidated obligations. (See *Table 28* for additional information regarding the effect of derivatives and hedging activities on net interest income.) The increase in the average balances of consolidated obligations was consistent with the increase in average total assets.

Effect of Derivatives and Hedging Activities on Net Interest Income

Net interest income includes components related to the effect of derivatives and hedging activities resulting from the FHLBanks' hedging strategies. Net interest income, net interest margin, and yield on advances for the year ended December 31, 2017, were negatively affected by the FHLBank of Atlanta's recording of \$302 million of accelerated amortization during the first quarter of 2017, due to prepayments of certain previously restructured and hedged advances. This accelerated amortization was offset by corresponding gains recorded in net gains (losses) on derivatives and hedging activities included in non-interest income, recorded during the first quarter of 2017. *Table 28* presents the effect of derivatives and hedging activities on net interest income and *Table 30* presents the effect of derivatives and hedging activities on non-interest income.

If a hedging relationship is designated and qualifies for hedge accounting treatment, the net interest settlements of interest receivables or payables related to derivatives designated in fair value or cash flow hedge relationships are recognized as adjustments to interest income or expense of the designated hedged item. In addition, when hedge accounting is discontinued, the cumulative basis adjustment on the hedged item is amortized or accreted into net interest income over the remaining life of the hedged item using a level-yield methodology. (See [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements for additional information on the effect of derivatives and hedging activities.)

Table 28 - Effect of Derivatives and Hedging Activities on Net Interest Income
(dollars in millions)

	Year Ended December 31, 2018					
	Advances	Investment Securities	Mortgage Loans	Consolidated Bonds	Consolidated Discount Notes	Total
Net interest income						
Amortization and accretion of hedging activities in net interest income	\$ (26)	\$ 44	\$ (10)	\$ (23)	\$ (15)	\$ (30)
Net interest settlements included in net interest income(1)	473	(105)	—	(548)	(95)	(275)
Total effect on net interest income	<u>\$ 447</u>	<u>\$ (61)</u>	<u>\$ (10)</u>	<u>\$ (571)</u>	<u>\$ (110)</u>	<u>\$ (305)</u>

	Year Ended December 31, 2017					
	Advances	Investment Securities	Mortgage Loans	Consolidated Bonds	Consolidated Discount Notes	Total
Net interest income						
Amortization and accretion of hedging activities in net interest income	\$ (342)	\$ 64	\$ (17)	\$ (17)	\$ (2)	\$ (314)
Net interest settlements included in net interest income(1)	(730)	(460)	—	262	(202)	(1,130)
Total effect on net interest income	<u>\$ (1,072)</u>	<u>\$ (396)</u>	<u>\$ (17)</u>	<u>\$ 245</u>	<u>\$ (204)</u>	<u>\$ (1,444)</u>

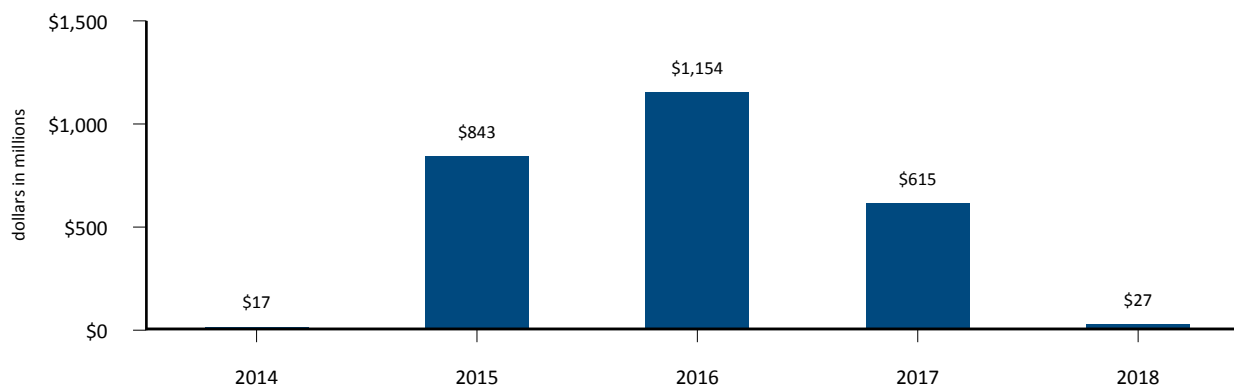
	Year Ended December 31, 2016					
	Advances	Investment Securities	Mortgage Loans	Consolidated Bonds	Consolidated Discount Notes	Total
Net interest income						
Amortization and accretion of hedging activities in net interest income	\$ (125)	\$ 74	\$ (29)	\$ (16)	\$ (2)	\$ (98)
Net interest settlements included in net interest income(1)	(1,716)	(643)	—	872	(234)	(1,721)
Total effect on net interest income	<u>\$ (1,841)</u>	<u>\$ (569)</u>	<u>\$ (29)</u>	<u>\$ 856</u>	<u>\$ (236)</u>	<u>\$ (1,819)</u>

(1) Represents interest income or expense on derivatives included in net interest income.

Non-Interest Income

Non-interest income consists of realized and unrealized gains (losses) on investment securities and derivatives activities, gains on litigation settlements, and other non-interest-earning activities. Figure 28 presents non-interest income for the most recent five years.

Figure 28: Non-Interest Income



Non-interest income was \$27 million for the year ended December 31, 2018, a decrease of 95.6% compared to the year ended December 31, 2017, due primarily to net losses on derivatives and hedging activities and lower gains on litigation settlements.

Non-interest income was \$615 million for the year ended December 31, 2017, a decrease of 46.7% compared to the year ended December 31, 2016, due primarily to lower gains on litigation settlements, partially offset by higher net gains on derivatives and hedging activities.

Table 29 - Changes in Non-Interest Income
(dollars in millions)

	Year Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net other-than-temporary impairment losses	\$ (17)	\$ (21)	\$ (22)	\$ 4	\$ 1
Net gains (losses) on investment securities	5	3	17	2	(14)
Net gains (losses) on financial instruments held under fair value option	(54)	(28)	3	(26)	(31)
Net gains (losses) on derivatives and hedging activities	(81)	324	47	(405)	277
Gains on litigation settlements, net	14	161	952	(147)	(791)
Other, net	160	176	157	(16)	19
Total non-interest income (loss)	\$ 27	\$ 615	\$ 1,154	\$ (588)	\$ (539)

Other-than-Temporary Impairment Losses. Each FHLBank updates its own other-than-temporary impairment analysis each quarter to reflect current housing market conditions, changes in anticipated housing market conditions, observed and anticipated borrower behavior, and updated information on the loans supporting private-label mortgage-backed securities. This process includes updating key aspects of the FHLBank's loss projection models. (See [Note 7 - Other-than-Temporary Impairment Analysis](#) to the accompanying combined financial statements, [Critical Accounting Estimates - OTTI for Investment Securities](#), and [Risk Management - Credit Risk - Investments](#) for additional information.)

Gains (Losses) on Investment Securities. The FHLBanks classify investment securities as AFS, HTM, or trading securities. The realized gains (losses) from the sale of AFS and HTM securities are recognized in current period earnings. Trading securities are recorded at fair value, with changes in fair value reflected in non-interest income. There are a number of factors that affect the fair value of trading securities, including current and projected levels of interest rates, credit spreads, and volatility, as well as the passage of time.

Gains (Losses) on Financial Instruments Held under Fair Value Option. Certain FHLBanks elect the fair value option for certain financial assets and certain financial liabilities, and recognize the changes in fair value on these assets and liabilities as unrealized gains and losses in current period earnings. The use of the fair value option allows these FHLBanks to mitigate potential income statement volatility that can arise when an economic derivative is adjusted for changes in fair value but the related hedged item is not. (See [Table 30](#) for additional information regarding the gains (losses) on financial instruments held under fair value option and the effect of derivatives and hedging activities on non-interest income and [Note 19 - Fair Value](#) to the accompanying combined financial statements for additional information.)

Gains (Losses) on Derivatives and Hedging Activities. Fair value estimates for an FHLBank's derivatives and hedging positions fluctuate with changes in market conditions. In general, an FHLBank holds derivatives and associated hedged items to the maturity, call, or put date. Therefore, as a matter of timing, nearly all of the cumulative net gains and losses for these financial instruments generally reverse over the remaining contractual terms of the hedged items. However, there may be instances when an FHLBank terminates these instruments prior to maturity or prior to the call or put dates. Terminating the financial instrument or hedging relationship may result in a realized gain or loss.

Fair values are based on a wide range of factors, including current and projected levels of interest rates, credit spreads, and volatility, as well as the passage of time. Hedge ineffectiveness occurs when changes in the fair value of the derivative and the associated hedged item do not perfectly offset. (See [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements for additional information on the financial effect of derivatives and hedging activities.) [Table 30](#) presents the effect of derivatives and hedging activities on non-interest income.

Table 30 - Effect of Derivatives and Hedging Activities on Non-Interest Income
(dollars in millions)

	Year Ended December 31, 2018							
	Advances	Investment Securities	Mortgage Loans	Consolidated Bonds	Consolidated Discount Notes	Balance Sheet	Intermediary Positions and Other	Total
Net gains (losses) on derivatives and hedging activities								
Gains (losses) related to fair value hedge ineffectiveness	\$ 37	\$ (22)	\$ —	\$ (10)	\$ (1)	\$ —	\$ —	\$ 4
Gains (losses) related to cash flow hedge ineffectiveness	—	—	—	—	1	—	—	1
Gains (losses) related to derivatives not designated as hedging instruments	38	28	10	(134)	16	(4)	(3)	(49)
Price alignment amount	—	—	—	—	—	—	(37)	(37)
Total net gains (losses) on derivatives and hedging activities	75	6	10	(144)	16	(4)	(40)	(81)
Net gains (losses) on trading securities(1)	—	(30)	—	—	—	—	—	(30)
Net gains (losses) on financial instruments held at fair value	(28)	—	(6)	(20)	—	—	—	(54)
Total effect on non-interest income	\$ 47	\$ (24)	\$ 4	\$ (164)	\$ 16	\$ (4)	\$ (40)	\$ (165)
Year Ended December 31, 2017								
	Advances	Investment Securities	Mortgage Loans	Consolidated Bonds	Consolidated Discount Notes	Balance Sheet	Intermediary Positions and Other	Total
Net gains (losses) on derivatives and hedging activities								
Gains (losses) related to fair value hedge ineffectiveness	\$ 339	\$ (7)	\$ —	\$ —	\$ 1	\$ —	\$ —	\$ 333
Gains (losses) related to cash flow hedge ineffectiveness	—	—	—	1	2	—	—	3
Gains (losses) related to derivatives not designated as hedging instruments	13	(24)	37	10	(36)	(24)	6	(18)
Price alignment amount	—	—	—	—	—	—	6	6
Total net gains (losses) on derivatives and hedging activities	352	(31)	37	11	(33)	(24)	12	324
Net gains (losses) on trading securities(1)	—	(2)	—	—	—	—	—	(2)
Net gains (losses) on financial instruments held at fair value	(42)	—	(4)	18	—	—	—	(28)
Total effect on non-interest income	\$ 310	\$ (33)	\$ 33	\$ 29	\$ (33)	\$ (24)	\$ 12	\$ 294
Year Ended December 31, 2016								
	Advances	Investment Securities	Mortgage Loans	Consolidated Bonds	Consolidated Discount Notes	Balance Sheet	Intermediary Positions and Other	Total
Net gains (losses) on derivatives and hedging activities								
Gains (losses) related to fair value hedge ineffectiveness	\$ 158	\$ 35	\$ —	\$ (31)	\$ (3)	\$ —	\$ —	\$ 159
Gains (losses) related to cash flow hedge ineffectiveness	—	—	—	—	5	—	—	5
Gains (losses) related to derivatives not designated as hedging instruments	(5)	(31)	10	(71)	(8)	5	(17)	(117)
Total net gains (losses) on derivatives and hedging activities	153	4	10	(102)	(6)	5	(17)	47
Net gains (losses) on trading securities(1)	—	(50)	—	—	—	—	—	(50)
Net gains (losses) on financial instruments held at fair value	(21)	—	(5)	35	(6)	—	—	3
Total effect on non-interest income	\$ 132	\$ (46)	\$ 5	\$ (67)	\$ (12)	\$ 5	\$ (17)	\$ —

(1) Includes only those gains (losses) on trading securities that have an assigned economic derivative.

Net losses on derivatives and hedging activities were \$81 million for the year ended December 31, 2018, resulting primarily from losses related to derivatives not designated as qualifying accounting hedges under GAAP and the price alignment amount. The price alignment amount reflects the overnight cost of funding variation margin received or paid on derivatives for which variation margin is characterized as a daily settled contract.

Net gains on derivatives and hedging activities were \$324 million for the year ended December 31, 2017, consisting primarily of gains related to fair value hedge ineffectiveness. Fair value hedge ineffectiveness was driven primarily by gains resulting from prepayments of certain previously restructured and hedged advances recorded by the FHLBank of Atlanta during the first quarter of 2017. However, this gain was offset by \$302 million of accelerated amortization included in net interest income during the first quarter of 2017. (See *Table 28*, which presents the effect of derivatives and hedging activities on net interest income.)

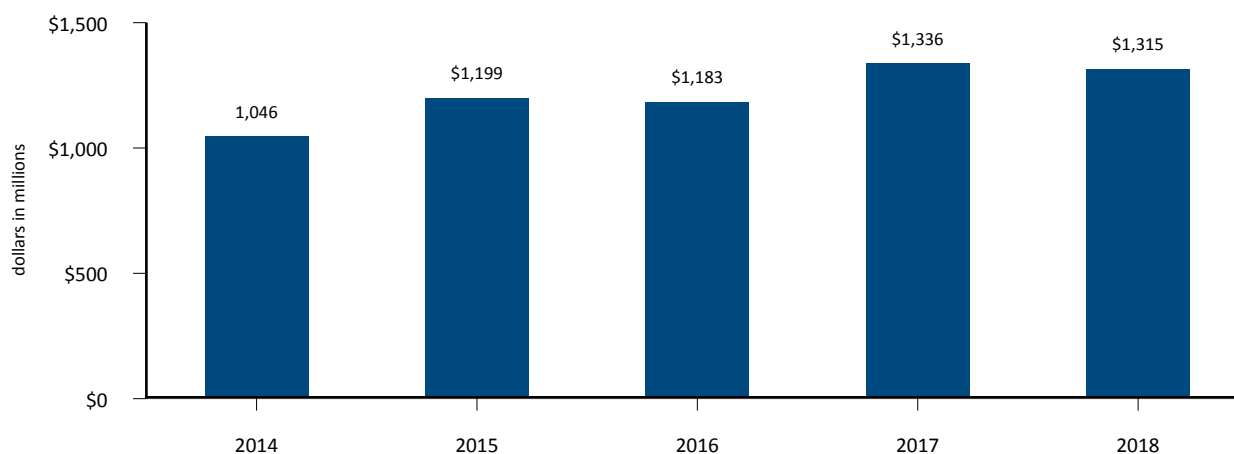
Net gains on derivatives and hedging activities were \$47 million for the year ended December 31, 2016, driven primarily by gains related to fair value hedge ineffectiveness, partially offset by losses related to derivatives not designated as qualifying accounting hedges under GAAP.

Gains on Litigation Settlement, Net. Certain of the FHLBanks agreed to settle certain claims arising from investments in private-label mortgage-backed securities.

Non-Interest Expense

Non-interest expense consists of compensation and benefits, other operating expenses, FHFA expenses, and Office of Finance expenses. Figure 29 presents non-interest expense for the most recent five years.

Figure 29: Non-Interest Expense



Non-interest expense was \$1,315 million for the year ended December 31, 2018, a decrease of 1.6% compared to the year ended December 31, 2017, due primarily to a decrease in other expenses, partially offset by an increase in compensation and benefits. The decrease in other expenses resulted primarily from certain one-time expenses incurred during the year ended December 31, 2017. The increase in compensation and benefits was driven primarily by increased employee headcount, salaries, wages, and retirement benefits.

Non-interest expense was \$1,336 million for the year ended December 31, 2017, an increase of 12.9% compared to the year ended December 31, 2016, due primarily to an increase in other expenses. The increase in other expenses was primarily the result of a charge of \$70 million during the first quarter of 2017 by the FHLBank of New York to settle all claims related to the 2008 Lehman Brothers bankruptcy and voluntary charitable contributions of \$60 million during the year ended December 31, 2017, by the FHLBank of San Francisco for a donor-advised fund established to support quality job growth and small business expansion.

Table 31 - Changes in Non-Interest Expense
(dollars in millions)

	Year Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Compensation and benefits	\$ 698	\$ 650	\$ 623	\$ 48	\$ 27
Other operating expenses	433	397	385	36	12
Federal Housing Finance Agency	64	65	59	(1)	6
Office of Finance	56	52	47	4	5
Other expenses	64	172	69	(108)	103
Total non-interest expense	\$ 1,315	\$ 1,336	\$ 1,183	\$ (21)	\$ 153

Compensation and Benefits. These expenses consist primarily of costs for FHLBank employees, including salaries, incentives, and health and retirement benefits.

Other Operating Expenses. These expenses consist primarily of professional and other contractual services, occupancy costs, depreciation and amortization, and information technology related costs.

FHFA Expenses. The FHLBanks fund the portion of the FHFA's operating costs and working capital fund that relate to the FHLBanks, as determined by the FHFA. These costs are based on the FHFA's annual budget and are under the sole control of the FHFA. Each FHLBank pays its pro-rata share of FHFA expenses based on the ratio of each FHLBank's minimum required regulatory capital to the aggregate minimum required regulatory capital of all FHLBanks.

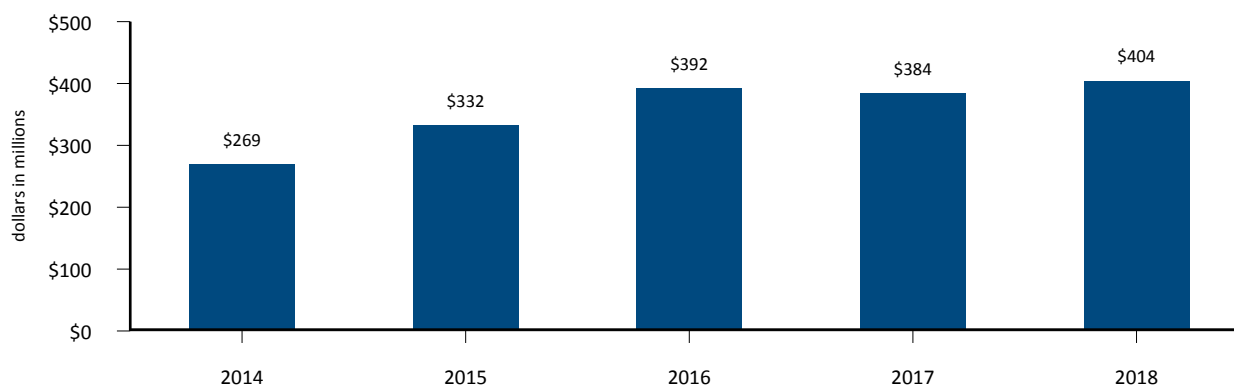
Office of Finance Expenses. The FHLBanks also fund the operating and capital expenditures of the Office of Finance, a joint office of the FHLBanks that issues and services consolidated obligations, prepares the FHLBanks' quarterly and annual combined financial reports, and performs certain other functions.

Affordable Housing Program (AHP) Assessments

By regulation, each FHLBank is required to contribute to its AHP the greater of 10% of its annual income subject to assessment, or the prorated sum required to ensure the aggregate contribution by the FHLBanks is no less than \$100 million for each year. In addition to the required assessment, an FHLBank's board of directors may elect to make voluntary contributions to the AHP. For purposes of the AHP calculation, each FHLBank's income subject to assessment is defined as the individual FHLBank's net income before assessments, plus interest expense related to mandatorily redeemable capital stock. (See [Note 14 - Affordable Housing Program \(AHP\)](#) to the accompanying combined financial statements for additional information related to the AHP calculation.)

AHP helps members provide subsidized and other low-cost funding, as well as grants, to create affordable rental and homeownership opportunities. All FHLBank operating costs for the AHP are included in operating expenses, so all AHP assessments go directly to support affordable housing projects. Figure 30 presents AHP assessments for the most recent five years.

Figure 30: Affordable Housing Program Assessments



Interbank Eliminations

Combined net income of the FHLBanks is affected by interbank transfers of the liability on outstanding consolidated bonds. These transactions arise when one FHLBank transfers its direct liability on outstanding consolidated bonds to another FHLBank. By engaging in these transactions, two FHLBanks are able to better match their funding needs by transferring funds held by one FHLBank to another FHLBank that needs funds. Because the consolidated bonds are joint and several obligations of all FHLBanks, these interbank transactions have no effect on the holders of the consolidated bonds.

The amount of total interbank consolidated bonds transferred during a period depends on a variety of factors, including (1) whether an assuming FHLBank can obtain equal or lower funding costs through interbank transfers as compared to issuing new debt, (2) an FHLBank's overall asset/liability management strategy, and (3) current market conditions. There were no interbank transfers of consolidated obligations during the years ended December 31, 2018, 2017, and 2016.

In the event that there is a transfer, the transferring FHLBank treats the transfer as a debt extinguishment because that FHLBank has been released from being the primary obligor. The transferring FHLBank records a gain or loss on the debt transferred to the assuming FHLBank based on the difference between the fair value and the carrying value of the consolidated bonds, including any unamortized premiums or discounts. The assuming FHLBank becomes the primary obligor because it is now directly responsible for repaying the debt. The assuming FHLBank records the fair value, including any premium or discount, as the initial carrying amount for the consolidated bond it received from the transferring FHLBank. However, under the principles of combination accounting, interbank eliminations are required to reflect the transaction as if the transferring FHLBank continues to hold the consolidated bond for purposes of the FHLBanks' combined financial statements.

Table 32 presents the effect of interbank eliminations and rounding adjustments (collectively referred to as combining adjustments) on the Combined Statement of Income. Interbank eliminations include:

- transfers of interbank consolidated bond liabilities;
- interest on purchased consolidated bonds, which is eliminated in interest income and interest expense; and
- fees related to the MPF Program that are eliminated in non-interest income and non-interest expense.

Table 32 - Effect of Combining Adjustments on Combined Statement of Income
(dollars in millions)

Effect on	Year Ended December 31,		
	2018	2017	2016
Interest income	\$ (3)	\$ (5)	\$ (10)
Interest expense	2	4	5
Provision (reversal) for credit losses	(1)	—	—
Net interest income after provision (reversal) for credit losses	(4)	(9)	(15)
Non-interest income	(29)	(23)	(16)
Non-interest expense	(29)	(22)	(17)
Net income	\$ (4)	\$ (10)	\$ (14)

Comprehensive Income

Comprehensive income is comprised of net income and other comprehensive income. Other comprehensive income is reported on the Combined Statement of Comprehensive Income and presents the net change in the accumulated other comprehensive income (loss) balances.

Other comprehensive loss was \$377 million, a decrease of \$1,258 million for the year ended December 31, 2018, compared to the year ended December 31, 2017, due primarily to fair value losses on AFS securities.

Other comprehensive income was \$881 million, an increase of \$404 million for the year ended December 31, 2017, compared to the year ended December 31, 2016, due primarily to fair value gains on AFS securities.

Table 33 - Comprehensive Income*(dollars in millions)*

	Year Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net income	\$ 3,562	\$ 3,376	\$ 3,408	\$ 186	\$ (32)
Other comprehensive income					
Changes in fair value of AFS securities					
Net unrealized gains (losses) on AFS securities	(467)	383	41	(850)	342
Net change in fair value of other-than-temporarily impaired AFS securities	(109)	209	123	(318)	86
Total changes in fair value of AFS securities	(576)	592	164	(1,168)	428
Changes in non-credit OTTI losses					
Net amount of AFS and HTM impairment losses reclassified to (from) non-interest income	(4)	11	(8)	(15)	19
Reclassification of (gains) losses of the non-credit portion on AFS securities included in net income	(32)	—	(1)	(32)	1
Accretion of non-credit portion on HTM securities	69	90	95	(21)	(5)
Total changes in non-credit OTTI losses	33	101	86	(68)	15
Net unrealized gains (losses) relating to hedging activities	161	200	240	(39)	(40)
Other	5	(12)	(13)	17	1
Total other comprehensive income (loss)	(377)	881	477	(1,258)	404
Comprehensive income	\$ 3,185	\$ 4,257	\$ 3,885	\$ (1,072)	\$ 372

Changes in Fair Value of AFS securities. Changes in the fair value of AFS securities are recorded in other comprehensive income. The net change in unrealized gains (losses) on AFS securities, which have not been other-than-temporarily impaired, is due primarily to changes in interest rates, credit spreads, the passage of time, and volatility. The net change in the fair value of other-than-temporarily impaired AFS securities is driven by housing prices and the economic outlook, as well as changes in interest rates, credit spreads, the passage of time, and volatility. The distinction between the two categories is whether the AFS security has ever incurred an OTTI loss.

Changes in Non-Credit OTTI Losses. Changes in non-credit OTTI losses are comprised of the accretion of the non-credit portion on HTM securities, the reclassification of (gains) losses of the non-credit portion on AFS securities included in net income, and the net amount of AFS and HTM impairment losses reclassified to (from) non-interest income.

Accretion of the Non-credit Portion on HTM Securities. For HTM securities with non-credit-related impairment losses recognized in AOCI, the non-credit-related impairment is accreted as an increase in the carrying value over the remaining life of the security, based on the amount and timing of future estimated cash flows.

Reclassification of (Gains) Losses of the Non-credit Portion on AFS Securities Included in Net Income. For AFS securities that had experienced OTTI in previous periods, these reclassifications represent the remaining non-credit portion of OTTI losses in AOCI that are recognized in net income upon the sale of the securities.

Net Amount of AFS and HTM Impairment Losses Reclassified To (From) Non-interest Income. For AFS and HTM securities with OTTI, the net decrease or increase in the non-credit component is reclassified between AOCI and earnings.

Net Unrealized Gains (Losses) Relating to Hedging Activities. Net unrealized gains (losses) relating to hedging activities is comprised of changes in the fair value of a derivative that is designated and qualifies as a cash flow hedge, to the extent that the hedge is highly effective, until earnings are affected by the variability of the cash flows of the hedged transaction and the amounts are reclassified to interest income or interest expense. The FHLBanks' gains (losses) on hedging activities fluctuate with volatility in the overall interest-rate environment and with the positions taken by the FHLBanks to hedge their risk exposure using cash flow hedges.

Liquidity and Capital Resources

Liquidity

Each FHLBank is required to maintain liquidity in accordance with the FHLBank Act, FHFA regulations and guidance, and policies established by its management and board of directors. Each FHLBank seeks to be in a position to meet the credit and liquidity needs of its members and to meet all current and future financial commitments of the FHLBank. Each FHLBank seeks to achieve this objective by managing liquidity positions to maintain stable, reliable, and cost-effective sources of funds while taking into account market conditions, member demand, and the maturity profile of the assets and liabilities of the FHLBank.

The FHLBanks may not be able to predict future trends in member credit needs because member credit needs are driven by complex interactions among a number of factors, including members' mortgage loan originations, other loan portfolio growth, deposit growth, and the attractiveness of advances compared to other wholesale borrowing alternatives. Each FHLBank monitors current trends and anticipates future debt issuance needs to fund its members' credit needs and investment opportunities of the FHLBank. An FHLBank's ability to expand its balance sheet and corresponding liquidity requirements in response to its members' increased credit needs is correlated to its members' requirements for advances and mortgage loans. Alternatively, in response to reduced member credit needs, an FHLBank may allow its consolidated obligations to mature without replacement, or repurchase and retire outstanding consolidated obligations, allowing its balance sheet to shrink. Over time, the FHLBanks historically have had comparatively stable access to funding through a diverse investor base.

Sources of Liquidity. The FHLBanks' primary sources of liquidity are proceeds from the issuance of consolidated obligations, as well as cash and investment holdings that are primarily high-quality, short-, and intermediate-term financial instruments. The FHLBanks' consolidated obligations are not obligations of the United States and are not guaranteed by either the United States or any government agency, but have historically received the same credit rating as the government bond credit rating of the United States. Moody's, S&P, or other rating organizations could downgrade or upgrade the credit ratings of the U.S. government and GSEs, including the FHLBanks and their consolidated obligations. Investors should note that a rating issued by a nationally recognized statistical rating organization is not a recommendation to buy, sell, or hold securities, and that the ratings may be revised or withdrawn at any time. Investors should evaluate the rating of each nationally recognized statistical rating organization independently. As of March 15, 2019, the FHLBanks' consolidated obligations were rated Aaa/AA+ (with outlook stable) by Moody's and S&P. Investors should not take the historical or current ratings of the FHLBanks and their consolidated obligations as an indication of future ratings for FHLBanks and their consolidated obligations.

Other sources of liquidity include advance repayments, payments collected on mortgage loans, proceeds from the issuance of capital stock, and deposits from members. In addition, by law, the Secretary of the Treasury is authorized to purchase up to \$4 billion aggregate principal amount of consolidated obligations of the FHLBanks. This authority may be exercised only if alternative means cannot be effectively employed to permit the FHLBanks to continue to supply reasonable amounts of funds to the mortgage market, and the ability to supply such funds is substantially impaired because of monetary stringency and a high level of interest rates. Any funds borrowed from the U.S. Treasury shall be repaid by the FHLBanks at the earliest practicable date.

Uses of Liquidity. The FHLBanks' primary uses of liquidity are advance originations and consolidated obligation payments. Other uses of liquidity are mortgage loan and investment purchases, dividend payments, and other contractual payments. An FHLBank also maintains liquidity to redeem or repurchase excess capital stock, at its discretion, upon the request of a member or under an FHLBank's capital plan.

See [Combined Financial Condition - Advances](#) for advance originations and repayments and [Combined Financial Condition - Consolidated Obligations](#) for net proceeds and payments for consolidated obligations.

FHLBank Funding and Debt Issuance. Changes or disruptions in the capital markets could limit the FHLBanks' ability to issue consolidated obligations. However, during the year ended December 31, 2018, the FHLBanks maintained continual access to funding and managed their debt issuance to meet the needs of their members. The FHLBanks' short-term funding was generally driven by member demand and was achieved through the issuance of consolidated discount notes and short-term consolidated bonds during the year ended December 31, 2018. Access to short-term debt markets has been supported by strong demand, as investors, driven by increased liquidity preferences and risk aversion, including the effects of money market fund reform, have sought the FHLBanks' short-term debt as an asset of choice. In addition, increasing short-term interest rates

and equity market volatility also increased investor demand in 2018 for high-quality short-term investments such as money market mutual funds. This has led to advantageous funding opportunities and continued utilization of debt maturing in one year or less. (See [Combined Financial Condition - Consolidated Obligations](#) for more information on short-term consolidated obligations.)

Refinancing Risk and Investor Concentration Risk. There are inherent risks in utilizing short-term funding to support longer-dated assets and the FHLBanks may be exposed to refinancing risk and investor concentration risk. Refinancing risk includes the risk that the FHLBanks could have difficulty rolling over short-term obligations when market conditions change or investor confidence in short-term consolidated obligations declines. In managing and monitoring the amounts of financial assets that require refinancing, the FHLBanks consider their contractual maturities, as well as certain assumptions regarding expected cash flows (i.e., estimated prepayments, embedded call optionality, and scheduled amortizations). Investor concentration risk includes the risk that a market-driven or regulatory disruption to certain investor classes could lead to significant investor outflows causing unfavorable market conditions for consolidated obligations. (See the notes to the accompanying combined financial statements for additional information regarding contractual maturities of certain financial assets and financial liabilities and [Risk Factors - Liquidity Risk](#) for more information on refinancing risk and investor concentration risk.)

Interest-Rate Risk. The FHLBanks may use a portion of the short-term consolidated obligations issued to fund both short- and long-term variable-rate assets. However, funding longer-term variable-rate assets with shorter-term liabilities generally does not expose the FHLBanks to interest-rate risk because the rates on the variable-rate assets reset similarly to the liabilities (either through rate resets or re-issuance of the obligations). The FHLBanks measure and monitor interest-rate risk with commonly used methods and metrics, which include the calculations of market value of equity, duration of equity, and duration gap. (See [Quantitative and Qualitative Disclosures about Market Risk](#) for additional discussion and analysis regarding the FHLBanks' sensitivity to interest rate changes and the use of derivatives to manage their exposure to interest-rate risk.)

Asset/Liability Maturity Profile. Each FHLBank is focused on maintaining an adequate amount of liquidity, and a balance between the cash flows for its financial assets and financial liabilities, and the FHLBanks work collectively to manage system-wide liquidity and funding needs. The FHLBanks jointly monitor the combined risks, primarily by tracking the maturities of financial assets and financial liabilities. The FHLBanks monitor the balance between the cash flows for their financial assets and financial liabilities and are committed to prudent risk management practices. External factors, including FHLBank member borrowing needs, supply and demand in the debt markets, and other factors may affect the amount of liquidity and the balance between the cash flows for financial assets and financial liabilities. However, due to the FHLBanks' status as GSEs, they have traditionally had ready access to funding at relatively favorable rates.

Regulatory Liquidity Requirements. To protect the FHLBanks against temporary disruptions in access to the debt markets in response to a rise in capital markets volatility, the FHFA requires each FHLBank to:

- maintain contingency liquidity sufficient to meet liquidity needs that shall, at a minimum, cover five business days of inability to access consolidated obligations in the debt markets;
- have available at all times an amount greater than or equal to its members' current deposits invested in advances with maturities not to exceed five years, deposits in banks or trust companies, and obligations of the U.S. Treasury;
- maintain, in the aggregate, unpledged qualifying assets in an amount at least equal to the amount of its participation in total consolidated obligations outstanding; and
- maintain, through short-term investments, an amount at least equal to its anticipated cash outflows under these two hypothetical scenarios.
 - The first scenario assumes that an FHLBank cannot access the capital markets for a period of between 10 to 20 days, with initial guidance set at 15 days, and that during that time members do not renew any maturing, prepaid, or called advances.
 - The second scenario assumes that an FHLBank cannot access the capital markets for a period of between three to seven days, with initial guidance set at five days, and that during that period an FHLBank will automatically renew maturing and called advances for all members except very large members, provided that the member is well-rated by its primary Federal regulator or its state regulator equivalent for insurance companies, and is well-rated by the individual FHLBank's internal credit rating system.

Each FHLBank also maintains a contingency liquidity plan designed to enable it to meet its obligations and the liquidity needs of members in the event of operational disruptions at the FHLBanks and/or the Office of Finance, or short-term capital market disruptions. As defined by FHFA regulations, contingency liquidity means the sources of cash an FHLBank may use to meet its operational requirements when its access to capital markets is impeded, and includes:

- marketable securities with a maturity of one year or less;
- self-liquidating assets with a maturity of seven days or less;
- assets that are generally accepted as collateral in the repurchase agreement market; and
- irrevocable lines of credit from financial institutions rated not lower than the second highest rating category by a nationally recognized statistical rating organization.

In August 2018, the FHFA issued an Advisory Bulletin on liquidity (Liquidity Guidance AB), which, among other things, replaces its guidance for maintaining liquidity under hypothetical scenarios discussed above and also provides guidance related to asset and liability maturity funding gap limits. Portions of the Liquidity Guidance AB were implemented on December 31, 2018, with further implementation to take place on March 31, 2019, and full implementation on December 31, 2019. The Liquidity Guidance AB may require the FHLBanks to hold an additional amount of liquid assets to meet the new guidance. (See [Legislative and Regulatory Developments](#) for additional information.)

During the year ended December 31, 2018, each of the FHLBanks was in compliance with the FHFA's regulatory liquidity requirements.

Office of Finance Funding Contingency Plan Policy. The Office of Finance has an allocation methodology for the proceeds from the issuance of consolidated obligations when consolidated obligations cannot be issued in sufficient amounts to satisfy all FHLBank demand for funding during periods of financial distress and when its existing allocation processes are deemed insufficient. The purpose and objective of this allocation methodology is to ensure that guidance is in place to facilitate the ability of the Office of Finance to meet the funding needs of FHLBanks when market conditions threaten to limit or prevent access to funding in periods of financial distress. In general, this methodology provides that the proceeds in these circumstances will be allocated among the FHLBanks based on relative FHLBank regulatory capital unless the Office of Finance determines that there is an overwhelming reason to adopt a different allocation method. As is the case during any instance of a disruption in an FHLBank's ability to access the capital markets, market conditions or this allocation could adversely impact an FHLBank's ability to finance its operations, which could thereby adversely impact that FHLBank's financial condition and results of operations.

Capital Resources

The FHLBanks' ability to expand their balance sheets as member credit needs increase is based, in part, on the capital stock requirements for advances. In addition, FHFA regulations stipulate that each FHLBank must comply with three limits on capital. While each FHLBank's minimum total regulatory capital-to-assets ratio requirement is 4.0%, each FHLBank strives to maintain a level of retained earnings to support its regulatory capital compliance, stable dividend payments to members, and business growth. At December 31, 2018, each FHLBank was in compliance with its statutory minimum capital requirements. (See [Note 16 - Capital](#) to the accompanying combined financial statements for additional information regarding minimum regulatory capital requirements.) Regulatory guidance requires each FHLBank to assess, at least once a year, the adequacy of its retained earnings under various future financial and economic scenarios, including:

- parallel and non-parallel interest-rate shifts;
- changes in the interest-rate relationship between different yield curves; and
- changes in the credit quality of the FHLBank's assets.

Management and the board of directors of each FHLBank review the capital structure of that FHLBank on a periodic basis to ensure the capital structure supports the risk associated with its assets and addresses applicable regulatory and supervisory matters. In addition, an individual FHLBank may, at its discretion, institute a higher capital requirement to meet internally-established thresholds or to address supervisory matters, limit dividend payments, or restrict excess capital stock repurchases as part of its retained earnings policies. (See [Note 16 - Capital](#) to the accompanying combined financial statements and [Business - Capital, Capital Rules, and Dividends](#) for more information.)

Annual Stress Test. Under the Dodd-Frank Wall Street Reform and Consumer Protection Act, as implemented by the FHFA, each FHLBank is required to perform an annual stress test to assess the potential impact of various financial and economic conditions on capital adequacy. The annual stress tests were completed and published in November 2018, based on each FHLBank's financial condition as of December 31, 2017, using the methodology prescribed by the FHFA. Each FHLBank's stress test results demonstrated capital adequacy under the severely adverse economic scenario defined by the FHFA.

Joint Capital Enhancement Agreement. The Joint Capital Enhancement Agreement, as amended (Capital Agreement), is intended to enhance the capital position of each FHLBank. The Capital Agreement provides that each FHLBank will allocate 20% of its net income each quarter to a separate restricted retained earnings account until the balance of that account equals at least one percent of that FHLBank's average balance of outstanding consolidated obligations for the previous quarter. These restricted retained earnings are not available to pay dividends. (See [Note 16 - Capital - Restricted Retained Earnings](#) to the accompanying combined financial statements for more information.)

Off-Balance Sheet Arrangements and Other Commitments

In the ordinary course of business, the FHLBanks engage in financial transactions that, in accordance with GAAP, are not recorded on the FHLBanks' Combined Statement of Condition or may be recorded on the FHLBanks' Combined Statement of Condition in amounts that are different from the full contract or notional amount of the transactions. (See [Note 20 - Commitments and Contingencies - Off-Balance Sheet Commitments](#) to the accompanying combined financial statements for a discussion of and the amounts of the FHLBanks' off-balance sheet arrangements and other commitments.) The FHLBanks do not have any special purpose entities or any other types of off-balance sheet conduits.

Contractual Obligations

In the ordinary course of operations, the FHLBanks enter into certain contractual obligations. Table 34 presents the FHLBanks' significant contractual obligations at December 31, 2018.

Table 34 - Payments Due or Expiration Terms by Type of Contractual Obligation
(dollars in millions)

	Payments Due or Expiration Terms by Period					Total
	Less than 1 year	1 year to less than 3 years	3 years to less than 5 years	Thereafter		
Consolidated bonds(1)	\$ 359,133	\$ 151,535	\$ 47,697	\$ 45,776	\$ 604,141	
Mandatorily redeemable capital stock	57	248	97	660	1,062	
Commitments to fund/purchase mortgage loans	833	—	—	—	833	
Pension and post-retirement contributions(2)	64	50	73	149	336	
Operating leases	25	48	48	153	274	
Financing obligation	—	—	—	35	35	
Capital lease obligations	2	5	2	—	9	
Total contractual obligations	\$ 360,114	\$ 151,886	\$ 47,917	\$ 46,773	\$ 606,690	

(1) Does not include consolidated discount notes and contractual interest payments related to consolidated bonds. Payments for consolidated bonds are allocated to a period based on contractual maturities. The actual timing of payments could be influenced by factors affecting redemptions. (See [Note 13 - Consolidated Obligations](#) to the accompanying combined financial statements for additional information.)

(2) Includes future funding contributions for the qualified pension plans and scheduled benefit payments for the nonqualified (unfunded) pension plans.

Critical Accounting Estimates

The preparation of financial statements in accordance with GAAP requires each FHLBank's management to make a number of judgments, estimates, and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities (if applicable), and the reported amounts of income and expense during the reported periods. Although each FHLBank's management believes that its judgments, estimates, and assumptions are reasonable, actual results may differ from these estimates.

Each individual FHLBank manages its operations independently and is responsible for establishing its own accounting and financial reporting policies in accordance with GAAP. An individual FHLBank's accounting and financial reporting policies and practices, including accounting estimates, are not always identical to those used by other FHLBanks because alternative policies and presentations are permitted under GAAP in certain circumstances. For example, the FHLBanks might not use the same models and assumptions in determining the fair values of their respective assets and liabilities. The use of different models or assumptions by individual FHLBanks could result in materially different valuations or other estimates, even when similar or identical assets and liabilities are being measured, and could have materially different effects on the net income and retained earnings of the respective FHLBanks, although each of these methodologies is in compliance with GAAP. However, the FHLBanks and the Office of Finance recognize the importance of transparency and enhanced consistency in financial reporting, and have implemented a uniform framework for completing their OTTI analyses of private-label MBS and a uniform valuation technique for determining the fair value of agency MBS and private-label MBS.

The accounting estimates and assumptions discussed in this section are those generally considered by each FHLBank's management to be the most critical to an understanding of its financial statements and the financial data it provides to the Office of Finance for this Combined Financial Report. These estimates require an FHLBank's management to make subjective or complex judgments about matters that are inherently uncertain. Investors are cautioned that future events rarely develop exactly as forecasted, and the best estimates routinely require adjustments, which could be material. A change in an estimate or assumption could have a material effect on an FHLBank's reported results of operations or its financial condition, and differences between the assumptions and estimates used by individual FHLBanks could result in material differences in the reported results of operations and financial condition of those FHLBanks.

Estimates and assumptions that are significant to the results of operations and financial condition of the FHLBanks include those used in conjunction with (1) OTTI for investment securities; (2) fair value estimates; (3) derivative hedging relationships; (4) amortization of premiums and accretion of discounts on investment securities and purchased mortgage loans; and (5) calculation of allowance for credit losses for each identified portfolio segment of financing receivables. (See [Note 1 - Summary of Significant Accounting Policies](#) to the accompanying combined financial statements for a description of accounting policies related to these estimates and assumptions.)

OTTI for Investment Securities

Uniform OTTI Framework. The FHLBanks have developed a uniform framework for completing their OTTI analyses in compliance with accounting guidance on the recognition and presentation of OTTI in the financial statements. To ensure consistency in the determination of OTTI for private-label MBS among all FHLBanks, the FHLBanks use a system-wide governance committee and a formal process to ensure consistency in key OTTI modeling assumptions used for purposes of their cash flow analyses for the majority of these securities. To assess whether the entire amortized cost bases of the FHLBanks' private-label MBS will be recovered, the FHLBanks performed a cash flow analysis for each such security that was previously other-than-temporarily impaired or where fair value was less than amortized cost as of the balance sheet date, except for certain private-label MBS where the underlying loan-level collateral data was not available using the OTTI modeling methodology under the FHLBanks' uniform framework.

The FHLBanks evaluate substantially all of their private-label MBS in an unrealized loss position using the FHLBanks' uniform framework and approved assumptions for purposes of OTTI cash flow analysis. For private-label MBS where underlying collateral data is not available, alternative procedures, as determined by each FHLBank, are used to assess these securities for OTTI. (See [Note 7 - Other-than-Temporary Impairment Analysis](#) to the accompanying combined financial statements for additional discussion regarding the recognition and presentation of OTTI.)

At December 31, 2018, five FHLBanks owned certain private-label MBS where the underlying loan-level collateral data was not available. For private-label MBS that could not be modeled under the FHLBanks' uniform framework, alternative procedures were determined and approved by the system-wide governance committee. These alternative procedures established a formal process by which the FHLBanks could provide input on and approve key OTTI assumptions. Each affected FHLBank used the approved alternative procedures to assess these securities for OTTI. These securities represented approximately 3% of the FHLBanks' total unpaid principal balance of private-label MBS at December 31, 2018.

Each FHLBank updates its OTTI analysis each quarter to reflect current and anticipated housing market conditions, observed and anticipated borrower behavior, and updated information on the loans supporting the FHLBank's private-label MBS. This process includes updating key aspects of each FHLBank's loss projection models. In doing so, an FHLBank considers many factors including, but not limited to, the following:

- the credit ratings assigned to the securities by the nationally recognized statistical rating organizations;
- other indicators of issuer credit quality;
- the strength of the provider of any guarantees;
- the duration and magnitude of the unrealized loss; and
- whether the FHLBank has the intent to sell the security or more likely than not will be required to sell the security before the recovery of its amortized cost basis.

In the case of its private-label MBS, each FHLBank also considers prepayment speeds, the historical and projected performance of the underlying loans, and the credit support provided by the subordinate securities.

In performing the cash flow analysis for the private-label MBS under the uniform framework, each FHLBank uses two third-party models. The first model forecasts loan-level prepayment, default, and severity behavior. The second model is used to determine the resulting cash flows. The FHLBanks also assess the potential mitigation of projected credit losses through the application of existing monoline bond insurance from third parties by performing an assessment of the respective insurer's ability to cover the security's projected shortfall of contractual principal or interest.

The modeling assumptions, significant inputs, and methodologies are material to an OTTI determination. Any changes to these assumptions, significant inputs, or methodologies could result in materially different outcomes to this determination, including the realization of additional OTTI charges that may be substantial. Each FHLBank is responsible for making its own OTTI determination and assessing the reasonableness of assumptions, significant inputs, and methodologies used, as well as for performing the required present value calculations using appropriate historical cost bases and yields. Two or more FHLBanks that hold the same private-label MBS are required to consult with one another to ensure they reach the same conclusion on any decision that a commonly-held private-label MBS is other-than-temporarily impaired. This includes the determination that the fair value and the credit loss component of the unrealized loss are consistent among those FHLBanks.

Table 35 presents the unpaid principal balances and the significant inputs used to assess private-label residential MBS and home equity loan ABS under the FHLBanks' uniform framework for OTTI, as well as related current credit enhancements as of December 31, 2018. The calculated averages represent the dollar-weighted averages of all private-label residential MBS and home equity loan ABS in each category shown.

Table 35 - Significant Inputs for Private-Label Residential MBS and Home Equity Loan ABS at December 31, 2018
(dollars in millions)

	Unpaid Principal Balance	Significant Inputs			Current Credit Enhancement
		Prepayment Rates	Default Rates	Loss Severities	Weighted-Average
		Weighted-Average	Weighted-Average	Weighted-Average	
Private-label Residential MBS(1)					
Prime	\$ 1,808	16.0%	8.5%	24.9%	9.0%
Alt-A	5,840	12.7%	20.7%	35.6%	6.2%
Subprime	315	5.2%	34.7%	52.1%	16.6%
Total private-label residential MBS	<u>\$ 7,963</u>	13.2%	18.5%	33.8%	7.3%
Home Equity Loan ABS(1)					
Subprime	\$ 20	4.0%	7.4%	43.0%	43.8%
Total home equity loan ABS	<u>\$ 20</u>	4.0%	7.4%	43.0%	43.8%

(1) The classification (prime, Alt-A, and subprime) is based on the model used to run the estimated cash flows for the individual securities, which may not necessarily be the same as the classification at the time of origination.

Adverse Case Scenario. In addition to evaluating its private-label MBS under a base case (or best estimate) scenario as discussed in [Note 7 - Other-than-Temporary Impairment Analysis](#) to the accompanying combined financial statements, each FHLBank performed a cash flow analysis for each of these securities under a more stressful scenario, or adverse case scenario. This adverse case scenario was primarily based on a short-term housing price forecast, which was five percentage points lower than the base case, followed by a path with annual rates of housing price growth that included rates which were 33% lower than the base case. The credit losses on all other-than-temporarily impaired private-label MBS under the base case and adverse case scenarios were \$5 million and \$6 million for the three months ended December 31, 2018. The base case scenario represents actual OTTI-related credit losses recognized in earnings for the three months ended December 31, 2018.

The estimated cash flows of the adverse case scenario were generated to estimate what the OTTI charges would have been under a more stressful scenario for the three months ended December 31, 2018. The adverse case scenario and associated results do not represent each FHLBank's current expectations, and therefore should not be construed as a prediction of each FHLBank's future results, market conditions, or the actual performance of these securities. Rather, the results from this hypothetical adverse case scenario provide a measure of the credit losses that the FHLBanks might incur if home price declines (and subsequent recoveries) are more adverse than those projected in each FHLBank's base case OTTI assessment.

Interest Income Recognition. When a security has been other-than-temporarily impaired, a new accretable yield is calculated for that security at its impairment measurement date. This adjusted yield is used to calculate the interest income recognized over the remaining life of that security, matching the amount and timing of its estimated future collectible cash flows. Subsequent to that security's initial OTTI, an FHLBank re-evaluates estimated future collectible cash flows on a quarterly basis. If the security has no additional OTTI based on this evaluation, the accretable yield is reassessed for possible adjustment on a prospective basis. Depending on an FHLBank's accounting method, the accretable yield is adjusted if there is either: (1) a significant increase in the security's expected cash flows or (2) a favorable or unfavorable change in the timing and amount of the security's expected cash flows. If there continues to be improvements in the estimated cash flows of securities previously identified as other-than-temporarily impaired, the accretion of yield adjustments is likely to continue to be a positive source of net interest income in future periods.

Monoline Bond Insurers. Certain FHLBanks' investment securities are insured by monoline bond insurers. The bond insurance on these investments guarantees the timely payments of principal and interest if these payments cannot be satisfied from the cash flows of the underlying mortgage pool(s). Private-label MBS insured by monoline bond insurers are cash flow tested for credit impairment. For private-label MBS protected by such monoline insurance, an FHLBank's OTTI analysis would look first to the performance of the underlying security, considering its embedded credit enhancements in the form of excess spread, over-collateralization, and credit subordination, to determine the collectability of all amounts due. If these protections are deemed insufficient to make timely payment of all amounts due, then an FHLBank may consider the capacity of the monoline bond insurer to cover any shortfalls. (See [Risk Management - Monoline Bond Insurance](#) for additional information regarding the FHLBanks' monoline bond insurance coverage on a limited number of private-label MBS.)

Fair Value Estimates

The use of fair value to measure the FHLBanks' financial instruments is fundamental to the FHLBanks' financial statements and is a critical accounting estimate because certain assets and liabilities are carried at fair value, including trading securities, available-for-sale securities, derivative assets and liabilities, certain advances, certain consolidated obligations, and certain other assets. In addition, certain assets are measured at fair value on a non-recurring basis at December 31, 2018. These assets are subject to fair value adjustments in certain circumstances (for example, when there is evidence of impairment).

GAAP defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date (i.e., an exit price). In general, the transaction price will equal the exit price, and therefore represents the fair value of the asset or liability at initial recognition. However, in concluding whether a transaction price represents fair value, each reporting entity is required to consider factors specific to the transaction and the asset or liability. In addition, the reporting entity must determine the unit of account, highest and best use, principal market, and market participants. These determinations allow the reporting entity to define the inputs for fair value and level of hierarchy. The three-level fair value hierarchy prioritizes the inputs into the valuation technique used to measure the fair value of the assets and liabilities held at fair value. The fair value hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and lowest priority to unobservable inputs (Level 3 measurements).

Table 36 presents the assets and liabilities measured at fair value and their respective percentages compared to total recurring assets and liabilities measured at fair value and to total assets and total liabilities as reported on the Combined Statement of Condition at December 31, 2018. (See [Note 19 - Fair Value](#) to the accompanying combined financial statements for details on fair value measurements.)

Table 36 - Assets and Liabilities Measured at Fair Value at December 31, 2018
(dollars in millions)

	Total	Level 1	Level 2	Level 3	Netting Adjustment and Cash Collateral(1)
Assets measured at fair value					
Recurring					
Fair value option	\$ 6,276	\$ —	\$ 6,276	\$ —	\$ —
All other	100,905	5,502	91,118	4,523	(238)
Total recurring assets	107,181	5,502	97,394	4,523	(238)
Non-recurring					
Total assets measured at fair value	\$ 107,217	\$ 5,502	\$ 97,395	\$ 4,558	\$ (238)
Percentage of recurring assets to total recurring assets					
	100.0%	5.1%	90.9%	4.2%	(0.2)%
Percentage of recurring assets to total assets(2)					
	9.7%	0.5%	8.8%	0.4%	— %
Percentage of total assets measured at fair value to total assets(2)					
	9.7%	0.5%	8.8%	0.4%	— %
Liabilities measured at fair value					
Recurring					
Fair value option	\$ 17,610	\$ —	\$ 17,610	\$ —	\$ —
All other	445	—	2,054	—	(1,609)
Total recurring liabilities	18,055	—	19,664	—	(1,609)
Total liabilities measured at fair value	\$ 18,055	\$ —	\$ 19,664	\$ —	\$ (1,609)
Percentage of recurring liabilities to total recurring liabilities					
	100.0%	—	108.9%	—	(8.9)%
Percentage of recurring liabilities to total liabilities(2)					
	1.7%	—	1.9%	—	(0.2)%
Percentage of total liabilities measured at fair value to total liabilities(2)					
	1.7%	—	1.9%	—	(0.2)%

- (1) Amounts represent the application of the netting requirements that allow an FHLBank to settle positive and negative positions, and also cash collateral and related accrued interest held or placed by that FHLBank with the same clearing agent and/or counterparty.
- (2) The percentage is calculated based on the total assets of \$1,102,850 million and total liabilities of \$1,044,506 million as reported on the Combined Statement of Condition at December 31, 2018.

Each FHLBank uses valuation techniques that are intended to maximize the use of observable market-based inputs, when appropriate, to value the assets and liabilities carried at fair value on a recurring basis or to determine whether a fair value adjustment is needed for assets and liabilities to be carried at fair value on a non-recurring basis. Given the nature of some of the FHLBanks' financial instruments, clearly determinable market-based valuation inputs are often not available. Therefore, the fair value measurements of these instruments use unobservable inputs and are classified as Level 3 within the fair value hierarchy. Level 3 assets primarily consist of private-label MBS. If observable market based inputs are unavailable, fair values are determined by valuation models that use the following:

- third-party vendor prices;
- discounted cash flows, using market estimates of interest rates and volatility; or
- dealer prices on similar instruments.

The assumptions used in these models are based on each FHLBank's best estimate with respect to the following:

- discount rates;
- prepayments;
- market volatility; and
- other factors.

These assumptions may have a significant effect on the reported fair value of assets and liabilities. The use of different assumptions, as well as changes in market conditions, could result in materially different net income, other comprehensive income, and retained earnings.

Uniform Valuation Technique for MBS. Using a uniform framework, each FHLBank's valuation technique incorporates prices from multiple designated third-party pricing vendors, when available; and it requires the establishment of a median price for each security using a formula based on the number of third party vendor prices received. All prices that are within a specified tolerance threshold of the median price are included in the cluster of prices that are averaged to compute a default price. Prices that are outside the threshold (outliers) are subject to further analysis to determine if they are a better estimate of fair value. This analysis includes, but is not limited to, comparison to prices provided by an additional third-party valuation service, prices for similar securities, and non-binding dealer estimates. If the analysis determines an outlier or some other price is a better estimate of fair value, then the outlier or the other price is used as the final price rather than the default price. If the analysis confirms that an outlier is not representative of fair value, then the default price is used as the final price. In all cases, the final price is used to determine the fair value of the security. (See [Note 19 - Fair Value](#) to the accompanying combined financial statements for additional information.)

Each individual FHLBank has its set of control processes that are designed to ensure its fair value measurements are appropriate and reliable. These control processes may include, but are not limited to, the following:

- obtaining the third-party pricing service methodologies and control reports;
- challenging a third-party pricing vendor when a price falls outside of the tolerance parameters;
- identifying a stale price, a price that changed significantly from prior valuations, and other anomalies that may indicate that a price may not be accurate; and
- reviewing pricing consistency within the same asset group to identify anomalies.

Prices for MBS CUSIPs held in common with other FHLBanks are reviewed for consistency. In using this common methodology, each FHLBank remains responsible for the selection and application of its fair value methodology and for the reasonableness of assumptions and inputs used.

Derivative Hedging Relationships

Derivatives accounting involves estimating the fair value of the derivatives and assessing the effectiveness of the hedging relationship. These estimates include subjective calculations and estimates based on information available as of the date of the financial statements, which could be materially different based on different assumptions, calculations, and estimates. If hedging relationships meet the required criteria, two approaches to hedge accounting can be used: short-cut hedge accounting and long-haul hedge accounting.

Short-Cut Hedge Accounting. A short-cut hedging relationship assumes no ineffectiveness and implies that the hedge between an interest-rate swap and an interest-bearing financial instrument is perfectly correlated. Therefore, it is assumed that changes in the fair value of the interest-rate swap and the interest-bearing financial instrument will perfectly offset one another. To qualify for short-cut accounting treatment, a number of restrictive conditions must be met, including but not limited to, the following:

- the notional amount of the interest-rate swap matches the principal amount of the interest-bearing financial instrument being hedged;
- the fair value of the interest-rate swap at the inception of the hedging relationship is zero;
- the formula for computing net settlements under the interest-rate swap is the same for each net settlement; and
- the interest-bearing financial instrument is not prepayable.

Provided that no terms changed, the entire change in the hedging instrument's fair value is considered to be highly effective at achieving offsetting changes in fair values or cash flows of the hedged asset or liability. If all the criteria are met, an FHLBank may apply the short-cut method to a qualifying hedge when the relationship is designated on the trade date of both the hedging instrument and the hedged items (for example, upon commitment to disburse advances or issue consolidated obligation bonds). In many hedging relationships the hedged item is not recognized for accounting purposes until its settlement date; however, the FHLBanks record the changes in the hedging instrument and the hedged item's fair value beginning on the trade date, but this relationship has no effect on earnings or capital.

Long-Haul Hedge Accounting. A long-haul hedging relationship implies a highly effective hedging relationship that requires an FHLBank to assess, retrospectively and prospectively, whether the derivative and hedged item have been and will be highly effective in offsetting changes in fair value or cash flows attributable to the hedged risk. An FHLBank may perform dollar-offset prospective testing at the inception of the hedge and calculate retrospective regressions after a sufficient number of data points have been accumulated. Alternatively, an FHLBank may employ regression-based testing prospectively based on valuations derived from historical and current market data. For cash flow hedges, the FHLBanks measure effectiveness using the hypothetical derivative method, which compares the cumulative change in fair value of the actual derivative designated as the hedging instrument to the cumulative change in fair value of a hypothetical derivative having terms that identically match the critical terms of the hedged forecasted transaction.

If during this effectiveness testing the hedge fails to maintain effectiveness at any point, the hedge relationship will be deemed ineffective. As a result, the hedged item's changes in fair value will no longer be evaluated for effectiveness, and will be treated as not highly effective. If a hedging relationship is not considered highly effective, it does not qualify for hedge accounting treatment. Therefore, the hedged item's changes in fair value are not evaluated, even though an offsetting relationship between fair values or cash flows of the hedge and hedged items may be demonstrated. Changes in the fair value of economic hedges of assets or liabilities are recorded in current period earnings.

The changes in fair value of the derivative and the hedged item may or may not be perfectly correlated. Any difference in the change of fair value between the two will be recognized as a net gain (loss) on the statement of income. To maintain the highly effective relationship, this effectiveness testing of the hedge is performed at the inception of the hedge and thereafter, on at least a quarterly basis.

See [Note 1 - Summary of Significant Accounting Policies](#) and [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements for additional discussion regarding the FHLBanks' accounting for derivatives and types of hedging transactions.

Amortization of Premiums and Accretion of Discounts on Investment Securities and Purchased Mortgage Loans

When an FHLBank purchases investment securities and mortgage loans, it may pay the seller an amount that is different than the unpaid principal balance of the asset. If an FHLBank purchases the asset at a premium, the premium reduces the yield that an FHLBank recognizes on the asset below the stated coupon or note rate. Conversely, if an FHLBank purchases the asset at a discount, the discount increases the yield that FHLBank recognizes on the asset above the stated coupon or note rate.

The FHLBanks amortize premiums and accrete discounts in accordance with GAAP and recognize the amounts of amortization or accretion in current period earnings as a decrease or increase to interest income. An offsetting adjustment is made to the asset's net carrying value as the premiums are amortized and the discounts are accreted into interest income.

Contractual Interest Method. The amortization of premiums or accretion of discounts to interest income using the contractual interest method produces a constant level-yield over the contractual life, which represents the stated maturity. The contractual interest method recognizes the income effects of premiums and discounts over the contractual life of the asset, including adjustments for actual prepayment activities, and reflects the contractual terms of the asset without regard to assumptions about future borrower prepayment behavior.

Retrospective Interest Method. Except when the contractual interest method is used, the FHLBanks apply the retrospective interest method on their investment securities and purchased mortgage loans for which prepayments reasonably can be expected and estimated. The retrospective interest method requires that an FHLBank estimate prepayments over the estimated life of the securities and make a retrospective adjustment of the effective yield each time that it changes the estimated life as if the new estimate had been known since the original acquisition date of the asset. Declining interest rates generally accelerate prepayments, which accelerate the amortization of premiums or the accretion of discounts recognized in current period earnings. Conversely, rising interest rates generally result in slower prepayments, which shift premium amortization and discount accretion to future periods. Use of the retrospective method may increase volatility of reported earnings during periods of changing interest rates, and the use of different estimates or assumptions, as well as changes in external factors, could produce significantly different results.

Allowance for Credit Losses

Each FHLBank is required to assess potential credit losses and establish an allowance for credit losses, as applicable, for each identified portfolio segment of financing receivables. The FHLBanks' allowance for credit losses methodologies are discussed below for the following portfolio segments:

- credit products (advances, letters of credit, and other extensions of credit to borrowers);
- government-guaranteed or -insured mortgage loans held for portfolio; and
- conventional MPF loans held for portfolio and conventional MPP loans held for portfolio.

Furthermore, each FHLBank has established a systematic methodology for assessing other financing receivables for potential credit losses, including term securities purchased under agreements to resell and term federal funds sold. (See [Note 10 - Allowance for Credit Losses](#) to the accompanying combined financial statements for additional information on the FHLBanks' allowance for credit losses methodologies.)

The allowance for credit losses represents the best estimate by each FHLBank's management of the probable credit losses inherent in its financing receivable portfolios. Determining the amount of the allowance for credit losses is considered a critical accounting estimate because management's evaluation of the adequacy of the allowance for credit losses is subjective and requires significant estimates, such as the amounts and timing of estimated future cash flows, estimated losses based on historical loss experience, and consideration of current economic trends, all of which are susceptible to change. Each FHLBank's assumptions and judgments related to its allowance for credit losses are based on information available as of the date of the corresponding financial statements. Actual losses could differ from these estimates. (See [Risk Management - Credit Risk](#) for further discussion of how the FHLBanks monitor, limit, and assess credit risk on their financing receivables.)

Credit Products. Each FHLBank expects to collect all amounts due according to the contractual terms of its credit products based on the nature and quality of the collateral held as security for its credit products, its credit extension and collateral policies, its credit analysis, and the repayment history on its credit products. Accordingly, no allowance for losses on credit products was deemed necessary at December 31, 2018 and 2017. Furthermore, no liability to reflect an allowance for credit losses for off-balance sheet exposures was recorded at December 31, 2018 and 2017. No FHLBank has ever experienced a credit loss on any of its credit products.

The FHLBanks are required by FHFA regulation to obtain sufficient collateral on credit products to protect against losses. The FHLBanks are permitted to accept only certain collateral, such as the following:

- residential mortgage loans;
- U.S. government or agency securities;
- FHLBank deposits; and
- other real estate-related assets.

Each FHLBank may require additional collateral (whether or not that additional collateral meets the eligibility criteria previously discussed) or require that the borrower substitute existing collateral at any time. An FHLBank also has a statutory lien on each member's FHLBank stock as additional security for the indebtedness of that member. At December 31, 2018 and 2017, each FHLBank had the rights to collateral on a borrower-by-borrower basis with an estimated value that was equal to, or greater than, the outstanding extensions of credit. Management of each FHLBank believes that adequate policies and procedures are in place to effectively manage that FHLBank's respective credit risk on its credit products.

Government-Guaranteed or -Insured Mortgage Loans Held for Portfolio. An FHLBank may purchase both conventional mortgage loans and government-guaranteed or -insured mortgage loans under the MPF Program and MPP. Government loans are insured or guaranteed by the Federal Housing Administration, the Department of Veterans Affairs, the Rural Housing Service of the Department of Agriculture, or the Department of Housing and Urban Development. Any losses from these mortgage loans are expected to be recovered from those entities or absorbed by the servicer or PFI, as applicable. Accordingly, the FHLBanks have determined that no allowance for credit losses is necessary in connection with government-guaranteed or -insured mortgage loans held for portfolio at December 31, 2018 and 2017.

Conventional MPF Mortgage Loans Held for Portfolio. At December 31, 2018 and 2017, each FHLBank that holds mortgage loans under the MPF Program (MPF FHLBank) had an allowance for credit losses on mortgage loans held under that program. Each FHLBank bases its allowance on its management's estimate of credit losses inherent in its mortgage loan portfolio at the statement of condition date. The estimate is based on each MPF FHLBank's loan portfolio performance history and/or on analysis of industry statistics for similar mortgage loan portfolios. Conventional loans, in addition to having the related real estate as collateral, are also credit enhanced either by the PFI, which is required to pledge qualified collateral to secure its credit enhancement obligation, or by the supplemental mortgage insurance (SMI) purchased by the PFI. If an MPF FHLBank had losses in excess of the estimated liquidation value of collateral held and credit enhancement amount, credit losses would be recognized for financial reporting purposes. Certain conventional mortgage loans, primarily impaired mortgage loans that are considered collateral-dependent, may be specifically identified for purposes of calculating the allowance for credit losses. MPF loans that are not individually evaluated are collectively evaluated for impairment. The allowance for credit losses on mortgage loans held under the MPF Program is established at a level that each FHLBank's management believes to be adequate to absorb its estimated credit losses related to specifically identified loans and estimated credit losses inherent in its total MPF loan portfolio.

The estimation of credit losses in the total MPF loan portfolio involves assessing the effect of current economic trends and specific events on the allowance for credit losses on mortgage loans. Furthermore, each FHLBank generally takes into consideration the following factors: (1) management's judgment as to the eligibility of PFIs to continue to service and credit-enhance the loans delivered to an MPF FHLBank; (2) evaluation of credit exposure on portfolio loans; (3) valuation and collectability of credit enhancements provided by PFIs or mortgage insurers; (4) estimation of loss exposure and historical loss experience; (5) loan portfolio characteristics and collateral valuations; and (6) industry data and prevailing economic conditions. Setting the level of reserves requires significant judgment, due to the inability to readily determine the fair value of all underlying properties and the uncertainty in other macroeconomic factors that make estimating defaults and severity imprecise, and regular evaluation by management.

Conventional MPP Mortgage Loans Held for Portfolio. At December 31, 2018 and 2017, each FHLBank that holds mortgage loans under the MPP (MPP FHLBank) had an allowance for credit losses on mortgage loans held under that program. Each MPP FHLBank analyzes its MPP loans on a quarterly basis by estimating probable incurred losses, comparing these losses to credit enhancements, including the recoverability of insured amounts, and then establishes general or specific reserves based on the results. If an MPP FHLBank had losses in excess of the estimated liquidation value of collateral held, PMI (if applicable), lender risk account, and SMI (if applicable), credit losses would be recognized for financial reporting purposes. The allowance for credit losses on mortgage loans held under the MPP is established at a level that each MPP FHLBank's management believes to be adequate to absorb its estimated credit losses related to specifically identified loans and estimated credit losses inherent in its total MPP loan portfolio.

The MPP FHLBanks apply a consistent methodology to determine the adequacy of the allowance for credit losses. The key estimates and assumptions that affect each MPP FHLBank's allowance for credit losses generally include the following: (1) the characteristics of specific delinquent conventional loans outstanding under the MPP; (2) evaluations of the overall delinquent loan portfolio through the use of migration analysis; (3) loss severity estimates; (4) historical claims and default experience; (5) expected proceeds from credit enhancements; (6) comparisons to reported industry data; and (7) current economic trends and conditions. Setting the level of reserves requires significant judgment, due to the inability to readily determine the fair value of all underlying properties and the uncertainty in other macroeconomic factors that make estimating defaults and severity imprecise, and regular evaluation by management.

Recent Accounting Developments

See [Note 2 - Recently Issued and Adopted Accounting Guidance](#) to the accompanying combined financial statements for a discussion regarding the effect of recently issued accounting guidance on the FHLBanks' combined financial condition, combined results of operations, or combined cash flows.

Legislative and Regulatory Developments

Significant regulatory actions and developments since the beginning of 2018 are summarized below.

FHFA Final Rule on FHLBank Capital Requirements. On February 20, 2019, the FHFA published a final rule, effective January 1, 2020, that adopts, with amendments, the regulations of the Federal Housing Finance Board (FHFB), predecessor to the FHFA, pertaining to the capital requirements for the FHLBanks. The final rule carries over most of the prior FHFB regulations without material change but substantively revises the credit risk component of the risk-based capital requirement, as well as the limitations on extensions of unsecured credit. The main revisions remove requirements that the FHLBanks calculate credit risk capital charges and unsecured credit limits based on ratings issued by a nationally recognized statistical rating organization, and instead require that the FHLBanks establish and use their own internal rating methodology. The rule imposes a new credit risk capital charge for cleared derivatives. The final rule also revises the percentages used in the regulation to calculate credit risk capital charges for advances and for non-mortgage assets. The final rule also rescinds certain contingency liquidity requirements that were part of the FHFB regulations, as these requirements are now addressed in an Advisory Bulletin (AB) on FHLBank Liquidity Guidance issued by the FHFA in 2018 (see “FHFA AB 2018-07 FHLBank Liquidity Guidance” below).

The FHLBanks do not expect this rule to materially affect the FHLBanks' combined financial condition or combined results of operations.

FDIC Final Rule on Reciprocal Deposits. On February 4, 2019, the FDIC issued a final rule, effective March 6, 2019, related to the treatment of “reciprocal deposits” that implements Section 202 of the Economic Growth, Regulatory Relief, and Consumer Protection Act. The final rule exempts, for certain insured depository institutions (depositories), certain reciprocal deposits — deposits acquired by a depository from a network of participating depositories that enables depositors to receive FDIC insurance coverage for the entire amount of their deposits — from being subject to FDIC restrictions on brokered deposits. Under the rule, well-capitalized and well-rated depositories are not required to treat reciprocal deposits as brokered deposits up to the lesser of 20% of their total liabilities or \$5 billion. Reciprocal deposits held by depositories that are not well-capitalized and well-rated may also be excluded from brokered deposit treatment in certain circumstances.

The FHLBanks continue to evaluate the potential effect of the final rule, but currently do not expect the rule to materially affect the FHLBanks' combined financial condition or combined results of operations. The rule could, however, enhance depositories' liquidity by increasing the attractiveness of deposits that exceed FDIC insurance limits. This could affect the demand for certain FHLBank advance products.

FHFA Final Rule Regarding Golden Parachute and Indemnification Payments. On December 20, 2018, the FHFA published a final rule, effective January 22, 2019, regarding golden parachute and indemnification payments (Golden Parachute Rule) to better align the Golden Parachute Rule with areas of the FHFA's supervisory concern and reduce administrative and compliance burdens. The Golden Parachute Rule sets forth the standards that the FHFA would take into consideration when limiting or prohibiting golden parachute and indemnification payments by an FHLBank or the Office of Finance to an entity-affiliated party when such entity is in troubled condition, in conservatorship or receivership, or insolvent. The final rule amendments:

- focus the standards on payments to and agreements with executive officers, broad-based plans covering large numbers of employees (such as severance plans), and payments made to non-executive-officer employees who may have engaged in certain types of wrongdoing; and
- revise and clarify definitions, exemptions, and procedures to implement the FHFA's supervisory approach.

The FHLBanks do not expect this rule to materially affect the FHLBanks' combined financial condition or combined results of operations.

FHFA Final Rule Amending Affordable Housing Program (AHP) Regulations. On November 28, 2018, the FHFA published a final rule, effective December 28, 2018, that amends the operating requirements of the FHLBanks' AHP. The final rule retains a scoring criteria method for awarding competitive AHP subsidies, but allows the FHLBanks to create multiple pools of competitive funds in order to target specific affordable housing needs in each FHLBank's district. The final rule amendments also:

- revise the scoring criteria to create different and new scoring priorities;
- remove the retention agreement requirement on owner-occupied units using the subsidy solely for rehabilitation;
- increase the per-household set-aside grant amount to \$22,000 with an annual housing price inflation adjustment (up from the current fixed limit of \$15,000);
- clarify the requirements for remediating AHP noncompliance;
- prohibit each FHLBank's board of directors from delegating approval of AHP strategic policy decisions to a committee; and
- further align AHP monitoring with certain federal government funding programs.

The majority of the rule's provisions take effect January 1, 2021, while the owner-occupied retention agreement requirements take effect January 1, 2020. The FHLBanks do not expect this rule to materially affect the FHLBanks' combined financial condition or combined results of operations.

FHFA Proposed Rule on Housing Goals. On November 2, 2018, the FHFA published a proposed rule that would amend the existing FHLBank Housing Goals regulation. The proposed amendments are intended to replace existing FHLBank housing goals with a more streamlined set of goals. While the existing housing goals are established retrospectively, the proposed rule would establish the levels of annual housing goals in advance, thereby eliminating uncertainty about housing goals from year-to-year. If adopted as proposed, the proposed amendments would:

- eliminate the \$2.5 billion Acquired Member Asset (AMA) mortgage purchase volume threshold that triggers the application of housing goals;
- establish the target level for the new prospective AMA mortgage purchase housing goal at 20% of total AMA mortgage purchases that are for very low-income families, low-income families, or families in low-income areas, and require that at least 75% of all mortgage purchases that count toward the goal be for borrowers with incomes at or below 80% of the area median income;
- establish a goal that 50% of AMA program users meet the definition of "small members" whose assets do not exceed the "community financial institution" asset cap, which under FHFA regulations is currently \$1.199 billion; and
- allow the FHLBanks to request FHFA approval of alternative target percentages for mortgage purchase housing goals and small member participation goals.

The FHLBanks submitted a comment letter on the proposed rule on January 29, 2019. The FHLBanks continue to evaluate the proposed rule but do not expect this rule, if adopted as proposed, would materially affect the FHLBanks' combined financial condition or combined results of operations.

Office of the Comptroller of the Currency, Board of Governors of the Federal Reserve, FDIC, Farm Credit Administration, and FHFA Final Rule on Margin and Capital Requirements for Covered Swap Entities. On October 10, 2018, the Office of the Comptroller of the Currency (OCC), Board of Governors of the Federal Reserve (Federal Reserve Board), FDIC, Farm Credit Administration, and FHFA published a final rule, effective November 9, 2018, that amended each agency's rule on Margin and Capital Requirements for Covered Swap Entities (Swap Margin Rules) to conform the definition of "eligible master netting agreement" in such rules to the OCC's, Federal Reserve Board's, and FDIC's final qualified financial contract rules. The final rule also clarifies that a legacy swap would not be deemed to be a covered swap under the Swap Margin Rules if it is amended solely to conform to the qualified financial contract rules. The qualified financial contract rules previously published by the

OCC, Federal Reserve Board, and FDIC require their respective regulated entities to amend covered qualified financial contracts to limit a counterparty's immediate termination or exercise of default rights in the event of bankruptcy or receivership of the regulated entity or its affiliate(s). The FHLBanks do not expect this rule to materially affect the FHLBanks' combined financial condition or combined results of operations.

FHFA Final Rule on Indemnification Payments. On October 4, 2018, the FHFA published a final rule, effective November 5, 2018, establishing standards for identifying when an indemnification payment by an FHLBank or the Office of Finance to an officer, director, employee, or other affiliated party in connection with an administrative proceeding or civil action instituted by the FHFA is prohibited or permissible. The rule generally prohibits these payments except in the following circumstances:

- premiums for any commercial insurance or fidelity bonds for directors and officers, to the extent that the insurance or fidelity bond covers expenses and restitution, but not a judgment in favor of the FHFA or a civil money penalty imposed by the FHFA;
- expenses of defending an action, subject to an agreement to repay those expenses in certain instances; and
- amounts due under an indemnification agreement entered into with a named affiliated party on or prior to September 20, 2016 (the date the rule was proposed).

The rule also outlines the process the board of directors must undergo prior to making a permitted payment related to expenses of defending an action. The FHLBanks do not expect the rule to materially affect the FHLBanks' combined financial condition or combined results of operations.

FHFA AB 2018-07 FHLBank Liquidity Guidance. On August 23, 2018, the FHFA issued an AB on FHLBank liquidity (Liquidity Guidance AB) that communicates the FHFA's expectations with respect to the maintenance of sufficient liquidity to enable the FHLBanks to provide advances and letters of credit for members. The Liquidity Guidance AB rescinds 2009 liquidity guidance previously issued by the FHFA. Contemporaneously with the issuance of the Liquidity Guidance AB, the FHFA issued a supervisory letter that identifies initial thresholds for measures of liquidity within the established ranges set forth in the Liquidity Guidance AB.

The Liquidity Guidance AB provides guidance on the level of on-balance sheet liquid assets related to base case liquidity. As part of the base case liquidity measure, the guidance also includes a separate provision covering off-balance sheet commitments from standby letters of credit. In addition, the Liquidity Guidance AB provides guidance related to asset/liability maturity funding gap limits.

With respect to base case liquidity, the FHFA revised previous guidance that required the FHLBanks to assume a 5-day period without access to capital markets due to a change in certain assumptions underlying that guidance. Under the Liquidity Guidance AB, the FHLBanks are required to hold positive cash flow assuming no access to capital markets and assuming renewal of all maturing advances for a period of between ten and thirty calendar days. The Liquidity Guidance AB also sets forth the initial cash flow assumptions and formula to calculate base case liquidity. With respect to standby letters of credit, the guidance states that each FHLBank should maintain a liquidity reserve of between 1% and 20% of its outstanding standby letters of credit commitments.

With respect to funding gaps and possible asset and liability mismatches, the Liquidity Guidance AB provides guidance on maintaining appropriate funding gaps for three-month and one-year maturity horizons. The Liquidity Guidance AB provides for these limits to reduce the liquidity risks associated with a mismatch in asset and liability maturities, including an undue reliance on short-term debt funding.

The Liquidity Guidance AB also addresses liquidity stress testing, contingency funding plans, and an adjustment to the FHLBanks' core mission achievement calculation. Portions of the Liquidity Guidance AB were implemented on December 31, 2018, with further implementation to take place on March 31, 2019, and full implementation on December 31, 2019. The Liquidity Guidance AB may require the FHLBanks to hold an additional amount of liquid assets to meet the new guidance, which could reduce the FHLBanks' ability to invest in higher-yielding assets. Further, the FHLBanks' cost of funding may increase if the FHLBanks were required to achieve the appropriate funding gap with longer-term funding.

Adoption of Single-Counterparty Credit Limits for Bank Holding Companies and Foreign Banking Organizations by the Federal Reserve Board. On August 6, 2018, the Federal Reserve Board published a final rule, effective October 5, 2018, establishing single-counterparty credit limits applicable to bank holding companies and foreign banking organizations with total consolidated assets of \$250 billion or more, including global systemically important bank holding companies in the United States. These entities are considered to be "covered companies" under the rule. The FHLBanks are themselves exempt from the limits and reporting requirements contained in this rule. However, credit exposure to individual FHLBanks must be monitored, and reported on as required, by any entity that is a covered company under this rule.

Under the final rule, a covered company and its subsidiaries may not have aggregate net credit exposure to an FHLBank and, if applicable, (in certain cases) economically interdependent entities in excess of 25% of the company's tier 1 capital. Such credit exposure does not include advances from an FHLBank, but generally includes collateral pledged to an FHLBank in excess of a covered company's outstanding advances. Also included towards a covered company's net credit exposure is its investment in FHLBank capital stock and debt instruments; deposits with an FHLBank; FHLBank-issued letters of credit where a covered company is the named beneficiary; and other obligations to an FHLBank, including repurchase or reverse repurchase transactions net of collateral that create a credit exposure to an FHLBank. Intra-day exposures are exempt from the final rule.

With respect to the FHLBanks' consolidated obligations held by a covered company, the company must monitor, and report on as required, its credit exposure for such obligations. It is not clear if the Federal Reserve will require consolidated obligations to be aggregated with other exposures to an FHLBank or the FHLBank System.

The final rule gives major covered companies (i.e., the global systemically important bank holding companies) until January 1, 2020 to comply, and all other covered companies will have until July 1, 2020 to comply. The FHLBanks do not expect the rule to materially affect the FHLBanks' combined financial condition or combined results of operations.

External Credit Ratings

During the year ended December 31, 2018, there were no changes to external credit ratings with regard to the FHLBanks or their consolidated obligations. At March 15, 2019, consolidated obligations were rated AA+/A-1+ by S&P and Aaa/P-1 by Moody's, with outlook stable. S&P, Moody's, or other rating organizations could downgrade or upgrade the credit ratings of the U.S. government and GSEs, including the FHLBanks and their consolidated obligations. Investors should note that a rating issued by a nationally recognized statistical rating organization is not a recommendation to buy, sell, or hold securities, and that the ratings may be revised or withdrawn at any time. Investors should evaluate the rating of each nationally recognized statistical rating organization independently. Investors should not take the historical or current ratings of the FHLBanks and their consolidated obligations as an indication of future ratings for FHLBanks and their consolidated obligations. Table 37 presents each FHLBank's long-term credit rating, short-term credit rating, and outlook at March 15, 2019.

Table 37 - FHLBanks' Long-Term Credit Ratings, Short-Term Credit Ratings, and Outlook at March 15, 2019

FHLBank	S&P		Moody's	
	Long-Term/ Short-Term Rating	Outlook	Long-Term/ Short-Term Rating	Outlook
Boston	AA+/A-1+	Stable	Aaa/P-1	Stable
New York	AA+/A-1+	Stable	Aaa/P-1	Stable
Pittsburgh	AA+/A-1+	Stable	Aaa/P-1	Stable
Atlanta	AA+/A-1+	Stable	Aaa/P-1	Stable
Cincinnati	AA+/A-1+	Stable	Aaa/P-1	Stable
Indianapolis	AA+/A-1+	Stable	Aaa/P-1	Stable
Chicago	AA+/A-1+	Stable	Aaa/P-1	Stable
Des Moines	AA+/A-1+	Stable	Aaa/P-1	Stable
Dallas	AA+/A-1+	Stable	Aaa/P-1	Stable
Topeka	AA+/A-1+	Stable	Aaa/P-1	Stable
San Francisco	AA+/A-1+	Stable	Aaa/P-1	Stable

Risk Management

The fundamental business of each FHLBank is to provide a readily available, competitively-priced source of funds, in a wide range of maturities, to meet the borrowing demands of its members and housing associates. The principal sources of funds for these activities are the proceeds from the issuance of consolidated obligations and, to a lesser extent, capital and deposits from members. Lending and investing funds, and engaging in derivative transactions, can potentially expose the FHLBanks to a number of risks, including market risk and credit risk. (See [Quantitative and Qualitative Disclosures about Market Risk](#) for a discussion of market risk.) The FHLBanks are also subject to liquidity, operational, and business risks. Each of the FHLBanks and the Office of Finance has established policies and procedures, including board oversight and escalation practices, to evaluate, manage, and control their risks. Each FHLBank must also file periodic compliance reports with the FHFA. The FHFA has established regulations governing the risk management practices of the FHLBanks and conducts an annual on-site examination, interim on-site visits of each FHLBank and the Office of Finance, as well as off-site analyses.

Credit Risk

Advances. Each FHLBank manages its credit exposure to advances through an integrated approach that provides for the ongoing review of the financial condition of its borrowers coupled with collateral and lending policies and procedures designed to limit its risk of loss while balancing its borrowers' needs for a reliable source of funding. Each FHLBank uses a methodology to evaluate its borrowers, based on financial, regulatory, and other qualitative information, including examination reports. Each FHLBank reviews its borrowers' financial condition on an ongoing basis using current information and makes changes to its collateral guidelines to mitigate the credit risk on advances. As of December 31, 2018, the management of each FHLBank believed it had adequate policies and procedures in place to manage its credit risk on advances effectively.

The FHLBanks protect against credit risk on advances by collateralizing all advances. Advances and other credit product obligations to an FHLBank are fully secured with eligible collateral, the value of which is discounted to protect the FHLBanks from credit loss. Eligible collateral values are determined by the market value for securities collateral, and the market value or unpaid principal balance for all loan collateral. For collateral which market prices are not readily available, the FHLBanks may use internal or external valuation models or methodologies to determine the fair value of the collateral. These valuation models incorporate assumptions related to factors that may affect collateral values, such as market liquidity, discounts rates, potential prepayments, and liquidation and servicing costs in the event of default, among others, which may be adjusted in response to changes in economic and market conditions in order to produce reliable results. The FHLBanks also have policies and procedures for validating the reasonableness of their collateral valuations. In addition, collateral verifications and on-site reviews are performed by the FHLBanks based on the risk profile of the borrower. At December 31, 2018, each FHLBank had rights to collateral with an estimated value greater than the related outstanding advances.

The FHLBank Act requires that FHLBanks obtain and maintain collateral from their borrowers to secure advances at the time the advances are originated or renewed. Furthermore, under the FHLBank Act, an FHLBank has a statutory lien on that FHLBank's capital stock held by its members, which serves as further collateral for the indebtedness of these members to the FHLBank. The FHLBank Act also allows FHLBanks to further protect their security position with respect to advances by allowing them to require the posting of additional collateral, whether or not such additional collateral is eligible to originate or renew an advance. The FHLBanks perfect their security interests by filing applicable financing statements or taking delivery of collateral. In addition, the FHLBank Act states that notwithstanding any other provision of law, any security interest granted to an FHLBank by any member of any FHLBank, or any affiliate of any member, is entitled to a priority over the claims and rights of any party (including any receiver, conservator, trustee, or similar lien creditor), other than claims and rights that (1) would be entitled to priority under otherwise applicable law, and (2) are held by actual bona fide purchasers for value or by actual secured parties that are secured by actual perfected security interests. Collateral arrangements will vary depending on: (1) borrower credit quality, financial condition, and performance; (2) borrowing capacity; (3) collateral availability; and (4) overall credit exposure to the borrower.

Each FHLBank establishes each borrower's borrowing capacity by determining the amount it will lend against each collateral type. Borrowers are also required to collateralize the face amount of any letters of credit issued for their benefit by an FHLBank. In addition, an FHLBank must take any steps necessary to ensure that its security interest in all collateral pledged by non-depository member institutions, such as insurance companies and housing associates, is as secure as its security interests in collateral pledged by depository member institutions.

Residential mortgage loans are the principal form of collateral for advances. Collateral eligible to secure new or renewed advances includes:

- one-to-four family and multifamily mortgage loans (delinquent for no more than 90 days) and securities representing such mortgages;
- loans and securities issued, insured, or guaranteed by the U.S. government or any U.S. government agency (for example, mortgage-backed securities issued or guaranteed by Fannie Mae, Freddie Mac, or Ginnie Mae);
- cash or deposits in the FHLBank;
- certain other collateral that is real estate-related, provided that the collateral has a readily ascertainable value and that the FHLBank can perfect a security interest in it; and
- certain qualifying securities representing undivided equity interests in eligible advance collateral.

Each FHLBank generally establishes an overall FHLBank credit limit for each borrower, which caps the amount of FHLBank credit availability to the borrower. This limit is designed to reduce an FHLBank's credit exposure to an individual borrower, while encouraging borrowers to diversify their funding sources. A borrower's total credit limit with an FHLBank includes the principal amount of outstanding advances, the face amount of outstanding letters of credit, the total exposure of the FHLBank to the borrower under any derivative contract, and the credit enhancement obligation of the borrower on mortgage loans sold to the FHLBank. Each FHLBank determines the credit limit of its borrower by evaluating a wide variety of factors, including, but not limited to, the borrower's overall creditworthiness and collateral management practices. The FHLBanks impose borrowing limits on most borrowers with a maximum ranging from 20% to 60% of a borrower's total assets. However, certain borrowers may be approved for a higher borrowing limit when it is supported by that borrower's creditworthiness and collateral.

Collateral discounts, or haircuts, used in determining lending values of the collateral, are calculated to project that the lending value of collateral securing each borrower's obligations exceeds the amount the borrower may borrow from the FHLBanks. Table 38 presents the range of collateral lending values for the blanket lien, listing, and delivery methods of pledging collateral across the FHLBanks.

Collateral lending values are determined by subtracting the collateral haircut from 100%. Certain collateral haircuts may also reflect haircuts applied to advances outstanding based on borrowers' actual financial performance. Effective lending value percentages are equal to the collateral lending value divided by the unpaid principal balance of eligible loan collateral or market value of eligible securities collateral. Average effective lending values are calculated based on the total lending value against eligible collateral for all borrowers without regard to the amount of credit extended to any particular borrower; however, individual borrower credit obligations to the FHLBanks are not cross-collateralized between borrowers.

Table 38 - Effective Lending Values by Type of Collateral at December 31, 2018

Collateral Type	Blanket Lien		Listing		Delivery	
	Range	Average	Range	Average	Range	Average
Single-family mortgage loans(1)	8%-94%	82%	0%-96%	80%	14%-92%	90%
Multifamily mortgage loans	5%-79%	74%	26%-89%	77%	32%-82%	72%
Other U.S. government-guaranteed loans	77%-92%	82%	n/a	n/a	n/a	n/a
Home equity loans and lines of credit	4%-79%	68%	8%-92%	68%	37%-85%	62%
Community Financial Institutions (CFI) loans	10%-74%	61%	25%-71%	68%	7%-71%	68%
Commercial real estate loans	9%-83%	65%	25%-89%	72%	15%-85%	17%
Other loan collateral	27%-81%	60%	40%-82%	78%	10%-74%	73%
Cash, U.S. government, and U.S. Treasury securities	n/a	n/a	n/a	n/a	68%-100%	96%
State and local government securities	n/a	n/a	n/a	n/a	17%-98%	71%
Municipal debt	n/a	n/a	n/a	n/a	54%-94%	86%
U.S. agency securities (excluding MBS)	n/a	n/a	n/a	n/a	68%-99%	96%
U.S. agency MBS and collateralized mortgage obligations (CMOs)	n/a	n/a	n/a	n/a	68%-98%	96%
Private-label MBS and CMOs	n/a	n/a	n/a	n/a	50%-96%	86%
CFI securities	n/a	n/a	n/a	n/a	93%-95%	95%
Commercial MBS	n/a	n/a	n/a	n/a	50%-97%	82%
Other securities	n/a	n/a	n/a	n/a	51%-90%	89%
Student loan securities	n/a	n/a	n/a	n/a	94%-97%	97%

(1) Includes Federal Housing Administration and Department of Veterans Affairs loans.
n/a Collateral is not pledged using this pledging method.

As of December 31, 2018, there were 113 individual FHLBank borrowers (112 FHLBank members and 1 non-member financial institutions) that each held advance balances of at least \$1.0 billion. When a non-member financial institution acquires some or all of the assets and liabilities of an FHLBank member, including outstanding advances and FHLBank capital stock, an FHLBank may allow those advances to remain outstanding to that non-member financial institution. The non-member borrower would be required to meet all of that FHLBank's credit and collateral requirements, including requirements regarding creditworthiness and collateral borrowing capacity.

A borrower's total credit obligation to an FHLBank could include outstanding advances, notional amount of letters of credit, collateralized derivative contracts, and credit enhanced obligations on mortgage loans sold to the FHLBank. Eligible collateral values include market values for securities and the unpaid principal balance for all other collateral pledged by the blanket lien, listing, or delivery method. The collateralization ratio was 2.7 at December 31, 2018, which represents the total of these 113 individual FHLBank borrowers' eligible collateral divided by these borrowers' advances and other credit products outstanding. The collateralization ratio for all borrowers was 3.0 at December 31, 2018. However, individual borrower credit obligations to the FHLBanks are not cross-collateralized between borrowers.

Table 39 presents advances, other credit products (which primarily includes notional amount of letters of credit), and collateral outstanding for borrowers with at least \$1.0 billion of advances outstanding as compared to all borrowers.

Table 39 - Advances, Other Credit Products, and Collateral Outstanding at December 31, 2018
(dollars in millions)

	Borrowers with at Least \$1.0 Billion of Advances Outstanding	All Borrowers	Percentage
Advances outstanding, principal amount	\$ 529,650	\$ 729,501	72.6%
Other credit products	\$ 85,929	\$ 162,732	52.8%
Collateral outstanding	\$ 1,664,008	\$ 2,719,227	61.2%

Based on the financial condition of the borrower, each FHLBank classifies each borrower by the method of pledging collateral into one of three collateral categories: (1) blanket lien status; (2) listing (specific identification) status; or (3) delivery (possession) status. The blanket lien status is the least restrictive collateral status, and is generally assigned to lower risk institutions pledging collateral. Under the blanket lien status, an individual FHLBank allows a borrower to retain possession of eligible collateral pledged to that FHLBank, provided the borrower executes a written security agreement and agrees to hold the collateral for the benefit of that FHLBank. Origination of new advances or renewal of advances must only be supported by certain eligible collateral categories. A blanket lien is typically accepted by the FHLBanks only for loan collateral; most securities collateral must be delivered to an FHLBank, or an FHLBank-approved third-party custodian, and pledged for the benefit of that FHLBank.

An FHLBank may require borrowers to provide a detailed listing of eligible advance collateral being pledged to the FHLBank due to their high usage of FHLBank credit products, the type of assets being pledged, or the credit condition of the borrower. Under the listing status, the borrower retains physical possession of specific collateral pledged to an FHLBank, but the borrower provides listings of loans pledged to its FHLBank with detailed loan information, such as loan amount, payments, maturity date, interest rate, loan-to-value, collateral type, and FICO® scores. From a borrower's perspective, the benefit of listing collateral in lieu of a blanket lien security agreement is that, in some cases, the discount or haircut applicable to that collateral may be lower than that for blanket lien collateral. From an FHLBank's perspective, the benefit of listing collateral is that it provides more detailed loan information to arrive at a more precise valuation.

Under the delivery status, an FHLBank requires the borrower to place physical possession of eligible collateral with the FHLBank or a third-party custodian to sufficiently secure all outstanding obligations. Typically, an FHLBank would take physical possession or control of collateral if the financial condition of the borrower was deteriorating or if the borrower exceeded certain credit product usage triggers. However, to ensure its position as a first-priority secured creditor, an FHLBank will generally require insurance company borrowers to place physical possession of all pledged eligible collateral with the FHLBank or deposit it with a custodian or control agent. Delivery of collateral may also be required if there is a regulatory action against the borrower by its regulator that would indicate inadequate controls or other conditions that would be of concern to that FHLBank.

Table 40 presents information on a combined basis regarding the type of collateral securing advances and other credit products outstanding.

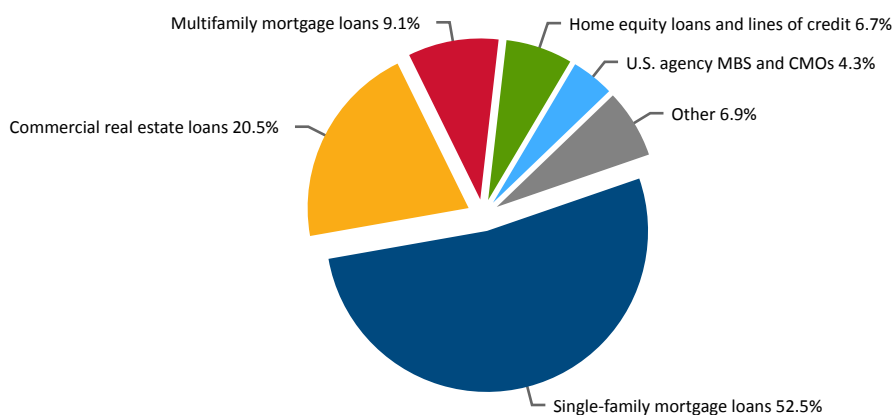
Table 40 - Type of Collateral Securing Advances and Other Credit Products Outstanding at December 31, 2018
(dollars in millions)

Collateral Type	Blanket Lien		Listing		Delivery		Total	
	Amount	Percentage	Amount	Percentage	Amount	Percentage	Amount	Percentage
Single-family mortgage loans (1)	\$ 492,117	18.1%	\$ 929,107	34.2%	\$ 5,286	0.2%	\$ 1,426,510	52.5%
Commercial real estate loans	373,760	13.7%	152,031	5.6%	31,984	1.2%	557,775	20.5%
Multifamily mortgage loans	73,297	2.7%	159,387	5.9%	13,561	0.5%	246,245	9.1%
Home equity loans and lines of credit	88,870	3.3%	91,992	3.4%	25	—	180,887	6.7%
U.S. agency MBS and CMOs	n/a	n/a	n/a	n/a	115,449	4.3%	115,449	4.3%
Other real estate loans	57,389	2.1%	10,717	0.4%	3,634	0.1%	71,740	2.6%
CFI loans	35,958	1.3%	1,684	0.1%	14	—	37,656	1.4%
Commercial MBS	n/a	n/a	n/a	n/a	22,566	0.8%	22,566	0.8%
U.S. agency securities (excluding MBS)	n/a	n/a	n/a	n/a	22,059	0.8%	22,059	0.8%
U.S. obligations	n/a	n/a	n/a	n/a	14,301	0.5%	14,301	0.5%
Private-label MBS and CMOs	n/a	n/a	n/a	n/a	6,216	0.2%	6,216	0.2%
Other	783	—	n/a	n/a	17,040	0.6%	17,823	0.6%
Total collateral	\$ 1,122,174	41.2%	\$ 1,344,918	49.6%	\$ 252,135	9.2%	\$ 2,719,227	100.0%

(1) Includes Federal Housing Administration and Department of Veterans Affairs loans.
n/a Collateral is not pledged using this pledging method.

Figure 31 presents the percentage of collateral securing advances and other credit products by type at December 31, 2018.

Figure 31: Percentage of Collateral Securing Advances and Other Credit Products by Type



The FHLBank Act also permits borrowers that qualify as a Community Financial Institution (CFI) to pledge certain CFI-specific collateral to the extent that its FHLBank accepts those loans as collateral for advances. The FHLBank Act, as amended by the Housing Act, defines CFIs as depository institutions insured by the FDIC with average total assets over the preceding three-year period of less than \$1.0 billion (the average total asset cap), with the average total asset cap adjusted annually for inflation. The average total asset cap for 2018 was \$1.173 billion and the average total asset cap for 2019 is \$1.199 billion.

The FHLBanks that accept CFI-specific collateral mitigate the potential increased credit risk through higher haircuts (lower lending values) on that collateral as presented in Table 38. CFI-specific collateral consists of small business, small farm, and small agri-business loans. Furthermore, the FHFA provides the FHLBanks with regulatory authority to receive community development loans as collateral for advances from CFI members.

Borrower Failures. The financial condition of all members and housing associates is closely monitored for compliance with financial criteria as set forth in each FHLBank's credit policies. During the year ended December 31, 2018, no FHLBank incurred any credit loss on any of its advances, including advances to failed borrowers. All extensions of credit by the FHLBanks to borrowers are secured by eligible collateral. However, if a borrower were to default, and the value of the collateral pledged by the borrower declined to a point such that an FHLBank was unable to realize sufficient value from the pledged collateral to cover the borrower's obligations, and an FHLBank was unable to obtain additional collateral to make up for the reduction in value of that collateral, that FHLBank could incur losses. Defaults by borrowers with significant obligations to the FHLBanks could result in significant financial losses, which would adversely affect the FHLBanks' results of operations and financial condition.

Investments. The FHLBanks are subject to credit risk on investments consisting of investment securities, interest-bearing deposits, securities purchased under agreements to resell, and federal funds sold. These investments are generally transacted with government agencies and large financial institutions that are considered by an individual FHLBank to be of investment quality. FHFA regulation defines investment quality as a determination by an FHLBank, with respect to a security, that there is adequate financial backing so that full and timely payment of principal and interest on such a security is expected, and there is minimal risk that the timely payment of principal and interest would not occur because of adverse changes in economic and financial conditions during the projected life of the security.

The FHLBanks maintain short-term investment portfolios, the proceeds of which may provide funds to meet the credit needs of their members and to maintain liquidity. Within this portfolio of short-term investments, the FHLBanks have unsecured credit exposure on certain investments.

The FHLBanks maintain long-term investment portfolios as an additional source of liquidity and to earn interest income. These investments generally provide the FHLBanks with higher returns than those available on short-term investments. Within this portfolio of long-term investments, the FHLBanks are primarily subject to credit risk related to private-label mortgage-backed securities that are either directly or indirectly supported by underlying mortgage loans.

Regulatory Restrictions on Investments. To minimize credit risk on investments, the FHLBanks are prohibited by FHFA regulations from investing in any of the following security types:

- instruments, such as common stock that represent an ownership interest in an entity, other than stock in small business investment companies or certain investments targeted at low-income persons or communities;
- instruments issued by non-U.S. entities, other than those issued by U.S. branches and agency offices of foreign commercial banks (e.g., federal funds);
- debt instruments that are not investment quality, other than certain investments targeted at low-income persons or communities and instruments that became less than investment quality after their purchase by the FHLBank;
- whole mortgages or other whole loans, or interests in mortgages or loans, other than:
 - whole mortgages or loans acquired under an FHLBank's Acquired Member Asset program;
 - certain investments targeted at low-income persons or communities;
 - certain marketable direct obligations of state, local, or tribal government units or agencies that are investment quality;
 - mortgage-backed securities (which include agency and private-label pools of commercial and residential mortgage loans), or asset-backed securities collateralized by manufactured housing loans or home equity loans that meet the definition of the term "securities" under the Securities Act of 1933, as amended; and
 - certain foreign housing loans authorized under section 12(b) of the FHLBank Act;
- residual interest and interest accrual classes of securities;
- interest-only and principal-only securities;
- mortgage-backed securities or eligible asset-backed securities that on the trade date are at rates equal to their contractual cap, with average lives that vary more than six years under an assumed instantaneous rate change of 300 basis points, unless the instrument qualifies as an Acquired Member Asset; and
- foreign currency or commodity positions.

Investment Quality and Ratings. The FHLBanks seek to reduce the credit risk by investing in investment-quality securities. The FHLBanks consider a variety of credit quality factors when analyzing potential investments, including collateral performance, marketability, asset class or sector considerations, local and regional economic conditions, credit ratings based on the nationally recognized statistical rating organization(s), and/or the financial health of the underlying issuer. Figures 32 and 33 present the composition of total investments by credit rating at December 31, 2018 and 2017.

Figure 32: Total Investments by Credit Rating at December 31, 2018 (dollars in billions)

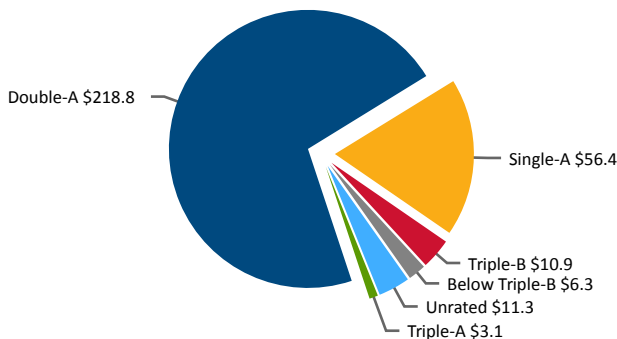


Figure 33: Total Investments by Credit Rating at December 31, 2017 (dollars in billions)

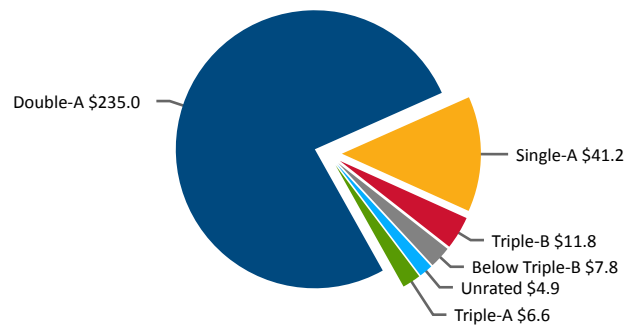


Table 41 presents the credit ratings of the investment securities held by the FHLBanks as of December 31, 2018 and 2017, using the lowest long-term credit rating for each security owned by an individual FHLBank based on the nationally recognized statistical rating organization(s) used by that FHLBank. The internal ratings of an individual FHLBank may differ from those obtained from the nationally recognized statistical rating organization(s) and other FHLBank internal ratings. Investors should not take the historical or current ratings displayed in this table as an indication of future ratings.

Table 41 - Investment Ratings
(dollars in millions)

Carrying Value	December 31, 2018(1)(2)						Total
	Triple-A	Double-A	Single-A	Triple-B	Below Triple-B	Unrated	
Interest-bearing deposits	\$ —	\$ 2,027	\$ 15,108	\$ 47	\$ —	\$ —	\$ 17,182
Securities purchased under agreements to resell	—	18,365	7,900	7,399	2,445	9,216	45,325
Federal funds sold	—	20,176	30,944	2,933	22	141	54,216
Total investment securities by major security type							
Non-mortgage backed securities							
Certificates of deposit	—	1,000	2,050	—	—	—	3,050
U.S. obligations	—	16,859	—	—	—	—	16,859
GSE and Tennessee Valley Authority obligations	—	19,038	—	—	—	—	19,038
State or local housing agency obligations	1,246	1,795	128	52	—	—	3,221
Federal Family Education Loan Program ABS	33	3,748	—	—	—	—	3,781
Other	1,019	98	—	—	—	10	1,127
Total non-mortgage-backed securities	2,298	42,538	2,178	52	—	10	47,076
Mortgage-backed securities							
U.S. obligations single-family MBS	134	12,394	—	—	—	—	12,528
U.S. obligations multifamily MBS	—	362	—	—	—	—	362
GSE single-family MBS	—	38,154	7	—	4	—	38,165
GSE multifamily MBS	629	84,454	—	—	—	—	85,083
Private-label residential MBS	6	325	234	424	3,784	1,936	6,709
Private-label manufactured housing loan ABS	2	—	34	—	—	—	36
Private-label home equity loan ABS	—	1	66	10	31	—	108
Total mortgage-backed securities	771	135,690	341	434	3,819	1,936	142,991
Total investment securities	3,069	178,228	2,519	486	3,819	1,946	190,067
Total investments	\$ 3,069	\$ 218,796	\$ 56,471	\$ 10,865	\$ 6,286	\$ 11,303	\$ 306,790

Carrying Value	December 31, 2017(2)(3)						
	Triple-A	Double-A	Single-A	Triple-B	Below Triple-B	Unrated	Total
Interest-bearing deposits	\$ —	\$ 1,747	\$ 3,627	\$ 46	\$ —	\$ —	\$ 5,420
Securities purchased under agreements to resell	2,100	36,907	2,500	6,699	500	3,862	52,568
Federal funds sold	—	27,354	33,620	4,329	—	227	65,530
Total investment securities by major security type							
Non-mortgage backed securities							
Certificates of deposit	—	1,235	925	—	—	—	2,160
U.S. obligations	1,285	5,842	—	—	—	—	7,127
GSE and Tennessee Valley Authority obligations	—	24,167	—	—	—	—	24,167
State or local housing agency obligations	1,438	1,833	309	—	—	—	3,580
Federal Family Education Loan Program ABS	41	4,173	—	—	—	—	4,214
Other	1,044	100	—	—	—	71	1,215
Total non-mortgage-backed securities	3,808	37,350	1,234	—	—	71	42,463
Mortgage-backed securities							
U.S. obligations single-family MBS	172	12,723	—	—	—	—	12,895
U.S. obligations multifamily MBS	—	446	—	—	—	—	446
GSE single-family MBS	—	42,785	7	—	5	—	42,797
GSE multifamily MBS	577	75,586	—	—	—	—	76,163
Private-label residential MBS	3	69	90	681	7,240	727	8,810
Private-label manufactured housing loan ABS	—	—	54	—	—	—	54
Private-label home equity loan ABS	1	3	71	20	39	—	134
Total mortgage-backed securities	753	131,612	222	701	7,284	727	141,299
Total investment securities	4,561	168,962	1,456	701	7,284	798	183,762
Total investments	\$ 6,661	\$ 234,970	\$ 41,203	\$ 11,775	\$ 7,784	\$ 4,887	\$ 307,280

- (1) Does not reflect any changes in ratings, outlook, or watch status occurring after December 31, 2018.
(2) Investment amounts represent the carrying value and do not include related accrued interest.
(3) Does not reflect any changes in ratings, outlook, or watch status occurring after December 31, 2017.

Long-term Investments. Within the portfolio of long-term investments, the FHLBanks are primarily subject to credit risk related to private-label mortgage-backed securities that are either directly or indirectly supported by underlying mortgage loans. The FHLBanks invested in private-label mortgage-backed securities, which consisted of private-label residential MBS, manufactured housing loan ABS, and home equity loan ABS. Each private-label mortgage-backed security may contain one or more forms of credit protection/enhancements, including, but not limited to, (1) guarantee of principal and interest, (2) subordination, (3) over-collateralization and excess interest, and (4) third-party insurance. Credit enhancement achieved through subordination features results in the subordination of payments to junior classes to support cash flows received by senior classes held by investors such as the FHLBanks.

Although the FHLBanks invested in private-label mortgage-backed securities that at the date of purchase were substantially all rated triple-A, many of these securities have incurred credit losses based on economic conditions and housing market trends since the FHLBanks originally purchased them.

Current credit enhancement percentages reflect the ability of subordinated classes of securities to absorb principal losses and interest shortfalls before the senior classes held by the FHLBanks are affected (i.e., the losses, expressed as a percentage of the outstanding principal balances, that could be incurred in the underlying loan pools before the securities held by the FHLBanks would be affected, assuming that all of those losses occurred on the measurement date). Depending on the timing and amount of losses in the underlying loan pools, it is possible that the senior classes held by the FHLBanks could have losses in scenarios where the cumulative loan losses do not exceed the current credit enhancement percentage.

Table 42 presents collateral performance and credit enhancement information related to private-label mortgage-backed securities at December 31, 2018. No FHLBank has purchased private-label mortgage-backed securities since 2008.

Table 42 - Credit Ratings of Private-Label Mortgage-Backed Securities at December 31, 2018
(dollars in millions)

	Total	Prime(1)	Alt-A(1)(2)	Subprime(1)
Unpaid Principal Balance (UPB) by credit rating(3)				
Triple-A	\$ 8	\$ —	\$ 6	\$ 2
Double-A	325	203	121	1
Single-A	338	169	63	106
Triple-B	438	312	108	18
Double-B	469	283	161	25
Single-B	378	119	251	8
Triple-C	2,598	329	2,254	15
Double-C	767	29	493	245
Single-C	151	—	99	52
Single-D	356	139	201	16
Unrated	2,360	1,247	1,112	1
Total	\$ 8,188	\$ 2,830	\$ 4,869	\$ 489
Amortized cost	\$ 6,689	\$ 2,490	\$ 3,887	\$ 312
Gross unrealized losses(4)	(160)	(98)	(33)	(29)
Fair value	7,361	2,643	4,307	411
Weighted-average percentage				
Fair value to UPB	89.9%	93.4%	88.5%	84.0%
Original credit support(5)	20.2%	11.4%	23.7%	35.7%
Remaining Credit support(6)	8.0%	7.1%	6.8%	24.4%
Collateral delinquency(7)	13.0%	10.6%	13.8%	18.7%

- (1) The FHLBanks classify securities as prime, Alt-A, and subprime based on the originator's classification at the time of origination or based on classification by a nationally recognized statistical rating organization upon issuance of the securities.
- (2) The FHLBanks held a total of \$1,169 million in Alt-A option adjustable-rate mortgages, of which \$212 million are in a gross unrealized loss position based on their unpaid principal balance at December 31, 2018.
- (3) Represents the lowest rating available at December 31, 2018, for each security owned by an individual FHLBank based on the nationally recognized statistical rating organization(s) used by that FHLBank. The internal ratings of an individual FHLBank may differ from those obtained from the nationally recognized statistical rating organization(s) and other FHLBank internal ratings.
- (4) Represents total gross unrealized losses including non-credit-related other-than-temporary impairment recognized in AOCL. The unpaid principal balance and amortized cost of private-label mortgage-backed securities in a gross unrealized loss position was \$2,317 million and \$2,007 million at December 31, 2018.
- (5) Original weighted-average credit support is based on the credit support at the time of issuance and is determined based on the unpaid principal balance of the individual securities in the category and their respective original credit support.
- (6) Remaining weighted-average credit support is based on the credit support as of December 31, 2018, and is determined based on the unpaid principal balance of the individual securities in the category and their respective credit support as of December 31, 2018.
- (7) Weighted-average collateral delinquency rate is determined based on the underlying loans that are 60 days or more past due and is determined based on the unpaid principal balance of the individual securities in the category and their respective delinquencies.

Monoline Bond Insurance. Certain FHLBank investment securities portfolios include a limited number of investments that are insured by monoline bond insurers. The monoline bond insurance on these investments guarantees the timely payment of principal and interest if these payments cannot be satisfied from the cash flows of the underlying mortgage collateral.

The monoline bond insurers continue to be subject to adverse ratings and weak financial performance measures, which imply an increased risk that the monoline bond insurer will fail to fulfill its obligations to reimburse the insured investor for claims made under the related insurance policies. There are four monoline bond insurers that insure certain FHLBanks' investment securities. Of the four monoline bond insurers, the financial guarantee from Assured Guaranty Municipal Corp. is considered sufficient to cover all future claims. Conversely, the financial guarantees from monoline bond insurers Financial Guaranty Insurance Company and MBIA Insurance Corp. are not considered applicable due to regulatory intervention that has suspended all claims, and the affected FHLBanks have placed no reliance on these monoline insurers. For the remaining monoline bond insurer, Ambac Assurance Corp., the affected FHLBanks assessed an expected reimbursement rate of 100% for new claims through December 31, 2024. (See [Critical Accounting Estimates - OTTI for Investment Securities](#) for information regarding the FHLBanks' processes for evaluating monoline bond insurance for purposes of OTTI analysis.)

As of December 31, 2018, total monoline bond insurance coverage was \$168 million, of which \$152 million represents the FHLBanks' private-label MBS covered by the monoline bond insurance that the FHLBanks were relying on at December 31, 2018, for modeling cash flows. Of the \$152 million, 76.3% represents subprime loans and 23.7% represents Alt-A loans. The FHLBanks classify securities as prime, Alt-A, and subprime based on the originator's classification at the time of origination or based on classification by a nationally recognized statistical rating organization upon issuance of the securities.

Short-term Investments. The FHLBanks maintain short-term investment portfolios, the proceeds of which may provide funds to meet the credit needs of their members and to maintain liquidity. The FHLBank Act and FHFA regulations set liquidity requirements for the FHLBanks, and an individual FHLBank's board of directors may also adopt additional liquidity policies. In addition, each FHLBank maintains a contingency liquidity plan in the event of operational disruptions at either the FHLBanks or the Office of Finance. (See [Liquidity and Capital Resources](#) for a discussion of the FHLBanks' liquidity management.)

Within the portfolio of short-term investments, the FHLBanks are subject to credit risk from unsecured credit exposures with private counterparties. Each FHLBank manages its own credit risk independently. The FHLBanks' unsecured credit investments have maturities ranging between overnight and nine months, and generally include the following types:

- *Interest-bearing deposits.* Primarily consists of unsecured deposits that earn interest.
- *Federal funds sold.* Unsecured loans of reserve balances at the Federal Reserve Banks between financial institutions that are made on an overnight and term basis.
- *Certificates of deposit.* Unsecured negotiable promissory notes issued by banks and payable to the bearer on demand.

Table 43 presents the FHLBanks' unsecured credit exposure with private counterparties by investment type. At December 31, 2018, the FHLBanks had aggregate unsecured credit exposure from investments of \$1 billion or more to each of 20 private counterparties. The aggregate unsecured credit exposure to these counterparties represented 74.1% of the FHLBanks' total unsecured investment credit exposure to private counterparties. The unsecured investment credit exposure presented in Table 43 does not reflect the average or maximum exposure during the period, as the balances presented reflect the balances at period end.

Table 43 - Unsecured Credit Exposure by Investment Type
(dollars in millions)

Carrying Value(1)(2)	December 31, 2018	December 31, 2017
Interest-bearing deposits	\$ 17,182	\$ 5,420
Federal funds sold	54,216	65,530
Certificates of deposit	3,050	2,160
Total	<u>\$ 74,448</u>	<u>\$ 73,110</u>

(1) Excludes unsecured investment credit exposure to U.S. government, U.S. government agencies, government instrumentalities, government-sponsored enterprises, and supranational entities, and does not include related accrued interest.

(2) May include unsecured investment credit exposure to members. (See [Security Ownership of Certain Beneficial Owners and Certain Relationships and Related Transactions](#) for further discussion of related-party transactions.)

Each FHLBank actively monitors its credit exposures and the credit quality of its counterparties, including an assessment of each counterparty's financial performance, capital adequacy, sovereign support, and the current market perceptions of the counterparties. General macroeconomic, political, and market conditions may also be considered when deciding on unsecured exposure. As a result, the FHLBanks may limit or suspend existing exposures.

FHFA regulations include limits on the amount of unsecured credit an individual FHLBank may extend to a counterparty or to a group of affiliated counterparties. This limit is based on a percentage of eligible capital and the counterparty's overall credit rating. Under these regulations, the level of eligible capital is determined as the lesser of an individual FHLBank's total regulatory capital or the eligible amount of Tier 1 capital or regulatory capital of the counterparty. The eligible amount of capital is then multiplied by a stated percentage. The percentage that an FHLBank may offer for term extensions of unsecured credit ranges from 1% to 15% based on the counterparty's credit rating. The calculation of term extensions of unsecured credit includes on-balance sheet transactions, off-balance sheet commitments, and derivative transactions. (See [Credit Risk - Derivative Counterparties](#) for additional information related to derivatives exposure.)

FHFA regulation also permits the FHLBanks to extend additional unsecured credit for sales of federal funds with a maturity of one day or less and sales of federal funds subject to a continuing contract that renews automatically. An FHLBank's total unsecured exposure to a counterparty may not exceed twice the regulatory limit for term exposures, or a total of 2% to 30% of the eligible amount of capital, based on the counterparty's credit rating. As of December 31, 2018, each of the FHLBanks was in compliance with the regulatory limits established for unsecured credit.

The FHLBanks are prohibited by FHFA regulation from investing in financial instruments issued by non-U.S. entities, other than those issued by U.S. branches and agency offices of foreign commercial banks. The FHLBanks' unsecured credit exposures to U.S. branches and agency offices of foreign commercial banks include the risk that, as a result of political or economic conditions in a country, the counterparty may be unable to meet its contractual repayment obligations. The FHLBanks' unsecured credit exposures to domestic counterparties and U.S. subsidiaries of foreign commercial banks include the risk that these counterparties have extended credit to foreign counterparties. As of December 31, 2018, an FHLBank held full faith and credit U.S. guaranteed securities with foreign issuers totaling \$440 million. Other than these investments, the FHLBanks are in compliance with the FHFA regulation as of December 31, 2018.

As of December 31, 2018, the FHLBanks' unsecured investment credit exposure to U.S. branches and agency offices of foreign commercial banks was comprised of federal funds sold and certificates of deposit. As of December 31, 2018, 71.3% of the FHLBanks' unsecured investments in federal funds sold and all of the FHLBanks' unsecured investments in certificates of deposit were to U.S. branches and agency offices of foreign commercial banks.

Figures 34 and 35 present total unsecured investment credit exposure by credit rating and by contractual maturity at December 31, 2018.

Figure 34: Total Unsecured Investment Credit Exposure by Credit Rating (dollars in billions)

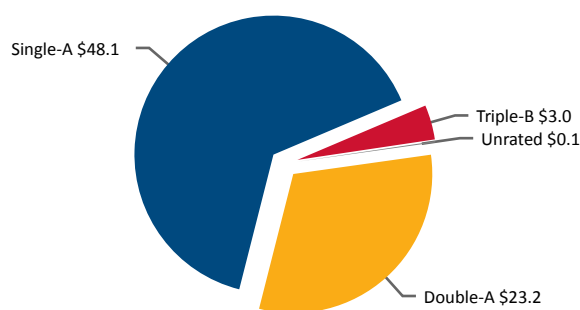


Figure 35: Total Unsecured Investment Credit Exposure by Contractual Maturity (dollars in billions)

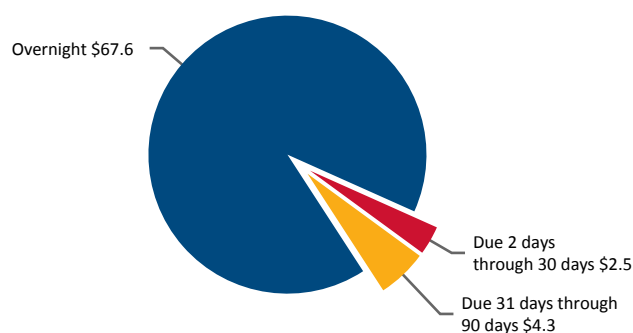


Table 44 presents the lowest long-term credit ratings of the unsecured investment credit exposures presented by the domicile of the counterparty or the domicile of the counterparty's immediate parent for U.S. branches and agency offices of foreign commercial banks based on the nationally recognized statistical rating organization(s) used by the individual FHLBank holding the investment. This table does not reflect the foreign sovereign government's credit rating. The internal ratings of an individual FHLBank may differ from those obtained from the nationally recognized statistical rating organization(s) and other FHLBank internal ratings. Investors should not take the historical or current ratings displayed in this table as an indication of future ratings.

Table 44 - Ratings of Unsecured Investment Credit Exposure by Domicile of Counterparty at December 31, 2018(1)
(dollars in millions)

Carrying Value(2)	Investment Grade			Below Investment Grade	Unrated	Total
	Double-A	Single-A	Triple-B			
Domestic	\$ 7,732	\$ 21,873	\$ 2,980	\$ 22	\$ 141	\$ 32,748
U.S. branches and agency offices of foreign commercial banks						
Canada	750	10,586	—	—	—	11,336
Australia	9,595	—	—	—	—	9,595
Netherlands	—	4,576	—	—	—	4,576
Germany	1,201	2,990	—	—	—	4,191
Finland	2,725	—	—	—	—	2,725
France	—	2,500	—	—	—	2,500
Norway	—	2,175	—	—	—	2,175
Sweden	400	650	—	—	—	1,050
United Kingdom	—	1,000	—	—	—	1,000
Austria	—	967	—	—	—	967
Singapore	800	—	—	—	—	800
Switzerland	—	535	—	—	—	535
Japan	—	250	—	—	—	250
Total U.S. branches and agency offices of foreign commercial banks	15,471	26,229	—	—	—	41,700
Total unsecured investment credit exposure	\$ 23,203	\$ 48,102	\$ 2,980	\$ 22	\$ 141	\$ 74,448

(1) Does not reflect any changes in ratings, outlook, or watch status occurring after December 31, 2018.

(2) Excludes unsecured investment credit exposure to U.S. government, U.S. government agencies, government instrumentalities, government-sponsored enterprises, and supranational entities, and does not include related accrued interest.

Table 45 presents the contractual maturity of the FHLBanks' unsecured investment credit exposure by the domicile of the counterparty or the domicile of the counterparty's immediate parent for U.S. branches and agency offices of foreign commercial banks. The FHLBanks also reduce the credit risk on investments by generally investing in investments that have short-term maturities. At December 31, 2018, 90.8% of the carrying value of the total unsecured investments held by the FHLBanks had overnight maturities.

Table 45 - Contractual Maturity of Unsecured Investment Credit Exposure by Domicile of Counterparty at December 31, 2018
(dollars in millions)

Carrying Value(1)	Overnight	Due 2 days through 30 days	Due 31 days through 90 days	Total
Domestic	\$ 32,748	\$ —	\$ —	\$ 32,748
U.S. branches and agency offices of foreign commercial banks				
Canada	10,101	935	300	11,336
Australia	9,115	180	300	9,595
Netherlands	4,576	—	—	4,576
Germany	2,966	825	400	4,191
Finland	2,225	—	500	2,725
France	2,400	—	100	2,500
Norway	1,675	—	500	2,175
Sweden	350	200	500	1,050
United Kingdom	1,000	—	—	1,000
Austria	467	400	100	967
Singapore	—	—	800	800
Switzerland	—	—	535	535
Japan	—	—	250	250
Total U.S. branches and agency offices of foreign commercial banks	34,875	2,540	4,285	41,700
Total unsecured investment credit exposure	\$ 67,623	\$ 2,540	\$ 4,285	\$ 74,448

(1) Excludes unsecured investment credit exposure to U.S. government, U.S. government agencies, government instrumentalities, government-sponsored enterprises, and supranational entities and does not include related accrued interest.

Mortgage Loans Held for Portfolio. The FHFA's Acquired Member Asset (AMA) regulation permits the FHLBanks to purchase and hold specified mortgage loans from their members. Each FHLBank has established or participated in the Acquired Member Asset programs such as the MPF Program and MPP as services to their members. Members and eligible housing associates may apply to become a participating financial institution (PFI) of their respective FHLBank. The mortgage loans purchased under these programs may carry more credit risk than advances, even though the respective member or housing associate provides credit enhancement and bears a portion of the credit risk.

The FHFA's AMA regulation on credit risk sharing allows an FHLBank to utilize its own model and methodology to determine the credit enhancement for AMA loan assets and pool loans. The assets delivered must be credit enhanced by the members up to an FHLBank determined "AMA investment-grade" instead of a specific nationally recognized statistical rating organization's ratings.

An FHLBank must hold risk-based capital against acquired member assets or pools of assets based on the applicable percentage required by the FHFA. This percentage is determined by the credit rating of those assets or pools of assets after taking into account any credit enhancements on those assets.

Management at each FHLBank believes that it has adequate policies and procedures in place to manage credit risk on mortgage loans appropriately. At December 31, 2018 and 2017, each FHLBank that is currently participating in, or previously participated in, the Acquired Member Asset programs has established loan loss allowances under each program. (See [Note 10 - Allowance for Credit Losses](#) to the accompanying combined financial statements for additional information about mortgage loan credit quality indicators, allowance for credit losses, and delinquency statistics.)

Table 46 presents the comparison of MPF and MPP products at December 31, 2018.

Table 46 - MPF and MPP Product Comparison at December 31, 2018

Product Name	Mortgage	Loan Balance	Held for Investment or Sale
MPF Original(1), MPF 35, MPF 100 (2) ; MPF 125 and MPF Plus(2)	Conventional	Conforming	Held for Investment
MPF Government	Government(3)	Determined by the applicable government agency eligibility guidelines	Held for Investment
MPF Xtra	Conventional	Conforming	MPF loans are concurrently sold to the Federal National Mortgage Association (Fannie Mae).
MPF Direct	Conventional	Non-conforming (jumbo - up to \$2,500,000)	MPF loans are concurrently sold to a third party investor.
MPF Government MBS	Government(3)	Determined by the applicable government agency eligibility guidelines	Government loans are held in portfolio for a short period of time until such loans are pooled into Ginnie Mae MBS.
MPP	Conventional	Conforming	Held for Investment
MPP FHA	Government(3)	Conforming	Held for Investment

(1) PFIs share in the associated credit risk of these MPF Loan products in accordance with the FHFA Acquired Member Assets (AMA) regulation requirements.

(2) MPF 100 and MPF Plus are not currently offered.

(3) Government Loans are insured or guaranteed by one of the following government agencies: the Federal Housing Administration (FHA); the Department of Veterans Affairs (VA); Rural Housing Service of the Department of Agriculture (RHS); or Department of Housing and Urban Development (HUD) (collectively, Government Loans).

MPF Loans - Loss Allocation. Credit losses on conventional MPF loans held for portfolio not absorbed by the borrower's equity in the mortgaged property, property insurance, or primary mortgage insurance (PMI) are allocated for each master commitment between an FHLBank participating in the MPF program (MPF FHLBank) and the PFI as follows:

- First, losses are recovered by withholding performance-based credit enhancement fees. The PFI is paid a monthly credit enhancement fee for managing credit risk on the mortgage loans. In certain cases, the credit enhancement fees are performance-based, which provides incentive to the PFI to minimize credit losses on MPF loans. These fees may be withheld to recover losses incurred by an MPF FHLBank for each master commitment, if any, up to the First Loss Account.
- Second, up to an agreed-upon amount to the First Loss Account maintained by an MPF FHLBank. The First Loss Account functions as a tracking mechanism for determining the point in which a PFI's credit enhancement amount would cover the next layer of losses. An MPF FHLBank's First Loss Account exposure varies by MPF loan product type.
- Third, credit losses in excess of the First Loss Account, if any, to the PFI under its credit enhancement obligation, up to the credit enhancement amount. The credit enhancement amount may consist of a direct liability of the PFI to pay credit losses up to a specified amount, a contractual obligation of the PFI to provide supplemental mortgage insurance (SMI), or a combination of both. Credit losses on a loan may only be absorbed by the credit enhancement amount specified in the Master Commitment related to the loan.
- Fourth, any remaining unallocated losses are absorbed by an MPF FHLBank.

An MPF FHLBank's share of credit losses is based on its respective participation interest in the entire master commitment. An MPF FHLBank's credit risk on MPF loans is the potential for financial loss due to borrower default or depreciation in the value of the real estate collateral securing the MPF loan, which may be offset by the PFI's credit enhancement amount. The PFI is required to pledge collateral to secure any portion of its credit enhancement amount that is a direct obligation.

The MPF FHLBanks also face credit risk through potential losses on conventional MPF loans to the extent that those losses are not recoverable from PFIs, and with respect to MPF Government loans, amounts not recoverable from the applicable government agency, servicer, or PFI, as applicable. The outstanding balance of MPF loans exposed to credit losses that are not recoverable from these sources was approximately \$35.3 billion and \$28.6 billion at December 31, 2018 and 2017. The MPF FHLBanks' actual credit exposure is less than these amounts because the borrower's equity, which represents the fair value of underlying property in excess of the outstanding MPF loan balance, has not been considered. The MPF FHLBanks require PMI for those loans with a loan-to-value ratio over 80% at origination. If the original value of the real estate collateral securing an MPF loan does not decline, then the principal paydowns will lower the loan-to-value ratio over the life of the loan.

MPF Loans - Setting Credit Enhancements. For conventional MPF loans held in portfolio, the PFI's credit enhancement amount is determined by an FHLBank, based on documented analysis, that the FHLBank has a high degree of confidence that it will not bear material losses beyond the losses absorbed by the FHLBank's First Loss Account, even under reasonably likely adverse changes to expected economic conditions. Loans are assessed by a third party's credit model at acquisition and a credit enhancement is calculated based on loan attributes and the FHLBank's risk tolerance in light of its entire MPF portfolio.

The MPF products were designed to allow for periodic resets of the credit enhancement amount and the First Loss Account for each master commitment for certain products. The amount of credit enhancement necessary to maintain an FHLBank's risk of credit losses within that FHLBank's risk tolerance for any master commitment is usually reduced over time.

MPP Loans - Loss Allocation. Each FHLBank participating in the MPP (MPP FHLBank) is exposed to credit risk on loans purchased from members through its MPP. Like the MPF Program, MPP is governed by the Acquired Member Asset regulation. Mortgage loans purchased from PFIs under this program also must carry sufficient credit enhancements to provide a credit risk exposure within an FHLBank's risk tolerance at the time of purchase. For FHA-insured loans, MPP FHLBanks believe they bear no credit risk on purchased FHA loans, and therefore do not require either a Lender Risk Account or SMI coverage for these U.S. government-insured loans.

The MPP FHLBanks' primary management of credit risk for conventional loans involves the mortgage assets themselves (homeowners' equity) as well as additional layers of credit enhancements. The order of priority for credit enhancements is as follows:

- PMI (when applicable);
- Lender Risk Account; and
- SMI (when applicable).

For conventional loans, PMI, if applicable, covers losses or exposure down to a loan-to-value ratio of between approximately 61% and 80% based on the original appraisal, original loan-to-value ratio, term, amount of PMI coverage, and characteristics of the loan. At the time the underlying conventional loan is purchased, a Lender Risk Account is established by the FHLBank for each PFI selling an MPP loan to that FHLBank. Generally, after five years, if the balance of the funds in the Lender Risk Account exceeds the required balance, the excess amounts are distributed to the PFI based on a step-down schedule set forth in the master commitment contract that establishes the Lender Risk Account. In addition to the Lender Risk Accounts, participating MPP FHLBanks with SMI coverage are protected from a portion of the credit losses. This coverage may be exceeded based on the severity of a loss on a loan and in certain cases subject to an aggregate stop-loss provision in the SMI policy

Credit Exposure to Insurance Providers. In addition to credit risk associated with mortgage loans purchased or funded through the Acquired Member Asset programs, the FHLBanks are exposed to the risk of non-performance of mortgage insurers that provide PMI and SMI coverage on mortgage loans.

Primary Mortgage Insurance. Qualified mortgage insurance companies issue PMI for conventional mortgage loans with loan-to-value ratios greater than 80% to cover principally those losses incurred related to borrower default. Historically, the FHLBanks have depended on the PMI policies for loss coverage. An FHLBank may be exposed to credit risk if a PMI provider fails to fulfill its claims payment obligations to that FHLBank. Each FHLBank has policies to limit its credit exposure to each mortgage insurance company, or limit its credit exposure to a certain percentage of the mortgage insurance company's regulatory capital. The FHLBanks receive PMI coverage information at acquisition of the mortgage loans and generally do not receive notification of any subsequent changes in PMI coverage. As a result, they can only estimate the amount of PMI in force at any time subsequent to acquisition.

If a PMI provider does not meet an FHLBank's policies, an FHLBank may request that the servicer obtain replacement PMI coverage with a different provider. However, it is possible that replacement coverage may be unavailable or may result in additional cost to the FHLBank. PMI for conventional mortgage loans must be issued by a mortgage insurance company on that FHLBank's approved mortgage insurance company list whenever PMI coverage is required. In order for a mortgage insurance company to remain on the current approved mortgage insurance company list, the mortgage insurance company must be acceptable for use in that FHLBank's rating modeling software used to calculate the required amount of credit enhancement. In addition, many FHLBanks perform a quarterly analysis evaluating the financial condition and concentration risk regarding the PMI providers, which may include a review of rating levels, ratings watch and outlook, and profitability. At December 31, 2018, the FHLBanks' total unpaid principal balance of seriously delinquent loans (conventional loans 90 days or more delinquent or in the process of foreclosure) was \$20 million for the MPF Program and \$6 million for the MPP. The FHLBanks' PMI coverage (estimated contractual limit for reimbursement of principal losses) for seriously delinquent loans was \$7 million for the MPF Program and \$2 million for the MPP at December 31, 2018.

Supplemental Mortgage Insurance. Certain FHLBanks use SMI as a credit enhancement to limit the loss exposure for their Acquired Member Asset programs. For MPF/MPP loans credit enhanced with SMI, the FHFA's AMA regulation requires the FHLBank members that sell loans to their respective FHLBanks to maintain SMI with an insurer that meets the FHLBank's definition of qualified insurer. If a mortgage insurer fails to fulfill its obligations, the affected FHLBank(s) may bear any remaining loss of the borrower's default on the related mortgage loans not covered by the member. Each MPF and MPP FHLBank evaluates the claims-paying ability of its SMI providers.

FICO[®] Score and Loan-to-Value Ratios. High loan-to-value ratios, in which homeowners have little or no equity at stake, and low FICO[®] scores are key drivers of potential mortgage delinquencies and defaults. The FHLBanks generally consider a FICO[®] score of over 660, and a loan-to-value ratio of 80% or lower, as benchmarks indicating reduced credit risk of default. As of December 31, 2018, outstanding conventional loans with FICO[®] scores under 660 at origination totaled 5.2% and 0.6% of the MPF Program and MPP total mortgage loan portfolios. Considering both qualitative and quantitative factors, these loans were not considered high-risk loans at origination or at the time of purchase based on the Acquired Member Asset programs' design and the original terms and structure of the loans.

Table 47 presents conventional MPF Program and MPP loans by FICO[®] score at origination and payment status at December 31, 2018.

Table 47 - MPF and MPP Conventional Loans by FICO[®] Score and Payment Status at December 31, 2018
(dollars in millions)

FICO [®] Score at Origination (1)	Unpaid Principal Balance	Current	Delinquent			
			30 Days	60 Days	90 Days or More	
MPF Conventional Loans						
619 or less	\$ 172	81.7%	9.0%	3.2%	6.1%	
620-659	1,634	94.9%	2.8%	0.9%	1.4%	
660 or higher	35,065	99.2%	0.5%	0.1%	0.2%	
No FICO [®] score	101	96.5%	2.0%	0.8%	0.7%	
Total	<u>\$ 36,972</u>	98.8%	0.7%	0.2%	0.3%	
Weighted average FICO [®] score - MPF	744					
MPP Conventional Loans						
619 or less	\$ 4	89.3%	3.0%	5.4%	2.3%	
620-659	125	89.4%	4.7%	1.8%	4.1%	
660 or higher	20,781	99.5%	0.3%	0.1%	0.1%	
No FICO [®] score	—	—	—	—	—	
Total	<u>\$ 20,910</u>	99.3%	0.4%	0.1%	0.2%	
Weighted average FICO [®] score - MPP	763					

(1) Represents the original lowest FICO[®] score of the borrowers and co-borrowers.

Table 48 presents loan-to-value ratios at origination for MPF and MPP conventional loans outstanding at December 31, 2018.

Table 48 - MPF and MPP Conventional Loans by Loan-to-Value Ratio at Origination at December 31, 2018
(dollars in millions)

Loan-to-Value Ratio at Origination	MPF Conventional Loans		MPP Conventional Loans	
	Unpaid Principal Balance	Percentage	Unpaid Principal Balance	Percentage
< = 60%	\$ 5,938	16.1%	\$ 2,915	14.0%
> 60% to 70%	5,120	13.8%	3,059	14.6%
> 70% to 80%	19,086	51.6%	11,580	55.4%
> 80% to 90%(1)	3,591	9.7%	2,237	10.7%
> 90%(1)	3,237	8.8%	1,119	5.3%
Total	\$ 36,972	100.0%	\$ 20,910	100.0%
Weighted-average loan-to-value %		74.1%		73.9%

(1) These conventional loans were required to have PMI at origination.

Geographic Concentrations. Figures 36 and 37 provide the percentage of unpaid principal balance of conventional mortgage loans held for portfolio outstanding at December 31, 2018, for the five largest state concentrations. These figures show the state concentration on an aggregated basis for all FHLBanks that hold loans under the MPF Program and MPP. As a result, these figures do not reflect the actual state concentration with respect to each individual FHLBank.

Figure 36: State Concentrations of MPF Program

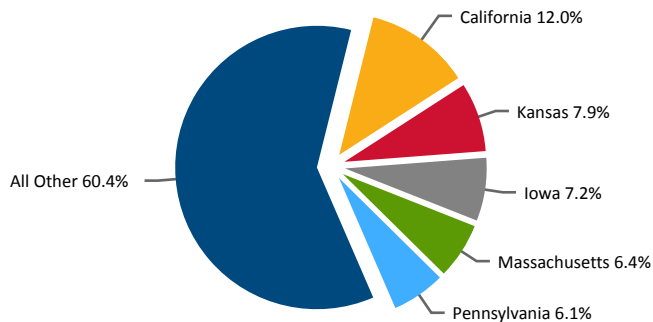
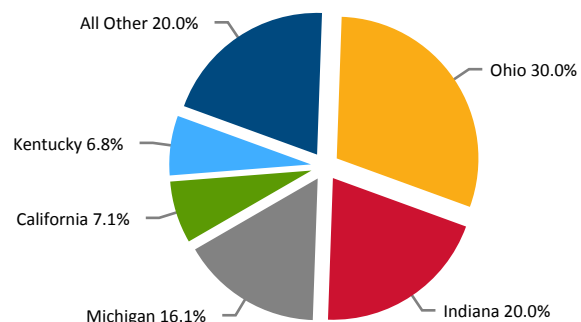


Figure 37: State Concentrations of MPP



Derivative Counterparties. Each FHLBank transacts most of its derivatives with large banks and major broker-dealers. Derivative transactions may be either executed with a counterparty (uncleared derivatives) or cleared through a Futures Commission Merchant (i.e., clearing agent) with a Derivative Clearing Organization (cleared derivatives).

Each FHLBank is subject to credit risk due to the risk of non-performance by counterparties to its derivative transactions. The amount of credit risk on derivatives depends on the extent to which netting procedures, collateral requirements, and other credit enhancements are used and are effective in mitigating the risk. Each FHLBank manages credit risk through credit analysis, collateral management, and other credit enhancements. The FHLBanks are also required to follow the requirements set forth by applicable regulation.

The contractual or notional amount of derivative transactions reflects the involvement of an FHLBank in the various classes of financial instruments. The maximum credit risk of an FHLBank with respect to derivative transactions is the estimated cost of replacing the derivative transactions if there is a default, minus the value of any related collateral. In determining maximum credit risk, each FHLBank considers accrued interest receivables and payables, as well as the netting requirements to net assets and liabilities.

Uncleared Derivatives. Each FHLBank is subject to the risk of non-performance by the counterparties to its uncleared derivative transactions. An FHLBank generally requires collateral on uncleared derivative transactions. Unless the collateral delivery threshold is set to zero, the amount of net unsecured credit exposure that is permissible with respect to each counterparty depends on the credit rating of that counterparty. A counterparty generally must deliver collateral if the total market value of the FHLBank's exposure to that counterparty rises above a specific threshold. As a result of these risk mitigation initiatives, the management of each FHLBank did not anticipate any credit losses on its uncleared derivative transactions as of December 31, 2018.

Cleared Derivatives. Each FHLBank is subject to the risk of non-performance by the Derivative Clearing Organization(s) (Clearinghouse) and the clearing agents. The requirement that an FHLBank posts initial and variation margin through the clearing agent, to the Clearinghouse, exposes an FHLBank to credit risk in the event that the clearing agent or the Clearinghouse fails to meet its obligations. However, the use of cleared derivatives is intended to mitigate an FHLBank's overall credit risk exposure because a central counterparty is substituted for individual counterparties and collateral/payment is posted daily for changes in the value of cleared derivatives through a clearing agent. The management of each FHLBank did not anticipate any credit losses on its cleared derivatives as of December 31, 2018.

Table 49 presents the derivative positions with non-member counterparties and member institutions to which the FHLBanks had credit exposure at December 31, 2018. The ratings presented in this table represent the lowest long-term counterparty credit rating available for each counterparty of an individual FHLBank, based on the nationally recognized statistical rating organization(s) used by that FHLBank. Investors should not take the historical or current ratings displayed in this table as an indication of future ratings.

Table 49 - Derivative Counterparty Credit Exposure at December 31, 2018
(dollars in millions)

Credit Rating(1)	Notional Amount	Net Derivatives Fair Value Before Collateral	Cash Collateral Pledged To (From) Counterparties	Non-cash Collateral Pledged To (From) Counterparties	Net Credit Exposure to Counterparties
Non-member counterparties					
Asset positions with credit exposure					
Uncleared derivatives					
Double-A	\$ 2,541	\$ 9	\$ (3)	\$ —	\$ 6
Single-A	7,119	178	(66)	(102)	10
Triple-B	15,082	46	(44)	—	2
Cleared derivatives(2)	35,648	3	19	35	57
Liability positions with credit exposure					
Uncleared derivatives					
Double-A	985	(3)	3	—	—
Single-A	34,349	(305)	317	6	18
Triple-B	16,970	(181)	178	6	3
Cleared derivatives(2)	345,892	(134)	954	1,186	2,006
Total derivative positions with credit exposure to non-member counterparties	458,586	(387)	1,358	1,131	2,102
Member institutions(3)	538	4	—	—	4
Total	\$ 459,124	\$ (383)	\$ 1,358	\$ 1,131	\$ 2,106

(1) This table does not reflect any changes in rating, outlook, or watch status occurring after December 31, 2018.

(2) Represents derivative transactions cleared with LCH Ltd. and CME Clearing, the FHLBanks' clearinghouses, which are not rated. LCH Ltd.'s ultimate parent, London Stock Exchange Group Plc, is rated A3 by Moody's and A- by S&P. CME Clearing's parent company, CME Group Inc., is rated Aa3 by Moody's and AA- by S&P.

(3) Member institutions include mortgage delivery commitments and derivatives with members where an FHLBank is acting as an intermediary. Collateral held with respect to derivatives with member institutions where an FHLBank is acting as an intermediary represents the amount of eligible collateral physically held by or on behalf of the FHLBank or collateral assigned to the FHLBank, as evidenced by a written security agreement, and held by the member institution for the benefit of that FHLBank.

Liquidity Risk

Liquidity risk is the risk that an FHLBank will be unable to meet its financial obligations as they come due or meet the credit needs of its members and housing associates in a timely, cost-effective manner. There are two types of liquidity risk that affect the FHLBanks:

- *Operational Liquidity Risk.* The potential inability of an FHLBank to meet its anticipated (or unanticipated) day-to-day needs through normal sources of funding, including the short-term discount note market; and
- *Contingency Liquidity Risk.* The potential inability of an FHLBank to meet its liquidity needs when its access to the capital markets is impeded, including the short-term discount note market.

To address liquidity risk, the FHLBank Act and FHFA regulations set liquidity requirements for the FHLBanks. (See [Liquidity and Capital Resources](#) for FHFA regulations on the FHLBanks' liquidity requirements.) An FHLBank's board of directors may, at its discretion, also set additional liquidity policies.

The FHLBanks' primary sources of liquidity are proceeds from the issuance of consolidated obligations, as well as cash and investment holdings that are primarily high-quality, short-, and intermediate-term financial instruments. During 2018, the FHLBanks maintained access to funding and were able to structure their debt issuance to meet the credit and liquidity needs of their members and to meet their financial commitments. (See [Risk Factors - Liquidity Risk](#) for additional discussion on liquidity risk and [Combined Financial Condition - Consolidated Obligations](#) for additional analysis and discussion about the FHLBanks' consolidated obligations.)

Operational Risk

Operational risk is the risk of potential loss resulting from inadequate or failed internal processes, people, or systems, or from external events. These failures may be due to:

- human error;
- key person dependency;
- business or financial model errors;
- systems malfunctions or cyber attacks;
- man-made or natural disasters;
- critical vendor or third-party failure;
- unenforceability of legal contracts;
- fraud; or
- circumvention or failure of internal controls.

Each of the FHLBanks and the Office of Finance has established comprehensive risk assessments, as well as financial and operating policies and procedures, to reduce the likelihood of these occurrences and the potential for damage that could result from them. They have also each instituted insurance coverage that may mitigate damages that could result from certain of these risks. The internal audit department of each FHLBank and the Office of Finance, which reports directly to its audit committee, regularly monitors and tests its entity's compliance with established policies and procedures.

Each of the FHLBanks and the Office of Finance relies heavily on their information systems and other technology to conduct and manage their business. Like many companies and government entities, the FHLBanks and the Office of Finance may be the subject of cyber attacks and other information security threats. Each of the FHLBanks and Office of Finance has controls in place to help ensure that information technology assets are well managed and secure from unauthorized access, and to identify information security events. In addition, each of the FHLBanks and the Office of Finance has a business continuity plan that is designed to restore critical business processes and systems in the event of a disruption. Some of the operational risks of the FHLBanks and Office of Finance, however, are beyond their control. Furthermore, the failure of third parties to address their operational risk adequately could adversely affect the FHLBanks and the Office of Finance. (See [Risk Factors - Operational Risk](#) for additional information about certain operational risks and [Controls and Procedures](#) for additional information regarding each FHLBank's controls over its financial reporting and the Office of Finance's controls and procedures over the combined financial reporting process.)

Business Risk

Business risk is the risk of an adverse effect on an FHLBank's profitability and its ability to fulfill its mission as a result of external factors that may occur in both the short and long term. Business risk includes political, strategic, reputation, and/or regulatory events that are beyond an FHLBank's control. From time to time, proposals or changes in laws and regulations are made or considered, which could affect the status of the FHLBanks and their costs of doing business. (See [Risk Factors](#) for additional discussions of general business risk, legislative and regulatory business risk, and strategic business risk.)

Each FHLBank's board of directors and management try to reduce these business risks through long-term strategic planning and by continually monitoring economic indicators and their external environment. Additionally, the FHLBanks are members of the Council of Federal Home Loan Banks (Council), a trade association based in Washington, D.C. whose primary function is to represent the positions and views of the Council's members to policymakers. The Council's mission is to: (1) ensure the FHLBanks' common legislative and regulatory interests are served; (2) promote enactment of laws and regulations that are beneficial to the FHLBanks; and (3) enhance awareness and understanding of the FHLBanks among Washington, D.C. leaders, including members of the U.S. Congress, the executive branch of the U.S. government, regulators, trade associations, and the financial media.

An FHLBank's financial strategies are generally designed to enable it to safely expand and contract its assets, liabilities, and capital in response to changes in its member base and in its members' credit needs. An FHLBank's capital generally grows when members are required to purchase additional capital stock as they increase their advances borrowings or other business activities with their FHLBank. An FHLBank may also repurchase excess capital stock from its members as business activities with those members decline. In addition, in order to meet internally established thresholds or to meet its regulatory capital requirement, an FHLBank, at the discretion of its board of directors or management, could undertake capital preservation initiatives such as: (1) voluntarily reducing or eliminating dividend payments; (2) suspending excess capital stock repurchases; or (3) raising capital stock holding requirements for its members.

An FHLBank may have borrower concentration risk in advances, and therefore, it analyzes the implications for its financial management and profitability if it were to lose the advances of one or more of these borrowers. (See [Combined Financial Condition - Advances](#) for the *Top 10 Advance Holding Borrowers by Holding Company at December 31, 2018*, for the FHLBank System's member concentration risk and *Top 5 Advance Holding Borrowers by FHLBank at December 31, 2018*, for more information regarding each FHLBank's member concentration risk.)

If an FHLBank loses one or more large borrowers that represent a significant portion of its business, that FHLBank could, depending on the magnitude of the effect, compensate for the loss by:

- lowering dividend rates;
- raising advance rates;
- attempting to reduce operating expenses; or
- undertaking some combination of these actions.

The magnitude of the effect would depend, in part, on the FHLBank's size and profitability at the time the institution ceases to be a borrower. Each FHLBank describes its risk management policies, including disclosures about its member concentration risk, if any, in its periodic reports filed with the SEC.

QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Each FHLBank is responsible for establishing its own risk management philosophies, practices, and policies. Each FHLBank describes its risk management policies for its business, including quantitative and qualitative disclosures about its market risk, in its periodic reports filed with the SEC. (See [Explanatory Statement about Federal Home Loan Banks Combined Financial Report](#).)

Each FHLBank has established policies and procedures to evaluate, manage, and mitigate market risks. The FHFA has established regulations governing the risk management practices of the FHLBanks. The FHLBanks must file periodic compliance reports with the FHFA. The FHFA conducts annual on-site examinations, interim on-site visits, and off-site analyses of each FHLBank and the Office of Finance.

Interest-Rate Risk

Interest-rate risk is the risk that relative and absolute changes in interest rates may adversely affect an institution's financial condition. The goal of an interest-rate risk management strategy is not necessarily to eliminate interest-rate risk, but to manage it by setting, and operating within, an appropriate framework and limits. The FHLBanks generally manage interest-rate risk by acquiring and maintaining a portfolio of assets and liabilities and entering into related derivative transactions to limit the expected mismatches in duration and market value of equity sensitivity. The FHLBanks measure and monitor interest-rate risk with commonly used methods, which include the calculations of market value of equity, duration of equity, and duration gap.

The optionality embedded in certain financial instruments held by the FHLBanks can create interest-rate risk. For example, when a member prepays an advance, this can lead to lower future income for the FHLBank. If the principal portion of the advance being prepaid is reinvested in assets yielding a lower return, but that principal amount continues to be funded by the original (higher-cost) debt, the FHLBank can suffer lower net returns. To protect against this risk, each FHLBank generally charges members a prepayment fee to compensate the FHLBank for this potential loss, making it financially indifferent to the prepayment. When an FHLBank offers advances (other than short-term advances) that a member may prepay without a prepayment fee, it usually finances these advances with callable debt or otherwise hedges this option.

The FHLBanks hold mortgage-related investments, such as mortgage loans and mortgage-backed securities. Because mortgage-related investments may contain prepayment options, changes in interest rates may cause the expected maturities of these investments to become shorter (prepay) or longer (extend). The rate and timing of unscheduled payments and collections of principal on mortgage loans are difficult to predict accurately and will be affected by a variety of factors. While the FHLBanks manage prepayment and extension risk by using a combination of debt instruments and derivative transactions, if the level of actual prepayments is higher or lower than expected, the FHLBanks may incur additional costs to hedge the change in this market-risk exposure, which would result in reduced earnings. FHFA regulation also limits this source of interest-rate risk by restricting the types of mortgage-backed securities the FHLBanks may own. FHLBanks may own only those mortgage-backed securities with limited average life extension and contraction under certain interest-rate shock scenarios. The FHLBanks may hedge against prepayment risk by funding some mortgage-related investments with consolidated obligations that have call features. In addition, the FHLBanks may use caps, floors, and other derivative transactions to manage the interest-rate risk and extension and contraction variability of mortgage-related investments. The FHLBanks may also use derivative transactions to manage the interest-rate risk associated with investment securities, other than mortgage-backed securities, to match the cash flow characteristics and/or market value of the hedged item. (See [Quantitative and Qualitative Disclosures about Market Risk - Use of Derivatives to Manage Interest-Rate Risk](#) for additional information.)

Market Value of Equity and Duration of Equity

An FHLBank may analyze its interest-rate risk exposure by estimating its theoretical market value of equity. Market value of equity represents the difference between the theoretical market value of total assets and the theoretical market value of total liabilities, including off-balance sheet items. It measures, in present value terms, the long-term economic value of current capital and the long-term level and volatility of net interest income. Generally, an FHLBank analyzes the sensitivity of the market value of equity to changes in interest rates, prepayment speeds, options prices, mortgage and debt spreads, interest-rate volatility, and other market variables. Therefore, market values can be calculated under various interest-rate scenarios, and the resulting changes in net equity can provide an indicator of the exposure of that FHLBank's market value of equity to market volatility.

Another measure of interest-rate risk is duration of equity, which measures how sensitive a theoretical market value of equity is to incremental changes in interest rates. Generally, duration of equity equals the market value-weighted duration of assets minus the market value-weighted duration of liabilities (factoring in the effect of derivatives), divided by the market value of equity. Each FHLBank has an internal modeling system for measuring its duration of equity; therefore, individual FHLBank measurements may not be directly comparable. Each FHLBank reports the results of its duration of equity calculations to the FHFA each quarter. However, not all FHLBanks manage to the duration of equity risk measure. The capital adequacy rules of the FHFA require each FHLBank to hold permanent capital in an amount sufficient to cover the sum of its credit, market, and operations risk-based capital requirements, which are defined by applicable regulations. Each FHLBank has implemented a market-risk model that calculates the market-risk component of this requirement.

Table 50 presents each FHLBank that includes quantitative market value of equity and duration of equity information in its individual 2018 SEC Form 10-K.

Table 50 - Individual FHLBank's Market Value of Equity and Duration of Equity Disclosures

FHLBank	Market Value of Equity	Duration of Equity
Boston	✓	✓
New York	✓	✓
Pittsburgh	(1)	✓
Atlanta	✓	✓
Cincinnati	✓	✓
Indianapolis	✓	✓
Chicago	(2)	✓
Des Moines	(3)	(3)
Dallas	✓	✓
Topeka	(4)	✓
San Francisco	✓	(5)

- (1) The FHLBank of Pittsburgh monitors and measures market value of equity to par value of capital stock, as described in its 2018 SEC Form 10-K. In addition, the FHLBank of Pittsburgh also monitors return on equity spread volatility relative to a return on equity spread volatility limit, established and approved by its board of directors.
- (2) The FHLBank of Chicago disclosed the dollar loss limits on changes in market value of equity under parallel interest rate shocks in its 2018 SEC Form 10-K.
- (3) Although the FHLBank of Des Moines measures and monitors market value of equity and duration of equity, those measures are not disclosed as key market risk measures. The FHLBank of Des Moines disclosed, in its 2018 SEC Form 10-K, market value of capital stock (MVCS) sensitivity and projected income sensitivity as key market risk measures and MVCS and regulatory capital as its key capital adequacy measures.
- (4) The FHLBank of Topeka measures and monitors market value of equity (MVE); however, the FHLBank of Topeka measures market value risk in terms of its MVE in relation to its total regulatory capital stock outstanding instead of to its book value of equity. As described in its 2018 SEC Form 10-K, the FHLBank of Topeka believes this is a reasonable metric because, as a cooperative, the metric reflects the market value of the FHLBank of Topeka relative to the book value of its capital stock.
- (5) The FHLBank of San Francisco does not disclose duration of equity, rather it discloses a comparable metric, "Market Value of Capital Sensitivity" as a key market risk measure.

Table 51 presents the duration of equity reported by each FHLBank to the FHFA in accordance with the FHFA's guidance, which prescribes that down and up interest-rate shocks equal 200 basis points. However, the applicable guidance restricts the down rate from assuming a negative interest rate. Therefore, each FHLBank adjusts the down rate accordingly in periods of very low levels of interest rates.

Table 51 - Duration of Equity
(in years)

FHLBank	December 31, 2018			December 31, 2017		
	Down	Base	Up	Down	Base	Up
Boston	(5.5)	(0.3)	1.5	(2.6)	(0.5)	3.2
New York	(0.8)	(0.1)	0.3	1.8	(0.4)	0.4
Pittsburgh	0.2	0.1	0.5	(0.4)	0.0	0.6
Atlanta	(2.0)	(0.8)	1.0	0.1	0.5	2.5
Cincinnati	(5.6)	1.2	1.0	(5.3)	0.5	1.4
Indianapolis	1.3	2.8	(0.3)	2.3	2.9	3.7
Chicago	1.1	0.7	1.9	2.9	1.2	2.2
Des Moines	(1.1)	0.9	1.9	(0.2)	1.3	2.7
Dallas	(3.3)	(1.8)	0.4	0.7	0.0	0.8
Topeka	2.8	1.3	2.3	2.9	(1.5)	2.4
San Francisco	2.1	1.2	2.2	3.8	1.6	2.3

Duration Gap

A related measure of interest-rate risk is duration gap, which is the difference between the estimated durations (market value sensitivity) of assets and liabilities, and reflects the extent to which estimated maturity and repricing cash flows for assets and liabilities are matched. Duration gap determines the sensitivity of assets and liabilities to interest-rate changes. Each FHLBank has an internal modeling system for measuring its duration gap; therefore, individual FHLBank measurements may not be directly comparable. Duration generally indicates the expected change in an instrument's market value resulting from an increase or a decrease in interest rates. Higher duration numbers, whether positive or negative, indicate greater volatility in the market value of equity in response to changing interest rates. Duration gap numbers in Table 52 include the effect of derivative transactions.

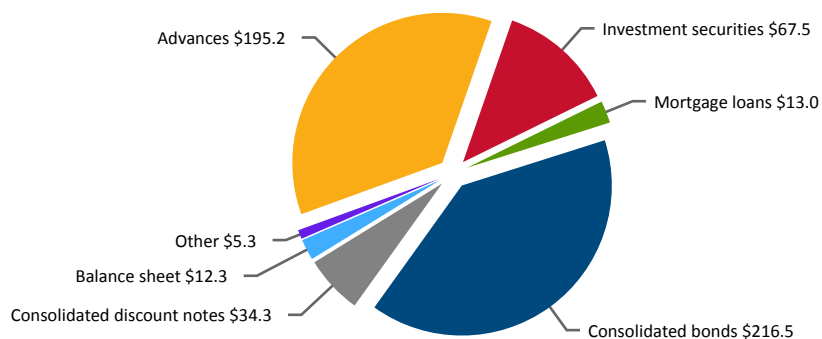
Table 52 - Duration Gap
(in months)

FHLBank	December 31, 2018	December 31, 2017
Boston	(0.2)	(0.3)
New York	(0.4)	(0.5)
Pittsburgh	(0.2)	(0.2)
Atlanta	0.6	0.2
Cincinnati	0.0	0.0
Indianapolis	1.1	1.2
Chicago	0.5	0.9
Des Moines	0.3	0.5
Dallas	(1.3)	(0.2)
Topeka	0.8	(1.0)
San Francisco	0.7	1.1

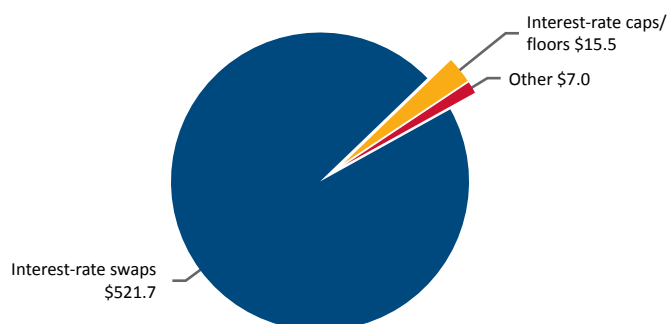
Use of Derivatives to Manage Interest-Rate Risk

An FHLBank enters into derivatives to manage interest-rate risk, prepayment risk, and other exposure inherent in otherwise unhedged assets and funding positions. An FHLBank attempts to use derivatives to reduce interest-rate exposure in the most cost-efficient manner. Derivatives are also used to manage the effective maturity, repricing frequency, or option characteristics of financial instruments to achieve risk-management objectives. (See [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements for a discussion of managing interest-rate risk exposure and [Financial Discussion and Analysis - Combined Results of Operations](#) for the effect of derivatives and hedging activities on net interest income and non-interest income resulting from the FHLBanks' hedging strategies.) Figures 38, 39, and 40 present the notional amount of derivatives by hedged item, hedging instrument, and hedge accounting designation at December 31, 2018.

Figure 38: Notional Amount by Hedged Item
(dollars in billions)



**Figure 39: Notional Amount by Hedging Instrument
(dollars in billions)**



**Figure 40: Notional Amount by Hedge Accounting Designation
(dollars in billions)**

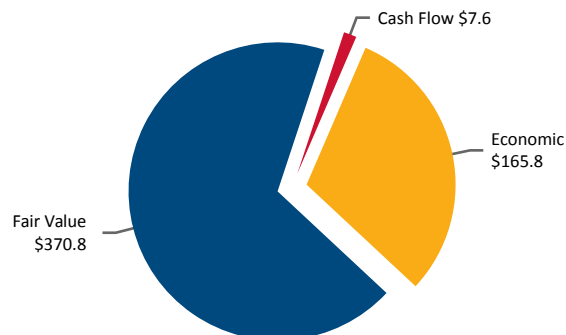


Table 53 presents the notional amount and hedging objectives of the derivatives used to manage interest-rate risk, prepayment risk, and other exposure inherent in otherwise unhedged assets and funding positions. The notional amount of derivatives serves as a factor in determining periodic interest payments or cash flows received and paid, and reflects the FHLBanks' involvement in the various classes of financial instruments. However, the notional amount of derivatives does not represent the actual amounts exchanged or the overall exposure of the FHLBanks to credit and market risk; the overall risk is much smaller. The risks of derivatives can be measured meaningfully on a portfolio basis that takes into account the counterparties, the types of derivatives, the items being hedged, and any offsets between the derivatives and the items being hedged. (See [Note 11 - Derivatives and Hedging Activities](#) to the accompanying combined financial statements for a discussion of the use of derivatives and [Financial Discussion and Analysis - Risk Management - Credit Risk - Derivative Counterparties](#) for credit exposure to derivative counterparties.)

Table 53 - Hedging Strategies
(dollars in millions)

Hedged Item / Hedging Instrument	Hedging Objective	Hedge Accounting Designation(1)	December 31,	
			2018 Notional Amount	2017 Notional Amount
Advances(2)				
Pay-fixed, receive-float interest-rate swap (without options)	Converts the advance's fixed rate to a variable-rate index.	Fair Value	\$ 137,424	\$ 132,006
		Economic	8,550	26,655
Pay-fixed, receive-float interest-rate swap (with options)	Converts the advance's fixed rate to a variable-rate index and offsets option risk in the advance.	Fair Value	44,395	29,023
		Economic	1,207	1,908
Pay-fixed, receive-float interest-rate swap (with purchased swaption)	Converts the advance's fixed rate to a variable-rate index and offsets an optional commitment embedded in the advance that allows the member to increase the amount of the advance.	Fair Value	4	8
Receive-fixed, pay-float interest-rate swap	Converts the advance's variable rate to a fixed rate.	Economic	2,277	2,012
Pay-fixed with embedded features, receive-float interest-rate swap (non-callable)	Reduces interest-rate sensitivity and repricing gaps by converting the advance's fixed rate to a variable-rate index and/or offsets embedded option risk in the advance.	Fair Value	30	30
Pay-float with embedded features, receive-float interest-rate swap (non-callable)	Reduces interest-rate sensitivity and repricing gaps by converting the advance's variable rate to a different variable-rate index and/or offsets embedded option risk in the advance.	Fair Value	232	136
		Economic	180	—
Pay-float with embedded features, receive-float interest-rate swap (callable)	Reduces interest-rate sensitivity and repricing gaps by converting the advance's variable rate to a different variable-rate index and/or offsets embedded option risk in the advance.	Fair Value	54	50
Pay-float, receive-float basis swap	Reduces interest-rate sensitivity and repricing gaps by converting the advance's variable rate to a different variable-rate index.	Economic	679	777
Interest-rate cap, floor, corridor, or collar	Offsets the interest cap, floor, corridor, or collar embedded in a variable-rate advance.	Economic	119	90
		Total	195,151	192,695

Hedged Item / Hedging Instrument	Hedging Objective	Hedge Accounting Designation(1)	December 31,	
			2018 Notional Amount	2017 Notional Amount
Investment securities(3)				
Pay-fixed, receive-float interest-rate swap	Converts the investment security's fixed rate to a variable-rate index.	Fair Value	\$ 41,921	\$ 32,839
		Economic	15,622	4,707
Pay-float, receive-float interest-rate swap	Converts the investment security's variable rate to a different variable-rate index.	Economic	500	750
Interest-rate cap or floor	Offsets the interest-rate cap or floor embedded in a variable-rate investment.	Economic	5,938	6,725
Pay-fixed, receive-float interest-rate swap (with options)	Converts the investment securities' fixed rate to a variable-rate index and offsets option risk in the investment.	Fair Value	3,501	2,528
		Total	67,482	47,549
Mortgage loans(4)				
Pay-fixed, receive-float interest-rate swap	Converts the mortgage loan's fixed rate to a variable-rate index.	Economic	6,301	6,887
Receive-fixed, pay-float interest-rate swap	Converts the variable rate to a fixed rate in a pooled mortgage portfolio hedge.	Economic	4,929	5,634
Interest-rate swaption	Provides the option to enter into an interest-rate swap to offset interest-rate or prepayment risk in a pooled mortgage portfolio hedge.	Economic	1,335	315
Interest-rate cap or floor	Protects against changes in income of certain mortgage assets due to changes in interest rates.	Economic	—	375
Forward settlement agreement	Protects against changes in market value of fixed-rate mortgage delivery commitments resulting from changes in interest rates.	Economic	462	551
		Total	13,027	13,762
Consolidated bonds(5)				
Receive-fixed or structured, pay-float interest-rate swap (without options)	Converts the bond's fixed or structured rate to a variable-rate index.	Fair Value	85,102	94,904
		Economic	12,552	10,803
Receive-fixed or structured, pay-float interest-rate swap (with options)	Converts the bond's fixed- or structured-rate to a variable-rate index and offsets option risk in the bond.	Fair Value	57,875	39,676
		Economic	8,958	9,473
Receive-float with embedded features, pay-float interest-rate swap (callable)	Reduces interest-rate sensitivity and repricing gaps by converting the bond's variable rate to a different variable-rate index and/or offsets embedded option risk in the bond.	Fair Value	175	175
		Economic	399	294
Receive-float, pay-float basis swap	Reduces interest-rate sensitivity and repricing gaps by converting the bond's variable rate to a different variable-rate index.	Economic	31,015	38,270
Pay-fixed, receive-float interest-rate swap	Fixed-rate or variable-rate non-callable bond, which may have been previously converted to LIBOR, converted to fixed-rate debt that offsets the interest-rate risk of mortgage assets.	Economic	—	4,620
Basis swap	Fixed-rate or variable-rate non-callable bond previously converted to a variable-rate index, converted to another variable-rate index to reduce interest-rate sensitivity and repricing gaps.	Economic	19,710	8,050
Forward-starting interest-rate swap	Locks in the cost of funding on anticipated issuance of debt.	Cash Flow	743	511
		Total	216,529	206,776

Hedged Item / Hedging Instrument	Hedging Objective	Hedge Accounting Designation(1)	December 31,	
			2018 Notional Amount	2017 Notional Amount
Consolidated discount notes(6)				
Receive-fixed, pay-float interest-rate swap	Converts the discount note's fixed rate to a variable-rate index.	Fair Value	\$ 49	\$ 2,383
		Economic	24,716	31,892
Pay-fixed, receive-float interest-rate swap (with options)	Discount note converted to fixed-rate callable debt that offsets the prepayment risk of mortgage assets.	Economic	1,725	1,535
Pay-fixed, receive-float interest-rate swap (without options)	Discount note converted to fixed-rate non-callable debt that offsets the interest-rate risk of mortgage assets.	Economic	960	400
Interest-rate cap, floor, or swap	Mitigates the variability of cash flows associated with the benchmark interest rate.	Cash Flow	6,847	8,722
		Total	34,297	44,932
Balance sheet				
Pay-fixed, receive-float interest-rate swap	Converts the asset or liability fixed rate to a variable-rate index.	Economic	100	105
Pay-float, receive-fixed interest-rate swap	Interest-rate swap not linked to a specific asset, liability or forecasted transaction.	Economic	425	325
Interest-rate swaption	Provides the option to enter into an interest-rate swap to offset interest-rate or prepayment risk.	Economic	3,000	2,316
Interest-rate cap or floor	Protects against changes in income of certain assets due to changes in interest rates.	Economic	8,800	20,692
		Total	12,325	23,438
Intermediary positions and other				
Pay-fixed, receive-float interest-rate swap, and receive-fixed, pay-float interest-rate swap	To offset interest-rate swaps executed with members by executing interest-rate swaps with derivatives counterparties.	Economic	2,764	3,464
Interest-rate cap or floor	To offset interest-rate caps or floors executed with members by executing interest-rate caps or floors with derivatives counterparties.	Economic	624	80
Pay-fixed, receive-float interest-rate swap, and receive-fixed, pay-float interest-rate swap	Interest-rate swap used to offset the economic effect of an interest-rate swap that is no longer designated to advances, investment securities, mortgage loans, consolidated bonds or consolidated discount notes.	Economic	423	437
		Total	3,811	3,981
Stand-alone derivatives				
Mortgage delivery commitment	Exposed to fair-value risk associated with fixed-rate mortgage purchase commitments.	n/a	992	1,206
Discount note issuance commitment	Exposed to fair-value risk associated with discount note issuances.	n/a	525	—
		Total	1,517	1,206
Total Notional Amount			\$ 544,139	\$ 534,339

(1) The Fair Value and Cash Flow categories represent hedging strategies for which qualifying hedge accounting is achieved. All fair value hedges represent benchmark interest-rate hedges. The Economic category represents hedging strategies for which qualifying hedge accounting is not achieved.

(2) At December 31, 2018 and 2017, the principal amount of advances outstanding was \$729,501 million and \$732,114 million.

(3) At December 31, 2018 and 2017, the fair value of trading securities was \$16,449 million and \$7,736 million and the amortized cost of AFS securities was \$82,462 million and \$78,197 million.

(4) At December 31, 2018 and 2017, the unpaid principal balance of mortgage loans held for portfolio was \$61,394 million and \$52,792 million.

(5) At December 31, 2018 and 2017, the principal amount of consolidated bonds outstanding was \$604,141 million and \$642,102 million.

(6) At December 31, 2018 and 2017, the principal amount of consolidated discount notes outstanding was \$427,367 million and \$392,049 million.

FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Financial Statements

The combined financial statements and accompanying notes, including the Office of Finance Audit Committee Report and the Report of Independent Auditors, begin on page F-1 of this Combined Financial Report.

Supplementary Financial Data

Table 54 - Selected Quarterly Combined Results of Operations (Unaudited)

(dollars in millions)

	2018 Quarter Ended			
	December 31,	September 30,	June 30,	March 31,
Total interest income	\$ 7,232	\$ 6,721	\$ 6,322	\$ 5,442
Total interest expense	5,913	5,381	4,990	4,177
Net interest income	1,319	1,340	1,332	1,265
Provision (reversal) for credit losses	1	—	(1)	2
Net interest income after provision (reversal) for credit losses	1,318	1,340	1,333	1,263
Non-interest income (loss)	(76)	40	59	4
Non-interest expense	361	331	311	312
Affordable Housing Program assessments	90	107	110	97
Net income	<u>\$ 791</u>	<u>\$ 942</u>	<u>\$ 971</u>	<u>\$ 858</u>

	2017 Quarter Ended			
	December 31,	September 30,	June 30,	March 31,
Total interest income	\$ 4,632	\$ 4,446	\$ 3,848	\$ 3,076
Total interest expense	3,396	3,210	2,659	2,256
Net interest income	1,236	1,236	1,189	820
Provision (reversal) for credit losses	—	(1)	1	—
Net interest income after provision (reversal) for credit losses	1,236	1,237	1,188	820
Non-interest income (loss)	58	28	37	492
Non-interest expense	330	314	285	407
Affordable Housing Program assessments	98	97	96	93
Net income	<u>\$ 866</u>	<u>\$ 854</u>	<u>\$ 844</u>	<u>\$ 812</u>

**CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS
ON COMBINED ACCOUNTING AND FINANCIAL DISCLOSURES**

There were no changes in accountants or disagreements with accountants in the period covered by this Combined Financial Report.

CONTROLS AND PROCEDURES

FHLBanks

The management of each FHLBank is required under applicable laws and regulations to establish and maintain effective disclosure controls and procedures as well as effective internal control over financial reporting, as such disclosure controls and procedures and internal control over financial reporting relate to that FHLBank only. Each FHLBank's management assessed the effectiveness of its individual internal control over financial reporting as of December 31, 2018, based on the criteria established in *Internal Control-Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, management of each FHLBank, other than the FHLBank of Des Moines, concluded, as of December 31, 2018, that its individual internal control over financial reporting was effective based on the criteria established in *Internal Control-Integrated Framework*. Additionally, the independent registered public accounting firm of each FHLBank, other than the FHLBank of Des Moines, opined that the respective individual FHLBank maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018. (See *Part II. Item 8 - Financial Statements and Supplementary Data* or *Item 9A - Controls and Procedures* of each FHLBank's 2018 SEC Form 10-K for its *Management's Report on Internal Control over Financial Reporting*.)

Additionally, the management of each FHLBank, other than the FHLBank of Des Moines, concluded that its disclosure controls and procedures were effective at a reasonable assurance level as of the end of the period covered by its 2018 SEC Form 10-K. Each FHLBank indicated that there were no changes to its internal control over financial reporting during the quarter ended December 31, 2018, that materially affected, or are reasonably likely to materially affect, its internal control over financial reporting. (See *Part II. Item 9A - Controls and Procedures* of each FHLBank's 2018 SEC Form 10-K.)

FHLBank of Des Moines' Material Weaknesses in Internal Control over Financial Reporting

The FHLBank of Des Moines' management identified two material weaknesses in its internal controls as of December 31, 2018: 1) ineffective user access controls needed to ensure appropriate segregation of duties and adequate restrictions on user and privileged access to the FHLBank's information technology applications, programs, and data, and 2) ineffective control over information technology change management, including controls to monitor developers' access to production and testing of program changes. As a result, the FHLBank of Des Moines' management determined that its internal control over financial reporting was not effective as of December 31, 2018, and that its disclosure controls and procedures were not effective at a reasonable assurance level as of the end of the period covered by its 2018 SEC Form 10-K. The FHLBank of Des Moines' management concluded that the identified material weaknesses did not result in a material misstatement to its financial statements. However, they could result in a misstatement potentially affecting all financial statement accounts and disclosures that would not be prevented or detected on a timely basis. (See *Part II. Item 8 - Financial Statements and Supplementary Data* and *Item 9A - Controls and Procedures* of the FHLBank of Des Moines' 2018 SEC Form 10-K for additional information.)

Office of Finance Controls and Procedures over the Combined Financial Reporting Combining Process

The Office of Finance is not responsible for the preparation, accuracy, or adequacy of the information or financial data provided by the FHLBanks to the Office of Finance for use in preparing the combined financial reports, or for the quality or effectiveness of the disclosure controls and procedures or internal control over financial reporting of the FHLBanks as they relate to that information and financial data. Each FHLBank is responsible for establishing and maintaining disclosure controls and procedures and internal control over financial reporting with respect to the information and financial data provided to the Office of Finance. Although the Office of Finance is not an SEC registrant, FHFA regulations require that the combined financial report form and content generally be consistent with SEC Regulations S-K and S-X, as interpreted by the FHFA. The Office of Finance is not required to establish and maintain, and in light of the nature of its role has not established and maintained, disclosure controls and procedures and internal control over financial reporting in the same manner as those maintained by each FHLBank. The Office of Finance has established controls and procedures concerning the FHLBanks' submission of information and financial data to the Office of Finance, the process of combining the financial statements and other financial information of the individual FHLBanks, and the review of that information.

The Office of Finance does not independently verify the financial information submitted by each FHLBank that comprise the combined financial statements, the condensed combining schedules, and other disclosures included in this Combined Financial Report. Instead, the Office of Finance relies on each FHLBank management's certification and representation regarding the accuracy and completeness, in all material respects, of its data submitted to the Office of Finance for use in preparing this Combined Financial Report.

Audit Committee Charter

The charter of the audit committee of the Office of Finance's board of directors is available on the Office of Finance's web site at fhlb-of.com. This web site address is provided as a matter of convenience only, and its contents are not made part of or incorporated by reference into this report.

OTHER INFORMATION

PricewaterhouseCoopers LLP (PwC) serves as the independent registered public accounting firm for each of the FHLBanks. Rule 2-01(c)(1)(ii)(A) of SEC Regulation S-X (the Loan Rule) prohibits an accounting firm, such as PwC, from having certain financial relationships with its audit clients and affiliated entities. Specifically, the Loan Rule provides, in relevant part, that an accounting firm generally would not be independent if it or any covered person in the firm receives a loan from a lender that is a “record or beneficial owner of more than ten percent of the audit client’s equity securities.” A covered person in the firm includes personnel on the audit engagement team, personnel in the chain of command, partners and managers who provide ten or more hours of non-audit services to the audit client, and partners in the office where the lead engagement partner practices in connection with the client.

PwC has advised certain FHLBanks that, as of and during the years ended December 31, 2018 and 2017, PwC and certain covered persons had borrowing relationships with certain FHLBank shareholders (referred to below as the “lenders”) who own more than 10% of the affected FHLBanks' capital stock, which, under the Loan Rule, could call into question PwC’s independence with respect to the affected FHLBanks. This disclosure is intended to explain the facts and circumstances, as well as conclusions of PwC and the Audit Committee of each affected FHLBank, concerning PwC’s objectivity and impartiality with respect to the audit of each affected FHLBank.

PwC advised the Audit Committee of each affected FHLBank that it believes, in light of the facts of each borrowing relationship, its ability to exercise objective and impartial judgment on all matters encompassed within PwC’s audit engagements has not been impaired and that a reasonable investor with knowledge of all relevant facts and circumstances would reach the same conclusion. PwC has advised the Audit Committee of each affected FHLBank that this conclusion is based in part on the following considerations:

- the borrowings are in good standing and the lenders do not have the right to take action against PwC, as borrower, in connection with the financings;
- the debt balances outstanding are immaterial to PwC and to the lenders;
- PwC has borrowing relationships with a diverse group of lenders, and therefore PwC is not dependent on any single lender or group of lenders; and
- PwC audit engagement teams have no involvement in PwC’s treasury function and PwC’s treasury function has no oversight or ability to influence PwC audit engagement teams.

Additionally, each affected FHLBank and its Audit Committee reviewed PwC’s analysis and continue to conclude that PwC has maintained objectivity and impartiality in connection with its audit of the respective FHLBank’s financial statements. The conclusion is based on the unique nature and status of the FHLBanks, and due to the ownership structure of the FHLBanks and the limited voting rights of the FHLBanks' members.

SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

Each FHLBank is a member-owned cooperative, whose members elect a majority of that FHLBank's directors from among the officers and directors of its members. The FHLBanks conduct their advances and mortgage loan business primarily with members. As a result, in the normal course of business, the FHLBanks regularly extend credit to members whose officers and/or directors may serve as directors of the FHLBanks and members (or affiliates) owning more than 5% of an FHLBank's capital stock. This credit is extended on market terms that are no more favorable to these "related" members than comparable transactions with other members of the same FHLBank. As of December 31, 2018, the FHLBanks had \$73.2 billion of advances outstanding to members whose officers and/or directors were serving as directors of the FHLBanks, which represented 10.0% of the principal amount of total advances. (See [Market for Capital Stock and Related Stockholder Matters](#) and [Financial Discussion and Analysis - Combined Financial Condition - Advances](#) for additional information on FHLBank advances and membership.)

An FHLBank provides Affordable Housing Program subsidies in the form of direct grants and below-market interest rate advances to members, which use the funds to assist in the purchase, construction, or rehabilitation of housing for very low-, low-, and moderate-income households. Only FHLBank members, along with their non-member Affordable Housing Program project sponsors, may submit Affordable Housing Program applications. All Affordable Housing Program subsidies are made in the normal course of business.

An FHLBank also provides subsidies in the form of grants and below-market interest rate advances or standby letters of credit to members for community lending and economic development projects under the Community Investment Program and Community Investment Cash Advance programs. Only FHLBank members may submit applications for these credit program subsidies. These subsidies are made in the normal course of business.

In instances where an Affordable Housing Program, Community Investment Program, or Community Investment Cash Advance transaction involves a member (or its affiliate) owning more than 5% of an FHLBank's capital stock, a member with an officer or director who serves as a director of an FHLBank, or an entity with an officer, director, or general partner who serves as a director of an FHLBank (and has a direct or indirect interest in the subsidy), the transaction is subject to the same eligibility and other program criteria and requirements as all other transactions, and the regulations governing the operations of the relevant program.

An FHLBank may also have investments in interest-bearing deposits, securities purchased under agreements to resell, federal funds sold, and certificates of deposit, and may also execute mortgage-backed securities and derivative transactions, with members, former members, or their affiliates, some of whose officers and/or directors may serve as directors of their respective FHLBank. All investments are transacted at then-current market prices without preference to the status of the counterparty or the issuer of the investment as a member, former member, or affiliate. (See each FHLBank's 2018 SEC Form 10-K under *Item 13—Certain Relationships and Related Transactions, and Director Independence* for additional information regarding related transactions with its members.)

PRINCIPAL ACCOUNTING FEES AND SERVICES

Each of the audit committees of the FHLBanks and the Office of Finance pre-approve audit and non-audit services provided by the principal independent public accountant to the entity it oversees. Also, each audit committee annually considers whether the services identified under the caption "all other fees" and rendered to the entity it oversees are compatible with maintaining the principal accountant's independence. Table 55 presents the aggregate fees billed or to be billed to the FHLBanks and the Office of Finance by their principal independent public accountant, PricewaterhouseCoopers LLP.

Table 55 - Principal Accounting Fees and Services
(dollars in millions)

	Year Ended December 31,	
	2018	2017
Audit fees(1)	\$ 10	\$ 10
Audit-related fees(2)	1	1
Tax fees	—	—
All other fees(3)	—	—
Total fees	<u>\$ 11</u>	<u>\$ 11</u>

- (1) Audit fees consist of fees incurred in connection with the annual audits and quarterly reviews of the FHLBanks' individual and combined financial statements, including audits of internal control over financial reporting, and for the review of related financial information.
- (2) Audit-related fees primarily consist of assurance and related services for accounting consultations and combined audit central team services.
- (3) All other fees consist of services rendered for non-financial information system related consulting. No fees were paid to the principal independent public accountant for financial information system design and implementation.

OFFICE OF FINANCE AUDIT COMMITTEE REPORT

By Federal Housing Finance Agency (FHFA) regulation, the Audit Committee of the Office of Finance Board of Directors performs oversight duties in connection with the preparation of the combined financial report of the Federal Home Loan Banks (FHLBanks), which includes the audited combined financial statements of the FHLBanks. The Audit Committee is comprised of five independent directors not employed by an FHLBank or the Office of Finance; who were selected by the Office of Finance Board of Directors, subject to review by the FHFA; and who as a group must have substantial experience in financial and accounting matters. In connection with its duties, the Audit Committee has adopted a written charter, which is posted on the Office of Finance web site. The Audit Committee members are not required to satisfy any express qualification or independence standards governing their service as audit committee members that are separate and distinct from their qualifications to serve as members of the Office of Finance Board of Directors.

There is no system-wide centralized management of the FHLBanks. Each FHLBank is a separately chartered entity and has its own board of directors and management. Each FHLBank's board of directors has established an audit committee, the members of which are required to meet express qualification and independence standards established by the FHFA and the audit committee independence requirements set forth in Section 10A(m) of the Securities Exchange Act of 1934, as amended. For disclosure purposes, each FHLBank is required to identify audit committee members who may not be considered "independent" based on corporate governance standards of independence used by the FHLBanks as required under Securities and Exchange Commission rules and regulations. In addition, each FHLBank's board of directors and management is responsible for establishing its own accounting and financial reporting policies in accordance with accounting principles generally accepted in the United States of America. Each FHLBank is subject to certain reporting requirements of the Securities Exchange Act of 1934, as amended, and must file periodic reports and other information including annual audited financial statements with the Securities and Exchange Commission. (See [Explanatory Statement about Federal Home Loan Banks Combined Financial Report.](#))

In connection with its responsibilities in preparing the combined financial reports and the combined financial statements, the Office of Finance is responsible for combining the financial information it receives from each of the FHLBanks. Each FHLBank is responsible for the financial information and the underlying data it provides to the Office of Finance for inclusion in the combined financial reports and combined financial statements. Based on FHFA regulation and guidance related to the combined financial reports, the Audit Committee's responsibilities are limited to the oversight of the preparation of the combined financial reports with regard to the basis and approach to combining information from the FHLBanks. The Audit Committee is responsible for ensuring that the FHLBanks adopt consistent accounting policies and procedures to the extent necessary for information submitted by the FHLBanks to the Office of Finance to be combined to create accurate and meaningful combined financial reports. However, the Audit Committee is not responsible for overseeing the reliability and integrity of the accounting policies and financial reporting of the individual FHLBanks or the accuracy of the information that they submit to the Office of Finance.

The FHLBanks and the Office of Finance have determined that the FHLBank System is best served by having the same independent audit firm to coordinate and perform the separate audits of each of the FHLBanks and the combined financial report of the FHLBanks, which includes the audited combined financial statements of the FHLBanks. The audit committee of each of the FHLBanks and the Office of Finance cooperate in selecting, and evaluating the performance of, the independent auditor, but the responsibility for the appointment of and oversight of the independent auditor remains solely with the audit committee of each FHLBank and the Office of Finance.

PricewaterhouseCoopers LLP (PwC) has been the independent auditor for each of the FHLBanks and the Office of Finance since 1990. The audit committee at each FHLBank and the Office of Finance engages in a rigorous evaluation each year when appointing an independent auditor. In connection with the appointment of an independent auditor, the evaluation includes consultation amongst the audit committees of each of the FHLBanks and the Office of Finance. Specific considerations may include:

- an analysis of the risks and benefits of retaining PwC as independent auditor versus engaging a different firm, including consideration of:
 - PwC engagement audit partner, engagement quality review partner, and audit team rotation;
 - PwC's tenure as the FHLBanks and the Office of Finance's independent auditor;
 - independence of PwC;
 - benefits associated with engaging a different firm as independent auditor; and
 - potential disruption and risks associated with changing auditors.

- PwC's depth and breadth of understanding of our business, operations, and accounting policies and practices;
- PwC's historical and recent audit results and performance;
- an analysis of PwC's known legal risks and significant proceedings;
- external data relating to audit quality and performance, including recent Public Company Accounting Oversight Board audit quality inspection reports on PwC and its peer firms;
- the appropriateness of PwC's fees, on both an absolute basis and as compared to its peer firms; and
- the diversity of PwC's ownership and staff assigned to the engagement.

Each of the audit committees of the FHLBanks and the Office of Finance pre-approve audit and non-audit services provided by PwC to the entity it oversees. Also, each audit committee annually considers whether the services identified under the caption "all other fees" and rendered to the entity it oversees are compatible with maintaining the principal accountant's independence.

The Audit Committee of the Office of Finance requires audit partner rotation and limits the number of consecutive years an individual partner may provide service to the Office of Finance. For lead engagement audit and quality review partners, the maximum number of consecutive years of service in that capacity is five years. The process for selection of the Office of Finance's lead audit partner pursuant to this rotation policy involves a meeting between the Chair of the Office of Finance Audit Committee and the candidate for the role, as well as discussion with the full Office of Finance Audit Committee and with management.

Based on its reviews, the Audit Committee appointed PwC as the independent registered public accounting firm for 2018.

The Audit Committee has reviewed and discussed the audited combined financial statements with senior management of the Office of Finance, and discussed with the independent accountant the matters required to be discussed in accordance with auditing standards generally accepted in the United States of America.

The Audit Committee has also received the written disclosures from the independent accountant required to be disclosed in accordance with auditing standards generally accepted in the United States of America regarding the independent accountant's communications with the Audit Committee concerning independence, and has discussed with the independent accountant their independence.

Based on the review and discussions referred to above, the Audit Committee of the Office of Finance Board of Directors determined to include the audited combined financial statements in the FHLBanks' Combined Financial Report for the Year Ended December 31, 2018.

Patricia A. Oelrich, Chair
Jonathan A. Scott, Vice-Chair
Janice C. Eberly
Kathleen C. McKinney
Joel W. Motley

March 27, 2019

REPORT OF INDEPENDENT AUDITORS

To the Board of Directors of the Federal Home Loan Banks Office of Finance

We have audited the accompanying combined financial statements of the Federal Home Loan Banks (FHLBanks), which comprise the combined statements of condition as of December 31, 2018 and 2017, and the related combined statements of income, comprehensive income, capital, and cash flows for each of the years in the three-year period ended December 31, 2018.

Management's Responsibility for the Combined Financial Statements

Management of the FHLBanks Office of Finance (OF) and the FHLBanks are responsible for the preparation and fair presentation of the combined financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the combined financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on the combined financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the combined financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the combined financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the combined financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the OF's and the FHLBanks' preparation and fair presentation of the combined financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the combined financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the combined financial statements referred to above present fairly, in all material respects, the financial position of the FHLBanks as of December 31, 2018 and 2017, and the results of their operations and their cash flows for each of the years in the three-year period ended December 31, 2018, in accordance with accounting principles generally accepted in the United States of America.

Other Matter

Our audits were conducted for the purpose of forming an opinion on the combined financial statements taken as a whole. The condensed combining information shown on pages F-76 to F-93 is the responsibility of management of the OF and the FHLBanks and was derived from and relates directly to the underlying accounting and other records used to prepare the combined financial statements. The condensed combining information has been subjected to the auditing procedures applied in the audit of the combined financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the combined financial statements or to the combined financial statements themselves, and other additional procedures, in accordance with auditing standards generally accepted in the United States of America. In our opinion, the condensed combining information is fairly stated, in all material respects, in relation to the combined financial statements taken as a whole. The condensed combining information is presented for purposes of additional analysis of the combined financial statements rather than to present the financial position, results of operations, and cash flows of the individual FHLBanks and is not a required part of the combined financial statements.

PricewaterhouseCoopers LLP

McLean, Virginia
March 27, 2019

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**FEDERAL HOME LOAN BANKS
COMBINED STATEMENT OF CONDITION**

<i>(dollars in millions, except par value)</i>	December 31,	
	2018	2017
Assets		
Cash and due from banks <i>(Note 3)</i>	\$ 522	\$ 7,175
Interest-bearing deposits	17,182	5,420
Securities purchased under agreements to resell	45,325	52,568
Federal funds sold	54,216	65,530
Investment securities		
Trading securities, includes \$509 and \$306 pledged as collateral that may be repledged <i>(Note 4)</i>	16,449	7,736
Available-for-sale securities, includes \$716 and \$749 pledged as collateral that may be repledged <i>(Note 5)</i>	83,205	79,560
Held-to-maturity securities, includes \$3 and \$12 pledged as collateral that may be repledged, fair value of \$90,658 and \$97,282 <i>(Note 6)</i>	90,413	96,466
Total investment securities	190,067	183,762
Advances, includes \$6,168 and \$9,428 at fair value held under fair value option <i>(Note 8)</i>	728,767	731,544
Mortgage loans held for portfolio, net of allowance for credit losses of \$15 and \$16 <i>(Note 9 and Note 10)</i>	62,534	53,827
Accrued interest receivable	2,087	1,584
Derivative assets, net <i>(Note 11)</i>	1,038	991
Other assets	1,112	1,050
Total assets	\$ 1,102,850	\$ 1,103,451
Liabilities		
Deposits <i>(Note 12)</i>	\$ 7,560	\$ 7,789
Consolidated obligations <i>(Note 13)</i>		
Discount notes, includes \$4,172 and \$3,062 at fair value held under fair value option	426,034	391,480
Bonds, includes \$13,438 and \$12,917 at fair value held under fair value option	603,491	641,601
Total consolidated obligations	1,029,525	1,033,081
Mandatorily redeemable capital stock	1,062	1,272
Accrued interest payable	1,878	1,324
Affordable Housing Program payable <i>(Note 14)</i>	1,096	1,032
Derivative liabilities, net <i>(Note 11)</i>	445	449
Other liabilities	2,940	2,024
Total liabilities	1,044,506	1,046,971
Commitments and contingencies <i>(Note 20)</i>		
Capital <i>(Note 16)</i>		
Capital stock		
Class B putable (\$100 par value) issued and outstanding shares: 382,512,514 and 374,218,420	38,251	37,422
Class A putable (\$100 par value) issued and outstanding shares: 2,473,614 and 2,351,339	247	235
Total capital stock	38,498	37,657
Retained earnings		
Unrestricted	15,241	14,549
Restricted	4,263	3,550
Total retained earnings	19,504	18,099
Accumulated other comprehensive income (loss) <i>(Note 17)</i>	342	724
Total capital	58,344	56,480
Total liabilities and capital	\$ 1,102,850	\$ 1,103,451

The accompanying notes are an integral part of these combined financial statements.

**FEDERAL HOME LOAN BANKS
COMBINED STATEMENT OF INCOME**

<i>(dollars in millions)</i>	Year Ended December 31,		
	2018	2017	2016
Interest income			
Advances	\$ 16,031	\$ 9,043	\$ 5,359
Interest-bearing deposits	239	64	39
Securities purchased under agreements to resell	678	179	92
Federal funds sold	1,561	950	274
Investment securities			
Trading securities	271	156	186
Available-for-sale securities	2,403	1,874	1,603
Held-to-maturity securities	2,539	2,010	1,794
Total investment securities	5,213	4,040	3,583
Mortgage loans held for portfolio	1,989	1,719	1,579
Other	6	7	4
Total interest income	25,717	16,002	10,930
Interest expense			
Consolidated obligations			
Discount notes	7,605	3,759	2,020
Bonds	12,657	7,620	4,931
Total consolidated obligations	20,262	11,379	6,951
Deposits	129	70	19
Subordinated notes	—	—	24
Mandatorily redeemable capital stock	70	72	101
Total interest expense	20,461	11,521	7,095
Net interest income	5,256	4,481	3,835
Provision (reversal) for credit losses	2	—	6
Net interest income after provision (reversal) for credit losses	5,254	4,481	3,829
Non-interest income			
Net other-than-temporary impairment losses	(17)	(21)	(22)
Net gains (losses) on investment securities	5	3	17
Net gains (losses) on financial instruments held under fair value option	(54)	(28)	3
Net gains (losses) on derivatives and hedging activities	(81)	324	47
Gains on litigation settlements, net	14	161	952
Other, net	160	176	157
Total non-interest income (loss)	27	615	1,154
Non-interest expense			
Compensation and benefits	698	650	623
Other operating expenses	433	397	385
Federal Housing Finance Agency	64	65	59
Office of Finance	56	52	47
Other	64	172	69
Total non-interest expense	1,315	1,336	1,183
Net income before assessments	3,966	3,760	3,800
Affordable Housing Program assessments	404	384	392
Net income	\$ 3,562	\$ 3,376	\$ 3,408

The accompanying notes are an integral part of these combined financial statements.

FEDERAL HOME LOAN BANKS
COMBINED STATEMENT OF COMPREHENSIVE INCOME

<i>(dollars in millions)</i>	Year Ended December 31,		
	2018	2017	2016
Net income	\$ 3,562	\$ 3,376	\$ 3,408
Other comprehensive income			
Net unrealized gains (losses) on available-for-sale securities	(467)	383	41
Net unrealized gains (losses) on held-to-maturity securities transferred from available-for-sale securities	—	—	1
Net non-credit portion of other-than-temporary impairment gains (losses) on investment securities	(76)	310	209
Net unrealized gains (losses) relating to hedging activities	161	200	240
Pension and postretirement benefits	5	(12)	(14)
Total other comprehensive income (loss)	(377)	881	477
Comprehensive income	\$ 3,185	\$ 4,257	\$ 3,885

The accompanying notes are an integral part of these combined financial statements.

FEDERAL HOME LOAN BANKS
COMBINED STATEMENT OF CAPITAL
YEARS ENDED DECEMBER 31, 2018, 2017, AND 2016

<i>(dollars and shares in millions)</i>	Capital Stock - Putable			
	Class B		Class A	
	Shares	Par Value	Shares	Par Value
Balance, December 31, 2015	340	\$ 34,005	2	\$ 180
Comprehensive income (loss)	—	—	—	—
Proceeds from issuance of capital stock	252	25,160	—	2
Repurchases/redemptions of capital stock	(201)	(20,100)	(6)	(582)
Net shares reclassified (to)/from mandatorily redeemable capital stock	(25)	(2,463)	—	(63)
Transfers between Class B and Class A shares	(6)	(625)	6	625
Dividends on capital stock				
Cash	—	—	—	—
Stock	1	95	—	—
Balance, December 31, 2016	361	36,072	2	162
Comprehensive income (loss)	—	—	—	—
Proceeds from issuance of capital stock	352	35,188	—	2
Repurchases/redemptions of capital stock	(321)	(32,002)	(8)	(713)
Net shares reclassified (to)/from mandatorily redeemable capital stock	(10)	(1,036)	(1)	(140)
Transfers between Class B and Class A shares	(9)	(924)	9	924
Transfers to unrestricted/(from) restricted retained earnings	—	—	—	—
Dividends on capital stock				
Cash	—	—	—	—
Stock	1	124	—	—
Balance, December 31, 2017	374	37,422	2	235
Adjustment for cumulative effect of accounting change - recognition and measurement of financial instruments	—	—	—	—
Comprehensive income (loss)	—	—	—	—
Proceeds from issuance of capital stock	432	43,163	—	2
Repurchases/redemptions of capital stock	(404)	(40,372)	(8)	(819)
Net shares reclassified (to)/from mandatorily redeemable capital stock	(11)	(1,084)	(2)	(204)
Transfers between Class B and Class A shares	(10)	(1,033)	10	1,033
Dividends on capital stock				
Cash	—	—	—	—
Stock	2	155	—	—
Balance, December 31, 2018	383	\$ 38,251	2	\$ 247

Capital Stock - Putable			Additional Capital from Merger	Retained Earnings			Accumulated Other Comprehensive Income (Loss)	Total Capital
Total		Unrestricted		Restricted	Total			
Shares	Par Value							
342	\$ 34,185	\$ 194	\$ 10,447	\$ 3,850	\$ 14,297	\$ (634)	\$ 48,042	
—	—	—	2,717	691	3,408	477	3,885	
252	25,162	—	—	—	—	—	25,162	
(207)	(20,682)	—	—	—	—	—	(20,682)	
(25)	(2,526)	—	—	—	—	—	(2,526)	
—	—	—	—	—	—	—	—	
—	—	(142)	(1,280)	—	(1,280)	—	(1,422)	
1	95	—	(95)	—	(95)	—	—	
363	36,234	52	11,789	4,541	16,330	(157)	52,459	
—	—	—	2,596	780	3,376	881	4,257	
352	35,190	—	—	—	—	—	35,190	
(329)	(32,715)	—	—	—	—	—	(32,715)	
(11)	(1,176)	—	—	—	—	—	(1,176)	
—	—	—	—	—	—	—	—	
—	—	—	1,771	(1,771)	—	—	—	
—	—	(52)	(1,483)	—	(1,483)	—	(1,535)	
1	124	—	(124)	—	(124)	—	—	
376	37,657	—	14,549	3,550	18,099	724	56,480	
—	—	—	5	—	5	(5)	—	
—	—	—	2,849	713	3,562	(377)	3,185	
432	43,165	—	—	—	—	—	43,165	
(412)	(41,191)	—	—	—	—	—	(41,191)	
(13)	(1,288)	—	—	—	—	—	(1,288)	
—	—	—	—	—	—	—	—	
—	—	—	(2,007)	—	(2,007)	—	(2,007)	
2	155	—	(155)	—	(155)	—	—	
385	\$ 38,498	\$ —	\$ 15,241	\$ 4,263	\$ 19,504	\$ 342	\$ 58,344	

The accompanying notes are an integral part of these combined financial statements.

**FEDERAL HOME LOAN BANKS
COMBINED STATEMENT OF CASH FLOWS**

<i>(dollars in millions)</i>	Year Ended December 31,		
	2018	2017	2016
Operating activities			
Net income	\$ 3,562	\$ 3,376	\$ 3,408
Adjustments to reconcile net income to net cash provided by operating activities			
Depreciation and amortization	617	252	137
Net change in derivatives and hedging activities	435	611	276
Net other-than-temporary impairment losses	17	21	22
Net change in fair value adjustments on trading securities	20	5	41
Net change in fair value adjustments on financial instruments held under fair value option	54	28	(3)
Other adjustments	6	(27)	(59)
Net change in			
Trading securities	(891)	(5)	(1)
Accrued interest receivable	(603)	(383)	(176)
Other assets	(44)	(93)	(91)
Accrued interest payable	554	222	142
Other liabilities	110	95	59
Total adjustments	275	726	347
Net cash provided by (used in) operating activities	3,837	4,102	3,755
Investing activities			
Net change in			
Interest-bearing deposits	(12,023)	(1,491)	464
Securities purchased under agreements to resell	7,243	203	(4,944)
Federal funds sold	11,314	(16,897)	(6,253)
Trading securities			
Net decrease (increase) in short-term	585	(585)	—
Proceeds from long-term	6,085	5,011	7,348
Purchases of long-term	(14,330)	(2,699)	(6,331)
Available-for-sale securities			
Net decrease (increase) in short-term	(1,450)	400	(600)
Proceeds from long-term	12,673	11,189	14,358
Purchases of long-term	(14,706)	(9,265)	(19,681)
Held-to-maturity securities			
Net decrease (increase) in short-term	(14)	1,062	(1,712)
Proceeds from long-term	23,205	21,102	20,915
Purchases of long-term	(17,206)	(22,634)	(20,052)
Advances			
Repaid	11,271,130	9,173,597	6,613,082
Originated	(11,268,522)	(9,201,402)	(6,686,143)
Mortgage loans held for portfolio			
Principal collected	6,449	6,960	8,687
Purchases	(15,317)	(12,463)	(12,772)
Other investing activities	(41)	(88)	33
Net cash provided by (used in) investing activities	(4,925)	(48,000)	(93,601)

FEDERAL HOME LOAN BANKS
COMBINED STATEMENT OF CASH FLOWS (continued)

<i>(dollars in millions)</i>	Year Ended December 31,		
	2018	2017	2016
Financing activities			
Net change in deposits and pass-through reserves, and other financing activities	\$ (35)	\$ (93)	\$ (1,178)
Net proceeds (payments) on derivative contracts with financing element	(14)	(209)	(381)
Net proceeds from issuance of consolidated obligations			
Discount notes	7,369,878	6,310,301	3,863,143
Bonds	477,225	482,691	524,098
Payments for maturing and retiring consolidated obligations			
Discount notes	(7,335,962)	(6,328,904)	(3,947,549)
Bonds	(515,126)	(419,478)	(355,683)
Payments for retirement of subordinated notes	—	—	(944)
Proceeds from issuance of capital stock	43,165	35,190	25,162
Payments for repurchases/redemptions of capital stock	(41,191)	(32,715)	(20,682)
Payments for repurchases/redemptions of mandatorily redeemable capital stock	(1,498)	(1,616)	(1,566)
Cash dividends paid	(2,007)	(1,535)	(1,422)
Net cash provided by (used in) financing activities	(5,565)	43,632	82,998
Net increase (decrease) in cash and due from banks	(6,653)	(266)	(6,848)
Cash and due from banks at beginning of the period	7,175	7,441	14,289
Cash and due from banks at end of the period	\$ 522	\$ 7,175	\$ 7,441
Supplemental disclosures			
Interest paid	\$ 19,179	\$ 10,996	\$ 6,843
Affordable Housing Program payments, net	\$ 340	\$ 304	\$ 285
Transfers of mortgage loans to other assets	\$ 29	\$ 38	\$ 47
Transfers of mortgage loans held for sale to securitized mortgage loans	\$ 513	\$ 526	\$ 422
Non-cash receipt of trading securities	\$ 11	\$ —	\$ —
Net capital stock reclassified to/(from) mandatorily redeemable capital stock	\$ 1,288	\$ 1,176	\$ 2,526

The accompanying notes are an integral part of these combined financial statements.

NOTES TO COMBINED FINANCIAL STATEMENTS

Background Information

These financial statements present the combined financial position and combined results of operations of the Federal Home Loan Banks (FHLBanks). The FHLBanks are government-sponsored enterprises (GSEs) that were organized under the Federal Home Loan Bank Act of 1932, as amended (FHLBank Act), to serve the public by enhancing the availability of credit for residential mortgages and targeted community development. They are financial cooperatives that provide a readily available, competitively-priced source of funds to their member institutions. All federally-insured depository institutions and insurance companies engaged in residential housing finance may apply for membership. Additionally, qualified community development financial institutions are eligible to be members of an FHLBank. Housing associates, including state and local housing authorities, that meet certain statutory and regulatory criteria may also borrow from the FHLBanks. While eligible to borrow, housing associates are not members of the FHLBanks. All members must purchase stock in their district's FHLBank. On a combined basis, member institutions own most of the FHLBanks' capital stock. Former members (including certain non-members that own FHLBank capital stock as a result of merger or acquisition, relocation, charter termination, voluntary termination, or involuntary termination of an FHLBank member) own the remaining capital stock to support business transactions still carried on an FHLBank's statement of condition. All holders of an FHLBank's capital stock may, to the extent declared by that FHLBank's board of directors, receive dividends on their capital stock.

Each FHLBank operates as a separate entity with its own management, employees, and board of directors. The FHLBanks do not have any special purpose entities or any other type of off-balance sheet conduits.

The Federal Housing Finance Agency (FHFA) is the independent Federal regulator of the FHLBanks, Federal Home Loan Mortgage Corporation (Freddie Mac), and Federal National Mortgage Association (Fannie Mae). The FHFA's stated mission is to ensure that the housing GSEs operate in a safe and sound manner so that they serve as a reliable source of liquidity and funding for housing finance and community investment.

The Office of Finance is a joint office of the FHLBanks established to facilitate the issuance and servicing of the debt instruments of the FHLBanks, known as consolidated obligations (consolidated bonds and consolidated discount notes), and to prepare the quarterly and annual combined financial reports of the FHLBanks. As provided by the FHLBank Act, and applicable regulations, consolidated obligations are backed only by the financial resources of the FHLBanks. Consolidated obligations are the primary source of funds for the FHLBanks in addition to deposits, other borrowings, and capital stock issued to members. The FHLBanks primarily use these funds to provide advances to members. Certain FHLBanks also use these funds to acquire mortgage loans from members (acquired member assets) through their respective FHLBank's Mortgage Purchase Program (MPP) or the Mortgage Partnership Finance[®] (MPF[®]) Program. "Mortgage Partnership Finance," "MPF," and "MPF Xtra" are registered trademarks of the FHLBank of Chicago. In addition, some FHLBanks offer correspondent services to their member institutions, including wire transfer, security safekeeping, and settlement services.

Unless otherwise stated, dollar amounts disclosed in this Combined Financial Report represent values rounded to the nearest million. Dollar amounts rounding to less than one million are not reflected in this Combined Financial Report.

Note 1 - Summary of Significant Accounting Policies

Basis of Presentation

These combined financial statements include the financial statements and records of the FHLBanks that are prepared in accordance with generally accepted accounting principles in the United States of America (GAAP).

Principles of Combination. Transactions between the FHLBanks have been eliminated in accordance with combination accounting principles similar to consolidation under GAAP. The more significant transactions between the FHLBanks are:

1. *Transfers of Direct Liability on Consolidated Bonds between FHLBanks.* These transfers occur when the primary obligation under consolidated bonds issued on behalf of one FHLBank is transferred to and assumed by another FHLBank. The transferring FHLBank treats the transfer as a debt extinguishment because it is released from being the primary obligor when the Office of Finance records the transfer, pursuant to its duties under applicable regulations. The assuming FHLBank then becomes the primary obligor while the transferring FHLBank has a contingent liability because it still has joint and several liability with respect to repaying the transferred consolidated bonds.

The FHLBank assuming the consolidated bond liability initially records the consolidated bond at fair value, which represents the amount paid to the assuming FHLBank by the transferring FHLBank to assume the debt. A premium or discount exists for the amount paid above or below face value. Because these transfers represent inter-company transfers under combination accounting principles, an inter-company elimination is made for any gain or loss on the transfer. As a result, the subsequent amortization of premium or discount, amortization of concession fees, and recognition of hedging-related adjustments in the combined financial statements represent those of the transferring FHLBank.

2. *Purchases of Consolidated Bonds.* These purchases occur when consolidated bonds issued on behalf of one FHLBank are purchased by another FHLBank in the open market. All purchase transactions occur at market prices with third parties and the purchasing FHLBanks treat these consolidated bonds as investments. Under combination accounting principles, the investment and the consolidated bonds, and related contractual interest income and expense, are eliminated in combination.

No other transactions among the FHLBanks had a material effect on operating results. (See the [Condensed Combining Schedules](#) for the combining adjustments made to the combined financial statements.)

Segment Reporting. FHFA regulations consider each FHLBank to be a segment. However, there is no single chief operating decision maker because there is no centralized, system-wide management or centralized board of director oversight of the individual FHLBanks. (See the [Condensed Combining Schedules](#) for segment information.)

Reclassifications and Revisions to Prior Period Amounts. Certain amounts in the 2017 and 2016 combined financial statements have been reclassified or revised to conform to the financial statement presentation for the year ended December 31, 2018. Additionally, certain other prior period amounts have been revised and may not agree to the Federal Home Loan Banks Combined Financial Reports for the years ended December 31, 2017 and 2016. These amounts were not deemed to be material.

Changes to Supplemental Disclosures of the Combined Statement of Cash Flows. On January 1, 2018, the FHLBanks retrospectively adopted the guidance, *Classification of Certain Cash Receipts and Cash Payments*, issued by the Financial Accounting Standards Board in August 2016. As a result, interest paid as reported in the supplemental disclosures section of the Combined Statement of Cash Flows was adjusted for the years ended December 31, 2017 and 2016, to include \$1,164 million and \$498 million relating to accreted interest on zero-interest consolidated obligations. The adoption of this guidance did not have any other effect on the FHLBanks' combined financial condition, combined results of operations, and combined cash flows.

Significant Accounting Policies

The following summary of significant accounting policies has been compiled from the FHLBanks' individual summaries of significant accounting policies. While the FHLBanks' accounting and financial reporting policies are not necessarily always identical, each FHLBank is responsible for establishing its own accounting and financial reporting policies in accordance with GAAP. The following paragraphs describe the more significant accounting policies followed by the FHLBanks, including the more notable alternatives acceptable under GAAP.

Use of Estimates

The preparation of financial statements in accordance with GAAP requires each FHLBank's management to make subjective assumptions and estimates that may affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities, and the reported amounts of income and expense. The most significant of these estimates include those used in conjunction with other-than-temporary impairments for investment securities, fair value estimates, derivative hedging relationships, amortization of premiums and accretion of discounts on investment securities and purchased mortgage loans, and calculation of allowance for credit losses for each identified portfolio segment of financing receivables. Actual results could differ from these estimates significantly.

Fair Value. The fair value amounts, recorded on the Combined Statement of Condition and in the footnotes for the periods presented, have been determined by the FHLBanks using available market and other pertinent information, and reflect each FHLBank's best judgment of appropriate valuation methods. Although an FHLBank uses its best judgment in estimating the fair value of these financial instruments, there are inherent limitations in any valuation technique. Therefore, these fair values may

not be indicative of the amounts that would have been realized in market transactions at the reporting dates. (See [Note 19 - Fair Value](#) for more information.)

Financial Instruments Meeting Netting Requirements

The FHLBanks present certain financial instruments on a net basis when they have a legal right of offset and all other requirements for netting are met (collectively referred to as the netting requirements). For these financial instruments, each of the affected FHLBanks has elected to offset its asset and liability positions, as well as cash collateral received or pledged, when it has met the netting requirements.

The net exposure for these financial instruments can change on a daily basis; therefore, there may be a delay between the time this exposure change is identified and additional collateral is requested, and the time when this collateral is received or pledged. Likewise, there may be a delay for excess collateral to be returned. For derivative instruments that meet the netting requirements, any excess cash collateral received or pledged is recognized as a derivative liability or derivative asset. (See [Note 11 - Derivatives and Hedging Activities](#) for additional information regarding these agreements.)

At December 31, 2018 and 2017, the FHLBanks had \$45,325 million and \$52,568 million in securities purchased under agreements to resell. Based on the fair value of the related collateral held, the securities purchased under agreements to resell were fully collateralized for the periods presented. There were no offsetting liabilities related to these securities at December 31, 2018 and 2017.

Interest-Bearing Deposits, Securities Purchased under Agreements to Resell, and Federal Funds Sold

Interest-bearing deposits, securities purchased under agreements to resell, and federal funds sold provide short-term liquidity and are carried at cost. Interest-bearing deposits include certificates of deposit and bank notes not meeting the definition of a security. The FHLBanks treat securities purchased under agreements to resell as short-term collateralized loans that are classified as assets on the Combined Statement of Condition. Securities purchased under agreements to resell are held in safekeeping in the name of the affected FHLBank by third-party custodians approved by that FHLBank. If the fair value of the underlying securities decreases below the fair value required as collateral, the counterparty has the option to (1) place an equivalent amount of additional securities in safekeeping in the name of the FHLBank or (2) remit an equivalent amount of cash. Federal funds sold consist of short-term, unsecured loans generally transacted with counterparties that are considered by an FHLBank to be of investment quality.

Investment Securities

The FHLBanks classify investment securities as trading, available-for-sale (AFS), and held-to-maturity (HTM) at the date of acquisition. Purchases and sales of securities are recorded on a trade date basis.

Trading. Securities classified as trading are held for liquidity purposes and carried at fair value. The FHLBanks record changes in the fair value of these securities through non-interest income as net gains (losses) on trading securities. FHFA regulation and each FHLBank's risk management policy prohibit trading in or the speculative use of these instruments and limit credit risk arising from these instruments.

Available-for-Sale. Securities that are not classified as HTM or trading are classified as AFS and are carried at fair value. The FHLBanks record changes in the fair value of these securities in other comprehensive income (loss) (OCI) as net unrealized gains (losses) on available-for-sale securities. For AFS securities that have been hedged and qualify as a fair value hedge, the FHLBanks record the portion of the change in the fair value of the investment related to the risk being hedged in non-interest income as net gains (losses) on derivatives and hedging activities together with the related change in the fair value of the derivative, and record the remainder of the change in the fair value of the investment in OCI as net unrealized gains (losses) on available-for-sale securities. For AFS securities that have been hedged and qualify as a cash flow hedge, the FHLBanks record the effective portion of the change in the fair value of the derivative related to the risk being hedged in OCI as net unrealized gains (losses) relating to hedging activities. The ineffective portion is recorded in non-interest income and presented as net gains (losses) on derivatives and hedging activities.

Held-to-Maturity. Securities that the FHLBanks have both the ability and intent to hold to maturity are classified as HTM and are carried at cost adjusted for periodic principal repayments, amortization of premiums and accretion of discounts, other-than-temporary impairment (OTTI), and accretion of the non-credit portion of OTTI recognized in OCI.

Certain changes in circumstances may cause an FHLBank to change its intent to hold a security to maturity without calling into question its intent to hold other debt securities to maturity in the future. Thus, the sale or transfer of an HTM security due to certain changes in circumstances, such as evidence of significant deterioration in the issuer's creditworthiness or changes in regulatory requirements, is not considered to be inconsistent with its original classification. Other events that are isolated, nonrecurring, and unusual for the FHLBanks that could not have been reasonably anticipated may cause an FHLBank to sell or transfer an HTM security without necessarily calling into question its intent to hold other debt securities to maturity. In addition, sale of a debt security that meets either of the following two conditions would not be considered inconsistent with the original classification of that security:

1. The sale occurs near enough to its maturity date (for example, within three months of maturity), or call date if exercise of the call is probable, that interest-rate risk is substantially eliminated as a pricing factor and the changes in market interest rates would not have a significant effect on the security's fair value; or
2. The sale of a security occurs after an FHLBank has already collected a substantial portion (at least 85 percent) of the principal outstanding at acquisition due either to prepayments on the debt security or to scheduled payments on a debt security payable in equal installments (both principal and interest) over its term.

Premiums and Discounts. The FHLBanks amortize purchased premiums and accrete purchased discounts on investment securities using either the contractual level-yield (contractual interest method) or the retrospective level-yield (retrospective interest method) over the estimated cash flows of the securities. The contractual interest method recognizes the income effects of premiums and discounts over the contractual life of the securities based on the actual behavior of the underlying assets, including adjustments for actual prepayment activities, and reflects the contractual terms of the securities without regard to changes in estimated prepayments based on assumptions about future borrower behavior. The retrospective interest method requires that an FHLBank estimate prepayments over the estimated life of the securities and make a retrospective adjustment of the effective yield each time that it changes the estimated life as if the new estimate had been known since the original acquisition date of the securities.

Gains and Losses on Sales. Each FHLBank computes gains and losses on sales of its investment securities using the specific identification method and includes these gains and losses in non-interest income (loss).

Investment Securities - Other-than-Temporary Impairment

Each FHLBank evaluates its individual AFS and HTM securities in unrealized loss positions for OTTI on a quarterly basis. A security is considered impaired (i.e., in an unrealized loss position) when its fair value is less than its amortized cost. An FHLBank considers an OTTI to have occurred under any of the following conditions:

- It has an intent to sell the impaired debt security;
- If, based on available evidence, it believes it is more likely than not that it will be required to sell the impaired debt security before the recovery of its amortized cost; or
- It does not expect to recover the entire amortized cost of the impaired debt security.

Recognition of OTTI. If either of these first two conditions is met, an FHLBank recognizes an OTTI charge in earnings equal to the entire difference between the security's amortized cost and its fair value as of the statement of condition date. For securities in an unrealized loss position that do not meet either of these conditions, the entire loss position, or total OTTI, is evaluated to determine the extent and amount of credit loss.

To determine whether a credit loss exists, each FHLBank performs an analysis, which includes a cash flow analysis for private-label mortgage-backed securities (MBS), to determine if it will recover the entire amortized cost of each of these securities. The present value of the cash flows expected to be collected is compared to the amortized cost of the debt security. If there is a credit loss (the difference between the present value of the cash flows expected to be collected and the amortized cost of the debt security), the carrying value of the debt security is adjusted to its fair value. However, rather than recognizing the entire difference between the amortized cost and fair value in earnings, only the amount of the impairment representing the credit loss (i.e., the credit component) is recognized in earnings, while the amount related to all other factors (i.e., the non-credit component) is recognized in OCI. The credit loss on a debt security is limited to the amount of that security's unrealized losses.

The total OTTI is presented on the statement of income with an offset for the amount of the non-credit portion of OTTI that is recognized in OCI. The remaining amount on the statement of income represents the credit loss for the period.

Accounting for OTTI Recognized in OCI. For subsequent accounting of an other-than-temporarily impaired security, an FHLBank records an additional OTTI if the present value of cash flows expected to be collected is less than the amortized cost of the security. The total amount of this additional OTTI (both credit and non-credit component, if any) is determined as the difference between the security's amortized cost less the amount of OTTI recognized in OCI prior to the determination of this additional OTTI and its fair value. Any additional credit loss is limited to that security's unrealized losses, or the difference between the security's amortized cost and its fair value as of the statement of condition date. This additional credit loss, up to the amount in OCI related to the security, is reclassified out of OCI and recognized in earnings. Any credit loss in excess of the related OCI is also recognized in earnings.

Subsequent related increases and decreases (if not an additional OTTI) in the fair value of AFS securities are netted against the non-credit component of OTTI recognized previously in OCI. For HTM securities, if the current carrying value is less than its current fair value, the carrying value of the security is not increased. However, the OTTI recognized in OCI for HTM securities is accreted to the carrying value of each security on a prospective basis, based on the amount and timing of future estimated cash flows (with no effect on earnings unless the security is subsequently sold or there are additional decreases in cash flows expected to be collected). For debt securities classified as AFS, the FHLBanks do not accrete the OTTI recognized in OCI to the carrying value because the subsequent measurement basis for these securities is fair value.

Interest Income Recognition. When a security has been other-than-temporarily impaired, a new accretable yield is calculated for that security at its impairment measurement date. This adjusted yield is used to calculate the interest income recognized over the remaining life of that security, matching the amount and timing of its estimated future collectible cash flows. Subsequent to that security's initial OTTI, an FHLBank re-evaluates estimated future collectible cash flows on a quarterly basis. If the security has no additional OTTI based on this evaluation, the accretable yield is reassessed for possible adjustment on a prospective basis. Depending on an FHLBank's accounting method, the accretable yield is adjusted if there is either: (1) a significant increase in the security's expected cash flows or (2) a favorable or unfavorable change in the timing and amount of the security's expected cash flows.

Variable Interest Entities

Certain FHLBanks have investments in variable interest entities (VIEs) that include, but are not limited to, senior interests in private-label MBS and asset-backed securities (ABS). The carrying amounts and classification of the assets that relate to the FHLBanks' investments in VIEs are included in investment securities on the Combined Statement of Condition. The affected FHLBanks have no liabilities related to these VIEs. The maximum loss exposure for these VIEs is limited to the FHLBanks' investments in the VIEs.

If an FHLBank determines it is the primary beneficiary of a VIE, it would be required to consolidate that VIE. Each affected FHLBank performs its evaluation, at least annually, or as needed, to determine whether it is the primary beneficiary in any VIE. To perform this evaluation, an FHLBank considers whether it possesses both of the following characteristics:

- The power to direct the VIE's activities that most significantly affect the VIE's economic performance; and
- The obligation to absorb the VIE's losses or the right to receive benefits from the VIE that could potentially be significant to the VIE.

Based on an evaluation of these characteristics, each affected FHLBank has determined that consolidation is not required for its VIEs for the periods presented. In addition, each of these FHLBanks has not provided financial or other support (explicitly or implicitly) during the periods presented. Furthermore, each affected FHLBank was not previously contractually required to provide, nor does it intend to provide, that support in the future.

Advances

The FHLBanks report advances (secured loans to members, former members, or housing associates) either at amortized cost or at fair value when the fair value option is elected. Advances carried at amortized cost are reported net of premiums, discounts (including discounts related to the Affordable Housing Program (AHP)), unearned commitment fees, and hedging adjustments. The FHLBanks amortize or accrete premiums and discounts, and recognize unearned commitment fees and hedging adjustments, to interest income using a level-yield methodology. The FHLBanks record interest on advances to interest income as earned. For advances carried at fair value, interest income is recognized based on the contractual interest rate.

Advance Modifications. In cases in which an FHLBank funds a new advance concurrently with or within a short period of time before or after the prepayment of an existing advance, the FHLBank evaluates whether the new advance meets the accounting criteria to qualify as a modification of an existing advance or whether it constitutes a new advance. The FHLBank compares the present value of cash flows on the new advance to the present value of cash flows remaining on the existing advance. If there is at least a 10 percent difference in the present value of cash flows or if the FHLBank concludes the difference between the advances is more than minor based on a qualitative assessment of the modifications made to the original contractual terms, then the advance is accounted for as a new advance. In all other instances, the new advance is accounted for as a modification.

Prepayment Fees. The FHLBanks charge a borrower a prepayment fee when the borrower prepays certain advances before the original maturity. The FHLBanks record prepayment fees net of basis adjustments related to hedging activities included in the carrying value of the advance as prepayment fees on advances, net in the interest income section of the Combined Statement of Income.

If a new advance does not qualify as a modification of an existing advance, the existing advance is treated as an advance termination and any prepayment fee, net of hedging adjustments, is recorded to prepayment fees on advances, net in the interest income section of the Combined Statement of Income.

If a new advance qualifies as a modification of an existing advance, any prepayment fee, net of hedging adjustments, is deferred, recorded in the basis of the modified advance, and amortized using a level-yield methodology over the life of the modified advance to advance interest income. If the modified advance is hedged and meets hedge accounting requirements, the modified advance is marked to benchmark or full fair value, depending on the risk being hedged, and subsequent fair value changes that are attributable to the hedged risk are recorded in non-interest income.

Mortgage Loans Held for Portfolio

Each FHLBank classifies mortgage loans that it has the intent and ability to hold for the foreseeable future, or until maturity or payoff, as held for portfolio. Accordingly, these mortgage loans are reported net of premiums, discounts, deferred loan fees or costs, hedging adjustments, charge-offs, and the allowance for credit losses.

Premiums and Discounts. An FHLBank defers and amortizes premiums and accretes discounts paid to and received by participating financial institutions (PFIs), deferred loan fees or costs, and hedging basis adjustments to interest income using either the contractual interest method or the retrospective interest method. In determining prepayment estimates for the retrospective interest method, mortgage loans are aggregated by similar characteristics (type, maturity, note rate, and acquisition date).

Credit Enhancement Fees. For conventional mortgage loans, PFIs retain a portion of the credit risk on the loans they sell to the FHLBanks by providing credit enhancement either through a direct liability to pay credit losses up to a specified amount or through a contractual obligation to the FHLBanks. To secure this obligation, a PFI may either pledge collateral or purchase supplemental mortgage insurance (SMI). For certain mortgage loans purchased under the MPF Program, PFIs are paid a credit enhancement fee (CE Fee) for assuming credit risk and in some instances all or a portion of the CE Fee may be performance-based. CE Fees are paid monthly based on the remaining unpaid principal balance of the loans in a master commitment. CE Fees are recorded as an offset to mortgage loan interest income. To the extent an FHLBank experiences losses in a master commitment, it may be able to recapture performance-based CE Fees paid to that PFI to offset these losses.

Other Fees. The FHLBanks may receive other non-origination fees, such as delivery commitment extension fees, pair-off fees, and price adjustment fees. Delivery commitment extension fees are received when a PFI requests to extend the delivery commitment period beyond the original stated expiration. These fees compensate the FHLBanks for lost interest as a result of late funding and are recorded in non-interest income as received. Pair-off fees represent a make-whole provision; they are received when the amount funded is less than a specific percentage of the delivery commitment amount and are recorded in non-interest income. Price adjustment fees are received when the amount funded is greater than a specified percentage of the delivery commitment amount; they represent purchase price adjustments to the related loans acquired and are recorded as a part of the carrying value of the loans.

Allowance for Credit Losses

Establishing Allowance for Credit Losses. An allowance for credit losses is a valuation allowance separately established for each identified portfolio segment, if it is probable that impairment has occurred in an FHLBank's portfolio as of the statement of condition date and the amount of loss can be reasonably estimated. A loan is considered impaired when, based on current information and events, it is probable that an FHLBank will be unable to collect all amounts due according to the contractual terms of the loan agreement. To the extent necessary, an allowance for credit losses for off-balance sheet credit exposures is recorded as a liability. (See [Note 10 - Allowance for Credit Losses](#) for details on each allowance methodology.)

Portfolio Segments. A portfolio segment is defined as the level at which an entity develops and documents a systematic methodology for determining its allowance for credit losses. Each FHLBank has developed and documented a systematic methodology for determining an allowance for credit losses, where applicable, for:

- credit products (advances, letters of credit, and other extensions of credit to borrowers);
- government-guaranteed or -insured mortgage loans held for portfolio;
- conventional MPF loans held for portfolio, conventional MPP loans held for portfolio, and other loans;
- term federal funds sold; and
- term securities purchased under agreements to resell.

Classes of Financing Receivables. Classes of financing receivables generally are a disaggregation of a portfolio segment to the extent that it is needed to understand the exposure to credit risk arising from these financing receivables. Each FHLBank determined that no further disaggregation of its portfolio segments is needed as the credit risk arising from these financing receivables is assessed and measured by that FHLBank at the portfolio segment level.

Non-accrual Loans. The FHLBanks place a conventional mortgage loan on non-accrual status if it is determined that either (1) the collection of interest or principal is doubtful or (2) interest or principal is past due for 90 days or more, except when the loan is well-secured (e.g., through credit enhancements) and in the process of collection. As such, FHLBanks do not place conventional mortgage loans over 90 days delinquent on non-accrual status when losses are not expected to be incurred. The FHLBanks do not place government-guaranteed or -insured mortgage loans on non-accrual status due to the U.S. government guarantee or insurance on these loans and the contractual obligation of the loan servicer to repurchase the loans when certain criteria are met. For those mortgage loans placed on non-accrual status, accrued but uncollected interest is reversed against interest income. The FHLBanks record cash payments received first as interest income and then as a reduction of principal as specified in the contractual agreement, unless the collection of the remaining principal amount due is considered doubtful. If the collection of the remaining principal amount due is considered doubtful, then cash payments received would be applied first solely to principal until the remaining principal amount due is expected to be collected and then as a recovery of any charge-off, if applicable, followed by recording interest income. A loan on non-accrual status may be restored to accrual status when (1) none of its contractual principal and interest is due and unpaid, and an FHLBank expects repayment of the remaining contractual interest and principal, or (2) it otherwise becomes well secured and in the process of collection.

Troubled Debt Restructuring. An FHLBank considers a troubled debt restructuring to have occurred when a concession is granted to a borrower for economic or legal reasons related to the borrower's financial difficulties and that concession would not have been considered otherwise. An FHLBank has granted a concession when it does not expect to collect all amounts due to the FHLBank under the original contract as a result of the restructuring. Loans that are discharged in Chapter 7 bankruptcy and have not been reaffirmed by the borrowers are also considered to be troubled debt restructurings, except in certain cases where supplemental mortgage insurance policies are held or where all contractual amounts due are still expected to be collected as a result of certain credit enhancements or government guarantees.

Collateral-dependent Loans. An impaired loan is considered collateral-dependent if repayment is expected to be provided solely by the sale of the underlying property; that is, there is no other available and reliable source of repayment. A loan that is considered collateral-dependent is measured for impairment based on the fair value of the underlying property less estimated selling costs, with any shortfall recognized as an allowance for loan loss or charged-off. Interest income on impaired loans is recognized in the same manner as non-accrual loans.

Charge-off Policy. A charge-off is recorded if it is estimated that the recorded investment in a loan will not be recovered. The FHLBanks evaluate whether to record a charge-off on a conventional mortgage loan upon the occurrence of a confirming event. Confirming events include, but are not limited to, the occurrence of foreclosure or notification of a claim against any of the credit enhancements. The FHLBanks charge off the portion of outstanding conventional mortgage loan balances in excess of fair value of the underlying property, less cost to sell and adjusted for any available credit enhancements, for loans that are 180 days or more delinquent and/or certain loans that the borrower has filed for bankruptcy.

Derivatives

All derivatives are recognized on the Combined Statement of Condition at their fair values and are reported as either derivative assets or derivative liabilities, net of cash collateral, and accrued interest received from or pledged to clearing agents and/or counterparties. The fair values of derivatives are netted by clearing agent and/or counterparty when the netting requirements have been met. If these netted amounts are positive, they are classified as an asset, and if negative, they are classified as a liability. Cash flows associated with derivatives are reflected as cash flows from operating activities on the Combined Statement of Cash Flows unless the derivative meets the criteria to be a financing derivative.

Each FHLBank utilizes one or two Derivative Clearing Organizations (Clearinghouses), for all cleared derivative transactions, LCH Ltd. and/or CME Clearing. Effective January 16, 2018, LCH Ltd. made certain amendments to its rulebook, changing the legal characterization of variation margin payments to be daily settlement payments, rather than collateral. CME Clearing made the same changes to its rulebook on January 3, 2017. As a result, at both Clearinghouses, variation margin is characterized as daily settlement payments, rather than cash collateral; and initial margin continues to be considered cash collateral.

Derivative Designations. Each derivative is designated as one of the following:

- a qualifying hedge of the change in fair value of a recognized asset or liability or an unrecognized firm commitment (a fair value hedge);
- a qualifying hedge of a forecasted transaction or the variability of cash flows that are to be received or paid in connection with a recognized asset or liability (a cash flow hedge);
- a non-qualifying hedge (economic hedge) for asset-liability management purposes; or
- a non-qualifying hedge of another derivative (an intermediation hedge) that is offered as a product to members or used to offset other derivatives with non-member counterparties.

Accounting for Fair Value or Cash Flow Hedges. If hedging relationships meet certain criteria, including, but not limited to, formal documentation of the hedging relationship and an expectation to be highly effective, they qualify for fair value or cash flow hedge accounting and the offsetting changes in fair value of the hedged items attributable to the hedged risk may be recorded either in earnings (fair value hedges) or OCI (cash flow hedges). For cash flow hedges, the FHLBanks measure effectiveness using the hypothetical derivative method, which compares the cumulative change in fair value of the actual derivative designated as the hedging instrument to the cumulative change in fair value of a hypothetical derivative having terms that identically match the critical terms of the hedged forecasted transaction.

Two approaches to hedge accounting include:

- *Long-haul hedge accounting.* The application of long-haul hedge accounting requires an FHLBank to formally assess (both at the hedge's inception and at least quarterly) whether the derivatives that are used in hedging transactions have been highly effective in offsetting changes in the fair value or cash flows of hedged items or forecasted transactions attributable to the hedged risk and whether those derivatives may be expected to remain highly effective in future periods.
- *Short-cut hedge accounting.* Transactions that meet certain criteria qualify for the short-cut method of hedge accounting in which an assumption can be made that the change in fair value of a hedged item, due to changes in the benchmark rate, exactly offsets the change in fair value of the related derivative. Under the short-cut method, the entire change in fair value of the interest-rate swap is considered to be highly effective at achieving offsetting changes in fair values or cash flows of the hedged asset or liability.

Derivatives are typically executed at the same time as the hedged item, and each FHLBank designates the hedged item in a qualifying hedge relationship at the trade date. In many hedging relationships, an FHLBank may designate the hedging relationship upon its commitment to disburse an advance or trade a consolidated obligation in which settlement occurs within the shortest period of time possible for the type of instrument based on market settlement conventions. An FHLBank then records the changes in fair value of the derivative and the hedged item beginning on the trade date.

Changes in the fair value of a derivative that is designated and qualifies as a fair value hedge, along with changes in the fair value of the hedged asset or liability that are attributable to the hedged risk, are recorded in non-interest income as net gains (losses) on derivatives and hedging activities.

Changes in the fair value of a derivative that is designated and qualifies as a cash flow hedge, to the extent that the hedge is highly effective, are recorded in accumulated other comprehensive income (loss) (AOCI), a component of capital, until earnings are affected by the variability of the cash flows of the hedged transaction.

For both fair value and cash flow hedges, any hedge ineffectiveness (which represents the amount by which the change in the fair value of the derivative differs from the change in the fair value of the hedged item or the variability in the cash flows of the forecasted transaction attributable to the hedged risk) is recorded in non-interest income as net gains (losses) on derivatives and hedging activities.

Accounting for Economic Hedges or Intermediary Activities. An economic hedge is defined as a derivative hedging specific or non-specific underlying assets, liabilities, or firm commitments that does not qualify or was not designated for fair value or cash flow hedge accounting, but is an acceptable hedging strategy under an FHLBank's risk management program. These economic hedging strategies also comply with FHFA regulatory requirements prohibiting speculative hedge transactions. An economic hedge by definition introduces the potential for earnings variability caused by the changes in fair value of the derivatives that are recorded in an FHLBank's income but that are not offset by corresponding changes in the value of the economically hedged assets, liabilities, or firm commitments. As a result, an FHLBank recognizes only the net interest and the change in fair value of these derivatives in non-interest income as net gains (losses) on derivatives and hedging activities with no offsetting fair value adjustments for the assets, liabilities, or firm commitments.

The derivatives used in intermediary activities do not qualify for hedge accounting treatment and are separately marked-to-market through earnings. The net result of the accounting for these derivatives does not significantly affect the operating results of the FHLBanks. These amounts are recorded in non-interest income as net gains (losses) on derivatives and hedging activities.

Accrued Interest Receivables and Payables. The net settlements of interest receivables and payables related to derivatives designated in fair value or cash flow hedge relationships are recognized as adjustments to the income or expense of the designated hedged item. The net settlements of interest receivables and payables related to intermediated derivatives for members and other economic hedges are recognized in non-interest income as net gains (losses) on derivatives and hedging activities.

Discontinuance of Hedge Accounting. An FHLBank discontinues hedge accounting prospectively when:

- it determines that the derivative is no longer effective in offsetting changes in the fair value or cash flows of a hedged item attributable to the hedged risk (including hedged items such as firm commitments or forecasted transactions);
- the derivative and/or the hedged item expires or is sold, terminated, or exercised;
- it is no longer probable that the forecasted transaction will occur in the originally expected period or within the following two months;
- a hedged firm commitment no longer meets the definition of a firm commitment; or
- management determines that designating the derivative as a hedging instrument is no longer appropriate.

When hedge accounting is discontinued, an FHLBank either terminates the derivative or continues to carry the derivative on the statement of condition at its fair value, ceases to adjust the hedged asset or liability for changes in fair value, and amortizes the cumulative basis adjustment on the hedged item into earnings over the remaining life of the hedged item using a level-yield methodology.

When hedge accounting is discontinued because an FHLBank determines that the derivative no longer qualifies as an effective cash flow hedge of an existing hedged item, that FHLBank continues to carry the derivative on the statement of condition at its fair value and reclassifies the cumulative other comprehensive income adjustment into earnings when earnings are affected by the existing hedged item (i.e., the original forecasted transaction).

Under limited circumstances, when an FHLBank discontinues cash flow hedge accounting because it is no longer probable that the forecasted transaction will occur by the end of the originally specified time period, or within the following two months, but it is probable the transaction will still occur in the future, the gain or loss on the derivative remains in AOCI and is recognized as earnings when the forecasted transaction affects earnings. However, if it is probable that a forecasted transaction will not occur by the end of the originally specified time period or within the following two months, the gains and losses that were in AOCI are recognized immediately in earnings.

When hedge accounting is discontinued because the hedged item no longer meets the definition of a firm commitment, an FHLBank continues to carry the derivative on the statement of condition at its fair value, removing from the statement of condition any asset or liability that was recorded to recognize the firm commitment and recording it as a gain or loss in current period earnings.

Embedded Derivatives. The FHLBanks may issue debt, make advances, or purchase financial instruments in which a derivative instrument is "embedded." Upon execution of these transactions, an FHLBank assesses whether the economic characteristics of the embedded derivative are clearly and closely related to the economic characteristics of the remaining component of the advance, debt, or purchased financial instrument (the host contract) and whether a separate, non-embedded instrument with the same terms as the embedded instrument would meet the definition of a derivative instrument. The embedded derivative is separated from the host contract, carried at fair value, and designated as a stand-alone derivative instrument pursuant to an economic hedge when an FHLBank determines that (1) the embedded derivative has economic characteristics that are not clearly and closely related to the economic characteristics of the host contract and (2) a separate, stand-alone instrument with the same terms would qualify as a derivative instrument. However, the entire contract is carried at fair value and no portion of the contract is designated as a hedging instrument if the entire contract (the host contract and the embedded derivative) is to be measured at fair value, with changes in fair value reported in current period earnings (such as an investment security classified as "trading" as well as hybrid financial instruments that are selected for the fair value option), or if an FHLBank cannot reliably identify and measure the embedded derivative for purposes of separating that derivative from its host contract.

Premises, Software, and Equipment

Premises, software, and equipment are included in other assets on the Combined Statement of Condition. The FHLBanks record premises, software, and equipment at cost less accumulated depreciation and amortization and compute depreciation using the straight-line method over the estimated useful lives of assets, which range from one to 40 years. Leasehold improvements are amortized using the straight-line method over the shorter of the estimated useful life of the improvement or the remaining term of the lease. The FHLBanks capitalize improvements and major renewals but expense ordinary maintenance and repairs when incurred. The FHLBanks capitalize and amortize the cost of computer software developed or obtained for internal use over future periods. In addition, the FHLBanks include gains and losses on the disposal of premises, software, and equipment in non-interest income (loss) on the Combined Statement of Income.

At December 31, 2018 and 2017, premises, software, and equipment were \$334 million and \$292 million, net of accumulated depreciation and amortization of \$593 million and \$590 million, respectively. For the years ended December 31, 2018, 2017, and 2016, the depreciation and amortization expense for premises, software, and equipment was \$64 million, \$63 million, and \$54 million.

Consolidated Obligations

Consolidated obligations are recorded at amortized cost unless an FHLBank has elected the fair value option, in which case the consolidated obligations are carried at fair value.

Discounts and Premiums. The FHLBanks amortize premiums and accrete discounts as well as hedging basis adjustments on consolidated obligations to interest expense using the interest method over the term to maturity or the estimated life of the corresponding consolidated obligation.

Concessions. The FHLBanks pay concessions to dealers in connection with the issuance of certain consolidated obligations. The Office of Finance prorates the amount of the concession to each FHLBank based upon the percentage of the debt issued that is assumed by that FHLBank. Concessions paid on consolidated obligations designated under the fair value option are expensed as incurred in non-interest expense. The FHLBanks record concessions paid on consolidated obligations not designated under the fair value option as a direct deduction from their carrying amounts, consistent with the presentation of discounts on consolidated obligations. The concessions are amortized, using the interest method, over the term to maturity or the estimated life of the corresponding consolidated obligations. The amortization of those concessions is included in consolidated obligation interest expense.

Mandatorily Redeemable Capital Stock

An FHLBank generally reclassifies stock subject to redemption from capital stock to a liability after a member provides written notice of redemption, gives notice of intention to withdraw from membership, or attains non-member status by merger or acquisition, relocation, charter termination, or other involuntary termination from membership, because the member's shares will then meet the definition of a mandatorily redeemable financial instrument. Shares meeting this definition are reclassified to a liability at fair value. Dividends declared on shares classified as a liability are accrued at the expected dividend rate and reflected as interest expense on the Combined Statement of Income. The repurchase or redemption of mandatorily redeemable capital stock is reflected as a financing cash outflow on the Combined Statement of Cash Flows.

If a member cancels its written notice of redemption or notice of withdrawal, the affected FHLBank will reclassify mandatorily redeemable capital stock from liabilities to capital. After the reclassification, dividends on the capital stock will no longer be classified as interest expense.

Restricted Retained Earnings

Under the Joint Capital Enhancement Agreement, as amended (Capital Agreement), each FHLBank allocates 20% of its quarterly net income to a separate restricted retained earnings account at that FHLBank until the account balance equals at least one percent of that FHLBank's average balance of outstanding consolidated obligations for the previous quarter. The FHLBanks' restricted retained earnings are not available to pay dividends and are presented separately on the Combined Statement of Condition.

Gains on Litigation Settlement, Net

Litigation settlement gains, net of related legal expenses, are recorded in non-interest income as gains on litigation settlements, net on the Combined Statement of Income. A litigation settlement gain is considered realized and recorded when an affected FHLBank receives cash or assets that are readily convertible to known amounts of cash or claims to cash. In addition, a litigation settlement gain is considered realizable and recorded when an FHLBank enters into a signed agreement that is not subject to appeal, where the counterparty has the ability to pay, and the amount to be received can be reasonably estimated. Prior to being realized or realizable, the FHLBanks consider potential litigation settlement gains to be gain contingencies, and therefore they are not recorded on the Combined Statement of Income. The related legal expenses are contingent-based fees and are only incurred and recorded upon a litigation settlement gain.

FHFA Expenses

The portion of the FHFA's expenses and working capital fund paid by the FHLBanks are allocated among the FHLBanks based on the pro-rata share of the annual assessments (which are based on the ratio between each FHLBank's minimum required regulatory capital and the aggregate minimum required regulatory capital of every FHLBank).

Office of Finance Expenses

Each FHLBank's proportionate share of Office of Finance operating and capital expenditures is calculated using a formula that is based upon the following components: (1) two-thirds based upon each FHLBank's share of total consolidated obligations outstanding and (2) one-third based upon an equal pro-rata allocation.

Assessments

Affordable Housing Program (AHP). The FHLBank Act requires each FHLBank to establish and fund an AHP, providing subsidies to members to assist in the purchase, construction, or rehabilitation of housing for very low-to-moderate-income households. Each FHLBank charges the required funding for AHP to earnings and establishes a liability. An FHLBank issues AHP advances at interest rates below the customary interest rate for non-subsidized advances. A discount on the AHP advance and charge against AHP liability is recorded for the present value of the variation in the cash flow caused by the difference in the interest rate between the AHP advance rate and that FHLBank's related cost of funds for comparable maturity funding. As an alternative, that FHLBank has the authority to make the AHP subsidy available to members as a grant. The discount on AHP advances is accreted to interest income on advances using a level-yield methodology over the life of the advance.

Note 2 - Recently Issued and Adopted Accounting Guidance

The following table provides a summary of recently issued accounting standards which may have an effect on the combined financial statements.

Accounting Standards Update (ASU)	Description	Effective Date	Effect on the Combined Financial Statements or Other Significant Matters
Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract (ASU 2018-15)	This guidance aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software (and hosting arrangements that include an internal-use software license).	This guidance becomes effective for the FHLBanks for the interim and annual periods beginning on January 1, 2020. Early adoption is permitted.	This FHLBanks do not intend to adopt this guidance early. The FHLBanks are in the process of evaluating the guidance and its effect on the FHLBanks' combined financial condition, combined results of operations, and combined cash flows has not yet been determined.
Changes to the Disclosure Requirements for Defined Benefit Plans (ASU 2018-14)	This guidance modifies the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans to improve disclosure effectiveness.	This guidance becomes effective for the FHLBanks for the annual period ended December 31, 2020, and the annual periods thereafter. Early adoption is permitted.	The FHLBanks do not intend to adopt this guidance early. The adoption of this guidance may affect the FHLBanks' disclosures but it will not have any effect on the FHLBanks' combined financial condition, combined results of operations, or combined cash flows.
Changes to the Disclosure Requirements for Fair Value Measurement (ASU 2018-13)	This guidance modifies the disclosure requirements for fair value measurements to improve disclosure effectiveness.	This guidance becomes effective for the FHLBanks for the interim and annual periods beginning on January 1, 2020. Early adoption is permitted.	The FHLBanks do not intend to adopt this guidance early. The adoption of this guidance may affect the FHLBanks' disclosures but it will not have any effect on the FHLBanks' combined financial condition, combined results of operations, or combined cash flows.
Measurement of Credit Losses on Financial Instruments (ASU 2016-13)	The guidance replaces the current incurred loss model and requires entities to measure expected credit losses based on consideration of a broad range of relevant information, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount.	This guidance becomes effective for the FHLBanks for the interim and annual periods beginning on January 1, 2020. Early adoption is permitted.	The FHLBanks do not intend to adopt this guidance early. Based on the FHLBanks' preliminary assessments, this guidance is expected to have no effect on advances, U.S. obligations, or GSE investments, and an immaterial effect on their remaining investment portfolio given the specific terms, issuer guarantees, and collateralized/secured nature of these instruments. The FHLBanks are in the process of assessing the effect of this guidance on their mortgage loans on the combined financial statements. However, the ultimate effect on the FHLBanks' combined financial condition, combined results of operations, and combined cash flows will depend upon the composition of financial assets held by the individual FHLBanks at the adoption date, as well as the economic conditions and forecasts at that time.

Accounting Standards Update (ASU)	Description	Effective Date	Effect on the Combined Financial Statements or Other Significant Matters
Inclusion of the Secured Overnight Financing Rate (SOFR) Overnight Index Swap (OIS) Rate as a Benchmark Interest Rate for Hedge Accounting Purposes (ASU 2018-16)	This guidance permits the OIS rate based on SOFR as an eligible U.S. benchmark interest rate for hedge accounting purposes, to facilitate the LIBOR to SOFR transition.	This guidance became effective for the FHLBanks for the interim and annual periods beginning on January 1, 2019, concurrent with the adoption of ASU 2017-12.	This guidance was adopted prospectively for qualifying new or re-designated hedging relationships entered into on or after January 1, 2019. However, the adoption of this guidance did not have a material effect on the FHLBanks' combined financial condition, combined results of operations, or combined cash flows. The FHLBanks will continue to assess opportunities to expand their eligible hedge strategies in the future.
Targeted Improvements to Accounting for Hedging Activities (ASU 2017-12)	This guidance amends the accounting for derivatives and hedging activities to better portray the economic results of an entity's risk management activities in its financial statements.	This guidance became effective for the FHLBanks for the interim and annual periods beginning on January 1, 2019.	This guidance was applied to all existing hedging relationships as of January 1, 2019. Upon adoption, the FHLBanks modified the presentation of fair value and cash flow hedge results on the FHLBanks' Combined Statements of Income and Comprehensive Income, as well as relevant disclosures, prospectively. However, the adoption of this guidance did not have a material effect on the FHLBanks' combined financial condition, combined results of operations, or combined cash flows.
Premium Amortization on Purchased Callable Debt Securities (ASU 2017-08)	This guidance shortens the amortization period for certain purchased callable debt securities held at a premium by requiring the premium to be amortized to the earliest call date rather than contractual maturity. This guidance does not require an accounting change for securities held at a discount, which continue to be amortized to their contractual maturity.	This guidance became effective for the FHLBanks for the interim and annual periods beginning on January 1, 2019.	This guidance was adopted on a modified retrospective basis as of January 1, 2019. However, the adoption of this guidance did not have a material effect on the FHLBanks' combined financial condition, combined results of operations, or combined cash flows.
Leases, as amended (ASU 2016-02)	This guidance amends the accounting for lease arrangements. In particular, it requires a lessee of operating and financing leases to recognize on the statement of condition, a right-of-use asset and a lease liability for leases.	This guidance became effective for the FHLBanks for the interim and annual periods beginning on January 1, 2019.	This guidance was adopted on a modified retrospective basis as of January 1, 2019. Upon adoption, the FHLBanks recognized right-of-use assets and lease liabilities on their existing leases. However, the adoption of this guidance did not have a material effect on the FHLBanks' combined financial condition, combined results of operations, or combined cash flows.

Note 3 - Cash and Due from Banks

Cash and due from banks on the Statement of Condition includes cash on hand, cash items in the process of collection, compensating balances, and amounts due from correspondent banks and the Federal Reserve Bank.

Compensating Balances

The FHLBanks maintain collected cash balances with commercial banks in return for certain services. These agreements contain no legal restrictions on the withdrawal of funds. The average collected cash balances were \$230 million and \$508 million for the years ended December 31, 2018 and 2017.

Pass-through Deposit Reserves

Certain FHLBanks act as pass-through correspondents for member institutions required to deposit reserves with the Federal Reserve Banks. The amount shown as cash and due from banks includes pass-through reserves deposited with the Federal Reserve Banks of \$190 million and \$173 million at December 31, 2018 and 2017.

Note 4 - Trading Securities

Table 4.1 - Trading Securities by Major Security Type
(dollars in millions)

Fair Value	December 31, 2018	December 31, 2017
Non-mortgage-backed securities		
Certificates of deposit	\$ —	\$ 585
U.S. obligations	11,991	1,785
GSE and Tennessee Valley Authority obligations	2,671	3,463
Other	275	293
Total non-mortgage-backed securities	14,937	6,126
Mortgage-backed securities		
U.S. obligations single-family MBS	12	16
GSE single-family MBS	76	101
GSE multifamily MBS	1,424	1,493
Total mortgage-backed securities	1,512	1,610
Total	\$ 16,449	\$ 7,736

Table 4.2 - Net Gains (Losses) on Trading Securities
(dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
Net unrealized gains (losses) on trading securities held at period-end	\$ (31)	\$ 11	\$ (10)
Net unrealized and realized gains (losses) on trading securities sold/matured during the period	1	(13)	(31)
Net gains (losses) on trading securities	\$ (30)	\$ (2)	\$ (41)

Note 5 - Available-for-Sale Securities

Table 5.1 - Available-for-Sale (AFS) Securities by Major Security Type
(dollars in millions)

	December 31, 2018				
	Amortized Cost(1)	OTTI Recognized in AOCI(2)	Gross Unrealized Gains(3)	Gross Unrealized Losses(3)	Fair Value
Non-mortgage-backed securities					
Certificates of deposit	\$ 2,350	\$ —	\$ —	\$ —	\$ 2,350
U.S. obligations	3,495	—	27	(3)	3,519
GSE and Tennessee Valley Authority obligations	13,182	—	161	(36)	13,307
State or local housing agency obligations	1,142	—	2	(19)	1,125
Federal Family Education Loan Program ABS	3,578	—	203	—	3,781
Other	854	—	12	(14)	852
Total non-mortgage-backed securities	24,601	—	405	(72)	24,934
Mortgage-backed securities					
U.S. obligations single-family MBS	5,412	—	40	(5)	5,447
U.S. obligations multifamily MBS	368	—	—	(7)	361
GSE single-family MBS	7,451	—	24	(98)	7,377
GSE multifamily MBS	40,589	—	181	(157)	40,613
Private-label residential MBS	4,041	(20)	455	(3)	4,473
Total mortgage-backed securities	57,861	(20)	700	(270)	58,271
Total	\$ 82,462	\$ (20)	\$ 1,105	\$ (342)	\$ 83,205
December 31, 2017					
	Amortized Cost(1)	OTTI Recognized in AOCI(2)	Gross Unrealized Gains(3)	Gross Unrealized Losses(3)	Fair Value
Non-mortgage-backed securities					
Certificates of deposit	\$ 900	\$ —	\$ —	\$ —	\$ 900
U.S. obligations	3,746	—	24	(5)	3,765
GSE and Tennessee Valley Authority obligations	14,786	—	210	(35)	14,961
State or local housing agency obligations	1,262	—	7	(7)	1,262
Federal Family Education Loan Program ABS	3,986	—	234	(6)	4,214
Other	928	—	15	(21)	922
Total non-mortgage-backed securities	25,608	—	490	(74)	26,024
Mortgage-backed securities					
U.S. obligations single-family MBS	4,978	—	36	(4)	5,010
U.S. obligations multifamily MBS	448	—	—	(5)	443
GSE single-family MBS	8,808	—	32	(69)	8,771
GSE multifamily MBS	33,208	—	384	(10)	33,582
Private-label residential MBS	5,147	(34)	617	—	5,730
Total mortgage-backed securities	52,589	(34)	1,069	(88)	53,536
Total	\$ 78,197	\$ (34)	\$ 1,559	\$ (162)	\$ 79,560

- (1) Amortized cost of AFS securities includes adjustments made to the cost basis of an investment for accretion, amortization, OTTI recognized in earnings, and/or fair value hedge accounting adjustments.
- (2) OTTI recognized in AOCI does not include \$445 million and \$607 million in subsequent unrealized gains (losses) in fair value of previously other-than-temporarily impaired AFS securities at December 31, 2018 and 2017, which is included in net non-credit portion of OTTI losses on AFS securities in [Note 17 - Accumulated Other Comprehensive Income \(Loss\)](#).
- (3) Gross unrealized gains and gross unrealized losses on AFS securities include \$445 million and \$607 million in subsequent unrealized gains (losses) in fair value of previously other-than-temporarily impaired AFS securities at December 31, 2018 and 2017, which is not included in net unrealized gains (losses) on AFS securities in [Note 17 - Accumulated Other Comprehensive Income \(Loss\)](#).

Table 5.2 presents the AFS securities with unrealized losses by major security type and length of time that individual securities have been in a continuous unrealized loss position.

Table 5.2 - AFS Securities in a Continuous Unrealized Loss Position
(dollars in millions)

	December 31, 2018					
	Less than 12 Months		12 months or more		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses(1)
Non-mortgage-backed securities						
U.S. obligations	\$ 592	\$ (1)	\$ 314	\$ (2)	\$ 906	\$ (3)
GSE and Tennessee Valley Authority obligations	298	(2)	662	(34)	960	(36)
State or local housing agency obligations	243	(2)	750	(17)	993	(19)
Other	—	—	405	(14)	405	(14)
Total non-mortgage-backed securities	1,133	(5)	2,131	(67)	3,264	(72)
Mortgage-backed securities						
U.S. obligations single-family MBS	739	(1)	58	(4)	797	(5)
U.S. obligations multifamily MBS	—	—	361	(7)	361	(7)
GSE single-family MBS	668	(2)	3,812	(96)	4,480	(98)
GSE multifamily MBS	20,258	(146)	1,329	(11)	21,587	(157)
Private-label residential MBS	214	(3)	364	(20)	578	(23)
Total mortgage-backed securities	21,879	(152)	5,924	(138)	27,803	(290)
Total	\$ 23,012	\$ (157)	\$ 8,055	\$ (205)	\$ 31,067	\$ (362)

	December 31, 2017					
	Less than 12 Months		12 months or more		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses(1)
Non-mortgage-backed securities						
U.S. obligations	\$ 32	\$ —	\$ 1,783	\$ (5)	\$ 1,815	\$ (5)
GSE and Tennessee Valley Authority obligations	63	—	1,676	(35)	1,739	(35)
State or local housing agency obligations	45	(4)	741	(3)	786	(7)
Federal Family Education Loan Program ABS	—	—	644	(6)	644	(6)
Other	—	—	418	(21)	418	(21)
Total non-mortgage-backed securities	140	(4)	5,262	(70)	5,402	(74)
Mortgage-backed securities						
U.S. obligations single-family MBS	111	—	995	(4)	1,106	(4)
U.S. obligations multifamily MBS	64	(1)	379	(4)	443	(5)
GSE single-family MBS	2,226	(15)	2,866	(54)	5,092	(69)
GSE multifamily MBS	948	(4)	2,867	(6)	3,815	(10)
Private-label residential MBS	12	—	528	(34)	540	(34)
Total mortgage-backed securities	3,361	(20)	7,635	(102)	10,996	(122)
Total	\$ 3,501	\$ (24)	\$ 12,897	\$ (172)	\$ 16,398	\$ (196)

(1) Total unrealized losses in Table 5.2 will not agree to total gross unrealized losses in Table 5.1. Total unrealized losses in Table 5.2 includes non-credit-related OTTI recognized in AOCI.

See [Note 7 - Other-than-Temporary Impairment Analysis](#) for analysis related to OTTI as well as additional information on AFS securities in unrealized loss positions that are not considered to be other-than-temporarily impaired.

Table 5.3 - AFS Securities by Contractual Maturity*(dollars in millions)*

Year of Maturity	December 31, 2018		December 31, 2017	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value
Non-mortgage-backed securities				
Due in one year or less	\$ 3,715	\$ 3,715	\$ 2,427	\$ 2,431
Due after one year through five years	6,141	6,184	6,504	6,557
Due after five years through ten years	8,734	8,815	9,854	9,947
Due after ten years	2,433	2,439	2,837	2,875
Federal Family Education Loan Program ABS(1)	3,578	3,781	3,986	4,214
Total non-mortgage-backed securities	24,601	24,934	25,608	26,024
Mortgage-backed securities(1)				
Total	\$ 82,462	\$ 83,205	\$ 78,197	\$ 79,560

(1) Federal Family Education Loan Program ABS and MBS are not presented by contractual maturity because their expected maturities will likely differ from contractual maturities as borrowers may have the right to call or prepay obligations with or without call or prepayment fees.

Table 5.4 - Proceeds from Sale and Gross Gains and Losses on AFS Securities*(dollars in millions)*

	Year Ended December 31,		
	2018	2017	2016
Proceeds from sale of AFS securities	\$ 204	\$ 377	\$ 3,267
Gross gains on sale of AFS securities	\$ 32	\$ 2	\$ 18
Gross losses on sale of AFS securities	—	(1)	—
Net realized gains/(losses) from sale of AFS securities	\$ 32	\$ 1	\$ 18

Note 6 - Held-to-Maturity Securities**Table 6.1 - HTM Securities by Major Security Type***(dollars in millions)*

	December 31, 2018					
	Amortized Cost(1)	OTTI Recognized in AOCI(2)	Carrying Value(2)	Gross Unrecognized Holding Gains(3)	Gross Unrecognized Holding Losses(3)	Fair Value
Non-mortgage-backed securities						
Certificates of deposit	\$ 700	\$ —	\$ 700	\$ —	\$ —	\$ 700
U.S. obligations	1,349	—	1,349	17	(1)	1,365
GSE and Tennessee Valley Authority obligations	3,060	—	3,060	54	(3)	3,111
State or local housing agency obligations	2,096	—	2,096	1	(42)	2,055
Total non-mortgage-backed securities	7,205	—	7,205	72	(46)	7,231
Mortgage-backed securities						
U.S. obligations single-family MBS	7,069	—	7,069	18	(55)	7,032
U.S. obligations multifamily MBS	1	—	1	—	—	1
GSE single-family MBS	30,712	—	30,712	160	(302)	30,570
GSE multifamily MBS	43,046	—	43,046	85	(195)	42,936
Private-label residential MBS	2,493	(257)	2,236	493	(16)	2,713
Private-label manufactured housing loan ABS	36	—	36	1	—	37
Private-label home equity loan ABS	119	(11)	108	31	(1)	138
Total mortgage-backed securities	83,476	(268)	83,208	788	(569)	83,427
Total	\$ 90,681	\$ (268)	\$ 90,413	\$ 860	\$ (615)	\$ 90,658

December 31, 2017						
	Amortized Cost(1)	OTTI Recognized in AOCI(2)	Carrying Value(2)	Gross Unrecognized Holding Gains(3)	Gross Unrecognized Holding Losses(3)	Fair Value
Non-mortgage-backed securities						
Certificates of deposit	\$ 675	\$ —	\$ 675	\$ —	\$ —	\$ 675
U.S. obligations	1,577	—	1,577	28	(1)	1,604
GSE and Tennessee Valley Authority obligations	5,743	—	5,743	72	(6)	5,809
State or local housing agency obligations	2,318	—	2,318	3	(69)	2,252
Total non-mortgage-backed securities	10,313	—	10,313	103	(76)	10,340
Mortgage-backed securities						
U.S. obligations single-family MBS	7,869	—	7,869	22	(32)	7,859
U.S. obligations multifamily MBS	3	—	3	—	—	3
GSE single-family MBS	33,925	—	33,925	268	(214)	33,979
GSE multifamily MBS	41,088	—	41,088	173	(64)	41,197
Private-label residential MBS	3,406	(326)	3,080	616	(15)	3,681
Private-label manufactured housing loan ABS	54	—	54	2	—	56
Private-label home equity loan ABS	148	(14)	134	34	(1)	167
Total mortgage-backed securities	86,493	(340)	86,153	1,115	(326)	86,942
Total	\$ 96,806	\$ (340)	\$ 96,466	\$ 1,218	\$ (402)	\$ 97,282

(1) Amortized cost of HTM securities includes adjustments made to the cost basis of an investment for accretion, amortization, and/or OTTI recognized in earnings.

(2) Carrying value of HTM securities represents amortized cost after adjustment for the non-credit-related OTTI recognized in AOCI.

(3) Gross unrecognized holding gains (losses) represent the difference between fair value and carrying value.

Table 6.2 presents the HTM securities with unrealized losses, which are aggregated by major security type and length of time that individual securities have been in a continuous unrealized loss position.

Table 6.2 - HTM Securities in a Continuous Unrealized Loss Position

(dollars in millions)

December 31, 2018						
	Less than 12 Months		12 months or more		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses(1)
Non-mortgage-backed securities						
U.S. obligations	\$ 495	\$ —	\$ 23	\$ (1)	\$ 518	\$ (1)
GSE and Tennessee Valley Authority obligations	1,304	(2)	99	(1)	1,403	(3)
State or local housing agency obligations	361	(1)	718	(41)	1,079	(42)
Total non-mortgage-backed securities	2,160	(3)	840	(43)	3,000	(46)
Mortgage-backed securities						
U.S. obligations single-family MBS	1,230	(3)	2,505	(52)	3,735	(55)
GSE single-family MBS	7,257	(27)	9,930	(275)	17,187	(302)
GSE multifamily MBS	23,316	(84)	7,753	(111)	31,069	(195)
Private-label residential MBS	450	(4)	1,019	(132)	1,469	(136)
Private-label home equity loan ABS	3	—	25	(1)	28	(1)
Total mortgage-backed securities	32,256	(118)	21,232	(571)	53,488	(689)
Total	\$ 34,416	\$ (121)	\$ 22,072	\$ (614)	\$ 56,488	\$ (735)

	December 31, 2017					
	Less than 12 Months		12 months or more		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses(1)
Non-mortgage-backed securities						
U.S. obligations	\$ 633	\$ —	\$ 23	\$ (1)	\$ 656	\$ (1)
GSE and Tennessee Valley Authority obligations	996	(1)	1,495	(5)	2,491	(6)
State or local housing agency obligations	232	—	941	(69)	1,173	(69)
Total non-mortgage-backed securities	1,861	(1)	2,459	(75)	4,320	(76)
Mortgage-backed securities						
U.S. obligations single-family MBS	2,786	(15)	1,544	(17)	4,330	(32)
GSE single-family MBS	5,795	(42)	7,794	(172)	13,589	(214)
GSE multifamily MBS	7,238	(32)	3,399	(32)	10,637	(64)
Private-label residential MBS	52	—	1,554	(169)	1,606	(169)
Private-label home equity loan ABS	1	—	35	(1)	36	(1)
Total mortgage-backed securities	15,872	(89)	14,326	(391)	30,198	(480)
Total	\$ 17,733	\$ (90)	\$ 16,785	\$ (466)	\$ 34,518	\$ (556)

(1) Total unrealized losses in Table 6.2 will not agree to total gross unrecognized holding losses in Table 6.1. Total unrealized losses in Table 6.2 includes non-credit-related OTTI recognized in AOCI and gross unrecognized holding gains on previously other-than-temporarily impaired securities.

See [Note 7 - Other-than-Temporary Impairment Analysis](#) for analysis related to OTTI as well as additional information on HTM securities in unrealized loss positions that are not considered to be other-than-temporarily impaired.

Table 6.3 - HTM Securities by Contractual Maturity
(dollars in millions)

Year of Maturity	December 31, 2018			December 31, 2017		
	Amortized Cost	Carrying Value(1)	Fair Value	Amortized Cost	Carrying Value(1)	Fair Value
Non-mortgage-backed securities						
Due in one year or less	\$ 1,610	\$ 1,610	\$ 1,610	\$ 4,332	\$ 4,332	\$ 4,329
Due after one year through five years	2,244	2,244	2,246	2,244	2,244	2,250
Due after five years through ten years	853	853	875	994	994	1,025
Due after ten years	2,498	2,498	2,500	2,743	2,743	2,736
Total non-mortgage-backed securities	7,205	7,205	7,231	10,313	10,313	10,340
Mortgage-backed securities(2)	83,476	83,208	83,427	86,493	86,153	86,942
Total	\$ 90,681	\$ 90,413	\$ 90,658	\$ 96,806	\$ 96,466	\$ 97,282

(1) Carrying value of HTM securities represents amortized cost after adjustment for non-credit-related OTTI recognized in AOCI.

(2) MBS are not presented by contractual maturity because their expected maturities will likely differ from contractual maturities as borrowers may have the right to call or prepay obligations with or without call or prepayment fees.

Realized Gains and Losses

Certain FHLBanks sold securities out of their respective HTM portfolio that were near enough to their maturity date (for example, within three months of maturity) that changes in market interest rates would not have a significant effect on the security's fair value or had less than 15% of the acquired principal outstanding at the time of the sale. These sales are considered maturities for purposes of security classification.

Table 6.4 - Proceeds from Sale and Gains and Losses on HTM Securities
(dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
Proceeds from sale of HTM securities	\$ 228	\$ 163	\$ 1,010
Carrying value of HTM securities sold	225	159	970
Net realized gains (losses) from sale of HTM securities	\$ 3	\$ 4	\$ 40

Note 7 - Other-than-Temporary Impairment Analysis

Each FHLBank evaluates its individual AFS and HTM investment securities holdings in an unrealized loss position for OTTI on a quarterly basis. To ensure consistency in determination of OTTI for private-label MBS among all FHLBanks, the FHLBanks use a system-wide governance committee and a formal process to ensure consistency in key OTTI modeling assumptions used for purposes of their cash flow analyses for the majority of these securities. Most of the FHLBanks select all of their private-label MBS in an unrealized loss position to be evaluated using the FHLBanks' common framework and approved assumptions for purposes of OTTI cash flow analysis. For certain private-label MBS where underlying collateral data is not available, alternative procedures as determined by each FHLBank are used to assess these securities for OTTI.

Each FHLBank's evaluation includes estimating the projected cash flows that the FHLBank is likely to collect based on an assessment of available information, including the structure of the applicable security and certain assumptions such as:

- the remaining payment terms for the security;
- prepayment speeds based on underlying loan-level borrower and loan characteristics;
- default rates based on underlying loan-level borrower and loan characteristics;
- loss severity on the collateral supporting each FHLBank's security based on underlying loan-level borrower and loan characteristics;
- expected housing price changes; and
- interest-rate assumptions.

Certain Private-label MBS

Each FHLBank performed a cash flow analysis using third-party models to assess whether the entire amortized cost basis of its private-label MBS securities will be recovered. The projected cash flows are based on a number of assumptions and expectations, and the results of these models can vary significantly with changes in assumptions and expectations. The projected cash flows, determined based on the model approach, reflect a best estimate scenario and include a base case housing price forecast and a base case housing price recovery path.

The FHLBanks' system-wide governance committee developed a short-term housing price forecast with geographically projected changes ranging from a decrease of 7.0% to an increase of 14.0% over the twelve-month period beginning October 1, 2018. For the vast majority of markets, the projected short-term housing price changes range from an increase of 3.0% to an increase of 7.0%. Thereafter, a unique path is projected for each geographic area based on an internally developed framework derived from historical data.

Credit Loss. In performing a detailed cash flow analysis, each FHLBank identifies the best estimate of the cash flows expected to be collected. If this estimate results in a present value of expected cash flows (discounted at the security's effective yield) that is less than the amortized cost basis of a security (that is, a credit loss exists), an OTTI loss is considered to have occurred.

Table 7.1 presents the December 31, 2018 balance of the total HTM and AFS MBS with OTTI charges during the life of the security, which represents securities other-than-temporarily impaired prior to and at December 31, 2018, based on each individual FHLBank's impairment analyses of its investment portfolio.

Table 7.1 - Total MBS Other-than-Temporarily Impaired during the Life of the Security at December 31, 2018(1)
(dollars in millions)

	Held-to-Maturity Securities				Available-for-Sale Securities		
	Unpaid Principal Balance	Amortized Cost	Carrying Value	Fair Value	Unpaid Principal Balance	Amortized Cost	Fair Value
Private-label residential MBS(2)							
Prime	\$ 486	\$ 391	\$ 292	\$ 430	\$ 1,325	\$ 1,080	\$ 1,196
Alt-A	867	635	505	744	3,709	2,958	3,274
Subprime	308	149	121	227	—	—	—
Total private-label residential MBS	1,661	1,175	918	1,401	5,034	4,038	4,470
Private-label home equity loan ABS(2)							
Subprime	67	48	37	66	—	—	—
Total private-label home equity loan ABS	67	48	37	66	—	—	—
Total	\$ 1,728	\$ 1,223	\$ 955	\$ 1,467	\$ 5,034	\$ 4,038	\$ 4,470

- (1) Table 7.1 does not include all HTM and AFS securities that are in an unrealized loss position as of December 31, 2018. This table includes only HTM and AFS MBS with OTTI charges during the life of the security.
- (2) The FHLBanks classify securities as prime, Alt-A, and subprime based on the originator's classification at the time of origination or based on classification by a nationally recognized statistical rating organization upon issuance of the securities.

Table 7.2 - Rollforward of the Amounts Related to Credit Losses Recognized into Earnings
(dollars in millions)

	Year ended December 31,		
	2018	2017	2016
Balance, at beginning of period	\$ 2,749	\$ 2,983	\$ 3,240
Additions			
Additional OTTI credit losses for securities upon which an OTTI charge was previously recognized	17	21	22
Reductions			
Securities sold or matured during the period	(51)	(7)	(20)
Increases in cash flows expected to be collected (accrued as interest income over the remaining lives of the applicable securities)	(220)	(248)	(259)
Balance, at end of period	<u>\$ 2,495</u>	<u>\$ 2,749</u>	<u>\$ 2,983</u>

All other AFS and HTM Investment Securities

At December 31, 2018, the FHLBanks held certain other AFS and HTM securities in unrealized loss positions. These unrealized losses are due primarily to interest rate volatility and/or illiquidity. These losses are considered temporary as each FHLBank expects to recover the entire amortized cost basis on its remaining AFS and HTM securities in unrealized loss positions and neither intends to sell these securities nor considers it more likely than not that it will be required to sell these securities before its anticipated recovery of each security's remaining amortized cost basis. As a result, each FHLBank does not consider these other AFS and HTM investment securities to be other-than-temporarily impaired at December 31, 2018.

Note 8 - Advances

The FHLBanks offer a wide range of fixed- and variable-rate advance products with different maturities, interest rates, payment characteristics, and optionality. Fixed-rate advances generally have maturities ranging from one day to 30 years. Variable-rate advances generally have maturities ranging from less than 30 days to 20 years, where the interest rates reset periodically at a fixed spread to LIBOR or other specified indices, or consolidated obligation yields.

Table 8.1 - Advances by Redemption Term
(dollars in millions)

Redemption Term	December 31, 2018		December 31, 2017	
	Amount	Weighted-Average Interest Rate	Amount	Weighted-Average Interest Rate
Overdrawn demand and overnight deposit accounts	\$ 52	2.70%	\$ 12	1.72%
Due in 1 year or less	407,861	2.52%	408,817	1.54%
Due after 1 year through 2 years	121,416	2.52%	104,117	1.70%
Due after 2 years through 3 years	68,888	2.61%	78,366	1.74%
Due after 3 years through 4 years	35,649	2.57%	54,087	1.88%
Due after 4 years through 5 years	33,011	2.72%	23,030	2.00%
Thereafter	62,624	2.67%	63,685	1.96%
Total principal amount	729,501	2.55%	732,114	1.66%
Commitment fees	(1)		(1)	
Discounts on AHP advances	(28)		(27)	
Premiums	61		90	
Discounts	(44)		(55)	
Hedging adjustments	(681)		(557)	
Fair value option valuation adjustments	(41)		(20)	
Total	<u>\$ 728,767</u>		<u>\$ 731,544</u>	

The FHLBanks offer advances to members and housing associates that provide the right, based upon predetermined option exercise dates, to call the advance prior to maturity without incurring prepayment or termination fees (callable advances). The FHLBanks also offer certain floating-rate and/or amortizing advances that may be contractually prepaid by the borrower on specified dates without incurring prepayment or termination fees (prepayable advances). Other advances may only be prepaid by paying a fee to the FHLBank (prepayment fee) that makes the FHLBank financially indifferent to the prepayment of the advance.

Some advances contain embedded options allowing an FHLBank to offer puttable and convertible advances. A member either can sell an embedded option to an FHLBank or can purchase an embedded option from an FHLBank. With a puttable advance to a member, an FHLBank effectively purchases a put option from the member that allows that FHLBank to put or extinguish the fixed-rate advance to the member on predetermined exercise dates. Generally, these put options are exercised when interest rates increase relative to contractual rates.

Convertible advances allow an FHLBank to convert an advance from one interest-payment term structure to another. Fixed-rate to variable-rate convertible advances have a defined lockout period after which they convert to the current market rate or another structure. A convertible advance generally carries a lower initial interest rate than a comparable-maturity fixed-rate advance without the conversion feature. Variable- to fixed-rate convertible advances have a defined lockout period during which the interest rates adjust based on a spread to LIBOR or other specified index. At the end of the lockout period, these advances may convert to fixed-rate advances. The fixed rates on the converted advances are determined at origination.

Table 8.2 - Advances by Redemption Term or Next Call Date and Next Put or Convert Date
(dollars in millions)

	Redemption Term or Next Call Date(1)		Redemption Term or Next Put or Convert Date	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Overdrawn demand and overnight deposit accounts	\$ 52	\$ 12	\$ 52	\$ 12
Due in 1 year or less	510,711	507,706	415,962	412,106
Due after 1 year through 2 years	89,542	92,983	126,864	106,267
Due after 2 years through 3 years	51,104	54,395	73,768	79,399
Due after 3 years through 4 years	23,137	34,703	35,884	54,516
Due after 4 years through 5 years	18,367	15,825	32,119	22,422
Thereafter	36,588	26,490	44,852	57,392
Total principal amount	<u>\$ 729,501</u>	<u>\$ 732,114</u>	<u>\$ 729,501</u>	<u>\$ 732,114</u>

(1) Also includes certain floating-rate and/or amortizing advances that may be contractually prepaid by the borrower on specified dates without incurring prepayment or termination fees.

Table 8.3 - Advances by Current Interest Rate Terms
(dollars in millions)

Redemption Term	December 31, 2018	December 31, 2017
Fixed-rate		
Due in one year or less	\$ 249,835	\$ 261,781
Due after one year	162,513	143,279
Total fixed-rate	412,348	405,060
Variable-rate		
Due in one year or less	157,896	146,877
Due after one year	159,257	180,177
Total variable-rate	317,153	327,054
Total principal amount	\$ 729,501	\$ 732,114

Credit Risk Exposure and Security Terms

The FHLBanks' potential credit risk from advances is concentrated in commercial banks. The FHLBanks' advances outstanding that were greater than or equal to \$1.0 billion per borrower were \$529.7 billion and \$527.8 billion at December 31, 2018 and 2017. These advances were made to 113 and 110 borrowers (members and non-members), and represented 72.6% and 72.1% of total advances outstanding at December 31, 2018 and 2017. (See [Note 10 - Allowance for Credit Losses](#) for information related to the FHLBanks' credit risk on advances and allowance methodology for credit losses.)

Note 9 - Mortgage Loans

Mortgage Loans Held for Portfolio

Mortgage loans held for portfolio consist of loans obtained through the MPP and MPF Program and are either conventional mortgage loans or government-guaranteed or -insured mortgage loans. Under the MPP and MPF Program, the FHLBanks purchase single-family mortgage loans that are originated or acquired by participating financial institutions. These mortgage loans are credit-enhanced by participating financial institutions or are guaranteed or insured by Federal agencies.

Table 9.1 - Mortgage Loans Held for Portfolio
(dollars in millions)

	December 31,	
	2018	2017
Fixed-rate, long-term single-family mortgage loans	\$ 56,256	\$ 46,955
Fixed-rate, medium-term(1) single-family mortgage loans	5,138	5,837
Total unpaid principal balance	61,394	52,792
Premiums	1,152	1,019
Discounts	(39)	(40)
Deferred loan costs, net	—	(3)
Hedging adjustments	42	75
Total mortgage loans held for portfolio	\$ 62,549	\$ 53,843

(1) Medium-term is defined as a term of 15 years or less.

Table 9.2 - Mortgage Loans Held for Portfolio by Collateral/Guarantee Type
(dollars in millions)

	December 31,	
	2018	2017
Conventional MPF/MPP mortgage loans	\$ 57,862	\$ 48,978
Government-guaranteed or -insured mortgage loans	3,532	3,814
Total unpaid principal balance	\$ 61,394	\$ 52,792

Note 10 - Allowance for Credit Losses

Each FHLBank has established an allowance methodology for its applicable portfolio segments:

- credit products (advances, letters of credit, and other extensions of credit to borrowers);
- government-guaranteed or -insured mortgage loans held for portfolio;
- conventional MPF loans held for portfolio and conventional MPP loans held for portfolio;
- term federal funds sold; and
- term securities purchased under agreements to resell.

Credit Products

Each FHLBank manages its credit exposure to credit products through an integrated approach that includes establishing a credit limit for each borrower. This approach includes an ongoing review of each borrower's financial condition, in conjunction with the FHLBank's collateral and lending policies to limit risk of loss, while balancing borrowers' needs for a reliable source of funding. In addition, each FHLBank lends to eligible borrowers in accordance with federal law and FHFA regulations. Specifically, each FHLBank is required to obtain sufficient collateral to fully secure credit products. The estimated value of the collateral required to secure each member's credit products is calculated by applying collateral discounts, or haircuts, to the market value or unpaid principal balance of the collateral, as applicable. Each FHLBank accepts certain investment securities, residential mortgage loans, deposits, and other real estate related assets as collateral. In addition, community financial institutions are eligible to use expanded statutory collateral provisions for small business, agriculture loans, and community development loans. The FHLBank capital stock owned by each borrower is also pledged as collateral. Collateral arrangements may vary depending upon borrower credit quality, financial condition, and performance; borrowing capacity; and overall credit exposure to the borrower. Each FHLBank can also require additional or substitute collateral to protect its security interest. Management of each FHLBank believes that these policies effectively manage that FHLBank's respective credit risk from credit products.

An FHLBank either allows a borrower to retain physical possession of the collateral assigned to it, or requires the borrower to specifically assign or place physical possession of the collateral with the FHLBank or its safekeeping agent. Each FHLBank perfects its security interest in all pledged collateral. The FHLBank Act states that any security interest granted to an FHLBank by a borrower will have priority over the claims or rights of any other party, except for claims or rights of a third party that would be entitled to priority under otherwise applicable law and are held by a bona fide purchaser for value or by a secured party holding a prior perfected security interest.

Using a risk-based approach and taking into consideration each borrower's financial strength, the FHLBanks consider the types and level of collateral to be the primary indicator of credit quality on their credit products. At December 31, 2018 and 2017, each FHLBank had rights to collateral on a borrower-by-borrower basis with an estimated value equal to, or greater than, its outstanding extensions of credit.

Each FHLBank continues to evaluate and make changes to its collateral guidelines, as necessary, based on current market conditions. At December 31, 2018 and 2017, none of the FHLBanks had any credit products that were past due, on non-accrual status, or considered impaired. In addition, there were no troubled debt restructurings related to credit products at any FHLBank during the years ended December 31, 2018 and 2017.

Based on the collateral held as security, each FHLBank management's credit extension and collateral policies and repayment history on credit products, no FHLBank has incurred any losses on its credit products. Accordingly, at December 31, 2018 and 2017, no FHLBank recorded any allowance for credit losses on these credit products, and no FHLBank recorded any liability to reflect an allowance for credit losses for off-balance sheet credit exposures. (See [Note 20 - Commitments and Contingencies](#) for additional information on the FHLBanks' off-balance sheet credit exposure.)

Government-Guaranteed or -Insured Mortgage Loans Held for Portfolio

An FHLBank invests in fixed-rate mortgage loans that are insured or guaranteed by the Federal Housing Administration, the Department of Veterans Affairs, the Rural Housing Service of the Department of Agriculture, and/or the Department of Housing and Urban Development. The servicer provides and maintains insurance or a guarantee from the applicable government agency. The servicer is responsible for compliance with all government agency requirements and for obtaining the benefit of the applicable guarantee or insurance with respect to defaulted government-guaranteed or -insured mortgage loans. Any losses incurred on these loans that are not recovered from the issuer or the guarantor are absorbed by the servicer. Therefore, each FHLBank only has credit risk for these loans if the servicer fails to pay for losses not covered by the guarantee or insurance. Based on each FHLBank's assessment of its servicers, no FHLBank established an allowance for credit losses for its government-guaranteed or -insured mortgage loan portfolio at December 31, 2018 and 2017. Furthermore, none of these mortgage loans has been placed on non-accrual status because of the U.S. government guarantee or insurance on these loans and the contractual obligation of the loan servicer to repurchase the loans when certain criteria are met.

Conventional MPF and Conventional MPP Mortgage Loans Held for Portfolio

Each FHLBank determines its allowances for conventional loans through analyses that include consideration of various data observations, such as past performance, current performance, loan portfolio characteristics, collateral-related characteristics, industry data, and prevailing economic conditions. The allowance for loan losses consists of losses from: (1) individually evaluated mortgage loans including collateral dependent mortgage loans; (2) collectively evaluated mortgage loans; and may include (3) estimating additional credit losses on mortgage loans.

Individually Evaluated Mortgage Loans Including Collateral Dependent Mortgage Loans. Certain conventional mortgage loans, primarily impaired mortgage loans that are considered collateral dependent, may be specifically identified for purposes of calculating the allowance for credit losses. A mortgage loan is considered collateral dependent if repayment is expected to be provided by the sale of the underlying property, that is, if it is considered likely that the borrower will default and there is no credit enhancement from a participating financial institution to offset losses under the master commitment. The estimated credit losses on impaired collateral-dependent loans may be separately determined because sufficient information exists to make a reasonable estimate of the inherent loss on these loans on an individual loan basis. An FHLBank may estimate the fair value of this collateral by applying an appropriate loss severity rate or using third party estimates or property valuation model (s). The incurred loss of an individually evaluated mortgage loan is equal to the difference between the carrying value of the loan and the estimated fair value of the collateral, less estimated selling costs, and may include expected proceeds from primary mortgage insurance and other applicable credit enhancements.

Collectively Evaluated Mortgage Loans. The credit risk analysis of conventional loans evaluated collectively for impairment by an FHLBank considers loan pool specific attribute data, including historical delinquency migration, applies estimated loss severities, and incorporates the associated credit enhancements in order to determine the FHLBank's best estimate of probable incurred losses at the reporting date. Migration analysis is a methodology for determining, through an FHLBank's experience over a historical period, the rate of default on pools of similar loans. Certain FHLBanks apply migration analysis to loans based on payment status categories, such as current, 30, 60, and 90 days past due, as well as to loans 60 days past due following receipt of notice of filing from the bankruptcy court. Each FHLBank then estimates how many loans in these categories may migrate to a realized loss position and applies a loss severity factor to estimate losses incurred at the statement of condition date. The losses are then reduced by the probable cash flows resulting from available credit enhancements. Credit enhancement cash flows that are projected and assessed as not probable of receipt are not considered in reducing the estimated losses.

Estimating Additional Credit Losses on Mortgage Loans. Certain FHLBanks also assess other factors in the estimation of loan losses for their respective homogeneous loan population. These factors represent subjective management judgment based on facts and circumstances that exist as of the reporting date that are unallocated to any specific measurable economic or credit event and are intended to cover other inherent losses that may not otherwise be captured in the methodology. Therefore, the allowance for credit losses that includes these factors represents management's best estimate of probable loan losses. However, the actual loss that may occur on homogeneous pools of mortgage loans may be more or less than the estimated loss.

Allowance for Credit Losses on Mortgage Loans. Each FHLBank has established an allowance for credit losses on its conventional mortgage loans held for portfolio. Table 10.1 presents a rollforward of the allowance for credit losses on mortgage loans for the years ended December 31, 2018, 2017, and 2016.

Table 10.1 - Rollforward of Allowance for Credit Losses on Conventional MPF/MPP Mortgage Loans
(dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
Balance, at beginning of period	\$ 16	\$ 18	\$ 18
Charge-offs, net of recoveries	(3)	(2)	(6)
Provision (reversal) for credit losses	2	—	6
Balance, at end of period	<u>\$ 15</u>	<u>\$ 16</u>	<u>\$ 18</u>

Table 10.2 presents the recorded investment in mortgage loans by impairment methodology at December 31, 2018 and 2017. The recorded investment in a loan is the unpaid principal balance of the loan, adjusted for accrued interest, net deferred loan fees or costs, unamortized premiums or discounts, fair value hedge adjustments, and direct write-downs. The recorded investment is not net of any valuation allowance.

Table 10.2 - Allowance for Credit Losses and Recorded Investment by Impairment Methodology on Conventional MPF/MPP Mortgage Loans
(dollars in millions)

	December 31,	
	2018	2017
Allowance for credit losses		
Individually evaluated for impairment	\$ 7	\$ 6
Collectively evaluated for impairment	8	10
Total allowance for credit losses	<u>\$ 15</u>	<u>\$ 16</u>
Recorded investment		
Individually evaluated for impairment	\$ 211	\$ 252
Collectively evaluated for impairment	59,024	49,936
Total recorded investment	<u>\$ 59,235</u>	<u>\$ 50,188</u>

Credit Quality Indicators. Key credit quality indicators for mortgage loans include the migration of past due loans, non-accrual loans, loans in process of foreclosure, and impaired loans. Table 10.3 presents the FHLBanks' key credit quality indicators for mortgage loans at December 31, 2018 and 2017.

Table 10.3 - Recorded Investment in Delinquent Mortgage Loans
(dollars in millions)

	December 31, 2018		
	Conventional MPF/MPP	Government-Guaranteed or -Insured(1)	Total
Past due 30-59 days	\$ 318	\$ 134	\$ 452
Past due 60-89 days	78	41	119
Past due 90 days or more	135	60	195
Total past due mortgage loans	531	235	766
Total current mortgage loans	58,704	3,372	62,076
Total mortgage loans(2)	<u>\$ 59,235</u>	<u>\$ 3,607</u>	<u>\$ 62,842</u>
Other delinquency statistics			
In process of foreclosure, included above(3)	\$ 59	\$ 22	\$ 81
Serious delinquency rate(4)	0.23%	1.69%	0.32%
Past due 90 days or more and still accruing interest	\$ 30	\$ 60	\$ 90
Loans on non-accrual status	<u>\$ 134</u>	<u>\$ —</u>	<u>\$ 134</u>

	December 31, 2017		
	Conventional MPF/MPP	Government- Guaranteed or -Insured(1)	Total
Past due 30-59 days	\$ 384	\$ 159	\$ 543
Past due 60-89 days	91	47	138
Past due 90 days or more	202	68	270
Total past due mortgage loans	677	274	951
Total current mortgage loans	49,511	3,625	53,136
Total mortgage loans(2)	\$ 50,188	\$ 3,899	\$ 54,087
Other delinquency statistics			
In process of foreclosure, included above(3)	\$ 89	\$ 20	\$ 109
Serious delinquency rate(4)	0.41%	1.74%	0.51%
Past due 90 days or more and still accruing interest	\$ 40	\$ 68	\$ 108
Loans on non-accrual status	\$ 193	\$ —	\$ 193

- (1) Any losses incurred on these loans that are not recovered from the issuer or the guarantor are absorbed by the servicer.
- (2) The difference between the recorded investment and the carrying value of total mortgage loans of \$293 million and \$244 million at December 31, 2018 and 2017, relates primarily to accrued interest. (See [Note 9 - Mortgage Loans](#) for details on the carrying values of total mortgage loans.)
- (3) Includes loans where the decision of foreclosure or a similar alternative, such as pursuit of deed-in-lieu, has been reported. Loans in the process of foreclosure are included in past due or current loans depending on their delinquency status.
- (4) Represents seriously delinquent loans as a percentage of total mortgage loans. Seriously delinquent loans are comprised of all loans past due 90 days or more delinquent or loans that are in the process of foreclosure (including past due or current loans in the process of foreclosure).

Credit Enhancements. An FHLBank's allowance for credit losses considers the credit enhancements associated with conventional mortgage loans under the MPF Program and MPP. These credit enhancements apply after a homeowner's equity is exhausted. Credit enhancements may include primary mortgage insurance, supplemental mortgage insurance, the credit enhancement amount plus any recoverable performance-based credit enhancement fees (for certain MPF loans), and Lender Risk Account (for MPP loans). The credit risk analysis of all conventional loans is performed at the individual master commitment level to determine the credit enhancements available to recover losses on loans under each individual master commitment. The amount of credit enhancements estimated to protect an FHLBank against credit losses, within an FHLBank's risk tolerance, is determined through the use of a validated model. Any incurred losses that would be recovered from the credit enhancements are not reserved as part of an FHLBank's allowance for credit losses on mortgage loans.

Mortgage Partnership Finance Program. The conventional MPF loans held for portfolio are required to be credit enhanced so that the risk of loss is limited to the losses within an FHLBank's risk tolerance, determined through the use of a validated model. Each FHLBank participating in the MPF program (MPF FHLBank) and its participating financial institution share the risk of credit losses on conventional MPF loan products held for portfolio, by structuring potential losses into layers with respect to each master commitment. Each MPF FHLBank analyzes the risk characteristics of its MPF loans using a model. Credit losses in a master commitment are first absorbed by an FHLBank's First Loss Account but, if applicable to the MPF product, the FHLBank will withhold a participating financial institution's scheduled performance credit enhancement fee in order to reimburse the FHLBank for any losses allocated to the First Loss Account. If the First Loss Account is exhausted, the credit losses are then absorbed by the participating financial institution's credit enhancement amount that is calculated by utilizing a third party's credit model. The participating financial institution's credit enhancement amount is determined by the FHLBank with respect to an asset or a pool, based on documented analysis, that the FHLBank has a high degree of confidence that it will not bear material losses beyond the losses absorbed by the First Loss Account, even under reasonably likely adverse changes to expected economic conditions.

The First Loss Account represents the first layer or portion of credit losses that each MPF FHLBank absorbs with respect to its MPF loans after considering the borrower's equity, primary mortgage insurance, and recoverable credit enhancement fees. The participating financial institution is required to cover the next layer of losses up to an agreed-upon credit enhancement obligation amount, which may consist of a direct liability of the participating financial institution to pay credit losses up to a specified amount, a contractual obligation of a participating financial institution to provide supplemental mortgage insurance, or a combination of both. Any remaining unallocated losses are absorbed by the MPF FHLBank.

Participating financial institutions are paid a credit enhancement fee for assuming credit risk, and in some instances all or a portion of the credit enhancement fee may be performance-based. An MPF FHLBank's losses incurred under the First Loss Account may be recovered by withholding future performance-based credit enhancement fees otherwise payable to the

participating financial institutions. If at any time an MPF FHLBank cancels all or a portion of its supplemental mortgage insurance policies required under certain MPF products, that MPF FHLBank will hold additional retained earnings to protect against losses and no performance-based credit enhancement fees are paid to the participating financial institution.

At December 31, 2018 and 2017, the amounts of First Loss Account remaining to cover the losses under the MPF program were \$454 million and \$415 million. This balance excludes amounts that may be recovered through the recapture of performance-based credit enhancement fees. An FHLBank records credit enhancement fees paid to the participating financial institutions as a reduction to mortgage interest income.

Unlike conventional MPF products held for portfolio, under the MPF Xtra, MPF Direct, MPF Government, and MPF Government MBS products, participating financial institutions are not required to provide credit enhancement and do not receive credit enhancement fees. Loans sold to the FHLBank of Chicago under the MPF Xtra and MPF Direct products are concurrently sold to third-party investors, and are not held on the participating MPF FHLBank's statement of condition. (See [Note 20 - Commitments and Contingencies](#) for additional information.)

Mortgage Purchase Program. The conventional mortgage loans under the MPP are supported by a Lender Risk Account, and may also be supported by primary or supplemental mortgage insurance, in addition to the associated property as collateral. The Lender Risk Account is funded by an FHLBank participating in the MPP (MPP FHLBank) either upfront as a portion of the purchase proceeds or through a portion of the net interest remitted monthly by the borrower in an amount sufficient to cover expected losses on the pool of mortgages. The Lender Risk Account is recorded in other liabilities on the Combined Statement of Condition. To the extent available, Lender Risk Account funds are used to offset any losses that occur. Typically after five years, excess funds over required balances are returned to the PFI in accordance with a step-down schedule that is established upon execution of a master commitment contract. The Lender Risk Account is released in accordance with the terms of the master commitment. At December 31, 2018 and 2017, the amount of the Lender Risk Account remaining to cover future potential losses under the MPP were \$389 million and \$352 million.

Troubled Debt Restructurings. A troubled debt restructuring is considered to have occurred when a concession is granted to a borrower for economic or legal reasons related to the borrower's financial difficulties and that concession would not have been considered otherwise. An FHLBank has granted a concession when it does not expect to collect all amounts due to the FHLBank under the original contract as a result of the restructuring. Loans that are discharged in Chapter 7 bankruptcy and have not been reaffirmed by the borrowers are also considered to be troubled debt restructurings, except in certain cases where supplemental mortgage insurance policies are held or where all contractual amounts due are still expected to be collected as a result of certain credit enhancements or government guarantees.

An MPF or MPP loan considered to be a troubled debt restructuring is individually evaluated for impairment when determining its related allowance for credit losses. Credit loss is measured by estimating expected cash shortfalls (i.e., loss severity rate) incurred as of the reporting date as well as the economic loss attributable to delaying the original contractual principal and interest due dates, if applicable. At December 31, 2018 and 2017, the recorded investment in mortgage loans classified as troubled debt restructurings were \$117 million and \$132 million.

Term Federal Funds Sold and Term Securities Purchased Under Agreements to Resell

Term federal funds sold and term securities purchased under agreements to resell are generally short-term, their recorded balance approximates fair value, and they are generally transacted with counterparties that are considered by an individual FHLBank to be of investment quality. FHLBank investments in term federal funds are evaluated for purposes of a reserve for credit losses only if the investment is not paid when due. All investments in term federal funds sold are unsecured and were repaid or expected to be repaid according to the contractual terms as of December 31, 2018 and 2017. Term securities purchased under agreements to resell are considered collateralized financing arrangements and effectively represent short-term loans. The terms of these loans are structured such that if the market value of the underlying securities decreases below the market value required as collateral, the counterparty must place an equivalent amount of additional securities as collateral or remit an equivalent amount of cash. If an agreement to resell is deemed to be impaired, the difference between the fair value of the collateral and the amortized cost of the agreement is charged to earnings. Based upon the collateral held as security, each FHLBank determined that no allowance for credit losses was needed for its term securities purchased under agreements to resell at December 31, 2018 and 2017.

Note 11 - Derivatives and Hedging Activities

Nature of Business Activity

The FHLBanks are exposed to interest-rate risk primarily from the effect of interest rate changes on their interest-earning assets and their interest-bearing liabilities that finance these assets. The goal of each FHLBank's interest-rate risk management strategy is not to eliminate interest-rate risk, but to manage it within appropriate limits. To mitigate the risk of loss, each FHLBank has established policies and procedures, which include guidelines on the amount of exposure to interest rate changes it is willing to accept. In addition, each FHLBank monitors the risk to its interest income, net interest margin, and average maturity of interest-earning assets and interest-bearing liabilities.

Consistent with FHFA regulation, an FHLBank enters into derivatives: (1) to manage the interest-rate risk exposures inherent in its otherwise unhedged assets and funding positions, (2) to achieve the FHLBank's risk management objectives, and (3) to act as an intermediary between its members and counterparties. FHFA regulation and each FHLBank's risk management policy prohibit the speculative use of these derivative instruments and limit credit risk arising from these instruments. The use of derivatives is an integral part of each FHLBank's financial and risk management strategy.

Each FHLBank reevaluates its hedging strategies from time to time and may change the hedging techniques it uses or may adopt new strategies. The most common ways in which an FHLBank uses derivatives are to:

- reduce the interest-rate sensitivity and repricing gaps of assets and liabilities;
- preserve a favorable interest-rate spread between the yield of an asset (e.g., an advance) and the cost of the related liability (e.g., the consolidated obligation used to fund the advance);
- mitigate the adverse earnings effects of the shortening or extension of certain assets (e.g., advances or mortgage assets) and liabilities;
- manage embedded options in assets and liabilities;
- reduce funding costs by combining a derivative with a consolidated obligation because the cost of a combined funding structure can be lower than the cost of a comparable consolidated obligation; and
- protect the value of existing asset or liability positions or of anticipated transactions.

Application of Derivatives

Each FHLBank documents at inception all relationships between derivatives designated as hedging instruments and hedged items, its risk management objectives and strategies for undertaking various hedge transactions, and its method of assessing effectiveness for all derivatives qualifying for hedge accounting. This process includes linking all derivatives that are designated as fair value or cash flow hedges to: (1) assets and liabilities on the statement of condition, (2) firm commitments, or (3) forecasted transactions.

Derivative instruments are designated by the FHLBanks as:

- A qualifying fair value or cash flow hedge of an associated financial instrument, a firm commitment, or an anticipated transaction.
- A non-qualifying economic hedge to manage certain defined risks on the statement of condition. These hedges are primarily used to: (1) manage mismatches between the coupon features of assets and liabilities, (2) offset prepayment risks in certain assets, (3) mitigate the income statement volatility that occurs when financial instruments are recorded at fair value and hedge accounting is not permitted, or (4) to reduce exposure reset risk.

- A non-qualifying intermediary hedge to meet the asset or liability management needs of its members. An FHLBank acts as an intermediary by entering into derivatives with its members and offsetting derivatives with other counterparties. This intermediation grants smaller members indirect access to the derivatives market. The derivatives used in intermediary activities do not receive hedge accounting treatment and are separately marked-to-market through earnings. The net result of the accounting for these derivatives does not significantly affect the operating results of the FHLBanks.

Each FHLBank transacts most of its derivatives with large banks and major broker-dealers. Some of these banks and broker-dealers, or their affiliates, buy, sell, and distribute consolidated obligations. Derivative transactions may be either executed with a counterparty (uncleared derivatives) or cleared through a Futures Commission Merchant (i.e., clearing agent) with a Derivative Clearing Organization (cleared derivatives). Once a derivative transaction has been accepted for clearing by a Derivative Clearing Organization (Clearinghouse) the executing counterparty is replaced with the Clearinghouse. FHLBanks are not derivative dealers and do not trade derivatives for short-term profit.

Types of Derivatives

The FHLBanks primarily use the following derivative instruments:

Interest-Rate Swaps. An interest-rate swap is an agreement between two entities to exchange cash flows in the future. The agreement sets the dates on which the cash flows will be exchanged and the manner in which the cash flows will be calculated. One of the simplest forms of an interest-rate swap involves the promise by one party to pay cash flows equivalent to the interest on a notional amount at a predetermined fixed rate for a given period of time. In return for this promise, this party receives cash flows equivalent to the interest on the same notional amount at a variable-rate index for the same period of time. The variable rate received or paid by the FHLBanks in most derivative transactions is the London Interbank Offered Rate (LIBOR).

Options. An option is an agreement between two entities that conveys the right, but not the obligation, to engage in a future transaction on some underlying security or other financial asset at an agreed-upon price during a certain period of time or on a specific date. Premiums paid to acquire options are considered the fair value of the derivative at inception of the hedge and are reported in derivative assets.

Swaptions. A swaption is an option on a swap that gives the buyer the right to enter into a specified interest-rate swap at a certain time in the future. When used as a hedge, a swaption can protect an FHLBank that is planning to lend or borrow funds in the future against future interest rate changes. The FHLBanks may enter into both payer swaptions and receiver swaptions. A payer swaption is the option to make fixed interest payments at a later date and a receiver swaption is the option to receive fixed interest payments at a later date.

Interest-Rate Cap and Floor Agreements. In an interest-rate cap agreement, a cash flow is generated if the price or rate of an underlying variable rises above a certain threshold (or cap) price. In an interest-rate floor agreement, a cash flow is generated if the price or rate of an underlying variable falls below a certain threshold (or floor) price. Interest-rate caps and floors are designed as protection against the interest rate on a variable-rate asset or liability falling below or rising above a certain level.

Futures and Forwards Contracts. Futures and forwards contracts gives the buyer the right to buy or sell a specific type of asset at a specific time at a given price. For example, certain mortgage purchase commitments entered into by an FHLBank are considered derivatives. An FHLBank may hedge these commitments by selling to-be-announced (TBA) mortgage-backed securities for forward settlement. A TBA represents a forward contract for the sale of mortgage-backed securities at a future agreed upon date for an established price.

Types of Hedged Items

An FHLBank may have the following types of hedged items:

Investments. The FHLBanks classify investment securities as held-to-maturity, available-for-sale, or trading securities. The interest-rate and prepayment risks associated with these investment securities are managed through a combination of debt issuance and derivatives. An FHLBank may manage the prepayment and interest-rate risk by funding investment securities with consolidated obligations that have call features or by hedging the prepayment risk with caps or floors, callable swaps, or swaptions. An FHLBank may manage prepayment and duration risk by funding investment securities with consolidated obligations that contain call features. An FHLBank may also manage the risk arising from changing market prices and volatility of investment securities by entering into economic derivatives that generally offset the changes in fair value of the securities. Derivatives held by an FHLBank that are associated with trading and held-to-maturity securities are designated as economic hedges and derivatives held by an FHLBank associated with available-for-sale securities may qualify as either a fair value hedge or a cash flow hedge, or may be designated as an economic hedge.

Advances. The FHLBanks offer a wide range of fixed- and variable-rate advance products with different maturities, interest rates, payment characteristics, and optionality. An FHLBank may use derivatives to manage the repricing and/or option characteristics of advances in order to more closely match the characteristics of that FHLBank's funding liabilities. In general, whenever a member executes a fixed-rate advance or a variable-rate advance with embedded options, the FHLBank may simultaneously execute a derivative with terms that offset the terms and embedded options, in the advance. For example, an FHLBank may hedge a fixed-rate advance with an interest-rate swap where the FHLBank pays a fixed-rate and receives a variable-rate, effectively converting the fixed-rate advance to a variable-rate advance. This type of hedge is typically treated as a fair value hedge. In addition, an FHLBank may hedge a callable, prepayable, convertible or puttable advance by entering into a cancelable interest-rate swap.

Mortgage Loans. The FHLBanks invest in fixed-rate mortgage loans. The prepayment options embedded in mortgage loans can result in extensions or contractions in the expected repayment of these investments, depending on changes in actual and estimated prepayment speeds. The FHLBanks manage the interest-rate and prepayment risks associated with mortgage loans through a combination of debt issuance and derivatives. The FHLBanks issue both callable and non-callable debt and prepayment-linked consolidated obligations to achieve cash flow patterns and liability durations similar to those expected on the mortgage loans. Interest-rate swaps, to the extent the payments on the mortgage loans result in a simultaneous reduction of the notional amount on the swaps, may receive fair value hedge accounting.

A combination of swaps and options, including futures, may be used as a portfolio of derivatives linked to a portfolio of mortgage loans. The portfolio of mortgage loans consists of one or more pools of similar assets, as determined by factors such as product type and coupon. As the portfolio of loans changes due to new loans, liquidations, and payments, the derivative portfolio is modified accordingly to hedge the interest-rate and prepayment risks effectively. A new hedging relationship is created and is treated as a fair value hedge.

The FHLBanks may also enter into interest-rate caps and floors, swaptions, callable swaps, and calls and puts to minimize the prepayment risk embedded in the mortgage loans. These type of hedges are treated as economic hedges as they are not identified to specific mortgage loans and are marked-to-market through earnings.

Consolidated Obligations. An FHLBank may enter into derivatives to hedge the interest-rate risk associated with its debt issuances. An FHLBank manages the risk arising from changing market prices and volatility of a consolidated obligation by matching the cash inflow on the derivative with the cash outflow on the consolidated obligation.

For example, an FHLBank may issue a fixed-rate consolidated obligation and simultaneously enter into a matching derivative in which the FHLBank receives a fixed cash flow designed to match in timing and amount the cash outflows the FHLBank pays on the consolidated obligation and the FHLBank pays a variable cash flow that closely matches the interest payments it receives on short-term or variable-rate advances (typically one- or three-month LIBOR). These transactions are typically treated as fair value hedges. The FHLBanks may issue variable-rate consolidated obligations indexed to the federal funds effective rate, LIBOR, or others and simultaneously execute interest-rate swaps to hedge the basis risk of the variable-rate debt. This type of hedge is treated as an economic hedge and is marked-to-market through earnings.

This strategy of issuing consolidated obligations while simultaneously entering into derivatives enables an FHLBank to offer a wider range of attractively-priced advances to its members and may allow an FHLBank to reduce its funding costs and manage its interest-rate risk. The continued attractiveness of this strategy depends on yield relationships between the FHLBanks' consolidated obligations and the derivatives markets. If conditions change, an FHLBank may alter the types or terms of the consolidated obligations that it issues.

Anticipated Streams of Future Cash Flows. An FHLBank may enter into an option to hedge a specified future variable cash stream as a result of rolling over short-term, fixed-rate financial instruments, such as LIBOR advances and consolidated discount notes. The option will effectively cap the variable cash stream at a predetermined target rate.

Firm Commitments. Certain mortgage loan purchase commitments are considered derivatives. An FHLBank normally hedges these commitments by selling TBA mortgage-backed securities or other derivatives for forward settlement. The mortgage loan purchase commitment and the TBA used in the firm commitment hedging strategy are treated as an economic hedge and are marked-to-market through earnings. When the mortgage loan purchase commitment derivative settles, the current market value of the commitment is included with the basis of the mortgage loan and amortized accordingly.

Additionally, an FHLBank may enter into a commitment to issue consolidated obligations beyond the timeframe of normal market settlement conventions. These commitments are considered derivatives and treated as economic hedges, with changes in the fair value of the derivative marked-to-market through earnings. When the consolidated obligation issuance commitment derivative settles, the current market value of the commitment is included with the basis of the consolidated obligation and amortized accordingly.

An FHLBank may also hedge a firm commitment for a forward-starting advance through the use of an interest-rate swap. In this case, the interest-rate swap functions as the hedging instrument for both the firm commitment and the subsequent advance and is treated as a fair value hedge. If the hedge relationship is de-designated when the commitment is terminated and the advance is issued, the fair value change associated with the firm commitment is recorded as a basis adjustment of the advance and amortized accordingly. In addition, if a hedged firm commitment no longer qualifies as a fair value hedge, the hedge would be terminated and net gains and losses would be recognized in current period earnings. There were no material amounts of gains and losses recognized due to disqualification of firm commitment hedges during the years ended December 31, 2018, 2017, and 2016.

Anticipated Debt Issuance. Certain FHLBanks use derivatives to lock in the cost of funding prior to an anticipated debt issuance and designate them as cash flow hedges. The derivative is terminated upon issuance of the debt instrument.

Variable Cash Streams. Certain FHLBanks use derivatives to hedge the variability of cash flows over a specified period of time as a result of the issuances and maturities of short-term, fixed-rate instruments, such as discount notes, and designate them as cash flow hedges. The maturity dates of the cash flow streams are matched to the maturity dates of the derivatives. If the hedge relationships are terminated prior to their maturity dates by an FHLBank, that FHLBank continues to carry the derivative on the statement of condition at its fair value and reclassifies the cumulative other comprehensive income adjustment into earnings when earnings are affected by the existing hedged item (i.e., the original forecasted transaction).

Financial Statement Effect and Additional Financial Information

Derivative Notional Amounts. The notional amount of derivatives serves as a factor in determining periodic interest payments or cash flows received and paid. However, the notional amount of derivatives reflects the FHLBanks' involvement in the various classes of financial instruments and represents neither the actual amounts exchanged nor the overall exposure of the FHLBanks to credit and market risk; the overall risk is much smaller. The risks of derivatives can be measured meaningfully on a portfolio basis that takes into account the counterparties, the types of derivatives, the items being hedged, and any offsets between the derivatives and the items being hedged.

Table 11.1 presents the notional amount, fair value of derivative instruments, and total derivative assets and liabilities. Total derivative assets and liabilities include the effect of netting adjustments and cash collateral. For purposes of this disclosure, the derivative values include the fair value of derivatives and the related accrued interest.

Table 11.1 - Fair Value of Derivative Instruments
(dollars in millions)

	December 31, 2018			December 31, 2017(1)		
	Notional Amount of Derivatives	Derivative Assets	Derivative Liabilities	Notional Amount of Derivatives	Derivative Assets	Derivative Liabilities
Derivatives designated as hedging instruments						
Interest-rate swaps	\$ 378,352	\$ 873	\$ 1,680	\$ 342,989	\$ 1,605	\$ 1,915
Interest-rate swaptions	—	—	—	2	—	—
Total derivatives designated as hedging instruments	378,352	873	1,680	342,991	1,605	1,915
Derivatives not designated as hedging instruments						
Interest-rate swaps	143,326	364	354	158,613	362	332
Interest-rate swaptions	4,335	18	—	2,631	29	—
Interest-rate caps or floors	15,481	11	4	27,961	9	2
Interest-rate futures or forwards	338	—	4	391	—	—
Mortgage delivery commitments	992	4	1	1,206	2	1
Other	1,315	6	11	546	6	6
Total derivatives not designated as hedging instruments	165,787	403	374	191,348	408	341
Total derivatives before netting and collateral adjustments	\$ 544,139	1,276	2,054	\$ 534,339	2,013	2,256
Netting adjustments and cash collateral(2)		(238)	(1,609)		(1,022)	(1,807)
Total derivative assets and total derivative liabilities		\$ 1,038	\$ 445		\$ 991	\$ 449

- (1) To conform with current presentation, \$401 million of variation margin on cleared derivatives has been allocated to the individual derivative instruments as of December 31, 2017. Previously, this amount was included with Netting adjustments and cash collateral
- (2) Amounts represent the application of the netting requirements that allow an FHLBank to settle positive and negative positions, and also cash collateral and related accrued interest held or placed by that FHLBank with the same clearing agent and/or counterparty. Cash collateral posted and related accrued interest was \$1,737 million and \$1,465 million at December 31, 2018 and 2017. Cash collateral received and related accrued interest was \$254 million and \$680 million at December 31, 2018 and 2017.

Table 11.2 presents the components of net gains (losses) on derivatives and hedging activities as presented on the Combined Statement of Income.

Table 11.2 - Net Gains (Losses) on Derivatives and Hedging Activities
(dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
Derivatives designated as hedging instruments			
Total net gains related to fair value hedge ineffectiveness(1)	\$ 4	\$ 333	\$ 159
Total net gains related to cash flow hedge ineffectiveness	1	3	5
Derivatives not designated as hedging instruments			
Economic hedges			
Interest-rate swaps	57	73	(28)
Interest-rate swaptions	(11)	(33)	6
Interest-rate caps or floors	(1)	(57)	(42)
Interest-rate futures or forwards	6	(10)	6
Net interest settlements	(99)	(42)	(64)
Other	6	3	3
Mortgage delivery commitments	(7)	44	1
Intermediary interest-rate swap transactions	—	4	1
Total net gains (losses) related to derivatives not designated as hedging instruments	(49)	(18)	(117)
Price alignment amount(2)	(37)	6	—
Net gains (losses) on derivatives and hedging activities	\$ (81)	\$ 324	\$ 47

- (1) Consists of interest-rate swaps.
- (2) This amount is for derivatives for which variation margin is characterized as a daily settled contract.

Table 11.3 presents, by type of hedged item, the gains (losses) on derivatives and the related hedged items in fair value hedging relationships and the effect of those derivatives on the FHLBanks' net interest income.

Table 11.3 - Effect of Fair Value Hedge-Related Derivative Instruments
(dollars in millions)

Hedged Item Type	Year Ended December 31, 2018			
	Gains (Losses) on Derivatives	Gains (Losses) on Hedged Items	Net Fair Value Hedge Ineffectiveness	Net Effect of Derivatives on Net Interest Income(1)
Advances	\$ 156	\$ (119)	\$ 37	\$ 473
Consolidated bonds	(115)	105	(10)	(548)
Consolidated discount notes	1	(2)	(1)	(2)
Available-for-sale securities	231	(253)	(22)	(105)
Total	\$ 273	\$ (269)	\$ 4	\$ (182)

Hedged Item Type	Year Ended December 31, 2017			
	Gains (Losses) on Derivatives	Gains (Losses) on Hedged Items	Net Fair Value Hedge Ineffectiveness	Net Effect of Derivatives on Net Interest Income(1)
Advances	\$ 1,324	\$ (985)	\$ 339	\$ (730)
Consolidated bonds	(345)	345	—	262
Consolidated discount notes	3	(2)	1	(3)
Available-for-sale securities	315	(322)	(7)	(460)
Total	\$ 1,297	\$ (964)	\$ 333	\$ (931)

Hedged Item Type	Year Ended December 31, 2016			
	Gains (Losses) on Derivatives	Gains (Losses) on Hedged Items	Net Fair Value Hedge Ineffectiveness	Net Effect of Derivatives on Net Interest Income(1)
Advances	\$ 1,740	\$ (1,582)	\$ 158	\$ (1,716)
Consolidated bonds	(1,174)	1,143	(31)	872
Consolidated discount notes	2	(5)	(3)	(3)
Available-for-sale securities	764	(729)	35	(643)
Total	\$ 1,332	\$ (1,173)	\$ 159	\$ (1,490)

(1) The net effect of derivatives, in fair value hedge relationships, on net interest income is included in the interest income or interest expense line item of the respective hedged item type. These amounts include the effect of net interest settlements attributable to designated fair value hedges but do not include \$(12) million, \$(305) million, and \$(74) million of amortization/accretion related to fair value hedging activities for the years ended December 31, 2018, 2017, and 2016.

Table 11.4 presents by type of hedged item in cash flow hedging relationships, the gains (losses) recognized in OCI, the gains (losses) reclassified from AOCI into income, and the effect of those hedging activities on the FHLBanks' net gains (losses) on derivatives and hedging activities on the Combined Statement of Income. (See [Note 17 - Accumulated Other Comprehensive Income \(Loss\)](#) for more details on the effect of cash flow hedges on AOCI.)

Table 11.4 - Effect of Cash Flow Hedge-Related Derivative Instruments
(dollars in millions)

Derivatives and Hedged Items in Cash Flow Hedging Relationships(1)	Year Ended December 31, 2018			
	Amount of Gains (Losses) Recognized in OCI on Derivatives (Effective Portion)	Location of Gains (Losses) Reclassified from AOCI into Income (Effective Portion)	Amount of Gains (Losses) Reclassified from AOCI into Income (Effective Portion)	Amount of Gains Recognized in Net Gains (Losses) on Derivatives and Hedging Activities (Ineffective Portion)
Interest-rate swaps				
Consolidated bonds	\$ 4	Interest expense	\$ (4)	\$ —
Consolidated discount notes	140	Interest expense	(14)	1
Total	\$ 144		\$ (18)	\$ 1

Derivatives and Hedged Items in Cash Flow Hedging Relationships(1)	Year Ended December 31, 2017			
	Amount of Gains (Losses) Recognized in OCI on Derivatives (Effective Portion)	Location of Gains (Losses) Reclassified from AOCI into Income (Effective Portion)	Amount of Gains (Losses) Reclassified from AOCI into Income (Effective Portion)	Amount of Gains Recognized in Net Gains (Losses) on Derivatives and Hedging Activities (Ineffective Portion)
Interest-rate swaps				
Consolidated bonds	\$ (3)	Interest expense	\$ (15)	\$ 1
Consolidated discount notes	197	Interest expense	(4)	2
Interest-rate caps or floors				
Advances	—	Interest income	10	—
Total	<u>\$ 194</u>		<u>\$ (9)</u>	<u>\$ 3</u>
Year Ended December 31, 2016				
Derivatives and Hedged Items in Cash Flow Hedging Relationships(1)	Amount of Gains (Losses) Recognized in OCI on Derivatives (Effective Portion)	Location of Gains (Losses) Reclassified from AOCI into Income (Effective Portion)	Amount of Gains (Losses) Reclassified from AOCI into Income (Effective Portion)	Amount of Gains Recognized in Net Gains (Losses) on Derivatives and Hedging Activities (Ineffective Portion)
Interest-rate swaps				
Consolidated bonds	\$ 6	Interest expense	\$ (29)	\$ —
Consolidated discount notes	215	Interest expense	(5)	5
Interest-rate caps or floors				
Advances	—	Interest income	10	—
Total	<u>\$ 221</u>		<u>\$ (24)</u>	<u>\$ 5</u>

(1) Table 11.4 does not include \$(93) million, \$(199) million, and \$(231) million for the effect of net interest settlements on net interest income attributable to open cash flow hedges for the years ended December 31, 2018, 2017, and 2016.

For the years ended December 31, 2018, 2017, and 2016, no material amounts were reclassified from AOCI into earnings as a result of discontinued cash flow hedges because the original forecasted transactions occurred by the end of the originally specified time period or within a two-month period thereafter. At December 31, 2018, \$1 million of deferred net gains on derivative instruments in AOCI is expected to be reclassified to earnings during the next twelve months. At December 31, 2018, the maximum length of time over which an FHLBank is hedging its exposure to the variability in future cash flows for forecasted transactions is thirteen years, excluding those forecasted transactions related to the payment of variable interest on existing financial instruments.

Managing Credit Risk on Derivatives

Each FHLBank is subject to credit risk due to the risk of non-performance by counterparties to its derivative transactions, and manages credit risk through credit analysis, collateral requirements, and adherence to the requirements set forth in its policies, U.S. Commodity Futures Trading Commission regulations, and FHFA regulations.

Uncleared Derivatives. For uncleared derivatives, the degree of credit risk depends on the extent to which master netting arrangements are included in these contracts to mitigate the risk. Each FHLBank requires collateral agreements on its uncleared derivatives. Additionally, collateral related to derivatives with member institutions includes collateral assigned to an FHLBank, as evidenced by a written security agreement and held by the member institution for the benefit of that FHLBank.

Certain of the FHLBanks' uncleared derivative instruments contain provisions that require an FHLBank to post additional collateral with its counterparties if there is deterioration in that FHLBank's credit rating. If an FHLBank's credit rating is lowered by a nationally recognized statistical rating organization, that FHLBank may be required to deliver additional collateral on uncleared derivative instruments in net liability positions, unless the collateral delivery threshold is set to zero. The aggregate fair value of all uncleared derivative instruments with credit-risk-related contingent features that require an FHLBank to deliver additional collateral due to a credit downgrade and were in a net liability position (before cash collateral and related accrued interest) at December 31, 2018, was \$581 million, for which the FHLBanks have posted collateral with a fair value of \$532 million in the normal course of business. If each FHLBank's credit rating had been lowered from its current rating to the next lower rating that would have triggered additional collateral to be delivered, the FHLBanks would have been required to deliver an additional \$27 million of collateral at fair value to their uncleared derivatives counterparties at December 31, 2018.

Cleared Derivatives. For cleared derivatives, a Derivative Clearing Organization (Clearinghouse) is an FHLBank's counterparty. The Clearinghouse notifies the clearing agent of the required initial and variation margin and the clearing agent in turn notifies the FHLBank. Each FHLBank utilizes one or two Clearinghouses for all cleared derivative transactions, LCH Ltd. and/or CME Clearing. Effective January 16, 2018, LCH Ltd. made certain amendments to its rulebook, changing the legal characterization of variation margin payments to be daily settlement payments, rather than collateral. CME Clearing made the same change to its rulebook on January 3, 2017. As a result, at both Clearinghouses, variation margin is characterized as daily settlement payments, rather than cash collateral. At both Clearinghouses, initial margin continues to be considered cash collateral. The requirement that an FHLBank post initial and variation margin, through the clearing agent to the Clearinghouse, exposes an FHLBank to credit risk if the clearing agent or the Clearinghouse fails to meet its obligations. The use of cleared derivatives is intended to mitigate credit risk exposure because a central counterparty is substituted for individual counterparties and collateral/payments for changes in the fair value of cleared derivatives is posted daily through a clearing agent.

The Clearinghouse determines initial margin requirements and generally credit ratings are not factored into the initial margin. However, clearing agents may require additional initial margin to be posted based on credit considerations, including, but not limited to, credit rating downgrades. None of the FHLBanks were required to post additional initial margin by its clearing agents, based on credit considerations, at December 31, 2018.

Offsetting of Derivative Assets and Derivative Liabilities

An FHLBank presents derivative instruments, related cash collateral received or pledged, and associated accrued interest, on a net basis by clearing agent and/or by counterparty when it has met the netting requirements.

Each FHLBank has analyzed the enforceability of offsetting rights incorporated in its cleared derivative transactions and determined that the exercise of those offsetting rights by a non-defaulting party under these transactions should be upheld under applicable law upon an event of default including a bankruptcy, insolvency, or similar proceeding involving the Clearinghouse or that FHLBank's clearing agent, or both. Based on this analysis, each FHLBank presents a net derivative receivable or payable for all of its transactions through a particular clearing agent with a particular Clearinghouse.

Table 11.5 presents separately the fair value of derivative instruments meeting or not meeting netting requirements, with and without the legal right of offset, including the related collateral received from or pledged to counterparties.

Table 11.5 - Offsetting of Derivative Assets and Derivative Liabilities
(dollars in millions)

	December 31, 2018							
	Derivative Instruments Meeting Netting Requirements			Derivative Instruments Not Meeting Netting Requirements(1)	Total Derivative Assets and Total Derivative Liabilities	Non-cash Collateral Received or Pledged Not Offset		Net Amount(2)
	Gross Recognized Amount	Gross Amounts of Netting Adjustments and Cash Collateral	Can Be Sold or Repledged			Cannot Be Sold or Repledged		
Derivative Assets								
Uncleared	\$ 918	\$ (772)	\$ 4	\$ 150	\$ 1	\$ 106	\$ 43	
Cleared	354	534	—	888	—	—	888	
Total				\$ 1,038			\$ 931	
Derivative Liabilities								
Uncleared	\$ 1,536	\$ (1,170)	\$ 4	\$ 370	\$ 6	\$ 237	\$ 127	
Cleared	514	(439)	—	75	37	9	29	
Total				\$ 445			\$ 156	

December 31, 2017(3)

	Derivative Instruments Meeting Netting Requirements			Total Derivative Assets and Total Derivative Liabilities	Non-cash Collateral Received or Pledged Not Offset		Net Amount(2)
	Amount Recognized	Gross Amounts of Netting Adjustments and Cash Collateral	Derivative Instruments Not Meeting Netting Requirements(1)		Can Be Sold or Repledged	Cannot Be Sold or Repledged	
Derivative Assets							
Uncleared	\$ 782	\$ (646)	\$ 2	\$ 138	\$ —	\$ 110	\$ 28
Cleared	1,229	(376)	—	853	—	—	853
Total				\$ 991			\$ 881
Derivative Liabilities							
Uncleared	\$ 1,492	\$ (1,078)	\$ 1	\$ 415	\$ 8	\$ 281	\$ 126
Cleared	763	(729)	—	34	14	6	14
Total				\$ 449			\$ 140

- (1) Represents derivatives that are not subject to an enforceable netting agreement (e.g., mortgage delivery commitments and certain interest-rate futures or forwards).
- (2) Any overcollateralization at an FHLBank's individual clearing agent and/or counterparty level is not included in the determination of the net amount. At December 31, 2018 and 2017, the FHLBanks had additional net credit exposure of \$1,175 million and \$1,034 million due to instances where an FHLBank's non-cash collateral to a counterparty exceeded the FHLBank's net derivative position.
- (3) To conform with current presentation, \$401 million of variation margin on cleared derivatives has been allocated to the individual derivative instruments within the Amount Recognized as of December 31, 2017. Previously, this amount was included with Gross Amount of Netting Adjustments and Cash Collateral.

Note 12 - Deposits

The FHLBanks offer demand and overnight deposit programs to members and to qualifying non-members. In addition, certain FHLBanks offer short-term interest-bearing deposit programs to members, and in certain cases, to qualifying non-members. A member that services mortgage loans may deposit in its FHLBank funds collected in connection with the mortgage loans, pending disbursement of these funds to the owners of the mortgage loans. The FHLBanks classify these funds as other deposits. Deposits classified as demand, overnight, or other pay interest based on a daily interest rate. Term deposits pay interest based on a fixed rate determined at the issuance of the deposit.

Table 12.1 - Deposits
(dollars in millions)

	December 31, 2018	December 31, 2017
Interest-bearing		
Demand and overnight	\$ 6,795	\$ 6,960
Term	393	481
Other	9	11
Total interest-bearing	7,197	7,452
Non-interest-bearing		
Demand and overnight	138	136
Other	225	201
Total non-interest-bearing	363	337
Total deposits	\$ 7,560	\$ 7,789

Note 13 - Consolidated Obligations

Consolidated obligations consist of consolidated bonds and consolidated discount notes, which are joint and several obligations of all FHLBanks. The FHLBanks issue consolidated obligations through the Office of Finance as their agent. In connection with each debt issuance, an FHLBank specifies the amount of debt it wants issued on its behalf. The Office of Finance tracks the amount of debt issued on behalf of each FHLBank. In addition, each FHLBank records as a liability its specific portion of consolidated obligations for which it is the primary obligor.

The FHFA and the Secretary of the Treasury oversee the issuance of FHLBank debt through the Office of Finance. Consolidated bonds may be issued to raise short-, intermediate-, or long-term funds for the FHLBanks and are not subject to any statutory or regulatory limits on their maturity. Consolidated discount notes are issued primarily to raise short-term funds and have original maturities of up to one year. These notes generally sell below their face value and are redeemed at face value when they mature.

Although each FHLBank is primarily liable for its portion of consolidated obligations, each FHLBank is also jointly and severally liable with the other FHLBanks for the payment of principal and interest on all consolidated obligations of the FHLBanks. The principal amount of the FHLBanks' outstanding consolidated obligations, including consolidated obligations held by other FHLBanks, was \$1,031.6 billion and \$1,034.3 billion at December 31, 2018 and 2017. The FHFA, at its discretion, may require any FHLBank to make principal or interest payments due on any consolidated obligation whether or not the consolidated obligation represents a primary liability of that FHLBank. Although an FHLBank has never paid the principal or interest payments due on a consolidated obligation on behalf of another FHLBank, if that event should occur, FHFA regulations provide that the paying FHLBank is entitled to reimbursement from the FHLBank that is primarily liable for that consolidated obligation for any payments and other associated costs, including interest to be determined by the FHFA. If, however, that FHLBank is unable to satisfy its repayment obligations, then the FHFA may allocate the outstanding liabilities of that FHLBank among the remaining FHLBanks on a pro-rata basis in proportion to each FHLBank's participation in all consolidated obligations outstanding or in any other manner it may determine to ensure that the FHLBanks operate in a safe and sound manner.

Regulations require each FHLBank to maintain unpledged qualifying assets equal to its participation in the consolidated obligations outstanding. Qualifying assets are defined as cash; secured advances; obligations of or fully guaranteed by the United States; obligations, participations, or other instruments of or issued by Fannie Mae or Ginnie Mae; mortgages, obligations, or other securities which are or ever have been sold by Freddie Mac under the FHLBank Act; and such securities as fiduciary and trust funds may invest in under the laws of the state in which the FHLBank is located. Any assets subject to a lien or pledge for the benefit of holders of any issue of consolidated obligations are treated as if they were free from lien or pledge for purposes of compliance with these regulations.

Table 13.1 - Consolidated Discount Notes Outstanding
(dollars in millions)

	Book Value	Principal Amount	Weighted-Average Interest Rate(1)
December 31, 2018	\$ 426,034	\$ 427,367	2.33%
December 31, 2017	\$ 391,480	\$ 392,049	1.22%

(1) Represents yield to maturity excluding concession fees.

Table 13.2 - Consolidated Bonds Outstanding by Contractual Maturity
(dollars in millions)

Year of Contractual Maturity	December 31,			
	2018		2017	
	Amount	Weighted-Average Interest Rate	Amount	Weighted-Average Interest Rate
Due in 1 year or less	\$ 359,133	2.19%	\$ 391,541	1.32%
Due after 1 year through 2 years	103,887	2.31%	119,384	1.44%
Due after 2 years through 3 years	47,648	2.19%	34,949	1.91%
Due after 3 years through 4 years	28,376	2.36%	31,927	1.84%
Due after 4 years through 5 years	19,321	2.72%	22,572	2.20%
Thereafter	45,776	3.13%	41,711	2.80%
Index-amortizing notes	—	—	18	5.39%
Total principal amount	604,141	2.31%	642,102	1.53%
Net premiums	250		346	
Hedging adjustments	(876)		(784)	
Fair value option valuation adjustments	(24)		(63)	
Total	<u>\$ 603,491</u>		<u>\$ 641,601</u>	

Consolidated bonds outstanding were issued with either fixed-rate coupon payment terms or variable-rate coupon payment terms that are indexed primarily to LIBOR. To meet the specific needs of certain investors in consolidated obligations, both fixed-rate consolidated bonds and variable-rate consolidated bonds may contain features that result in complex coupon payment terms and call options. When these consolidated bonds are issued, an FHLBank may enter into derivatives containing features that offset the terms and embedded options, if any, of the consolidated bond obligations.

Table 13.3 - Consolidated Bonds Outstanding by Call Features
(dollars in millions)

Principal Amount of Consolidated Bonds	December 31,	
	2018	2017
Non-callable/non-puttable	\$ 500,416	\$ 563,990
Callable	103,725	78,112
Total principal amount	<u>\$ 604,141</u>	<u>\$ 642,102</u>

Table 13.4 - Consolidated Bonds Outstanding by Contractual Maturity or Next Call Date
(dollars in millions)

Year of Contractual Maturity or Next Call Date	December 31,	
	2018	2017
Due in 1 year or less	\$ 443,750	\$ 459,695
Due after 1 year through 2 years	91,049	113,678
Due after 2 years through 3 years	28,948	25,258
Due after 3 years through 4 years	13,477	18,537
Due after 4 years through 5 years	9,756	9,052
Thereafter	17,161	15,864
Index-amortizing notes	—	18
Total principal amount	<u>\$ 604,141</u>	<u>\$ 642,102</u>

Consolidated bonds, beyond having fixed-rate or simple variable-rate interest-rate payment terms, may also have the following interest-rate payment types:

- *Step-up bonds* pay interest at increasing fixed rates and *step-down bonds* pay interest at decreasing fixed rates for specified intervals over the life of the consolidated bond. These consolidated bonds generally contain provisions enabling an FHLBank to call consolidated bonds at its option on the step-up or step-down dates.
- *Conversion bonds* have interest rates that convert from fixed to variable, or variable to fixed, or from one index to another, on predetermined dates according to the terms of the consolidated bond offerings.
- *Range bonds* pay interest based on the number of days a specified index is within/outside of a specified range. The computation of the variable interest rate differs for each consolidated bond issue, but the consolidated bond generally pays zero interest or a minimal rate if the specified index is outside of the specified range.

Table 13.5 - Consolidated Bonds by Interest-Rate Payment Type
(dollars in millions)

Principal Amount of Consolidated Bonds	December 31,	
	2018	2017
Simple variable-rate	\$ 314,899	\$ 370,830
Fixed-rate	265,276	256,068
Step-up	21,112	12,524
Step-down	1,530	1,441
Fixed-rate that converts to variable-rate	994	994
Range bonds	230	155
Other	100	90
Total principal amount	<u>\$ 604,141</u>	<u>\$ 642,102</u>

Consolidated Bonds Denominated in Foreign Currencies. Consolidated bonds issued can be denominated in foreign currencies. Concurrent with these issuances, the FHLBanks exchange the interest and principal payment obligations related to the issues for equivalent amounts denominated in U.S. dollars. There were no consolidated bonds denominated in foreign currencies outstanding at December 31, 2018 and 2017.

Note 14 - Affordable Housing Program (AHP)

The FHLBank Act requires each FHLBank to establish an AHP. Each FHLBank provides subsidies in the form of direct grants and below-market interest rate advances to members who use the funds to assist in the purchase, construction, or rehabilitation of housing for very low-, low-, and moderate-income households. Each FHLBank is required to contribute to its AHP the greater of 10% of its annual income subject to assessment, or the prorated sum required to ensure the aggregate contribution by the FHLBanks is no less than \$100 million for each year. For purposes of the AHP calculation, each FHLBank's income subject to assessment is defined as the individual FHLBank's net income before assessments, plus interest expense related to mandatorily redeemable capital stock. Each FHLBank accrues this expense monthly based on its income subject to assessment. An FHLBank reduces its AHP liability as members use subsidies.

If an FHLBank experienced a net loss during a quarter, but still had income subject to assessment year-to-date, the FHLBank's obligation to the AHP would be calculated based on the FHLBank's year-to-date income subject to assessment. If the FHLBank had income subject to assessment in subsequent quarters, it would be required to contribute additional amounts to meet its calculated annual obligation. If the FHLBank experienced a net loss for a full year, the FHLBank would have no obligation to the AHP for the year, because each FHLBank's required annual AHP contribution is limited to its annual income subject to assessment. If the aggregate 10% calculation previously discussed was less than \$100 million for the FHLBanks, each FHLBank would be required to contribute a prorated sum to ensure that the aggregate contribution by the FHLBanks equals \$100 million. The proration would be made on the basis of an FHLBank's income in relation to the income of all FHLBanks for the previous year, subject to the annual income limitation as previously discussed. In addition to the required AHP assessment, an FHLBank's board of directors may elect to make voluntary contributions to the AHP. There was no shortfall in the years ended December 31, 2018, 2017, or 2016. If an FHLBank finds that its required contributions are contributing to the financial instability of that FHLBank, it may apply to the FHFA for a temporary suspension of its contributions. The FHLBanks did not make any such applications in the years ended December 31, 2018, 2017, or 2016.

Table 14.1 - Analysis of AHP Liability
(dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
Balance, at beginning of year	\$ 1,032	\$ 946	\$ 841
Assessments(1)	407	391	392
Subsidy usage, net(2)	(343)	(305)	(287)
Balance, at end of year	\$ 1,096	\$ 1,032	\$ 946

(1) Includes \$3 million and \$7 million of voluntary AHP contributions from an FHLBank in 2018 and 2017.

(2) Amounts may not agree to the Affordable Housing Program payments, net amounts on the Combined Statement of Cash Flows for each applicable period due to rounding and the amount of subsidies provided for AHP advance disbursements.

Note 15 - Subordinated Notes

As approved by the Federal Housing Finance Board (predecessor to the FHFA), the FHLBank of Chicago issued \$1 billion of 10-year subordinated notes in 2006, and during 2013, the FHLBank of Chicago purchased \$56 million of these notes in the open market. On June 13, 2016, the FHLBank of Chicago's remaining \$944 million subordinated notes matured and the FHLBank of Chicago paid the holders of its subordinated notes in full in accordance with the terms of the notes.

Note 16 - Capital

Each FHLBank is subject to three capital requirements under its capital plan and the FHFA rules and regulations. Regulatory capital does not include AOCI, but does include mandatorily redeemable capital stock.

1. *Risk-based capital.* Each FHLBank must maintain at all times permanent capital, defined as Class B stock and retained earnings, in an amount at least equal to the sum of its credit risk, market risk, and operations risk capital requirements, all of which are calculated in accordance with the rules and regulations of the FHFA.
2. *Total regulatory capital.* Each FHLBank must maintain at all times a total capital-to-assets ratio of at least four percent. Total regulatory capital is the sum of permanent capital, Class A stock, any general loss allowance, if consistent with GAAP and not established for specific assets, and other amounts from sources determined by the FHFA as available to absorb losses.
3. *Leverage capital.* Each FHLBank must maintain at all times a leverage capital-to-assets ratio of at least five percent. Leverage capital is defined as the sum of permanent capital weighted 1.5 times and all other capital without a weighting factor.

The FHFA may require an FHLBank to maintain greater minimum capital levels than are required based on FHFA rules and regulation. At December 31, 2018, each FHLBank was in compliance with FHFA regulatory capital requirements.

Table 16.1 - Risk-Based Capital Requirements at December 31, 2018
(dollars in millions)

FHLBank	Risk-Based Capital	
	Minimum Requirement	Actual
Boston	\$ 619	\$ 3,956
New York	798	7,766
Pittsburgh	1,239	5,327
Atlanta	1,654	7,597
Cincinnati	838	5,366
Indianapolis	787	3,178
Chicago	1,111	5,547
Des Moines	1,146	7,719
Dallas	1,159	3,643
Topeka	388	2,193
San Francisco	1,899	6,522

Table 16.2 - Regulatory Capital Requirements at December 31, 2018
(dollars in millions)

FHLBank	Regulatory Capital Ratio		Regulatory Capital	
	Minimum Requirement	Actual	Minimum Requirement	Actual
Boston	4.0%	6.2%	\$ 2,544	\$ 3,956
New York	4.0%	5.4%	5,775	7,766
Pittsburgh	4.0%	5.0%	4,302	5,327
Atlanta	4.0%	4.9%	6,179	7,597
Cincinnati	4.0%	5.4%	3,968	5,366
Indianapolis	4.0%	4.9%	2,616	3,178
Chicago	4.0%	6.0%	3,714	5,547
Des Moines	4.0%	5.3%	5,861	7,719
Dallas	4.0%	5.0%	2,911	3,643
Topeka	4.0%	5.1%	1,909	2,442
San Francisco	4.0%	6.0%	4,373	6,522

Table 16.3 - Leverage Capital Requirements at December 31, 2018
(dollars in millions)

FHLBank	Leverage Capital Ratio		Leverage Capital	
	Minimum Requirement	Actual	Minimum Requirement	Actual
Boston	5.0%	9.3%	\$ 3,180	\$ 5,934
New York	5.0%	8.1%	7,219	11,649
Pittsburgh	5.0%	7.4%	5,377	7,991
Atlanta	5.0%	7.4%	7,724	11,396
Cincinnati	5.0%	8.1%	4,960	8,050
Indianapolis	5.0%	7.3%	3,271	4,766
Chicago	5.0%	9.0%	4,643	8,321
Des Moines	5.0%	7.9%	7,326	11,579
Dallas	5.0%	7.5%	3,639	5,465
Topeka	5.0%	7.4%	2,386	3,539
San Francisco	5.0%	8.9%	5,466	9,783

Capital Stock

Each FHLBank is a cooperative whose member financial institutions own most of the FHLBank's capital stock. Former members (including certain non-members that own FHLBank capital stock as a result of merger or acquisition, relocation, charter termination, voluntary termination, or involuntary termination of an FHLBank member) own the remaining capital stock to support business transactions still carried on an FHLBank's statement of condition. Shares of capital stock cannot be purchased or sold except between an FHLBank and its members at its \$100 per share par value, as mandated by each FHLBank's capital plan.

Members can redeem Class A stock by giving six-months written notice, and members can redeem Class B stock by giving five-years written notice, subject to certain restrictions. Any member that withdraws from membership may not be readmitted to membership in any FHLBank until five years from the divestiture date for all capital stock that is held as a condition of membership, as that requirement is set out in an FHLBank's capital plan, unless the institution has canceled its notice of withdrawal prior to that date. This restriction does not apply if the member is transferring its membership from one FHLBank to another on an uninterrupted basis.

Each class of FHLBank stock is considered puttable by the member and an FHLBank may repurchase, at its sole discretion, any member's stock investments that exceed the required minimum amount. However, there are significant statutory and regulatory restrictions on the obligation to redeem, or right to repurchase, the outstanding stock. As a result, whether or not a member may have its capital stock in an FHLBank repurchased (at an FHLBank's discretion at any time before the end of the redemption period) or redeemed (at a member's request, completed at the end of a redemption period) will depend in part on whether the FHLBank is in compliance with those restrictions.

An FHLBank's board of directors may declare and pay dividends in either cash or capital stock, assuming the FHLBank is in compliance with FHFA rules.

Additional Capital from Merger

As a result of the merger between the FHLBanks of Des Moines and Seattle, effective May 31, 2015, the FHLBank of Des Moines recognized net assets acquired from the FHLBank of Seattle by recording the par value of capital stock issued in the transaction as capital stock, with the remaining portion of net assets acquired recorded as additional capital from merger. The FHLBank of Des Moines treats this additional capital from merger as a component of total capital for regulatory capital purposes. Following the merger, the FHLBank of Des Moines began distributing dividends on capital stock from additional capital from merger. For the years ended December 31, 2017 and 2016, the FHLBank of Des Moines paid dividends in the amount of \$52 million and \$142 million. The balance in additional capital from merger was depleted following the first quarter dividend payment in May 2017.

Restricted Retained Earnings

The Joint Capital Enhancement Agreement, as amended (Capital Agreement), is intended to enhance the capital position of each FHLBank. The Capital Agreement provides that each FHLBank will allocate 20% of its net income each quarter to a separate restricted retained earnings account until the balance of that account equals at least one percent of that FHLBank's average balance of outstanding consolidated obligations for the previous quarter. These restricted retained earnings are not available to pay dividends.

The FHLBank of San Francisco's Excess Stock Repurchase, Retained Earnings, and Dividend Framework (Framework) assesses the level and adequacy of retained earnings and establishes amounts to be retained in restricted retained earnings, which are not made available in the current dividend period, and maintains an amount of total retained earnings at least equal to its required retained earnings as described in the Framework. Prior to July 2017, the FHLBank of San Francisco's Framework had three categories of restricted retained earnings: Valuation Adjustments, Other Restricted Retained Earnings (which represented a targeted amount), and the Capital Agreement. Under the Framework, the FHLBank of San Francisco's required amount of restricted retained earnings was determined using its retained earnings methodology. As determined using the FHLBank of San Francisco's methodology, from July 2015 to January 2017, its restricted retained earnings requirement was \$2,000 million, and from January 2017 to July 2017, its restricted retained earnings requirement was \$2,300 million.

In July 2017, the FHLBank of San Francisco's board of directors approved the transfer of all amounts classified as restricted retained earnings, other than the amounts related to the Capital Agreement, to unrestricted retained earnings. As a conforming change related to the transfer, the FHLBank of San Francisco's board of directors amended the Framework to eliminate two of the categories of restricted retained earnings (Valuation Adjustments and Other Restricted Retained Earnings) and approved revisions to its retained earnings methodology to provide for a required level of total retained earnings of \$2,300 million for loss protection, capital compliance, and business growth. In January 2018, the FHLBank of San Francisco further revised its retained earnings methodology to provide a required level of total retained earnings of \$2,500 million. The FHLBank of San Francisco satisfies its retained earnings requirement with both restricted retained earnings (i.e., amounts related to the Capital Agreement) and unrestricted retained earnings.

Table 16.4 presents the components of retained earnings, including the restricted amounts related to the Capital Agreement and the restricted amounts related to the FHLBank of San Francisco's Framework.

Table 16.4 - Retained Earnings
(dollars in millions)

	Unrestricted Retained Earnings	Capital Agreement Restricted Retained Earnings	Other Restricted Retained Earnings(1)	Total Restricted Retained Earnings	Total Retained Earnings
Balance, December 31, 2015	\$ 10,447	\$ 2,190	\$ 1,660	\$ 3,850	\$ 14,297
Net income	2,717	683	8	691	3,408
Dividends on capital stock					
Cash	(1,280)	—	—	—	(1,280)
Stock	(95)	—	—	—	(95)
Balance, December 31, 2016	11,789	2,873	1,668	4,541	16,330
Net income	2,596	677	103	780	3,376
Transfers to unrestricted/(from) restricted retained earnings	1,771	—	(1,771)	(1,771)	—
Dividends on capital stock					
Cash	(1,483)	—	—	—	(1,483)
Stock	(124)	—	—	—	(124)
Balance, December 31, 2017	14,549	3,550	—	3,550	18,099
Adjustment for cumulative effect of accounting change - recognition and measurement of financial instruments	5	—	—	—	5
Net income	2,849	713	—	713	3,562
Dividends on capital stock					
Cash	(2,007)	—	—	—	(2,007)
Stock	(155)	—	—	—	(155)
Balance, December 31, 2018	\$ 15,241	\$ 4,263	\$ —	\$ 4,263	\$ 19,504

(1) Represents retained earnings restricted by the FHLBank of San Francisco's Framework, which were eliminated in July 2017.

Mandatorily Redeemable Capital Stock

An FHLBank generally reclassifies capital stock subject to redemption from capital to the mandatorily redeemable capital stock liability upon expiration of a grace period, if applicable, after a member exercises a written redemption right, or gives notice of intent to withdraw from membership, or attains non-member status by merger or acquisition, relocation, charter termination, or involuntary termination from membership. Shares of capital stock meeting these definitions are reclassified to mandatorily redeemable capital stock at fair value. Dividends related to capital stock classified as mandatorily redeemable capital stock are accrued at the expected dividend rate and reported as interest expense on the Combined Statement of Income. For the years ended December 31, 2018, 2017, and 2016, dividends on mandatorily redeemable capital stock of \$70 million, \$72 million, and \$101 million were recorded as interest expense.

A member may cancel or revoke its written notice of redemption or its notice of withdrawal from membership prior to the end of the applicable redemption period. Each FHLBank's capital plan provides the terms for cancellation fees that may be incurred by the member upon cancellation.

Table 16.5 presents capital stock subject to mandatory redemption. Payment is contingent on each FHLBank's waiting period and the FHLBank's ability to meet its minimum regulatory capital requirements. These amounts have been classified as a liability on the Combined Statement of Condition. The number of stockholders holding mandatorily redeemable capital stock was 138, 148, and 171 at December 31, 2018, 2017, and 2016.

Table 16.5 - Mandatorily Redeemable Capital Stock Rollforward
(dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
Balance, beginning of year	\$ 1,272	\$ 1,704	\$ 745
Capital stock subject to mandatory redemption reclassified from capital	1,293	1,176	2,526 ^(a)
Capital stock previously subject to mandatory redemption reclassified to capital	(5)	—	—
Redemption/repurchase of mandatorily redeemable capital stock	(1,498)	(1,616)	(1,566)
Other(1)	—	8	(1)
Balance, end of year	<u>\$ 1,062</u>	<u>\$ 1,272</u>	<u>\$ 1,704</u>

(a) Includes \$1,276 million of reclassifications to mandatorily redeemable capital stock resulting from an FHFA rule effective February 19, 2016, that made captive insurance companies ineligible for FHLBank membership. Captive insurance company members that were admitted as FHLBank members prior to September 12, 2014, will have their memberships terminated no later than February 19, 2021. Captive insurance company members that were admitted as FHLBank members on or after September 12, 2014, had their memberships terminated no later than February 19, 2017.

(1) Represents rounding adjustments. In addition, for the year ended December 31, 2017, also includes a direct purchase of mandatorily redeemable capital stock by a member.

Table 16.6 presents the amount of mandatorily redeemable capital stock by contractual year of redemption. The year of redemption in the table is the end of the appropriate redemption period applicable to each FHLBank's capital plan. An FHLBank is not required to redeem membership stock until either five years or six months, depending on the type of capital stock issuable under its capital plan, after the membership is terminated or the FHLBank receives notice of withdrawal. However, if membership is terminated due to merger or consolidation, the FHLBank may recalculate the former member's stock requirement following that termination and the stock may be deemed excess stock subject to repurchase at the FHLBank's discretion. An FHLBank is not required to redeem activity-based stock until the later of the expiration of the notice of redemption or until the activity to which the capital stock relates no longer remains outstanding. If activity-based stock becomes excess stock as a result of an activity no longer remaining outstanding, an FHLBank may repurchase those shares, at its sole discretion, subject to the statutory and regulatory restrictions on excess capital stock redemption.

Table 16.6 - Mandatorily Redeemable Capital Stock by Contractual Year of Redemption
(dollars in millions)

	December 31,	
	2018	2017
Year 1	\$ 34	\$ 14
Year 2	230	34
Year 3	18	312
Year 4	19	21
Year 5	78	43
Thereafter(1)	641	791
Past contractual redemption date due to remaining activity(2)	42	57
Total	<u>\$ 1,062</u>	<u>\$ 1,272</u>

(1) Represents mandatorily redeemable capital stock resulting from an FHFA rule effective February 19, 2016, that made captive insurance companies ineligible for FHLBank membership. Captive insurance company members that were admitted as FHLBank members prior to September 12, 2014, will have their memberships terminated no later than February 19, 2021. Captive insurance company members that were admitted as FHLBank members on or after September 12, 2014, had their memberships terminated no later than February 19, 2017. The related mandatorily redeemable capital stock is not required to be redeemed until five years after the member's termination.

(2) Represents mandatorily redeemable capital stock that is past the end of the contractual redemption period because there is activity outstanding to which the mandatorily redeemable capital stock relates.

Excess Capital Stock

Excess capital stock is defined as the amount of stock held by a member (or former member) in excess of that institution's minimum stock ownership requirement. FHFA rules limit the ability of an FHLBank to create member excess capital stock under certain circumstances. An FHLBank may not pay dividends in the form of capital stock or issue new excess capital stock to members if that FHLBank's excess capital stock exceeds one percent of its total assets or if the issuance of excess capital stock would cause that FHLBank's excess capital stock to exceed one percent of its total assets. At December 31, 2018, the FHLBank of Cincinnati had excess capital stock outstanding totaling more than one percent of its total assets.

Capital Classification Determination

The FHFA determines each FHLBank's capital classification on at least a quarterly basis. If an FHLBank is determined to be other than adequately capitalized, that FHLBank becomes subject to additional supervisory authority by the FHFA. Before implementing a reclassification, the Director of the FHFA is required to provide that FHLBank with written notice of the proposed action and an opportunity to submit a response. Each FHLBank was classified by the FHFA as adequately capitalized as of the date of the FHFA's most recent notification to each FHLBank.

Note 17 - Accumulated Other Comprehensive Income (Loss)

Table 17.1 presents a summary of changes in accumulated other comprehensive income (loss) for the years ended December 31, 2018, 2017, and 2016.

Table 17.1 - Accumulated Other Comprehensive Income (Loss)
(dollars in millions)

	Net Unrealized Gains (Losses) on AFS Securities (Note 5)	Net Unrealized Gains (Losses) on HTM Securities Transferred from AFS Securities	Net Non-Credit Portion of OTTI Gains (Losses) on AFS Securities (Notes 5 and 7)	Net Non-Credit Portion of OTTI Gains (Losses) on HTM Securities (Notes 6 and 7)	Net Unrealized Gains (Losses) Relating to Hedging Activities (Note 11)	Pension and Postretirement Benefits (Note 18)	Total Accumulated Other Comprehensive Income (Loss)
Balance, December 31, 2015	\$ 366	\$ (1)	\$ 241	\$ (527)	\$ (626)	\$ (87)	\$ (634)
Other comprehensive income before reclassifications							
Unrealized gains (losses)	58	1	50	—	221	—	330
Non-credit OTTI losses	—	—	(18)	(3)	—	—	(21)
Change in fair value of other-than-temporarily impaired securities	—	—	73	—	—	—	73
Accretion of non-credit loss	—	—	—	95	—	—	95
Reclassifications from accumulated other comprehensive income (loss) to net income							
Reclassification of realized net (gains) losses included in net income	(17)	—	(1)	—	—	—	(18)
Non-credit OTTI to credit OTTI	—	—	10	3	—	—	13
Amortization on hedging activities	—	—	—	—	19	—	19
Amortization - pension and postretirement	—	—	—	—	—	(14)	(14)
Net current period other comprehensive income (loss)	41	1	114	95	240	(14)	477

	Net Unrealized Gains (Losses) on AFS Securities (Note 5)	Net Unrealized Gains (Losses) on HTM Securities Transferred from AFS Securities	Net Non-Credit Portion of OTTI Gains (Losses) on AFS Securities (Notes 5 and 7)	Net Non-Credit Portion of OTTI Gains (Losses) on HTM Securities (Notes 6 and 7)	Net Unrealized Gains (Losses) Relating to Hedging Activities (Note 11)	Pension and Postretirement Benefits (Note 18)	Total Accumulated Other Comprehensive Income (Loss)
Balance, December 31, 2016	\$ 407	\$ —	\$ 355	\$ (432)	\$ (386)	\$ (101)	\$ (157)
Other comprehensive income before reclassifications							
Unrealized gains (losses)	384	—	132	—	194	—	710
Non-credit OTTI losses	—	—	(5)	—	—	—	(5)
Change in fair value of other- than-temporarily impaired securities	—	—	77	—	—	—	77
Accretion of non-credit loss	—	—	—	90	—	—	90
Reclassifications from accumulated other comprehensive income (loss) to net income							
Reclassification of realized net (gains) losses included in net income	(1)	—	—	—	—	—	(1)
Non-credit OTTI to credit OTTI	—	—	14	2	—	—	16
Amortization on hedging activities	—	—	—	—	6	—	6
Amortization - pension and postretirement	—	—	—	—	—	(12)	(12)
Net current period other comprehensive income (loss)	383	—	218	92	200	(12)	881
Balance, December 31, 2017	790	—	573	(340)	(186)	(113)	724
Other comprehensive income before reclassifications							
Unrealized gains (losses)	(467)	—	(134)	—	144	—	(457)
Non-credit OTTI losses	—	—	(13)	3	—	—	(10)
Change in fair value of other- than-temporarily impaired securities	—	—	25	—	—	—	25
Accretion of non-credit loss	—	—	—	69	—	—	69
Reclassifications from accumulated other comprehensive income (loss) to net income							
Reclassification of realized net (gains) losses included in net income	—	—	(32)	—	—	—	(32)
Non-credit OTTI to credit OTTI	—	—	6	—	—	—	6
Amortization on hedging activities	—	—	—	—	17	—	17
Amortization - pension and postretirement	—	—	—	—	—	5	5
Net current period other comprehensive income (loss)	(467)	—	(148)	72	161	5	(377)
Adjustment for cumulative effect of accounting change - recognition and measurement of financial instruments	(5)	—	—	—	—	—	(5)
Balance, December 31, 2018	\$ 318	\$ —	\$ 425	\$ (268)	\$ (25)	\$ (108)	\$ 342

Note 18 - Pension and Postretirement Benefit Plans

Qualified Defined Benefit Multiemployer Plan

All of the FHLBanks participate in the Pentegra Defined Benefit Plan for Financial Institutions (Pentegra DB Plan), except for the FHLBank of San Francisco, which provides a Cash Balance Plan to eligible employees. The Pentegra DB Plan is a tax-qualified, defined-benefit pension plan. The Pentegra DB Plan is treated as a multiemployer plan for accounting purposes, but operates as a multiple-employer plan under the Employee Retirement Income Security Act of 1974 (ERISA) and the Internal Revenue Code. As a result, certain multiemployer plan disclosures are not applicable to the Pentegra DB Plan. Under the Pentegra DB Plan, contributions made by a participating employer may be used to provide benefits to employees of other participating employers because assets contributed by an employer are not segregated in a separate account or restricted to provide benefits only to employees of that employer. Also, in the event a participating employer is unable to meet its contribution requirements, the required contributions for the other participating employers could increase proportionately.

The Pentegra DB Plan covers all officers and employees of the FHLBanks that meet certain eligibility requirements, except that:

- FHLBank of Atlanta employees are eligible to participate only if hired before March 1, 2011;
- FHLBank of Indianapolis employees are eligible to participate only if hired before February 1, 2010;
- In August 2016, the FHLBank of Des Moines' board of directors elected to freeze the Pentegra DB Plan effective January 1, 2017. After January 1, 2017, participants no longer accrue new benefits under the Pentegra DB Plan;
- FHLBank of Dallas employees are eligible to participate only if hired before January 1, 2007, or hired on or after January 1, 2007, provided that the new employee had prior service with a financial services institution that participated in the Pentegra DB Plan, during which service the employee was covered by that plan. Effective July 1, 2015, coverage was extended to include all of the FHLBank of Dallas' non-highly compensated employees (as defined by the Internal Revenue Service rules) who were hired on and after January 1, 2007, but before August 1, 2010; and
- FHLBank of Topeka employees are eligible to participate only if hired before January 1, 2009.

The Pentegra DB Plan operates on a fiscal year from July 1 through June 30. The Pentegra DB Plan files one Form 5500 on behalf of all employers who participate in the plan. The Employer Identification Number is 13-5645888 and the three-digit plan number is 333. There are no collective bargaining agreements in place at any FHLBank.

The Pentegra DB Plan's annual valuation process includes calculating the plan's funded status and separately calculating the funded status of each participating employer. The funded status is defined as the market value of assets divided by the funding target (100% of the present value of all benefit liabilities accrued at that date). As permitted by ERISA, the Pentegra DB Plan accepts contributions for the prior plan year up to eight and a half months after the asset valuation date. As a result, the market value of assets at the valuation date (July 1) will increase by any subsequent contributions designated for the immediately preceding plan year ended June 30.

The most recent Form 5500 available for the Pentegra DB Plan is for the plan year ended June 30, 2017. The contributions made by the FHLBank of Atlanta during 2018 were more than 5% of the total contributions to the Pentegra DB Plan for the plan year ended June 30, 2017. The contributions made by each of the FHLBanks of Atlanta and Cincinnati during 2017 were more than 5% of the total contributions to the Pentegra DB Plan for the plan year ended June 30, 2016.

Table 18.1 - Pentegra DB Plan Net Pension Cost and Funded Status
(dollars in millions)

	2018	2017	2016
Net pension cost charged to compensation and benefit expense for the year ended December 31	\$ 79	\$ 61	\$ 64
Pentegra DB Plan funded status as of July 1	109.9% ^(a)	111.8% ^(b)	104.7%
Range of the FHLBanks' funded status as of July 1	97.4%-147.3%	97.7%-142.4%	93.8%-129.6%

- (a) The Pentegra DB Plan's funded status as of July 1, 2018, is preliminary and may increase because the plan's participants were permitted to make contributions for the plan year ended June 30, 2018 through March 15, 2019. Contributions made on or before March 15, 2019, and designated for the plan year ended June 30, 2018, will be included in the final valuation as of July 1, 2018. The final funded status as of July 1, 2018, will not be available until the Form 5500 for the plan year July 1, 2018 through June 30, 2019, is filed (this Form 5500 is due to be filed no later than April 2020).
- (b) The Pentegra DB Plan's funded status as of July 1, 2017, is preliminary and may increase because the plan's participants were permitted to make contributions for the plan year ended June 30, 2017 through March 15, 2018. Contributions made on or before March 15, 2018, and designated for the plan year ended June 30, 2017, will be included in the final valuation as of July 1, 2017. The final funded status as of July 1, 2017, will not be available until the Form 5500 for the plan year July 1, 2017 through June 30, 2018, is filed (this Form 5500 is due to be filed no later than April 2019).

Defined Contribution Retirement Plans

Qualified Defined Contribution Plans. Each FHLBank participates in a defined contribution plan. The FHLBanks of Boston, New York, Pittsburgh, Cincinnati, Indianapolis, Chicago, and Topeka participate in the Pentegra Defined Contribution Plan for Financial Institutions, a tax-qualified, defined-contribution plan. The FHLBanks of Atlanta, Des Moines, Dallas, and San Francisco have similar defined contribution plans. Under these plans, each FHLBank contributes a percentage of the participants' compensation by making a matching contribution equal to a percentage of the employee's voluntary contributions, subject to certain limitations.

Nonqualified Supplemental Defined Contribution Retirement Plans. Certain FHLBanks maintain at least one or more nonqualified, unfunded supplemental defined contribution plans. These plans restore all or a portion of defined contributions to those employees who have had their qualified defined contribution benefits limited by IRS regulations. The unfunded liability associated with these nonqualified supplemental defined contribution retirement plans was \$92 million at both December 31, 2018 and 2017. However, certain of these FHLBanks have established a grantor/rabbi trust to meet future benefit obligations and current payments to the beneficiaries.

Costs expensed for all qualified and nonqualified defined contribution plans were \$24 million, \$23 million, and \$21 million for the years ended December 31, 2018, 2017, and 2016.

Defined Benefit Retirement Plans

Nonqualified Supplemental Defined Benefit Retirement Plans. Certain FHLBanks maintain one or more nonqualified, unfunded supplemental defined benefit plans. These plans ensure that participants receive the full amount of benefits to which they would have been entitled under the qualified defined benefit plan in the absence of limits on benefit levels imposed by the IRS. Certain of these FHLBanks have established a grantor/rabbi trust to meet future benefit obligations and current payments to the beneficiaries. There are no funded plan assets that have been designated to provide supplemental retirement benefits.

FHLBank of San Francisco Cash Balance Plan. The FHLBank of San Francisco provides retirement benefits through its Cash Balance Plan, a qualified defined benefit plan. The Cash Balance Plan is provided to all employees who have completed six months of FHLBank of San Francisco service. Under the plan, each eligible FHLBank of San Francisco employee accrues benefits annually equal to six percent of the employee's total annual compensation, plus six percent interest on the benefits accrued to the employee through the prior year-end. The Cash Balance Plan is funded through a qualified trust established by the FHLBank of San Francisco. The fair value of the plan assets were \$57 million and \$63 million at December 31, 2018 and 2017; all plan assets were Level 1 within the fair value hierarchy. (See [Note 19 - Fair Value](#) for more information.)

Table 18.2 presents the obligations and funding status of the FHLBanks' nonqualified supplemental defined benefit retirement plans and the FHLBank of San Francisco's Cash Balance Plan (collectively referred to as "Defined Benefit Retirement Plans").

Table 18.2 - Benefit Obligation, Fair Value of Plan Assets, and Funded Status
(dollars in millions)

Defined Benefit Retirement Plans	Year Ended December 31,	
	2018	2017
Change in benefit obligation		
Benefit obligation at beginning of year	\$ 336	\$ 291
Service cost	14	13
Interest cost	12	11
Loss (gain)	8	27
Benefits paid	(12)	(7)
Plan amendments	5	5
Settlements and curtailments	(2)	(4)
Benefit obligation at end of year	<u>361</u>	<u>336</u>
Change in plan assets		
Fair value of plan assets at beginning of year	63	53
Actual return on plan assets	(4)	9
Employer contributions	12	12
Benefits paid	(12)	(7)
Settlements and curtailments	(2)	(4)
Fair value of plan assets at end of year	<u>57</u>	<u>63</u>
Funded status	<u>\$ (304)</u>	<u>\$ (273)</u>

Amounts recognized in other liabilities on the Combined Statement of Condition for the FHLBanks' Defined Benefit Retirement Plans at December 31, 2018 and 2017, were \$304 million and \$273 million. Amounts recognized for net actuarial loss and prior service cost in accumulated other comprehensive income (loss) on the Combined Statement of Condition for the FHLBanks' Defined Benefit Retirement Plans at December 31, 2018 and 2017, were \$116 million and \$112 million. The accumulated benefit obligation for the Defined Benefit Retirement Plans was \$301 million and \$288 million at December 31, 2018 and 2017.

The net periodic benefit cost recognized on the Combined Statement of Income in Compensation and benefits for the FHLBanks' Defined Benefit Retirement Plans was \$31 million, \$32 million, and \$31 million for the years ended December 31, 2018, 2017, and 2016. The other changes in benefit obligations recognized on the Combined Statement of Comprehensive Income were gains of \$4 million, \$15 million, and \$14 million for the years ended December 31, 2018, 2017, and 2016. The estimated net actuarial loss and prior service cost that will be amortized from AOCI into net periodic benefit cost over the next fiscal year is \$13 million.

Table 18.3 presents the key assumptions used for the actuarial calculations to determine benefit obligations for the FHLBanks' Defined Benefit Retirement Plans (displayed as a range from low to high).

Table 18.3 - Benefit Obligation Key Assumptions

Defined Benefit Retirement Plans	2018	2017
Discount rate	3.6% - 4.1%	3.0% - 3.7%
Salary increases	3.0% - 5.5%	3.0% - 5.5%

Table 18.4 presents the key assumptions used for the actuarial calculations to determine net periodic benefit cost for the FHLBanks' Defined Benefit Retirement Plans (displayed as a range from low to high).

Table 18.4 - Net Periodic Benefit Cost Key Assumptions

Defined Benefit Retirement Plans	December 31,		
	2018	2017	2016
Discount rate	3.0% - 3.7%	3.5% - 4.2%	3.8% - 4.5%
Salary increases	3.0% - 5.5%	3.0% - 5.5%	3.0% - 6.5%
Expected return on plan assets	7.8%	7.8%	7.8%

Estimated future benefit payments are based on each plan's census data, benefit formulas and provisions, and valuation assumptions reflecting the probability of decrement and survival. The present value of the future benefit payments is determined by using duration-based interest rate yields from a variety of highly rated relevant corporate bond indices as of December 31, 2018, and solving for the single discount rate that produces the same present value.

The nonqualified supplemental retirement plans are not funded; therefore, no contributions will be made in 2019 other than for the payment of benefits. Table 18.5 presents the estimated future payments of benefits.

Table 18.5 - Estimated Future Benefit Payments
(dollars in millions)

Years	Payments
2019	\$ 36
2020	27
2021	26
2022	32
2023	61
2024-2028	131

Postretirement Benefit Plans

Certain FHLBanks offer postretirement benefit plans that may include health care and/or life insurance benefits for eligible retirees. There are no funded plan assets that have been designated to provide postretirement benefits. The financial amounts related to postretirement benefit plans are immaterial to the FHLBanks' combined financial condition, combined results of operations, and combined cash flows.

Note 19 - Fair Value

The fair value amounts recorded on the Combined Statement of Condition and presented in the note disclosures for the periods presented have been determined by the FHLBanks using available market and other pertinent information and reflect each FHLBank's best judgment of appropriate valuation methods. GAAP defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date (i.e., an exit price). Although each FHLBank uses its best judgment in estimating the fair value of its financial instruments, there are inherent limitations in any valuation technique. Therefore, the fair values may not be indicative of the amounts that would have been realized in market transactions at December 31, 2018 and 2017. Additionally, these values do not represent an estimate of the overall market value of the FHLBanks as going concerns, which would take into account future business opportunities and the net profitability of assets and liabilities.

Fair Value Hierarchy

GAAP establishes a fair value hierarchy and requires an entity to maximize the use of significant observable inputs and minimize the use of significant unobservable inputs when measuring fair value. The inputs are evaluated and an overall level for the fair value measurement is determined. This overall level is an indication of market observability of the fair value measurement for the asset or liability. An entity must disclose the level within the fair value hierarchy in which the measurements are classified.

The fair value hierarchy prioritizes the inputs used to measure fair value into three broad levels:

- Level 1 Inputs. Quoted prices (unadjusted) for identical assets or liabilities in an active market that the reporting entity can access on the measurement date.
- Level 2 Inputs. Inputs other than quoted prices within Level 1, that are observable inputs for the asset or liability, either directly or indirectly. If the asset or liability has a specified or contractual term, a Level 2 input must be observable for substantially the full term of the asset or liability. Level 2 inputs include the following: (1) quoted prices for similar assets or liabilities in active markets; (2) quoted prices for identical or similar assets or liabilities in markets that are not active; (3) inputs other than quoted prices that are observable for the asset or liability (e.g., interest rates and yield curves that are observable at commonly quoted intervals, and implied volatilities); and (4) inputs that are derived principally from or corroborated by observable market data by correlation or other means.
- Level 3 Inputs. Unobservable inputs for the asset or liability.

Each FHLBank reviews its fair value hierarchy classifications on a quarterly basis. Changes in the observability of the valuation inputs may result in a reclassification of certain assets or liabilities. These reclassifications would be reported as transfers in/out at fair value at the beginning of the quarter in which the changes occur. The FHLBanks had no transfers of assets or liabilities between fair value levels during the years ended December 31, 2018, 2017, or 2016.

Table 19.1 presents the carrying value, fair value, and fair value hierarchy of financial assets and liabilities of the FHLBanks at December 31, 2018 and 2017. The FHLBanks record trading securities, available-for-sale securities, derivative assets, derivative liabilities, certain advances, certain consolidated obligations, and certain other assets at fair value on a recurring basis, and on occasion certain private-label MBS, certain mortgage loans held for portfolio, and certain other assets at fair value on a non-recurring basis. The FHLBanks record all other financial assets and liabilities at amortized cost. Refer to Table 19.2 for further details about the financial assets and liabilities held at fair value on either a recurring or non-recurring basis.

Table 19.1 - Fair Value Summary
(dollars in millions)

Financial Instruments	December 31, 2018					
	Carrying Value	Fair Value				Netting Adjustment and Cash Collateral(1)
		Total	Level 1	Level 2	Level 3	
Assets						
Cash and due from banks	\$ 522	\$ 522	\$ 522	\$ —	\$ —	\$ —
Interest-bearing deposits	17,182	17,182	7,250	9,932	—	—
Securities purchased under agreements to resell	45,325	45,325	—	45,325	—	—
Federal funds sold	54,216	54,217	—	54,217	—	—
Trading securities	16,449	16,449	5,304	11,145	—	—
Available-for-sale securities	83,205	83,205	—	78,682	4,523	—
Held-to-maturity securities	90,413	90,658	—	86,345	4,313	—
Advances(2)	728,767	728,435	—	728,435	—	—
Mortgage loans held for portfolio, net	62,534	61,820	—	61,704	116	—
Mortgage loans held for sale(3)	108	108	—	108	—	—
Accrued interest receivable	2,087	2,087	—	2,087	—	—
Derivative assets, net	1,038	1,038	—	1,276	—	(238)
Other assets	249	245	198	47	—	—
Liabilities						
Deposits	7,560	7,560	—	7,560	—	—
Consolidated obligations						
Discount notes(4)	426,034	425,987	—	425,987	—	—
Bonds(5)	603,491	602,116	—	602,116	—	—
Total consolidated obligations	1,029,525	1,028,103	—	1,028,103	—	—
Mandatorily redeemable capital stock	1,062	1,062	1,062	—	—	—
Accrued interest payable	1,878	1,878	—	1,878	—	—
Derivative liabilities, net	445	445	—	2,054	—	(1,609)
Other liabilities	121	118	86	32	—	—

December 31, 2017

Financial Instruments	Carrying Value	Fair Value				Netting Adjustment and Cash Collateral (1)(6)
		Total	Level 1	Level 2	Level 3	
Assets						
Cash and due from banks	\$ 7,175	\$ 7,175	\$ 7,175	\$ —	\$ —	\$ —
Interest-bearing deposits	5,420	5,420	2,825	2,595	—	—
Securities purchased under agreements to resell	52,568	52,568	—	52,568	—	—
Federal funds sold	65,530	65,531	—	65,531	—	—
Trading securities	7,736	7,736	1,306	6,430	—	—
Available-for-sale securities	79,560	79,560	51	73,742	5,767	—
Held-to-maturity securities	96,466	97,282	—	91,869	5,413	—
Advances(2)	731,544	731,600	—	731,600	—	—
Mortgage loans held for portfolio, net	53,827	54,325	—	54,189	136	—
Mortgage loans held for sale(3)	118	118	—	118	—	—
Accrued interest receivable	1,584	1,584	—	1,584	—	—
Derivative assets, net	991	991	—	2,013	—	(1,022)
Other assets	159	157	117	40	—	—
Liabilities						
Deposits	7,789	7,789	—	7,789	—	—
Consolidated obligations						
Discount notes(4)	391,480	391,469	—	391,469	—	—
Bonds(5)	641,601	641,476	—	641,476	—	—
Total consolidated obligations	1,033,081	1,032,945	—	1,032,945	—	—
Mandatorily redeemable capital stock	1,272	1,272	1,272	—	—	—
Accrued interest payable	1,324	1,324	—	1,324	—	—
Derivative liabilities, net	449	449	—	2,256	—	(1,807)
Other liabilities	113	111	84	27	—	—

(1) Amounts represent the application of the netting requirements that allow an FHLBank to settle positive and negative positions, and also cash collateral and related accrued interest held or placed by that FHLBank with the same clearing agent and/or counterparty.

(2) Includes \$6,168 million and \$9,428 million of advances recorded under fair value option at December 31, 2018 and 2017.

(3) Represents mortgage loans held for sale recorded under fair value option, included in other assets on the Combined Statement of Condition.

(4) Includes \$4,172 million and \$3,062 million of consolidated discount notes recorded under fair value option at December 31, 2018 and 2017.

(5) Includes \$13,438 million and \$12,917 million of consolidated bonds recorded under fair value option at December 31, 2018 and 2017.

(6) To conform with current presentation, \$401 million of variation margin on cleared derivatives has been allocated to the individual derivative instruments as of December 31, 2017. Previously, this amount was included with Netting Adjustments and Cash Collateral.

Summary of Valuation Methodologies and Primary Inputs

The valuation methodologies and primary inputs used to develop the measurement of fair value for assets and liabilities that are measured at fair value on a recurring or nonrecurring basis in the Statement of Condition are listed below. The fair values and level within the fair value hierarchy of these assets and liabilities are reported in Table 19.2.

Investment securities-MBS. Using a uniform framework, each FHLBank's valuation technique incorporates prices from multiple designated third-party pricing vendors, when available. The third-party pricing vendors use various proprietary models to price MBS. The inputs to those models are derived from various sources, including, but not limited to, benchmark yields, reported trades, dealer estimates, issuer spreads, benchmark securities, bids, offers, and other market-related data. As many MBS do not trade on a daily basis, the pricing vendors use applicable, available information, such as benchmark curves, benchmarking of like securities, sector groupings, and matrix pricing, to determine the prices for individual securities. Each pricing vendor has an established challenge process in place for all MBS valuations, which facilitates resolution of potentially erroneous prices identified by the FHLBanks. Each FHLBank has conducted reviews of multiple pricing vendors to confirm and further augment its understanding of the vendors' pricing processes, methodologies, and control procedures for specific instruments.

The FHLBanks' valuation technique for estimating the fair values of MBS first requires the establishment of a median price for each security. All prices that are within a specified tolerance threshold of the median price are included in the cluster of prices that are averaged to compute a default price. All prices that are outside the threshold (outliers) are subject to further analysis to determine if an outlier is a better estimate of fair value. These steps include, but are not limited to, comparison to prices provided by an additional third-party valuation service, prices for similar securities, and/or non-binding dealer estimates. If an outlier or some other price identified in the analysis is determined to be a better estimate of fair value, then the outlier or the other price as appropriate is used as the final price rather than the default price. Alternatively, if the analysis confirms that an outlier (or outliers) is (are) in fact not representative of fair value and the default price is the best estimate, then the default price is used as the final price. In all cases, the final price is used to determine the fair value of the security.

As of December 31, 2018 and 2017, multiple prices were received for substantially all of the FHLBanks' MBS holdings and the final prices for those securities were computed by averaging the prices received. Based on each FHLBank's review of the pricing methods employed by the third-party pricing vendors and the relative lack of dispersion among the vendor prices (or, in those instances in which there were outliers or significant yield variances, the FHLBanks' additional analyses), each FHLBank believes its final prices result in reasonable estimates of fair value and that the fair value measurements are classified appropriately in the fair value hierarchy. Based on the lack of significant market activity for private-label residential MBS and home equity loan ABS, the recurring and non-recurring fair value measurements for those securities were classified as Level 3 within the fair value hierarchy as of December 31, 2018 and 2017.

Investment securities-Non-MBS. To determine the estimated fair values of non-MBS investment securities, each FHLBank uses either a market approach using prices from third-party pricing vendors, generally consistent with the methodologies for MBS, or an income approach based on a market-observable interest rate curve adjusted for a spread, which may be based on unobservable information. Differing spreads may be applied to distinct term points along the discount curve in determining the fair values of instruments with varying maturities. Each FHLBank believes that its methodologies result in fair values that are reasonable and similar in all material respects based on the nature of the financial instruments being measured. The market-observable interest rate curves used by the FHLBanks and the related financial instrument they measure are as follows:

- *Treasury Curve.* U.S. Treasury obligations.
- *LIBOR Swap Curve.* Certificates of deposit and Federal Family Education Loan Program ABS.
- *U.S. Government Agency Fair Value Curve.* Government-sponsored enterprises and Tennessee Valley Authority obligations.

Advances recorded under fair value option. Each FHLBank generally determines the fair values of its advances recorded under fair value option by calculating the present value of expected future cash flows from the advances, excluding the amount of the accrued interest receivable. The discount rates used in these calculations are equivalent to the replacement advance rates for advances with similar terms. Each FHLBank calculates its replacement advance rates at a spread to its cost of funds. Each FHLBank's cost of funds approximates the consolidated obligation (CO) curve. (See *Summary of Valuation Methodologies and Primary Inputs - Consolidated obligations* within this note for a discussion of the CO curve.) To estimate the fair values of advances with optionality, market-based expectations of future interest rate volatility implied from current market prices for similar options are also used. In accordance with the FHFA's advances regulations, an advance with a maturity or repricing period greater than six months requires a prepayment fee sufficient to make an FHLBank financially indifferent to the borrower's decision to prepay the advances. Therefore, the fair values of advances do not assume prepayment risk.

The FHLBanks did not adjust their fair value measurement of advances recorded under fair value option for creditworthiness primarily because advances were fully collateralized. (See [Note 8 - Advances](#) and [Note 10 - Allowance for Credit Losses](#) for additional information.)

Mortgage loans held for sale. The fair value of mortgage loans held for sale is based on to-be-announced (TBA) securities, which represent quoted market prices for new mortgage-backed securities issued by U.S. government-sponsored enterprises.

Impaired mortgage loans held for portfolio and real estate owned. The estimated fair values of impaired mortgage loans held for portfolio and real estate owned on a non-recurring basis are generally based on broker prices, property values obtained from a third-party pricing vendor, or current actual loss severity rates that the FHLBanks have incurred on sales. All estimated fair values of impaired mortgage loans held for portfolio and real estate owned are net of any estimated selling costs.

Derivative assets/liabilities. Each FHLBank bases the fair values of derivatives with similar terms on market prices, when available. However, active markets do not exist for many of the FHLBanks' derivatives. Consequently, fair values for these instruments are generally estimated using standard valuation techniques such as discounted cash flow analysis and comparisons to similar instruments. In limited instances, fair value estimates for derivatives are obtained from dealers and are corroborated by an FHLBank using a pricing model and observable market data. Each FHLBank is subject to credit risk due to the risk of nonperformance by counterparties to its derivative transactions. For uncleared derivatives, the degree of credit risk depends on the extent to which master netting arrangements are included in these contracts to mitigate the risk. In addition, each FHLBank requires collateral agreements with collateral delivery thresholds on the majority of its uncleared derivatives. The use of cleared derivatives is intended to mitigate credit risk exposure because a central counterparty is substituted for individual counterparties and collateral is posted daily, through a clearing agent, for changes in the value of cleared derivatives. Each FHLBank has evaluated the potential for the fair value of the instruments to be affected by counterparty credit risk and its own credit risk and has determined that no adjustments were significant to the overall fair value measurements.

The fair values of each FHLBank's derivative assets and liabilities include accrued interest receivable/payable and related cash collateral remitted to/received from clearing agents and/or counterparties. The estimated fair values of the accrued interest receivable/payable and cash collateral approximate their carrying values due to their short-term nature. Derivatives are presented on a net basis by clearing agent and/or by counterparty when it has met the netting requirements. If these netted amounts are positive, they are classified as an asset and, if negative, they are classified as a liability.

Each FHLBank's discounted cash flow analysis uses market-observable inputs. Inputs by class of derivative are as follows:

Interest-rate related:

- *Discount rate assumption.* The FHLBanks used the Overnight Index Swap (OIS) curve or the LIBOR swap curve depending on the terms of the derivative.
- *Forward interest rate assumption.* LIBOR swap curve.
- *Volatility assumption.* Market-based expectations of future interest rate volatility implied from current market prices for similar options.
- *Prepayment assumption* (if applicable).
- *TBA securities prices.* Market-based prices of TBAs are determined by coupon class and expected term until settlement.
- *TBA "drops."* TBA price "drops" are used to adjust base TBA prices and are a function of current short-term interest rates, prepayment estimates, and the supply and demand for pass-throughs in the current delivery month. TBA drops are obtained from a market-observable source.

Mortgage delivery commitments:

- *TBA securities prices.* TBA security prices are generally adjusted for differences in coupon, average loan rate, and seasoning.

Consolidated obligations recorded under fair value option. Each FHLBank estimates the fair values of consolidated obligations recorded under fair value option based on prices received from pricing vendors, consistent with the methodology for MBS previously discussed, or by using standard valuation techniques and inputs based on the cost of raising comparable term debt.

The inputs used to determine the fair values of consolidated obligations are as follows:

- *CO Curve and LIBOR Swap Curve.* The Office of Finance constructs an internal curve, referred to as the CO curve, using the U.S. Treasury curve as a base curve that is then adjusted by adding indicative spreads obtained from market observable sources. These market indications are generally derived from pricing indications from dealers of consolidated obligations, historical pricing relationships, recent GSE trades, and secondary market activity. The LIBOR swap curve is used for certain callable consolidated obligations.
- *Volatility assumption.* To estimate the fair values of consolidated obligations with optionality the FHLBanks use market-based expectations of future interest rate volatility implied from current market prices for similar options.
- *Spread adjustment.* FHLBanks may apply an adjustment to the curve.

The FHLBanks monitor their own creditworthiness and determine if any credit risk adjustments are necessary in their fair value measurement of consolidated obligations.

Subjectivity of estimates. Estimates of the fair value of financial assets and liabilities using the methodologies described above are highly subjective and require judgments regarding significant matters such as the amount and timing of future cash flows, prepayment speed assumptions, expected interest rate volatility, possible distributions of future interest rates used to value options, and the selection of discount rates that appropriately reflect market and credit risks. The use of different assumptions could have a material effect on the fair value estimates.

Fair Value Measurements

Table 19.2 presents the fair value of assets and liabilities that are recorded on a recurring or non-recurring basis at December 31, 2018 and 2017, by level within the fair value hierarchy. The FHLBanks measure certain held-to-maturity securities and mortgage loans at fair value on a non-recurring basis due to the recognition of a credit loss. Real estate owned is measured using fair value when the asset's fair value less costs to sell is lower than its carrying amount.

Table 19.2 - Fair Value Measurements
(dollars in millions)

	December 31, 2018				
	Total	Level 1	Level 2	Level 3	Netting Adjustment and Cash Collateral(1)
Recurring fair value measurements - Assets					
Trading securities					
Certificates of deposit	\$ —	\$ —	\$ —	\$ —	\$ —
U.S. obligations	11,991	5,304	6,687	—	—
GSE and Tennessee Valley Authority obligations	2,671	—	2,671	—	—
Other non-MBS	275	—	275	—	—
Other U.S. obligations single-family MBS	12	—	12	—	—
GSE single-family MBS	76	—	76	—	—
GSE multifamily MBS	1,424	—	1,424	—	—
Total trading securities	<u>16,449</u>	<u>5,304</u>	<u>11,145</u>	<u>—</u>	<u>—</u>
Available-for-sale securities					
Certificates of deposit	2,350	—	2,350	—	—
U.S. obligations	3,519	—	3,519	—	—
GSE and Tennessee Valley Authority obligations	13,307	—	13,307	—	—
State or local housing agency obligations	1,125	—	1,075	50	—
Federal Family Education Loan Program ABS	3,781	—	3,781	—	—
Other non-MBS	852	—	852	—	—
Other U.S. obligations single-family MBS	5,447	—	5,447	—	—
Other U.S. obligations multifamily MBS	361	—	361	—	—
GSE single-family MBS	7,377	—	7,377	—	—
GSE multifamily MBS	40,613	—	40,613	—	—
Private-label residential MBS	4,473	—	—	4,473	—
Total available-for-sale securities	<u>83,205</u>	<u>—</u>	<u>78,682</u>	<u>4,523</u>	<u>—</u>
Advances(2)	6,168	—	6,168	—	—
Mortgage loans held for sale(2)	108	—	108	—	—
Derivative assets, net					
Interest-rate related	1,034	—	1,272	—	(238)
Mortgage delivery commitments	4	—	4	—	—
Total derivative assets, net	<u>1,038</u>	<u>—</u>	<u>1,276</u>	<u>—</u>	<u>(238)</u>
Other assets					
	213	198	15	—	—
Total recurring assets at fair value	<u>\$ 107,181</u>	<u>\$ 5,502</u>	<u>\$ 97,394</u>	<u>\$ 4,523</u>	<u>\$ (238)</u>
Recurring fair value measurements - Liabilities					
Consolidated Obligations					
Discount notes(2)	\$ 4,172	\$ —	\$ 4,172	\$ —	\$ —
Bonds(2)	13,438	—	13,438	—	—
Total consolidated obligations	<u>17,610</u>	<u>—</u>	<u>17,610</u>	<u>—</u>	<u>—</u>
Derivative liabilities, net					
Interest-rate related	444	—	2,053	—	(1,609)
Mortgage delivery commitments	1	—	1	—	—
Total derivative liabilities, net	<u>445</u>	<u>—</u>	<u>2,054</u>	<u>—</u>	<u>(1,609)</u>
Total recurring liabilities at fair value	<u>\$ 18,055</u>	<u>\$ —</u>	<u>\$ 19,664</u>	<u>\$ —</u>	<u>\$ (1,609)</u>
Non-recurring fair value measurements - Assets(3)					
Held-to-maturity securities					
Private-label residential MBS	\$ 2	\$ —	\$ —	\$ 2	—
Mortgage loans held for portfolio	24	—	1	23	—
Real estate owned	10	—	—	10	—
Total non-recurring assets at fair value	<u>\$ 36</u>	<u>\$ —</u>	<u>\$ 1</u>	<u>\$ 35</u>	<u>—</u>

December 31, 2017

	Total	Level 1	Level 2	Level 3	Netting Adjustment and Cash Collateral(1)(4)
Recurring fair value measurements - Assets					
Trading securities					
Certificates of deposit	\$ 585	\$ —	\$ 585	\$ —	\$ —
U.S. obligations	1,785	1,285	500	—	—
GSE and Tennessee Valley Authority obligations	3,463	—	3,463	—	—
Other non-MBS	293	21	272	—	—
Other U.S. obligations single-family MBS	16	—	16	—	—
GSE single-family MBS	101	—	101	—	—
GSE multifamily MBS	1,493	—	1,493	—	—
Total trading securities	7,736	1,306	6,430	—	—
Available-for-sale securities					
Certificates of deposit	900	—	900	—	—
U.S. obligations	3,765	—	3,765	—	—
GSE and Tennessee Valley Authority obligations	14,961	—	14,961	—	—
State or local housing agency obligations	1,262	—	1,225	37	—
Federal Family Education Loan Program ABS	4,214	—	4,214	—	—
Other non-MBS	922	51	871	—	—
Other U.S. obligations single-family MBS	5,010	—	5,010	—	—
Other U.S. obligations multifamily MBS	443	—	443	—	—
GSE single-family MBS	8,771	—	8,771	—	—
GSE multifamily MBS	33,582	—	33,582	—	—
Private-label residential MBS	5,730	—	—	5,730	—
Total available-for-sale securities	79,560	51	73,742	5,767	—
Advances(2)	9,428	—	9,428	—	—
Mortgage loans held for sale(2)	118	—	118	—	—
Derivative assets, net					
Interest-rate related	989	—	2,011	—	(1,022)
Mortgage delivery commitments	2	—	2	—	—
Total derivative assets, net	991	—	2,013	—	(1,022)
Other assets	130	117	13	—	—
Total recurring assets at fair value	\$ 97,963	\$ 1,474	\$ 91,744	\$ 5,767	\$ (1,022)
Recurring fair value measurements - Liabilities					
Consolidated Obligations					
Discount notes(2)	\$ 3,062	\$ —	\$ 3,062	\$ —	\$ —
Bonds(2)	12,917	—	12,917	—	—
Total consolidated obligations	15,979	—	15,979	—	—
Derivative liabilities, net					
Interest-rate related	448	—	2,255	—	(1,807)
Mortgage delivery commitments	1	—	1	—	—
Total derivative liabilities, net	449	—	2,256	—	(1,807)
Total recurring liabilities at fair value	\$ 16,428	\$ —	\$ 18,235	\$ —	\$ (1,807)
Non-recurring fair value measurements - Assets(3)					
Held-to-maturity securities					
Private-label residential MBS	\$ 6	\$ —	\$ —	\$ 6	—
Mortgage loans held for portfolio	46	—	3	43	—
Real estate owned	14	—	—	14	—
Total non-recurring assets at fair value	\$ 66	\$ —	\$ 3	\$ 63	—

(1) Amounts represent the application of the netting requirements that allow an FHLBank to settle positive and negative positions, and also cash collateral and related accrued interest held or placed by that FHLBank with the same clearing agent and/or counterparty.

(2) Represents financial instruments recorded under fair value option at December 31, 2018 and 2017.

(3) The fair value information presented is as of the date the fair value adjustment was recorded during the years ended December 31, 2018 and 2017.

(4) To conform with current presentation, \$401 million of variation margin on cleared derivatives has been allocated to the individual derivative instruments as of December 31, 2017. Previously, this amount was included with Netting Adjustments and Cash Collateral.

Level 3 Disclosures for All Assets and Liabilities that are Measured at Fair Value on a Recurring Basis

Table 19.3 presents a rollforward of assets and liabilities measured at fair value on a recurring basis and classified as Level 3 during the years ended December 31, 2018, 2017, and 2016.

Table 19.3 - Rollforward of Level 3 Assets and Liabilities

(dollars in millions)

	Year Ended December 31, 2018				
	Available-for-Sale Securities			Derivative Assets(1)	
	State and Local Housing Agency Obligations	Private-Label Residential MBS	Home Equity Loan ABS	Interest-Rate Related	Consolidated Bonds
Balance, at beginning of period	\$ 37	\$ 5,730	\$ —	\$ —	\$ —
Total gains (losses) included in earnings					
Net gains (losses) on sale of available-for-sale securities	—	32	—	—	—
Interest income	—	162	—	—	—
Net other-than-temporary impairment losses	—	(16)	—	—	—
Total gains (losses) included in other comprehensive income					
Net unrealized gains (losses) on available-for-sale securities	—	(2)	—	—	—
Net amount of impairment losses reclassified to (from) non-interest income	—	(8)	—	—	—
Net change in fair value of other-than-temporarily impaired securities	—	(109)	—	—	—
Purchases, issuances, sales, and settlements					
Purchases	13	—	—	—	—
Sales	—	(236)	—	—	—
Settlements	—	(1,093)	—	—	—
Transfers from held-to-maturity to available-for-sale securities	—	13	—	—	—
Balance, at end of period	\$ 50	\$ 4,473	\$ —	\$ —	\$ —
Total amount of gains (losses) for the period included in earnings attributable to the change in unrealized gains/losses relating to assets and liabilities held at end of period	\$ —	\$ 83	\$ —	\$ —	\$ —

	Year Ended December 31, 2017					
	Available-for-Sale Securities			Derivative Assets(1)		
	State and Local Housing Agency Obligations	Private-Label Residential MBS	Home Equity Loan ABS	Interest-Rate Related	Consolidated Bonds	
Balance, at beginning of period	\$ 8	\$ 6,833	\$ —	\$ —	\$ —	
Total gains (losses) included in earnings						
Net gains (losses) on sale of available-for-sale securities	—	—	—	—	—	
Net gains (losses) on derivatives and hedging activities	—	—	—	—	—	
Interest income	—	185	—	—	—	
Net other-than-temporary impairment losses	—	(19)	—	—	—	
Total gains (losses) included in other comprehensive income						
Net unrealized gains (losses) on available-for-sale securities	(4)	3	—	—	—	
Net amount of impairment losses reclassified to (from) non-interest income	—	10	—	—	—	
Net change in fair value of other-than-temporarily impaired securities	—	209	—	—	—	
Purchases, issuances, sales, and settlements						
Purchases	33	—	—	—	—	
Sales	—	—	—	—	—	
Settlements	—	(1,491)	—	—	—	
Balance, at end of period	\$ 37	\$ 5,730	\$ —	\$ —	\$ —	
Total amount of gains (losses) for the period included in earnings attributable to the change in unrealized gains/losses relating to assets and liabilities held at end of period	\$ —	\$ 100	\$ —	\$ —	\$ —	

	Year Ended December 31, 2016					
	Available-for-Sale Securities			Derivative Assets(1)		
	State and Local Housing Agency Obligations	Private-Label Residential MBS	Home Equity Loan ABS	Interest-Rate Related	Consolidated Bonds	
Balance, at beginning of period	—	\$ 8,282	\$ 10	\$ 4	\$ (55)	
Total gains (losses) included in earnings						
Net gains (losses) on sale of available-for-sale securities	—	—	1	—	—	
Net gains (losses) on derivatives and hedging activities	—	—	—	(4)	55	
Interest income	—	187	—	—	—	
Net other-than-temporary impairment losses	—	(19)	—	—	—	
Total gains (losses) included in other comprehensive income						
Net unrealized gains (losses) on available-for-sale securities	(1)	2	—	—	—	
Net amount of impairment losses reclassified to (from) non-interest income	—	(7)	(1)	—	—	
Net change in fair value of other-than-temporarily impaired securities	—	123	—	—	—	
Purchases, issuances, sales, and settlements						
Purchases	9	—	—	—	—	
Sales	—	(9)	(9)	—	—	
Settlements	—	(1,726)	(1)	—	—	
Balance, at end of period	\$ 8	\$ 6,833	\$ —	\$ —	\$ —	
Total amount of gains (losses) for the period included in earnings attributable to the change in unrealized gains/losses relating to assets and liabilities held at end of period	\$ —	\$ 112	\$ —	\$ —	\$ —	

(1) Balances exclude netting adjustments, cash collateral and related accrued interest.

Fair Value Option

The fair value option provides an irrevocable option to elect fair value as an alternative measurement for selected financial assets, financial liabilities, unrecognized firm commitments, and written loan commitments not previously carried at fair value. It requires entities to display the fair value of those assets and liabilities for which the entity has chosen to use fair value on the face of the statement of condition. Fair value is used for both the initial and subsequent measurement of the designated assets, liabilities and commitments, with the changes in fair value recognized in net income. Interest income and interest expense on advances and consolidated obligations at fair value are recognized solely on the contractual amount of interest due or unpaid. Any transaction fees or costs are immediately recognized into non-interest income or non-interest expense.

The FHLBanks of New York, Cincinnati, Chicago, and San Francisco (Electing FHLBanks) have each elected the fair value option for certain financial instruments when a hedge relationship does not qualify for hedge accounting or may be at risk for not meeting hedge effectiveness requirements. These fair value elections were made primarily in an effort to mitigate the potential income statement volatility that can arise when an economic derivative is adjusted for changes in fair value, but the related hedged item is not.

Table 19.4 presents net gains (losses) recognized in earnings related to financial assets and liabilities for which the fair value option was elected during the years ended December 31, 2018, 2017, and 2016.

Table 19.4 - Fair Value Option - Financial Assets and Liabilities
(dollars in millions)

Net Gains (Losses) from Changes in Fair Value Recognized in Earnings	Year Ended December 31,		
	2018	2017	2016
Advances	\$ (28)	\$ (42)	\$ (21)
Mortgage loans held for sale(1)	(6)	(4)	(5)
Consolidated discount notes	—	—	(6)
Consolidated bonds	(20)	18	35
Total net gains (losses)	\$ (54)	\$ (28)	\$ 3

(1) Included in other assets on the Combined Statement of Condition at December 31, 2018, 2017, and 2016.

For instruments for which the fair value option has been elected, the related contractual interest income, contractual interest expense, and the discount amortization on fair value option discount notes are recorded as part of net interest income on the Combined Statement of Income. The remaining changes in fair value for instruments for which the fair value option has been elected are recorded as net gains (losses) on financial instruments held under fair value option on the Combined Statement of Income, except for changes in fair value related to instrument specific credit risk, which are recorded in AOCI on the Combined Statement of Condition. Each of the Electing FHLBanks determined that none of the remaining changes in fair value were related to instrument specific credit risk during the years ended December 31, 2018, 2017, and 2016. In determining that there has been no change in instrument specific credit risk period to period, the Electing FHLBanks primarily considered the following factors:

- The FHLBanks are federally chartered GSEs, and as a result of this status, the FHLBanks' consolidated obligations have historically received the same credit ratings as the government bond credit rating of the United States, even though they are not obligations of the United States and are not guaranteed by the United States.
- Each FHLBank is jointly and severally liable with the other FHLBanks for the payment of principal and interest on all consolidated obligations of each of the FHLBanks.

Table 19.5 presents the difference between the aggregate fair value and the aggregate unpaid principal balance outstanding for advances, mortgage loans held for sale, and consolidated obligations for which the fair value option has been elected as of December 31, 2018 and 2017.

Table 19.5 - Aggregate Fair Value and Aggregate Unpaid Balance
(dollars in millions)

	December 31, 2018			December 31, 2017		
	Aggregate Fair Value	Aggregate Unpaid Principal Balance	Aggregate Fair Value Over/ (Under) Aggregate Unpaid Principal Balance	Aggregate Fair Value	Aggregate Unpaid Principal Balance	Aggregate Fair Value Over/ (Under) Aggregate Unpaid Principal Balance
Advances(1)	\$ 6,168	\$ 6,209	\$ (41)	\$ 9,428	\$ 9,448	\$ (20)
Mortgage loans held for sale(2)	108	106	2	118	116	2
Consolidated discount notes	4,172	4,163	9	3,062	3,059	3
Consolidated bonds	13,438	13,462	(24)	12,917	12,980	(63)

(1) At December 31, 2018 and 2017, none of the advances were 90 days or more past due or had been placed on non-accrual status.

(2) Included in other assets on the Combined Statement of Condition.

Note 20 - Commitments and Contingencies

Off-Balance Sheet Commitments

Table 20.1 - Off-Balance Sheet Commitments
(dollars in millions)

Notional amount	December 31, 2018			December 31, 2017
	Expire Within One Year	Expire After One Year	Total	Total
Standby letters of credit notional amount(1)	\$ 136,746	\$ 29,093	\$ 165,839	\$ 149,435
Unsettled consolidated discount notes, principal amount	4,958	—	4,958	1,009
Unused lines of credit - advances	2,337	—	2,337	2,371
Commitments for standby bond purchases	406	1,926	2,332	2,270
Unsettled consolidated bonds, principal amount	1,283	—	1,283	1,873
Commitments to fund additional advances	998	121	1,119	1,614
Commitments to purchase mortgage loans	833	—	833	928
Other	2	—	2	14

(1) Excludes unconditional commitments to issue standby letters of credit of \$111 million and \$53 million at December 31, 2018 and 2017.

Standby Letters of Credit. An FHLBank issues standby letters of credit on behalf of its members to support certain obligations of the members (or member's customers) to third-party beneficiaries. These standby letters of credit are subject to the same collateralization and borrowing limits that are applicable to advances. Standby letters of credit may be offered to assist members in facilitating residential housing finance, community lending, and asset-liability management, and to provide liquidity. In particular, members often use standby letters of credit as collateral for deposits from federal, state, and local government agencies. Standby letters of credit are executed for members for a fee. If an FHLBank is required to make payment for a beneficiary's draw, the member either reimburses the FHLBank for the amount drawn or, subject to the applicable FHLBank's discretion, the amount drawn may be converted into a collateralized advance to the member. However, standby letters of credit usually expire without being drawn upon. Standby letters of credit have original expiration periods of up to 20 years, currently expiring no later than 2038. The carrying value of guarantees related to standby letters of credit are recorded in other liabilities and were \$150 million and \$159 million at December 31, 2018 and 2017.

Each FHLBank monitors the creditworthiness of its members that have standby letters of credit. In addition, standby letters of credit are subject to the same collateralization and borrowing limits that apply to advances and are fully collateralized at the time of issuance. As a result, each FHLBank has deemed it unnecessary to record any additional liability on these commitments.

Standby Bond-Purchase Agreements. Certain FHLBanks have entered into standby bond-purchase agreements with state housing authorities within their district whereby these FHLBanks agree to provide liquidity for a fee. If required, the affected FHLBanks will purchase and hold the state housing authority's bonds until the designated marketing agent can find a suitable investor or the state housing authority repurchases the bond according to a schedule established by the standby bond-purchase agreement. Each standby bond-purchase agreement dictates the specific terms that would require the affected FHLBank to purchase the bond. The standby bond-purchase commitments entered into by these FHLBanks have original expiration periods of up to seven years, currently expiring no later than 2024, although some are renewable at the option of the affected FHLBank. At December 31, 2018 and 2017, the FHLBanks had standby bond-purchase commitments with 13 and 14 state housing authorities. During the years ended December 31, 2018 and 2017, the FHLBanks were not required to purchase any bonds under these agreements.

Pledged Collateral

Certain FHLBanks pledged securities, as collateral, related to derivatives. (See [Note 11 - Derivatives and Hedging Activities](#) for additional information about the FHLBanks' pledged collateral and other credit-risk-related contingent features.)

Lease Commitments

The FHLBanks charged to operating expenses net rental and related costs of approximately \$31 million, \$26 million, and \$24 million for the years ended December 31, 2018, 2017, and 2016. Total future minimum lease payments were \$283 million at December 31, 2018, including both operating and capital leases. Lease agreements for FHLBank premises generally provide for increases in the basic rentals resulting from increases in property taxes and maintenance expenses. These increases are not expected to have a material effect on the FHLBanks.

Legal Proceedings

The FHLBanks are subject to legal proceedings arising in the normal course of business. The FHLBanks would record an accrual for a loss contingency when it is probable that a loss has been incurred and the amount can be reasonably estimated. After consultation with legal counsel, management of each FHLBank does not anticipate that the ultimate liability, if any, arising out of these matters will have a material effect on its FHLBank's financial condition, results of operations, or cash flows.

Note 21 - Subsequent Events

Subsequent events have been evaluated from January 1, 2019, through the time of this Combined Financial Report publication. No significant subsequent events were identified, except for the declaration of dividends or repurchase or redemption of excess capital stock, which generally occur in the normal course of business unless there are regulatory or self-imposed restrictions.

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF CONDITION
DECEMBER 31, 2018

<i>(dollars in millions, except par value)</i>	Combined	Combining Adjustments	Boston	New York
Assets				
Cash and due from banks	\$ 522	\$ (1)	\$ 10	\$ 85
Investments	306,790	(137)	15,900	35,443
Advances	728,767	(2)	43,193	105,179
Mortgage loans held for portfolio, net	62,534	—	4,299	2,927
Other assets	4,237	(748)	191	747
Total assets	<u>\$ 1,102,850</u>	<u>\$ (888)</u>	<u>\$ 63,593</u>	<u>\$ 144,381</u>
Liabilities				
Deposits	\$ 7,560	\$ (31)	\$ 475	\$ 1,063
Consolidated obligations				
Discount notes	426,034	—	33,066	50,640
Bonds	603,491	(109)	25,912	84,154
Total consolidated obligations	1,029,525	(109)	58,978	134,794
Mandatorily redeemable capital stock	1,062	1	32	6
Other liabilities	6,359	(750)	501	771
Total liabilities	<u>1,044,506</u>	<u>(889)</u>	<u>59,986</u>	<u>136,634</u>
Capital				
Capital stock				
Class B putable (\$100 par value) issued and outstanding	38,251	(1)	2,529	6,066
Class A putable (\$100 par value) issued and outstanding	247	—	—	—
Total capital stock	38,498	(1)	2,529	6,066
Retained earnings				
Unrestricted	15,241	1	1,084	1,103
Restricted	4,263	—	311	591
Total retained earnings	19,504	1	1,395	1,694
Accumulated other comprehensive income (loss)	342	1	(317)	(13)
Total capital	<u>58,344</u>	<u>1</u>	<u>3,607</u>	<u>7,747</u>
Total liabilities and capital	<u>\$ 1,102,850</u>	<u>\$ (888)</u>	<u>\$ 63,593</u>	<u>\$ 144,381</u>

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 72	\$ 35	\$ 10	\$ 101	\$ 28	\$ 119	\$ 35	\$ 15	\$ 13
20,076	44,309	33,614	20,886	32,684	31,777	29,551	10,306	32,381
82,476	108,462	54,822	32,728	52,628	106,323	40,794	28,730	73,434
4,462	360	10,501	11,385	7,103	7,835	2,186	8,410	3,066
401	1,310	256	312	414	461	207	254	432
<u>\$ 107,487</u>	<u>\$ 154,476</u>	<u>\$ 99,203</u>	<u>\$ 65,412</u>	<u>\$ 92,857</u>	<u>\$ 146,515</u>	<u>\$ 72,773</u>	<u>\$ 47,715</u>	<u>\$ 109,326</u>
\$ 387	\$ 1,176	\$ 669	\$ 501	\$ 551	\$ 1,070	\$ 964	\$ 473	\$ 262
36,897	66,025	46,944	20,895	43,166	42,879	35,732	20,608	29,182
64,299	79,114	45,659	40,265	42,250	93,772	31,932	23,967	72,276
101,196	145,139	92,603	61,160	85,416	136,651	67,664	44,575	101,458
24	1	23	169	313	255	7	4	227
504	513	578	532	1,288	991	373	209	849
102,111	146,829	93,873	62,362	87,568	138,967	69,008	45,261	102,796
4,027	5,486	4,320	1,931	1,698	5,414	2,555	1,277	2,949
—	—	—	—	—	—	—	247	—
4,027	5,486	4,320	1,931	1,698	5,414	2,555	1,524	2,949
924	1,647	632	855	3,023	1,623	933	717	2,699
352	463	391	222	513	427	149	197	647
1,276	2,110	1,023	1,077	3,536	2,050	1,082	914	3,346
73	51	(13)	42	55	84	128	16	235
5,376	7,647	5,330	3,050	5,289	7,548	3,765	2,454	6,530
<u>\$ 107,487</u>	<u>\$ 154,476</u>	<u>\$ 99,203</u>	<u>\$ 65,412</u>	<u>\$ 92,857</u>	<u>\$ 146,515</u>	<u>\$ 72,773</u>	<u>\$ 47,715</u>	<u>\$ 109,326</u>

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF CONDITION
DECEMBER 31, 2017

<i>(dollars in millions, except par value)</i>	Combined	Combining Adjustments	Boston	New York
Assets				
Cash and due from banks	\$ 7,175	\$ —	\$ 262	\$ 127
Investments	307,280	(139)	17,942	33,069
Advances	731,544	—	37,566	122,448
Mortgage loans held for portfolio, net	53,827	1	4,004	2,897
Other assets	3,625	(604)	588	377
Total assets	<u>\$ 1,103,451</u>	<u>\$ (742)</u>	<u>\$ 60,362</u>	<u>\$ 158,918</u>
Liabilities				
Deposits	\$ 7,789	\$ (32)	\$ 477	\$ 1,196
Consolidated obligations				
Discount notes	391,480	(1)	27,721	49,614
Bonds	641,601	(116)	28,345	99,288
Total consolidated obligations	1,033,081	(117)	56,066	148,902
Mandatorily redeemable capital stock	1,272	—	36	20
Other liabilities	4,829	(595)	518	559
Total liabilities	<u>1,046,971</u>	<u>(744)</u>	<u>57,097</u>	<u>150,677</u>
Capital				
Capital stock				
Class B putable (\$100 par value) issued and outstanding	37,422	(1)	2,284	6,750
Class A putable (\$100 par value) issued and outstanding	235	—	—	—
Total capital stock	37,657	(1)	2,284	6,750
Retained earnings				
Unrestricted	14,549	3	1,041	1,067
Restricted	3,550	1	267	479
Total retained earnings	18,099	4	1,308	1,546
Accumulated other comprehensive income (loss)	724	(1)	(327)	(55)
Total capital	<u>56,480</u>	<u>2</u>	<u>3,265</u>	<u>8,241</u>
Total liabilities and capital	<u>\$ 1,103,451</u>	<u>\$ (742)</u>	<u>\$ 60,362</u>	<u>\$ 158,918</u>

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 3,415	\$ 2,357	\$ 27	\$ 55	\$ 42	\$ 503	\$ 88	\$ 268	\$ 31
17,756	40,378	27,058	17,572	30,683	34,452	30,941	13,998	43,570
74,280	102,440	69,918	34,055	48,085	102,613	36,461	26,296	77,382
3,923	435	9,681	10,356	5,193	7,096	878	7,287	2,076
289	956	211	311	352	435	156	228	326
<u>\$ 99,663</u>	<u>\$ 146,566</u>	<u>\$ 106,895</u>	<u>\$ 62,349</u>	<u>\$ 84,355</u>	<u>\$ 145,099</u>	<u>\$ 68,524</u>	<u>\$ 48,077</u>	<u>\$ 123,385</u>
\$ 538	\$ 1,177	\$ 650	\$ 565	\$ 524	\$ 1,107	\$ 844	\$ 462	\$ 281
36,193	50,139	46,211	20,358	41,191	36,682	32,511	20,421	30,440
57,534	87,523	54,163	37,896	37,121	98,893	31,377	24,514	85,063
93,727	137,662	100,374	58,254	78,312	135,575	63,888	44,935	115,503
5	1	30	164	311	385	6	5	309
465	459	676	420	356	1,011	306	168	486
94,735	139,299	101,730	59,403	79,503	138,078	65,044	45,570	116,579
3,659	5,154	4,241	1,858	1,443	5,068	2,318	1,405	3,243
—	—	—	—	—	—	—	235	—
3,659	5,154	4,241	1,858	1,443	5,068	2,318	1,640	3,243
876	1,623	617	793	2,845	1,504	833	677	2,670
282	380	323	183	452	335	109	164	575
1,158	2,003	940	976	3,297	1,839	942	841	3,245
111	110	(16)	112	112	114	220	26	318
4,928	7,267	5,165	2,946	4,852	7,021	3,480	2,507	6,806
<u>\$ 99,663</u>	<u>\$ 146,566</u>	<u>\$ 106,895</u>	<u>\$ 62,349</u>	<u>\$ 84,355</u>	<u>\$ 145,099</u>	<u>\$ 68,524</u>	<u>\$ 48,077</u>	<u>\$ 123,385</u>

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF INCOME
YEARS ENDED DECEMBER 31, 2018 and 2017

<i>(dollars in millions)</i>	Combined	Combining Adjustments	Boston	New York
December 31, 2018				
Interest income				
Advances	\$ 16,031	\$ —	\$ 867	\$ 2,522
Investments	7,691	(3)	422	967
Mortgage loans held for portfolio	1,989	—	137	97
Other interest income	6	—	—	—
Total interest income	<u>25,717</u>	<u>(3)</u>	<u>1,426</u>	<u>3,586</u>
Interest expense				
Consolidated obligations - Discount notes	7,605	—	562	961
Consolidated obligations - Bonds	12,657	2	545	1,808
Other interest expense	199	—	7	20
Total interest expense	<u>20,461</u>	<u>2</u>	<u>1,114</u>	<u>2,789</u>
Net interest income	5,256	(5)	312	797
Provision (reversal) for credit losses	2	(1)	—	—
Net interest income after provision (reversal) for credit losses	5,254	(4)	312	797
Non-interest income (loss)	27	(29)	21	(24)
Non-interest expense	1,315	(29)	92	151
Affordable Housing Program assessments	404	—	24	62
Net income	<u>\$ 3,562</u>	<u>\$ (4)</u>	<u>\$ 217</u>	<u>\$ 560</u>
December 31, 2017				
Interest income				
Advances	\$ 9,043	\$ 1	\$ 515	\$ 1,564
Investments	5,233	(7)	297	584
Mortgage loans held for portfolio	1,719	—	125	94
Other interest income	7	1	—	—
Total interest income	<u>16,002</u>	<u>(5)</u>	<u>937</u>	<u>2,242</u>
Interest expense				
Consolidated obligations - Discount notes	3,759	—	233	432
Consolidated obligations - Bonds	7,620	4	422	1,072
Other interest expense	142	—	5	17
Total interest expense	<u>11,521</u>	<u>4</u>	<u>660</u>	<u>1,521</u>
Net interest income	4,481	(9)	277	721
Provision (reversal) for credit losses	—	—	—	—
Net interest income after provision (reversal) for credit losses	4,481	(9)	277	721
Non-interest income (loss)	615	(23)	23	12
Non-interest expense	1,336	(22)	89	201
Affordable Housing Program assessments	384	—	21	53
Net income	<u>\$ 3,376</u>	<u>\$ (10)</u>	<u>\$ 190</u>	<u>\$ 479</u>

	Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$	1,648	\$ 2,227	\$ 1,409	\$ 726	\$ 1,157	\$ 2,443	\$ 832	\$ 637	\$ 1,563
	463	1,075	651	486	907	803	661	360	899
	151	21	321	354	247	252	54	257	98
	—	—	—	—	4	—	—	2	—
	2,262	3,323	2,381	1,566	2,315	3,498	1,547	1,256	2,560
	494	1,139	915	392	857	736	561	451	537
	1,288	1,604	951	865	922	2,095	660	524	1,393
	9	19	16	19	23	32	15	10	29
	1,791	2,762	1,882	1,276	1,802	2,863	1,236	985	1,959
	471	561	499	290	513	635	311	271	601
	3	—	—	—	—	—	—	—	—
	468	561	499	290	513	635	311	271	601
	10	51	(37)	20	16	20	2	(12)	(11)
	92	150	85	92	191	142	92	70	187
	39	46	38	23	35	53	22	19	43
\$	347	\$ 416	\$ 339	\$ 195	\$ 303	\$ 460	\$ 199	\$ 170	\$ 360
\$	987	\$ 817	\$ 905	\$ 405	\$ 560	\$ 1,589	\$ 423	\$ 402	\$ 875
	334	677	406	294	782	608	371	214	673
	133	25	297	315	213	236	15	214	52
	—	—	—	2	3	—	—	1	—
	1,454	1,519	1,608	1,016	1,558	2,433	809	831	1,600
	287	436	385	182	527	521	234	237	285
	726	915	787	560	533	1,239	328	321	713
	5	11	7	12	15	23	9	3	35
	1,018	1,362	1,179	754	1,075	1,783	571	561	1,033
	436	157	429	262	483	650	238	270	567
	—	—	—	—	—	—	—	—	—
	436	157	429	262	483	650	238	270	567
	33	367	(1)	(6)	42	52	22	16	78
	91	136	79	82	172	124	93	67	224
	38	39	35	18	36	60	17	22	45
\$	340	\$ 349	\$ 314	\$ 156	\$ 317	\$ 518	\$ 150	\$ 197	\$ 376

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF INCOME
YEAR ENDED DECEMBER 31, 2016

<i>(dollars in millions)</i>	Combined	Combining Adjustments	Boston	New York
Interest income				
Advances	\$ 5,359	\$ (1)	\$ 341	\$ 920
Investments	3,988	(11)	247	353
Mortgage loans held for portfolio	1,579	—	120	87
Other interest income	4	2	—	—
Total interest income	10,930	(10)	708	1,360
Interest expense				
Consolidated obligations - Discount notes	2,020	2	93	216
Consolidated obligations - Bonds	4,931	5	361	582
Other interest expense	144	(2)	2	6
Total interest expense	7,095	5	456	804
Net interest income	3,835	(15)	252	556
Provision (reversal) for credit losses	6	—	—	2
Net interest income after provision (reversal) for credit losses	3,829	(15)	252	554
Non-interest income (loss)	1,154	(16)	29	7
Non-interest expense	1,183	(17)	89	115
Affordable Housing Program assessments	392	—	19	45
Net income	<u>\$ 3,408</u>	<u>\$ (14)</u>	<u>\$ 173</u>	<u>\$ 401</u>

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 612	\$ 586	\$ 587	\$ 219	\$ 290	\$ 876	\$ 217	\$ 230	\$ 482
256	489	375	201	751	415	201	145	566
117	31	261	274	218	233	4	204	30
—	—	—	1	—	—	—	1	—
985	1,106	1,223	695	1,259	1,524	422	580	1,078
110	249	174	64	359	414	110	93	136
524	519	682	425	411	639	144	229	410
2	4	4	8	33	22	3	1	61
636	772	860	497	803	1,075	257	323	607
349	334	363	198	456	449	165	257	471
1	(1)	—	—	1	3	—	—	—
348	335	363	198	455	446	165	257	471
25	111	46	6	71	396	8	(14)	485
84	137	111	78	162	118	85	63	158
29	31	30	13	37	75	9	18	86
\$ 260	\$ 278	\$ 268	\$ 113	\$ 327	\$ 649	\$ 79	\$ 162	\$ 712

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF COMPREHENSIVE INCOME
YEARS ENDED DECEMBER 31, 2018, 2017, AND 2016

<i>(dollars in millions)</i>	Combined	Combining Adjustments	Boston	New York
December 31, 2018				
Net income	\$ 3,562	\$ (4)	\$ 217	\$ 560
Other comprehensive income				
Net unrealized gains (losses) on available-for-sale securities	(467)	—	(31)	(1)
Net non-credit portion of other-than-temporary impairment gains (losses) on investment securities	(76)	1	29	4
Net unrealized gains (losses) relating to hedging activities	161	(1)	11	37
Pension and postretirement benefits	5	2	1	7
Total other comprehensive income (loss)	(377)	2	10	47
Comprehensive income	<u>\$ 3,185</u>	<u>\$ (2)</u>	<u>\$ 227</u>	<u>\$ 607</u>
December 31, 2017				
Net income	\$ 3,376	\$ (10)	\$ 190	\$ 479
Other comprehensive income				
Net unrealized gains (losses) on available-for-sale securities	383	(1)	15	6
Net non-credit portion of other-than-temporary impairment gains (losses) on investment securities	310	—	34	16
Net unrealized gains (losses) relating to hedging activities	200	—	8	27
Pension and postretirement benefits	(12)	(3)	—	(8)
Total other comprehensive income (loss)	881	(4)	57	41
Comprehensive income	<u>\$ 4,257</u>	<u>\$ (14)</u>	<u>\$ 247</u>	<u>\$ 520</u>
December 31, 2016				
Net income	\$ 3,408	\$ (14)	\$ 173	\$ 401
Other comprehensive income				
Net unrealized gains (losses) on available-for-sale securities	41	(1)	1	(5)
Net unrealized gains (losses) on held-to-maturity securities transferred from available-for-sale securities	1	1	—	—
Net non-credit portion of other-than-temporary impairment gains (losses) on investment securities	209	1	37	6
Net unrealized gains (losses) relating to hedging activities	240	1	23	44
Pension and postretirement benefits	(14)	2	(2)	(5)
Total other comprehensive income (loss)	477	4	59	40
Comprehensive income	<u>\$ 3,885</u>	<u>\$ (10)</u>	<u>\$ 232</u>	<u>\$ 441</u>

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 347	\$ 416	\$ 339	\$ 195	\$ 303	\$ 460	\$ 199	\$ 170	\$ 360
(31)	—	—	(40)	(196)	(31)	(93)	(12)	(32)
(8)	(62)	—	(29)	29	—	3	4	(47)
—	—	—	—	116	—	(2)	—	—
1	3	3	(1)	(6)	1	—	(2)	(4)
(38)	(59)	3	(70)	(57)	(30)	(92)	(10)	(83)
<u>\$ 309</u>	<u>\$ 357</u>	<u>\$ 342</u>	<u>\$ 125</u>	<u>\$ 246</u>	<u>\$ 430</u>	<u>\$ 107</u>	<u>\$ 160</u>	<u>\$ 277</u>
\$ 340	\$ 349	\$ 314	\$ 156	\$ 317	\$ 518	\$ 150	\$ 197	\$ 376
54	—	—	54	(52)	132	153	22	—
5	10	—	2	34	—	3	2	204
—	—	—	—	165	—	—	—	—
(1)	(4)	(3)	—	1	—	1	2	3
58	6	(3)	56	148	132	157	26	207
<u>\$ 398</u>	<u>\$ 355</u>	<u>\$ 311</u>	<u>\$ 212</u>	<u>\$ 465</u>	<u>\$ 650</u>	<u>\$ 307</u>	<u>\$ 223</u>	<u>\$ 583</u>
\$ 260	\$ 278	\$ 268	\$ 113	\$ 327	\$ 649	\$ 79	\$ 162	\$ 712
(21)	—	—	39	(199)	68	141	18	—
—	—	—	—	—	—	—	—	—
(5)	29	—	(3)	40	—	4	2	98
—	—	—	—	151	—	21	—	—
(1)	—	—	(3)	—	(2)	—	(1)	(2)
(27)	29	—	33	(8)	66	166	19	96
<u>\$ 233</u>	<u>\$ 307</u>	<u>\$ 268</u>	<u>\$ 146</u>	<u>\$ 319</u>	<u>\$ 715</u>	<u>\$ 245</u>	<u>\$ 181</u>	<u>\$ 808</u>

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF CAPITAL
YEARS ENDED DECEMBER 31, 2018, 2017, AND 2016

<i>(dollars in millions)</i>	Combined	Combining Adjustments	Boston	New York
Balance, December 31, 2015	\$ 48,042	\$ 30	\$ 3,023	\$ 6,719
Comprehensive income (loss)	3,885	(10)	232	441
Proceeds from issuance of capital stock	25,162	—	456	4,778
Repurchases/redemptions of capital stock	(20,682)	—	(381)	(4,002)
Net shares reclassified (to)/from mandatorily redeemable capital stock	(2,526)	—	—	(53)
Dividends of capital stock	95	—	—	—
Dividends				
Cash	(1,422)	(2)	(85)	(259)
Stock	(95)	—	—	—
Balance, December 31, 2016	52,459	18	3,245	7,624
Comprehensive income (loss)	4,257	(14)	247	520
Proceeds from issuance of capital stock	35,190	1	1,068	6,451
Repurchases/redemptions of capital stock	(32,715)	—	(1,187)	(6,006)
Net shares reclassified (to)/from mandatorily redeemable capital stock	(1,176)	(1)	(9)	(3)
Dividends of capital stock	124	—	—	—
Dividends				
Cash	(1,535)	(2)	(99)	(345)
Stock	(124)	—	—	—
Balance, December 31, 2017	56,480	2	3,265	8,241
Comprehensive income (loss)	3,185	(2)	227	607
Proceeds from issuance of capital stock	43,165	2	1,800	7,978
Repurchases/redemptions of capital stock	(41,191)	(3)	(1,555)	(8,653)
Net shares reclassified (to)/from mandatorily redeemable capital stock	(1,288)	1	—	(9)
Dividends of capital stock	155	—	—	—
Dividends				
Cash	(2,007)	1	(130)	(417)
Stock	(155)	—	—	—
Balance, December 31, 2018	<u>\$ 58,344</u>	<u>\$ 1</u>	<u>\$ 3,607</u>	<u>\$ 7,747</u>

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 4,501	\$ 7,016	\$ 5,153	\$ 2,386	\$ 4,652	\$ 5,625	\$ 2,199	\$ 1,842	\$ 4,896
233	307	268	146	319	715	245	181	808
3,573	5,405	92	148	1,309	6,050	1,133	1,292	926
(3,302)	(5,544)	—	—	(1,248)	(4,105)	(757)	(590)	(753)
(56)	(7)	(364)	(183)	(300)	(742)	(3)	(762)	(56)
—	—	—	—	—	—	17	78	—
(155)	(226)	(171)	(61)	(37)	(142)	—	—	(284)
—	—	—	—	—	—	(17)	(78)	—
4,794	6,951	4,978	2,436	4,695	7,401	2,817	1,963	5,537
398	355	311	212	465	650	307	223	583
4,313	9,726	354	365	2,830	5,602	1,449	1,817	1,214
(4,402)	(9,493)	—	—	(3,093)	(6,407)	(1,072)	(716)	(339)
(7)	(34)	(270)	—	(5)	(44)	(21)	(780)	(2)
—	—	—	—	—	—	32	92	—
(168)	(238)	(208)	(67)	(40)	(181)	—	—	(187)
—	—	—	—	—	—	(32)	(92)	—
4,928	7,267	5,165	2,946	4,852	7,021	3,480	2,507	6,806
309	357	342	125	246	430	107	160	277
5,991	11,074	439	104	2,856	7,987	1,901	1,656	1,377
(5,580)	(10,705)	(297)	—	(2,598)	(7,588)	(1,716)	(827)	(1,669)
(43)	(37)	(63)	(31)	(3)	(53)	(7)	(1,041)	(2)
—	—	—	—	—	—	59	96	—
(229)	(309)	(256)	(94)	(64)	(249)	—	(1)	(259)
—	—	—	—	—	—	(59)	(96)	—
\$ 5,376	\$ 7,647	\$ 5,330	\$ 3,050	\$ 5,289	\$ 7,548	\$ 3,765	\$ 2,454	\$ 6,530

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF CASH FLOWS
YEAR ENDED DECEMBER 31, 2018

<i>(dollars in millions)</i>	Combined	Combining Adjustments	Boston	New York
Operating activities				
Net cash provided by (used in) operating activities	\$ 3,837	\$ (3)	\$ 270	\$ 680
Investing activities				
Net change/net proceeds and payments in				
Loans to FHLBanks	—	150	400	(250)
Investments	1,376	(2)	1,983	(2,304)
Advances	2,608	—	(5,621)	17,274
Mortgage loans held for portfolio	(8,868)	1	(305)	(37)
Other investing activities	(41)	(2)	2	(24)
Net cash provided by (used in) investing activities	(4,925)	147	(3,541)	14,659
Financing activities				
Net change in deposits and pass-through reserves, and other financing activities	(35)	3	(2)	(124)
Net change in loans from FHLBanks	—	(150)	—	—
Net proceeds (payments) on derivative contracts with financing element	(14)	2	—	(9)
Net proceeds from issuance of consolidated obligations				
Discount notes	7,369,878	—	198,660	1,177,557
Bonds	477,225	—	10,188	111,130
Payments for maturing and retiring consolidated obligations				
Discount notes	(7,335,962)	(2)	(193,351)	(1,176,600)
Bonds	(515,126)	—	(12,587)	(126,220)
Proceeds from issuance of capital stock	43,165	2	1,800	7,978
Payments for repurchases/redemptions of capital stock	(41,191)	(3)	(1,555)	(8,653)
Payments for repurchases/redemptions of mandatorily redeemable capital stock	(1,498)	2	(4)	(23)
Cash dividends paid	(2,007)	1	(130)	(417)
Net cash provided by (used in) financing activities	(5,565)	(145)	3,019	(15,381)
Net increase (decrease) in cash and due from banks	(6,653)	(1)	(252)	(42)
Cash and due from banks at beginning of the period	7,175	—	262	127
Cash and due from banks at end of the period	\$ 522	\$ (1)	\$ 10	\$ 85

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ (422)	\$ 579	\$ 405	\$ 354	\$ 408	\$ 620	\$ 360	\$ 228	\$ 358
—	(300)	—	—	—	—	—	—	—
(1,619)	(3,862)	(6,700)	(3,403)	(1,204)	2,686	1,048	3,648	11,105
(8,217)	(6,167)	15,106	1,340	(4,586)	(3,735)	(4,324)	(2,453)	3,991
(558)	73	(860)	(1,064)	(1,919)	(759)	(1,308)	(1,149)	(983)
5	(2)	(2)	(7)	19	(20)	(5)	(5)	—
(10,389)	(10,258)	7,544	(3,134)	(7,690)	(1,828)	(4,589)	41	14,113
(145)	(26)	28	(68)	27	(5)	240	55	(18)
—	—	—	—	—	(100)	—	—	250
—	(5)	(1)	—	(20)	(1)	22	(2)	—
463,640	1,022,557	552,604	352,096	1,978,593	161,907	282,147	1,036,653	143,464
55,384	68,281	29,072	17,386	35,074	46,812	19,396	10,833	73,669
(462,967)	(1,006,848)	(551,919)	(351,576)	(1,976,663)	(155,794)	(278,988)	(1,036,479)	(144,775)
(48,602)	(76,625)	(37,566)	(14,996)	(29,936)	(51,962)	(18,820)	(11,368)	(86,444)
5,991	11,074	439	104	2,856	7,987	1,901	1,656	1,377
(5,580)	(10,705)	(297)	—	(2,598)	(7,588)	(1,716)	(827)	(1,669)
(24)	(37)	(70)	(26)	(1)	(183)	(6)	(1,042)	(84)
(229)	(309)	(256)	(94)	(64)	(249)	—	(1)	(259)
7,468	7,357	(7,966)	2,826	7,268	824	4,176	(522)	(14,489)
(3,343)	(2,322)	(17)	46	(14)	(384)	(53)	(253)	(18)
3,415	2,357	27	55	42	503	88	268	31
\$ 72	\$ 35	\$ 10	\$ 101	\$ 28	\$ 119	\$ 35	\$ 15	\$ 13

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF CASH FLOWS
YEAR ENDED DECEMBER 31, 2017

<i>(dollars in millions)</i>	Combined	Combining Adjustments	Boston	New York
Operating activities				
Net cash provided by (used in) operating activities	\$ 4,102	\$ —	\$ 201	\$ 635
Investing activities				
Net change/net proceeds and payment in				
Loans to FHLBanks	—	(745)	(400)	255
Investments	(14,604)	(87)	174	(2,130)
Advances	(27,805)	(1)	1,468	(13,466)
Mortgage loans held for portfolio	(5,503)	1	(322)	(157)
Other investing activities	(88)	1	1	(18)
Net cash provided by (used in) investing activities	(48,000)	(831)	921	(15,516)
Financing activities				
Net change in deposits and pass-through reserves, and other financing activities	(93)	(18)	(5)	(13)
Net change in loans from FHLBanks	—	745	—	—
Net proceeds (payments) on derivative contracts with financing element	(209)	—	(4)	(19)
Net proceeds from issuance of consolidated obligations				
Discount notes	6,310,301	—	170,646	1,191,518
Bonds	482,691	1	10,656	93,274
Payments for maturing and retiring consolidated obligations				
Discount notes	(6,328,904)	1	(172,999)	(1,191,264)
Bonds	(419,478)	105	(9,450)	(78,726)
Proceeds from issuance of capital stock	35,190	1	1,068	6,451
Payments for repurchases/redemptions of capital stock	(32,715)	—	(1,187)	(6,006)
Payments for repurchases/redemptions of mandatorily redeemable capital stock	(1,616)	(1)	(6)	(14)
Cash dividends paid	(1,535)	(2)	(99)	(345)
Net cash provided by (used in) financing activities	43,632	832	(1,380)	14,856
Net increase (decrease) in cash and due from banks	(266)	1	(258)	(25)
Cash and due from banks at beginning of the period	7,441	(1)	520	152
Cash and due from banks at end of the period	\$ 7,175	\$ —	\$ 262	\$ 127

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 382	\$ 335	\$ 394	\$ 263	\$ 540	\$ 484	\$ 284	\$ 242	\$ 342
—	(200)	—	—	—	200	290	600	—
(251)	(3,536)	(1,993)	(2,171)	(2,708)	6,826	(5,817)	(357)	(2,554)
2,449	(3,959)	(71)	(6,038)	(3,055)	28,859	(3,997)	(2,365)	(27,629)
(553)	85	(570)	(899)	(232)	(205)	(753)	(669)	(1,229)
6	(1)	(3)	(5)	21	(24)	(3)	(54)	(9)
1,651	(7,611)	(2,637)	(9,113)	(5,974)	35,656	(10,280)	(2,845)	(31,421)
(21)	70	(100)	74	37	(2)	(151)	(78)	114
—	—	—	—	—	600	—	—	(1,345)
—	(30)	(4)	(17)	(29)	(4)	(86)	(16)	—
352,451	847,609	449,776	216,011	1,408,075	191,047	379,976	937,784	165,408
46,625	70,703	27,080	23,856	19,567	67,555	24,865	18,003	80,506
(344,815)	(838,777)	(448,296)	(212,480)	(1,402,859)	(235,329)	(374,434)	(939,161)	(168,491)
(56,182)	(71,718)	(26,066)	(19,379)	(19,358)	(58,418)	(20,473)	(14,191)	(45,622)
4,313	9,726	354	365	2,830	5,602	1,449	1,817	1,214
(4,402)	(9,493)	—	—	(3,093)	(6,407)	(1,072)	(716)	(339)
(7)	(34)	(275)	(5)	(5)	(323)	(18)	(778)	(150)
(168)	(238)	(208)	(67)	(40)	(181)	—	—	(187)
(2,206)	7,818	2,261	8,358	5,125	(35,860)	10,056	2,664	31,108
(173)	542	18	(492)	(309)	280	60	61	29
3,588	1,815	9	547	351	223	28	207	2
\$ 3,415	\$ 2,357	\$ 27	\$ 55	\$ 42	\$ 503	\$ 88	\$ 268	\$ 31

FEDERAL HOME LOAN BANKS
CONDENSED COMBINING SCHEDULES—STATEMENTS OF CASH FLOWS
YEAR ENDED DECEMBER 31, 2016

<i>(dollars in millions)</i>	Combined	Combining Adjustments	Boston	New York
Operating activities				
Net cash provided by (used in) operating activities	\$ 3,755	\$ 1	\$ 166	\$ 450
Investing activities				
Net change/net proceeds and payments in				
Loans to FHLBanks	—	1,345	—	(255)
Investments	(16,488)	(49)	(12)	(4,404)
Advances	(73,061)	(1)	(3,143)	(15,704)
Mortgage loans held for portfolio	(4,085)	—	(128)	(233)
Other investing activities	33	4	2	(4)
Net cash provided by (used in) investing activities	(93,601)	1,299	(3,281)	(20,600)
Financing activities				
Net change in deposits and pass-through reserves, and other financing activities	(1,178)	(4)	—	(65)
Net change in loans from FHLBanks	—	(1,345)	—	—
Net proceeds (payments) on derivative contracts with financing element	(381)	(2)	(13)	(49)
Net proceeds from issuance of consolidated obligations				
Discount notes	3,863,143	1	163,426	441,811
Bonds	524,098	(1)	18,313	59,499
Payments for maturing and retiring consolidated obligations				
Discount notes	(3,947,549)	(1)	(161,859)	(439,333)
Bonds	(355,683)	51	(16,467)	(42,364)
Payments for retirement of subordinated notes	(944)	—	—	—
Proceeds from issuance of capital stock	25,162	—	456	4,778
Payments for repurchases/redemptions of capital stock	(20,682)	—	(381)	(4,002)
Payments for repurchases/redemptions of mandatorily redeemable capital stock	(1,566)	2	(9)	(41)
Cash dividends paid	(1,422)	(2)	(85)	(259)
Net cash provided by (used in) financing activities	82,998	(1,301)	3,381	19,975
Net increase (decrease) in cash and due from banks	(6,848)	(1)	266	(175)
Cash and due from banks at beginning of the period	14,289	—	254	327
Cash and due from banks at end of the period	\$ 7,441	\$ (1)	\$ 520	\$ 152

Pittsburgh	Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 192	\$ 230	\$ 322	\$ 240	\$ 482	\$ 660	\$ 198	\$ 232	\$ 582
—	—	—	—	—	(200)	(290)	(600)	—
(995)	(1,055)	12,425	(5,152)	31	(1,058)	(8,670)	81	(7,630)
(2,497)	4,581	3,336	(1,325)	(8,361)	(42,625)	(7,823)	(483)	984
(321)	55	(1,238)	(1,373)	(142)	(192)	(69)	(276)	(168)
9	9	(2)	(5)	33	5	(4)	(4)	(10)
(3,804)	3,590	14,521	(7,855)	(8,439)	(44,070)	(16,856)	(1,282)	(6,824)
(129)	29	4	22	(43)	5	87	(161)	(923)
—	—	—	—	—	—	—	—	1,345
(18)	(72)	(23)	(33)	(49)	(7)	(85)	(39)	9
106,235	517,233	325,536	331,384	682,913	272,871	351,968	533,157	136,608
67,260	75,617	50,923	31,636	36,752	98,684	28,036	17,338	40,041
(120,015)	(545,415)	(358,051)	(333,840)	(688,540)	(290,948)	(345,583)	(533,203)	(130,761)
(48,569)	(50,763)	(32,787)	(25,998)	(22,297)	(39,576)	(18,941)	(16,458)	(41,514)
—	—	—	—	(944)	—	—	—	—
3,573	5,405	92	148	1,309	6,050	1,133	1,292	926
(3,302)	(5,544)	—	—	(1,248)	(4,105)	(757)	(590)	(753)
(57)	(20)	(367)	(28)	(7)	(181)	(9)	(762)	(87)
(155)	(226)	(171)	(61)	(37)	(142)	—	—	(284)
4,823	(3,756)	(14,844)	3,230	7,809	42,651	15,849	574	4,607
1,211	64	(1)	(4,385)	(148)	(759)	(809)	(476)	(1,635)
2,377	1,751	10	4,932	499	982	837	683	1,637
\$ 3,588	\$ 1,815	\$ 9	\$ 547	\$ 351	\$ 223	\$ 28	\$ 207	\$ 2

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SUPPLEMENTAL INFORMATION

FHLBank Management and Compensation

FHLBank Directors

A board of at least 13 Directors, or such other number as the Federal Housing Finance Agency (FHFA) determines appropriate, governs each FHLBank. The members of each FHLBank elect all of the FHLBank's Directors, each of whom is elected for a four-year term, unless otherwise adjusted by the Director of the FHFA in order to achieve an appropriate staggering of terms (with approximately one-fourth of the Directors' terms expiring each year). Directors may not serve more than three consecutive full terms. An FHLBank's Board of Directors must be comprised of a majority of member Directors, who are Directors or Officers of members, and a minority of non-member independent Directors. Non-member independent Directors must comprise not less than two-fifths of the members of the Board of Directors and two of these Directors must hold public interest Director positions.

To be eligible to serve as a member Director, a candidate must be a citizen of the United States and be an Officer or Director of a member institution that is located in the state to which the Director of the FHFA has allocated the directorship and that meets all of the minimum capital requirements established by its appropriate regulator. For member Directors, each eligible institution may nominate representatives from member institutions in its respective state to serve on the Board of the Directors. After the slate of nominees is finalized, each eligible institution may vote for the number of open member Director seats in the state in which its principal place of business is located.

To be eligible to serve as a non-member independent Director, an individual must be a citizen of the United States and a bona fide resident of that FHLBank's district. To be elected, a candidate must receive at least 20% of the votes that are eligible to be cast unless there are multiple nominees. The FHFA will impose the FHLBank Act's requirements on newly elected non-member independent Directors. A non-member independent Director may not be an officer of any FHLBank, or an Officer, Director, or employee of an FHLBank member on whose board the individual sits or of any recipient of advances from an FHLBank. Under the Federal Home Loan Bank Act of 1932, as amended (FHLBank Act), there are two types of non-member independent Directors:

- *Public interest Director.* Each FHLBank is required to have at least two public interest Directors. Before names are placed on the ballot, nominee eligibility will be verified through application and eligibility certification forms prescribed by the FHFA. Public interest Directors must have more than four years' experience in representing consumer or community interests in banking services, credit needs, housing, or consumer financial protections. The FHFA deemed existing public interest Directors who qualified and were designated under previous FHLBank Act provisions to be public interest Directors for the remainder of their current terms.
- *Other non-member independent Directors.* Non-member independent Directors shall have experience in, or knowledge of, one or more of the following areas: auditing and accounting, derivatives, financial management, organizational management, project development, risk management practices, and the law.

The FHFA's regulation includes the following provisions:

- requires each FHLBank's Board of Directors to annually determine how many of its non-member independent Directors should be designated public interest Directors (provided that each FHLBank at all times has at least two public interest Directors);
- states that where an FHLBank's Board of Directors acts to fill a member Director vacancy that occurs mid-term, the eligible candidates for that position must be Officers or Directors of a member institution at the time the FHLBank Board of Directors acts, not as of the prior year-end; and
- permits an FHLBank that nominates more than one nominee for each open non-member independent Director position to declare elected the nominee who receives the highest number of votes, even if the total votes received are less than 20% of the eligible votes.

Eligible members nominate representatives from members in their state to serve as member Directors. Non-member independent Directors may be nominated by members, with each FHLBank's Board of Directors determining the slate of nominees. For the election of both member Directors and non-member independent Directors, each eligible institution is entitled to cast one vote for each share of stock that it was required to hold as of December 31 of the calendar year immediately preceding the election year (the record date). The number of votes that any member may cast for any one directorship shall not exceed the average number of shares of stock required to be held as of the record date by all member institutions located in the member's state as of the record date.

The Board of Directors of each FHLBank has the responsibility to establish policies and programs that carry out the FHLBank's housing finance mission. Each Board of Directors adopts and reviews policies governing the FHLBank's credit, investment, and funding activities, and oversees the implementation of these policies. The Directors also must adopt policies to manage the FHLBank's exposure to credit, liquidity, and interest-rate risk. In addition, each Board of Directors is responsible for monitoring that FHLBank's compliance with FHFA regulations.

The following persons are currently serving as Chair or Vice-Chair of an FHLBank and the following information has been provided for each FHLBank primarily based on the information disclosed in its annual report on SEC Form 10-K for the year ended December 31, 2018:

Andrew J. Calamare, 63, is serving as Chair of the Board of Directors of the FHLBank of Boston. Mr. Calamare has served as President and Chief Executive Officer of The Co-operative Central Bank, located in Boston, Massachusetts, since March 2015. Prior to his current position, Mr. Calamare served as Executive Vice President of The Co-operative Central Bank from January 2011 to March 2015. Prior to that position, Mr. Calamare served as President and Chief Executive Officer of the Life Insurance Association of Massachusetts since 2000. Previously, Mr. Calamare served as of counsel with the law firm Quinn and Morris, as special counsel to the Rhode Island General Assembly, and as Commissioner of Banks for the Commonwealth of Massachusetts. Mr. Calamare has served as a Director of the FHLBank of Boston since March 30, 2007, and his current term as a Director will conclude on December 31, 2020.

Stephen G. Crowe, 68, is serving as Vice-Chair of the Board of Directors of the FHLBank of Boston. Mr. Crowe serves as the community engagement officer of MountainOne Bank, located in North Adams, Massachusetts, since April 2016. Mr. Crowe served as a Director of MountainOne Bank and a trustee of MountainOne Financial, its holding company, from 2002 to April 2016, and as President and Chief Executive Officer of MountainOne Bank from 2002 to 2012. Mr. Crowe also served as President and Chief Executive Officer of Williamstown Savings Bank from 1994 to 2009 and of Hoosac Bank from 2002 to 2009. Mr. Crowe is also a former Director of The Savings Bank Life Insurance Company of Massachusetts, which is also a member of the FHLBank of Boston. He was a Massachusetts certified public accountant from 1976 to June 2016. Mr. Crowe served as a Treasurer of the American Bankers Association in 2011 and 2012. Mr. Crowe's service as a Director of the FHLBank of Boston began on January 1, 2012, and his current term will conclude on December 31, 2019.

John R. Buran, 69, is serving as Chair of the Board of Directors of the FHLBank of New York. Mr. Buran serves as Director, President and Chief Executive Officer of Flushing Financial Corporation, the holding company for FHLBank of New York member Flushing Bank (formerly Flushing Savings Bank). He joined the holding company and the bank in 2001 as Chief Operating Officer and he became a Director of these entities in 2003. In 2005, he was named President and Chief Executive Officer of both entities. Mr. Buran's career in the banking industry began with Citibank in 1977. There, he held a variety of management positions including Business Manager of its retail distribution in Westchester, Long Island and Manhattan and Vice President in charge of its Investment Sales Division. Mr. Buran left Citibank to become Senior Vice President, Division Head for Retail Services of NatWest Bank and later Executive Vice President of Fleet Bank's (now Bank of America) retail branch system in New York City, Long Island, Westchester and Southern Connecticut. He also spent time as a consultant and Assistant to the President of Carver Bank. Mr. Buran is past Chair and current Board member of the New York Bankers Association. From 2011 to 2017, he served on the Community Depository Institutions Advisory Council of The Federal Reserve Bank of New York. Since 2012, he has been a member of the Nassau County Interim Finance Authority. Mr. Buran has devoted his time to a variety of charitable and not-for-profit organizations. He has been a Board member of the Long Island Association, both the Nassau and Suffolk County Boy Scouts, EAC, Long Island University, the Long Island Philharmonic and Channel 21. He was the fundraising Chair for the Suffolk County Vietnam Veteran's War Memorial in Farmingville, New York and has been recipient of the Boy Scouts' Chief Scout Citizen Award. His work in the community has been recognized by Family and Children's Association, and Gurwin Jewish Geriatric Center. He was also a recipient of the Long Island Association's SBA Small Business Advocate Award. Mr. Buran was honored twice with St. Joseph's College's Distinguished Service Award. Mr. Buran also serves on the Advisory Board and is a former Board President of Neighborhood Housing Services of New York City. He is a Board member of The Korean American Youth Foundation. Mr. Buran also serves on the Board of the Long Island Conservatory. He holds a B.S. in Management and an M.B.A., both from New York University.

Larry E. Thompson, 68, is serving as Vice-Chair of the Board of Directors of the FHLBank of New York. Mr. Thompson was Vice Chair of The Depository Trust & Clearing Corporation (DTCC) through the end of 2018, and previously, served as the Chief Legal Officer/General Counsel of the firm since 2005. He has more than 30 years of experience as a senior executive in corporate law, risk management and regulatory affairs. In his role as DTCC Vice-Chair, Mr. Thompson served as a senior advisor to DTCC and was responsible for all legal and regulatory activities of the company and its subsidiaries. He regularly interfaced with government and regulatory agencies on issues impacting the company. Mr. Thompson was Chair of the Board of DTCC Deriv/SERV LLC and former Chair of the DTCC Operating Committee. He was a member of the DTCC Management Committee, which is comprised of the company's executive leadership. In addition, Mr. Thompson was a member of the DTCC Management Risk Committee, where he helped oversee and assess a broad range of issues related to market, capital and operational risks facing the corporation. Mr. Thompson previously served as Chair of a DTCC Board subcommittee charged with reviewing the potential risk impacts of high frequency trading and algorithmic trading as a result of the Knight Capital market event of 2012. Mr. Thompson is the former Co-Chair of the DTCC Internal Risk Management Committee and former Chair of The Depository Trust Company (DTC) Internal Risk Management Committee. Mr. Thompson began his legal career with DTC as Associate Counsel in 1981 and was elected Vice President and Deputy General Counsel in 1991, Senior Vice President in 1993, General Counsel of DTC in 1999 and Managing Director and First Deputy General Counsel of DTCC in 2004. Previously, he was a partner in the New York law firm of Lake, Bogan, Lenoir, Jones & Thompson. Mr. Thompson began his legal career at Davis Polk & Wardwell. Mr. Thompson previously served on the Board of Directors of New York Portfolio Clearing (NYPC), a former joint venture derivatives clearinghouse owned by NYSE Euronext and DTCC. In addition, he also served as former Chair of the Securities Clearing Group and former Co-Chair of the Unified Clearing Group. His memberships include the New York State Bar Association; the New York County Lawyers' Association; Association of the Bar of the City of New York; Business Executives for National Security; and the Global Association of Risk Professionals. He is a former Director of the Legal Aid Society of New York and a former Director of The Studio Museum of Harlem. Mr. Thompson's legal and regulatory and risk management experience, as indicated by his background described above, supports his qualifications to serve on the FHLBank of New York's Board as an Independent Director.

Patrick A. Bond, 69, joined the Board of Directors of the FHLBank of Pittsburgh in May 2007 and is currently serving as its Chair. He is a Founding General Partner of Mountaineer Capital, LP in Charleston, West Virginia. He graduated with a BS in Industrial Engineering and an MS in Industrial Engineering from West Virginia University. He is a Board member of the West Virginia Symphony Orchestra, Chair of the Board of Directors of Mid-Atlantic Holdings, Board member of Troy, LLC, and a former member of the Bank's Affordable Housing Advisory Council.

Lynda A. Messick, 66, originally joined the Board of Directors of the FHLBank of Pittsburgh in 2012 and is currently serving as its Vice-Chair. She is a Director of County Bank Delaware and was formerly the President and CEO of Community Bank Delaware since 2006, and was formerly the President of Delaware National Bank, a community bank she helped found in 1979. Ms. Messick also serves as a Vice-Chair of Atlantic Community Bankers Bank. Ms. Messick is former Chair of the Nanticoke Health Services board, a nonprofit health care provider in Sussex County Delaware. She left that board in 2018. She is a Director of Micronic Technologies, a privately held water technology company.

Richard A. Whaley, 59, became Chair of the Board of Directors of the FHLBank of Atlanta on January 1, 2019, and previously served as Vice-Chair from 2015-2018. He has served as President, Chief Executive Officer, and Director of Citizens Bank of Americus in Americus, Georgia, since 2001. From 1989 to 2001, he served as Market Manager and Commercial Lender for Wachovia Bank. Mr. Whaley served as Chairman of the Georgia Bankers Association from October 2010 to June 2012. Mr. Whaley also served as Chairman of the South Georgia Technical College Foundation from 2008 to 2010. He serves as Chair of the Georgia Bankers Association Insurance Trust, Inc., and is a veteran of the U.S. Army.

Robert L. Strickland, Jr., 67, became Vice-Chair of the Board of Directors of the FHLBank of Atlanta on January 1, 2019. He is Executive Director of the Alabama Housing Finance Authority, an independent public corporation dedicated to serving the housing needs of low- and moderate-income Alabamians, a position he has held since 1987. Mr. Strickland served as president of the National Council of State Housing Agencies for two terms. He has also served on the National Association of Home Builders Mortgage Finance Roundtable and as a member of Fannie Mae's National Advisory Council. He currently serves as a Director of the Alabama Multifamily Loan Consortium.

Donald J. Mullineaux, 73, has served as Chair of the Board of Directors of the FHLBank of Cincinnati since January 2015. Dr. Mullineaux is the Emeritus duPont Endowed Chair in Banking and Financial Services in the Gatton College of Business and Economics at the University of Kentucky. He held the duPont Endowed Chair from 1984 until 2014. Previously, he was on the staff of the Federal Reserve Bank of Philadelphia, where he served as Senior Vice President and Director of Research from 1979 until 1984. He also served as a Director of Farmers Capital Bank Corporation from 2005 until 2009. He has published numerous articles and lectured on a variety of banking topics, including risk management, financial markets and economics. He served as

the Curriculum Director for the ABA's Stonier Graduate School of Banking from 2001 to 2016. Dr. Mullineaux brings knowledge and experience to the FHLBank of Cincinnati's Board in areas vital to the operation of financial institutions in today's economy.

James A. England, 67, has served as Vice-Chair of the Board of Directors of the FHLBank of Cincinnati since January 2018. Mr. England has been Chairman of Decatur County Bank, Decaturville, Tennessee since 1990. He also served as Chief Executive Officer of Decatur County Bank from 1990 to 2013.

Dan L. Moore, 68, serves as the Chair of the Board of Directors of the FHLBank of Indianapolis. Mr. Moore is the President and Chief Executive Officer of Home Bank SB in Martinsville, Indiana, and has served in that position since 2006. Prior to that time, Mr. Moore served as that bank's Executive Vice President and Chief Operating Officer. Mr. Moore has also served as a Director of Home Bank SB since 2000. He has been employed by Home Bank SB since 1978. Mr. Moore serves on the Board of Directors of Stability First, a not-for-profit organization in Martinsville, Indiana, established to address issues associated with the alleviation of poverty. Mr. Moore holds a bachelor's degree from Indiana State University and a master of science degree in management from Indiana Wesleyan University.

James L. Logue III, 66, serves as the Vice-Chair of the Board of Directors of the FHLBank of Indianapolis. Mr. Logue is the Chief Public Policy Officer of Cinnaire Corp., formerly Great Lakes Capital Fund, a housing finance and development company in Lansing, Michigan, and has held that position since 2018. He was appointed as Chief Strategy Officer in 2016 after having served as Chief Operating Officer of Cinnaire Corp., since 2003. Prior to that, Mr. Logue served as the Executive Director of the Michigan State Housing Development Authority beginning in 1991. Mr. Logue has over 40 years' experience in affordable housing, finance, commercial real estate and economic development matters. He served as Deputy Assistant Secretary for Multifamily Housing Programs at HUD in 1988 - 1989, and has been involved in various capacities with the issuance of housing bonds and the management of multi-billion dollar housing portfolios. Mr. Logue serves as a Board member of the National Housing Trust, Washington, D.C. Mr. Logue holds a bachelor of arts degree from Kean College.

Michael G. Steelman, 68, is Chair of the Board of Directors of the FHLBank of Chicago and has served in that capacity since January 1, 2018. Mr. Steelman has been with the Farmers and Merchants State Bank of Bushnell and its holding company, Prairieland Bancorp., Inc., since 1984. He has served as Chief Executive Officer of Farmers and Merchants State Bank of Bushnell since 1996, and was appointed Chair in 2001. In addition, Mr. Steelman has served as President and Chair of the holding company since 2001. Mr. Steelman served as Chair of the Illinois Bankers Association from 2008 to 2009, and was actively involved in the legislative and regulatory process at federal and state levels. An attorney practicing in banking law, Mr. Steelman is a member of the Illinois State Bar Association, and a graduate of the University of Wisconsin Graduate School of Banking. Mr. Steelman also serves as Secretary and Director of the Bushnell Economic Development Corporation.

John K. Reinke, 67, is Vice-Chair of the Board of Directors of the FHLBank of Chicago and has served in that capacity since January 1, 2018. Mr. Reinke has been with The Stephenson National Bank & Trust since 1974, where he served as President from 2000 to 2013. Mr. Reinke currently serves as Chair of the Board of Directors of The Stephenson National Bank & Trust subsequent to his retirement as President & CEO in April 2013. Mr. Reinke previously served on the Government Relations Administrative Council for the American Bankers Association. In addition, he served on the Board of the Wisconsin Bankers Association from 2002 through 2008 and as Chair from 2006 to 2007. Mr. Reinke also has previously served as a Bay Area Medical Center Board member and Treasurer, President of the University of Wisconsin - Marinette Foundation, Inc., President of the Menominee Area Chamber of Commerce, Chair of the M&M Area Community Foundation, M&M Area Great Lakes Sport Fishermen President, M&M YMCA President, and Marinette County Revolving Loan Committee President.

J. Benson Porter, 53, is Chair of the Board of Directors of the FHLBank of Des Moines and has served in that capacity since January 2018. Mr. Porter has served as President and CEO of Boeing Employees' Credit Union (BECU), a not-for-profit financial corporation in Tukwila, Washington, since April 2012. Prior to joining BECU in April 2012, he served as President and CEO of First Tech Credit Union in Palo Alto, California, from February 2007 to March 2012. He also served in several positions at Washington Mutual Bank, most recently as Executive Vice President and Chief Administrative Officer, from May 1996 to February 2007. Mr. Porter has also held positions as regulatory counsel at Key Bank and as staff Director for the Washington State Senate Banking Committee. He is a former Director of FHLBank San Francisco and is currently a member of the Board of CO-OP Financial Services, and the Board of CU Direct. Mr. Porter was elected to the FHLBank of Seattle's Board from the state of Washington in 2012 and served on the FHLBank of Seattle's Board until the merger with the FHLBank of Des Moines in 2015. Mr. Porter's knowledge of financial management and strategic planning, and his leadership and management skills, as indicated by his background, support his qualifications to serve on the FHLBank of Des Moines' Board of Directors. He currently serves as Chair of the Executive and Governance Committee of the FHLBank of Des Moines' Board of Directors.

Ellen Z. Lamale, 65, the Vice-Chair of the Board of Directors of the FHLBank of Des Moines has served in that capacity since January 2018. Ms. Lamale retired from her position as Senior Vice President and Chief Risk Officer (CRO) of The Principal Financial Group (The Principal Financial Group is a registered trademark) (Principal) in March of 2011. Prior to her retirement, she served as Senior Vice President and CRO of Principal since 2008. Ms. Lamale held executive positions at Principal for more than 10 years, and her responsibilities during her 34-year career at Principal included risk management, financial analysis, capital management, strategic planning, and internal audit. Ms. Lamale has served on several community boards, including West Des Moines Youth Soccer Club, Iowa United Soccer Club, Des Moines Symphony Second Strings, and Des Moines Public Library Foundation. Currently, she is a volunteer with the West Des Moines Youth Justice Initiative. Ms. Lamale's involvement in and knowledge of accounting, auditing, finance, and risk management, as indicated by her background, support her qualifications to serve as an Independent Director on the Board of Directors of the FHLBank of Des Moines. She currently serves as Vice-Chair of the Executive and Governance Committee of the FHLBank of Des Moines' Board of Directors.

Joseph F. Quinlan, Jr., 71, is Chair of the Board of Directors of the FHLBank of Dallas and has served in that capacity since January 1, 2015. Mr. Quinlan serves as Chair of First National Bankers Bank (a member of the FHLBank of Dallas) and as Chair of its privately held holding company, First National Bankers Bankshares, Inc. (Baton Rouge, Louisiana) and has served in such capacities since 1984. From 1984 through 2017, Mr. Quinlan served as Chair, President and Chief Executive Officer of First National Bankers Bankshares, Inc. and in 2018 he served as Chair and Chief Executive Officer of the holding company. From 2000 through March 2011, Mr. Quinlan also served as Chair of the Mississippi National Bankers Bank, a former member of the FHLBank of Dallas, and from 2003 through March 2011 he served as Chair of the First National Bankers Bank, Alabama. Further, Mr. Quinlan served as a Director of the Arkansas Bankers Bank, a former member of the FHLBank of Dallas, from December 2008 through March 2011 and as its Chair from February 2009 through March 2011. Mississippi National Bankers Bank, First National Bankers Bank, Alabama, and Arkansas Bankers Bank were merged into First National Bankers Bank on March 31, 2011. In addition, Mr. Quinlan serves as Chair of FNBB Services Corp. LLC., FNBB Capital Markets LLC, FNBB Insurance Agency LLC and FNBB Holdings LLC, and has served in those capacities since 1998, 2003, 2010, and 2016, respectively. He currently serves on the Council of Federal Home Loan Banks and is a member of the Chair and Vice-Chair Committee of the Council of Federal Home Loan Banks. Mr. Quinlan also serves as Chair of the Executive and Governance Committee of the FHLBank of Dallas' Board of Directors.

Robert M. Rigby, 72, is Vice-Chair of the Board of Directors of the FHLBank of Dallas and has served in that capacity since January 1, 2015. Mr. Rigby serves as Regional President, Executive Vice President for Legend Bank (a member of the FHLBank of Dallas) and has served in that capacity since December 1, 2017. Located in Fort Worth, Texas, Mr. Rigby has responsibility for Tarrant County and surrounding areas. Since June 2018, Mr. Rigby has also served as an advisory director for Legend Bank. From August 2008 through November 30, 2017, he served as an Advisory Director and Market President for Liberty Bank in North Richland Hills, Texas (a member of the FHLBank of Dallas). From 1998 to August 2008, Mr. Rigby served as a Director, President and Chief Executive Officer of Liberty Bank. Prior to joining Liberty Bank, Mr. Rigby served as a Director and Executive Vice President of First National Bank of Weatherford from 1980 to 1998. He previously served as an advisory director for the Texas Tech University School of Banking and is a former Vice-Chair of the North Richland Hills Economic Development Advisory Committee. He previously served on the BankPac Committee of the American Bankers Association and he is a past Chair of the Texas Bankers Association. Further, Mr. Rigby previously served on the Weatherford College Board of Trustees, the Board of Directors of the Birdville ISD Education Foundation and as an advisory Director for the North Texas Special Needs Assistance Partners. He is also a past Chair of the Northeast Tarrant Chamber of Commerce. Mr. Rigby currently serves on the Council of Federal Home Loan Banks and is a member of the Chair and Vice-Chair Committee of the Council of Federal Home Loan Banks. He also serves as Vice-Chair of the Executive and Governance Committee of the FHLBank of Dallas' Board of Directors.

G. Bridger Cox, 66, is the Chair of the Board of Directors of the FHLBank of Topeka and he has been Chair and President of Citizens Bank & Trust Company, Ardmore, Oklahoma, since 1996. Although the FHLBank of Topeka's Board of Directors did not participate in Mr. Cox's nomination since he is a member Director, Mr. Cox is a graduate of the Stonier Graduate School of Banking at Rutgers University, possesses more than 30 years of banking management experience, has served on the Board of Directors of the Oklahoma Industrial Finance Authority and the Oklahoma Development Finance Authority, and has prior experience as an FHLBank of Topeka Director, that assists in his service as a Director. Prior to his current term, Mr. Cox served as a member Director of the FHLBank of Topeka from January 1998 through December 2006.

Robert E. Caldwell, II, 48, is Vice-Chair of the Board of Directors of the FHLBank of Topeka and is currently Director of Corporate Development for Nebco, Inc., a supplier of materials to the construction industry to construct buildings, streets and highways, which he began in August 2014. Prior to his service at Nebco, Inc., Mr. Caldwell was the President and Chief Operating Officer of WRK Real Estate, LLC, which he began in January 2014. He previously served as President and Chief

Executive Officer of Hampton Enterprises, Inc., a commercial real estate development, general contracting, construction management and property management firm, since 2006 and General Counsel for Linweld, Inc., a large independent manufacturer and distributor of industrial/medical gases and welding supplies. The Board of Directors of the FHLBank of Topeka considered Mr. Caldwell's qualifications, skills and attributes, including his B.S. in business administration, his J.D. and MBA, his experience as General Counsel for Linweld, Inc., a subsidiary of a Japanese public company, his service as President and Chief Executive Officer of a commercial real estate and construction company, and his prior service as an FHLBank Director, when making his nomination.

John F. (Jack) Luikart, 69, is the Chair of the Board of Directors of the FHLBank of San Francisco, and has served in that capacity since January 2018. Mr. Luikart has been President of Bethany Advisors LLC, San Francisco, California, since February 2007. He has also been a trustee of four asbestos trusts, including the Western Asbestos Settlement Trust, since 2004 and a Board member of Wells Fargo Real Estate Investment Trust and Ohio Wesleyan University since 2014. He was senior advisor to the CEO of Red Capital Group from July 2011 to July 2012 and was Chair of Wedbush Securities Inc., Los Angeles, California, from 2006 to 2010. Previously, he was President and Chief Operating Officer of Tucker Anthony Sutro from 2001 to 2002 and Chair and Chief Executive Officer of Sutro & Co. from 1996 to 2002. He joined Sutro & Co. in 1988 as Executive Vice President of capital markets and became President in 1990. Mr. Luikart's previous positions as Director or Principal Executive Officer of investment banking firms (or their affiliates), and his experience in investment management, capital markets, corporate finance, securitization, and mortgage finance and his involvement in and knowledge of corporate governance, finance, auditing, accounting, internal controls, risk management, financial reporting, and financial management, as indicated by his background, support Mr. Luikart's qualifications to serve on the FHLBank of San Francisco's Board.

Brian M. Riley, 54, is Vice-Chair of the Board of Directors of the FHLBank of San Francisco and has served in that capacity since January 2018. Mr. Riley has been the President and Chief Executive Officer of State Bank of Arizona (formerly Mohave State Bank), Lake Havasu City, Arizona, since March 2009. He has also served as Director, President, and Chief Executive Officer of State Bank Corp., the holding company for State Bank of Arizona, since March 2009. Mr. Riley has also served as a Director of Clearinghouse CDFI, Lake Forest, California, since August 2018. He was the Chief Financial Officer of Mohave State Bank from April 2008 to March 2009. Prior to that, he was Chief Executive Officer of Harbor Bank and Trust, a financial institution in organization in Southport, Connecticut. Mr. Riley has over 30 years of experience in banking including serving as President and Chief Executive Officer of PriVest Bank, Costa Mesa, California, and holding other executive positions with Provident Savings Bank, Riverside, California, and Metro Commerce Bank, San Rafael, California. Mr. Riley is a Director of the Arizona Bankers Association. Mr. Riley's current position as the Principal Executive Officer of a FHLBank member, his previous executive positions with other financial institutions, and his involvement in and knowledge of corporate governance, finance, auditing, accounting, internal controls, risk management, financial reporting, and financial management, as indicated by his background, support Mr. Riley's qualifications to serve on the FHLBank of San Francisco's Board.

FHLBank Presidents

Each FHLBank president reports to the Board of Directors of the respective FHLBank. Each FHLBank president participates in regular meetings with the presidents of the other FHLBanks. The responsibilities of the president include:

- management of the FHLBank;
- administration of the programs of the FHLBank; and
- compliance with the regulations and policies of the FHFA.

The following persons are currently serving as president of an FHLBank and the following information has been provided for each FHLBank primarily based on the information disclosed in its annual report on SEC Form 10-K for the year ended December 31, 2018:

Edward A. Hjerpe III, 60, has served as President and Chief Executive Officer of the FHLBank of Boston since July 2009. Mr. Hjerpe joined the FHLBank of Boston from Strata Bank and Service Bancorp, Inc., where he was Interim Chief Executive Officer from September 2008 until joining the FHLBank of Boston. Mr. Hjerpe was a financial, strategy, and management consultant from August 2007 to September 2008. He was both President and Chief Operating Officer of the Massachusetts/Rhode Island Region of Webster Bank and Senior Vice President of Webster Financial Corporation from May 2004 to June 2007. Prior to those roles, Mr. Hjerpe served as Executive Vice President, Chief Operating Officer, and Chief Financial Officer at FIRSTFED AMERICA BANCORP, Inc. from July 1997 to May 2004. Mr. Hjerpe also worked at the FHLBank of Boston from 1988 to 1997, first as Vice President and Director of Financial Analysis and Economic Research, and ultimately as Executive Vice President and Chief Financial Officer. Mr. Hjerpe has been involved in numerous community, civic, industry, and nonprofit organizations

over the course of his career. He currently serves as a member of the Board of Directors of the Office of Finance, as a member of the FHLBank Presidents Conference and as a member of the Board of Directors of the Pentegra Defined Benefit Plan for Financial Institutions. He is also a former member and past Chair of the Board of Dental Services of Massachusetts, as well as a former member and past Chair of the Board of Trustees of St. Anselm College in Manchester, New Hampshire. Mr. Hjerpe earned a B.A. in Business and Economics from St. Anselm College, and an M.A. and Ph.D. in Economics from the University of Notre Dame.

José R. González, 64, was appointed President and CEO of the FHLBank of New York on April 2, 2014. Mr. González joined the FHLBank of New York on October 15, 2013, as Executive Vice President. Mr. González served as Vice-Chair of the Board of Directors of the FHLBank of New York from 2008 through 2013, and as an elected industry Director from 2004 through 2013. Prior to joining the FHLBank of New York, he served as Senior Executive Vice President, Banking & Corporate Development for OFG Bancorp (formerly Oriental Financial Group, Inc.). Mr. González has also been a member of the Board of Directors of the Pentegra Defined Benefit Plan for Financial Institutions since July 2014. On August 31, 2016, Mr. González was appointed by President Barack Obama to serve as one of the eight Directors of the Oversight Board created by the Puerto Rico Oversight, Management, and Economic Stability Act ("PROMESA") of 2016. Mr. González was a member of the Board of Directors of Santander BanCorp ("Santander"), a bank holding company, from 2000 to 2010. From 2002 to 2008, he was Vice-Chair of the Board, President and CEO of Santander. After joining Santander in 1996 as President and CEO of its securities broker dealer, Mr. González was named Senior Executive Vice President and Chief Financial Officer of the holding company in 2001. Mr. González began his career in banking in the early 1980s as Vice President, Investment Banking, for Credit Suisse First Boston ("CSFB") and, from 1989 through 1995, served as President and CEO of CSFB's Puerto Rico operations. He served as President and CEO of the Government Development Bank for Puerto Rico, a government instrumentality that acts as the Commonwealth's fiscal agent, from 1986 to 1989. He is a past President of both the Puerto Rico Bankers Association and the Securities Industry Association of Puerto Rico. Mr. González holds a B.A. in Economics from Yale University and M.B.A. and Juris Doctor degrees from Harvard University.

Winthrop Watson, 64, was appointed as the FHLBank of Pittsburgh's President and Chief Executive Officer effective January 1, 2011. Previously, he was Chief Operating Officer of the FHLBank of Pittsburgh, a position that he assumed in November 2009. Prior to joining the FHLBank of Pittsburgh, Mr. Watson worked at J.P. Morgan for 24 years in a variety of capital markets and financial institution roles most recently as Managing Director in its Asia Pacific investment banking business. Earlier, Mr. Watson led the building of the company's investment and commercial banking franchise for U.S. government-sponsored enterprises. Mr. Watson serves as a Director of the Office of Finance of the Federal Home Loan Banks and the Pentegra Defined Benefit Plan. He is involved in the community as a Board member of the Pittsburgh Ballet Theater, the Neighborhood Academy and the Pennsylvania Economy League of Greater Pittsburgh. Mr. Watson holds an MBA from Stanford University and a BA from the University of Virginia.

W. Wesley McMullan, 55, was appointed as the FHLBank of Atlanta's President and Chief Executive Officer in 2010. Previously he served as Executive Vice President and Director of Financial Management since 2004, with responsibility for sales, MPP sales, asset-liability management, liquidity management, other mission-related investments, customer systems and operations, and member education. Mr. McMullan joined the FHLBank of Atlanta as a credit analyst in 1988, and later earned promotions to assistant vice president in 1993, vice president in 1995, group vice president in 1998, and senior vice president in 2001. Mr. McMullan also currently serves on the Board of Directors of the FHLBanks Office of Finance. He is a Chartered Financial Analyst and earned a B.S. in Finance from Clemson University.

Andrew S. Howell, 57, was appointed as the FHLBank of Cincinnati's President and Chief Executive Officer in June 2012. Previously, he served as Executive Vice President-Chief Operating Officer of the FHLBank of Cincinnati since January 2008. Mr. Howell began his career at the FHLBank of Cincinnati in 1989 as the Credit Department Manager after being in several lending and management positions at Huntington Bank, Bank One, and First National Bank of Cincinnati. Mr. Howell currently serves on the Board of Directors of the FHLBanks Office of Finance. Mr. Howell earned a bachelor's degree of Business Administration from the University of Kentucky, and a Master of Business Administration degree from the University of Cincinnati.

Cindy L. Konich, 62, was appointed by the FHLBank of Indianapolis' Board of Directors to serve as President and Chief Executive Officer of the FHLBank of Indianapolis in July 2013. Ms. Konich also currently serves on the Board of Directors of the FHLBanks Office of Finance. Ms. Konich holds an MBA and is a CPA.

Matthew R. Feldman, 65, became President and Chief Executive Officer of the FHLBank of Chicago in May 2008, after serving as Acting President from April 2008 until then. Mr. Feldman was Executive Vice President, Operations and Administration of the FHLBank of Chicago from 2006 to 2008, Senior Vice President, Risk Management of the FHLBank of

Chicago from 2004 to 2006 and Senior Vice President, Manager of Operations Analysis of the FHLBank of Chicago from 2003 to 2004. Prior to his employment with the FHLBank of Chicago, Mr. Feldman was Co-founder and Chief Executive Officer of Learning Insights, Inc. from 1995 to 2003. Mr. Feldman conceived, established, financed, and directed the operations of this privately held e-learning company. Mr. Feldman was President of Continental Trust Company, a wholly-owned subsidiary of Continental Bank from 1992 to 1995 and Managing Director-Global Trading and Distribution of Continental Bank from 1988 to 1992. Mr. Feldman currently serves on the Board of Directors of the FHLBanks Office of Finance and as Chairman of the Board of the Pentegra Defined Benefit Plan for Financial Institutions.

Michael L. Wilson, 62, has been President and Chief Executive Officer of the FHLBank of Des Moines since April 2016. Mr. Wilson joined the FHLBank of Des Moines in June of 2015 as President after the merger with the FHLBank of Seattle. Previously, Mr. Wilson was President and CEO of the FHLBank of Seattle from 2012 until its merger into the FHLBank of Des Moines in June 2015, and from 2006 to 2012 he was Executive Vice President and the Chief Business Officer (CBO) of the FHLBank of Des Moines. During his prior role as CBO, Mr. Wilson was responsible for business activities that served the FHLBank of Des Moines' members and their communities. Before joining the FHLBank of Des Moines in 2006, Mr. Wilson was a Senior Executive Vice President and the Chief Operating Officer of the FHLBank of Boston, where he worked for 12 years. In addition, he served as the FHLBank of Boston's Executive Vice President for finance from 1997 to 1999 and Senior Vice President for planning and research from 1994 to 1997. Prior to his service at the FHLBank of Boston, he was the Director of the Office of Policy and Research at the Federal Housing Finance Board in Washington, D.C. Mr. Wilson currently serves on the Board of Directors of the Federal Home Loan Bank Office of Finance, the fiscal agent for the FHLBank System, and the Board of the Greater Des Moines Habitat for Humanity. Mr. Wilson has a B.A. in economics and political science from the University of Wisconsin-Milwaukee and an M.S. in economics from the University of Wisconsin-Madison.

Sanjay Bhasin, 50, serves as President and Chief Executive Officer of the FHLBank of Dallas and has served in that capacity since he joined the FHLBank of Dallas in May 2014. Prior to his employment with the FHLBank of Dallas, Mr. Bhasin served as Executive Vice President, Members and Markets for the FHLBank of Chicago from 2011 until May 2014. He joined the FHLBank of Chicago in 2004 as Vice President, Mortgage Finance and was promoted to Senior Vice President, Mortgage Finance in 2007 and to Executive Vice President, Financial Markets in 2008, a position he held until his appointment as Executive Vice President, Members and Markets. Prior to joining the FHLBank of Chicago, Mr. Bhasin was responsible for managing the interest rate risk associated with Bank One, NA's mortgage pipeline holdings from 1999 to 2004. Mr. Bhasin currently serves on the Council of Federal Home Loan Banks and as a Director of the FHLBanks Office of Finance.

Mark E Yardley, 63, became President and Chief Executive Officer of the FHLBank of Topeka on March 24, 2017, after serving as interim President and Chief Executive Officer starting on January 1, 2017. From May 2010 to January 2017, he was Executive Vice President and Chief Risk Officer. Mr. Yardley previously served as Executive Vice President and Chief Financial Officer from February 2005 to May 2010, First Senior Vice President and Chief Financial Officer from December 1999 through February 2005 and as First Senior Vice President, Director of Finance, from January 1999 to December 1999. Mr. Yardley joined the FHLBank of Topeka in 1984 as Director of Internal Audit and was promoted to Assistant Vice President in 1990 and Vice President in 1991. Mr. Yardley also currently serves on the Board of Directors of the FHLBanks Office of Finance.

J. Gregory Seibly, 55, has been President and Chief Executive Officer of the FHLBank of San Francisco since May 2016. Prior to joining the FHLBank of San Francisco, he served as President of Consumer Banking at Umpqua Bank from its April 2014 merger with Sterling Financial Corporation (Sterling) until May 2016. From October 2009 to April 2014, he served as President and Chief Executive Officer of Sterling and as a member of the Board of Directors. Before joining Sterling in 2007, he was President of U.S. Bank - California. With 30 years of industry experience, Mr. Seibly has also held executive-level positions in commercial banking at Wells Fargo Bank and in health care finance at Bank of America. He currently serves on the Board of the Pacific Coast Bankers School. Mr. Seibly also currently serves on the Board of Directors of the FHLBanks Office of Finance.

Chief Executive Officer, FHLBanks Office of Finance

Randolph C. Snook, 58, became Chief Executive Officer of the Office of Finance on January 1, 2019. Mr. Snook has more than three decades of experience in the securities industry. From August 2005 to December 2018, Mr. Snook served as the Executive Vice President of Business Policies & Practices for the Securities Industry and Financial Markets Association (SIFMA), where he was responsible for overseeing SIFMA's three U.S. business groups - Capital Markets, Private Client, and Asset Management - as well as Technology and Operations, Research, and Member Engagement. Prior to joining SIFMA, Mr. Snook held several senior positions at Goldman Sachs, including co-head of the Credit Capital Markets New Issue Desk and co-head of the Corporate Bond Business Unit. Mr. Snook holds a B.S. in Civil Engineering and an M.B.A., both from Rensselaer Polytechnic Institute.

FHLBanks Office of Finance Board of Directors

The Office of Finance Board of Directors is comprised of the FHLBank presidents and five Independent Directors. To be eligible to serve as an Independent Director, a candidate must be a citizen of the United States, and shall not have any material relationship with an FHLBank or the Office of Finance. In particular, an Independent Director may not be an officer, director or employee of an FHLBank or any member of an FHLBank or be an officer or employee of the Office of Finance (and, in each case, may not have held such a position during the previous three years). In addition, an Independent Director may not be affiliated with any consolidated obligations selling or dealer group under contract with the Office of Finance, or hold shares or any other financial interest in any consolidated obligations seller or dealer group in excess of specified amounts. The Independent Directors, as a group, are required to have substantial experience in financial and accounting matters.

The Governance Committee of the Office of Finance Board of Directors is responsible for recommending to the Office of Finance Board of Directors criteria and processes (including appropriate diversity and inclusion criteria and processes) for the identification and selection of Independent Director candidates, overseeing the implementation of such criteria and processes approved by the Office of Finance Board of Directors, and identifying and recommending to the Office of Finance Board of Directors Independent Director candidates.

Independent Directors are elected by majority vote of the Office of Finance Board of Directors, subject to the FHFA's review of, and non-objection to, each Independent Director. Each elected Independent Director serves a five-year term (staggered so that no more than one Independent Director seat would be scheduled to become vacant in any one year). An Independent Director may not serve more than two full consecutive terms.

Jonathan A. Scott is the Chair and W. Wesley McMullan, President and Chief Executive Officer of the FHLBank of Atlanta, is the Vice-Chair. The following persons are currently serving as an Independent Director:

Jonathan A. Scott, Ph.D., 69, has served as an independent Director since 2010. In 2018, he was re-elected for a five-year term ending in 2023. Dr. Scott is a full Professor of Finance at Temple University's Fox School of Business, where he has been since 1991. At Temple, he is currently Chair of the Finance Department and Managing Director of the William C. Dunkelberg Owl Fund. He also has six years of experience in academic administration at Temple University and managed initiatives related to information technology, program cost analysis, and performance metrics. Prior to joining the university, Dr. Scott was an executive for seven years at the FHLBank of Dallas, including service as the Chief Financial Officer from 1987-1988. Dr. Scott received a Ph.D. in Economics from Purdue University.

Janice C. Eberly, Ph.D., 56, has served as an independent Director since 2014. In 2015, she was re-elected to a five-year term ending in 2020. Dr. Eberly is the James R. and Helen D. Russell Distinguished Professor of Finance at the Northwestern University's Kellogg School of Management, where she has been a faculty member since 1998. She served as the Assistant Secretary for Economic Policy and Chief Economist for the United States Treasury from 2011 to 2013, and as an independent Director for the FHLBank of Chicago from 2009 to 2011. Dr. Eberly serves as an independent trustee of the TIAA-CREF mutual funds, starting in February 2018. Dr. Eberly received a Ph.D. in Economics from the Massachusetts Institute of Technology.

Kathleen C. McKinney, 64, has served as an independent Director since 2010. In 2017, she was re-elected to a five-year term ending in 2022. Ms. McKinney is a senior shareholder with Haynsworth Sinkler Boyd, P.A. having over 38 years of experience as bond counsel and underwriter's counsel in the public finance, community facilities and economic development sectors. She served as President of the National Association of Bond Lawyers and is a recognized speaker on public finance legal issues. Her practice includes advising State agencies and local governments on corporate governance matters with respect to debt issuance and investment of public funds. She is past Chair of the Furman University Board of Trustees. She is recognized by Chambers in Band 1 for her achievement as an attorney in banking and finance. She is a summa cum laude graduate of the University of South Carolina Honors College with a B.A. degree and member of Phi Beta Kappa. She is also a cum laude graduate of the University of South Carolina School of Law where she was executive editor of the South Carolina Law Review.

Joel W. Motley, 66, has served as an independent Director since 2016, with an initial term ending in 2021. Mr. Motley founded Carmona Motley Inc. in 1992 and Public Capital Advisors LLC in 2006. Prior to beginning his career in investment banking at Lazard Frères & Co. in 1985, Mr. Motley worked as an aide to the late Senator Daniel Patrick Moynihan (D-NY), serving as his Chief of Staff in New York City and surrounding counties. Mr. Motley is active on a number of corporate and not-for-profit boards. He chairs the New York Board of the Oppenheimer Funds, and serves as a member of the Council on Foreign Relations. He is Chair Emeritus of the Board of Human Rights Watch. Mr. Motley also serves on the Boards of the Pulitzer Center on Crisis Reporting, The Greenwall Foundation, and Historic Hudson Valley. Mr. Motley holds a JD degree from Harvard Law School and an AB degree (magna cum laude) from Harvard College.

Patricia A. Oelrich, Ph.D., CPA, CISA, 65, has served as an independent Director since 2014, with an initial term ending in 2019. Ms. Oelrich was a member of the Board of Directors of Pepco Holdings, Inc. from May 2010 until April 2016 when it was sold to Exelon Corporation. She is also on the Board of the Association of Audit Committee Members, Inc. From 1995 to 2009, she was with GlaxoSmithKline Pharmaceuticals as Vice President, Internal Audit and then as Vice President, IT Risk Management. Prior to joining GlaxoSmithKline, Ms. Oelrich was an Audit Partner with Ernst & Young, serving the audit assurance practice from 1975-1995. She spent two years in Ernst & Young's National Office Audit Assurance Group developing audit guidance and providing financial accounting interpretations to offices throughout the U.S. In 1988, she became a Partner and headed the Information Technology Audit and Security Practice in Chicago from 1988 to 1995. In addition to heading the Information Technology Audit and Security Practice, Ms. Oelrich was also lead Partner on various audit engagements. Ms. Oelrich is a member of the Advisory Board for the Raj and Kamala Gupta Governance Center, member and fellow of the Board of Directors for the National Association of Corporate Directors New Jersey Board, and Co-Chair of the Women Corporate Directors Philadelphia. Ms. Oelrich received a Ph.D. and an M.A. in Human Organizational Systems from Fielding Graduate University and a B.B. in Accounting and Information Systems from Western Illinois University.

Regulations Governing the Selection and Compensation of FHLBank and Office of Finance Employees

As specified in the FHLBank Act, the selection and compensation of FHLBank officers and employees are subject to the approval of the Board of Directors and management of each individual FHLBank. However, the Director of the FHFA has the authority to prohibit compensation that is not reasonable and comparable to compensation paid to executives in other similar businesses involving similar duties and responsibilities. The FHFA established several principles for the FHLBanks and the Office of Finance for setting executive compensation policies and practices to ensure sound incentive compensation practices:

- executive compensation must be reasonable and comparable to that offered to executives in similar positions at other comparable financial institutions;
- executive incentive compensation should be consistent with sound risk management and preservation of the par value of the FHLBank's capital stock;
- a significant percentage of an executive's incentive-based compensation should be tied to longer-term performance and outcome-indicators;
- a significant percentage of an executive's incentive-based compensation should be deferred and made contingent upon performance over several years; and
- the Board of Directors of each FHLBank and the Office of Finance should promote accountability and transparency with respect to the process of setting compensation.

Each FHLBank is responsible for establishing that FHLBank's compensation philosophy and objectives, and each FHLBank includes a compensation discussion and analysis relating to all material elements of the compensation of its named executive officers in its annual report on SEC Form 10-K. (See [Explanatory Statement about Federal Home Loan Banks Combined Financial Report.](#))

The FHFA exercises similar supervisory and examination authority over the Office of Finance and its Board of Directors as it exercises over an FHLBank and its Board of Directors. FHFA regulations require the Office of Finance Board of Directors to select, employ, determine the compensation for, and assign the duties of, the Office of Finance Chief Executive Officer. (See *Office of Finance CEO 2018 Compensation Discussion and Analysis* for more information.)

Overview and Objectives of FHLBank and Office of Finance Executive Compensation Programs

Each FHLBank strives to provide total compensation that promotes its mission. Compensation programs at each of the FHLBanks are generally intended to focus executives on achieving their individual FHLBank's mission and to associate executive pay with the FHLBank's corporate goals, performance targets, and strategic plan. Each FHLBank's Board of Directors determines total compensation for the president of that FHLBank, consisting of base salary, cash incentive compensation, and other benefits as described in Table S-1.

The Office of Finance is only responsible for the compensation policies for its employees. The Office of Finance seeks to provide a flexible and market-based approach to compensation that attracts, retains, and motivates high performing, accomplished financial services executives who, by their individual and collective performance, achieve the Office of Finance's strategic business initiatives. The objectives of the program are to communicate goals and standards of performance for the

successful achievement of the Office of Finance's mission. (See *Office of Finance CEO 2018 Compensation Discussion and Analysis* for more information.)

The following information has been provided for each FHLBank primarily based on the information disclosed in its annual report on SEC Form 10-K for the year ended December 31, 2018, which in each case provides detail about the FHLBank's compensation philosophy and objectives. The presentations may not be consistent due to differing FHLBank practices and application and interpretation of the rules.

Table S-1 - FHLBank Presidents and Office of Finance CEO Summary Compensation
(whole dollars)

FHLBank	President/CEO Name	Year	Salary	Bonus	Non-Equity Incentive Plan Compensation	Change In Pension Value and Nonqualified Deferred Compensation Earnings	All Other Compensation*	Total
Boston	Edward A. Hjerpe III(1)	2018	\$ 859,430	\$ —	\$ 859,430	\$ 498,000	\$ 118,999	\$ 2,335,859
		2017	781,300	—	757,100	981,000	106,684	2,626,084
		2016	756,700	—	654,149	692,000	103,149	2,205,998
New York	José R. González	2018	920,000	—	927,184	69,000	61,989	1,978,173
		2017	875,000	—	860,851	91,000	47,024	1,873,875
		2016	791,779	—	781,402	72,000	45,954	1,691,135
Pittsburgh	Winthrop Watson(2)	2018	839,055	—	839,055	246,000	78,233	2,002,343
		2017	806,783	—	815,271	480,000	72,808	2,174,862
		2016	775,753	—	753,061	360,000	68,737	1,957,551
Atlanta	W. Wesley McMullan(3)	2018	835,000	2,100	858,804	941,627	75,881	2,713,412
		2017	816,000	100	833,345	2,409,977	74,001	4,133,423
		2016	800,000	100	799,865	1,871,447	69,688	3,541,100
Cincinnati	Andrew S. Howell(4)	2018	901,538	—	722,867	192,000	34,233	1,850,638
		2017	854,808	—	650,066	2,149,000	32,837	3,686,711
		2016	800,625	—	648,357	1,426,000	27,215	2,902,197
Indianapolis	Cindy L. Konich	2018	887,614	—	792,565	979,000	53,257	2,712,436
		2017	829,530	—	765,447	3,980,000	49,772	5,624,749
		2016	775,242	—	595,086	2,996,000	46,515	4,412,843
Chicago	Matthew R. Feldman	2018	940,420	—	944,220	687,000	16,500	2,588,140
		2017	940,420	—	876,648	1,746,000	16,200	3,579,268
		2016	904,250	—	853,624	1,006,000	15,900	2,779,774
Des Moines	Michael L. Wilson(5)	2018	830,000	—	541,074	—	88,360	1,459,434
		2017	805,000	—	667,222	386,000	83,785	1,942,007
		2016	720,000	—	751,012	982,000	70,610	2,523,622
Dallas	Sanjay Bhasin(6)	2018	825,000	—	691,264	—	49,475	1,565,739
		2017	725,000	—	1,087,500	156,000	43,500	2,012,000
		2016	656,625	—	444,751	93,000	39,397	1,233,773
Topeka	Mark Yardley(7)	2018	650,000	—	306,822	1,044,036	60,175	2,061,033
		2017	550,000	—	355,720	1,297,561	58,773	2,262,054
San Francisco	J. Gregory Seibly(8)	2018	900,000	300,000	792,100	848,901	34,634	2,875,635
		2017	850,000	300,000	636,700	590,814	29,149	2,406,663
		2016	506,665	—	396,700	335,768	447,105	1,686,238
Office of Finance	John D. Fisk(9)	2018	771,432	—	569,433	197,000	86,954	1,624,819
		2017	741,762	—	537,487	596,000	73,187	1,948,436
		2016	730,800	—	413,694	523,000	84,481	1,751,975

* Compensation in this column is further presented in Table S-3 - All Other Compensation.

- (1) The amount Mr. Hjerpe earned under the 2016 Executive Incentive Plan at December 31, 2018, based on the formula in the plan, was \$486,156. This amount was reduced to \$473,323, however, to cap the combined short- and long-term incentive paid under the plan to no greater than 100 percent of Mr. Hjerpe's salary for 2018. The Board of Directors exercised discretion to raise the cap from the provision in the plan capping the combined short- and long-term incentive paid under the plan to no greater than 100 percent of the average of the participant's salary for 2016, 2017, and 2018. The FHLBank of Boston received non-objection from the FHFA on the revision of the cap. The amount Mr. Hjerpe earned under the 2015 Executive Incentive Plan at December 31, 2017, based on the formula in the plan, was \$513,230. This amount was reduced to \$386,685, however, to comply with a provision capping combined short- and long-term incentive paid under the plan to no greater than 100 percent of the average of the participant's salary for 2015, 2016, and 2017.
- (2) Mr. Watson's 2018 non-equity incentive plan compensation was the incentive plans described in the FHLBank of Pittsburgh's SEC Form 10-K, as well as deferred incentive earned in the 2017, 2016, and 2015 Executive Officer Incentive Compensation Plan.
- (3) Mr. McMullan's amount under the non-equity incentive plan compensation includes the dollar value of all earnings for services performed during the fiscal years ended December 31, 2018, 2017, and 2016 pursuant to awards under the FHLBank of Atlanta incentive compensation plan, subject to certain mandatory deferral requirements. 50% of the incentive compensation awards for each year were subject to mandatory deferral over three years. Also included is the dollar value of all interest during each year earned on deferred incentives related to incentive compensation awards for prior fiscal years. The \$100 bonus amounts for Mr. McMullan in each year reflect an annual \$100

employee appreciation bonus provided to all employees of FHLBank of Atlanta. The 2018 bonus amount includes an award payment of \$2,000 under the Bank's Service Award Program to recognize employees with five or more years of service. The Service Award Program, administered by the Bank's human resources department, is available to all employees of the Bank under the same general terms and conditions. To the extent the FHLBank of Atlanta provided a tax gross-up on such bonus amounts, those amounts are included in All Other Compensation.

- (4) Mr. Howell's 2018 salary includes \$61,538 of excess accrued vacation benefits automatically paid in accordance with the established policy (applicable to all employees).
- (5) During 2018, Mr. Wilson's pension value decreased by \$167,000. In accordance with SEC rules, this negative amount is not included in this table. Mr. Wilson's 2016 change in pension value and non-qualified deferred compensation earnings amount was revised by an immaterial amount from what was disclosed in the FHLBank of Des Moines' 2016 Form 10-K to include the change in value of the FHLBank of Seattle's BEP DB Plan.
- (6) In 2018, the actuarial present value of the accumulated pension benefits for Mr. Bhasin decreased by \$4,000. In accordance with SEC rules, this negative amount is not included in this table.
- (7) Mr. Yardley became President and Chief Executive Officer of the FHLBank of Topeka on March 24, 2017, after serving as interim President and Chief Executive Officer beginning on January 1, 2017.
- (8) Mr. Seibly became President and Chief Executive Officer of the FHLBank of San Francisco effective May 12, 2016.
- (9) Mr. Fisk served as the Office of Finance's CEO through December 31, 2018, and as an advisor from January 1, 2019, until his retirement on March 1, 2019.

FHLBank Presidents and Office of Finance CEO Pay Ratio

In determining the median employee, one of two approaches was used by each FHLBank and the Office of Finance to calculate the FHLBank President and Office of Finance CEO pay ratio; the Annual Total Compensation approach or the Consistently Applied Compensation Measures approach. Both of these approaches are acceptable methodologies for identifying the median employee. After identifying the median employee, each FHLBank calculates the annual total compensation for the identified median employee.

Annual Total Compensation Approach. The median employee is identified by calculating the annual total compensation for each employee (in the same manner as Total Compensation is calculated for the FHLBank Presidents and the Office of Finance CEO Summary Compensation in Table S-1) at an identified measurement date. The employee population includes all full-time and part-time employees at an identified measurement date (each FHLBank and the Office of Finance has identified its own measurement date). For permanent employees who were not employed for an entire year, total compensation is annualized. Employees are ranked from lowest to highest using annual total compensation, excluding the FHLBank President or Office of Finance CEO, and based on this ranking the median employee is identified.

Consistently Applied Compensation Measures Approach. The median employee is identified by comparing the amount of salary, wages, incentive awards, and other compensation (as reflected in payroll records or as reflected in an employee's W-2) for each employee at an identified measurement date. The employee population includes all full-time and part-time employees at an identified measurement date. For permanent employees who were not employed for an entire year, compensation is annualized. Employees are ranked from lowest to highest using compensation, excluding the President, and based on this ranking the median employee is identified.

Table S-2 presents the pay ratio for each of the FHLBanks and the Office of Finance and is calculated as a ratio of the FHLBank President's or the Office of Finance CEO's annual total compensation to the annual total compensation of the identified median employee. Each FHLBank and the Office of Finance is responsible for identifying its median employee and the calculation of its pay ratio, and as a result, the pay ratios presented in Table S-2 may not be comparable amongst the FHLBanks and the Office of Finance. The following information has been provided for each FHLBank based on the information disclosed in its annual report on SEC Form 10-K for the year ended December 31, 2018.

Table S-2 - FHLBank Presidents and Office of Finance CEO Pay Ratio
(whole dollars)

FHLBank	President/CEO Name	President/CEO Annual Total Compensation	Median Employee Annual Total Compensation	Median Employee Calculation Approach	Pay Ratio
Boston	Edward A. Hjerpe III	\$ 2,335,859	\$ 156,768	Consistently Applied Compensation Measures	15
New York	José R. González	1,978,173	169,671	Consistently Applied Compensation Measures	12
Pittsburgh	Winthrop Watson	2,002,343	133,885	Consistently Applied Compensation Measures	15
Atlanta	W. Wesley McMullan	2,713,412	123,140	Consistently Applied Compensation Measures	22
Cincinnati	Andrew S. Howell	1,850,638	108,624	Consistently Applied Compensation Measures	17
Indianapolis	Cindy L. Konich	2,712,436	120,150	Consistently Applied Compensation Measures	23
Chicago	Matthew R. Feldman	2,588,140	123,124	Consistently Applied Compensation Measures	21
Des Moines	Michael L. Wilson	1,459,434	113,354	Consistently Applied Compensation Measures	13
Dallas	Sanjay Bhasin	1,565,739	152,146	Annual Total Compensation	10
Topeka	Mark Yardley	2,061,033	115,814	Annual Total Compensation	18
San Francisco	J. Gregory Seibly	2,875,635	187,117	Annual Total Compensation	15
Office of Finance	John D. Fisk	1,624,819	151,906	Annual Total Compensation	11

FHLBank President Employment Agreements or Severance Plans

FHLBank of Boston. The FHLBank of Boston has a change-in-control agreement with Mr. Hjerpe, who is also eligible for benefits under the FHLBank of Boston's bankwide severance policy and its Executive Change in Control Severance Plan ("Executive Plan"). The terms cause, change in control, and good reason used in this summary are defined in the respective agreement, policy, or plan, as applicable.

Severance Policy: If his employment is terminated involuntarily other than for cause, Mr. Hjerpe is eligible for 12 months of base pay under the terms of the FHLBank of Boston's severance policy. A severance package for Mr. Hjerpe under the severance policy would require the approval of the FHLBank of Boston's Compensation Committee, and may also require the approval of the FHFA, prior to making any award. The severance policy does not constitute a contractual relationship between the FHLBank of Boston and Mr. Hjerpe, and the FHLBank of Boston reserves the right to modify, revoke, suspend, terminate, or change the severance policy at any time without notice.

Change-in-Control Agreement: Under the terms of the change-in-control agreement with Mr. Hjerpe, in the event that, within a specified period following the FHLBank of Boston's entry into a definitive reorganization agreement (i.e. relating to a merger or consolidation where the FHLBank of Boston is not the survivor, a sale or transfer of substantially all of the FHLBank of Boston's assets, or a liquidation or dissolution of the FHLBank of Boston), either:

- Mr. Hjerpe terminates his employment with the FHLBank of Boston for a good reason that is not remedied within certain cure periods by the FHLBank of Boston; or
- The FHLBank of Boston (or its successor in the event of a reorganization) terminates Mr. Hjerpe's employment without cause,

FHLBank of Boston has agreed to pay Mr. Hjerpe an amount equal to his annualized base salary at the time of such termination to be paid in equal installments over the following 12 months. As a condition to payment, Mr. Hjerpe must agree to execute FHLBank of Boston's standard release of claims agreement. Any payments to Mr. Hjerpe under the change-in-control agreement are in lieu of any severance payments that would otherwise be payable to him and may also require the approval of the FHFA.

Executive Change in Control Severance Plan: Mr. Hjerpe participates in the FHLBank of Boston's Executive Plan, which provides certain payments and benefits in the event of a qualifying termination following a change in control. Mr. Hjerpe's severance benefits under the Executive Plan would be reduced on a dollar for dollar basis for the severance benefits available under either his change in control agreement or the severance policy.

Under the terms of the Executive Plan, if there is a qualifying termination during the period beginning on the earliest of 180 days prior to the date a definitive agreement or order for a change in control has been entered into, or the effective date of a change in control as prescribed by the FHFA, and ending 24 months following the effective date of the change in control, Mr. Hjerpe would be entitled to certain severance payments and benefits. The Executive Plan defines a qualifying termination as a termination of the participant's employment with the FHLBank of Boston, (i) by the FHLBank of Boston, other than for cause; or (ii) by the participant, for good reason but does not include a termination resulting from the participant's death, disability or retirement.

The severance payments and benefits to which Mr. Hjerpe would be entitled under the Executive Plan include:

- a cash payment equal to 2.99 times the sum of (i) the greater of his annual base salary determined at the time of the qualifying termination or 180 days prior to the change in control, and (ii) his target long and short-term incentive awards for the year in which the qualifying termination of employment occurs;
- a lump sum cash payment equal to the amount that would have been payable pursuant to Mr. Hjerpe's annual incentive compensation award for the year in which the date of a qualifying termination occurs based on actual FHLBank of Boston performance, prorated based on the number of days Mr. Hjerpe was employed that year;
- lump sum cash payments (i) for outplacement assistance in the amount of \$25,000; and (ii) in an amount equivalent to the FHLBank of Boston's cost to maintain Mr. Hjerpe's health insurance coverage for 24 months.

All payments and benefits under the Executive Plan are conditioned upon Mr. Hjerpe having delivered an irrevocable general release of claims against the FHLBank of Boston before payment occurs. In addition, all payments and benefits remain subject to the FHLBank of Boston's compliance with any applicable statutory and regulatory requirements relating to the payment of amounts under the Executive Plan.

If the aggregate amount of pay and benefits payable under the Executive Plan would constitute a "parachute payment" subject to excise tax under Section 4999 of the U.S. Internal Revenue Code, Mr. Hjerpe's aggregate pay and benefits will be reduced to the extent necessary to avoid being subject to the excise tax imposed by Section 4999, unless payment of the unreduced benefit would provide him with a higher net after-tax benefit after payment of such excise tax. The FHLBank of Boston's Board of Directors has the right to revise, modify or terminate the Executive Plan in whole or in part at any time or for any reason without the consent of any participant in the Executive Plan outside a "change in control period" (as defined in the Executive Plan). However, during a change in control period (or such longer period until all payments and benefits, if any, which become due under the plan have been paid or satisfied), any such revision, modification or termination that would impact benefits to a participant would require the consent of that participant.

FHLBank of New York. The FHLBank of New York is an "at will" employer and does not provide written employment agreements to any of its employees except for change in control agreements for certain senior executives as discussed below. However, employees, including the president, receive:

- cash compensation (i.e., base salary, and, for exempt employees, "variable" or "at risk" short-term incentive compensation);
- retirement-related benefits (i.e., qualified defined benefit plan; qualified defined contribution plan; and nonqualified defined benefit portion of the benefit equalization plan); and
- health and welfare programs and other benefits.

Other benefits, which are available to all regular employees, include medical, dental, vision care, life, business travel accident insurance, and short- and long-term disability insurance, flexible spending accounts, an employee assistance program, educational development assistance, voluntary life insurance, long-term care insurance, fitness club reimbursement, and severance pay. An additional benefit offered to all officers who are at vice-president rank or above is a physical examination every 18 months.

In addition, Mr. González and the FHLBank of New York have entered into an Employee Change in Control Agreement ("CIC Agreement"), which is intended to provide Mr. González with certain severance payments and benefits in the event his employment is terminated in connection with a "change in control" of the FHLBank of New York. Certain other senior officers have also entered into CIC Agreements with the FHLBank of New York. The CIC Agreements are effective commencing December 1, 2015 for three years from the date the CIC Agreement is executed. Under the terms of the CIC Agreements, if the executive's employment with FHLBank of New York is terminated by FHLBank of New York without "cause" or by the executive for "good reason" (as such terms are defined in the CIC Agreement) during the period beginning on the earliest of (a) twelve months prior to the execution by FHLBank of New York of a definitive agreement regarding a change in control, (b) twelve months prior to change in control mandated by federal statute, rule or directive, (c) twelve months prior to the adoption of a plan or proposal for the liquidation or dissolution of the FHLBank of New York, and ending, in all cases, twenty-four months following the effective date of the change in control, the executive becomes entitled to certain severance payments and benefits. The CIC Agreements were renewed in January 2019 for an additional three-year period.

FHLBank of Pittsburgh. In the event of a merger of the FHLBank of Pittsburgh with another FHLBank, where the merger results in the termination of employment (including resignation for "good reason" as defined under the change in control agreement) for the CEO or any other Executives, each such individual(s) is (are) eligible for severance payments under his/her change in control agreement. Such severance is in lieu of severance under the Severance Policy. The Severance Policy (and in the case of the CEO, his separate severance agreement) continues to apply to employment terminations of the other Executives, other than those resulting from an FHLBank merger. Benefits under the CIC agreement for the CEO and other Executives are as follows:

- 2.99 times base salary (CEO); two times base salary (other Executives);
- For the CEO, a payment of 2.99 times target incentive award opportunity in the year of termination, a pro-rated incentive payment in the year of termination and a payment equal to the additional benefit that the CEO would have received under the FHLBank's qualified and nonqualified retirement plans calculated as if the CEO had three additional years of both age and service at the time of separation from the FHLBank;

- For the other Executives, a payment of two times target incentive award opportunity in the year of termination, a prorated incentive payment in the year of termination and a payment equal to the additional benefit that the other Executives would have received under the FHLBank's qualified and nonqualified retirement plans calculated as if the other Executive had two additional years of both age and service at the time of separation from the FHLBank;
- An amount equal to three (CEO) or two (other Executives) times six percent of the Executive's annual compensation (as defined in the Supplemental Thrift Plan) at the time of separation from the FHLBank;
- Taxable compensation equivalent to the FHLBank's monthly contribution to its active employees' medical plan coverage for the benefits continuation period of 18 months; and
- Individualized outplacement service for a maximum of 12 months and financial planning.

FHLBank of Atlanta. The FHLBank of Atlanta entered into an employment agreement with Mr. McMullan effective as of January 1, 2014 (McMullan Agreement). Under the McMullan Agreement, Mr. McMullan's employment with the FHLBank of Atlanta may be terminated at any time by the FHLBank of Atlanta, with or without "cause," or by Mr. McMullan, with or without "good reason," each as defined in the McMullan Agreement. Unless earlier terminated by either party as provided therein, the McMullan Agreement had an initial three-year term and will continue to extend automatically for subsequent one-year periods unless either party elects not to renew. If during the term of his employment Mr. McMullan is terminated without "cause" or resigns for "good reason," the McMullan Agreement provides for severance pay in an amount equal to: (1) his then-current annual base salary, payable in a lump sum within 30 days after Mr. McMullan executes and delivers a general release of claims to the FHLBank of Atlanta, and (2) an amount equal to the amount that would have been payable pursuant to his incentive compensation award for the year in which the termination occurs, prorated based upon the number of days Mr. McMullan was employed that year. The incentive compensation award is based upon the FHLBank of Atlanta's actual performance for the year in which the termination occurs and is payable at the same time that such awards are paid to the FHLBank of Atlanta's senior executives. In addition, Mr. McMullan is entitled to receive certain health care replacement costs and other amounts required to be paid or provided under any other FHLBank of Atlanta plan, program, policy or practice or contract or agreement. The McMullan Agreement does not provide for any severance pay in the event of a termination with "cause," a termination on account of his death or disability, or his resignation without "good reason."

FHLBank of Cincinnati. The FHLBank of Cincinnati does not provide written employment agreements to any of its employees. Other than normal pension benefits and eligibility to participate in the FHLBank of Cincinnati's retiree medical and life insurance program, no perquisites, tax gross-ups or other special benefits are provided to Mr. Howell in the event of a resignation, retirement or other termination of employment. However, Mr. Howell may receive certain benefits under the FHLBank of Cincinnati's severance policy and Change in Control Plan, described below.

Under the FHLBank of Cincinnati's severance policy, all employees may receive benefits in the event of termination of employment resulting from job elimination, substantial job modification, job relocation, or a planned reduction in staff. In accordance with this policy, Mr. Howell is entitled to six months' severance pay, as well as payment for all unused, accrued vacation benefits. Mr. Howell may also receive outplacement assistance as well as continuation of health insurance coverage on a limited basis.

Under the FHLBank of Cincinnati's Change in Control Plan for officers designated by the Board of Directors, certain payments and benefits are provided in the event of a qualifying termination within 24 months following a change in control. Change in control benefit payments are in lieu of, not in addition to, the severance benefit payments described above. In the event of a qualifying termination, Mr. Howell will receive a severance payment equal to 2.50 times his base salary and target annual incentive amount for the year in which the Change in Control occurs. Mr. Howell will also receive a lump sum cash payment equal to accrued vacation benefits and the amount that would have been payable pursuant to his annual incentive compensation award for the year in which the date of a qualifying termination occurs based on the FHLBank of Cincinnati's actual performance, prorated based on the number of days Mr. Howell was employed that year. In addition, he will receive a cash payment of \$7,500 for outplacement assistance, as well as 24 months of continued health care coverage.

FHLBank of Indianapolis. The FHLBank of Indianapolis maintains a key employee severance agreement for Ms. Konich. If a termination occurs under certain circumstances, Ms. Konich is entitled to 2.99 times the average of the three prior calendar years' base salary (less salary deferral), bonus, and other cash compensation, salary deferrals and employer matching contributions to the qualified and non-qualified defined contribution plans, the taxable portion of an automobile allowance (if any), continued medical and dental insurance coverage for 36 months (subject to Ms. Konich paying the employee portion of

the cost of such coverage), a gross-up amount to cover the increased tax liability (if any), an additional three years credit to age and years of service for the supplemental executive retirement plan, and reimbursement for reasonable legal, accounting, financial advisory, and actuarial services. If the FHLBank of Indianapolis is not in compliance with any applicable regulatory capital or regulatory leverage requirement at the time payment under the agreement becomes due, or if the payment would cause the FHLBank of Indianapolis to fall below applicable regulatory requirements, the payment would be deferred until such time as the FHLBank of Indianapolis achieves compliance with its regulatory requirements. Moreover, if the FHLBank of Indianapolis was insolvent, had a receiver or conservator appointed, or was in "troubled condition" at the time payment under this agreement became due, the FHFA could deem such a payment to be subject to its rules limiting golden parachute payments.

FHLBank of Chicago. The FHLBank of Chicago entered into a new employment agreement with Mr. Feldman effective January 1, 2018, which replaces his prior agreement that was effective January 1, 2015. The employment agreement provides for a three-year employment term ending December 31, 2020, unless terminated earlier as provided for in the agreement.

Mr. Feldman's employment agreement allows Mr. Feldman to participate in the FHLBank of Chicago's president and executive team incentive compensation plan. In addition, Mr. Feldman is also entitled to participate in the FHLBank of Chicago's health insurance, life insurance, retirement, and other benefit plans that are generally applicable to the FHLBank of Chicago's other senior executives. Under the employment agreement, Mr. Feldman is responsible for the payment of all federal, state and local income and other taxes that may be due with respect to any payments made to him pursuant to the employment agreement, although if any provision of the employment agreement would cause Mr. Feldman to incur any additional tax or interest under Section 409A of the Code, then the FHLBank of Chicago may reform such provision provided that it maintains (to the maximum extent practicable), the original intent of the applicable provision.

Under Mr. Feldman's employment agreement, in the event his employment with the FHLBank of Chicago was terminated by him through retirement (as defined in the employment agreement), Mr. Feldman is entitled to receive the following payments and benefits:

1. all accrued and unpaid salary for time worked as of the date of termination;
2. all accrued but unutilized vacation time as of the date of termination;
3. payment of the incentive compensation he would otherwise been entitled to for:
 - i. the total incentive award (both annual award and deferred award) under the FHLBank of Chicago's president and executive team incentive compensation plan for the year in which termination occurs, calculated as if all performance targets for the annual and deferral award period had been met at the target award level and prorated based on the number of full months Mr. Feldman was employed during the year of termination, divided by 12, and
 - ii. any previously deferred award (50% of the total incentive award) under the FHLBank of Chicago's president and executive team incentive compensation plan not subject to proration or further adjustments based on performance target achievement during the deferral period;

provided, however that the human resources and compensation committee of the FHLBank of Chicago may, in its discretion, reduce or eliminate any incentive compensation amounts paid under this item (3) for any of the circumstances set forth in Section 5.3(b)(1)-(3) or (5) the president and executive team incentive compensation plan, as applicable,

4. an additional amount under the FHLBank of Chicago's benefit equalization plan equal to the additional annual benefit under Section 3.01 of the benefit equalization plan, with such benefit calculated as if: (i) Mr. Feldman were 3 years older than his actual age and (ii) Mr. Feldman had 3 additional years of service at the same rate of annual compensation in effect for the 12-month period ending on the December 31 immediately preceding the termination of Mr. Feldman's employment, and (iii) the benefit equalization plan continued in effect without change in accordance with its terms as in effect on the date immediately preceding Mr. Feldman's date of termination, and
5. participation in the FHLBank of Chicago's retiree health care benefit plans for Mr. Feldman and his spouse, in accordance with the terms of the FHLBank of Chicago Description of Retiree Medical Coverage.

If Mr. Feldman's employment with the FHLBank of Chicago is terminated by resignation (as described in the employment agreement), Mr. Feldman will be entitled to the payments in items (1) through (4) above. If Mr. Feldman's employment with the FHLBank of Chicago is terminated by the board for cause (as defined in the employment agreement), Mr. Feldman will be entitled only to the amounts in items (1) and (2) above. If Mr. Feldman's employment with the FHLBank of Chicago is terminated by reason of death or disability, or by the FHLBank of Chicago other than for cause, Mr. Feldman will be entitled to the payments in items (1) through (4) above, as well as salary continuation (at the base salary in effect at the time of termination) for a period of one year, and continued participation in the FHLBank of Chicago's employee health care benefit plans for Mr. Feldman and his spouse, in accordance with the terms of the FHLBank of Chicago's severance plan that would be applicable if Mr. Feldman's employment had been terminated pursuant to such plan (provided, however, the FHLBank of Chicago shall continue paying the employer's portion of Mr. Feldman's medical and/or dental insurance premiums, if Mr. Feldman participates in either or both programs for one year.)

The employment agreement provides that Mr. Feldman would not be entitled to any other compensation, bonus or severance pay from the FHLBank of Chicago other than as specified above and any vested rights which he has under any pension, thrift, or other benefit plan, excluding the severance plan, and, in the instance of termination by any means other than for cause, the benefits equalization plan. The right to receive certain termination payments as outlined above is contingent upon, among other things, Mr. Feldman signing a general release of all claims against the FHLBank of Chicago in such form as the FHLBank of Chicago requires.

FHLBank of Des Moines. The FHLBank of Des Moines entered into an employment agreement with Michael L. Wilson, effective on consummation of the FHLBank of Des Moines and Seattle merger on May 31, 2015, in order to establish his duties and compensation and to provide for his employment as President of the FHLBank of Des Moines. In connection with the departure of Richard S. Swanson on June 30, 2016, Mr. Wilson was also appointed CEO. The employment agreement provides that the Bank will initially pay Mr. Wilson a base salary of \$720,000, subject to adjustment as described in the employment agreement. Mr. Wilson's incentive target will generally not be set lower than 75 percent of his base salary. Mr. Wilson will also be eligible for certain perquisites, including a car allowance in the amount of \$750 per month.

Mr. Wilson's employment agreement provides that the FHLBank of Des Moines or Mr. Wilson may terminate employment for any reason (other than Good Reason or Cause) following 60 days' written notice to the other party; the FHLBank of Des Moines may terminate for Cause immediately following written notice to Mr. Wilson; and Mr. Wilson may terminate for Good Reason following written notice to the FHLBank of Des Moines, in each case, in accordance with the procedures set forth in the employment agreement. Amounts payable under the employment agreement are subject to reduction in the event the amounts constitute an "excess parachute payment" under Section 280G of the Internal Revenue Code.

If Mr. Wilson's employment is terminated by the FHLBank of Des Moines for Cause or by Mr. Wilson without Good Reason, the employment agreement entitles Mr. Wilson to his base salary accrued through the date of termination; accrued but unpaid award(s) under any incentive plan in an amount equal to that which Mr. Wilson would have received in the year of termination; accrued and earned vacation through the date of termination; and all other vested benefits under the terms of the FHLBank of Des Moines' employee benefit plans, subject to the terms of such plans.

If Mr. Wilson's employment is terminated by the FHLBank of Des Moines without Cause or by Mr. Wilson for Good Reason, or following a merger/change in control, in addition to the payouts previously mentioned related to termination for cause or without good reason, the employment agreement entitles Mr. Wilson to severance payments equal to two times the annual base salary in effect on the date of termination for Mr. Wilson, or, in the case that the termination occurs within 24 months following a Change of Control, 2.99 times the annual base salary in effect on the date of termination for Mr. Wilson; one times Mr. Wilson's targeted non-deferred incentive plan award in effect for the calendar year in which the date of termination occurs, or, in the case that the termination occurs within 24 months following a Change in Control, 2.99 times the targeted non-deferred plan award in effect for the calendar year in which the date of termination occurs for Mr. Wilson; the incentive plan award for the calendar year in which the date of termination occurs and prorated for the portion of the calendar year in which Mr. Wilson was employed; the accrued but unpaid incentive plan awards covering periods prior to the one in which Mr. Wilson's employment was terminated, calculated in accordance with the terms of the incentive plan as if termination was due to death or disability; and any benefits mandated under any applicable health care continuation laws, provided that the continuing FHLBank will continue paying its portion of the medical and/or dental insurance premiums for Mr. Wilson for the one-year period following the date of termination.

If Mr. Wilson's employment is terminated due to death, disability, or qualifying retirement, in addition to the payouts for termination for cause or without good reason, he would also be entitled to the incentive plan award for the calendar year in which the date of termination occurs and prorated for the portion of the calendar year in which Mr. Wilson was employed; to the extent not already paid to Mr. Wilson, the accrued but unpaid incentive plan awards covering periods prior to the one in which Mr. Wilson's employment was terminated; and other coverage continuation rights that are available to such employees upon death disability, or retirement, as provided for under the terms of such plans.

FHLBank of Dallas. On March 24, 2015, the FHLBank of Dallas entered into an employment agreement with Mr. Bhasin. This agreement was authorized and approved by the Compensation and Human Resources Committee of the Board of Directors and Board of Directors and resulted from the Board's desire to retain Mr. Bhasin's services for no less than the one-year term of the agreement. On each yearly anniversary thereafter, Mr. Bhasin's employment agreement automatically renews for an additional one-year term unless either the FHLBank of Dallas or Mr. Bhasin gives a notice of non-renewal not less than 30 days prior to the expiration date. Because neither the FHLBank of Dallas nor Mr. Bhasin gave a notice of non-renewal, his employment agreement was, on March 24, 2019, automatically extended through March 23, 2020. Under the terms of the employment agreement, in the event that Mr. Bhasin's employment with the FHLBank of Dallas is terminated either by Mr. Bhasin for good reason or by the FHLBank of Dallas other than for cause, or in the event that the FHLBank of Dallas gives notice of non-renewal while Mr. Bhasin is willing and able to continue employment on the same terms, Mr. Bhasin shall be entitled to receive the following severance benefits in addition to those payable under any applicable incentive and benefit programs in effect at the time of termination and in accordance with their terms:

- base salary continuation (at the base salary in effect at the time of termination) for 12 months;
- a pro rata portion of his non-equity incentive plan compensation for the year in which his termination occurs, based on actual performance for such year; and
- continuation of any elective group health and dental insurance benefits that are being provided to him as of his termination date for a period of 12 months.

FHLBank of Topeka. The FHLBank of Topeka entered into a change in control agreement with Mr. Yardley on June 19, 2015. The Change in Control Plan provides that, upon both a change in control and the termination of a participant that qualifies as a change in control termination, a participant will be entitled to a cash lump sum payment. A Change in Control means the occurrence of any of the following events, provided it shall not include any reorganization that is mandated by any Federal statute, rule, regulations or directive: (1) the merger, reorganization, or consolidation of FHLBank Topeka with or into another FHLBank or other entity; (2) the sale or transfer of all or substantially all of the business or assets of FHLBank Topeka to another FHLBank of other entity; (3) the purchase by FHLBank Topeka or transfer to FHLBank Topeka of substantially all of the business or assets of another FHLBank; (4) a change in the composition of the Board of Directors, as a result of one or a series of related transactions, that causes the combined number of member Directors from states of Colorado, Kansas, Nebraska and Oklahoma to cease to constitute a majority of the Directors of FHLBank Topeka; or (5) the liquidation or dissolution of FHLBank Topeka. The cash lump sum payment is an amount that, when combined with any amount payable under an FHLBank Topeka severance policy, equals a compensation multiplier of 2.99 times (i) his then annualized base salary, and (ii) an amount equal to the target Total Base Opportunity as reflected in FHLBank Topeka's Executive Incentive Compensation Plan Targets document for the year in which the change in control occurs. He is also eligible to receive the continuation of certain group health care benefits for a period of years equal to his compensation multiplier. On June 22, 2017, FHLBank of Topeka's Compensation Committee approved Mr. Yardley's current compensation multiplier of 2.99. From June 19, 2015 through June 22, 2017, Mr. Yardley's compensation multiplier was 2.00.

The FHLBank of Topeka also provides severance benefits to Mr. Yardley pursuant to the FHLBank of Topeka's Executive Officer Severance Policy. The policy's primary objective is to provide a level of protection to Named Executive Officers from loss of income during a period of unemployment. Mr. Yardley is eligible to receive severance pay under the policy if the FHLBank of Topeka terminates his employment with or without cause, subject to certain limitations. These limitations include: (1) the officer voluntarily terminates employment, including disability or death; or (2) the officer's employment is terminated by us for misconduct. As of December 31, 2018, provided the requirements of the policy are met and Mr. Yardley provides the FHLBank of Topeka an enforceable release, he will receive severance pay equal to 12 months of his final annual base salary, absent a qualifying event that would result in payments under the Change in Control Plan. He is also eligible to receive the continuation of certain group health care benefits for a period of 12 months.

FHLBank of San Francisco. The FHLBank of San Francisco's president is employed on an at-will basis. The president may resign at any time, and the FHLBank of San Francisco may terminate his employment at any time, for any reason or no reason, with or without cause and with or without notice. The FHLBank of San Francisco entered into an employment agreement with Mr. Seibly (dated April 26, 2016, as amended) with an initial term of three years and one-year terms thereafter, unless terminated at any time by either the FHLBank of San Francisco or Mr. Seibly. Under the terms of the agreement, Mr. Seibly initially received a base annual salary of \$800,000 and a sign-on payment of \$600,000 to be received in two parts, and subject to clawback in certain circumstances. The base annual salary is subject to review at the FHLBank of San Francisco's Board discretion. The agreement provides for a severance payment equal to (i) two times his "Base Salary" (as defined in the agreement); and (ii) two times his "Annual Incentive Amounts" (as defined in the agreement) and continued benefits if Mr. Seibly's employment is terminated under certain circumstances in connection with a "Change in Control" (as defined in the agreement) of the FHLBank of San Francisco.

Mr. Seibly is also eligible to participate in the FHLBank of San Francisco's various executive incentive and employee benefit plans, including the FHLBank of San Francisco's SERP, 2016 PIP, and the 2014-2016, 2015-2017, and 2016-2018 EPUPs. Under Mr. Seibly's employment agreement, the years of credited service and the amount of FHLBank of San Francisco's contribution credits under the SERP, prior to its amendment effective January 2018, were as follows: 10% of total annual compensation for less than 4 years of credited service; 15% of total annual compensation for 4 or more years but less than 9 years of credited service; and 20% of total annual compensation for 9 or more years of credited service. In addition, Mr. Seibly's employment agreement provides that he will receive a supplemental SERP contribution credit in the amount of \$600,000, to be credited in three equal installments over two years, with the first installment credited at the time his employment began and the second and third installments on the first and second anniversary of his employment commencement, respectively. These supplemental SERP contribution credits vest immediately when credited. Mr. Seibly's employment agreement also provides for reimbursement of his relocation cost up to \$250,000 and payment to the appropriate taxing authorities of up to \$220,000 of any relocation tax obligations.

Table S-3 - All Other Compensation
(whole dollars)

FHLBank*	President/CEO Name	Year	Termination of Employment or Change of Control if Triggered	Contribution or Other Allocations Made by the Employer to Vested and/or Unvested Defined Contribution Plans	Dollar Value of any Insurance Premiums Paid by the Employer with Respect to Life Insurance for the Benefit of the President/CEO	Gross-ups or Other Amounts Reimbursed for the Payment of Taxes	Perquisites and Other Personal Benefits*	Other	Total
Boston	Edward A. Hjerpe III(1)	2018	\$ —	\$ 96,992	\$ —	\$ —	\$ 22,007	\$ —	\$ 118,999
		2017	—	86,127	—	—	20,557	—	106,684
		2016	—	85,882	—	—	17,267	—	103,149
New York	José R. González(2)	2018	—	55,097	720	—	6,172	—	61,989
		2017	—	16,200	720	—	30,104	—	47,024
		2016	—	15,900	990	—	29,064	—	45,954
Pittsburgh	Winthrop Watson	2018	—	74,144	—	—	—	4,089	78,233
		2017	—	70,080	—	—	—	2,728	72,808
		2016	—	68,295	—	—	—	442	68,737
Atlanta	W. Wesley McMullan(3)	2018	—	50,100	43	1,152	24,586	—	75,881
		2017	—	48,960	40	50	24,951	—	74,001
		2016	—	48,000	41	50	21,597	—	69,688
Cincinnati	Andrew S. Howell(4)	2018	—	16,500	—	—	17,733	—	34,233
		2017	—	16,200	—	—	16,637	—	32,837
		2016	—	15,900	—	—	11,315	—	27,215
Indianapolis	Cindy L. Konich	2018	—	53,257	—	—	—	—	53,257
		2017	—	49,772	—	—	—	—	49,772
		2016	—	46,515	—	—	—	—	46,515
Chicago	Matthew R. Feldman	2018	—	16,500	—	—	—	—	16,500
		2017	—	16,200	—	—	—	—	16,200
		2016	—	15,900	—	—	—	—	15,900
Des Moines	Michael L. Wilson	2018	—	75,494	—	—	12,866	—	88,360
		2017	—	74,785	—	—	9,000	—	83,785
		2016	—	61,518	—	—	9,000	92	70,610
Dallas	Sanjay Bhasin	2018	—	49,475	—	—	—	—	49,475
		2017	—	43,500	—	—	—	—	43,500
		2016	—	39,397	—	—	—	—	39,397
Topeka	Mark Yardley	2018	—	53,368	855	—	—	5,952	60,175
		2017	—	40,665	711	1,486	11,180	4,731	58,773
San Francisco	J. Gregory Seibly(5)	2018	—	27,000	792	—	—	6,842	34,634
		2017	—	22,115	792	—	—	6,242	29,149
		2016	—	2,000	576	217,135	225,141	2,253	447,105
Office of Finance	John D. Fisk(6)	2018	—	78,535	—	—	8,419	—	86,954
		2017	—	69,328	—	—	3,859	—	73,187
		2016	—	80,937	—	—	3,544	—	84,481

* Only individual amounts greater than \$25,000 are required to be disclosed in the footnotes.

- (1) Perquisites and other personal benefits amount for Mr. Hjerpe includes the following: personal use of an FHLBank of Boston-owned vehicle, parking, reimbursement for mass transportation, spousal travel expenses, and travel memberships and subscriptions.
- (2) Perquisites and other personal benefits amount for 2018 for Mr. González includes the following: funds matched in connection with the Pentegra Defined Contribution Plan for Financial Institutions, funds matched in connection with the Pentegra Nonqualified Defined Contribution Portion of the BEP, payment of group term life insurance premium, and payment of long term disability insurance premium. For 2016 and 2017, the FHLBank of New York included items that did not need to be included, as they involved benefits available to all employees, including costs relating to health (including employee assistance), dental, and vision insurance premiums.
- (3) Perquisites and other personal benefits amount for Mr. McMullan includes the following: reimbursement for guest travel to certain business functions, certain activities at FHLBank of Atlanta functions, an airline program membership, FHLBank of Atlanta paid premium for Business Travel Accidental Death and Dismemberment Policy, FHLBank of Atlanta matching contributions in the FHLBank of Atlanta's Once for All charitable giving program, and a \$1,500 per month automobile allowance. Perquisites are valued at the actual amounts paid by the FHLBank of Atlanta and the value of each perquisite was less than \$25,000.
- (4) Perquisites and other benefits amount for Mr. Howell includes the following: personal use of an FHLBank of Cincinnati-owned vehicle, premiums for an Executive long-term disability plan, guest travel expenses, and an airline program membership.
- (5) Perquisites and other personal benefits amount for Mr. Seibly in 2016, includes the following: reimbursement of relocation costs and related tax gross-ups, as part of his employment terms with the FHLBank of San Francisco.
- (6) Perquisites and other personal benefits amount for Mr. Fisk include the personal use of an Office of Finance-provided vehicle and financial retirement counseling.

Table S-4 - Grants of Plan-Based Awards
(whole dollars)

FHLBank	President/CEO Name		Estimated Future Payouts under Non-Equity Incentive Plan Awards		
			Threshold	Target	Maximum
Boston	Edward A. Hjerpe III	(1)	\$ 214,858	\$ 322,286	\$ 429,715
New York	José R. González	(2)	487,600	736,000	901,600
Pittsburgh	Winthrop Watson	(3)	251,716	314,645	419,527
		(3)	314,646	393,306	524,409
Atlanta	W. Wesley McMullan	(4)	417,500	626,250	835,000
Cincinnati	Andrew S. Howell	(5)	210,000	315,000	420,000
		(6)	210,000	315,000	420,000
Indianapolis	Cindy L. Konich	(7)	11,095	355,046	443,807
		(8)	331,291	441,721	552,151
Chicago	Matthew R. Feldman	(9)	282,126	376,168	470,210
		(10)	327,019	436,026	545,032
Des Moines	Michael L. Wilson	(11)	207,500	352,750	415,000
		(12)	207,500	352,750	415,000
Dallas	Sanjay Bhasin	(13)	170,053	313,913	391,875
		(14)	170,053	313,912	391,875
Topeka	Mark Yardley	(15)	113,750	227,500	341,250
		(16)	113,750	227,500	341,250
San Francisco	J. Gregory Seibly	(17)	180,000	360,000	450,000
		(18)	180,000	360,000	450,000
Office of Finance	John D. Fisk	(19)	n/a	308,573	385,716
		(20)	n/a	308,573	385,716

(1) Represents estimate of annual short-term incentive compensation for January 1, 2018 through December 31, 2018, under the FHLBank of Boston 2018 executive incentive compensation plan. The estimated future payout for the long-term component of the 2018 executive incentive compensation plan is based, in part, on the results of the short-term component at year-end 2018. The actual future payout for the long-term component will then be interpolated between threshold and target, or between target and excess, depending on the actual results of achievement for the long-term component goal as determined at year-end 2020. If threshold is not achieved, there will not be a payout.

If short-term component results in:	Estimated Possible Payouts under Non-Equity Incentive Plan Awards		
	Threshold	Target	Excess
Threshold	\$ 107,429	\$ 214,858	\$ 322,286
Target	161,143	322,286	483,429
Excess	214,858	429,715	644,573

- (2) The deferred portion of the incentive compensation plan provides that 50% of the total communicated award, if any, under the plan year communicated to the FHLBank of New York management committee participants will ordinarily be paid by the middle of March following the Plan year. The remaining 50% will be deferred (the "Deferred Incentive Award"), subject to certain additional conditions specified in the Plan, such that 33 1/3% of the Deferred Incentive Award will ordinarily be paid by the middle of March of the following three years.
- (3) Payment of each deferred incentive award installment is contingent on the CEO meeting the required criteria and the FHLBank of Pittsburgh meeting the stated bank performance criteria. For the 2017 Plan, the first year payout is 50% of the award amount and then 33 1/3% of the remaining 50% in each deferral installment over the next three years based on whether or not the stated payment criteria were met. The deferred amount for each of the years 2019, 2020, and 2021 is 125% of the maximum deferred amount if both MV/CS and retained earnings levels are maintained, which the FHLBank of Pittsburgh has assumed is met in each year for purposes of this calculation.
- (4) Represents threshold, target, and maximum payment opportunities under FHLBank of Atlanta's incentive compensation plan for the fiscal year ended December 31, 2018. Fifty percent of the actual amount earned is subject to mandatory deferral.
- (5) Represents the estimated annual payout under the FHLBank of Cincinnati's 2018 incentive plan for the period of January 1, 2018 through December 31, 2018, which is 50% of the award opportunity.
- (6) Represents the estimated mandatorily deferred payout under the FHLBank of Cincinnati's 2018 incentive plan for the period of January 1, 2019 through December 31, 2021, which is 50% of the award opportunity. If the FHLBank of Cincinnati operates in a safe and sound manner according to its specified metric during the deferred performance period, the final value will be 100% of the deferred award plus interest.
- (7) Represents the estimated payout range of the annual portion of the incentive compensation plan for January 1, 2018 through December 31, 2018 for the FHLBank of Indianapolis. The threshold payout is the amount expected to be paid when meeting the threshold for the smallest weighted of the components. There is no guaranteed payout under the annual award provisions of the incentive plan. Therefore, the minimum that could be paid out under this plan is \$0.
- (8) Represents the estimated payout under the deferred portion of the incentive compensation plan for the FHLBank of Indianapolis; payout is based upon the annual portion of the incentive compensation plan and is further dependent on attaining the threshold over the 3-year deferral period (2019-2021).
- (9) Represents the potential annual award payouts under FHLBank of Chicago's president and executive team incentive compensation plan for the period from January 1, 2018 through December 31, 2018. Under this plan, 50% of the total incentive award is an annual award payable at the end of a one-year performance period.
- (10) Represents the deferred award granted under FHLBank of Chicago's president and executive team incentive compensation plan for the period from January 1, 2019 through December 31, 2021 based on actual performance for 2018. Under this plan, 50% of the total incentive award is a deferred award which will be payable at the end of a three-year deferral period (subject to adjustment based upon achievement of certain performance requirements).
- (11) Represents the estimated payout range of the annual short-term incentive compensation plan for the FHLBank of Des Moines for January 1, 2018 through December 31, 2018 and payout range of the long-term incentive compensation for the three-year performance cycle beginning January 1, 2017 and ending December 31, 2019.

- (12) Represents estimate of deferred incentive compensation for the FHLBank of Des Moines for the four-year performance cycle beginning January 1, 2018 and ending December 31, 2021. Represents the estimated payout range of the long-term incentive compensation for the three-year performance cycle beginning January 1, 2017 and ending December 31, 2019.
- (13) Represents the estimated payout range of the current award, representing 50% of the annual award under the FHLBank of Dallas' executive incentive plan. The current award became earned and vested on December 31, 2018.
- (14) Represents the estimated payout range of the deferred award, representing 50% of the annual award under the FHLBank of Dallas' executive incentive plan. The deferred award will become earned and vested on December 31, 2021, if certain safety and soundness goals are satisfied during the three-year deferral performance period, which runs from January 1, 2019 through December 31, 2021. Mr. Bhasin's deferred award will earn interest at 6% compounded annually over the three-year deferred performance period. The estimated payment amounts exclude interest on the deferred award.
- (15) Represents the estimated payout range of the cash incentive of the executive incentive compensation plan for January 1, 2018 through December 31, 2018 for the FHLBank of Topeka.
- (16) Represents the estimated payout range of deferred incentive opportunity of the executive incentive compensation plan for the FHLBank of Topeka for the three-year performance period beginning January 1, 2019 through December 31, 2021. Payments are calculated using the base salary in effect on January 1 at the beginning of the performance period. Awards, if any, under this plan are payable in the year following the end of the three-year deferral performance period.
- (17) Represents the estimated payout range of the 2018 year-end portion of the annual award under the FHLBank of San Francisco's executive incentive plan for the performance period January 1, 2018 through December 31, 2018. Actual amounts earned and vested under the FHLBank of San Francisco's executive incentive plan for the 2018 year-end performance period are included in Table S-1 - FHLBank Presidents and Office of Finance CEO Summary Compensation.
- (18) Represents the estimated payout range of deferred award portion of the annual award under the FHLBank of San Francisco's executive incentive plan for the three-year performance period beginning January 1, 2019 and ending December 31, 2021. Any payout under the deferred award is after the three-year performance period and subject to certain qualifiers. The deferred award is payable following the completion of regulatory review.
- (19) Represents estimated payout under the executive incentive plan, approved by the Office of Finance Board of Directors for January 1, 2018 through December 31, 2018, which has two components: 50% annual and 50% deferred. These amounts represent the award opportunity for the annual portion payable in 2019.
- (20) Represents estimated payout for the deferred component under the executive incentive plan, approved by the Office of Finance Board of Directors for January 1, 2018 through December 31, 2018, which has two components: 50% annual and 50% deferred. Subject to the Office of Finance Board of Directors approval, the deferred portion is payable in three annual installments of 33.3% in 2020, 33.3% in 2021, and the remaining amount in 2022.

Table S-5 - Pension Benefits at December 31, 2018
(whole dollars)

FHLBank	President/CEO Name	Plan Name*	Number of Years Credited Service	Present Value of Accumulated Benefit	Payments During 2018
Boston	Edward A. Hjerpe III(1)	Pentegra DBP	26.7	\$ 1,759,000	\$ —
		BEP	9.5	2,535,000	—
New York	José R. González(2)	Pentegra DBP	4.8	342,000	—
Pittsburgh	Winthrop Watson(3)	Pentegra DBP	8.6	462,000	—
		SERP	9.1	1,609,000	—
Atlanta	W. Wesley McMullan(4)	Pentegra DBP	30.0	1,912,000	—
		BEP	30.0	10,308,000	—
Cincinnati	Andrew S. Howell(5)	Pentegra DBP	28.5	2,119,000	—
		BEP	28.5	7,961,000	—
Indianapolis	Cindy L. Konich(6)	Pentegra DBP	34.0	2,557,000	—
		SERP	34.0	15,208,000	—
Chicago	Matthew R. Feldman(7)	Pentegra DBP	14.8	1,288,000	—
		BEP	14.8	5,919,000	—
Des Moines	Michael L. Wilson(8)	Pentegra DBP	22.0	1,765,000	—
		BEP	10.4	1,807,000	—
Dallas	Sanjay Bhasin(9)	Pentegra DBP	14.1	693,000	—
Topeka	Mark Yardley(10)	Pentegra DBP	30.0	2,401,000	—
		BEP	30.0	3,712,000	—
San Francisco	J. Gregory Seibly(11)	BEP	2.1	191,363	—
		SERP	2.6	1,537,572	—
		CBP	2.1	46,547	—
		DCP	2.1	—	—
Office of Finance	John D. Fisk(12)	Pentegra DBP	14.1	1,125,000	—
		SERP	14.1	3,114,000	—

* Pentegra DBP = Pentegra Defined Benefit Plan for Financial Institutions
 BEP = Benefit Equalization Plan
 SERP = Supplemental Executive Retirement Plan
 CBP = Cash Balance Plan
 DCP = Deferred Compensation Plan

- (1) Boston- Participants' benefits are calculated as 2.00 percent multiplied by the participant's years of benefit service multiplied by the high three-year average salary. Compensation for the Pension BEP is compensation (salary and incentive) paid in the year. Compensation for Pentegra DBP is defined as base salary excluding the participant's voluntary contribution to the Thrift BEP, subject to the applicable IRS limits on annual earnings (\$275,000 for 2018). Mr. Hjerpe's Pension BEP benefit is subject to a maximum annual benefit amount not to exceed 80% of high three-year average compensation. The regular form of retirement benefits is a straight-life annuity with a 12 times initial death benefit feature. Mr. Hjerpe's credited years of service for the Pentegra DBP includes 19.6 years of service at the FHLBank of Boston and 7.1 years of service at a previous employer that participated in the Pentegra DBP.
- (2) New York- Formula: 2.0% of a participant's highest consecutive 5-year average earnings (as opposed to consecutive 3-year average earnings as previously provided to grandfathered participants), multiplied by the participant's years of benefit service, not to exceed 30 years. Earnings are defined as base salary plus short-term incentives, and overtime, subject to the annual Internal Revenue Code limit. The normal form of payment is a life annuity (i.e., an annuity paid until the death of the participant), as opposed to a guaranteed twelve-year payout as previously provided to grandfathered participants. In addition, to the non-grandfathered participants, the cost of living adjustments ("COLAs") are no longer provided on future accruals (as opposed to a 1% simple interest COLA beginning at age 66 as previously provided).
- (3) Pittsburgh- Formula: 1.5% × years of benefit service × high five-year average compensation. Compensation covered for the Pentegra Defined Benefit Plan includes annual base salary, subject to IRS limitations. Compensation covered for the SERP includes annual base salary and annual incentive compensation, without regard to IRS limitations. The regular form of retirement benefits provides a single life annuity; a lump sum option is also available.
- (4) Atlanta- The "Present Value of Accumulated Benefit" is the present value of the annual pension benefit that was earned as of December 31, 2018, assuming retirement at age 65. Benefits under the Pentegra DBP were calculated using a 4.22% discount rate; 3.67% was used to calculate benefits under the BEP.
- (5) Cincinnati- For employees hired prior to January 1, 2006: Formula: 2.5% × years of benefit service × highest three-year average compensation. Compensation is defined as base salary, excess accrued vacation benefits, and annual incentive compensation, and excludes any long-term or deferred incentive payments. The regular form of retirement benefits is a single-life annuity including a lump-sum retirement death benefit.
- (6) Indianapolis- Formula: 2.5% × years of benefit service × high three-year average compensation plus, at age 66, an annual retiree cost of living adjustment of three percent without regard to the IRS limits.
- Eligible compensation includes salary (before any employee contributions to tax qualified plans), short-term incentive, bonus (including annual awards under the Incentive Plan), and any other compensation that is reflected on the IRS Form W-2 (but not including long-term incentive payments such as deferred awards under the Incentive Plan).
 - Retirement benefits may be paid in the form of a lump sum payment or annual installments up to 20 years or a combination of lump sum and annual payments.
 - Benefit payments commencing before age 65 are reduced by applying an early retirement factor based on the participant's age when payments begin. The allowance payable at age 65 would be reduced by 3% for each year under age 65. If the sum of the age and years of vesting service at termination of employment is at least 70, the retirement allowance would be reduced by 1.5% for each year under age 65.
- (7) Chicago- Formula: 2.25% × the number of years credited service × highest five-year compensation. Compensation is the average annual salary (base and short-term incentive compensation) for five consecutive years of highest salary. At December 31, 2018, the additional present value of accrued benefits due Mr. Feldman under section (7)(b)(iv) of his employment agreement is \$1,505,000. The regular form of retirement benefits is an annuity or a lump-sum retirement death benefit.
- (8) Des Moines- Formula: 2% × the number of years credited service × highest three consecutive year's average compensation. Average compensation is defined as the total taxable compensation as reported on the IRS Form W-2. In August 2016, the FHLBank of Des Moines' Board of Directors elected to freeze the Pentegra DB Plans effective January 1, 2017. After January 1, 2017, participants no longer accrue new benefits under the Pentegra DB Plans.
- (9) Dallas- Formula: 2% × years of credited service × high 36-month average compensation. The pension plan limits the maximum years of benefit service to 30 years. Compensation covered by the plan includes taxable compensation as reported on Mr. Bhasin's W-2 (exclusive of any compensation deferred from a prior year) plus any pre-tax contributions to the FHLBank of Dallas' Section 401(k) plan and/or Section 125 cafeteria plan, subject to the 2018 IRS limitation of \$275,000 per year. While employed by the Federal Home Loan Bank of Chicago, Mr. Bhasin accrued benefits at a service accrual rate of 2.25%. Mr. Bhasin's credited years of service for the Pentegra DBP includes 4.6 years of service at the FHLBank of Dallas and 9.5 years of service at the FHLBanks of Chicago. The regular form of retirement benefit is a single life annuity that includes a lump-sum death benefit. The normal retirement age is 65, but Mr. Bhasin is eligible to receive an unreduced retirement benefit beginning at age 62. The FHLBank of Dallas does not have a supplemental defined benefit plan that covers compensation in excess of the IRS maximum limit; accordingly, Table S-5 reflects the estimated pension benefits payable to Mr. Bhasin based solely on the IRS compensation limit as his compensation exceeded such limit.
- (10) Topeka- Formula: Starting September 2003 Pentegra Defined Plan Benefit = 2.0% × years of benefit service (not to exceed 30 years) × high three-year average compensation. Benefit service begins one year after employment. Prior to September 2003 FIRF Benefit = 2.25% × years of benefit service (not to exceed 30 years) × high three-year average compensation. Benefit service begins one year after employment. Compensation covered includes annual base salary plus incentive compensation subject to the 2018 annual IRS limitation of \$275,000. The regular form of retirement benefits provides a single life annuity, a lump sum payment or other additional payment options.
- (11) San Francisco- Benefit Equalization Plan
The Benefit Equalization Plan is an unfunded and non-tax-qualified plan that is designed to restore retirement benefits lost under the Cash Balance Plan and the FHLBank of San Francisco's Savings Plan (a defined contribution plan) because of compensation and benefits limitations imposed on the Cash Balance Plan and the Savings Plan under the Internal Revenue Code (IRC). An employee's benefits that would have been credited under the Cash Balance Plan but for the limitations imposed on the plans under the IRC are credited as supplemental cash balance benefits under the BEP and the credits accrue interest at an annual rate of 6% until distributed. The amounts credited or accrued under the BEP vest according to the corresponding provisions of the Cash Balance Plan and the Savings Plan.
Supplemental Executive Retirement Plan
The SERP is an unfunded and non-tax-qualified retirement benefit plan that provides a cash balance benefit to the FHLBank of San Francisco's senior officers that is in addition to the Cash Balance Plan benefits. The SERP supplements the Cash Balance Plan benefits to provide a competitive postretirement compensation package that is intended to help the FHLBank of San Francisco attract and retain key senior officers who are critical to the success of the FHLBank of San Francisco.
Cash Balance Plan and the Financial Institutions Retirement Fund
The FHLBank of San Francisco began offering benefits under the Cash Balance Plan (CBP) on January 1, 1996. The CBP is a tax-qualified defined benefit pension plan that covers employees who have completed six months of service, including the president. Each year, eligible employees accrue benefits equal to 6% of their total annual compensation (which includes base salary and short-term cash incentive compensation) plus interest equal to 6% of their account balances accrued through the prior year, referred to as the annual benefit component of the CBP. The benefits under the CBP annual benefit component are fully vested after an employee completes three years of service. Vested amounts are generally payable in a lump sum or in an annuity when the employee leaves the FHLBank of San Francisco.
Deferred Compensation Plan
The FHLBank of San Francisco's Deferred Compensation Plan is an unfunded and non-tax-qualified plan, consisting of three components: (1) employee deferral of current compensation; (2) make-up matching contributions that would have been made by the FHLBank of San Francisco under the Savings Plan had the base salary compensation not been deferred; and, (3) make-up pension benefits that would have been earned under the Cash Balance Plan had any amount of total annual compensation (base salary and short-term cash incentive compensation) not been deferred.
- (12) Office of Finance- Formula: Starting July 2011 - 2.0% × years of benefit service × high three-year average compensation. Benefits earned from April 2003 to June 2011 are frozen under the prior benefit formula of 2.25%.

Table S-6 - Non-Qualified Deferred Compensation for 2018
(whole dollars)

FHLBank	President/CEO Name	President/CEO Contributions	Employer Contributions	Aggregate Withdrawals/ Distributions	Aggregate Earnings	Aggregate Balance at 12/31/18
Boston	Edward A. Hjerpe III	\$ 48,496	\$ 80,492	\$ —	\$ (48,192)	\$ 983,096
Pittsburgh	Winthrop Watson	550,368	67,851	—	(236,700)	3,364,805
Atlanta	W. Wesley McMullan	456,982	34,685	(771,329)	19,395	2,356,243
Indianapolis	Cindy L. Konich	53,257	36,757	—	(15,290)	260,264
Chicago	Matthew R. Feldman	60,138	43	—	10,183	588,585
Des Moines	Michael L. Wilson	60,621	50,870	—	(69,971)	1,120,351
Dallas	Sanjay Bhasin	153,000	32,975	—	(38,112)	490,439
Topeka	Mark Yardley	35,196	36,868	—	88,295	1,315,174
Office of Finance	John D. Fisk	54,036	62,035	—	(111,019)	2,864,099

Office of Finance CEO 2018 Compensation Discussion and Analysis

Compensation Philosophy and Objectives.

The Human Resources and Compensation Committee (HR Committee) serves as the compensation committee of the Office of Finance Board of Directors. The compensation program for the Office of Finance CEO is designed to provide a flexible and market-based approach to compensation that attracts, motivates, and retains an executive with the skills and expertise necessary to enable the Office of Finance to meet or exceed its business goals. To achieve these objectives, the Office of Finance compensates the CEO using a total compensation program approach that combines base salary, short- and long-term variable (incentive-based) compensation, retirement benefits, and modest fringe benefits. The objectives of the compensation program are to establish and communicate short- and long-term standards of performance for the successful achievement of the Office of Finance's mission and to recognize, motivate, and reward the CEO commensurate with his contributions.

The Office of Finance Board of Directors believes that its compensation philosophy is effective in attracting, retaining, and motivating a highly qualified individual. The Office of Finance Board of Directors reviews annually the compensation program to ensure that it is consistent with and supports the Office of Finance's business strategies and objectives. The FHFA's guiding principles for sound incentive compensation practices were incorporated into the development, implementation, and review of compensation policies and practices for the Office of Finance CEO in 2018.

Regulatory Oversight of Executive Compensation.

On December 20, 2018, the FHFA published a final rule, effective January 22, 2019, regarding golden parachute and indemnification payments (Golden Parachute Rule) to better align the Golden Parachute Rule with areas of the FHFA's supervisory concern and reduce administrative and compliance burdens. The Golden Parachute Rule sets forth the standards that the FHFA would take into consideration when limiting or prohibiting golden parachute and indemnification payments by an FHLBank or the Office of Finance to an entity-affiliated party when such entity is in troubled condition, in conservatorship or receivership, or insolvent. The final rule amendments:

- focus the standards on payments to and agreements with executive officers, broad-based plans covering large numbers of employees (such as severance plans), and payments made to non-executive-officer employees who may have engaged in certain types of wrongdoing; and
- revise and clarify definitions, exemptions, and procedures to implement the FHFA's supervisory approach.

The Director of the FHFA has the authority to review the compensation arrangements of executive officers of the FHLBanks and the Office of Finance and to prohibit an FHLBank or the Office of Finance from providing compensation to any executive officer that the Director of the FHFA determines is not reasonable and comparable with compensation for employment in other similar businesses involving similar duties and responsibilities. The Director of the FHFA also has the authority to approve, in advance, agreements or contracts of executive officers that provide compensation in connection with termination of employment.

Competition and Compensation Benchmarking.

Role of the HR Committee and the Office of Finance Board of Directors in Setting Executive Compensation. The HR Committee and the Office of Finance Board of Directors align the executive compensation program with the Office of Finance's business objectives and focus the CEO's efforts on fulfilling these goals. The HR Committee reviews the CEO's performance and researches and recommends the CEO salary to the Office of Finance Board of Directors. The percentage of salary increase that will apply to a base pay merit adjustment for each year is recommended by the HR Committee for approval by the Office of Finance Board of Directors. The retirement benefit plans that are offered, and any changes to those plans from year to year, are approved by the Office of Finance Board of Directors after a recommendation by the HR Committee. The HR Committee also recommends the goals, payout, and qualifications for the annual Executive Incentive Plan for approval by the Office of Finance Board of Directors.

Role of Compensation Consultant in Setting Executive Compensation. The salary and benefit benchmarks used by the Office of Finance to establish reasonable and competitive compensation for its employees are the competitor groups established by Aon Consulting and its affiliate, McLagan Partners, as presented in Table S-7. The benchmarking analysis included the following competitor positions: the FHLBank Presidents; the head of debt capital markets for certain commercial banks; the proxy data for Fannie Mae and Freddie Mac; and the publicly available data for the Federal Farm Credit Banks Funding Corporation.

Table S-7 - Benchmarking Institutions

Bank of America Merrill Lynch	Federal Home Loan Bank of Cincinnati	JP Morgan Investment Bank
BBVA Compass	Federal Home Loan Bank of Dallas	National Australia Bank
CIBC World Markets	Federal Home Loan Bank of Des Moines	PNC Bank
Citigroup	Federal Home Loan Bank of Indianapolis	Royal Bank of Canada
Crédit Agricole CIB	Federal Home Loan Bank of New York	TD Securities
Fannie Mae	Federal Home Loan Bank of Pittsburgh	Federal Farm Credit Banks Funding Corporation
Federal Home Loan Bank of Atlanta	Federal Home Loan Bank of San Francisco	UniCredit Bank AG
Federal Home Loan Bank of Boston	Federal Home Loan Bank of Topeka	Wells Fargo Bank
Federal Home Loan Bank of Chicago	Freddie Mac	

Elements of Total Compensation Program.

John D. Fisk served as the Office of Finance's CEO through December 31, 2018, and as an advisor from January 1, 2019, until his retirement on March 1, 2019. As an advisor, Mr. Fisk received compensation commensurate with that received by him as CEO. Randolph C. Snook became the Office of Finance's CEO effective January 1, 2019.

Base Salary. Base salary is a key component of the Office of Finance's total CEO compensation program. In setting the base salary for the CEO, the Office of Finance Board of Directors has discretion to consider a wide range of factors, including the CEO's individual performance, the performance of the Office of Finance overall, the CEO's tenure and the amount of the CEO base salary relative to the base salaries paid to executives in similar positions in the 50th percentile of executive salaries in the Office of Finance's peer groups. The Office of Finance Board of Directors also considers the amount and relative percentage of the CEO's total compensation that is derived from base salary. Effective December 6, 2017, the Office of Finance Board of Directors approved a 4% base salary increase for 2018, resulting in an annual base salary of \$771,432. (See *FHLBank Presidents and Office of Finance CEO Pay Ratio* within this section for information related to the CEO pay ratio.)

Executive Incentive Plan. The Office of Finance's CEO 2018 Executive Incentive Plan is an annual cash-based incentive compensation plan designed to promote and reward high levels of performance for accomplishing Office of Finance Board of Directors-approved goals. The annual goals reflect desired performance focused on the Office of Finance mission. Each goal is assigned a weight reflecting its relative importance and potential effect on the Office of Finance's strategic initiatives. The CEO is eligible to receive 50% of the combined plan award as a cash payment and 50% of the award is deferred over a three year period.

The Office of Finance Board of Directors approved four goals consistent with the 2018 Executive Incentive Plan that are intended to reinforce the strategic plan actions and value delivered by the Office of Finance to support the mission of the FHLBanks.

- Customers (30% weight): 1) Office of Finance Performance Survey and 2) IT Application Modifications.
 - Office of Finance Performance Survey consisted of serving the needs of the FHLBanks individually and collectively.
 - IT Application Modifications involved enhancing service either directly or through funding and market access.
- Strategic Plan (30% weight): 1) Funding and Market Access and 2) People.
 - Funding and Market Access consisted of ensuring that management and the Board are engaged in the major structural changes caused by regulatory and economic factors impacting dealers and investors in the agency debt market.
 - People consisted of ensuring the Office of Finance continues to cultivate a high performing organization with engaged staff and management bench strength.
- Operations (30% weight) consisted of continuing to enhance the Office of Finance's Risk Management program and Internal Control environment as well as regulatory compliance.
- Diversity and Inclusion (10% weight) consisted of continuing to enhance inclusion in all aspects of the Office of Finance's operations.

The authorization for payment of awards is provided following a review of the year-end performance results by the Office of Finance Board of Directors. The cash incentive payments are typically determined based on the actual performance in comparison to the performance level established for each goal. If actual performance falls below the threshold level of performance, typically no payment is made for that goal. If actual performance exceeds the maximum level, only the value assigned as the performance maximum is paid. When actual performance falls between the assigned threshold, target, or maximum performance levels, an interpolation is typically calculated for that goal. The achievement level for each goal is then multiplied by the corresponding incentive weight assigned to that goal and the results for each goal are summed to arrive at the final incentive award payable to the Office of Finance's CEO. However, the Board has the authority to adjust the combined incentive award opportunity based on various factors, at their discretion.

The CEO is assigned a combined incentive award opportunity, typically stated as a percentage of base salary, which corresponds to the level of organizational responsibility and ability to contribute to and influence overall Office of Finance performance. At its December 11, 2018 meeting, the Office of Finance Board of Directors authorized a 2018 Executive Incentive Plan award of \$717,432. In February 2019, \$358,716 (50%) was paid, and 50% is deferred over a three-year period. The deferred award is expected to be paid in three annual installments of \$119,572 (33.3%) in 2020, 2021, and 2022. The deferred awards will be reviewed prior to payment based on established criteria by the Office of Finance Board of Directors, and Mr. Fisk will be paid as scheduled, subject to approval after his retirement date.

Table S-8 - 2018 Executive Incentive Plan Results
(whole dollars)

Goal	Weight	Overall Award Level	Total Award
Customers	30%	Target	\$ 215,230
Strategic Plan	30%	Between target and maximum	215,230
Operations	30%	Close to maximum	215,230
Diversity & Inclusion	10%	Maximum	71,742
Total	100%		\$ 717,432

The Office of Finance Board of Directors approved a deferred award payment to John Fisk of \$210,717. The award was comprised of two components, an award of \$160,717, which is the deferred component of the 2017 Executive Incentive Plan (25% deferral of the 2016 Executive Incentive Plan and an additional gap payment award that serves as a make whole provision to support the transition from a two year to a three year deferral) and an award of \$50,000, which is the deferred component of the 2016 Executive Incentive Plan (25% deferral of the 2016 Executive Incentive Plan).

Table S-9 - 2017 Executive Incentive Plan Deferred Component
(whole dollars)

Goal	Weight	Overall Award Level	Total Award
Customers	25%	Target	\$ 40,179
Strategic Plan	30%	Between target and maximum	48,215
Operations	35%	Close to maximum	56,251
Diversity & Inclusion	10%	Maximum	16,072
Total	100%		\$ 160,717

The Board of Directors approved an award of \$200,000 for the 2016 Executive Incentive Plan of which \$50,000 was paid in 2018 (25% deferral of the 2016 executive incentive plan).

Retirement Benefits. The Office of Finance maintains a comprehensive retirement program for the CEO comprised of a combination of two IRS qualified plans and two non-qualified plans.

- **Qualified Defined Benefit Pension Plan** - The Pentegra Defined Benefit Plan is a funded tax-qualified plan that is maintained on a non-contributory basis (i.e., no employee contributions). Participants' pension benefits are 100% vested upon completion of six years of service. The pension benefits payable under the Pentegra Defined Benefit Plan are determined under a pre-established formula that provides a single life annuity payable monthly at normal retirement (age 65), or other actuarially equivalent forms of benefit payments, including an early retirement option. The CEO's benefit formula through June 30, 2011 was 2.25% for each year of benefit service multiplied by the highest three-year average compensation, excluding deferred compensation. As of July 1, 2011, the CEO's benefit formula was reduced to 2.0% for each year of benefit service multiplied by the highest three-year average compensation, excluding deferred compensation.
- **Non-qualified Defined Benefit Pension Plan** - The CEO is eligible to participate in the Supplemental Retirement Plan, an unfunded, non-qualified pension plan that mirrors the Pentegra Defined Benefit Plan in all material respects. In the event that benefits payable from the Pentegra Defined Benefit Plan have been reduced or otherwise limited by IRS provision, the executive's lost benefits are payable under the terms of the Supplemental Retirement Plan. Because this plan is a non-qualified plan, the benefits received from this plan do not receive the same funding protection associated with the qualified plan.
- **Qualified Defined Contribution Plan** - The Pentegra Defined Contribution Plan for Financial Institutions is a tax-qualified defined contribution plan to which the Office of Finance makes tenure-based matching contributions. The matching contribution begins upon completion of three months of employment and subsequently increases based on length of employment to a maximum of six percent of base salary. Under the Pentegra Defined Contribution Plan, a participant may elect to contribute up to 50% of base salary on either a before-tax (i.e., 401(k)), or after-tax basis up to the IRS limit. The plan permits participants to self-direct investment elections into one or more investment funds, which may be changed daily by the participants. A participant may withdraw vested account balances while employed, subject to certain IRS and plan limitations.
- **Non-qualified Defined Contribution Plan** - The CEO is eligible to participate in the Supplemental Thrift Plan, a funded, non-qualified, contributory plan that mirrors the Pentegra Defined Contribution Plan in all material respects. This plan restores benefits that participants would have received absent IRS limits on contributions to the Pentegra Defined Contribution Plan. Under the Supplemental Thrift Plan, participants may elect to contribute up to 50% of base salary and up to 100% of incentive compensation on a pre-tax basis. As in the Pentegra Defined Contribution Plan, the employer match in the Supplemental Thrift Plan is tenure-based with a six percent maximum. This plan permits participants to self-direct investment elections into a choice of investment funds.

Perquisites. The perquisites provided by the Office of Finance represent a small fraction of the CEO's total compensation and are provided in accordance with market practices for executives in similar positions and with similar responsibilities. During 2018, the CEO was provided with an Office of Finance-owned vehicle for his business and personal use. The operating expenses associated with the vehicle were also provided. The CEO's personal use of the Office of Finance-owned vehicle, including use for the daily commute to and from work, is reported as a taxable fringe benefit.

Financial Counseling. The CEO is eligible for an annual reimbursement of personal financial counseling not to exceed \$10,000. This benefit was utilized in 2018.

Director Compensation

In accordance with the regulations of the FHFA under the FHLBank Act, the FHLBanks and Office of Finance have established formal policies governing the compensation and expense reimbursement provided to their Directors. The goal of the policies is to compensate members of the Board of Directors for work performed on behalf of the FHLBanks. Under these policies, compensation consists of fees that compensate Directors for:

- time spent reviewing materials sent to them on a periodic basis;
- preparation for meetings;
- participation in any other activities; and
- actual time spent attending the meetings of the board or its committee.

Directors are also reimbursed for reasonable expenses, which are not included in Table S-10 - Chair and Vice-Chair Director Compensation for 2018.

An FHFA rule allows each of the FHLBanks and the Office of Finance to pay its Directors reasonable compensation and expenses, subject to the authority of the Director of the FHFA to object to, and to prohibit prospectively, compensation and/or expenses that the Director of the FHFA determines are not reasonable. (See *FHLBank Directors* and *FHLBanks Office of Finance Board of Directors* within this section for biographies.) The following information has been provided for each FHLBank primarily based on the information disclosed in its annual report on SEC Form 10-K for the year ended December 31, 2018.

Table S-10 - Chair and Vice-Chair Director Compensation for 2018
(whole dollars)

FHLBank	Director Name	Position	Fees Earned or Paid in Cash	Change in Pension Value and Nonqualified and Deferred Compensation Earnings	All Other Compensation	Total
Boston	Andrew J. Calamare	Chair	\$ 132,500	\$ —	\$ —	\$ 132,500
	Stephen G. Crowe	Vice-Chair	112,500	—	—	112,500
New York	John R. Buran	Chair	127,500	—	—	127,500
	Larry E. Thompson	Vice-Chair	112,500	—	—	112,500
Pittsburgh	Patrick A. Bond	Chair	141,250	—	22	141,272
	Lynda A. Messick	Vice-Chair	118,750	—	22	118,772
Atlanta	F. Gary Garczynski	Chair	130,000	—	—	130,000
	Richard A. Whaley	Vice-Chair	120,000	1,588	—	121,588
Cincinnati	Donald J. Mullineaux	Chair	145,000	—	—	145,000
	James A. England	Vice-Chair	125,500	—	—	125,500
Indianapolis	James D. MacPhee	Chair	135,000	—	—	135,000
	Dan L. Moore	Vice-Chair	115,000	—	—	115,000
Chicago	Michael G. Steelman	Chair	137,000	—	—	137,000
	John K. Reinke	Vice-Chair	122,000	—	—	122,000
Des Moines	J. Benson Porter	Chair	134,000	—	—	134,000
	Ellen Z. Lamale	Vice-Chair	123,500	—	—	123,500
Dallas	Joseph F. Quinlan, Jr.	Chair	128,750	—	—	128,750
	Robert M. Rigby	Vice-Chair	113,300	—	—	113,300
Topeka	G. Bridger Cox	Chair	133,750	1,061	—	134,811
	Robert E. Caldwell, II	Vice-Chair	113,750	—	—	113,750
San Francisco	John F. (Jack) Luikart	Chair	133,588	—	—	133,588
	Brian M. Riley	Vice-Chair	128,941	—	—	128,941
Office of Finance	Jonathan A. Scott(1)	Chair	135,000	—	—	135,000

(1) W. Wesley McMullan, President and Chief Executive Officer of the FHLBank of Atlanta, serves as the Vice-Chair of the Office of Finance Board of Directors. Per FHFA regulation, an FHLBank president shall not receive any additional compensation or reimbursement as a result of his service as a Director of the Office of Finance Board of Directors.

Individual Federal Home Loan Bank Selected Financial Data and Financial Ratios

The following individual Federal Home Loan Bank (FHLBank) selected financial data and financial ratios are provided as a convenience to the reader. Please refer to [Explanatory Statement about Federal Home Loan Banks Combined Financial Report](#), which discusses the independent management and operation of the FHLBanks; identifies the availability of other information about the FHLBanks; and describes where to find the periodic reports and other information filed by each FHLBank with the SEC.

Individual FHLBank Selected Financial Data and Financial Ratios

<i>(dollars in millions)</i>	Boston	New York	Pittsburgh
Selected Statement of Condition Data(1)			
At December 31, 2018			
Assets			
Investments(2)	\$ 15,900	\$ 35,443	\$ 20,076
Advances	43,193	105,179	82,476
Mortgage loans held for portfolio	4,300	2,928	4,469
Allowance for credit losses on mortgage loans	(1)	(1)	(7)
Total assets	63,593	144,381	107,487
Consolidated obligations(3)			
Discount notes	33,066	50,640	36,897
Bonds	25,912	84,154	64,299
Total consolidated obligations	58,978	134,794	101,196
Mandatorily redeemable capital stock	32	6	24
Total capital			
Capital stock(4)	2,529	6,066	4,027
Retained earnings	1,395	1,694	1,276
Accumulated other comprehensive income (loss)	(317)	(13)	73
Total capital	3,607	7,747	5,376
Asset composition (as a percentage of the individual FHLBank's total assets)			
Investments(2)	25.0%	24.5%	18.7%
Advances	67.9%	72.8%	76.7%
Mortgage loans held for portfolio, net	6.8%	2.0%	4.2%
Total retained earnings as a percentage of FHLBank's total assets	2.2%	1.2%	1.2%
FHLBank's total assets as a percentage of FHLBank System's total assets	5.8%	13.1%	9.7%
At December 31, 2017			
Assets			
Investments(2)	\$ 17,942	\$ 33,069	\$ 17,756
Advances	37,566	122,448	74,280
Mortgage loans held for portfolio	4,005	2,898	3,929
Allowance for credit losses on mortgage loans	(1)	(1)	(6)
Total assets	60,362	158,918	99,663
Consolidated obligations(3)			
Discount notes	27,721	49,614	36,193
Bonds	28,345	99,288	57,534
Total consolidated obligations	56,066	148,902	93,727
Mandatorily redeemable capital stock	36	20	5
Total capital			
Capital stock(4)	2,284	6,750	3,659
Retained earnings	1,308	1,546	1,158
Accumulated other comprehensive income (loss)	(327)	(55)	111
Total capital	3,265	8,241	4,928
Asset composition (as a percentage of the individual FHLBank's total assets)			
Investments(2)	29.7%	20.8%	17.8%
Advances	62.2%	77.1%	74.5%
Mortgage loans held for portfolio, net	6.6%	1.8%	3.9%
Total retained earnings as a percentage of individual FHLBank's total assets	2.2%	1.0%	1.2%
FHLBank's total assets as a percentage of FHLBank System's total assets	5.5%	14.4%	9.0%

- (1) The sum or recalculation of individual FHLBank amounts may not agree or may not be recalculated from the Combined Statement of Condition amounts due to combining adjustments.
- (2) Investments consist of interest-bearing deposits, deposits with other FHLBanks, securities purchased under agreements to resell, federal funds sold, trading securities, available-for-sale securities, and held-to-maturity securities.
- (3) See [Financial Discussion and Analysis - Combined Results of Operations - Interbank Eliminations](#).
- (4) FHLBank capital stock is redeemable at the request of a member subject to the statutory redemption periods and other conditions and limitations. (See [Note 16 - Capital](#) to the accompanying combined financial statements for additional information on the statutory redemption periods and other conditions and limitations.)

Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
\$ 44,309	\$ 33,614	\$ 20,886	\$ 32,684	\$ 31,777	\$ 29,551	\$ 10,306	\$ 32,381
108,462	54,822	32,728	52,628	106,323	40,794	28,730	73,434
361	10,502	11,386	7,104	7,836	2,186	8,411	3,066
(1)	(1)	(1)	(1)	(1)	—	(1)	—
154,476	99,203	65,412	92,857	146,515	72,773	47,715	109,326
66,025	46,944	20,895	43,166	42,879	35,732	20,608	29,182
79,114	45,659	40,265	42,250	93,772	31,932	23,967	72,276
145,139	92,603	61,160	85,416	136,651	67,664	44,575	101,458
1	23	169	313	255	7	4	227
5,486	4,320	1,931	1,698	5,414	2,555	1,524	2,949
2,110	1,023	1,077	3,536	2,050	1,082	914	3,346
51	(13)	42	55	84	128	16	235
7,647	5,330	3,050	5,289	7,548	3,765	2,454	6,530
28.7%	33.9%	31.9%	35.2%	21.7%	40.6%	21.6%	29.6%
70.2%	55.3%	50.0%	56.7%	72.6%	56.1%	60.2%	67.2%
0.2%	10.6%	17.4%	7.6%	5.3%	3.0%	17.6%	2.8%
1.4%	1.0%	1.6%	3.8%	1.4%	1.5%	1.9%	3.1%
14.0%	9.0%	5.9%	8.4%	13.3%	6.6%	4.3%	9.9%
\$ 40,378	\$ 27,058	\$ 17,572	\$ 30,683	\$ 34,452	\$ 30,941	\$ 13,998	\$ 43,570
102,440	69,918	34,055	48,085	102,613	36,461	26,296	77,382
436	9,682	10,357	5,195	7,098	878	7,288	2,076
(1)	(1)	(1)	(2)	(2)	—	(1)	—
146,566	106,895	62,349	84,355	145,099	68,524	48,077	123,385
50,139	46,211	20,358	41,191	36,682	32,511	20,421	30,440
87,523	54,163	37,896	37,121	98,893	31,377	24,514	85,063
137,662	100,374	58,254	78,312	135,575	63,888	44,935	115,503
1	30	164	311	385	6	5	309
5,154	4,241	1,858	1,443	5,068	2,318	1,640	3,243
2,003	940	976	3,297	1,839	942	841	3,245
110	(16)	112	112	114	220	26	318
7,267	5,165	2,946	4,852	7,021	3,480	2,507	6,806
27.5%	25.3%	28.2%	36.4%	23.7%	45.2%	29.1%	35.3%
69.9%	65.4%	54.6%	57.0%	70.7%	53.2%	54.7%	62.7%
0.3%	9.1%	16.6%	6.2%	4.9%	1.3%	15.2%	1.7%
1.4%	0.9%	1.6%	3.9%	1.3%	1.4%	1.7%	2.6%
13.3%	9.7%	5.7%	7.6%	13.1%	6.2%	4.4%	11.2%

Individual FHLBank Selected Financial Data and Financial Ratios (continued)

<i>(dollars in millions)</i>	Boston	New York	Pittsburgh
Selected Other Data			
December 31, 2018			
Advance concentrations - top five borrowers	35%	54%	77%
Capital stock concentrations - top five stockholders	29%	50%	70%
Regulatory capital-to-assets ratio(5)	6.2%	5.4%	5.0%
Core mission asset ratio(6)	75.2%	76.8%	84.6%
Cash and stock dividends			
Year-to-date December 31, 2018	\$ 130	\$ 417	\$ 229
Year-to-date December 31, 2017	\$ 99	\$ 345	\$ 168
Year-to-date December 31, 2016	\$ 85	\$ 259	\$ 155
Weighted average dividend rate			
Year-to-date December 31, 2018	5.56%	6.76%	6.42%
Year-to-date December 31, 2017	4.14%	5.76%	4.70%
Year-to-date December 31, 2016	3.63%	4.98%	4.71%
Return on average equity(7)			
Year-to-date December 31, 2018	6.38%	7.20%	7.03%
Year-to-date December 31, 2017	5.83%	6.30%	7.17%
Year-to-date December 31, 2016	5.49%	5.86%	5.96%
Return on average assets			
Year-to-date December 31, 2018	0.35%	0.36%	0.36%
Year-to-date December 31, 2017	0.32%	0.32%	0.35%
Year-to-date December 31, 2016	0.29%	0.31%	0.28%
Net interest margin(8)			
Year-to-date December 31, 2018	0.51%	0.52%	0.49%
Year-to-date December 31, 2017	0.47%	0.48%	0.46%
Year-to-date December 31, 2016	0.43%	0.43%	0.38%
Net interest spread			
Year-to-date December 31, 2018	0.38%	0.42%	0.39%
Year-to-date December 31, 2017	0.40%	0.43%	0.41%
Year-to-date December 31, 2016	0.38%	0.40%	0.35%

- (5) The regulatory capital-to-assets ratio is calculated based on the FHLBank's total regulatory capital as a percentage of total assets held at period-end. (See [Note 16 - Capital](#) to the accompanying combined financial statements for a definition and discussion of regulatory capital.)
- (6) The core mission asset ratio is calculated based on the FHLBank's total primary mission assets, which includes advances and mortgage loans acquired from members, as a percentage of total consolidated obligations. The core mission asset ratio is calculated annually at year-end as part of the FHFA's examination process, using annual average principal amounts. The FHFA's expectation is that each FHLBank's core mission asset ratio equal or exceed 70%. If the core mission asset ratio falls below the 70% preferred ratio, an FHLBank would be expected to include in its strategic plan actions aimed at increasing its mission focus.
- (7) Return on average equity is net income expressed as a percentage of average total capital. Mandatorily redeemable capital stock is not included in the calculation of return on average equity.
- (8) Net interest margin is equal to net interest income represented as a percentage of average interest-earning assets.

Atlanta	Cincinnati	Indianapolis	Chicago	Des Moines	Dallas	Topeka	San Francisco
55%	65%	40%	59%	60%	38%	57%	62%
48%	57%	37%	53%	46%	26%	50%	41%
4.9%	5.4%	4.9%	6.0%	5.3%	5.0%	5.1%	6.0%
74.1%	76.3%	72.6%	71.1%	81.7%	64.7%	74.3%	74.3%
\$ 309	\$ 256	\$ 94	\$ 64	\$ 249	\$ 59	\$ 97	\$ 259
\$ 238	\$ 208	\$ 67	\$ 40	\$ 181	\$ 32	\$ 92	\$ 187
\$ 226	\$ 171	\$ 61	\$ 37	\$ 142	\$ 17	\$ 78	\$ 284
5.77%	5.88%	5.00%	3.86%	4.71%	2.42%	6.13%	8.51%
4.82%	5.00%	4.25%	2.81%	3.19%	1.62%	5.77%	7.50%
4.62%	4.00%	4.25%	2.05%	2.94%	1.06%	5.29%	12.33%
5.54%	6.29%	6.43%	5.74%	6.21%	5.22%	6.82%	5.42%
4.97%	6.15%	5.88%	6.84%	7.01%	4.75%	8.18%	6.21%
4.08%	5.35%	4.92%	7.18%	10.09%	3.16%	7.45%	13.63%
0.27%	0.32%	0.30%	0.33%	0.31%	0.29%	0.31%	0.32%
0.25%	0.31%	0.26%	0.38%	0.31%	0.25%	0.37%	0.36%
0.20%	0.25%	0.22%	0.42%	0.40%	0.15%	0.33%	0.77%
0.37%	0.47%	0.45%	0.56%	0.43%	0.45%	0.50%	0.55%
0.11%	0.42%	0.45%	0.59%	0.39%	0.39%	0.51%	0.55%
0.24%	0.35%	0.39%	0.59%	0.28%	0.31%	0.53%	0.52%
0.28%	0.37%	0.35%	0.44%	0.32%	0.34%	0.42%	0.44%
0.07%	0.36%	0.38%	0.52%	0.34%	0.33%	0.46%	0.49%
0.21%	0.30%	0.34%	0.53%	0.24%	0.28%	0.49%	0.47%

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