Federal Housing Finance Agency
Office of Inspector General

The Division of Federal Home Loan Bank Regulation Needs to Improve Controls Over Internal Model Risk

Audit Report • AUD-2025-009 • September 29, 2025

EXECUTIVE SUMMARY

PURPOSE

The Federal Housing Finance Agency's (FHFA) Division of Federal Home Loan Bank Regulation (DBR) uses models – approximations of real-world conditions or future events using mathematical techniques and statistical methods – to conduct monitoring and analysis as well as support examiners in their evaluation of Federal Home Loan Bank (FHLBank) market risk management. The use of models exposes DBR to model risk – the risk that errors in a model's design, data, or use could lead to inaccurate results.

We conducted this audit to determine whether DBR designed and implemented controls over its risk models and analysis products to ensure their accuracy and reliability for decision-making and analyzing the FHLBanks' market risk model results.

RESULTS

We determined that DBR's Office of Risk Analysis and Modeling (ORAM) needs to improve controls over its risk models and analysis products to ensure their accuracy and reliability for decision-making and analyzing the FHLBanks' market risk model results.

While ORAM has designed and implemented controls that addressed some of FHFA's supervisory expectations for model risk management, it has not designed and implemented controls addressing model risk management supervisory expectations for three important areas: model inventory maintenance, independent model validation, and model performance tracking. Furthermore, some procedures are not up-to-date and lack certain controls over model risk management. These weaknesses increase the risk that DBR would not detect errors in a model's design, data, or use that could lead to inaccurate results and incorrect focus areas regarding FHLBanks' market risk modeling techniques. Additionally, out-of-date policies and procedures may not capture and address current risks or communicate current control expectations to ORAM personnel.

We also found that documentation of ORAM's review of inputs and outputs was not readily available or easily accessible. This weakness increases the risk that ORAM will not be able to demonstrate compliance with its own policies and procedures and expected control activities. Control activities that are not documented may not be performed as designed, increasing the risk that input, output, or processing errors that could adversely impact DBR decisions are not detected and corrected.

We made three recommendations to address our two findings. In a written response, FHFA management agreed with our recommendations.

This report was prepared by Jim Lisle, Audit Director; April Ellison, Audit Manager; Marco Uribe, Auditor-in-Charge; and Jianxun Pan, Auditor; with assistance from Abdil Salah, Assistant Inspector General for Audits. We appreciate the cooperation of FHFA staff, as well as the assistance of all those who contributed to the preparation of this report. This report has been distributed to Congress, the Office of Management and Budget, and others and will be posted on our website, www.fhfaoig.gov, and www.oversight.gov.

James Hodge
Deputy Inspector General for Audits /s/

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ABBREVIATIONS

AB	Advisory Bulletin
DBR	Division of Federal Home Loan Bank Regulation
FHFA	Federal Housing Finance Agency
FHLBank	Federal Home Loan Bank
FISCAM	GAO’s Federal Information System Controls Audit Manual
GAO	Government Accountability Office
Green Book	GAO’s Standards for Internal Control in the Federal Government
ORAM	Office of Risk Analysis and Modeling

BACKGROUND

Exposures to market risk caused by changes in interest rates and other market factors, if not controlled, can threaten an FHLBank's liquidity, earnings, economic capital, and solvency. Resulting changes to the credit ratings of consolidated obligations could adversely affect the FHLBank's ability to access, on acceptable terms, their primary source of funding, the capital markets. An FHLBank uses complex models to identify, measure, and monitor its market risk exposures, and to make decisions on how best to control those risks. DBR, in turn, uses a number of third-party financial models to conduct monitoring and analysis; these models also support examiners in their evaluation of an FHLBank's market risk management.[1] Given their complexity and the unpredictability of the financial markets, these models[2] are subject to a high degree of inherent model risk – the risk that errors in a model's design, data, or use could lead to inaccurate results and incorrect decisions.

FHFA's Supervisory Expectations for Controls Over Model Risk Management

FHFA communicates its supervisory expectations for an FHLBank's use and management of market risk models through advisory bulletins (ABs). The applicable ABs in effect during the scope of our audit are listed below. While these ABs are issued as guidance for the FHLBanks, and not to DBR directly, they reflect minimum thresholds for FHFA's supervisory expectations for model risk management.[3] Accordingly, we used these ABs as guidance to assess the internal controls over DBR's own use of models:

- AB 2013-07, *Model Risk Management Guidance*, sets supervisory expectations for model risk management, including that the regulated entities establish a baseline of control and governance requirements comprised of the following elements.
    - Model Risk Management Framework – includes developing policies, procedures, and defining clear roles and responsibilities.

[1] DBR maintains a primary market risk model that is integrated with other component models that perform specialized functions such as obtaining specific market data or estimating mortgage prepayments.

[2] Current regulatory guidance defines a model as approximations of real-world conditions or future events using mathematical techniques and statistical methods.

[3] The FHLBanks use their market risk models to make investment, funding, and hedging decisions that impact their financial condition and market risk exposure. DBR uses market risk models to benchmark FHLBank model output, which impacts the focus of supervisory discussions with the FHLBanks.

- Model Control Framework – includes establishing model inventory maintenance,[4] model change control management,[5] model performance tracking,[6] and assumption and data management.

- Model Validation Program – includes implementing review of the adequacy of controls, independent model validation,[7] assessments and periodic model reviews, findings and model risk issues management, and preparation and maintenance of model theory documentation.

- AB 2022-03, *Supplemental Model Risk Management Guidance*, provides supplemental guidelines to AB 2013-07, which addresses changes in model-related technologies; expanded use of complex models by the FHLBanks; and the regulated entities' model documentation, model validation program, model control framework, and model testing.

DBR's Office of Risk Analysis and Modeling

DBR conducts risk-based supervision of each of the 11 FHLBanks through a variety of methods including annual examinations, periodic visitations, special reviews, and offsite monitoring. DBR's ORAM is responsible for assisting DBR examiners in market risk examinations, monitoring FHLBanks' market risk, and performing supervisory activities on the FHLBanks' use of market risk models.[8] ORAM produces monthly and quarterly monitoring reports using FHLBank data and uses its third-party market risk models to produce an annual market risk

[4] According to AB 2013-07, model inventory maintenance includes maintaining a comprehensive inventory listing all models and updating the inventory at least on a quarterly basis. The model inventory should classify or risk-rank each listed model based on its inherent risk as driven by its factors such as its purpose and relative impact on decision making. The model inventory captures the key attributes of a model including its use, purpose, classification, owner, last update, and validation schedule. For vendor models, the model inventory should identify both the version number of the model and the latest version of the model available in the marketplace.

[5] Model change control management includes a change control log, which is a document that allows others to clearly understand a model's function and settings. AB 2013-07 states that a regulated entity should validate and approve all significant model changes according to its policies and procedures prior to deployment into production. The model's governance authority should define and establish applicable threshold levels which determine what constitutes a significant model change.

[6] Model performance tracking includes benchmarking and backtesting. Benchmarking consists of comparing a model's performance metrics to actual information available in the marketplace, where applicable. Backtesting consists of comparing projected model results with actual results.

[7] AB 2013-07 provides that all models are subject to independent model validation according to the schedule set forth in the model inventory based on model classification or annual validation planning. The frequency and scope of validation should be commensurate with the relative importance of a model to a regulated entity's decision-making or risk management processes.

[8] ORAM is responsible for maintaining DBR's suite of software, including implementing regular vendor data updates using its system change request process, and for the collection and validation of market rates data input for the model.

modeling analysis memorandum for each FHLBank.[9] These products are used to monitor market risk exposures at the FHLBanks and to help develop the scope of supervisory activities and examinations.

ORAM Internal Guidance

ORAM has implemented internal policies and procedures to govern its production of risk monitoring reports and model risk management processes (collectively referred to as ORAM Procedures in this report), including:

- DBR, Office of Risk Modeling Procedures[10] (January 2019) – outline ORAM's overall responsibilities in the annual examination and ongoing (off-site) supervision of the FHLBanks, including expectations for model risk examiner review of model inputs and assumptions, supervisor reviews and approvals, and distribution of reports to pertinent groups.[11]

- DBR, Risk Modeling FHLBanks Model Documentation and Procedures (draft, last updated August 2022) – contain detailed information and procedures for using the third-party models.

- DBR, Office of Risk Modeling Quarterly Market Risk Profile Update Procedures (February 2019) – contain guidelines for updating each FHLBank's quarterly market risk profile.

- DBR, [Primary Market Risk Model] Change Control Procedures (March 2006) – contain instructions for testing new versions or upgrades to the [Primary Market Risk Model] software, including new versions and upgrades to third-party vendor models used in the [Primary Market Risk Model] application.

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[9] To produce an annual market risk modeling analysis memorandum for each FHLBank, ORAM compares the FHLBank's model results of market value sensitivity estimates to ORAM's independent estimates using its third-party models.

[10] In 2019, DBR's Office of Risk Analysis and Modeling was known as the Office of Risk Modeling. At other points in time, the office has been called the FHLBank Risk Modeling Branch or the Market Risk Modeling Branch.

[11] The Government Accountability Office's (GAO) *Federal Information System Controls Audit Manual* (GAO-24-107026; September 2024) identifies the following as an information systems control: system generated input, processing, and output errors should be researched and resolved in a timely manner. We used this GAO guidance to identify key information systems controls applicable to our audit and designed a test for ORAM's compliance with them. Further, ORAM management also told us that they rely primarily on user controls – access controls, change controls, and the review of critical inputs and critical outputs – to assess whether the model runs properly.

ORAM Evaluation of FHLBank Model Changes

FHFA Regulations, codified at 12 C.F.R. § 1277.5(d), require that an FHLBank obtain FHFA approval of its internal market risk model, and any subsequent material adjustments to it, prior to the use of the model. FHLBanks commonly implement changes to a previously approved internal market risk model in response to changing technology and economic conditions. AB 2023-03, *FHLBank Changes to Internal Market Risk Models*, provides guidance to FHLBanks on the notification and approval for market risk model changes.

ORAM Procedures describe its process for evaluating model changes and communicating decisions to the FHLBanks. To illustrate, ORAM Procedures require that the model risk examiner assigned to the FHLBank (1) reviews the FHLBank model change request, (2) determines whether the FHLBank's submitted documentation is complete within 30 calendar days, and (3) recommends an approval or objection to the model change once they determine that the FHLBank's documentation is complete. On receipt of complete documentation, the ORAM Manager communicates approval or objection to the FHLBank within 30 calendar days.

OBJECTIVE AND SCOPE

The objective of our audit was to determine whether DBR designed and implemented controls over its risk models and analysis products to ensure their accuracy and reliability for decision-making and analyzing the FHLBanks' market risk model results. The scope of our audit focused on DBR ORAM's model risk control activities for the period January 1, 2024, through December 31, 2024.

For details on methodology see Appendix I.

RESULTS ....

We determined that DBR's ORAM needs to improve controls over its risk models and analysis products to ensure their accuracy and reliability for decision-making and analyzing the FHLBanks' market risk model results. While ORAM has designed and implemented controls that addressed some of FHFA's supervisory expectations for model risk management and ensured that FHLBank model change approval requests were properly handled, other needed controls were not in place.

ORAM effectively designed and implemented controls that:

- Addressed several of FHFA's supervisory expectations for model risk management, communicated in AB 2013-07 and AB 2022-03. These include: developing and implementing policies and procedures [for model risk management], assignment of clear roles and responsibilities [for model risk management], implementing change control management, implementing assumption data management, and preparing and maintaining model theory documentation.

- Limited employee's access to DBR models to only that needed for the employee's job responsibility – a relevant general control for federal systems illustrated in the Government Accountability Office's (GAO) *Federal Information System Controls Audit Manual* (FISCAM).

- Ensured all changes to DBR models were documented and that significant changes were tested and approved prior to being put into production. ORAM complied with its change control procedures for all seven internal model system changes in our sample.

- Ensured that ORAM evaluated all six FHLBank model change approval requests in our sample prior to approval in accordance with 12 C.F.R. § 1277.5(d) and AB 2023-03. Specifically, ORAM: tracked FHLBank model change requests; documented an evaluation supporting FHFA's decision on each request; documented supervisory review and approval of the decision; and communicated the decision to the FHLBank within established time limits.

While ORAM has designed and implemented controls that addressed some of FHFA's supervisory expectations for model risk management, ORAM has not designed and implemented controls addressing model risk management supervisory expectations for model inventory maintenance, independent model validation, and model performance tracking. Furthermore, some policies and procedures were in draft form and not up-to-date. As discussed in detail in Finding 1, these weaknesses increase the risk that DBR would not detect errors in a model's design, data, or use that could lead to inaccurate results and incorrect focus areas regarding FHLBanks' market risk modeling techniques.

In Finding 2, we noted that ORAM documented the review of model input and output as well as distribution for 12 of 18 regular market risk products in our sample, but the remaining 6 products were missing documentation of the review for at least one attribute. We also found that, even though ORAM designed and implemented controls to ensure that ORAM evaluated all six FHLBank model change approval requests in our sample, ORAM did not consistently record the date that complete documentation was received from the FHLBank. This information is necessary to assess compliance with governing procedures. These matters hinder ORAM's ability to demonstrate compliance with its own procedures.

Finding 1: ORAM's Procedures Are Not Up-to-Date and Lack Certain Controls Over Model Risk Management

ORAM has not implemented some of FHFA's model risk management supervisory expectations, communicated in AB 2013-07 and AB 2022-03, for its internal market risk models. Specifically, during the scope of our audit, ORAM has not:

- Maintained its model inventory, based on a periodic review of models. In addition, the model inventory did not include a risk rating or classification, date of latest update, or validation schedule for each model.
- Procured an independent validation of DBR's primary market risk model (or any of its integrated component models). The last independent validation of DBR's primary market risk model was conducted in 2022. Three low priority recommendations related to its policies and procedures, benchmarking, and backtesting made in the 2022 independent validation report remain unaddressed.
- Performed any documented model performance tracking or review (e.g., benchmarking, backtesting).
- Maintained its policies and procedures – several procedure documents were only maintained in draft format and were not up-to-date.[12] For example, we noted review procedures that were no longer performed but were included in ORAM Procedures as

[12] In its December 2014 "Quality Assurance Review of DBR's FHLBank Risk Modeling Branch," FHFA's former Office of Quality Assurance issued a similar finding and recommendation about internal operating policies and procedures not being formalized. An ORAM official told us that the Risk Modeling Branch staff responded to this recommendation with an annual review of procedures, recommending changes when needed, through 2019.

well as current practices for tracking FHLBank model change approval requests that were not reflected in ORAM Procedures.[13]

In addition to FHFA's model risk management supervisory expectations, GAO's *Standards for Internal Control in the Federal Government* (Green Book) requires that management (1) document policies in the appropriate level of detail to allow management to effectively monitor the control activity; (2) communicate to personnel the policies and procedures so that personnel can implement the control activities for their assigned responsibilities; and (3) periodically review policies, procedures, and related control activities for continued relevance and effectiveness in achieving the entity's objectives or addressing related risks.

ORAM Procedures do not address practices applicable to periodic review and maintenance of the model inventory, independent model validation and follow-up, or model performance tracking. An ORAM official acknowledged that the office had not performed a comprehensive review and approval of its significant policies and procedures since 2019, updated the model inventory since 2018, or conducted independent model validation since 2022. The same official told us that prepayment model benchmarking and backtesting work was suspended in 2021. We were told that the primary reasons for the discontinuance of these model risk management practices were: (1) resource constraints and (2) market disruptions in the historical data used for performance tracking (such as the low-interest rate environment in recent years).

The ORAM official agreed with the need for periodic, risk-based validation and performance tracking but did not consider the time since the last independent validation to be excessive given the relative risk of ORAM's models.[14] The official conceded, however, that a risk-based validation schedule was not documented. Further, the official noted model risk was somewhat mitigated by the fact that ORAM compares its model results with those of the FHLBanks' (which occurs as part of DBR's pre-examination process for each FHLBank annual examination) as a form of checking the validity of its own models.

Without a comprehensive and up-to-date model inventory, ORAM may not sufficiently consider the relative risk of each model that it uses or design risk management practices (such as, independent validation and performance tracking) appropriate for the assigned level of risk. When independent model validation and performance tracking are not designed or performed commensurate with the model's assigned level of risk, there is an increased risk that DBR will not detect errors in a model's design, data, or use. Absent detection of such errors, inaccurate results and incorrect focus areas regarding FHLBanks' market risk modeling techniques may

[13] ORAM Procedures include reference and hyperlink to a tracking log for model change approval requests that was incomplete. An ORAM official told us that the log is not ORAM's official tracking document for these requests, and that FHFA's Electronic Collaboration and Clearance review and approval system is used instead.

[14] See footnote 3 for an explanation of the difference in how FHLBanks and ORAM use market risk models.

occur. Additionally, out-of-date policies and procedures may not capture and address current risks or communicate current control expectations to ORAM personnel.

Recommendation

We recommend that the DBR Deputy Director:

1. Ensure that ORAM evaluates its current internal model risk management practices in line with FHFA's model risk management supervisory expectations (defined in AB 2013-07 and AB 2022-03) and design controls to (1) periodically review and maintain its model risk inventory (to include a risk-based validation schedule), (2) engage external resources to perform independent model validations in accordance with the validation schedule, and (3) conduct model performance tracking. Further, ORAM should update and finalize its policies and procedures to reflect the internal model risk management practices adopted.

Finding 2: Documentation of ORAM's Review of Inputs and Outputs, and Key Tracking Dates Was Not Readily Available or Easily Accessible

Of the 18 market risk products (monitoring reports and pre-examination analysis memoranda) produced by ORAM during our scope period, we found that ORAM was unable to provide documentation of its review of input files for 5 market risk products; and its supervisory review and sign-off of model results and output for 2 market risk products. Furthermore, ORAM had difficulty retrieving documentation of other input and output reviews in our sample. ORAM staff had to review emails, shared drives, and personal drives of other current and former ORAM personnel to obtain or recover the documentation.[15]

In addition, ORAM's model change approval requests procedures require that the ORAM Manager communicate approval or rejection to the FHLBank within 30 calendar days of receiving complete documentation. However, ORAM's tracking mechanism only identified the date that complete documentation was received for 1 of 6 model change approval requests in our sample. Based on our review of ORAM's communication with the FHLBank, we were able to identify an approximate date when the model risk examiner determined that an FHLBank's submitted documentation was complete for the other five sampled requests (and in each case a determination was made within the 30 calendar days). This information, however, was not recorded in ORAM's tracking mechanism.

[15] In its December 2014 "Quality Assurance Review of DBR's FHLBank Risk Modeling Branch," FHFA's former Office of Quality Assurance issued a similar finding and recommendation regarding inconsistent recordkeeping practices and records not being easily accessible.

The Federal Records Act and 36 C.F.R. Part 1220 require each federal agency to make and preserve records necessary to document the agency's policies, decisions, procedures, and essential transactions. In addition, FHFA's Records and Information Management Policy requires all employees and contractor personnel to manage the Agency's information, including records, throughout its lifecycle to facilitate and document FHFA's mission and functions. GAO's Green Book also requires that management clearly document internal control events in a manner that allows the documentation to be readily available for examination and establishes that documentation and records should be properly managed and maintained.

ORAM Procedures do not specify how records of reviews and FHLBank requests for approval of market risk model changes, including the complete documentation determination dates, are to be maintained. In addition, an ORAM official told us that the culture of the Market Risk Modeling Branch was less formal for work products distributed internally (DBR) rather than externally to the FHLBanks. For example, records of review and approval of an FHLBank's annual market risk modeling analysis memorandum, delivered to DBR's Examination offices, are often maintained only via email, and access to those emails has been hindered once the staff member leaves the agency. The official noted that ORAM has worked to change the informal culture, focusing first on documents that will be communicated outside of ORAM, such as the FHLBank model change request decision letters sent to the FHLBanks, and then internal DBR documents. For example, the official told us that ORAM started using Electronic Collaboration and Clearance to more formally track reviews of FHLBank requests for approval of market risk model changes in 2023 and turned to work products delivered to the division (e.g., monitoring reports) during 2025. Records of internal ORAM reviews and approvals (e.g., of data input) are the third priority in the effort to improve documentation and procedures.

The absence of clear and consistent records maintenance requirements increases the risk that ORAM will not be able to demonstrate compliance with its own policies and procedures and expected control activities. Control activities that are not documented may not be performed as designed, increasing the risk that input, output, or processing errors that could adversely impact DBR decisions are not detected and corrected.

Recommendations

We recommend that the DBR Deputy Director:

2. Ensure that ORAM evaluates its current practices for maintaining documentation of the review and approval of inputs and outputs and implements policies and procedures to communicate requirements for maintaining this documentation.

3. Ensure that ORAM evaluates its current tracking mechanism for FHLBank requests for approval of market risk model changes and implement policies and procedures to

ensure that the date that a complete model change approval request is received is tracked.

FHFA COMMENTS AND OIG EVALUATION................................

We provided FHFA management an opportunity to review and provide technical comments on a draft of this audit report. We considered those comments in finalizing this report. In a written response, FHFA management agreed with our recommendations and included the following planned corrective actions:

1. By August 31, 2026, DBR will evaluate its internal model risk management practices and design controls around reviewing model risk management inventory, performing independent model validations, and conducting model performance tracking. Additionally, FHFA will update its policies and procedures to reflect the internal model risk management practices adopted.

2. By February 28, 2026, DBR will evaluate its practices for documenting reviews of inputs and outputs for market risk analysis products. DBR will then implement governing policies and procedures.

3. By February 28, 2026, DBR will evaluate its tracking of FHLBank requests for approval of market risk model changes and implement appropriate policies and procedures.

We consider FHFA's planned corrective actions responsive to the recommendations. FHFA's written response, in its entirety, is included as Appendix II in this report.

APPENDIX I: METHODOLOGY...

To accomplish our objective, we performed the following procedures:

- Reviewed GAO's *Standards for Internal Control in the Federal Government* (GAO-14-704G; September 2014) and determined that the control activities component of internal control was significant to this objective.[16] We focused on the underlying principles that management should: (1) design control activities to achieve objectives and respond to risks; (2) implement control activities through policies; and (3) design the entity's information system and related control activities to achieve objectives and respond to risks. Reviewed GAO's *Federal Information System Controls Audit Manual* (GAO-24-107026; September 2024) and determined that the following user Business Process Controls were significant to our audit objective. Management designs and implements (1) user controls to reasonably assure that data input into the information system, data processing by the information system, and output data are complete, accurate, and valid; and (2) general controls to reasonably assure that business process applications are properly managed to achieve information processing objectives.

- Obtained and reviewed the following FHFA supervisory guidance documents for model risk management and FHLBank model change approval requests:

  - AB 2013-07, *Model Risk Management Guidance* (November 2013)

  - AB 2022-03, *Supplemental Guidance to AB 2013-07 – Model Risk Management Guidance* (December 2022)

  - AB 2023-03, *FHLBank Changes to Internal Market Risk Models* (April 2023)

- Obtained and reviewed the following applicable ORAM policies and procedures, and determined whether they described all significant duties, products, models, systems, and processes for internal model risk management:

  - Office of Risk Modeling Procedures (January 2019)

  - Risk Modeling FHLBanks Model Documentation and Procedures (draft, last updated August 2022)

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[16] GAO, *Standards for Internal Control in the Federal Government* (GAO-14-704G) issued in September 2014 was applicable during our audit scope. The 2014 version has been superseded by GAO's *Standards for Internal Control in the Federal Government* (GAO-25-107721) which was issued in May 2025 and is effective beginning with fiscal year 2026.

- Office of Risk Modeling Quarterly Market Risk Profile Update Procedures (February 2019)
- [Primary Market Risk Model] Change Control Procedures (March 2006)

- Reviewed prior OIG reports to identify findings and recommendations related to the FHLBanks' management of market risk modeling and determined there was no impact on our audit.
    - OIG, *DBR Provided Sufficient Oversight of the FHLBanks' Use of Market Risk Modeling* (March 26, 2025) (AUD-2025-001)
    - OIG, *Audit of the Federal Housing Finance Agency's Information Security Programs and Practices Fiscal Year 2024* (July 30, 2024) (AUD-2024-006)

- Interviewed DBR personnel to gain an understanding of ORAM policies, procedures, and practices over model risk management. DBR personnel included Senior Associate Directors, a Senior Financial Analyst, a Senior Business Technology Analyst, as well as a Supervisory Examination Specialist responsible for conducting independent quality control reviews of DBR examination workpapers. Obtained written responses, as needed, from DBR personnel to address questions and observations related to our audit testing procedures.

- Identified FHFA's supervisory expectations for model risk management presented in AB 2013-07 and AB 2022-03 and assessed the design and implementation of ORAM's controls by comparing ORAM's policies, procedures, and practices to those supervisory expectations.

- Obtained and reviewed DBR's model inventory to determine whether it was complete, up-to-date, and included a validation schedule. Assessed whether independent model validation and performance tracking were performed.

- Assessed the appropriateness of user and administrator access to DBR's models, ensuring that DBR removed access to those who departed the Agency and granted access to model servers only to those responsible for maintaining the servers.

- Identified the population of 22 ORAM internal model changes and selected a non-projectable, judgmental sample of 7 internal model changes (32 percent) designed to provide coverage of each change type (e.g., Routine Model Parameter File Updates, Model Patch, Model Removal, Configuration Changes, etc.). We reviewed each change in our sample to assess whether ORAM followed its system change request process for the specific change type, including, where applicable: (1) documentation of change justification, (2) testing results of change, (3) documented resolution of issues identified during testing, and (4) management sign-off of change prior to moving to production.

- Identified the population of 66 ORAM regular market risk products and selected a non-projectable, judgmental sample of 18 products (27 percent) designed to provide coverage of each type of product (e.g., Quarterly Market Risk Monitoring Reports and Profiles, Monthly Market Risk Monitoring Profiles, Market Risk Modeling Analysis Memoranda). For each product, we assessed whether expected controls were followed when generating the product, including that, as applicable: (1) input and assumptions were retrieved timely and in the requisite form from the correct FHLBank and for the time period under review; (2) documented supervisor review and sign-off of input files; (3) evidence that system generated input, processing, and output errors were researched and resolved in a timely manner; (4) documented supervisor review and sign-off of results and output; and (5) evidence of distribution to pertinent groups.

- Assessed ORAM's controls over FHLBank model change approval requests to determine whether they were designed and implemented to ensure that ORAM evaluated and made decisions on FHLBank model change approval request changes in accordance with 12 C.F.R. § 1277.5(d) and AB 2023-03.

- Identified the population of 21 FHLBank model change approval requests assessed by ORAM during our audit scope and selected a random sample of 6 change requests (29 percent). The purpose of using random sampling was to avoid bias and not to project the results to the population of FHLBank model change approval requests. For each request selected, we assessed whether ORAM: (1) tracked model change approval requests, (2) documented evaluation supporting FHFA decisions, (3) reviewed and approved these decisions, and (4) communicated decisions within established time constraints.

We conducted this performance audit from March 2025 to September 2025 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

APPENDIX II: FHFA MANAGEMENT RESPONSE........................

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Federal Housing Finance Agency

MEMORANDUM

TO: James Hodge, Deputy Inspector General for Audits

FROM: Joshua Stallings, Deputy Director, Division of FHLBank Regulation JOSHUA STALLINGS Digitally signed by JOSHUA STALLINGS Date: 2025.09.24 13:42:51 -04'00'

SUBJECT: Audit Report: *The Division of Federal Home Loan Bank Regulation Needs to Improve Controls Over Internal Model Risk*

DATE: September 24, 2025

Thank you for the opportunity to respond to the Office of Inspector General's (OIG) draft report. The objective of OIG's audit was to determine whether the Division of Federal Home Loan Bank Regulation (DBR) designed and implemented controls over its risk models and analysis products to ensure their accuracy and reliability for decision-making and analyzing the Federal Home Loan Banks' (FHLBanks) market risk model results.

While the report identified that DBR designed and implemented controls that addressed some of the Agency's supervisory expectations for model risk management and ensured that FHLBank model change approval requests were properly handled, it included two findings related to DBR's market risk management policies and procedures needing revision, as well as recommended improvements in associated controls, documentation, and tracking. DBR is in the process of enhancing its model risk management practices and revising its policies and procedures to reflect those findings. Accordingly, the Agency agrees with the three recommendations.

Recommendation 1: *Ensure that the Office of Risk Analysis and Modeling (ORAM) evaluates its current internal model risk management practices in line with FHFA's model risk management supervisory expectations (defined in AB 2013-07 and AB 2022-03) and design controls to (1) periodically review and maintain its model risk inventory (to include a risk-based validation schedule), (2) engage external resources to perform independent model validations in accordance with the validation schedule, and (3) conduct model performance tracking. Further, ORAM should update and finalize its policies and procedures to reflect the internal model risk management practices adopted.*

Management Response: FHFA agrees with the recommendation. By August 31, 2026, DBR will evaluate its internal model risk management practices and design controls around reviewing model risk management inventory, performing independent model validations, and conducting model performance tracking. Additionally, FHFA will update its policies and procedures to reflect the internal model risk management practices adopted.

Recommendation 2: *Ensure that ORAM evaluates its current practices for maintaining documentation of the review and approval of inputs and outputs and implements policies and procedures to communicate requirements for maintaining this documentation.*

Management Response: FHFA agrees with the recommendation. By February 28, 2026, DBR will evaluate its practices for documenting reviews of inputs and outputs, and implement related policies and procedures.

Recommendation 3: *Ensure that ORAM evaluates its current tracking mechanism for FHLBank requests for approval of market risk model changes and implement policies and procedures to ensure that the date that a complete model change approval request is received is tracked.*

Management Response: FHFA agrees with the recommendation. By February 28, 2026, DBR will evaluate its tracking of FHLBank requests for approval of market risk model changes and implement appropriate policies and procedures.

If you have any questions related to this response, please contact Ed Stolle.

cc: John Major
Ed Stolle

Federal Housing Finance Agency
Office of Inspector General

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