

## *Interest Rate Risk Management*

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### **Introduction**

Market risk reflects the degree to which changes in interest rates, foreign exchange rates, commodity prices, or equity prices can adversely affect an institution's earnings or economic capital. For the FHLBanks market risk is typically synonymous with interest rate risk because the FHLBank generally have little or no direct exposure to foreign exchange rates and commodity prices. This examination guidance discusses interest rate risk, which is the primary component of market risk that affects the FHLBank.

Advisory Bulletin 04-5, Interest Rate Risk Management, dated September 29, 2004, defines interest rate risk as the risk that changes in interest rates may adversely affect an institution's financial condition and performance. More specifically, interest rate risk is the sensitivity of an institution's cash flows, reported earnings, and economic value or market value-of-equity (MVE) to changes in interest rates. It arises from differences between the timing of rate changes and the timing of cash flows (repricing risk); from changing rate relationships among yield curves that affect FHLBank activities (basis risk); from changing rate relationships across the spectrum of maturities (yield curve risk); and from interest rate-related options embedded in FHLBank products or that stand-alone (option risk). The movement of interest rates affects an FHLBank's reported earnings and book capital by changing: (1) net interest income; (2) the market value of balance sheet instruments accounted for at market value; and (3) other interest sensitive income and expenses.

It is important that FHLBanks identify, measure, monitor and control repricing risk, basis risk, yield curve risk, option risk, and price risk to minimize their effect on earnings and capital. A brief analysis of these risks and mitigating controls is presented below:

Repricing risk results from differences in the timing of rate changes and the timing of cash flows that occur in the pricing and maturity of an FHLBank's assets, liabilities, and derivatives instruments. Repricing risk is often the most apparent source of interest rate risk for a FHLBank and is often gauged by comparing the volume of a FHLBank's assets that mature or reprice within a given time period with the volume of liabilities that also mature or reprice in this same time frame. Some FHLBanks intentionally take repricing risk in their balance sheet structure in an attempt to improve earnings. Because the yield curve is generally upward-sloping (long-term rates are higher than short-term rates), FHLBanks can often earn a positive spread by funding long-term assets with short-term liabilities. The earnings of such FHLBanks, however, are vulnerable to cost of funds increases as interest rates rise.

FHLBanks whose repricing asset maturities are longer than their repricing liability maturities are said to be "liability sensitive," because their liabilities will reprice more quickly. The earnings of a liability-sensitive FHLBank generally increase when interest rates fall and decrease when they rise. Conversely, an asset-sensitive FHLBank

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(repricing asset maturities are shorter than repricing liability maturities) will generally benefit from a rise in rates and be hurt by a fall in rates.

Repricing risk is often, but not always, reflected in the FHLBank's current earnings performance. An FHLBank may be creating repricing imbalances that will not be manifested in earnings until sometime into the future. An FHLBank that focuses only on short-term repricing imbalances may be induced to take on increased interest rate risk by extending maturities to improve yield. When evaluating repricing risk, the FHLBank must consider not only near-term imbalances but also long-term ones. Failure to measure and manage material long-term repricing imbalances can leave an FHLBank's future earnings significantly exposed to interest rate movements. The repricing gap report is the most widely used technique for assessing, monitoring and managing repricing risk.

Basis risk arises from a shift in the relationship of the rates in different financial markets or on different financial instruments. Basis risk occurs when market rates for different financial instruments, or the indices used to price assets and liabilities, change at different times or by different amounts. For example, basis risk occurs when the spread between the three-month U.S. Treasury security (Treasury) and the three-month London inter-bank offered rate (LIBOR) changes. This change affects an FHLBank's current net interest margin through changes in the earned/paid spreads of instruments that are being repriced. It also affects the anticipated future cash flows from such instruments, which in turn affects the underlying net economic value of the FHLBank.

Certain pricing indices have a built-in "lag" feature such that the index will respond more slowly to changes in market interest rates. Such lags may either accentuate or moderate the FHLBank's short-term interest rate exposure. One common index with this feature is the "11th District Federal Home Loan Bank Cost of Funds Index" (COFI) used in certain adjustable rate residential mortgage products (ARMs). The COFI index, which is based upon the monthly average interest costs of liabilities for thrifts in the 11th District, comprising California, Arizona, and Nevada, is a composite index containing both short- and long-term liabilities. Because current market interest rates will not be reflected in the index until the long-term liabilities have been repriced, the index generally will lag market interest rate movements.

Non-linear rate ramp projections can be used to measure basis risk and potential earnings exposure to broad changes in financial market conditions over time. In these tests, each driver rate moves at its appropriate speed relative to other rates once a scenario is defined. The FHLBanks' balance sheet is repriced based on changes in each driver rate, thus properly defining basis risk. To address potential earnings exposures to changes in yield curve shape, non-linear rate ramp type projections, again, can be used to track this exposure. In this case, however, selected short- and long-term Treasury rates are moved to define a flatter or steeper yield curve, with all other driver rates evolving in-line. In either case, the basis risk tests an FHLBank uses needs to be produced by scenario specific forecasts based on advanced statistical analyses of historic interest rates.

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Yield-curve risk arises from variations in the movement of interest rates across the maturity spectrum. It involves changes in the relationship between interest rates of different maturities of the same index or market, such as a three-month Treasury versus a five-year Treasury. The relationships change when the shape of the yield curve for a given market flattens, steepens, or becomes negatively sloped or inverted during an interest rate cycle. Yield curve variation can accentuate the risk of an FHLBank's position by amplifying the effect of maturity or repricing mismatches.

Certain types of structured notes can be particularly vulnerable to changes in the shape of the yield curve. For example, the performance of dual index notes is directly linked to basis and yield curve relationships. These bonds have coupon rates that are determined by the difference between market indices, such as the constant-maturity Treasury rate (CMT) and LIBOR. An example would be a coupon whose rate is based on the following formula: 10-year CMT plus 300 basis points less three-month LIBOR. Since the coupon on this bond adjusts as interest rates change, an FHLBank may incorrectly assume that it will always benefit if interest rates increase. If, however, the increase in three-month LIBOR exceeds the increase in the 10-year CMT rate, the coupon on this instrument will fall, even if both LIBOR and Treasury rates are increasing. FHLBanks holding these types of instruments should evaluate how their performance may vary under different yield curve shapes.

Flat or inverted yield curves have historically been associated with narrowing net interest margins and lower earnings. Whether the slope of the yield curve is positive, flat, or negative, FHLBanks can appropriately limit risk with strategies designed to cope with the uncertainty of changing interest rates.

Option risk arises when an FHLBank or an FHLBank's member has the right but not the obligation to alter the level and timing of the cash flows of an asset, liability, or derivatives instrument. An option gives the option holder the right to buy (call option) or sell (put option) a financial instrument at a specified price (strike price) over a specified period of time. For the seller or writer of an option, there is an obligation to perform if the option holder exercises the option.

The option holder's ability to choose whether to exercise the option creates an asymmetry in an option's performance. Generally, option holders will exercise their right only when it is to their benefit. As a result, an option holder faces limited downside risk (the premium or amount paid for the option) and unlimited upside reward. The option seller faces unlimited downside risk (an option is usually exercised at a disadvantageous time for the option seller) and limited upside reward (if the holder does not exercise the option and the seller retains the premium).

Options often result in an asymmetrical risk/reward profile for the FHLBank. If the FHLBank has written or sold options to its members, the amount of earnings or market value that an FHLBank may lose from an unfavorable movement in interest rates may

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exceed the amount that the FHLBank may gain if rates move in a favorable direction. As a result, the FHLBank may have more downside exposure than upside reward.

Some FHLBanks buy and sell options on a “stand-alone” basis. The option has an explicit price at which it is bought or sold and may or may not be linked with another FHLBank product. An FHLBank does not have to buy and sell explicitly priced options to incur option risk, however. Indeed, FHLBanks incur option risk from options that are embedded into certain assets, liabilities, or derivative instruments.

Prepayment options are the most prevalent embedded option. Most residential mortgage loans give the borrower an option to prepay with little or no prepayment penalty. A prepayment option is equivalent to having written a call option to the customer. When rates decline, customers are likely to exercise the calls by prepaying loans, and the FHLBank’s asset maturities will shorten just when extension would be preferable. Conversely, when rates rise, customers are likely to keep their mortgages, making it difficult for the FHLBank to shorten asset maturities just when shortening would be preferable.

FHLBank products that contain interest rate “caps” or “floors” are other sources of option risk. Such products are often embedded into advances and may have a significant effect on an FHLBank’s rate exposure. For the FHLBank, an advance cap is like selling a put option on a fixed income security, and a floor is like owning a call. The cap or floor rate of interest is the strike price. When market interest rates exceed the cap rate, the borrower’s option moves “in the money” because the borrower is paying interest at a rate lower than market. Conversely, when market interest rates decline below the floor, the FHLBank’s option moves “in the money” because the rate paid on the advance is higher than the market rate.

Option risk results when an FHLBank’s cash flow timing or amount is altered due to changes in interest rates. This risk can adversely affect earnings by reducing asset yields or increasing funding costs, and it may reduce the present value of expected cash flows. For example, the rapid and sustained declines in interest rates during 2000 through 2003 resulted in unprecedented prepayments of the FHLBank’s option-embedded advances and mortgage assets. FHLBanks funded the mortgage assets primarily with callable bonds; because most of the FHLBank’s callable bonds have specific lockout periods, they could not exercise the options to respond timely to the prepayment of mortgage assets.

Consequently, the FHLBanks retained higher priced debt, while the prepayment proceeds were redeployed in lower-yielding assets. Thus, the spread compression experienced by the FHLBanks during those years partially resulted from their inability to fully retire high-priced, long-term debt associated with prepaid assets, as well as the fact that spreads on new assets were narrower than they were when many of the prepaid assets were originally booked.

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Price risk results from changes in the value of marked-to-market financial instruments that occur when interest rates change. For example, trading portfolios, held-for-sale portfolios, and mortgage servicing assets contain price risk. Since these assets are marked-to-market, any value loss must be reflected in current earnings or capital account in accordance with Generally Accepted Accounting Principles (GAAP). FHLBanks are also exposed to price risk; however, the amount of this risk is generally not significant as their trading and available-for-sale portfolios are typically not large on a relative basis.

To evaluate the potential impact of interest rate risk on a FHLBank's operations, a well-managed FHLBank will consider the effect on both its earnings (the earnings or accounting perspective) and underlying economic value (the economic or capital perspective). In the following paragraphs, the effects of interest rate risk are analyzed in the context of both earnings and economic perspectives.

The earnings perspective considers how interest rate changes will affect an FHLBank's reported earnings. This perspective focuses on risk to earnings in the near term, typically over the next one or two years. Fluctuations in interest rates generally affect reported earnings through changes in an FHLBank's net interest income. Net interest income will vary with the movement of interest rates because of differences in the timing of accrual changes (repricing risk), changing rate and yield curve relationships (basis and yield curve risks), and options positions. Changes in the general level of market interest rates also may cause changes in the volume and mix of an FHLBank's balance sheet products. Declines in the market values of certain instruments may diminish near-term earnings when accounting rules require an FHLBank to charge such declines directly to current income.

FHLBanks should regularly conduct the income sensitivity analysis in the base case and in the shock scenarios, including changes in the level of interest rates and the slope of the yield curve to forecast how interest rate changes affect their earnings. The FHLBank should be able to measure how changes in interest rates affect their GAAP earnings and capital due to accounting principles.

The economic perspective provides a measure of the underlying value of the FHLBank's current position and seeks to evaluate the sensitivity of that value to changes in interest rates. This perspective focuses on how the economic value of all FHLBanks assets, liabilities, and off-balance sheet contracts change with movements in interest rates. The economic value of these instruments equals the present value of their future cash flows. By evaluating changes in the present value of the contracts that result from a given change in interest rates, one can estimate the change to an FHLBank's MVE.

By capturing the impact of interest rate changes on the value of all future cash flows, the economic perspective provides a more comprehensive measurement of interest rate risk than the earnings perspective. The future cash flow projections used to estimate an FHLBank's economic exposure provide a pro forma estimate of the FHLBank's future

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income generated by its current position. Because changes in economic value indicate the anticipated change in the value of the FHLBank's future cash flows, the economic perspective can provide an indicator of the FHLBank's future earnings. The growing complexity of many FHLBank advance products and investments heightens the need to consider the economic perspective of interest rate risk. The financial performance of FHLBank instruments increasingly is linked to pricing and cash flow options embedded within those instruments. The impact of some of these options, such as interest rate caps embedded in advances and the prepayment option on fixed rate mortgages, may not be discernable if the impact of interest rate changes is evaluated by simulating earnings over a short-term (earnings perspective) time horizon.

Economic value analysis facilitates risk/reward analysis because it provides a common benchmark, present value, for evaluating instruments with different maturities and cash flow characteristics. Many FHLBanks have found this type of analysis to be useful in decision making and risk monitoring.

Accepting interest rate risk is a normal part of the FHLBank's operations and can be an important source of profitability and shareholder value, but excessive interest rate risk can threaten the FHLBank's earnings, capital, liquidity, and solvency. Management decisions concerning an FHLBank's interest rate risk exposure should take into account the risk/reward tradeoff of interest rate risk positions. Management should compare the potential risk (impact of rate movements) of an interest rate risk position or strategy against the potential reward (the yield or spread that reflects this risk).

An FHLBank can use derivatives to achieve any or all of the following objectives: limit downside earnings exposures, preserve upside earnings potential, increase yield, and minimize income or capital volatility. Although derivatives are used to hedge interest rate risk, they could expose an FHLBank to basis risk if the indices contained in the cash and derivative instruments are different. For example, an FHLBank using interest rate swaps (priced off of LIBOR) to hedge a Treasury note portfolio may face basis risk because the spread between the swap rate and Treasuries may change.

An FHLBank using derivatives instruments such as futures, swaps, and options should consider how the derivatives contract's cash flows may change with changes in interest rates and in relation to the positions being hedged. Derivative strategies designed to hedge a balance sheet position will typically use derivative contracts whose cash flow characteristics have a strong negative correlation with the instrument or position being hedged. The FHLBank will also need to consider the relative liquidity and cost of various contracts, selecting the product that offers the best mix of correlation, liquidity, and relative cost. Even if there is a high degree of negative correlation between the derivative contract and the position being hedged, the FHLBank may be left with residual basis risk because cash and derivative prices do not always completely offset one another.

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The adequacy of an FHLBank's interest rate risk management system depends on its ability to identify and effectively capture all material activities and products that expose the FHLBank to interest rate risk and then measure the specific risks presented. The FHLBank should conduct stress tests that identify potential losses under extreme market conditions. That is, an FHLBank should measure its market risk exposures under normal and various alternative scenarios, including the stress scenarios.

Stress testing is designed to provide information on the kinds of conditions under which the FHLBank's strategies and positions would be most vulnerable. Stress testing should not result in implausible relationships. In short, arbitrage conditions should behave as intended. An FHLBank's stress testing should include instantaneous parallel shifts of the yield curve of +/- 50, 100, 150, and 200 basis points. In low interest rate environments, an FHLBank should use the largest parallel down shock that produces post-shock Treasury rates no lower than 35 basis points.

Additional stress scenarios should include changes in the relationships among key market interest rates, changes in the slope of the yield curve, changes in interest rate volatilities, changes in prepayment rates, and changes in spreads. Implied volatilities related to options (stand-alone or embedded) should also be stressed. It may also be appropriate to shock credit spreads. The scenarios should include optimistic, pessimistic, and most likely forecasts. The examiner should review the FHLBank's stress tests to ensure that complex financial instruments, including instruments with exotic option features, are properly valued under stress scenarios and that the risks associated with options exposures are properly understood.

The examiner should determine whether the FHLBank's board of directors considers the results of stress tests when establishing and reviewing its strategies, policies, and limits for managing and controlling interest rate risk. The board of directors and senior management should review periodically the design of stress tests to ensure that they encompass the kinds of market conditions under which the FHLBank's positions and strategies would be most vulnerable.

It is important that the FHLBank establish an independent risk management function for the design and administration of the interest rate risk management. Finance Board regulations and Advisory Bulletins provide sufficient guidance to FHLBanks for identifying, measuring, monitoring, controlling, and reporting interest rate risk exposure.

### **Regulatory Environment**

The primary authorities governing interest rate risk management are set forth below:

- 1) Rules and Regulations of the Federal Housing Finance Board***, which include the following parts and sections relevant to interest rate risk management:

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Part 917 of the Finance Board regulations addresses powers and responsibilities of the FHLBank boards of directors and senior management. In particular, Section 917.3, Risk Management, is pertinent.

Part 932 of the Finance Board regulations addresses required capital levels. In particular, Sections 932.2, 932.3, 932.5 and 932.7 are pertinent.

- 2) ***Advisory Bulletins of the Federal Housing Finance Board*** that provide supervisory guidance relating to the topic of interest rate risk management are the following:

Advisory Bulletin 04-5, dated September 29, 2004, discusses the responsibilities of the board of directors in establishing interest rate risk limits and describes policies, procedures and internal controls that each FHLBank should implement to manage interest rate risk. Advisory Bulletin 04-5 also discusses the risk measurement, monitoring, and reporting systems that an FHLBank should have in place, and sets forth the Finance Board's expectations with respect to stress testing, model validation, model documentation, and back testing.

Advisory Bulletin 05-06, dated June 10, 2005, establishes the process by which an FHLBank may obtain approval to make changes to a previously approved internal market risk model. It sets forth the process and describes the type of documentation that is required from an FHLBank in the notification process.

Advisory Bulletin 06-02, dated March 20, 2006, provides additional guidance on the use of financial models used by the FHLBanks, including interest rate risk models.

### **FHLBank Environment**

Each financial transaction that an FHLBank completes may affect its interest rate risk profile. Nevertheless, the FHLBanks differ in the degree of interest rate risk they are willing to assume. Some FHLBanks seek to minimize their interest rate risk exposure and generally avoid taking positions to benefit from expected movements in interest rates. Instead, they try to closely match the cash flows of their assets and liabilities. Other FHLBanks may deliberately, or from poor interest rate risk management, mismatch interest rate positions that capitalize on certain movements in interest rates. An FHLBank can alter its interest rate risk exposure by changing its balance sheet composition to achieve a desired risk profile. FHLBanks also use off-balance sheet derivatives, such as interest rate swaps, to adjust their interest rate risk profile.

Generally, FHLBanks establish strategies to substantially eliminate interest rate risk in certain lines of business or asset classes. For example, this is the typical strategy for the core business of advances to members. However, FHLBanks generally assume more interest rate risk in the funding of mortgage related assets, such as mortgage backed securities (MBS/CMO) and acquired member assets (AMA)). Borrowers are able to



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prepay their mortgage loans at any time without penalty and consequently FHLBanks face the risk that they will experience a return of principal earlier than anticipated and be left to invest that principal at lower yields. Because prepayments on MBS/CMOs and AMA accelerate when interest rates drop, MBS and acquired member assets are said to have “negative convexity.” In other words, the rate of price increase for mortgage assets declines as interest rate fall, depending on the underlying coupon(s) and the level of current market rates. As interest rates rise, prepayments tend to slow, creating extension risk. Fully hedging this risk may be too costly relative to the asset’s return. The risk and returns in this business line still must represent prudent interest rate risk management.

Embedded options are associated with many other assets, liabilities, and off-balance sheet derivatives, such as callable bonds, structured notes, and advances.

In general, an FHLBank uses a combination of swapped and unswapped callable debt, fixed- and floating-rate bullet debt, and derivative instruments to manage its interest rate risk exposure. Callable and amortizing prepayment-linked bonds are largely used to manage option risk associated with mortgage assets. Some FHLBanks use both the receiver and payer swaptions to hedge volatilities in the value of the mortgage portfolio. Specifically, the receiver swaptions are used to hedge the income volatility as a result of premium amortizations while the payer swaption hedges the decline in value when interest rates increase.

For fixed-rate assets and liabilities, the FHLBank uses interest rate swaps to manage the attendant risk. Particularly in funding fixed-rate advances, the FHLBank typically uses interest rate exchange agreements to convert fixed-rate callable consolidated obligations (COs) to floating-rate instruments that periodically reset to an index such as one-month or three-month LIBOR. If the hedged advances or liabilities have embedded call options, caps or floors, the hedged derivative instruments must also have mirrored embedded options. If interest rates decline, the swap counterparty will generally cancel the interest rate swap and the FHLBank will then typically call the CO bonds or the underlying assets.

It is not possible for an FHLBank to consistently issue debt simultaneously with the issuance of advances in the same amount and with the same terms as the advance, or to predict ahead of time demand for advances, including the terms sought for such advances. As such, the FHLBank must have a ready supply of funds on hand to meet member advance demand. The FHLBanks will typically source debt as opportunities arise in the market and make the proceeds of these debt issuances available for members to borrow in the form of advances. These debt issuances issued for liquidity are often referred to “warehoused” debt or liabilities. The FHLBank may use derivative instruments to hedge anticipated debt issuances and mortgage delivery commitments.

Some FHLBanks use a delta hedging strategy to manage the mortgage portfolio’s price volatilities. It is an options strategy designed to reduce the risk associated with price

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movements in the underlying security, achieved through offsetting long and short positions. It is the process of setting or keeping the delta of a portfolio at zero, or close to zero, where delta is the sensitivity of the value of a derivative to changes in the price of its underlying instruments. The mortgage portfolio has to be adjusted continuously in order to maintain delta neutrality.

To effectively manage interest rate risk, management should consider the FHLBank's ability to access various funding and derivative markets. Also, FHLBank should consider the fit of its interest rate risk profile with its strategic business plan.

Generally, all FHLBanks measure the duration of equity and market value of equity and report to their board of directors on a regular basis. Management also tracks specific sensitivity limits for individual portfolios, including mortgage-backed securities and acquired member assets. All FHLBanks also estimate their potential market value losses using historically-derived 120-day interest rate and volatility shift scenarios based on a monthly data since July 1978, and estimate that they have sufficient capital to cover all but the worst 1 percent of potential outcomes. They measure their exposure to earnings volatility and establish retained earnings targets that promote their ability to pay a steady dividend stream. In addition, FHLBanks should measure, monitor, and control their repricing, basis, yield curve, and option risks. All risk limits and risk management guidelines are documented in the FHLBank's risk management policy.

In general, most FHLBanks have established their market risk management function independent from risk-taking activities. For some FHLBanks, the market risk function is part of an enterprise risk management function. The market risk function is responsible for identifying, measuring, monitoring, and reporting the FHLBank's interest rate risk exposure to the board of directors and senior management.

An FHLBank should establish a risk governance policy detailing its risk governance structure and process. The policy should identify and capture the decision-making process and approval authority. The policy should exhibit consistent and coherent integration with the risk management practices directed towards meeting the FHLBank's overall profitability objective. The risk governance policy details the role of the board of directors and senior management in establishing and overseeing strategies, policies and processes that identify, measure, monitor and control risk and thereby ensure sound risk management and decision making. The risk governance policy includes the risk policies, committees and management processes, information flows and reporting that are integrated to effectively manage risk, including interest rate risk.

The FHLBank's board of directors usually delegates responsibility for establishing specific interest rate risk policies and practices to a committee of senior managers. This senior management committee is often referred to as the "financial management committee" (FMC) or the "asset/liability management committee" (ALCO). The ALCO usually manages the structure of the FHLBank's business and the level of interest rate

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risk it assumes. It is responsible for ensuring that measurement systems adequately reflect the FHLBank's exposure and that reporting systems adequately communicate relevant information concerning the level and sources of the FHLBank's exposure.

To be effective, the ALCO should include representatives from each major line of business of the FHLBank that assumes interest rate risk. The ALCOs of some FHLBanks include a representative from marketing so that marketing efforts are consistent with the ALCO's view on the structure of the FHLBank's business. Committee members should be senior managers with clear lines of authority over the units responsible for establishing and executing interest rate positions. A channel must exist for clear communication of the ALCO's directives to these line units. The risk management and strategic planning areas of the FHLBank should communicate regularly to facilitate evaluations of risk arising from future business.

The ALCO usually delegates day-to-day operating responsibilities to the FHLBank's treasury unit. The ALCO should establish specific practices and limits governing treasury operations before it makes such delegations. Treasury personnel are typically responsible for managing the FHLBank's discretionary portfolios, such as securities, consolidated obligations and discount notes, and derivatives interest rate contracts.

The treasury unit or investment officer can influence the level of interest rate risk in several ways. For example, the unit may be responsible for implementing the policies of the ALCO on short- and long-term positions. Regardless of its specific delegations, treasury or other units responsible for monitoring the FHLBank's risk positions should ensure that reports on the FHLBank's current risk are prepared and provided to the ALCO in a timely fashion.

To effectively manage risk, close coordination with other key operating areas of the institution is required, including:

- 1) Customer funding, such as with respect to advance activity with the members that includes new, maturing, and interest payments;
- 2) Acquired member assets, such as with respect to new loan purchases, and principal and interest payment cash flows to the FHLBank;
- 3) Correspondent bank services, such as with respect to deposit activity, wire transfer activity, automated clearing house activity, Federal Reserve Bank and correspondent bank activity, capital purchase/redemptions, and safekeeping activity;
- 4) Capital markets, such as with respect to investment purchases, maturing assets, large swap payments, and newly-issued and maturing debt;
- 5) Accounting, such as with respect to general ledger balances, premium amortization

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and discount accretion; and

- 6) Risk management, such as with respect to risk measurement, monitoring and reporting.

### **Risks Associated with Interest Rate Risk Management Function**

Accepting interest rate risk is a normal part of banking operations and is an important source of profitability and shareholder value. But taking excessive interest rate risk positions can threaten the FHLBank's earnings, capital, liquidity, and solvency. Therefore, the primary risk associated with the interest rate risk management function is the taking of excessive risk positions relative to the FHLBank's earnings and capital. This risk is compounded when the risk management function cannot identify the excessive risk, allowing for timely mitigation of the risk. This may result from (1) poor corporate governance, (2) inadequate risk measurement and information systems, (3) weak internal control infrastructure, or (4) inexperienced staff. Below are few specific examples that may contribute to excessive interest rate risk.

- 1) The board of directors and senior management may not have established adequate guidance and proper risk tolerance limits and may not monitor and review the level and direction of risk on a regular basis.
- 2) The FHLBank's funding and hedging strategies may not be commensurate with the level and types of risks undertaken.
- 3) The FHLBank's risk assessment process and risk measurement systems may not be sufficiently robust to identify and effectively capture all material risks.
- 4) The FHLBank may not have established an independent risk management function for the administration of its risk measurement, monitoring, and control activities. Reporting lines of risk management and risk-taking functions may not be properly and clearly defined.
- 5) Senior management may lack controls over traders due to lack of adequate oversight of their activities.
- 6) The FHLBank may have an unsound internal control infrastructure that allows traders to create policy exceptions that go undetected. The secondary reviewers may not be able to detect policy exceptions due to the lack of automated and manual controls.
- 7) The FHLBank may not have an effective internal audit function with requisite experience and skills. The audit scope, frequency and testing may be inadequate.
- 8) Traders and risk management staff may not have sufficient experience and skills.

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- 9) The FHLBank's new product development process may not be sufficiently robust to identify and assess all material risks of new products.

### **Specific Risk Controls Relating to the Interest Rate Risk Management Function**

Key elements of an effective risk management process include adequate board of directors and senior management oversight and a comprehensive risk management process:

#### **Board of Directors and Senior Management Oversight**

Effective board of directors and senior management oversight is the cornerstone of an effective risk management process. It is the responsibility of the board and senior management to understand the nature and level of interest rate risk being taken by the FHLBank. Effective risk management requires an informed board, capable management, and appropriate staffing.

For its part, a board of directors must:

- 1) Establish and guide the FHLBank's strategic direction and tolerance for interest rate risk and identify the senior managers who have the authority and responsibility for managing this risk.
- 2) Monitor the FHLBank's performance and overall interest rate risk profile, ensuring that the level of interest rate risk is maintained at prudent levels, is supported by adequate capital, and complies with regulatory requirements.
- 3) Ensure that the FHLBank adheres to sound risk management principles that facilitate the identification, measurement, monitoring, and control of interest rate risk.
- 4) Ensure that the FHLBank adheres to Finance Board regulations and its internal policy parameters.
- 5) Ensure that adequate resources are devoted to interest rate risk management. Effective risk management requires both technical and human resources.
- 6) Ensure that the risk management, monitoring, and control functions of the FHLBank are sufficiently independent of the position-taking functions.

Senior management is responsible for ensuring that interest rate risk is managed daily and over the long term. In managing the FHLBank's activities, senior management should:

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- 1) Develop and implement procedures and practices that translate the board of directors' goals, objectives, and risk tolerances into operating standards that are well understood by FHLBank personnel and that are consistent with the board's intent.
- 2) Ensure adherence to the lines of authority and responsibility that the board of directors has established for measuring, managing, and reporting interest rate risk exposures.
- 3) Oversee the implementation and maintenance of management information and other systems that identify, measure, monitor, and control the FHLBank's interest rate risk.
- 4) Establish effective internal controls over the interest rate risk management process.

### **Risk Management Process**

Effective control of interest rate risk requires a comprehensive risk management process that ensures the timely identification, measurement, monitoring, and control of risk. FHLBanks should establish and communicate risk management practices and principles in writing. The FHLBank's interest rate risk management procedures or process should establish:

- 1) **Responsibility and authority.** Appropriate management must identify the potential interest rate risk arising from new or existing products or activities; establish and maintain an interest rate risk measurement system; formulate and execute strategies; and authorize policy exceptions.
- 2) **An interest rate risk measurement system.** The FHLBank's risk measurement system should be able to identify and quantify the major sources of an FHLBank's interest rate risk, including repricing risk, basis risk, yield curve risk, price risk, and option risk. The risk measurement system should be able to measure how changes in interest rates will affect the FHLBank's income and capital.
- 3) **A system for monitoring and reporting risk exposures.** Senior management and the board of directors should receive reports on the FHLBank's interest rate risk profile at least monthly, but more frequently if the character and level of the risk require it. These reports should allow senior management and the board to evaluate the amount of interest rate risk being taken, compliance with regulations and established FHLBank policy risk limits, and whether management's strategies are appropriate in light of the board's expressed risk tolerance.
- 4) **Risk limits and controls.** When determining risk exposure limits, senior management should consider the nature of the FHLBank's strategies and activities, its past performance, the level of earnings and capital available to absorb potential losses, and the board of directors' tolerance for risk. Section 917.3(b)(2) of the

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Finance Board regulations requires each FHLBank to set forth in its risk management policy its tolerance levels for market risk. A comprehensive set of interest rate risk limits is the primary mechanism for achieving that objective. Each FHLBank should have a set of risk limits to control aggregate, or FHLBank-wide interest rate risk exposures. Where appropriate, FHLBanks should also have limits for individual business activities or units, portfolios, traders, and positions.

- 5) **Independent Risk Management Function.** The FHLBank should establish an independent risk management unit responsible for the design and administration of the FHLBank's risk measurement, monitoring, and control functions. In general, the unit should be headed by an officer with responsibility for developing an effective risk management infrastructure which includes: (1) a capable risk management staff; (2) risk management policies, procedures, and controls; (3) risk model review and approval; (4) risk measurement and monitoring capability; (5) risk limits monitoring and enforcement; and (6) risk management results communicated to senior management and the board of directors.
- 6) **Risk Management Policies and Procedures.** The FHLBank should establish comprehensive risk management policies and procedures pertaining to advances, investments, funding, and hedging activities that establish detailed procedures for risk measurement, monitoring, reporting, and controls.
- 7) **Internal control procedures.** Oversight by the board of directors and senior management is critical to the internal control process. In addition to establishing clear lines of authority, responsibilities, and risk limits, management and board should ensure that adequate resources are provided to support risk monitoring, audit, and control functions. The persons or units responsible for risk monitoring and control functions should be separate from the persons or units that create risk exposures.

It is particularly important that the FHLBank has a strong internal audit function and sufficient safeguards in place to ensure that all trades are reported to senior management in a timely manner and are consistent with strategies approved by senior management. The internal audit function provides evaluations on the adequacy and effectiveness of the internal control structure pertaining to interest rate risk management. If the internal audit function does not have adequate technical expertise, independent testing should be outsourced to external auditors or consultants.

### **Examination Guidance**

Advisory Bulletin 04-5 provides that the primary objective of interest rate risk management is to achieve a target level of return while maintaining interest rate risk exposures within prudent bounds. In pursuing these objectives, management should ensure that risk to the institution's earnings and economic values are within prudent bounds over a range of plausible interest rate environments. The objective is not to

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eliminate interest rate risk, but rather to maintain risk exposures at levels that are prudent and acceptable to the institution's board of directors. In determining a FHLBank's interest rate risk rating, examiners should review the level of a FHLBank's interest rate risk exposure, the level of oversight by the board of directors and senior management, and the quality of interest rate risk measurement systems and processes, including policies and procedures, internal controls, and the internal audit function.

A work program for interest rate risk management accompanies this narrative. What follow below are guidelines for interest rate management that incorporate many of elements of effective interest rate management discussed previously. It contains illustrative examples of attributes that the examiner should consider in completing the analysis of interest rate risk management activities. The examiner should also consider Finance Board regulations, Advisory Bulletins, Sarbanes-Oxley Act (SARBOX), Basle Committee guidelines on banking supervision, and guidelines provided by rating agencies. In addition to management reports, the ALCO and board of directors or board committee meeting minutes and agenda materials, examiners should review reports contained in the Finance Board Call Report System (CRS), filings with the Securities and Exchange Commission (SEC), and information from Finance Board risk modelers and FHLBank analysts.

### *1) Organizational structure*

Assess the effectiveness of the functional organizational structure, including board of directors and management committees, to determine whether the current structure is efficient and adequate for the purpose of interest rate risk management. Reviews should include, at a minimum, the following specific items:

- a) Identification of functional department and reporting responsibilities;
- b) Identification of key personnel responsible for risk management activities and reporting lines;
- c) Identification of primary duties, responsibilities, and technical expertise of personnel;
- d) Segregation of duties to ensure that risk management responsibilities are segregated from lending, investment, funding, hedging, and accounting activities. Ensure that the risk management activities are independent both at functional and committee levels;
- e) Cross-training of personnel;
- f) Coordination with other departments such as risk management, information technology, treasury, investment, cash management, and accounting;



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- g) Identification of management and board committees with the responsibility of monitoring the FHLBank's interest rate risk exposure; and
- h) Identification of significant changes since the last examination and changes anticipated.

**2) *Establishment of risk tolerances and development of key policies and oversight by the board of directors. Adequacy of senior management oversight and the risk management function***

Assess interest rate risk tolerances, the development of interest rate risk management policies, and oversight by the board of directors. Assess the adequacy of senior management oversight over the interest rate risk management function. Review board and management committee meeting minutes and agenda and their decision process.

Specifically, examiners should determine whether:

- a) The board of directors approves all major strategies and policies relating to managing interest rate risk and reviews such strategies and policies at least annually and more frequently if market conditions change or if the FHLBank incurs significant deviations from expectations.
- b) The board of directors approves the FHLBank's interest rate risk limits and provides management with clear guidance regarding the level of acceptable interest rate risk. The risk limits should be consistent with the FHLBank's risk and return objectives and with its liquidity and capital needs. The board of directors should review policies and institution-wide risk limits at least annually, and more frequently in the event of significant changes in market or financial conditions. The review should address the appropriateness of the FHLBank's risk limits in light of the board's tolerance for risk, the strength of the FHLBank's capital, the adequacy of retained earnings, and the overall quality of risk management, measurement, and reporting systems. The board's review should also include an assessment of management's compliance with the risk limits.
- c) The board of directors ensures that senior management take the steps necessary to identify, measure, manage, control, and report on the FHLBank's interest rate risk exposures and ensures that the FHLBank's system of internal controls is functioning effectively.
- d) The board of directors has established lines of authority and responsibility for managing interest rate risk. The board should be satisfied that the risk management, monitoring, and control functions of the FHLBank are sufficiently independent of the position-taking functions. Ideally, the FHLBank should

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establish an independent risk management unit responsible for the design and administration of the FHLBank's risk measurement, monitoring, and control functions. In general, the unit should be headed by an officer with responsibility for developing an effective risk management infrastructure which includes:

- (1) Maintaining a capable risk management staff;
  - (2) Establishing risk management policies, procedures, and controls;
  - (3) Reviewing and approving risk models;
  - (4) Measuring and monitoring risk;
  - (5) Monitoring and enforcing risk limits; and
  - (6) Communicating risk management results to senior management and the board.
- e) The board of directors is being informed routinely of the FHLBank's interest rate risk exposures and, on a regular basis, discusses and evaluates the FHLBank's risk exposures in light of current market conditions, established risk limits, operating performance, and other relevant factors.
- f) The board of directors or committee thereof understands and assesses the performance of senior management with respect to the implementation of board-approved strategies and policies governing interest rate risk and compliance with interest rate risk limits.

The board of directors ensures that appropriate corrective measures, such as improved reporting systems, intensified board oversight, or disciplinary action, are taken when interest rate risk limit exceptions occur.

Examiners should determine that senior management is carrying out its responsibilities with respect to interest rate risk. Specifically, examiners should determine whether:

- a) Senior management implements board of directors-approved strategies and policies relating to the management of interest rate risk.
- b) Senior management ensures that effective and appropriate interest rate risk management policies, procedures, and controls are established and followed.
- c) Senior management ensures that the FHLBank has adequate systems and resources available to measure, monitor, manage, and control the FHLBank's interest rate risk. Management should ensure that knowledgeable, competent, and experienced staff conduct analyses and risk management activities relating to interest rate risk.

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- d) Senior management ensures that policies and procedures assign responsibility for managing the FHLBank's interest rate risk limits.
- e) Senior management ensures that the lines of authority and responsibility for managing interest rate risk and monitoring interest rate risk limits are clearly identified.
- f) Senior management ensures that policies and procedures identify the reporting and remedial actions to be taken by management when interest rate risk limit violations occur.
- g) Senior management periodically reviews and discusses with the board of directors information regarding the FHLBank's interest rate exposures. The information should be sufficient in detail and timeliness to permit the board to understand and assess the performance of management with respect to the management and control of the FHLBank's interest rate risk exposures.

### **3) *Key FHLBank policies and procedures***

Review the adequacy of key FHLBank interest rate risk management policies and procedures.

Examiners should assess the quality of the FHLBank's risk management policies, procedures, and internal controls. Specifically, examiners should determine whether the FHLBank has clearly defined policies and procedures for managing and controlling interest rate risk exposures. The policies and procedures should delineate lines of responsibility and accountability over interest rate risk decisions. The policies and procedures should also delineate authorized hedging instruments and hedging strategies. Management should identify the interest rate risks inherent in new products and in business activities, including hedging activities, and ensure that they are subject to appropriate policies, procedures, and controls before being introduced or undertaken.

The FHLBank establishes a comprehensive risk management policy and other related procedures for the administration of interest rate risk management activities. Policies and procedures should address investment, funding, and hedging activities. The FHLBank may also have policies for retained earnings and dividends, capital management, accounting for premium amortizations and discount accretions, the risk assessment process, risk model validation, model calibration and back testing, and new product modeling.

Examiners should determine whether policies and procedures:

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- a) Are consistent with Finance Board regulations, Advisory Bulletin guidance, SARBOX, and Basle Committee guidance on interest rate risk management;
- b) Delineate authorized investment and hedging instruments and strategies;
- c) Delegate trading authority to specific individual(s);
- d) Include sufficient guidance for risk assessment, measurement, monitoring, and reporting processes as well as delineate proper lines of responsibility and accountability over risk management decisions; and
- e) Are periodically reviewed and approved by the board of directors as required by Finance Board regulations where appropriate.

### **Assessing Policy Limits**

The examiner should determine whether the risk limit structure included in the policies and procedures is prudent and effective and is part of the review or audit of the adequacy of policies and procedures. An FHLBank should have interest rate risk limits to safeguard earnings and economic capital against adverse movements in interest rates and other risk factors. The risk limits should reflect the risk and return objectives of the board of directors. Examiners should determine whether an FHLBank has a comprehensive set of interest rate risk limits. An FHLBank should consider setting risk limits that are defined in terms of its economic capital ratio. Limits based on the economic capital ratio should define the lowest economic capital ratio that the board is willing to tolerate under selected interest rate scenarios, such as parallel and nonparallel interest rate shocks as well as changes in other key risk factors such as prepayments, interest rate volatility, and interest rate spreads.

An FHLBank should also consider setting limits on the maximum allowable decline or variation in net interest income that its board of directors is willing to tolerate for a specified time horizon under specified interest rate scenarios. Limits based on other risk metrics such as VaR, duration-of-equity (DOE), duration gap, and the market value of equity to book value of equity should be considered. Other limits may include risk limits specific to the mortgage portfolio, repricing risk limits, and basis risk limits. Limits should not be set so far above actual risk exposures, or target levels of exposure, that they are meaningless or have no effect on risk-taking behavior.

The examiner should determine whether:

- a) Risk limits are comprehensive within the context of the risk characteristics of the FHLBank's on-and off-balance sheet activities. Limits should not be based

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on enterprise-wide aggregate exposure only, but also on a portfolio basis where appropriate.

- b) Limits are commensurate with the strength of the FHLBank's capital position, its earnings, the level of its retained earnings, and the quality of risk management and reporting systems.
- c) Changes in an FHLBank's aggregate risk limits are approved by the board of directors and documented in the board's minutes.
- d) A formal system to monitor interest rate risk exposures against established limits is present. Staff that is independent of those who are authorized to take positions should perform the risk measuring, monitoring and reporting.
- e) Senior management ensures that appropriate and prompt follow-up action is taken when limit violations occur and when policies and procedures are not followed. The FHLBank should also maintain a record of all limit violations. Recurrent changes in interest rate risk limits for the purpose of accommodating instances in which the limits have been, or are about to be, breached may be indicative of poor or inadequate risk management or faulty risk measurement systems.

#### ***4) Risk assessment under Part 917 and internal control evaluation under SARBOX***

##### **a) Risk Assessment**

Under Section 917.3(c) of the Finance Board regulations, each FHLBank is required to perform an annual risk assessment for all business processes to identify and evaluate all material risks, including both quantitative and qualitative aspects. The examiners should evaluate the FHLBank's annual risk assessment to ensure that it is reasonably designed to identify and evaluate all material interest rate risks, including repricing risk, basis risk, yield curve risk, option risk, and price risk that could adversely affect the achievement of the FHLBank's performance objectives and fulfillment of its compliance requirements. The examiners should determine whether the FHLBank's risk assessment:

- (1) Identifies all business lines and processes;
- (2) Identifies strategic objectives of each business line and process;
- (3) Describes key business processes;
- (4) Identifies and evaluates all material risks for all key business process;
- (5) Describes associated risks and quantifies potential effects on earnings and capital;
- (6) Describes control objectives;
- (7) Identifies existing mitigating controls;

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- (8) Assesses the effectiveness of existing mitigating controls;
- (9) Documents methodologies utilized for testing control effectiveness;
- (10) Quantifies the likelihood of control failures;
- (11) Identifies control weaknesses; and
- (12) Describes remedial actions to address identified weaknesses.

### **b) Sarbanes-Oxley Act Compliance**

The examiners should review:

- (1) The effectiveness of evaluations conducted pursuant to SARBOX that identifies the key risks and controls pertaining to financial reporting and evaluates potential fraud, and procedures implemented to periodically attest to the adequacy of the control environment.
- (2) An evaluation of the adequacy of corrective actions on control weaknesses identified by annual risk assessments and evaluations conducted under SARBOX.

### **5) *Testing performed by external and internal auditors and outside consultants***

Evaluate the adequacy of testing of controls over interest rate risk management performed by external and internal auditors and outside consultants.

The examiner should review the scope of the internal audit of the interest rate risk management process to determine whether the audit scope and testing are sufficiently comprehensive and the frequency of the audit is adequate. The examiner should review:

- (1) Evaluations of periodic appraisals of the adequacy and effectiveness of the interest rate risk management process.
- (2) Evaluations of appropriateness of the FHLBank's risk measurement methodologies and assumptions, including those for interest rates, spreads, prepayments, yield curves, discount rates, volatilities, and interest rate scenarios.
- (3) Verifications of the adequacy and accuracy of risk exposure reports and management reporting to the board of directors.
- (4) Reconciliations of on- and off-balance sheet inputs used in the model to general ledger.
- (5) Verifications of documentation of the risk modeling process and assumptions, including spreads, market rates, volatilities, and discount rates.

In addition, the examiner should:

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- (1) Determine whether individuals conducting the audit have the appropriate experience and skill.
- (2) Determine whether findings/recommendations by internal and external auditors and outside consultants are fully documented and tracked for adequate follow up.
- (3) Determine whether management's corrective actions on recommendations by internal and external auditors or consultants are adequate and are reviewed by senior management and the board of directors.

### ***6) Information technology and controls***

Assess the adequacy and effectiveness of automated and manual processing. The examiner should review the FHLBank's automated and manual data processing systems and spreadsheets. The examiner should also review flow charts to identify how information is channeled from one process to another and one function or department to another and determine that appropriate and effective automated and manual controls as needed are in place. At a minimum, the examiner should:

- a) Review the FHLBank's flow charts to determine how information is channeled from one business process to another.
- b) Identify and assess the automated and manual systems and applicable controls for processing information within the same business unit as well as from one business unit to another.
- c) Identify and assess control deficiencies noted by internal and external auditors or consultants.
- d) Identify and evaluate internal control exceptions and violations to determine whether they have occurred due to deficiencies in controls.
- e) Assess management corrective actions on identified control deficiencies to prevent their reoccurrence.

### ***7) Identification and evaluation of controls and significant changes to the activity or function***

Evaluate the workflow, analyses, and processes as well as controls, including the level, types, sources, and direction of interest rate risk, taking into account on- and off-balance sheet risk characteristics, and the quality of risk management. If applicable, conduct an assessment of any significant or anticipated changes to FHLBank funding and hedging strategies, product lines, trading volumes, and commitments since the last examination that may affect the FHLBank's interest rate risk profile.

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For the purpose of this program, the assessment is based on reviews of the Quarterly Risk Monitoring Report and on- and off-site risk analyses and results produced by Finance Board Risk Modeling Division (RMD), CRS data and trend book, FHLBank risk monitoring reports, SEC filings, and significant changes since the last examination. The examiner should have discussions with RMD staff and FHLBank management during the review process.

### **a) Level and Direction of Risk**

The examiner should assess and discuss with management the FHLBank's DOE and MVE sensitivity to various hypothetical scenarios, including:

- (1) Parallel interest rate shocks.
- (2) Non-parallel rate shocks. The FHLBank's rate scenarios should involve changes in the shape of the yield curve, including steepening, flattening, and twists.
- (3) Changes in key spreads. The FHLBank's interest rate scenarios should include shocks that change the spreads between key rates, such as CO rates and LIBOR, and CO rates and mortgage rates.
- (4) Changes in the FHLBank's exposure to rate changes at particular term points on the yield curve. The FHLBank's interest rate scenarios should include shocks that determine the FHLBank's key rate durations.
- (5) Assess the FHLBank's DOE and MVE sensitivity for various interest rate shocks in relation to the FHLBank's post-shock level of DOE and MVE, including the change in DOE and MVE resulting from a +/- 200 basis point parallel rate shock in relation to the FHLBank's DOE and MVE following a +/-200 basis point shock. Perform analysis for various rate shocks.
- (6) Assess the FHLBank's value-at-risk report that estimates the FHLBank's potential market value loss.

The examiner should assess and discuss with management the FHLBank's ***NII sensitivity*** to various hypothetical scenarios.

- (1) Assess the FHLBank's NII sensitivity for various interest rate scenarios in relation to the FHLBank's retained earnings in those scenarios. Use the FHLBank's scenario results to perform analysis.
- (2) Assess the FHLBank's other risk monitoring reports such as repricing and basis gap reports to estimate how each risk component could affect the FHLBank's earnings when interest rates change.
- (3) Assess and discuss with RMD staff their review of results and analyses.
- (4) Assess the ability of the FHLBank to estimate (mark-to-model) the value of its holdings of financial instruments in the base case and in alternative interest rate scenarios.



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For all financial instruments with embedded options or which are otherwise difficult to value, the examiner should determine whether the FHLBank can adequately value the instruments in both the base case and in all interest rate scenarios. The RMD's pre-examination Liability and Mortgage Reports should provide evidence as to whether the FHLBank's models are valuing optionality accurately.

For all financial instruments in the FHLBank's portfolio with embedded options and other instruments that are difficult to value, the examiner should determine whether the FHLBank obtains or develops reliable and independent estimates for base case values and for alternative scenarios.

### **b) Significant Sources of Risk**

Examiners should determine the level of exposure in the areas identified as potentially having significant interest rate risk. A basic tenet of portfolio theory is that interest rate risk must be assessed on a total portfolio basis. It is the risk of the entire portfolio not the risk of individual instruments that matters in assigning a risk exposure rating. Although interest rate risk exposure should not be measured piece-meal, once a FHLBank's overall level of exposure has been measured, it may be useful to identify the portions of the FHLBank's portfolio that contribute most to its exposure. This requires considering the assets, funding, and any derivatives associated with the particular portfolio, such as investments, advances, or AMA, together. The examiner should review and analyze the FHLBank's balance sheet structure, off-balance sheet activities, trends, and asset and liability compositions to identify the major sources of interest rate risk exposures.

The examiner should consider:

- (1) The maturity and repricing structures of the FHLBank's loan, investment, liability, and off-balance sheet portfolios;
- (2) Whether the FHLBank has substantial holdings of products with explicit or implicit embedded options, such as prepayment options, caps, or floors, or products whose rates will considerably lag market interest rates;
- (3) The various indices used by the FHLBank to price its variable rate products, such as prime, LIBOR, Treasury, and the level or mix of products tied to these indices;
- (4) The use and nature of derivative products; and
- (5) Other off-balance sheet items, such as, letters of credit, loan commitments, and mortgage delivery commitments.

The examiner should assess and discuss with management the FHLBank's vulnerability to various movements in market interest rates including:

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- (1) The timing of interest rate changes and cash flows because of maturity or repricing mismatches;
- (2) Changes in key spread or basis relationships;
- (3) Changes in yield curve relationships; and
- (4) The nature and level of embedded options exposures.

### **c) Mitigating Controls**

For the purpose of this program, the assessment of mitigating controls will be conducted based on FHLBank policies and procedures, risk management strategies and practices, and monitoring reports. RMD staff will complete a separate examination program for the purpose of assessing the FHLBank's interest rate risk modeling, including model validation and back testing. The examiners, in consultation with RMD staff and FHLBank management, will conclude whether existing mitigating controls are adequate and effective.

At a minimum, the examiner should determine that:

- (1) The FHLBank has appropriate risk management policies and strategies for investments, advances, AMA, funding and derivatives;
- (2) The FHLBank's hedging strategies are appropriate and sufficient to manage embedded options, basis risk, yield curve risk, price risk, and repricing risk associated with on- and off-balance sheet activities;
- (3) The FHLBank's risk tolerance limits are appropriate given the nature, the types and the level of risk;
- (4) The FHLBank's investment, advances, mortgage loan acquisition and debt issuance activities are consistent with board of directors-approved guidelines, and they achieve their intended risk management and earnings objectives;
- (5) The FHLBank appropriately uses derivatives to hedge the anticipated debt issuance and mortgage delivery comments;
- (6) The FHLBank, if applicable, appropriately uses a delta hedging strategy to manage volatility risk associated with mortgage assets;
- (7) The FHLBank has established sufficient procedures and systems to identify and measure risks associated with these derivative instruments.
- (8) The FHLBank's derivatives activities are consistent with the board of directors' risk management strategies and policies. If so, determine whether the use of such derivatives allows the FHLBank to achieve those strategies effectively;
- (9) The FHLBank's policies, procedures, and strategies are reviewed and approved by senior management; and
- (10) Procedures are established to ensure timely reporting of FHLBank policy exceptions and regulatory violations.

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### **d) Accounting Controls**

Assess the adequacy of the FHLBank's accounting procedures and strategies for mitigating accounting risk arising from changes in interest rates in context of earnings and capital. The review should determine:

- (1) Whether the FHLBank has established an appropriate methodology for premium amortization and discount accretion in accordance with SFAS 91.
- (2) Whether the FHLBank has procedures and systems in place to mark-to-market trading and available-for-sale securities (price risk) in accordance with SFAS 115.
- (3) Whether the FHLBank has established an effective methodology to perform hedge effectiveness testing in accordance with SFAS 133. In addition, determine if the FHLBank has the infrastructure to assess potential earnings impact from hedging and derivative strategies.
- (4) Whether the FHLBank has established procedure for compliance with SFAS 149.

### **8) Testing**

Conduct testing as appropriate. The scope of testing should be based on preliminary reviews of corporate governance, risk management practices, internal controls and audit coverage. Testing of the accuracy and adequacy of risk modeling, including model input and output, and model validation and back testing procedures is not part of this examination program. Testing for these attributes is included in the examination program for the interest rate risk modeling. For the purpose of this program, testing may include:

- a) Verifying management's adherence to regulations and risk management policies and procedures. Obtain periodic risk exposure reports and related documentation and spreadsheets/databases and verify that appropriate and effective procedures that underlie the production of these reports and spreadsheets are in place. Verify that key risk management reports, including regulatory violations and policy exceptions are regularly and timely submitted to senior management and the board of directors, and the board and senior management take appropriate corrective actions to prevent their reoccurrence.
- b) Obtaining flow charts and analyzing key processes and channels of information from the front office to the back office. Identify automated and manual controls in place and assess their effectiveness and determine that staff adheres to these mitigating controls.
- c) Obtaining management analyses and relevant board of directors and board committee meeting minutes. Determine whether the analyses consider the

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- board's strategic direction and risk appetite, and the FHLBank's earnings and capital positions, including retained earnings in order to set forth the FHLBank's limits for exposure to interest rate risk.
- d) Obtaining the FHLBank's prices for mortgage assets and derivative instruments used for the production of risk exposure reports. Compare the FHLBank's internally-generated prices against broker-dealer prices for accuracy.
  - e) Obtaining sample traded transactions, including advances, MBS/CMOs and AMA pools and associated debt and derivative instruments. Analyze their risk characteristics to determine that they are appropriate and consistent with the board-approved policies and regulatory guidelines.
  - f) Obtaining records of mortgage loan delivery commitments and securities held at fair value and available-for-sale. Determine that these accounts are marked-to-market and gains/losses are accounted for in earnings or capital in accordance with SFAS 133 or SFAS 115, as applicable.
  - g) Obtaining procedures and spreadsheets used for premium amortizations and discount accretions. Assess whether the FHLBank's procedures and calculations are appropriate and accurate, as well as consistent with the SFAS 91.
  - h) Obtaining audit and consultant reports, workpapers, and analyses. Assess whether audit scope and testing of attributes are adequate given the level and types of risks and that management responses and corrective actions are appropriate.

### ***9) Assessment of Risks***

Summarize the results of the activity or function examined in a separate memorandum. The memorandum must articulate the risks and the management of those risks. It should also clearly and specifically describe the basis and analysis for the assessment. The memorandum should discuss the level of market risk (low, moderate, high); the direction of market risk (stable, decreasing, increasing); and the quality of market risk management (strong, adequate, weak). A memorandum must be prepared irrespective of whether the examiner's assessment is positive or negative.

### ***10) Items requiring follow-up at the next on-site visitation***

Identify key issues that have been communicated to management (written or oral) that require follow-up during the next on-site visitation.