Summary of Responses to the Request for Information on Fintech in Housing Finance

In July 2022, FHFA issued *Fintech in Housing Finance: Request for Information*[1] in conjunction with the establishment of its Office of Financial Technology. The Request for Information (RFI) solicited public input on the role of technology in housing finance, broadly seeking to understand the current landscape of potential innovations throughout the mortgage lifecycle and related processes, risks, and opportunities. FHFA also requested input on constructively interacting with industry stakeholders to facilitate responsible innovation, identifying barriers or challenges in implementing fintech in the housing finance ecosystem, and leveraging fintech to support equity in housing finance for both homeowners and renters.

The RFI defined two key terms which are pertinent to the responses: responsible innovation and fintech. Responsible innovation was presented as balancing the value of new ideas, products, and operational approaches with the need for effective risk management and corporate governance. Further, FHFA presented its view that responsible financial innovation includes consideration and mitigation of possible adverse effects of innovation on housing finance system stability, equitable access of consumers to affordable and sustainable mortgage credit, and the competitive environment of the primary or secondary mortgage markets.

Fintech refers to the application of new technologies to the production or provision of financial products and services. FHFA interprets fintech in the mortgage space to include, among others, the application of new technologies and digital processes to

- mortgage origination, underwriting, servicing, investment, and other associated business activities, also known as "mortgage tech;"
- researching, transacting, and managing real estate, also known as "proptech;" and
- regulation and compliance, also known as "regtech."

The RFI solicited information in the following six areas, and for each area, the RFI posed a number of specific questions, as reproduced in Table 1.

- Fintech and Innovation
- Fintech Opportunities
- Equitable Access
- Fintech Risks
- Regtech
- Stakeholder Engagement

[1] See *Fintech in Housing Finance: Request for Information* at *https://www.fhfa.gov/PolicyProgramsResearch/Programs/Documents/FinancialTechnology-in-Housing-Finance-Request-for-Information.pdf*.

Table 1: Topic Areas and Questions from Request for Information on Fintech in Housing Finance

Topic	Questions
A. Fintech and Innovation	1. How do primary and secondary mortgage market participants define fintech in the housing finance sector? What key factors should be considered? 2. How could FHFA facilitate or encourage adoption of "responsible innovation?" 3. What factors currently inhibit the adoption of fintech and innovation in the primary and secondary housing finance sector? Are there specific challenges related to privacy laws, industry standards, or best practices?
B. Fintech Opportunities	4. What kind of fintech activities have the greatest potential to positively impact the housing finance sector? Describe several use cases, or situations in which a product or service could be used, the factors considered in determining importance, and associated impacts. 5. What are the typical time requirements of each process within the mortgage lifecycle? What are the "critical path" activities that drive the mortgage timeline and borrower expense? How could fintech be applied to improve efficiency, reduce costs, reduce time requirements, or facilitate equitable outcomes for borrowers? 6. What are the typical drivers of repetitive requests to borrowers or reevaluation of underwriting information by the lender in the mortgage process and what opportunities exist to automate processes? 7. What are the existing data challenges that most prevent data-driven decision-making in the mortgage lifecycle? 8. What are the existing regulatory and policy barriers to adopting and implementing fintech innovations within the mortgage lifecycle?
C. Equitable Access	9. What new fintech tools and techniques are emerging that could further equitable access to mortgage credit and sustainable homeownership? Which offer the most promise? What risks do the new technologies present? 10. What emerging techniques are available to facilitate or evaluate fintech compliance with fair lending laws? What documentation, archiving, and explainability requirements are needed to monitor compliance and to facilitate understanding of algorithmic decision-making? 11. Are there effective ways to identify and reduce the risk of discrimination, whether during development, validation, revision, and/or use fintech models or algorithms? Please provide examples if available.
D. Fintech Risk	12. What risks do fintech and fintech firms present to the housing finance sector? To FHFA-regulated entities? To counterparties of FHFA-regulated entities and other third parties? To mortgage borrowers and consumers? 13. What risk management practices do industry participants use to address the risks posed by fintech and innovation in housing finance? 14. What particular risks to consumer privacy have been associated with fintech? What practices are being used to manage these risks?
E. Regtech	15. What are the most promising areas for applying technology to regulatory and compliance functions? Please describe opportunities for "regtech" to simplify or improve compliance with FHFA, Enterprise, or FHLBank requirements.
F. Stakeholder Engagement	16. What forms of stakeholder engagement are most effective in facilitating open, timely, and continuous discussion on the challenges and opportunities presented by the application of fintech to housing finance? 17. What are some topics for a housing-focused "tech sprint" and how could FHFA encourage participation?

Overview of Responses

FHFA received over 60 total responses, including six responses that requested confidential treatment. Respondents included firms engaged directly in developing and marketing new financial technology, other financial sector firms, trade associations, and other interest groups.[2] This document provides a summary of the responses available for review on the FHFA website.[3]

Responses represented a range of views and priorities as well as a vast amount of information about the state of fintech in the housing finance sector. Important themes emerged with respect to the role of FHFA and its regulated entities as well as the opportunities, challenges, and risks presented by fintech.

Respondents suggested FHFA could encourage responsible innovation by providing clear regulatory guidance, collaborating with other regulators and industry participants to improve consistency and set standards, and creating a safe space such as a regulatory sandbox for fintech firms to test their ideas.[4] Respondents also saw benefits in robust stakeholder engagement by FHFA and suggested a variety of avenues for such engagement.

Respondents see fintech as presenting important opportunities to automate and streamline existing housing finance processes, improve data standards, facilitate the use of alternative data, and use technology to better serve underserved communities. Respondents enumerated a number of challenges that fintech will have to overcome to realize those opportunities, including specific challenges related to mortgage processes and data availability and quality. Prominent process challenges revolve around moving away from manual, paper-based, and non-standardized processes, while prominent data challenges revolve around timely access to verified, validated, and standardized data.

Risks respondents associate with fintech include risks generally associated with new technologies such as data privacy, cybersecurity, model, and compliance risks, as well as risks associated with general business activity such as counterparty, legal, and reputational risks. Respondents provided ways to mitigate each of these risks. Some respondents noted that some innovations can be risk-reducing and that relying on existing technology and processes is not without risk.

Fintech and Innovation

The RFI requested information about three foundational topics related to fintech and innovation: how market participants define fintech in the housing finance sector, how FHFA could facilitate

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[2] Publicly available responses can be found here: https://www.fhfa.gov/AboutUs/Contact/Pages/input-submissions.aspx. Several respondents requested that their submissions not be published.

[3] See https://www.fhfa.gov/AboutUs/Contact/Pages/input-submissions.aspx. To view responses related to the RFI, select "2022 Fintech in Housing Finance RFI" using the dropdown menu.

[4] A regulatory sandbox creates a space where participating businesses will not be subject to certain regulations, usually for a limited time, to allow businesses to test the market viability of their innovations.

adoption of "responsible innovation," and factors that inhibit adoption of fintech in the housing finance sector.

In defining fintech, respondents generally focused on the application of direct-to-source data, data processing techniques, modeling approaches, technologies, and other innovations to the provision of housing finance services either directly or indirectly. Respondents also highlighted the characteristics of fintech firms, which include delivering services through mobile or internet technology, focusing on automating or replacing manual processes or eliminating duplicative processes, and improving processes to enhance speed and accuracy in the provision of financial services. Other respondents noted that successful innovations meet the needs of lenders, borrowers, or investors by improving customer experiences and providing value to stakeholders.

The RFI presented FHFA's view of responsible innovation as "balancing the value of new ideas, products, and operational approaches with the need for effective risk management and corporate governance," including the "consideration and mitigation of possible adverse effects of innovation on housing finance system stability, equitable access of consumers to affordable and sustainable mortgage credit, and the competitive environment of the primary or secondary mortgage markets." To encourage responsible innovation, respondents suggested FHFA could provide clear regulatory guidance, create a safe space for fintech innovation such as a regulatory sandbox, and collaborate with other regulators and industry to improve consistency and set standards.[5] Respondents indicated that guidance about regulatory expectations regarding risk management, corporate governance, and data security would be particularly useful. Several respondents also suggested that access to Enterprise data would be useful for model development and modeling.

Respondents were also asked to identify barriers to fintech innovation. The three most prevalent answers were the lack of industry standards, insufficient regulatory guidance and support, and limited access to data. Some respondents also cited integration challenges and the fragmentation of the housing finance sector as barriers to technology adoption. Respondents suggested that the fragmented nature of the housing sector calls for industrywide standards. The lack of data standards creates compliance challenges. Several respondents specifically suggested that FHFA increase its collaboration with standards organizations, especially MISMO[6] and help ensure the broad and consistent adoption of standards. Without a standards-based approach, for example, the proliferation of customer interfaces and application programming interfaces (APIs) creates challenges for new entrants.

A lack of clear regulatory guidance and consistent compliance requirements were also cited as an important barrier to fintech adoption. One respondent suggested that FHFA could work with other regulatory agencies to encourage more efficient and effective oversight of fintech firms. Another suggested that some fintech firms face uncertainty on the applicability of regulatory requirements

[5] FHFA's ability to provide useful regulatory relief to the fintech sector was questioned by one respondent.
[6] MISMO stands for Mortgage Industry Standards Maintenance Organization. It is a not-for-profit, wholly owned subsidiary of the Mortgage Bankers Association responsible for developing standards for exchanging information and conducting business in the U.S. mortgage finance industry.

and suggested that FHFA could provide guidance on risks and constraints associated with a particular technology.

Respondents argued that difficulty accessing data is another important barrier to fintech innovation, with the most frequently cited concern being industry participants' timely access to loan data owned by FHFA and the Enterprises. Data challenges are discussed more in the next section.

Fintech Opportunities and Challenges

The RFI asked a series of questions about the potential for fintech activities to positively affect the housing sector. These questions focused attention on specific use cases and likely sources of efficiency gains in addition to questions about data challenges, regulatory barriers, and policy barriers hindering or inhibiting efforts to improve the mortgage lifecycle.

Respondents cited a wide variety of opportunities for fintech to improve housing finance. Such opportunities include using fintech innovations to automate workflows and streamline processes, improve data accuracy and reliability, accelerate appraisal modernization, and improve borrower education and credit accessibility services provided to underserved communities. Respondents indicated that fintech could exploit such opportunities by applying such technologies as artificial intelligence (AI), machine learning (ML), and blockchain in conjunction with improved access to data as well as mobile and internet connectivity. To facilitate equitable outcomes for borrowers, respondents suggested that fintech could help increase the use of validated alternative data, including data on consumer financial transactions, regular consumer payments such as utility bills or rent, and consumer income and income variability. They also saw potential for using fintech to play a role in borrower education and increase access to credit in underserved markets.

The RFI requested information about the cost and timeline of mortgage origination, including identification of critical path activities in mortgage origination. The critical path determines the minimum time necessary for completion of a process or project, so identifying activities on the critical path for residential mortgage origination is an important step toward determining how fintech might shorten the mortgage origination timeline.

Respondents indicated that the average time to originate a residential mortgage is 30 to 45 days and the average cost is about $10,000 per loan. Activities consistently cited by respondents as being on the critical path included: submission of the mortgage application by the borrower; income, employment, and asset verification; property appraisal; underwriting; credit decisions; quality checks; and loan funding.

Respondents cited a variety of factors to explain the persistent timeline and origination costs, including disparate data collection platforms and methods, manual and redundant data collection, repetitive requests and re-evaluation of underwriters, repetitive updates on calculations of borrower eligibility, and automated underwriting systems that rely on error-prone, manually entered data. Respondents generally advocated for access to standardized and verified data and direct-to-source data verification.

Respondents also cited appraisal modernization as another source of improved efficiency and reduced timelines. Respondents applauded FHFA's effort in modernizing the appraisal process, including the increased use of desktop appraisals. Other suggestions to accelerate appraisal modernization include moving toward automated valuation models (AVMs) and using remote inspection.

Equitable Access

Respondents highlighted fintech tools as potential ways to further equitable access to mortgage credit and sustainable homeownership or rental opportunities, while mitigating associated risks. Respondents also described fintech tools to monitor Fair Lending compliance and reduce discrimination. The most frequent method for furthering equitable access cited by respondents was the inclusion in the underwriting process of nontraditional variables available from alternative data sources. Respondents also indicated that fintech can improve equitable access by incorporating improved data capture, data processing, and accessibility tools (for persons with impairments) into mortgage and servicing processes. In addition, respondents suggested fintech innovations can facilitate better tailoring of credit or servicing decisions and customize education tools.

Respondents expressed awareness that certain fintech innovations, for example, those that depend on AI- or ML-based algorithms to automate underwriting decisions, may exacerbate existing bias – the most frequently cited risk associated with fintech's effect on equitable access. To identify and reduce the risk of discrimination, respondents recommended an active role for FHFA in curating data for model development, improving data transparency, reviewing models for fair lending risk, and helping market participants that lack mortgage expertise and experience. Respondents also cited risks associated with the quality of nontraditional data and uncertainty associated with applying existing fair lending frameworks to new products. In addition, fintech applications aimed at improving equitable access are subject to the same risks associated with other fintech applications discussed below.

The RFI solicited information on techniques to facilitate or evaluate compliance with fair lending laws, to monitor compliance, and to understand algorithmic decision-making. Several respondents expressed support for regulation and guidance in this area without providing recommendations, while several others recommended their own products. Respondents also suggested including demographic information in fair lending testing and in model risk management guidance and establishing standard benchmarks and tests (but not a single credentialing body).

Respondents noted that appropriate documentation is critical to compliance. Respondents recommended that documentation should include detailed – some said step-by-step – descriptions of algorithms, data used in training ML/AI models, challenger models, model results, and model limitations. Other recommended compliance techniques include inclusive sampling; stochastic modeling; adversarial de-biasing; periodic, independent auditing and robust ongoing monitoring; and techniques, such as symbolic regression algorithms, that can enhance explainability.

Several respondents provided detailed information about quantitative methods being developed to mitigate discrimination, including fairness-aware machine learning, which offers simple bias mitigation approaches and metrics, and discrimination-monitoring algorithms, which enable continuous assessment and trigger alerts for human action.

Fintech Risk

Respondents associated a variety of risks with fintech and generally agreed on the need for standards and regulatory guidance for fintech activities and for firms that do not fall within existing financial services regulations. Respondents specifically mentioned the following risks:

- Data privacy and data security risk;
- Counterparty risk;
- Model risk;
- Cybersecurity risk; and
- Compliance, legal, and reputational risks.

With respect to data privacy and security risk, respondents generally agreed that fintech involves a risk that sensitive consumer financial data and personally identifiable information (PII) may be exposed and that unproven technologies can heighten such risk. Respondents also expressed concern about the potential risk to consumers from falsified e-signatures as well as cybersecurity risk associated with blockchain technologies. Respondents suggested that these risks could be mitigated with appropriate data governance frameworks, controls and audits, staff education, and compliance with relevant regulations, although they also expressed concern about the confusing patchwork of state and federal privacy laws, and about the challenges posed by such laws on innovation.

Respondents generally agreed on the need for due diligence and third-party or regulatory oversight to mitigate counterparty and model risks posed by fintech innovations or counterparties. In particular, respondents indicated that banks and other financial service firms should impose vendor due diligence on fintech third parties and emphasized the need for appropriate testing of fintech products or services before deployment. With respect to model risk, respondents focused on risks associated with model complexity, transparency, and potential bias, noting that AI and ML algorithms require significant internal and regulatory oversight. Respondents noted that some fintech applications may deepen inequities if underserved communities are not included in the targeted markets or populations, potentially presenting compliance, legal, and reputational risks.

Some respondents also suggested the countervailing considerations. Some expressed the view that the risks of using traditional processes or obsolete technologies may outweigh the risks associated with fintech innovations. Others noted that certain fintech innovations may mitigate existing risks, while still others questioned whether fintech creates additional specific risks beyond those presented or faced by traditional providers.

Regtech

Respondents identified numerous areas where technology could be applied to automate regulatory and compliance functions, which can help reduce costs and improve compliance. Respondents cited the usefulness of technology in data verification and validation, which are fundamental to compliance. Respondents also mentioned that detailed, immutable audit trails can be built into fintech applications, as can controls to ensure that a firm's decisions or processes conform to rules set by counterparties or regulators, such as underwriting rules, investor requirements, or fair lending requirements. Technology can also be used to produce contemporaneous risk analytics and exception reports.

Respondents indicated that regtech could produce benefits for both industry and regulators. Private sector benefits cited include lower compliance costs; improved compliance, analytics, and risk monitoring; reduced reporting errors; and a more level playing field for smaller institutions, which have proportionally higher compliance burdens. Respondents also noted that regtech could facilitate securitization. Many of the private-sector benefits also benefit regulators. Respondents noted that regtech can improve oversight functions by taking advantage of full audit trails that track exceptions, detail rationales for decisions, and identify missing information. In addition, respondents indicated that regtech may help regulators by streamlining reporting and disclosures through improved information collection, standardization of reporting forms, and embedded analytics. Respondents also stated that regtech could improve regulators' responsiveness to industry issues and concerns by enabling quicker communications, standardizing whistleblower response procedures, and increasing the frequency of interactions with stakeholders.

Although not explicitly solicited, respondents noted actions regulators could take to facilitate regtech. Such actions include identifying and resolving impediments to technology, such as conflicts among state and federal rules. Some respondents suggested that regulators could also reconsider, clarify, and simplify regulatory requirements or guidance. In the mortgage space, respondents also see a role for regulators in standards development (one respondent cited FHFA's advisory bulletin on AI/ML modeling[7] as a useful example), mortgage digitization, and greater leveraging of market data.

Stakeholder Engagement

Many respondents noted the benefit of FHFA's direct and continued dialogue with a wide variety of stakeholders, including lenders, fintech providers, trade associations, academics, industry consultants, technology companies, and other regulators. Respondents also proposed additional forms of engagement such as advisory committees, tech sprints, webinars, forums, and surveys. Respondents expressed significant interest in FHFA sponsoring tech sprints and proposed many topics, the most common of which are presented in Table 2.

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[7] See *AB 2022-02 Artificial Intelligence/Machine Learning Risk Management* at https://www.fhfa.gov/SupervisionRegulation/AdvisoryBulletins/AdvisoryBulletinDocuments/Advisory-Bulletin-2022-02.pdf.

Table 2: Respondents' Tech Sprint Suggestions

Topic	Number of Respondents
Alternative data sources for credit modeling decisions	9
Digitization of paper-oriented activities completed during the mortgage process	7
Appraisal reform / modernization	4
Third-party reviews of underwriting systems, disclosures, or compliance with regulation	2
Technology solutions to enhance borrower education and financial literacy	3
Data standards and sharing of lending- and servicing-related data, including data for fair lending	3
Digitization of automated underwriting, lender loan delivery, and the rep and warrant process	4

Conclusion

FHFA appreciates the thoughtful and well-reasoned comments provided by a wide range of stakeholders in response to the RFI. Responses consistently indicated the need for coordination with other regulators as well as strong stakeholder engagement to support responsible innovation while protecting underserved communities and addressing their needs. The responses provide a strong foundation on which FHFA's Office of Financial Technology will build. Based on the comments, FHFA anticipates much significant work will ensue, including ongoing stakeholder engagement and collaboration through its new Office of Financial Technology.