INVESTOR DAY 2023

Economic and Housing Research: Financial Stress, Affordability, Migration

New research leveraging unique data that increases our understanding of housing market risk and opportunities

Freddie Mac SINGLE-FAMILY | Credit Risk Transfer

Today’s Speaker

Leonard Kiefer

Deputy Chief Economist, Economic and Housing Research

Leonard (Len) Kiefer is an economist who helps people understand what’s going on in the economy, housing, mortgage markets. Len joined Freddie Mac in 2009 and has served as Deputy Chief Economist since December 2012. Len is responsible for primary and secondary mortgage market analysis and research, macroeconomic analysis and forecasting. Kiefer holds a B.A. in economics from the University of Kentucky, and a PhD from The Ohio State University.

Our Agenda

1. **The U.S. Economy Under Stress**

   Stress is building in the economy, inflation remains high, the growth outlook darkens, will resilient consumers power through?

2. **Affordability Challenged by Higher Rates**

   Even though higher rates price out millions, millions more potential first-time buyers compete with investors over what little inventory is available

3. **House Prices Driven by Migration**

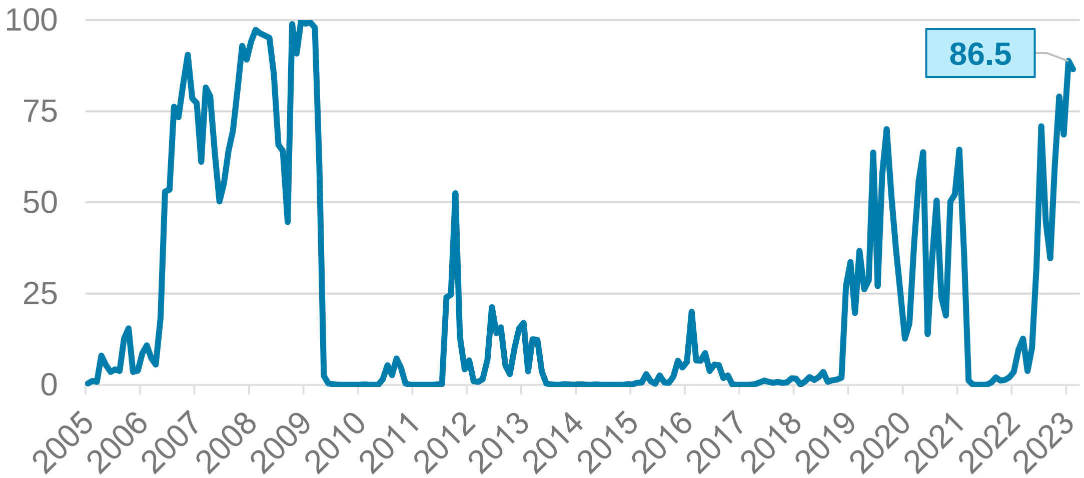
   House prices may have turned the corner, buyers are moving for affordability but may be exposing themselves to other risks

The U.S. Economy Under Stress

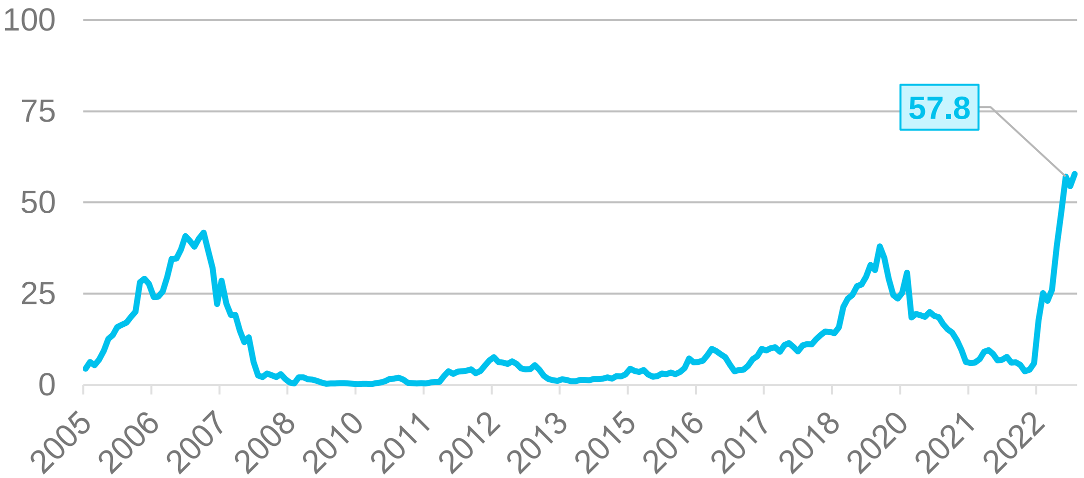
Stress is building in the economy, inflation remains high, the growth outlook darkens, will resilient consumers power through?

The Probability of a Recession in the Next 12 months is Ramping Up

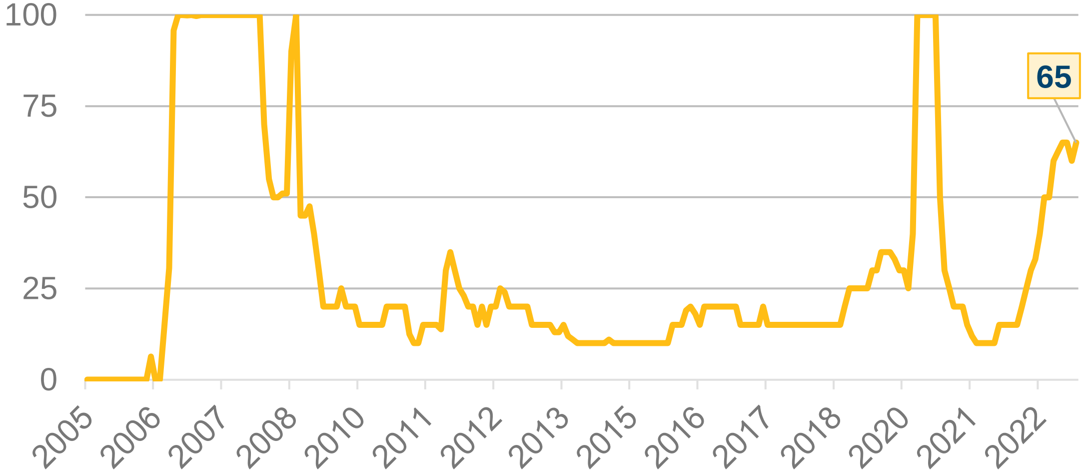
Moody's Analytics



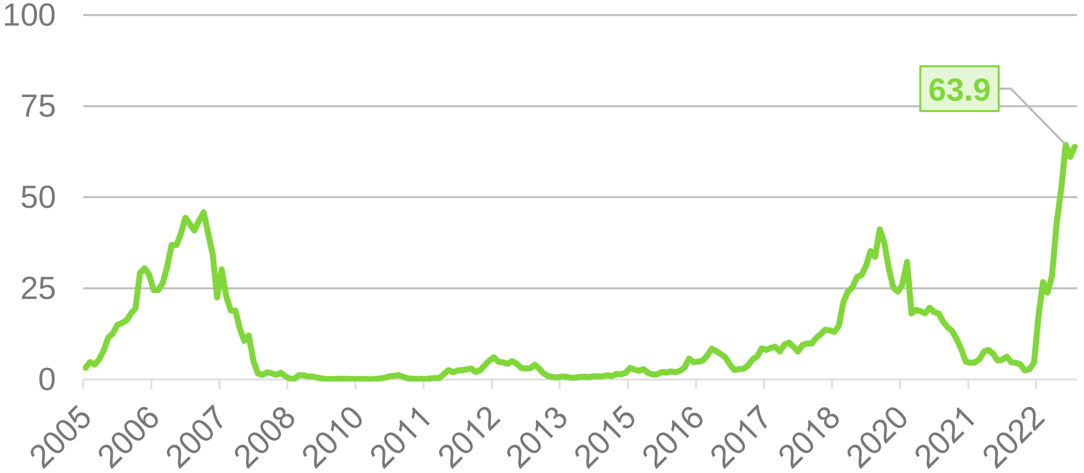
New York Fed



Bloomberg



Cleveland Fed



Source: Moody's Analytics, NY Fed, Bloomberg, Cleveland Fed

Measuring Mortgage Market Credit Conditions with Daily Conditional Mortgage Rate Spreads

$$r_{i,t} = c + f_t' \beta + x_{i,t}' \gamma + \epsilon_{i,t}$$

where

$r_{i,t}$ is mortgage interest rate for borrower i at time t,

c is a constant,

f_t is a summary of daily Treasury yield curve (level, slope, curvature, volatility) ,

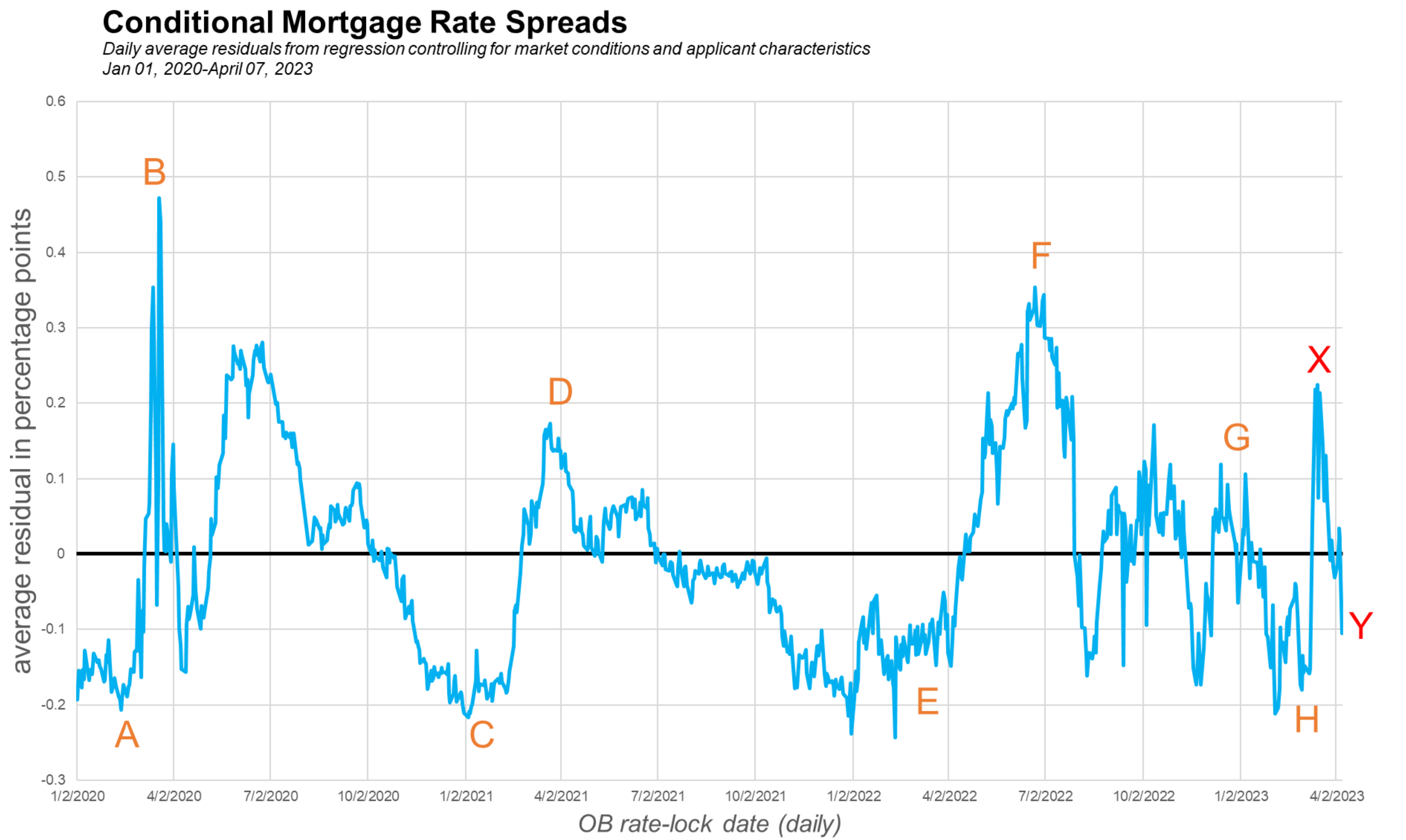
$x_{i,t}$ are borrower/loan-specific controls (credit score, LTV, loan product, term etc),

and

$\epsilon_{i,t}$ the residual is interpreted as a *conditional mortgage rate spread*

Daily conditional mortgage rate spreads are a modified version of conditional mortgage rate spreads as originally defined in:
Justiniano, A., Primiceri, G. E., & Tambalotti, A. (2022). The mortgage rate conundrum. Journal of Political Economy, 130(1), 121-156.

Financial Conditions Tightened Following SVB Failure, but Spreads have Normalized in the Past Few Weeks

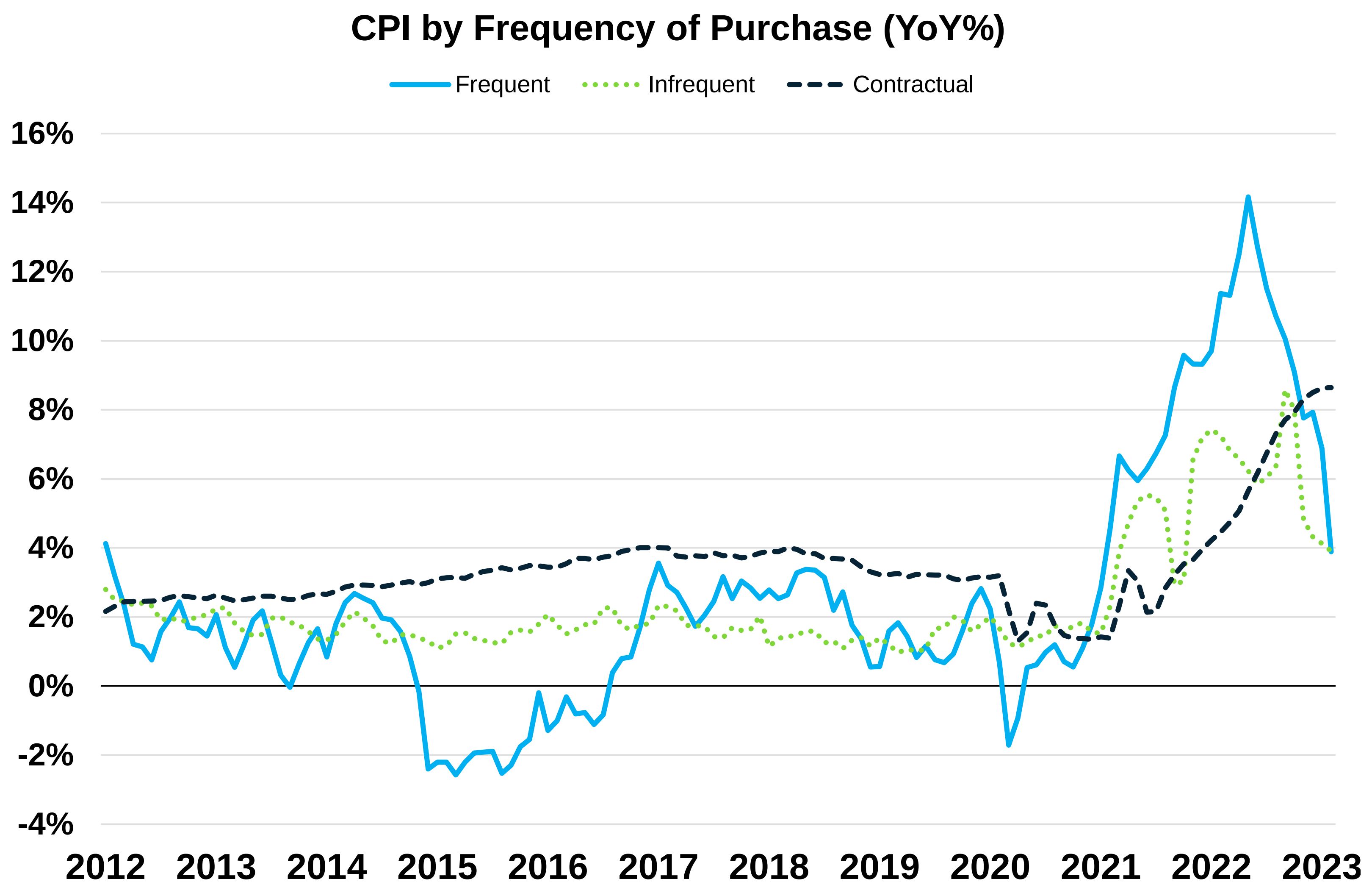


Data source: Optimal Blue, U.S. Treasury
OB level rate regressed on Treasury yield curve (level, slope, curvature, volatility) and application features (loan product, property type, borrower credit profile)
Home purchase applications only, excludes cash-out and rate/term refinances
Original Source: Justiniano, A., Primiceri, G. E., & Tambalotti, A. (2022). The mortgage rate conundrum. Journal of Political Economy, 130(1), 121-156.

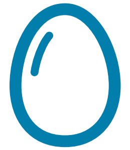
Timeline of Recent Events

(A) Pre-COVID in early 2020, financial market conditions were relatively loose
(B) When COVID hit conditions rapidly tightened
(C) But as the market stabilized conditions loosened and returned roughly to pre-COVID levels
(D) Conditions tightened again with the Delta variant of COVID in March 2021
(E) Conditions gradually loosed up until the Fed began tightening in spring 2022
(F) Conditional spreads widened as the Fed began hiking by 75 bps in 2022
(G) Things stabilized again through early 2023
(H) Optimism about policy normalization and a gradual slowdown in inflation
(X) SVB failure and concerns about contagion spreading to regional banks
(Y) FDIC, Federal Reserve, and US Treasury interventions calm market

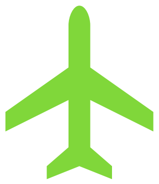
Inflation has Started to Moderate…But A Long Way from Fed Target



Source: BLS: Consumer Price Index for All Urban Consumers year-over-year % changes through March 2023



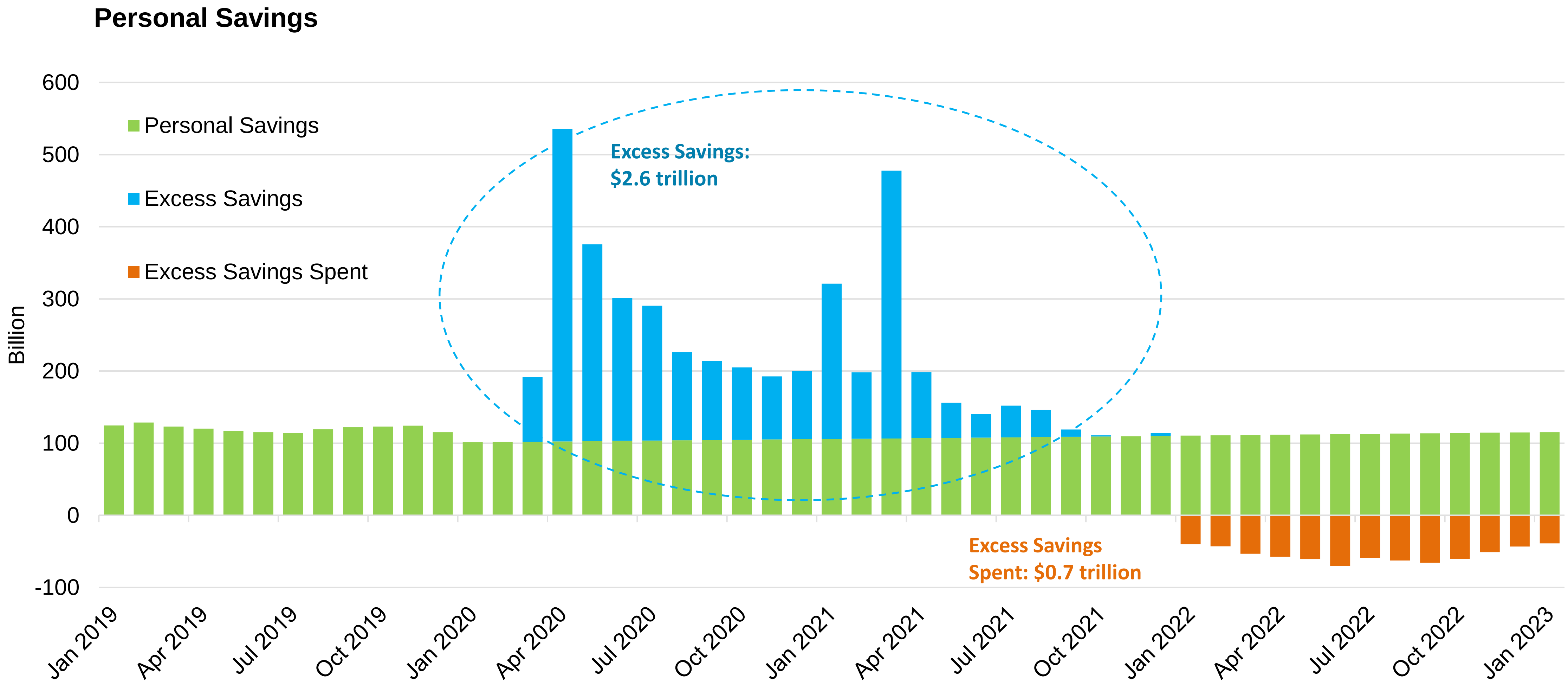
Frequent includes eggs:
up **36% YoY** in March 2023



Infrequent includes airline fares:
up **18% YoY** in March 2023

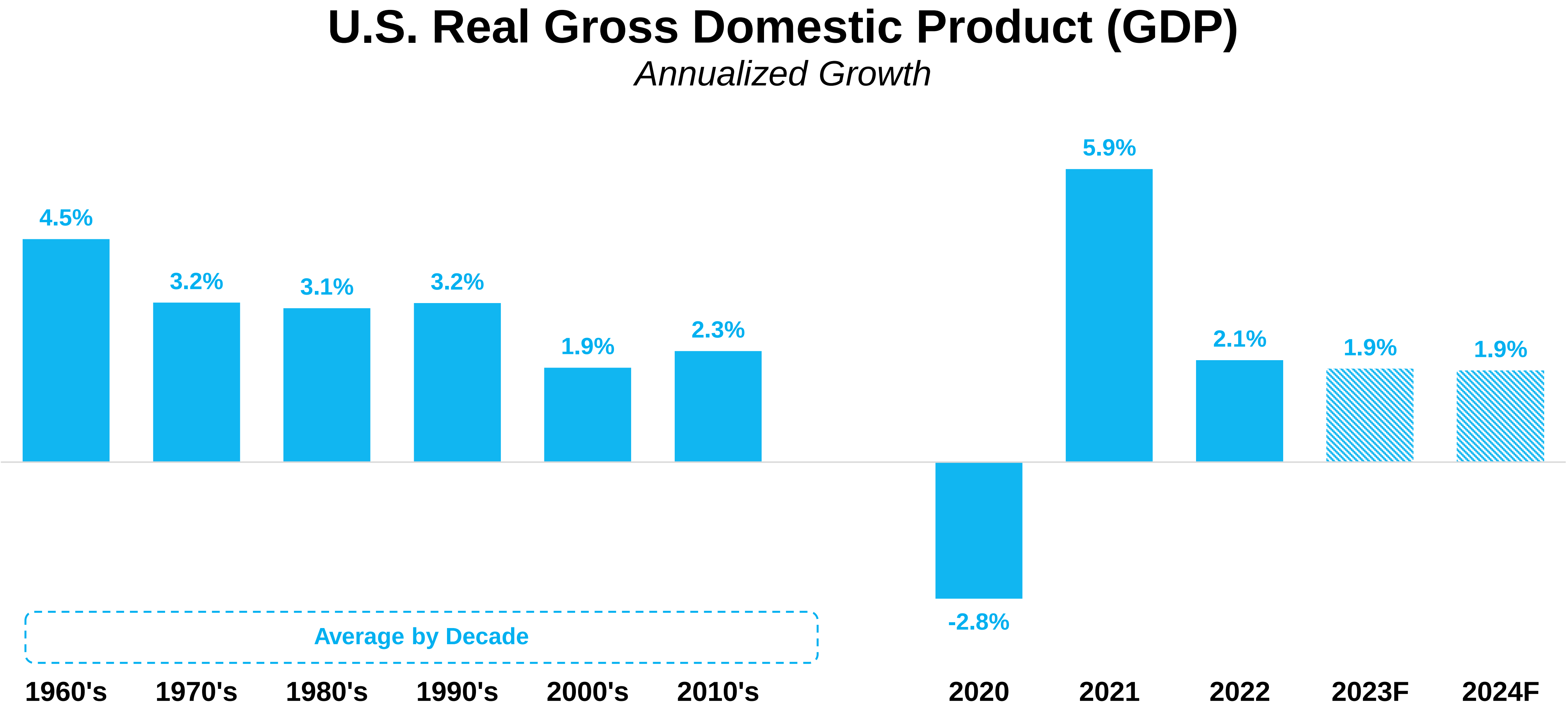
Contractual includes motor vehicle insurance:
up **14% YoY** in March 2023

Consumers have Significant Buffers to Deal with a Negative Hit to Incomes



Source: BEA, NY Fed

Economic Growth for 2022 Drops Back to Trend and Economic Growth Expected to Remain Flat in 2023

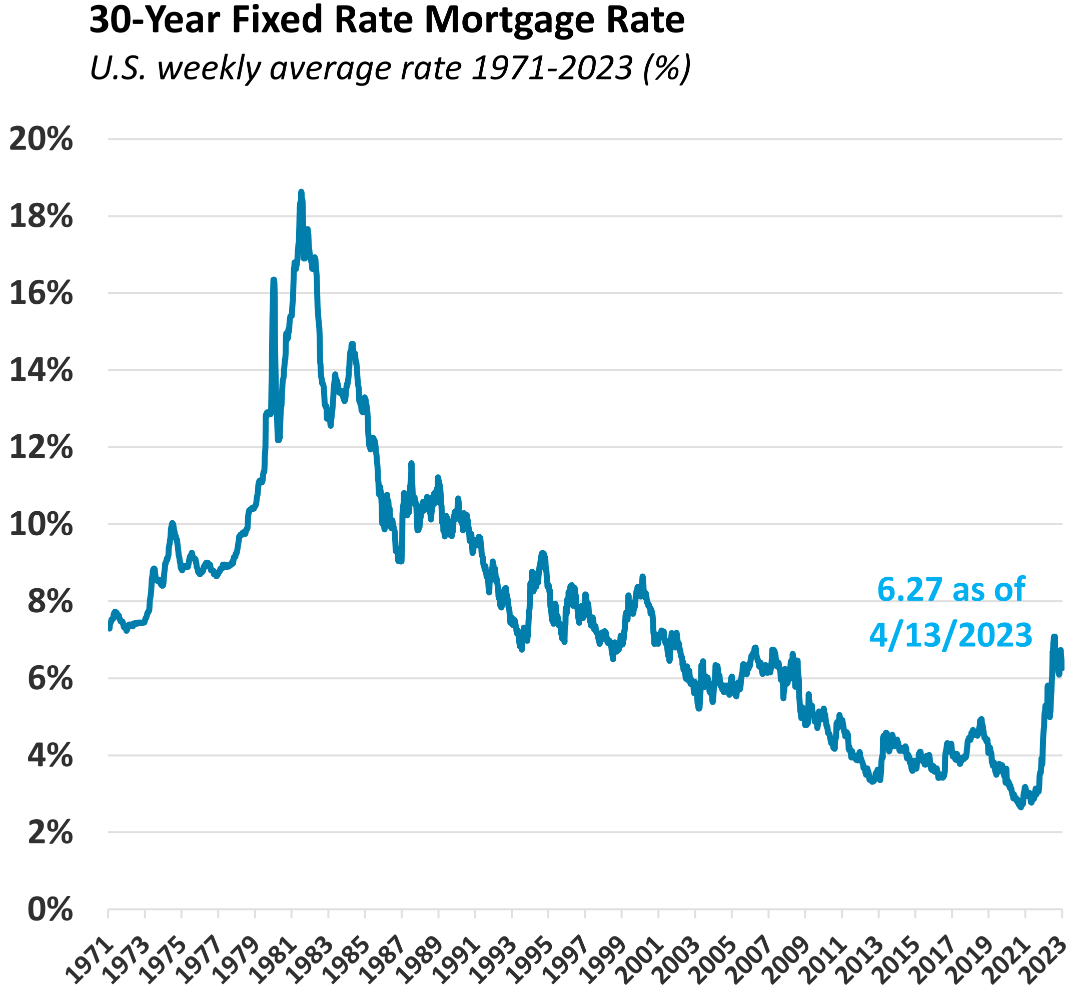


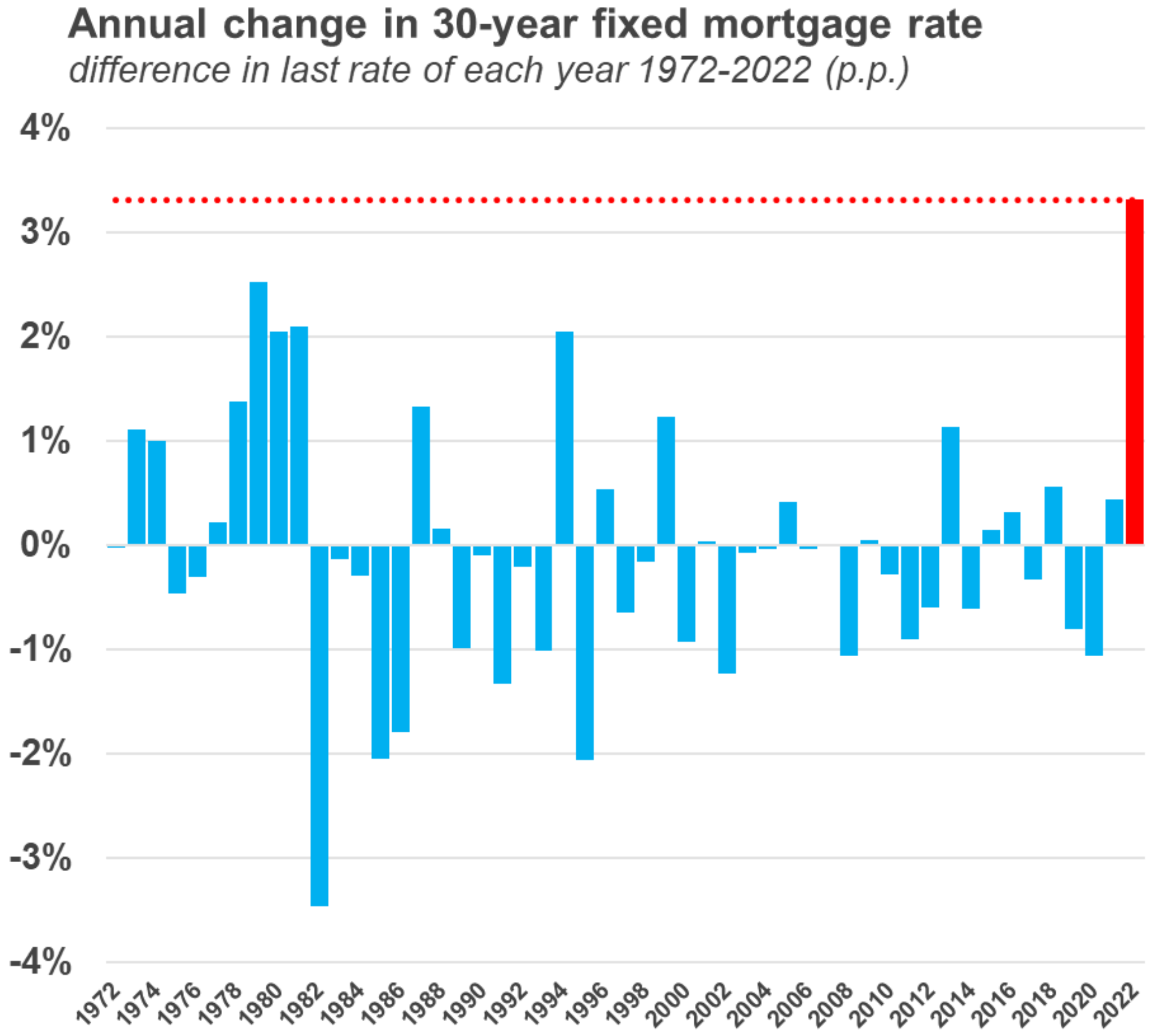
Note: Shaded areas are forecast
Source: BEA, Moody's Baseline (March 2023)

Affordability Challenged by Higher Rates

Even though higher rates price out millions, millions more potential first-time buyers compete with investors over what little inventory is available

Mortgage Rates in 2022 had the Largest Ever Annual Increase

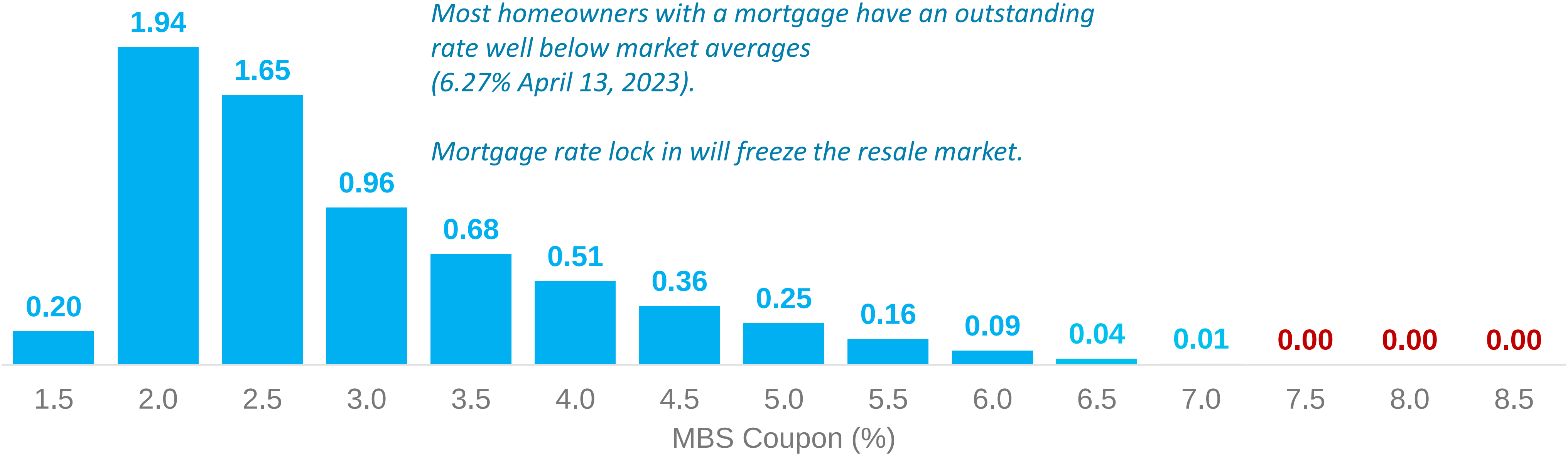




Source: Freddie Mac Primary Mortgage Market Survey

Historically Low Rates in Previous Years Means There is No Refi Incentive Given Today's Rates

Outstanding 30-year Conforming Balance by Coupon ($T's)



Most homeowners with a mortgage have an outstanding rate well below market averages (6.27% April 13, 2023).

Mortgage rate lock in will freeze the resale market.

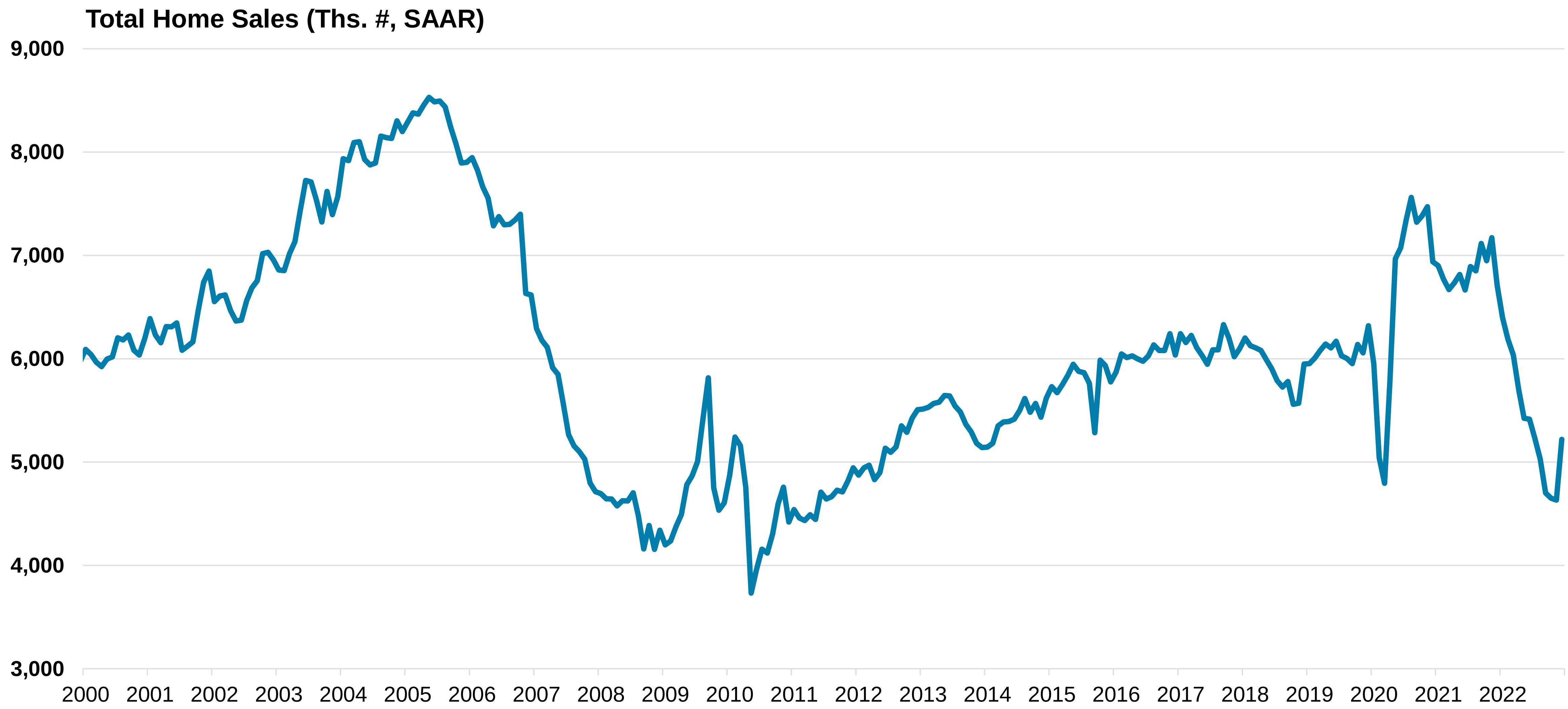
Out-of-the-money
Coupon < 6%
~ $6.7 Trillion

Marginally In-the-money
6% < Coupon < 7%
~ $0.05 Trillion

Deep In-the-money
Coupon > 7%
~ $0.93 Billion

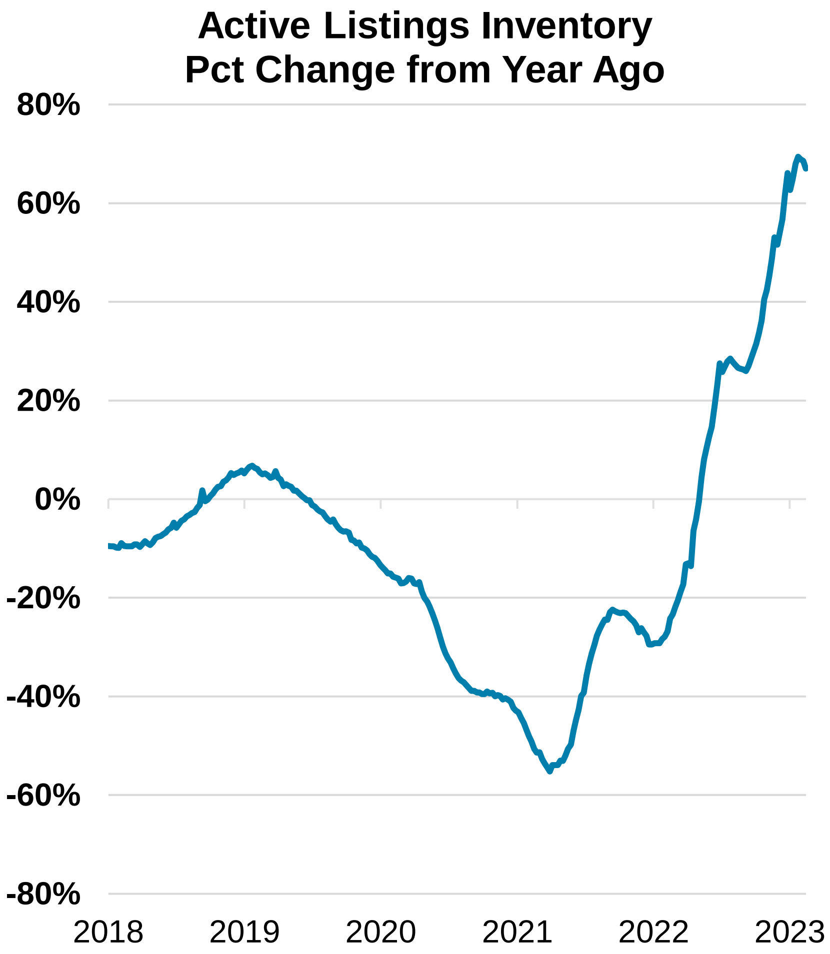
Source: Bloomberg as of 4/10/2023
Conforming includes Freddie Mac, Fannie Mae, Ginnie Mae 30-year fixed MBS Outstanding (UMBS, GNMA1, GNMA 2)

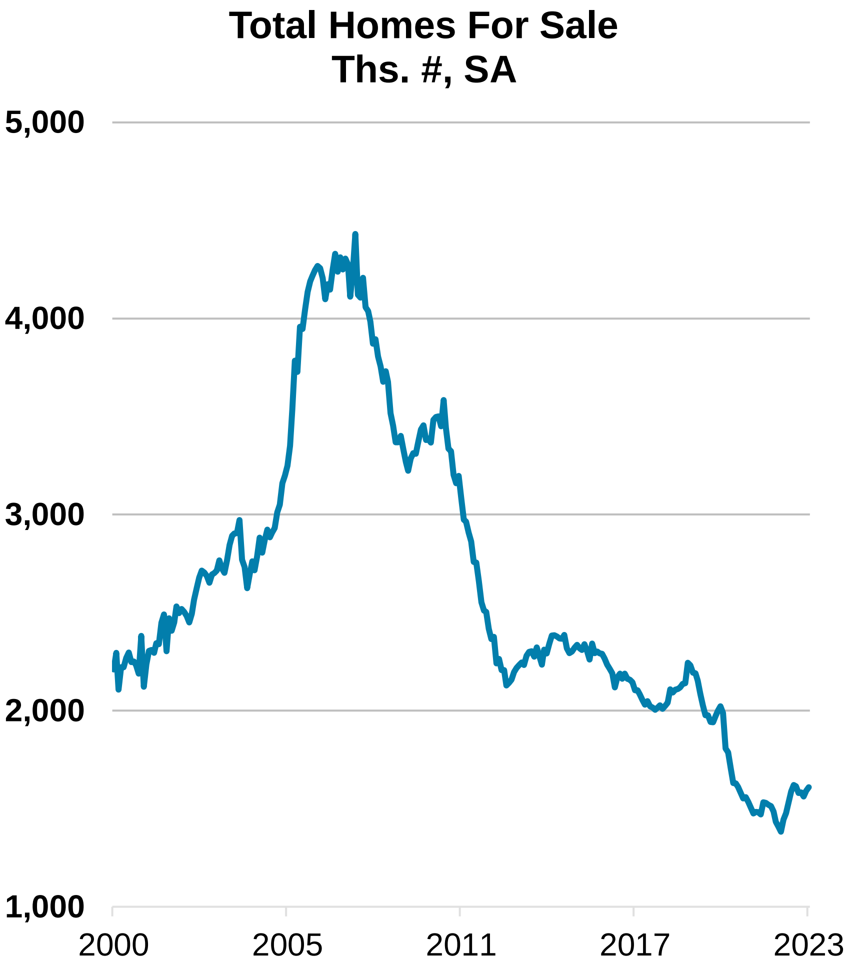
Home Sales Cooled Due to Rapidly Rising Rates

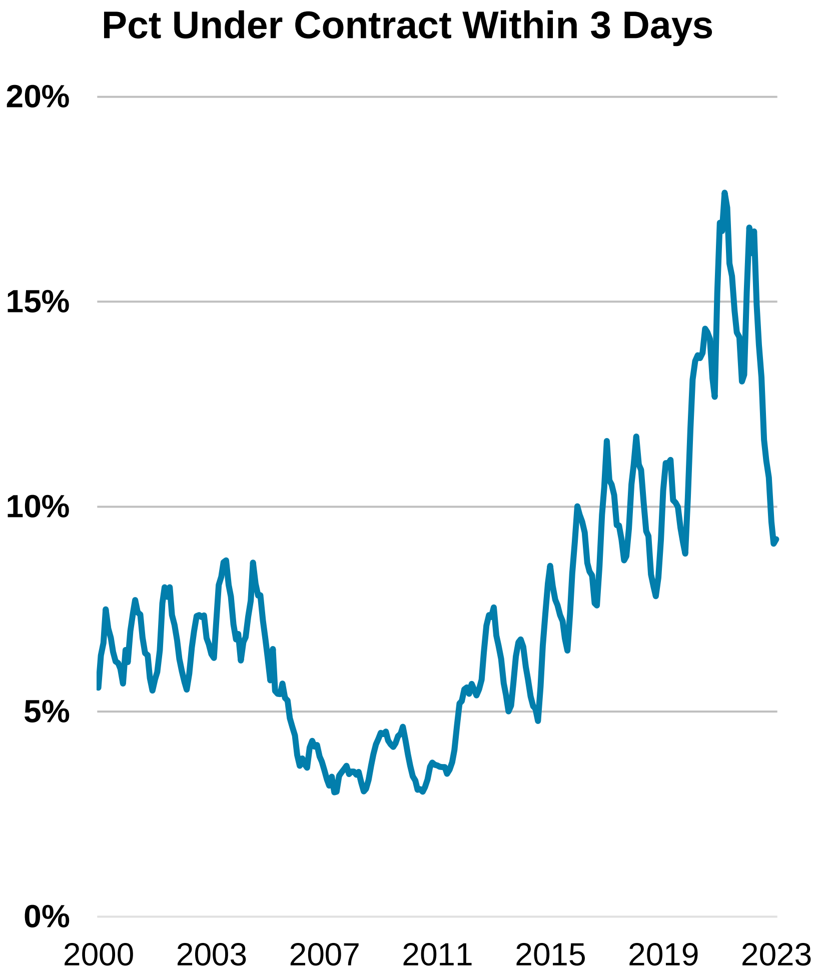


Sources : National Association of Realtors (NAR); U.S. Census Bureau

Softer Demand Has Led to a Rise in Inventory and a Decrease in the Velocity of Transactions, but Supply Remains Near Record Lows



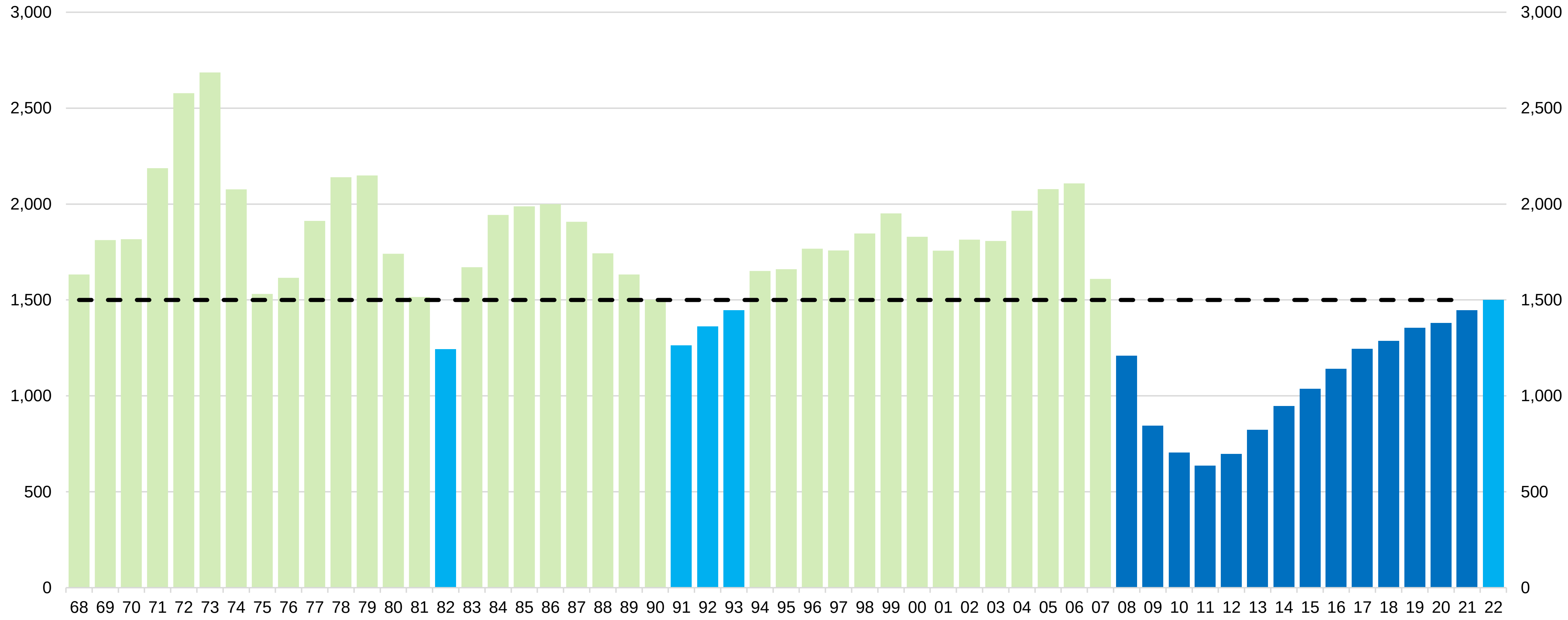




Source: Realtor.com, NAR, Census, CoreLogic
Note: Includes listings that sold during the month and listings still under contract.

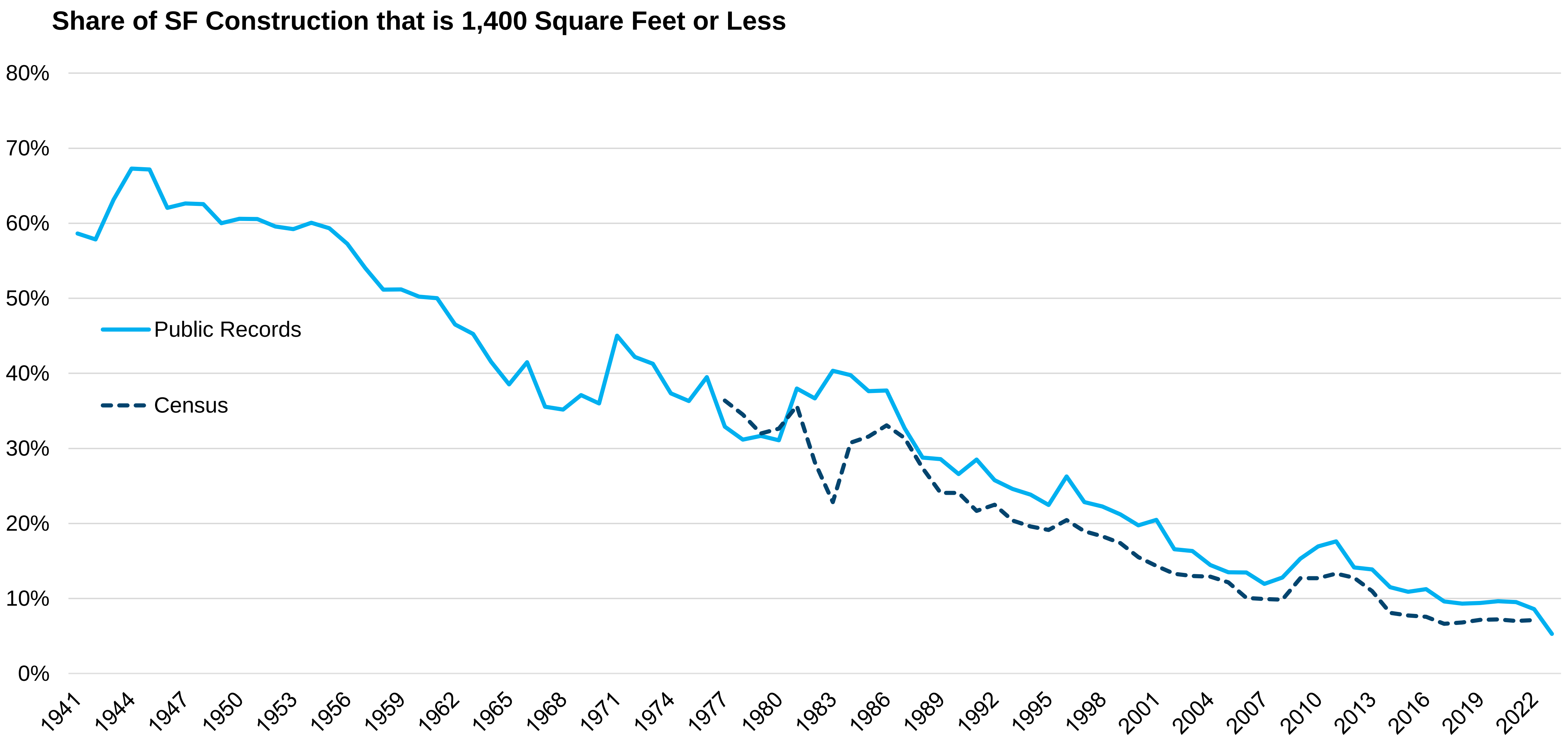
New Housing Completions Improved in 2022, but Still Below Pre-GFC Levels…

U.S. annual housing completions and manufactured home shipments (1000s)



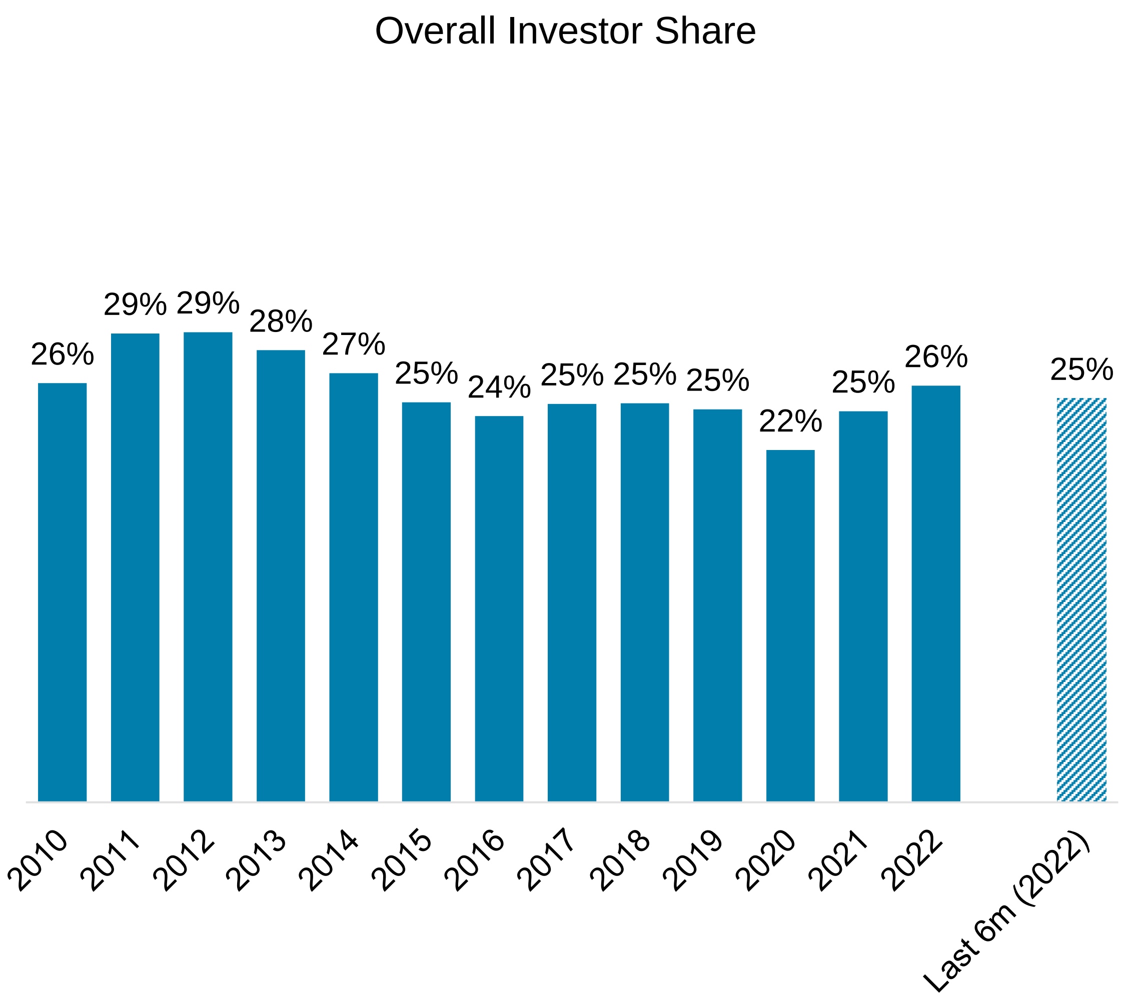
Source: U.S. Census Bureau and Department of Housing and Urban Development, Institute for Building Technology & Safety

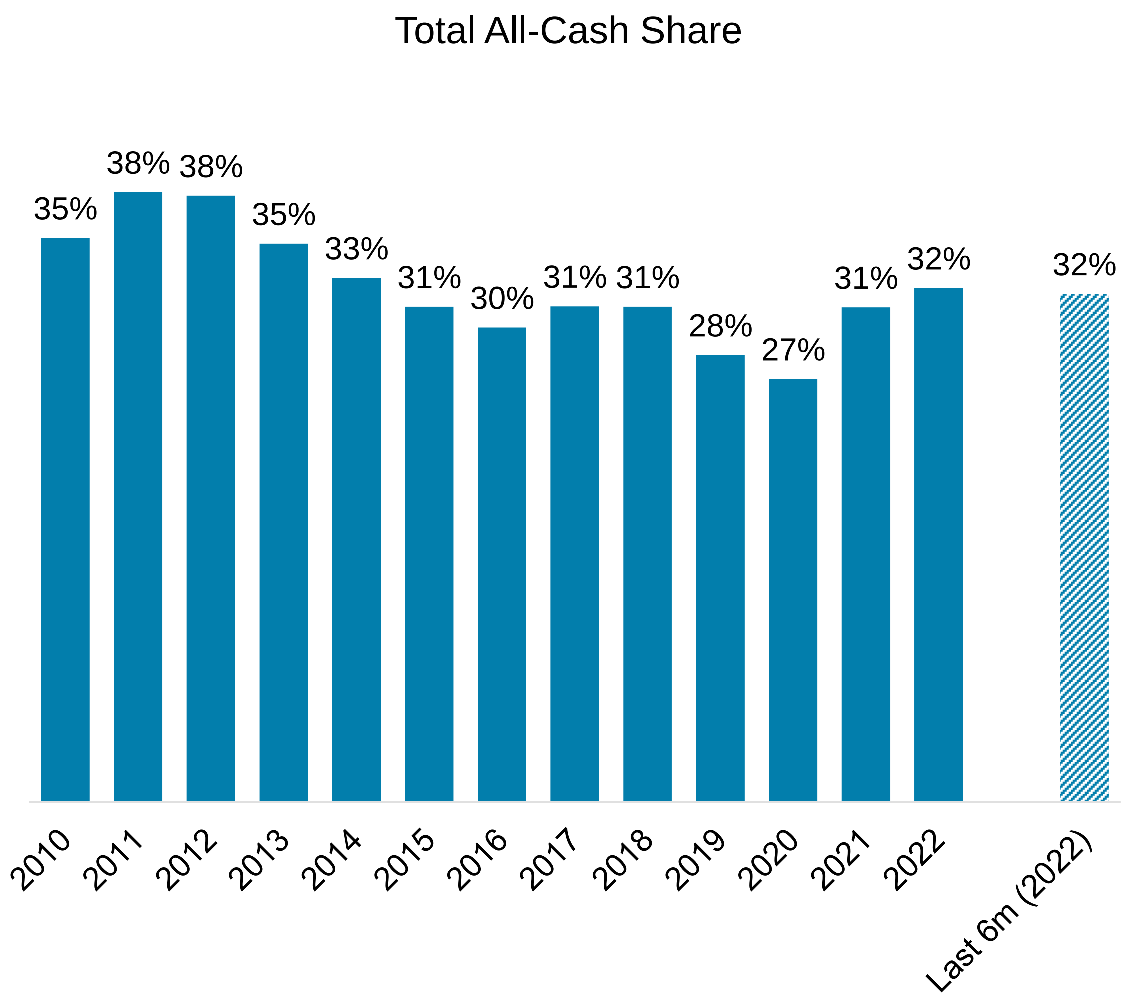
….and Entry-Level Supply Had Been Declining for Decades…



Source: Census and CoreLogic

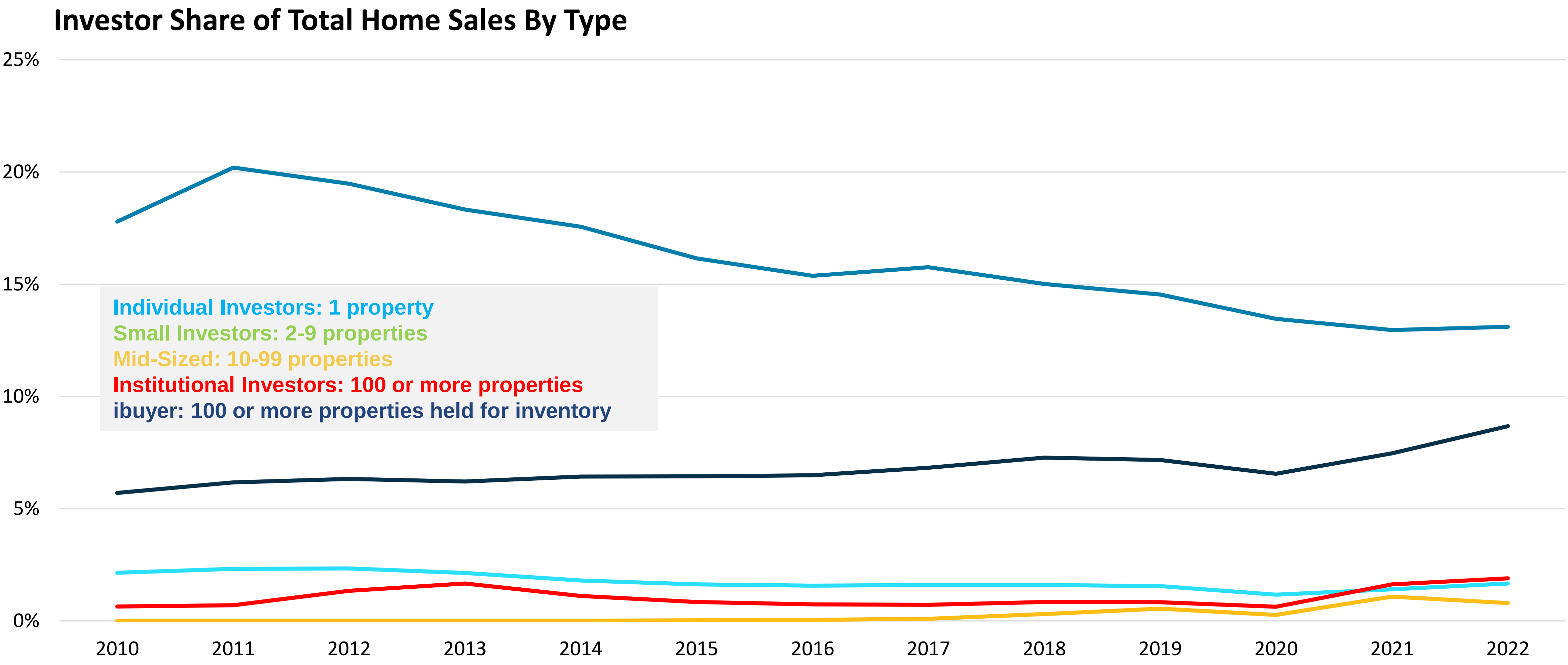
There Has Been a Modest Increase in Investor and Cash Share Since the Pandemic Began and it Has Only Slightly Declined





Source: Corelogic

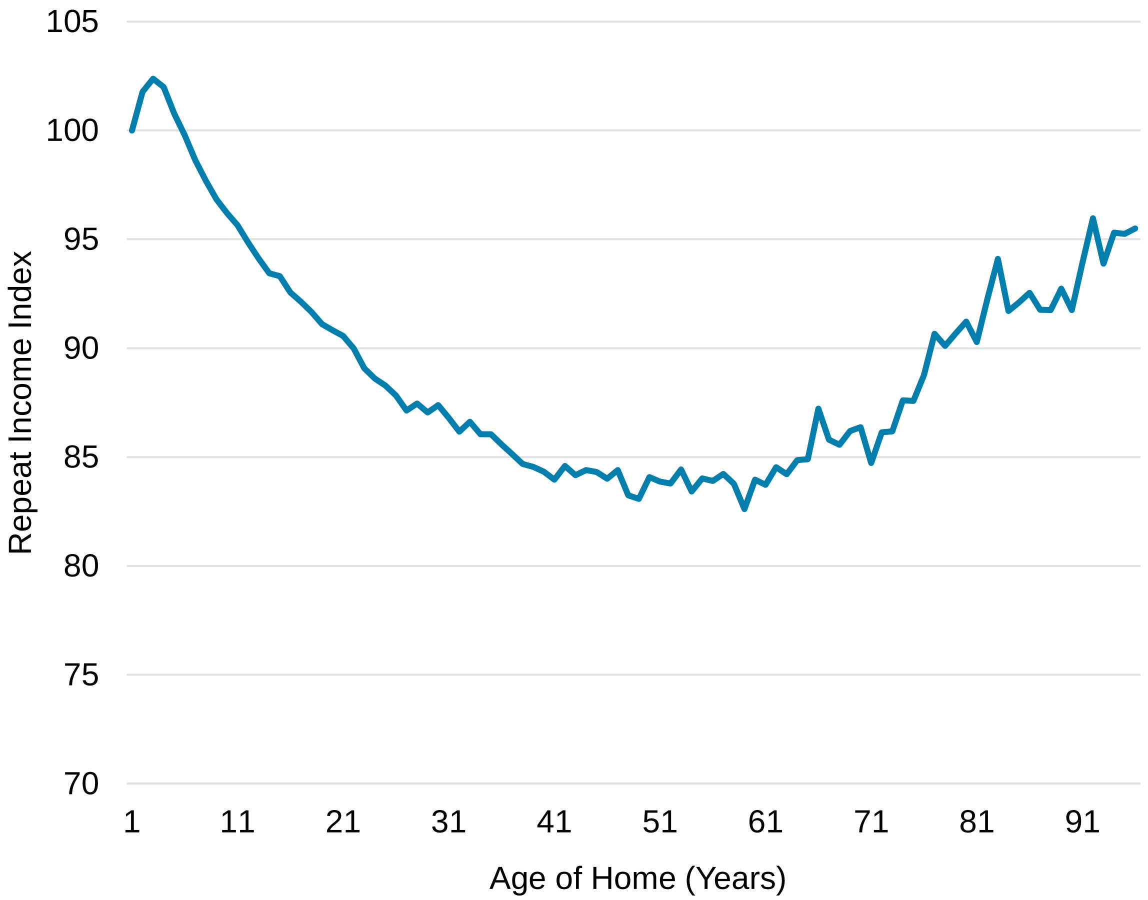
They Receive Little Attention, but Individual Investors Are Largest Category of Real Estate Investors



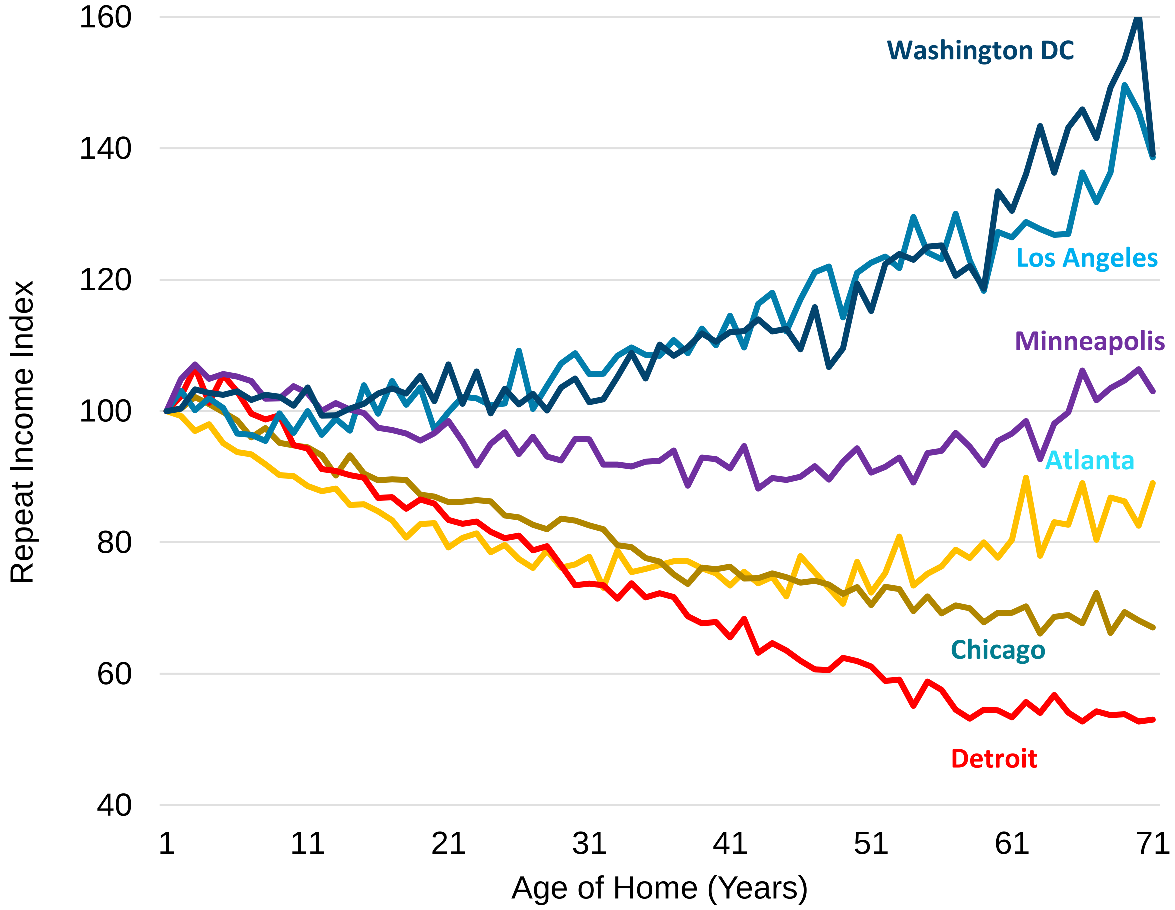
Source: Freddie Mac Economic and Housing Research group tabulation of CoreLogic data

The Market's Mechanism for Providing Affordable Housing is 'Filtering' But Not Working in High Priced Markets Due to Demand/Supply Imbalance

Older More Affordable Homes Are Filtering Up Due to Being Raided By Higher Income Households

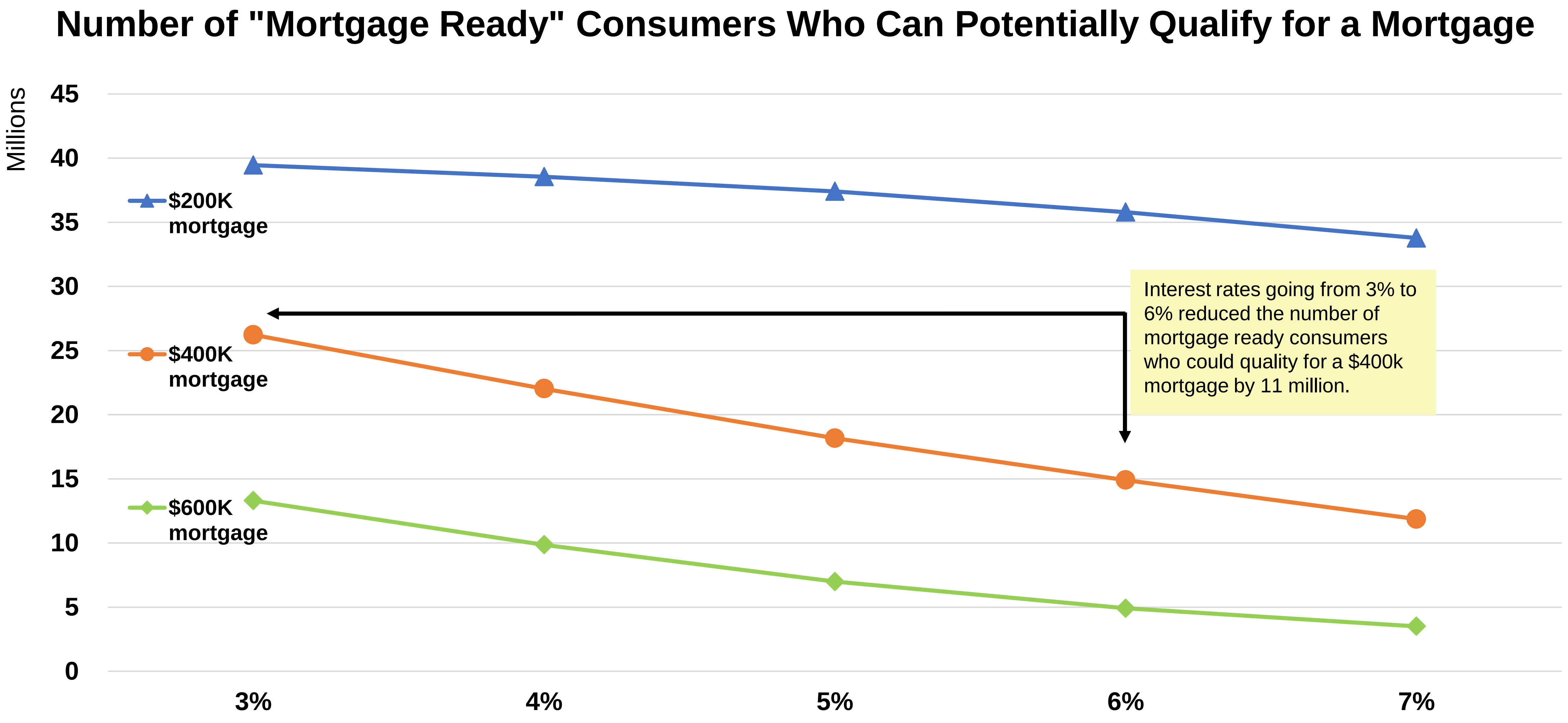


Older Homes in High-Cost Markets Are Not Filtering Down at All Due to High Demand



Source: Freddie Mac. Full paper available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3527800

Higher Mortgage Rates and House Prices have Dramatically Reduced the Number of Potential Homebuyers

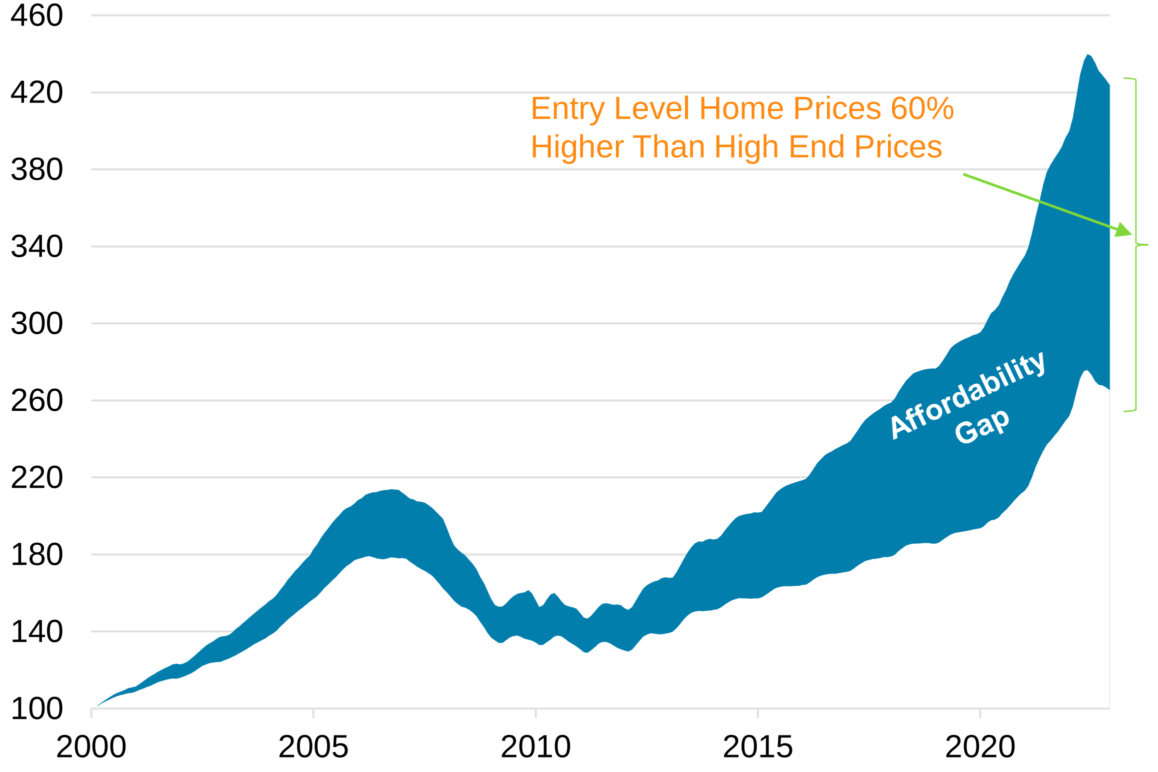


Source: "Do Rising Interest Rates Price Out Mortgage-Ready Borrowers?" https://www.freddiemac.com/research/insight/20221121-do-rising-interest-rates-price-out-mortgage-ready

Chronic Supply Shortage and High Entry-Level Demand Caused Entry-Level Prices to Soar

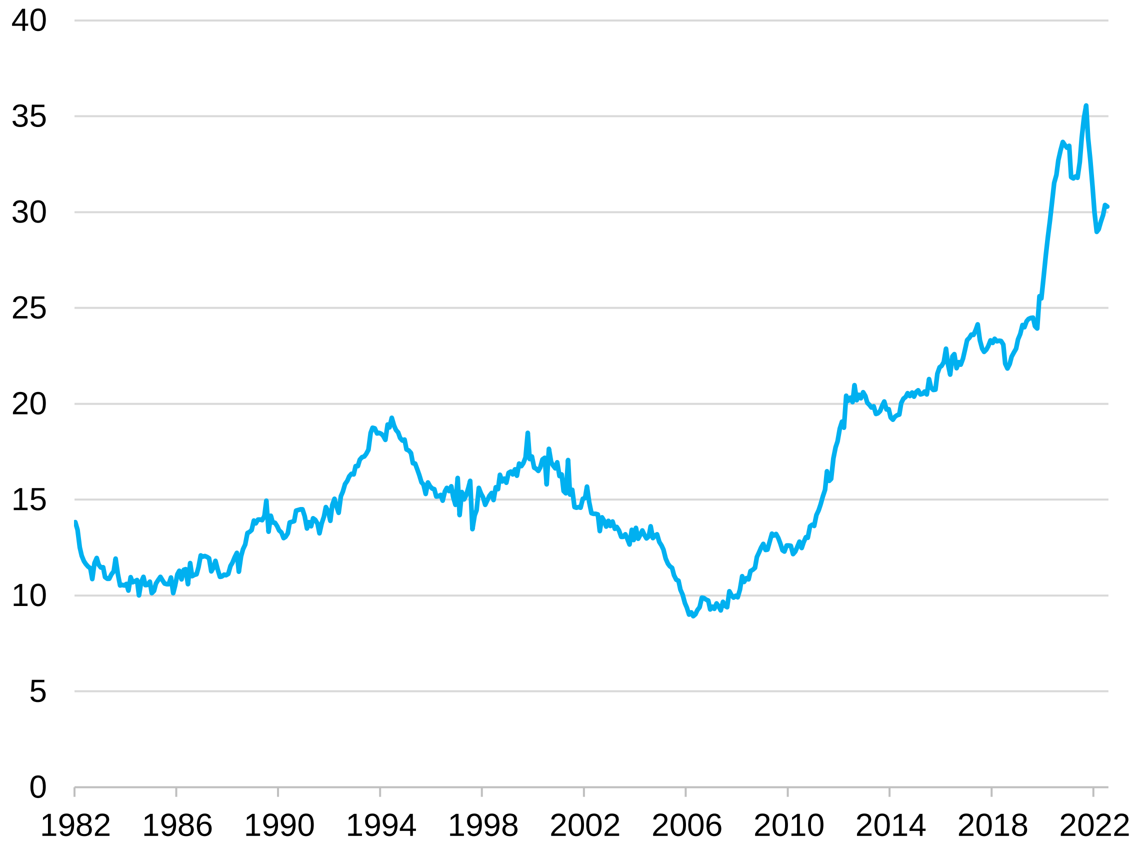
Entry-Level Home Prices Skyrocket

Affordability Gap Rapidly Rising
Cumulative Gap Between Entry Level and High End Home Prices – Home Price Index Level



Renters Scramble For Shrinking Inventory

Number of Renter Household Per Homes For Sale

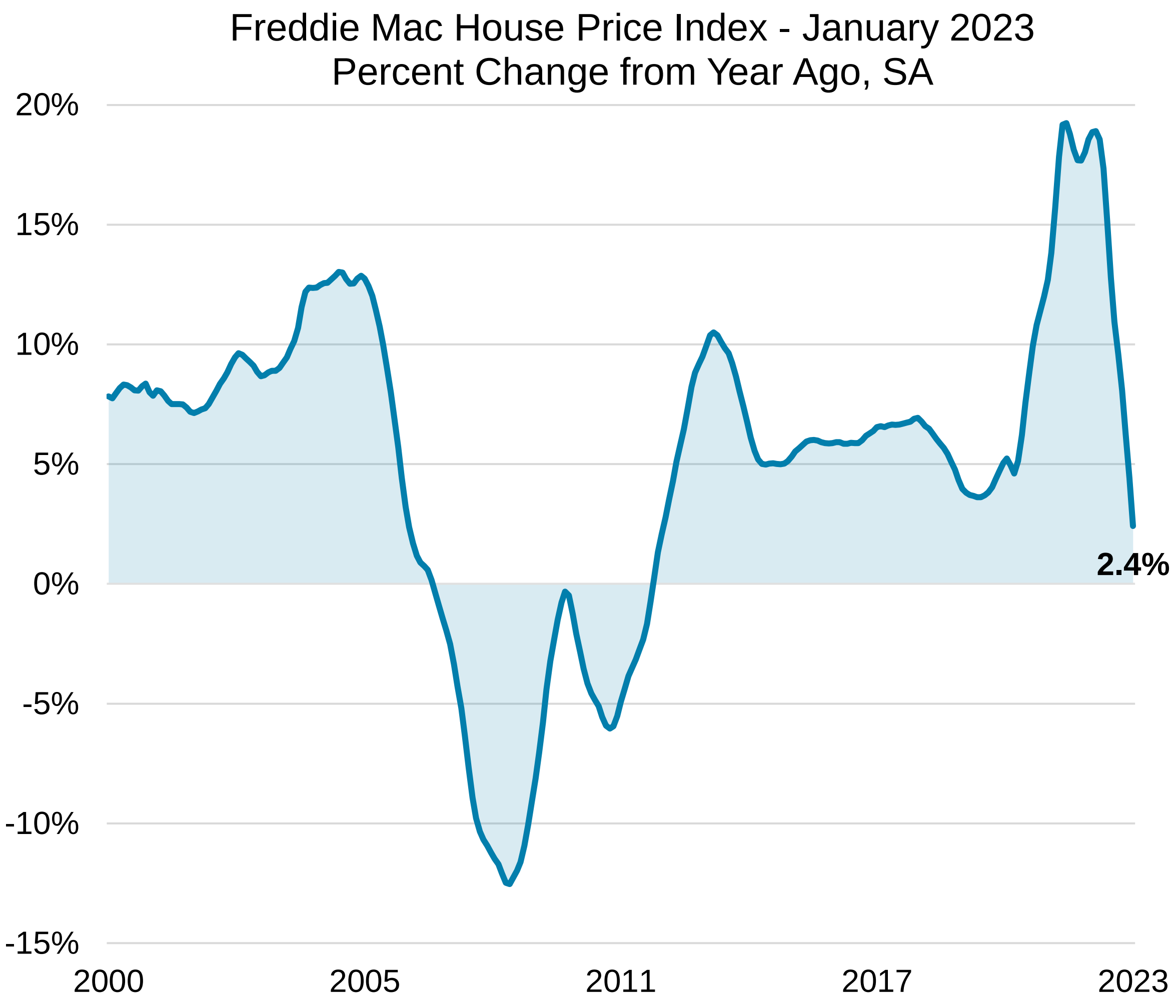


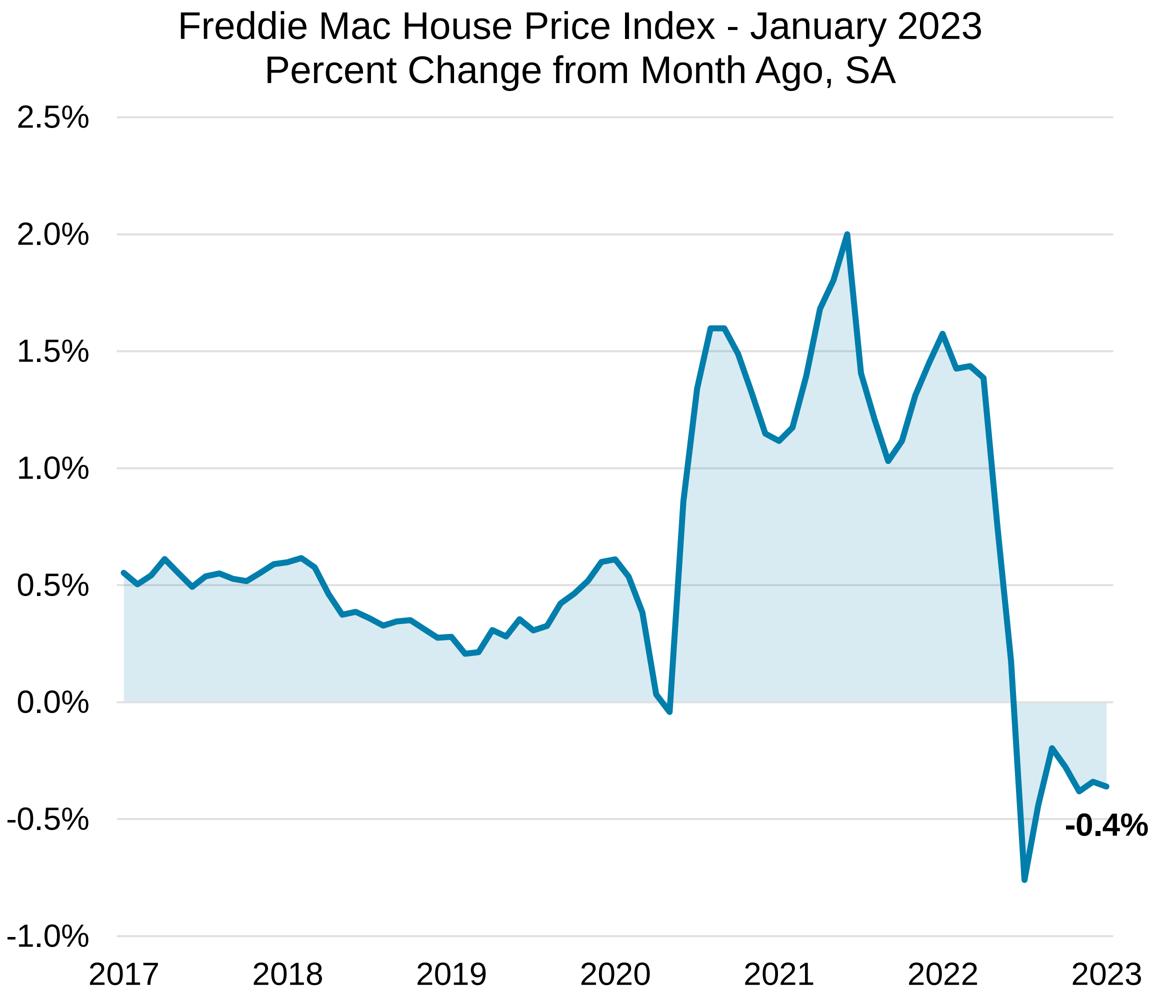
Sources: NAR, Census and CoreLogic. Entry level home prices are homes that sell at 75% of the median or below. High end home prices sell at 125% of the median or higher. Last data point December 2022.

House Prices Driven by Migration

House prices may have turned the corner, buyers are moving for affordability but may be exposing themselves to other risks.

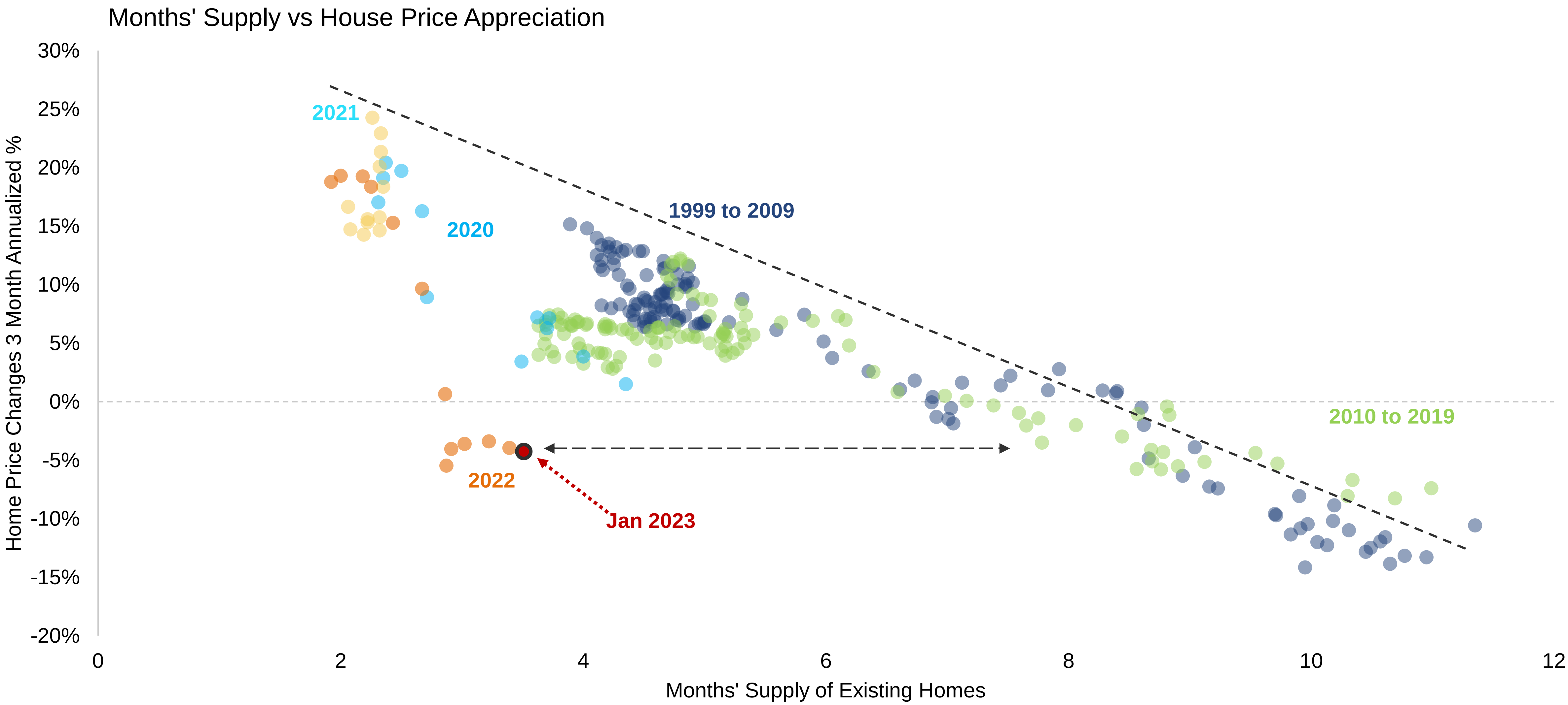
Home Price Growth Declines have Stabilized and Preliminary February/March Data Suggests Modest Increases





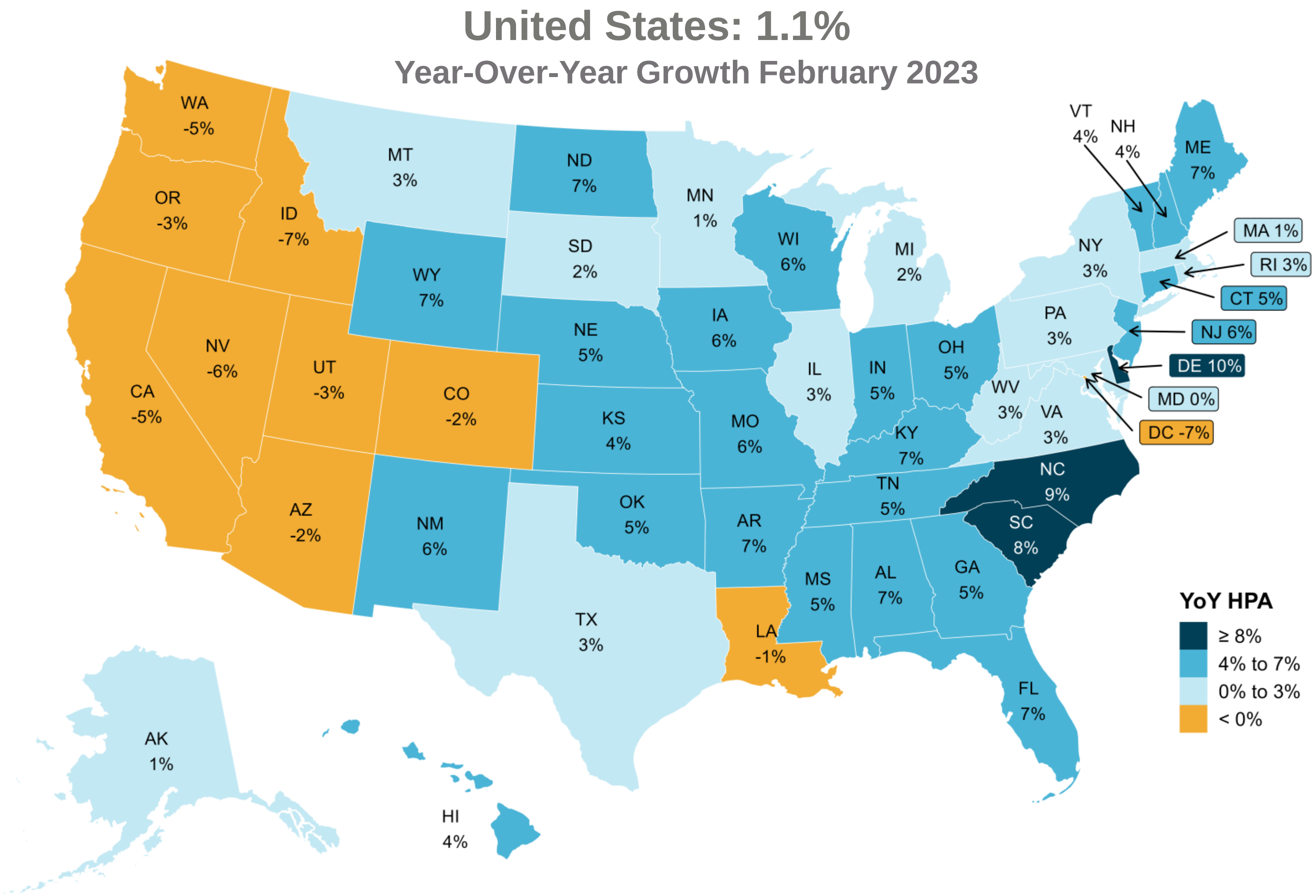
Source: Freddie Mac

Despite Still Low Supply, Very Large Drop in Demand Has Led to a Decline in Home Prices



Sources: Freddie Mac and NAR

Prices in Western Markets are Rapidly Declining, and the Slowdown is Spreading to Majority of Markets, but Some Markets Remain Resilient



[1] The Freddie Mac House Price Index for the U.S. is a value-weighted average of the state indexes where the value weights are based on Freddie Mac's single-family credit guarantee portfolio. Other indices of home prices may have different results, as they are determined using different pools of mortgage loans and calculated under different conventions. The Freddie Mac House Price Index for the U.S. is a seasonally-adjusted monthly series. Percent changes were rounded to nearest whole percentage point

Source: Freddie Mac

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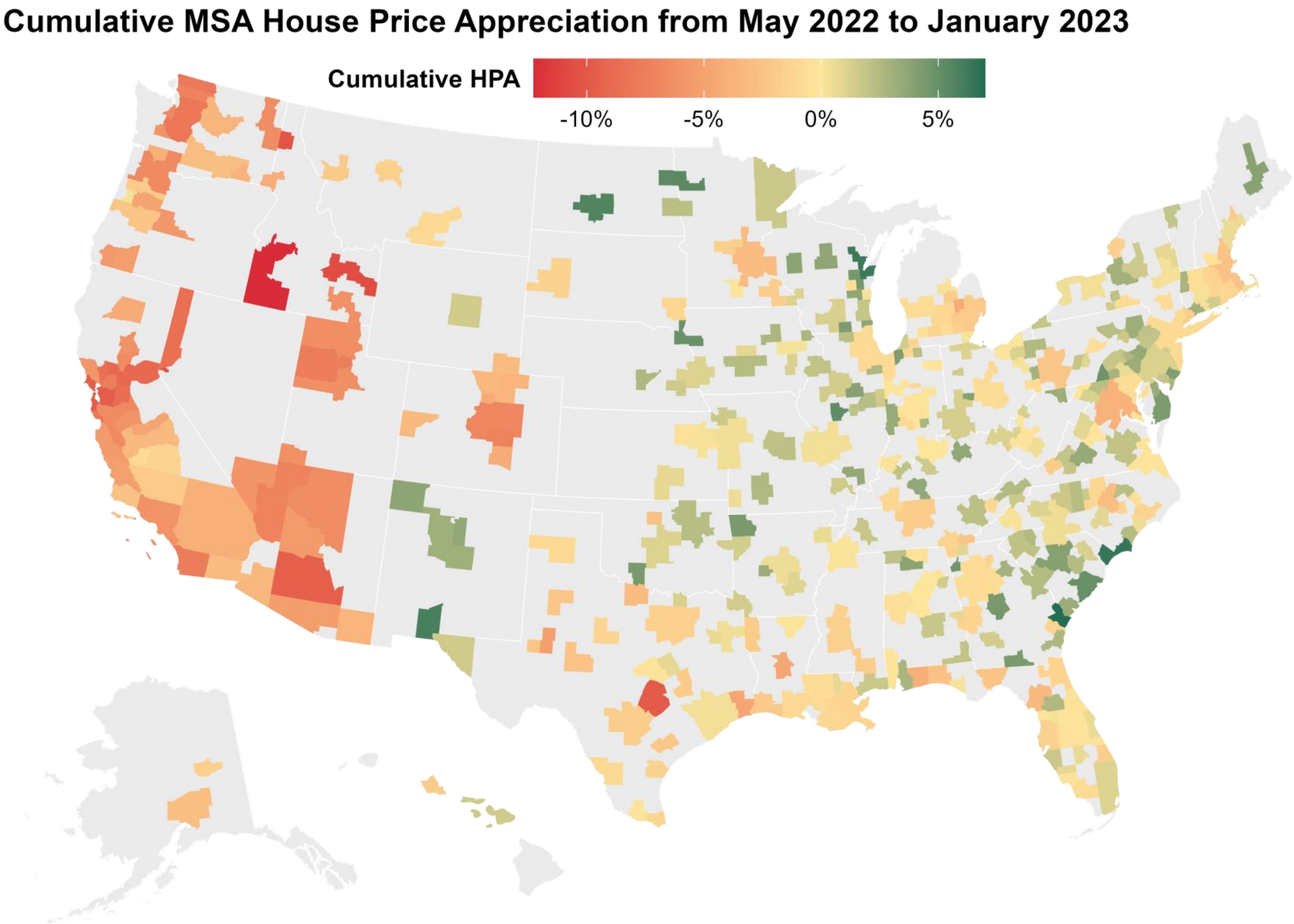
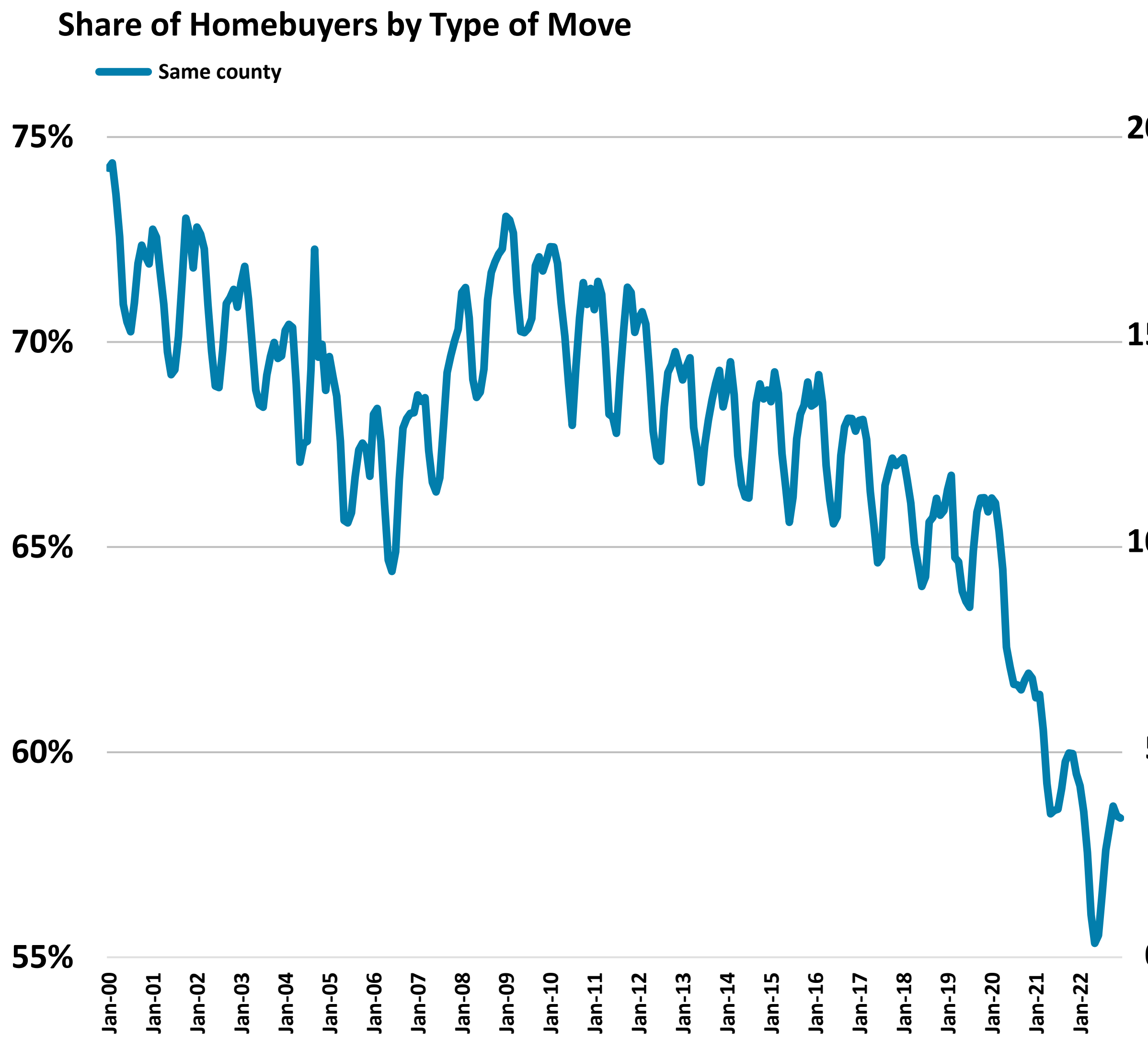
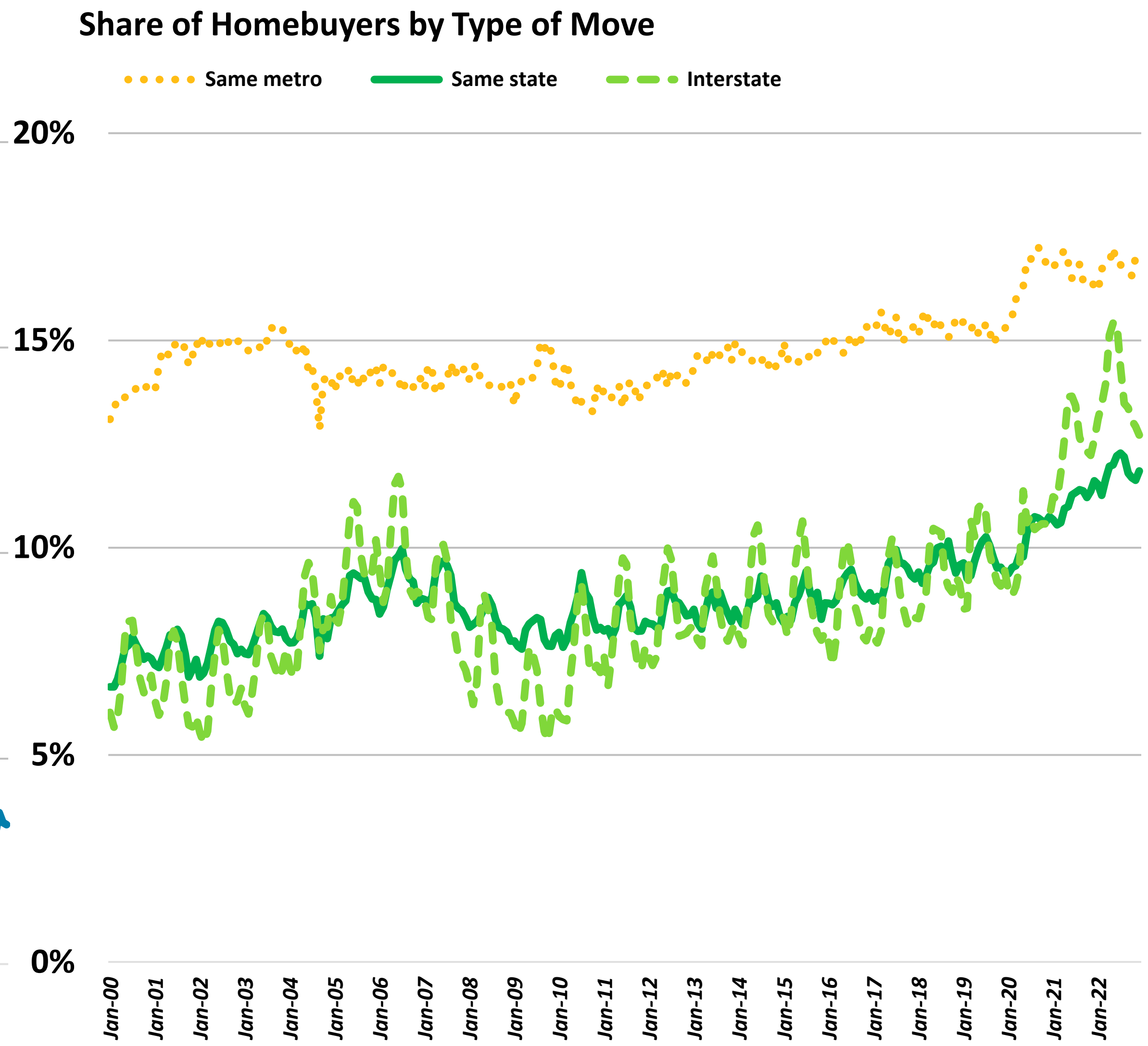


Source: Freddie Mac House Price Index, SA

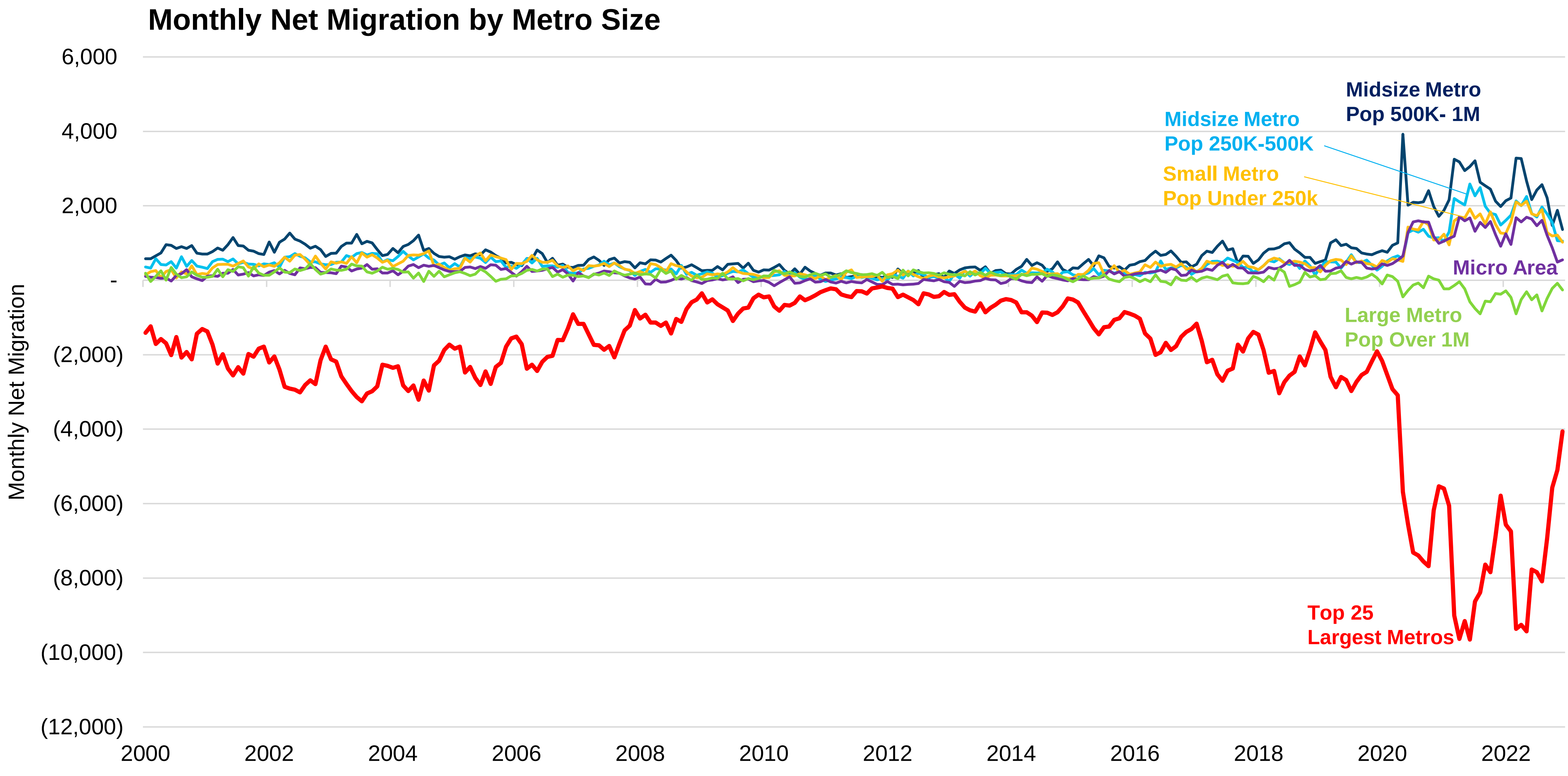
Increasing Share of Homebuyers Moving Out of Metro and State





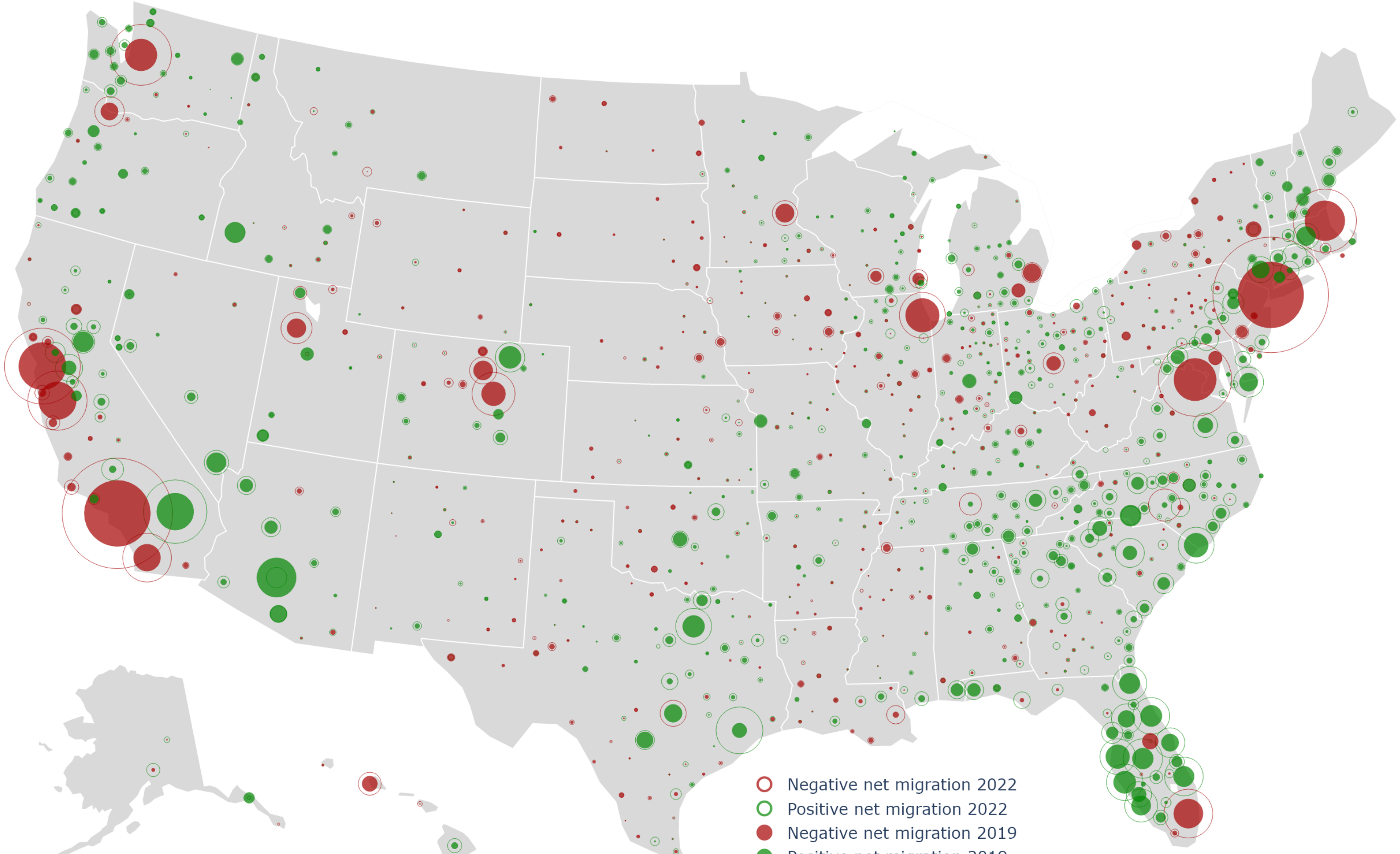
Source: Freddie Mac Loan Product Advisor

Migration to More Affordable Markets is a Large Countervailing Force to Housing Affordability Pressures in Expensive Markets



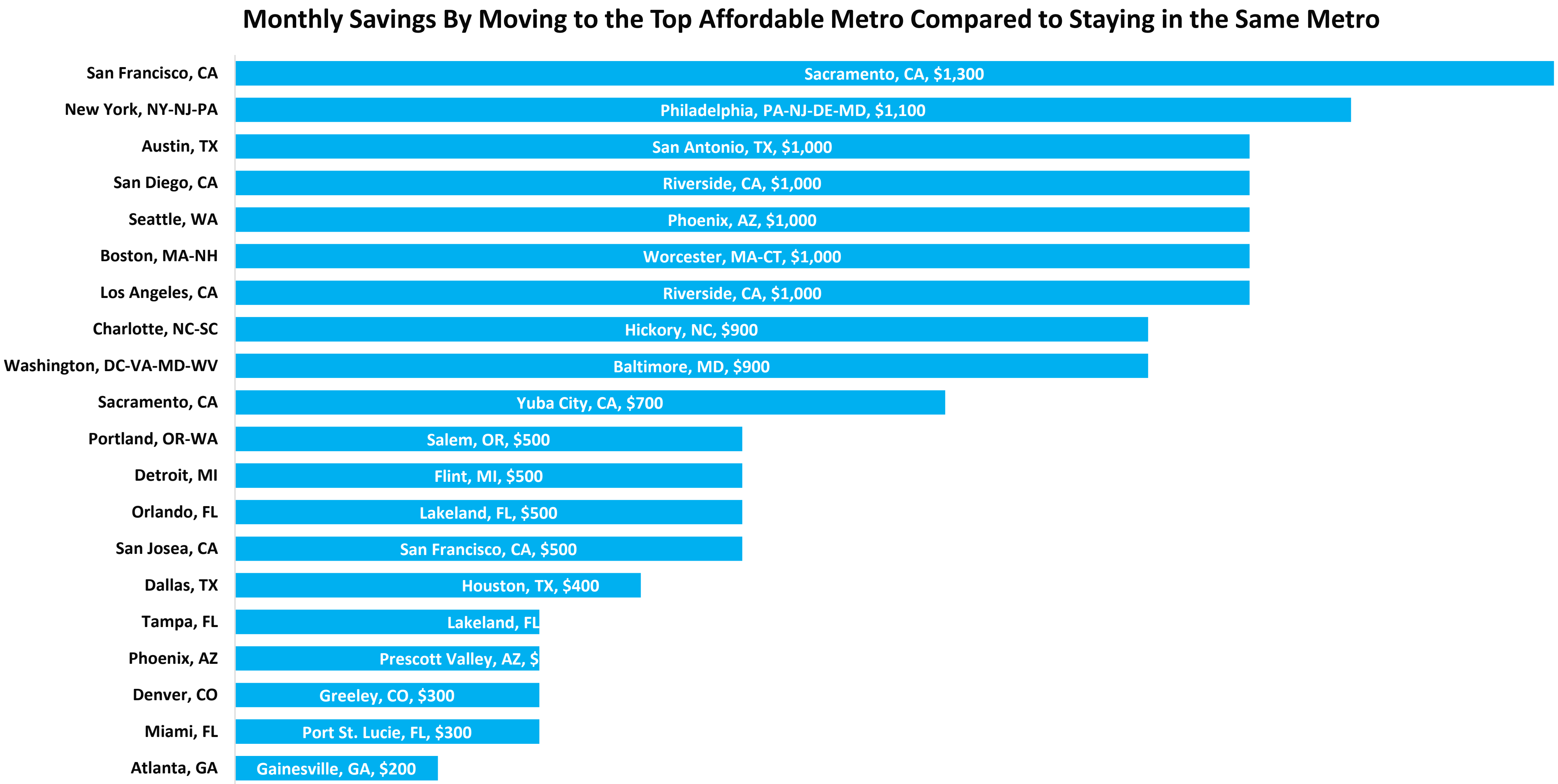
Source: Freddie Mac and Census

Homebuyers are Flocking to Many Small and Medium Markets, Especially in Southeast and Interior Markets



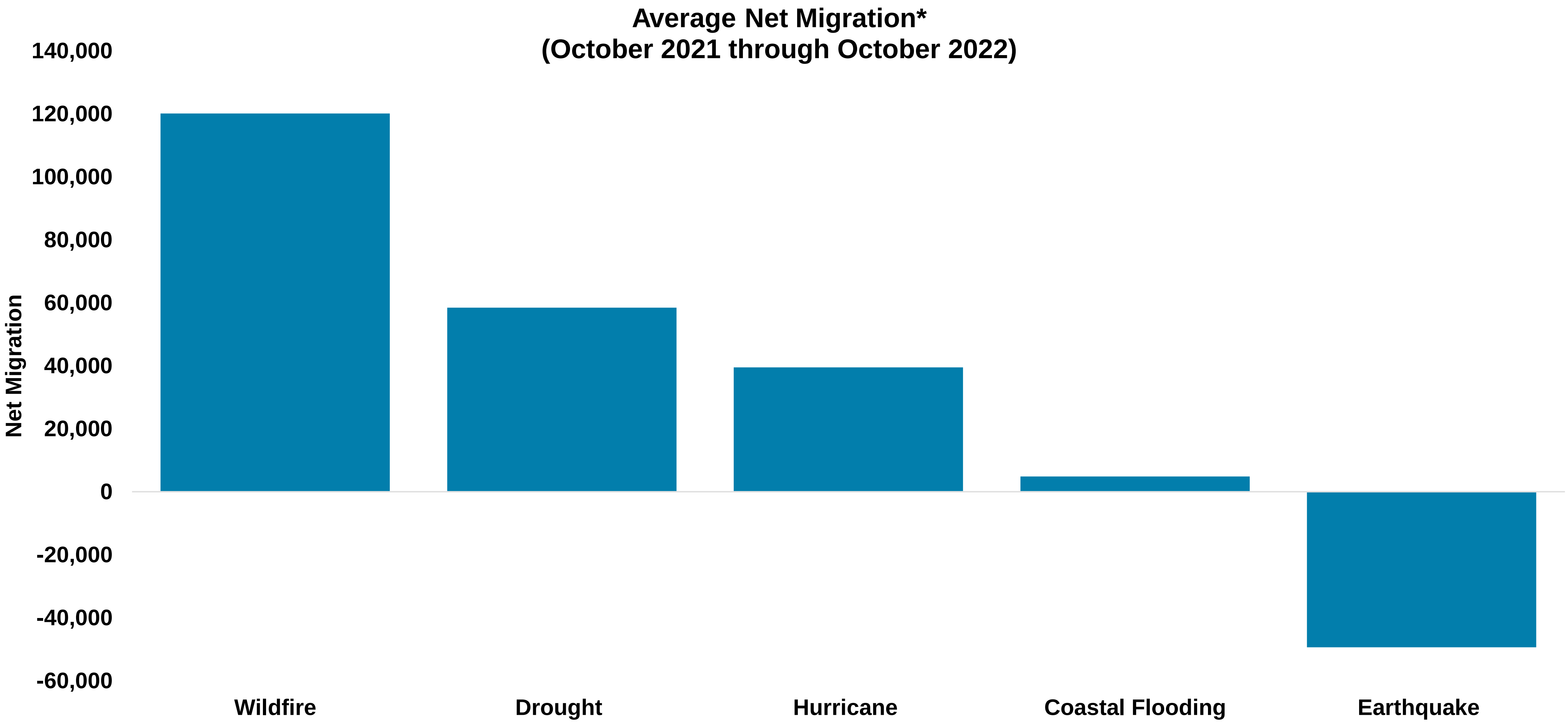
Source: Freddie Mac Loan Product Advisor®

Average Savings by Migrating to a More Affordable Location is $600



Source: Freddie Mac Loan Product Advisor

Buyers Seeking Affordability are Moving to Areas that have High Exposure to Wildfire, Drought and Hurricanes



Source: Freddie Mac https://www.freddiemac.com/research/insight/20221109-migration-environmentally-risky-areas-consequence

Summary

1. **The U.S. Economy Under Stress**

   Stress is building in the economy, inflation remains high, the growth outlook darkens, will resilient consumers power through?

2. **Affordability Challenged by Higher Rates**

   Even though higher rates price out millions, millions more potential first-time buyers compete with investors over what little inventory is available

3. **House Prices Driven by Migration**

   House prices may have turned the corner, buyers are moving for affordability but may be exposing themselves to other risks

Questions?

Thank You

INVESTOR DAY 2023

Single-Family Credit Risk Management Overview

Freddie Mac SINGLE-FAMILY | Credit Risk Transfer

Today’s Speaker

Terri Merlino

Senior Vice President & Chief Credit Officer,
Single-Family Business

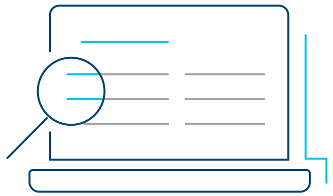
As chief credit officer for the past three years, Terri Merlino leveraged her broad-based knowledge of mortgage operations, sales, processing, underwriting, quality control and secondary marketing activities to substantially and positively impact Freddie Mac’s mortgage credit risk management efforts, as well as our client experience. Ms. Merlino holds a Bachelor of Business Administration in accounting from the University of Houston.

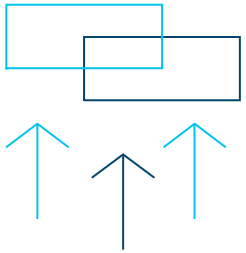
Our Agenda

1. Remaining Mission & Risk Management Focused for 2023
2. Single-Family Credit Risk Management
3. The Three Cs
4. Notable Policy Actions
5. Affordable Program Concentration & Risk in 2023

Remaining Mission & Risk Management Focused for 2023

- A key strategic priority is delivering on our mission by providing sustainable and equitable access to affordable housing
- One area of focus in supporting our mission is to practice risk management excellence; we must meet our affordable goals and remain within our risk appetite
    - ○ Key pillars of our credit box have remained stable since 2014
    - ○ Successfully manage higher concentration of layered risks of Affordable Program loans





Single-Family Credit Risk Management

Credit Policy

- Define, implement and manage credit policy, including negotiated credit terms of business

Automated Underwriting Risk Assessment

- Use automation, insights and collaboration to drive innovative intelligent credit risk assessments

Seller / Servicer Oversight

- Provide single point of accountability for all aspects of the S/S risk management lifecycle
- Consolidate analysis from key stakeholders, provide a comprehensive view of S/S risk and drive action to mitigate or reduce associated risk

Financial Risk Score

Credit Risk Score

Operational Risk Rating

Analytics, Reporting & Technology

- Establish benchmarks for acceptable loan quality and performance.
- Define the acceptable risk boundaries associated with mortgage credit

The Cs

Credit

Credit refers to a borrower's **willingness** to repay the loan, in this context. Factors that determine credit include:
- Credit score
- Foreclosures & bankruptcies
- Mortgage delinquencies
- Repossessions & collections

Capacity

Capacity refers to a borrower's **ability** to repay the loan. Factors that determine capacity include:
- Monthly housing expense-to-income ratio
- Debt payment-to-income ratio
- If the borrower is salaried or self-employed
- Cash reserves
- Loan characteristics

Collateral

Collateral refers to **property** used to secure the loan. Factors that determine collateral include:
- Borrower's total equity or down payment
- Property type (e.g., 1-unit, condominium)
- Property use: (e.g., primary residence, second home)

The Platform

Automated Underwriting Risk Assessment

Pre-Qual/ Application → Processing/ Underwriting → Pre-Closing → Closing

Loan Product Advisor® Enhanced Underwriting Workflow
- Risk Assessment
- Purchase Eligibility
- Collateral Options (ACE, ACE+ PDR, Desktop Appraisal)
- Asset & Income Modeler (AIM)
- Rent Payment History for FTHB included in Loan Product Advisor® (LPA℠) credit assessment
- Borrower's Cash Flow included in LPA credit assessment

Loan Quality Advisor® Eligibility Evaluated
- Risk Assessment
- Purchase Eligibility
- Loan Data Compare
- Confirmation of R&W Relief

Loan Collateral Advisor® Accurate Evaluations
- Collateral Risk Scoring
- Collateral R&W Relief
- Appraisal Quality Messaging
- Comp Analysis
- Enhancement to support

Condo Project Advisor® Determine Viability
- Unit-level Condo Exception Tool
- Project Level Assessment (Condo Project Advisor® PAR)

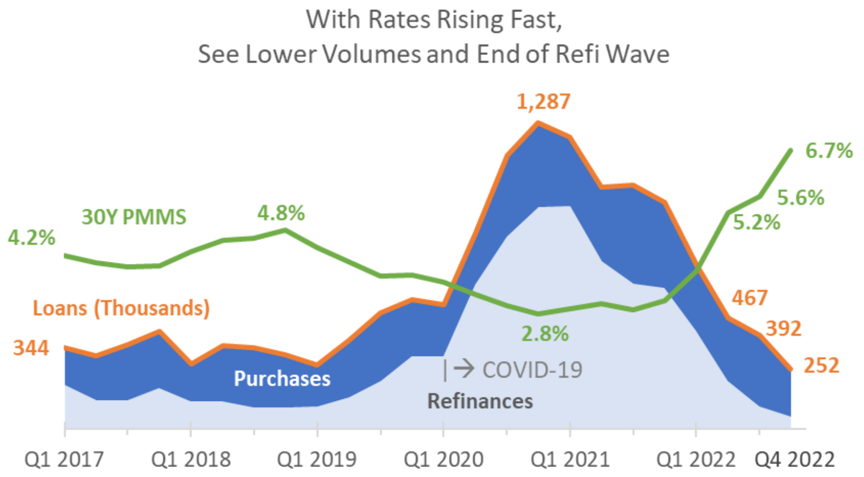
Since 2021 Q2, all loans delivered to us must be evaluated by our tools and must receive an acceptable risk assessment, either an LPA Accept or LQA Green rating.

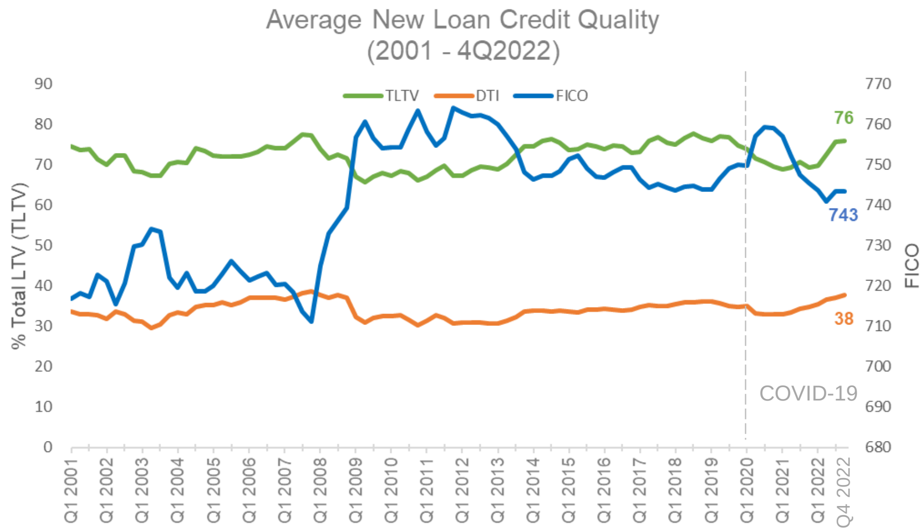
Funding Mix Shifted; but Quality Remains Strong

- Rising rates in 2022 shifted the market toward purchases and refinances with lower origination volumes. Purchases made up 80% of Q4 and 58% of all 2022 funding, while 2022 volume was down nearly 60% from 2021.
- Average TLTV increased during the year largely due to strong house price appreciation that drove refinance TLTV down to historically low levels before starting to flatten in Q4.
- Average FICO declined in 2021, primarily driven by refinance FICOs that dropped 44 points since their Q4 2020 peak, including 21 points in 2022, before flattening in the later part of the year.
- DTI trended up with rising rates and house prices.

All Flow Loans

	2018	2019	2020	2021	2022
Millions of Loans	1.3	1.7	3.8	4.2	1.8
Funded $ Billions	299	427	1085	1215	540
% Purchases	67%	56%	30%	33%	58%
% FICO <680	10%	8%	5%	8%	11%
% TLTV >90	22%	20%	12%	11%	18%
% DTI >45 Loan	16%	13%	10%	11%	16%
Ever 90 Day in 1 Year (bps)	18	195	109	35	
Ever 90 Day in 1 Year (bps) excl. COVID		11	9	10	





Notable Policy Actions

Credit Underwriting

Refinance Mortgages:

- Added a requirement that when there is a change in borrowers between the new mortgage and the mortgage being refinanced, the new borrower must have 12 months history of making timely payments on the mortgage being refinanced, with exception of when the new borrower inherited or was legally awarded the property
- Added a requirement for cash-out refinances that the mortgage being refinanced must be seasoned from the original note date at least 12 months

Employment/Income:

- Provided more extensive requirements and guidance for underwriting income received on IRS Form 1099 for services performed (i.e., "contractor" income)
- Provided requirements & guidance for borrowers with <25% business ownership interest who receive ordinary income or guaranteed payments reported on an IRS Schedule K-1 for partnerships and S-corporations

Gift Funds:

- Expanded requirements for use of gift funds for closing and reserves to permit graduation gifts provided by non-relatives, gift funds from an estate or trust of a related person, and gift funds provided by an unrelated individual with close, family-like ties to the borrower

Collateral

ACE+ PDR:

- Introduced ACE+ PDR, which provides the Seller with the option to obtain a Property Data Report (PDR) in lieu of appraisal for certain "no cash-out" refinances and cash-out refinances

Affordable

Accessory Dwelling Unit (ADU):

Expanded to allow the following flexibilities and clarifications:

- An ADU on 2- and 3-unit properties
- ADU rental income from a 1-unit primary residence
- Clarified that a no cash-out for previously constructed ADUs is allowable under a CHOICERenovation® mortgage

CHOICERenovation®:

In the February 2023 Single-Family Seller/Servicer Guide Bulletin, we announced the following revisions:

- Combined CHOICERenovation and GreenCHOICE Mortgages®, which allows the Seller to receive a $500 fee credit for energy and water efficient items that meet GreenCHOICE Mortgages requirements in a CHOICERenovation mortgage
- Provided some flexibility around contingency funds for outdoor recreational construction items and extended the construction/delivery timeframe to 450 days

Notable Policy Actions cont.

COVID-19 Related Underwriting Requirement Added in Seller/Servicer Guide

Desktop Appraisals:

- Due to success of desktop appraisals permitted for COVID-19, effective for new Loan Product Advisor submissions or resubmissions on or after March 6, 2022, Sellers were offered to obtain desktop appraisals for certain purchase transactions

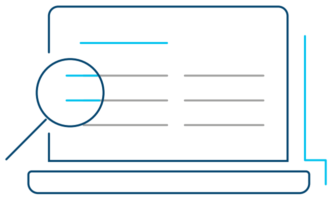
COVID-19 Related Underwriting Requirements Retired

Borrower Eligibility Requirements with Existing Mortgages:

- Verification that borrower is current on their existing mortgage(s) as of the note date of the new mortgage or meets additional eligibility requirements as stated in Guide Bulletin 2020-17

Self-employed Borrowers

- Seller must confirm Borrower's business is open and operating within 20 days of the Note Date



Affordable Program Concentration & Risk to Increase in 2023

- Affordable Program loans have higher concentration of risk tails and layered risks than non-Affordable Program loans. Borrowers are also much more likely to be first-time home buyers, qualifying on one borrower’s income, and below 80% of Area Median Income.
- As we drive efforts toward mission goals in 2023, we expect higher Affordable Program concentration and tail risk to achieve these goals.
- Affordable Program volume declined in 2022 as total originations contracted nearly 60% year-over-year.
- We remain focused on Freddie Mac’s Mission while practicing safe and sound risk management strategies.

Questions?

Thank You

INVESTOR DAY 2023

Seller/Servicer Risk Management

Freddie Mac SINGLE-FAMILY | Credit Risk Transfer

Today’s Speakers

Keith Jones

Vice President, Credit Policy, Client Credit Risk Management & Quality Control

Keith Jones is responsible for Seller/Servicer applications and annual recertifications, as well as holistic oversight of Seller/Servicer risk management activities for the Single-Family business. Throughout his career, Mr. Jones has primarily worked within the risk and capital markets areas of large lending and financial institutions. Prior to this role, Mr. Jones was most recently senior vice president of credit policy for Bayview Loans and senior vice president of risk management for NewRez, where he was responsible for policy, product, quality control and counterparty risk. He has held risk-centered roles at PHH Mortgage and Credit Suisse. Mr. Jones received his Bachelor of Science in biology from The College of New Jersey.

David Marcus

Vice President, Counterparty Credit Risk Management

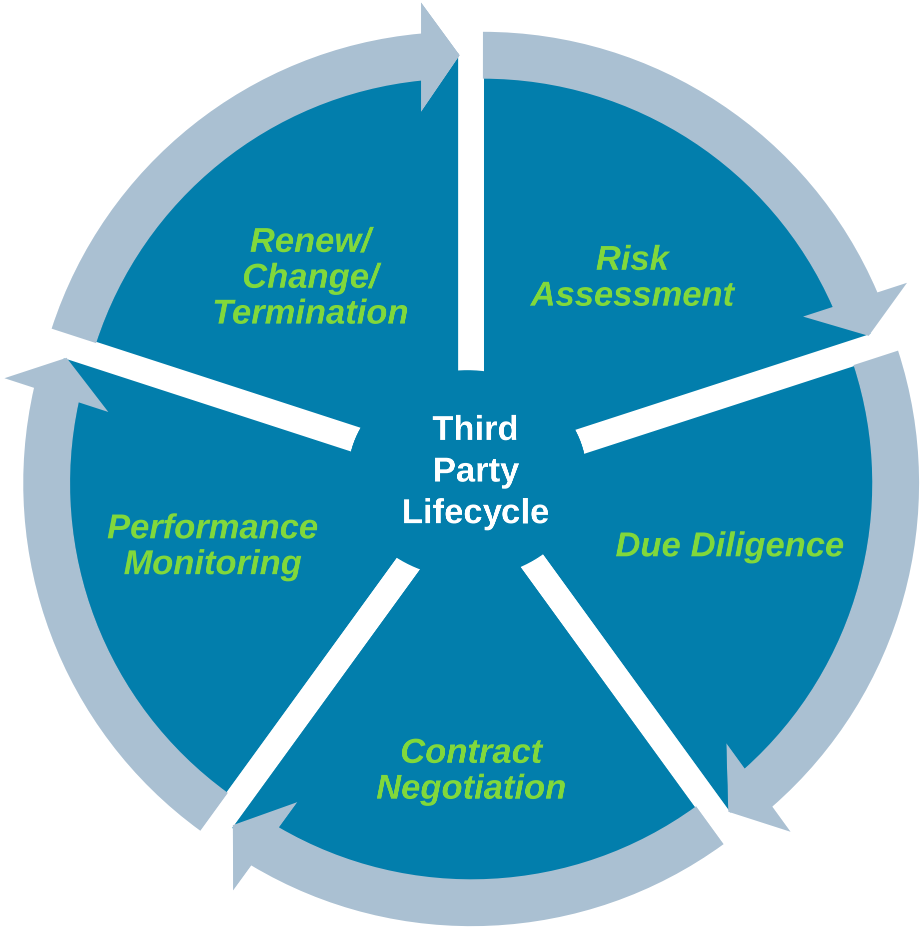
David Marcus is responsible for the financial analysis and risk appetite of financial counterparties to include non-bank seller/servicers, financial institutions, and reinsurers as well as exposure management for Single Family and I&CM financial risks (less mortgage insurers).

Our Agenda

1. **Risk Management Life Cycle Overview**
2. **Seller/Servicers Oversight & Tiering Process**
3. **Update to FHFA Financial Requirements**

Risk Management Life Cycle Overview

Third-Party Risk Management as outlined in FHFA Advisory Bulletins: risk assessment, due diligence, contracting, monitoring, issue management and renewal/termination.



Third Party Lifecycle

Risk Assessment/Measurement/Planning – Manage significant changes in third parties.

Due Diligence/Evaluation – Evaluate risks (applicant's financial condition, operational capabilities, legal, compliance, reputational risk, fraud, money laundering, terrorist activity financing) before approving a Seller/Servicer applicant.

Contract Negotiation – Defines the responsibilities, rights and obligations of each party.

Performance Monitoring – Ongoing monitoring guided by documented risk-based procedures that outline periodic reviews to assess third-party performance.

Renew/Change/Termination – Ensure process in place to efficiently terminate a third-party relationship to minimize adverse impacts.

Issue Management

Components of Seller/Servicer Oversight

Financial Risk, Credit Risk and Ops Risk are weighted and combined to create comprehensive risk rating.

- The Comprehensive Risk Rating comprises of Financial, Credit and Ops risk:
  - Financial Risk Score – Freddie Mac financial risk rating for seller/servicers
  - Credit Risk Score – Monthly risk assessment for each S/S based on their loan quality, performance, and QC metric
  - Operational Risk Rating – Combination of operational risk measures including CORE data, compliance risk profiles, cyber/privacy incident ratings and QC NAQ trends

Update to FHFA Financial Requirements

- The FHFA and Ginnie Mae jointly announced updated minimum financial eligibility requirements for Enterprise Seller/Servicers and Ginnie Mae Issuers that will be phased in starting September 30, 2023.
- The core changes to the current FHFA requirements are related to:
  - Definitions of tangible net worth and eligible liquidity.
  - Minimum liquidity requirements related to seller origination pipelines and adjustments to current base liquidity requirements which now differentiate liquidity requirement by remittance type.
  - Higher requirements to large non-depositories ($50B or more Servicing UPB).
- FHFA and Ginnie Mae requirements are largely aligned, with the notable exception of Ginnie Mae’s inclusion of a 6% minimum risk-based capital requirement (RBC). This requirement is similar to bank RBC required treatment of excess MSRs to capital.

Update to FHFA Financial Requirements cont.

Net Worth Requirement (Applies to non-bank and banks)	Current	Eligibility 2.0
Base: $2.5 million +		
Enterprise Servicing and All other Servicing	25 bps	25 bps
Ginnie Mae Servicing	25 bps	35 bps
Definition of Tangible Net Worth	Capital less Goodwill and Intangibles, Related Party Receivable, and Pledged Assets	Capital less Goodwill and Intangibles, Related Party Receivable, Pledged Assets, and Deferred Tax Assets net of associated Liabilities

Base Liquidity Requirement	Current	Eligibility 2.0
Enterprise Servicing		
Schedule Interest / Scheduled Principal	3.5 bps	7.0 bps
Schedule Interest / Actual Principal	3.5 bps	7.0 bps
Actual Interest / Actual Principal	3.5 bps	3.5 bps
Ginnie Mae Servicing	3.5 bps	10 bps
All Other Servicing		3.5 bps
Agency SDQ UPB greater than 6%	200bps	-
Eligible Liquidity	Unrestricted cash, Available for Sale or Held-for-Trading Agency MBS, Obligations of GSEs, US Treasury	Unrestricted cash, Available for Sale or Held-for-Trading Agency MBS, Obligations of GSEs, US Treasury, 50% of Unused Committed Agency Servicing Advance lines of Credit

Liquidity Buffer for Large Servicers	Current	Eligibility 2.0
Enterprise Servicing	-	2 bps
Ginnie Mae Servicing	-	5 bps

Origination Liquidity Requirement	Current	Eligibility 2.0
Mortgage Loans Held for Sale + UPB of Interest Rate Lock Commitments After Fallout Adjustment *Not required for Sellers with less than $1.0 billion or less in SF 1-4 Units origination in a four-quarter period*	-	50bps

Capital Ratio	Current	Eligibility 2.0
Tangible Net Worth / Total Assets	≥ 6%	≥ 6%

Counterparty Credit Risk Management (Counterparty Level Lifecyle)

Evaluation: Assessment of counterparty financial strength

- Annual Review
- Risk Rating
- Risk Appetite

Surveillance & Monitoring: On-going monitoring of risk profile

- Market Indicators
- Stress Testing (Capital Adequacy and Liquidity)
- Early Warning Indicators
- Frequent Reporting and Due Diligence (Senior Management).

Management: Effective CCR management frameworks

- Exposure and Risk Appetite
- Risk Mitigation

Reporting: Timely and Comprehensive Reporting

- Risk Appetite
- Risk Profile

Questions?

Thank You

INVESTOR DAY 2023

Modeling's Role in Risk Mitigation

Freddie Mac SINGLE-FAMILY | Credit Risk Transfer

Today’s Speaker

Michael Bradley

Senior Vice President, Single-Family Modeling and Analytics

Michael Bradley is responsible for setting the modeling and analytics strategy and positioning Freddie Mac to become the best credit guarantor. This is a critical role, since Freddie Mac relies on data-driven modeling and analytics to guide functions such as buying loans, valuation and hedging, predicting defaults/severity, and conducting risk management, to name a few. Mr. Bradley holds a Bachelor of Science in economics from the University of Delaware and a Master of Science and a doctorate, both in economics, from the University of Illinois.

Our Agenda

1. Background
2. Overvalued Markets: How to Identify and for How Long
3. Freddie Mac’s AI/ML Journey
4. Closing Thoughts

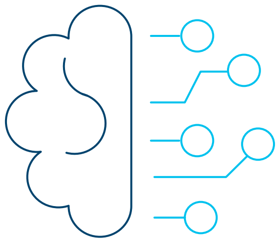
Contextual Background

- The Three C's
- Four Lines of Defense
- Formal Theories of Default

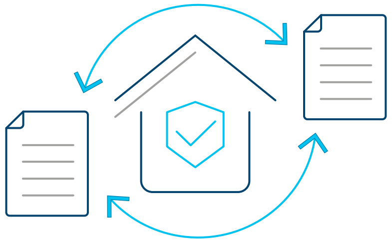
Contextual Background

The Three C’s of Mortgage Performance

Credit



Capacity



Collateral

Contextual Background

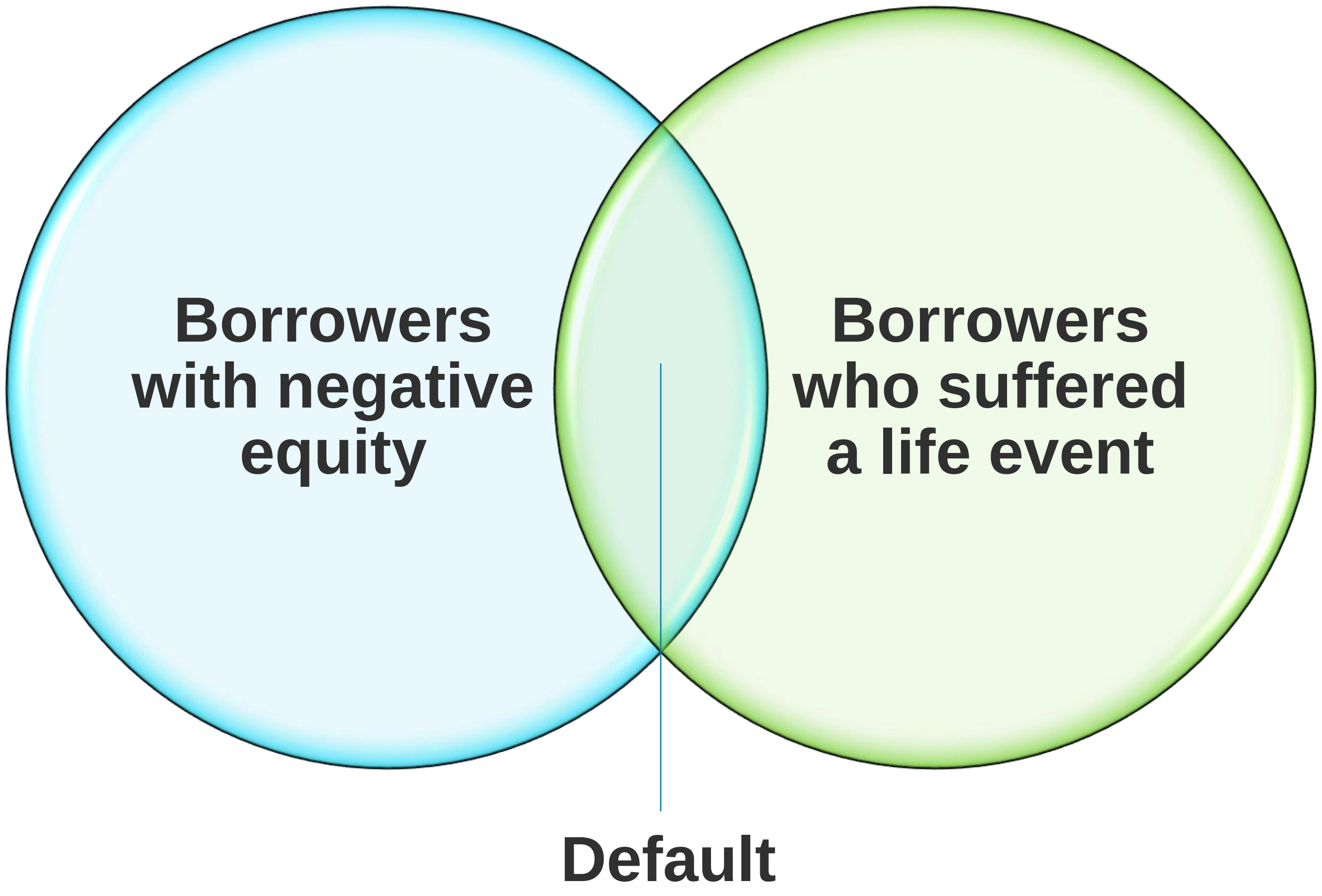
Four Lines of Defense

- Borrower
- Collateral
- Mortgage Insurance
- Capital

Contextual Background

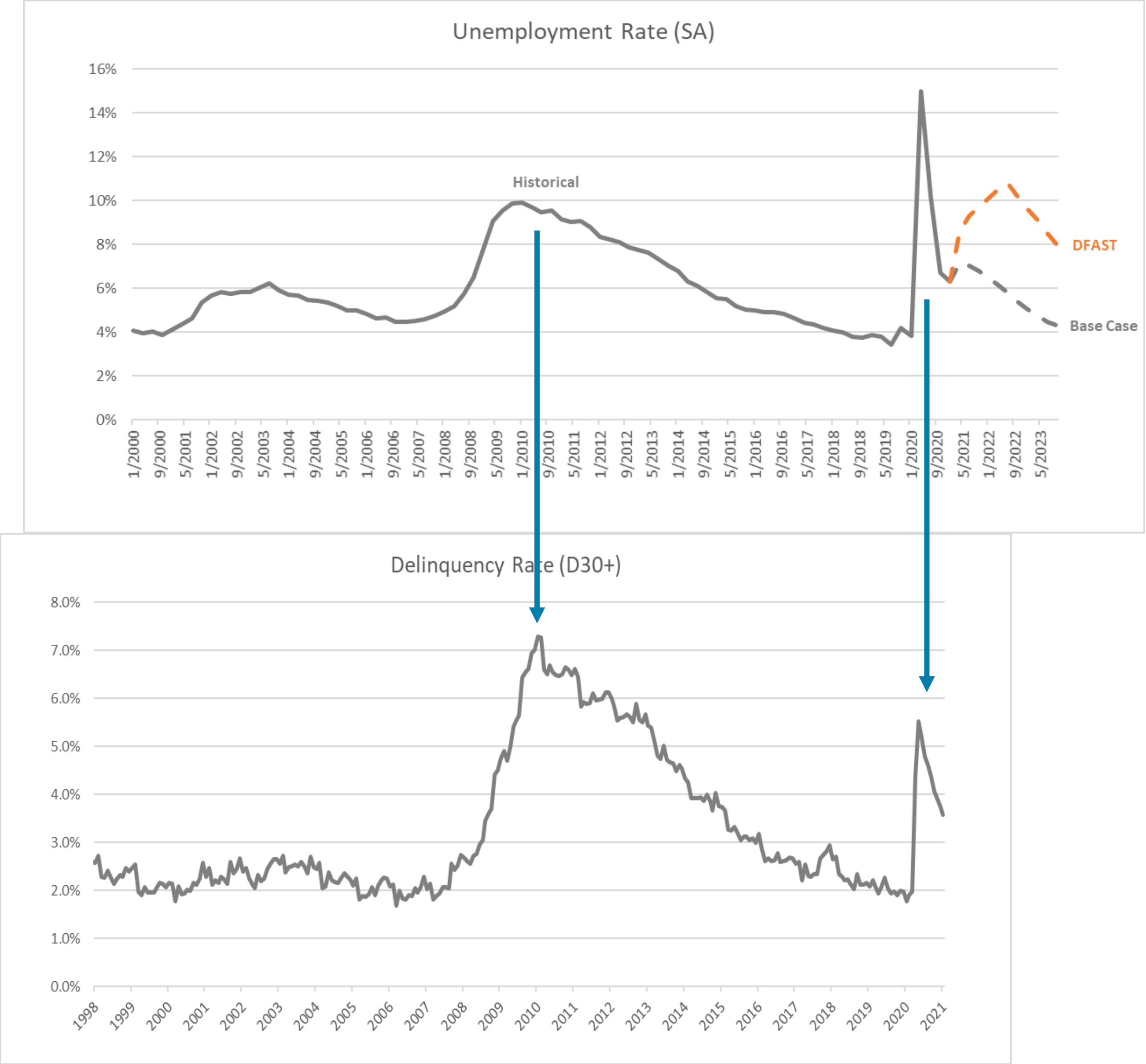
Trigger Theory

- A mortgage can be viewed as a collection of financial options.
- Think of a default as similar to a put option.
- Default requires the combination of negative equity and a ‘life event’, (e.g., job loss, divorce, illness, death).



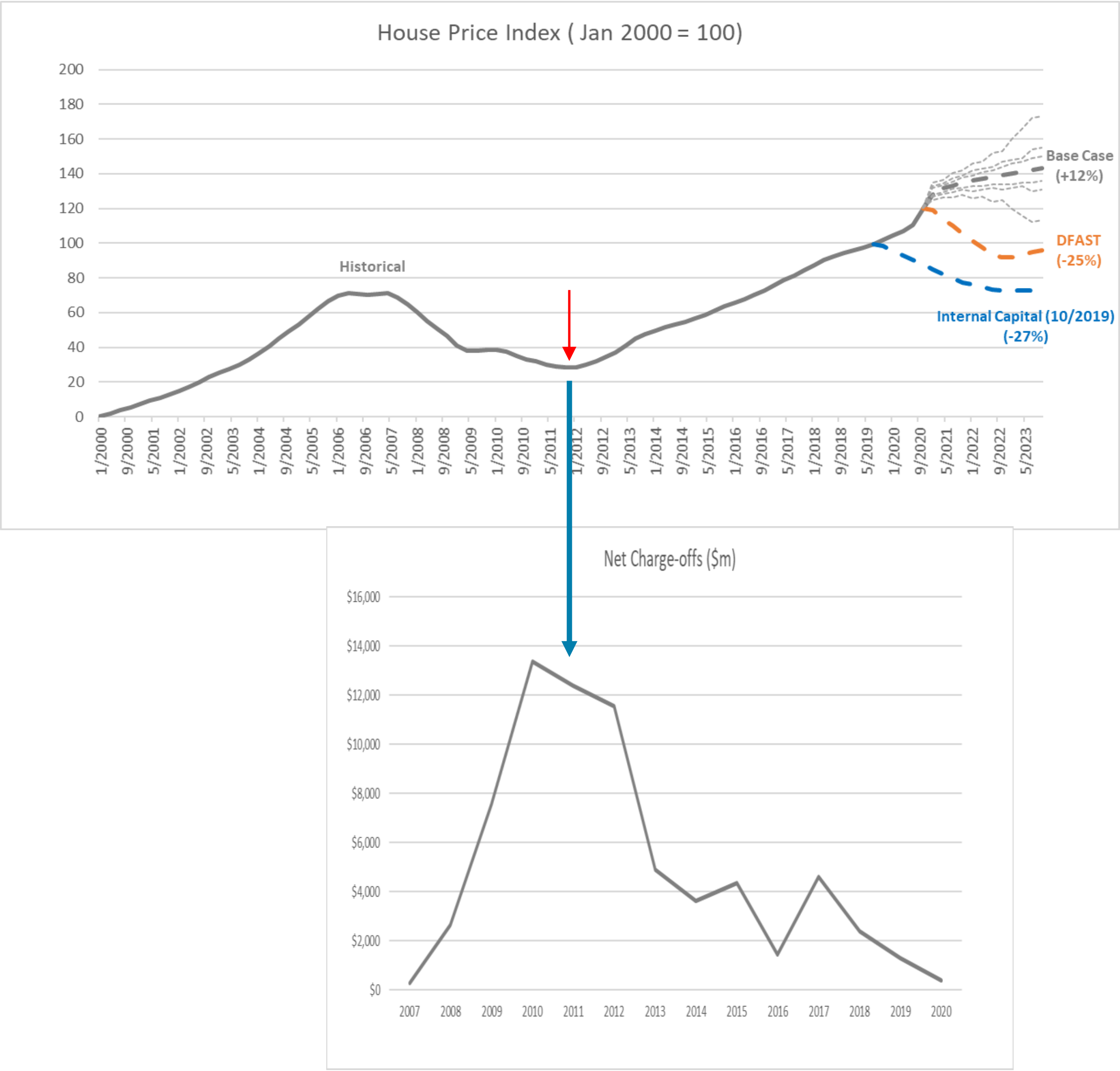
Contextual Background

A variety of life events help drive delinquencies



Contextual Background

Adding home price drop drives credit losses



Overvalued Markets: How to Identify & for How Long

Standard Industry House Price Forecasting Model

- **Standard House Price Forecasting Model in the industry is a two-stage error-correction model that:**
  - Uses **local house-price drivers** to predict both short-term HPA fluctuations and long-run fundamental level, supported by housing supply and demand;
  - Allows for **mean reversion** (to the fundamental price level);
  - Captures the **momentum effect** in local housing markets.

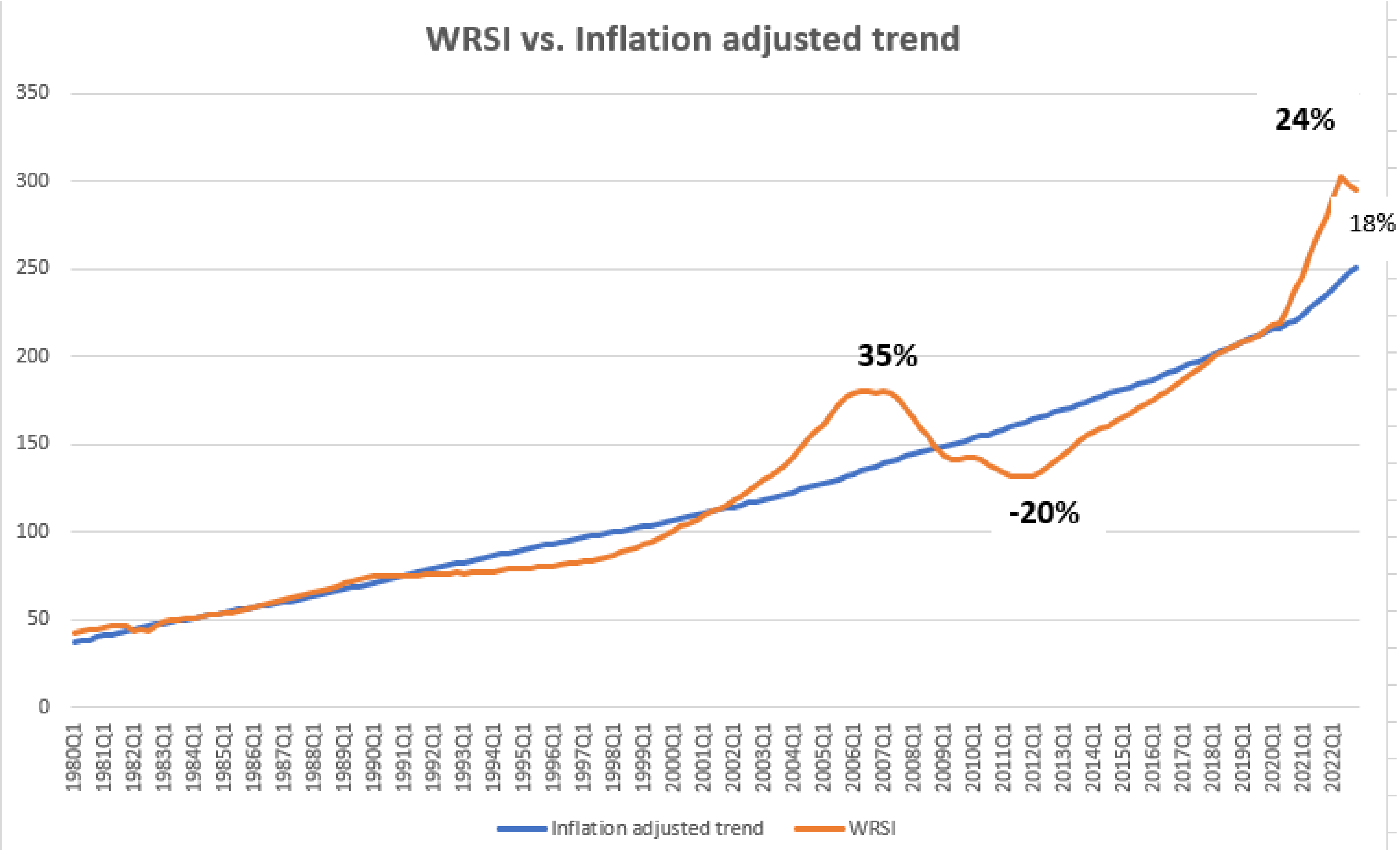
1st stage

Predict the local long-run sustainable house-price level that can be supported by long-run supply and demand factors, i.e., personal income, population and GDP.

2nd stage

Predict the short-run HPA movements around the long-run trend with the features of mean-reversion, momentum and local economic drivers.

One Example for Some MSA



Challenges of identifying an overvalued market

No definitive, universally accepted measure of market overvaluation; no observed equilibrium level of a market

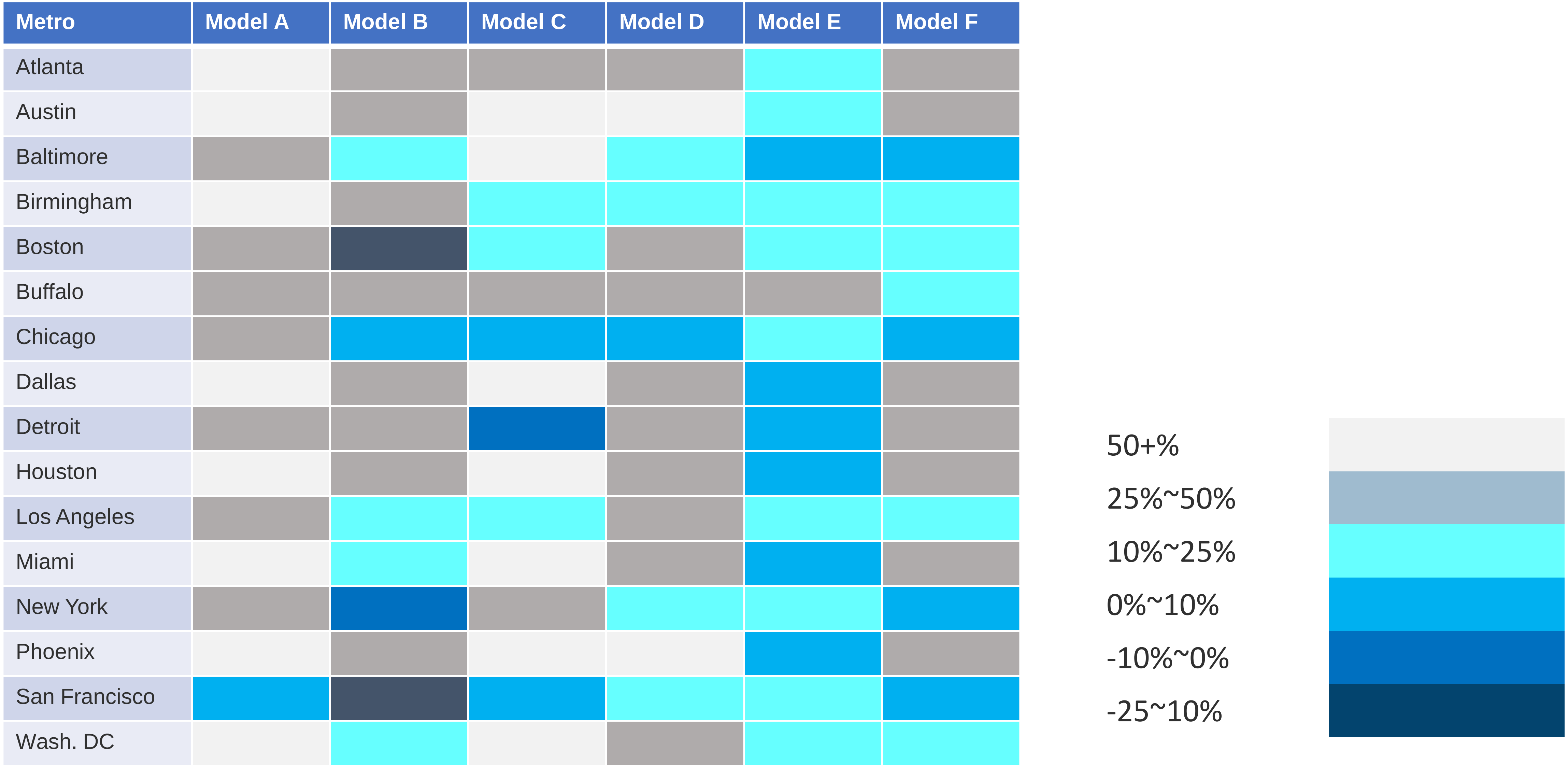
Different studies consider different factors:

- High price-to-income ratio
- High price-to-rent ratio
- Rapid price appreciation
- Low affordability
- Overbuilding

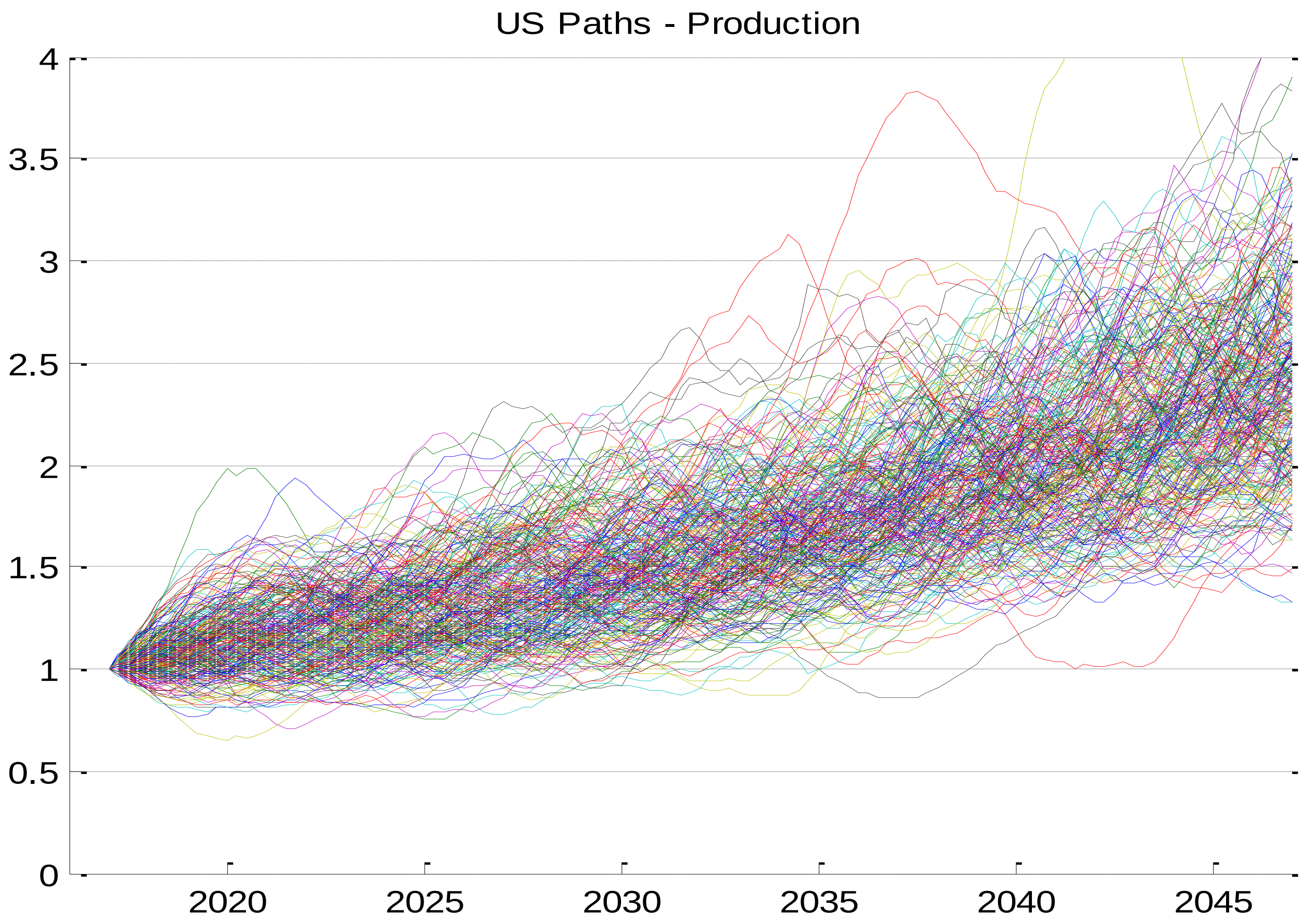
Even if one can determine the actual drivers of the equilibrium level of certain markets, statistical estimates depend on:

- Underlying house price index (e.g., Case-Shiller vs. FHFA)
- The underlying sample used for model estimation (e.g., with or without bubble years prior to 2007 Great Financial Crisis)
- Specific model specifications (with/without population growth, interaction terms or not)

Significant Variation - Different Model Views on Select MSAs from 2022 Q2



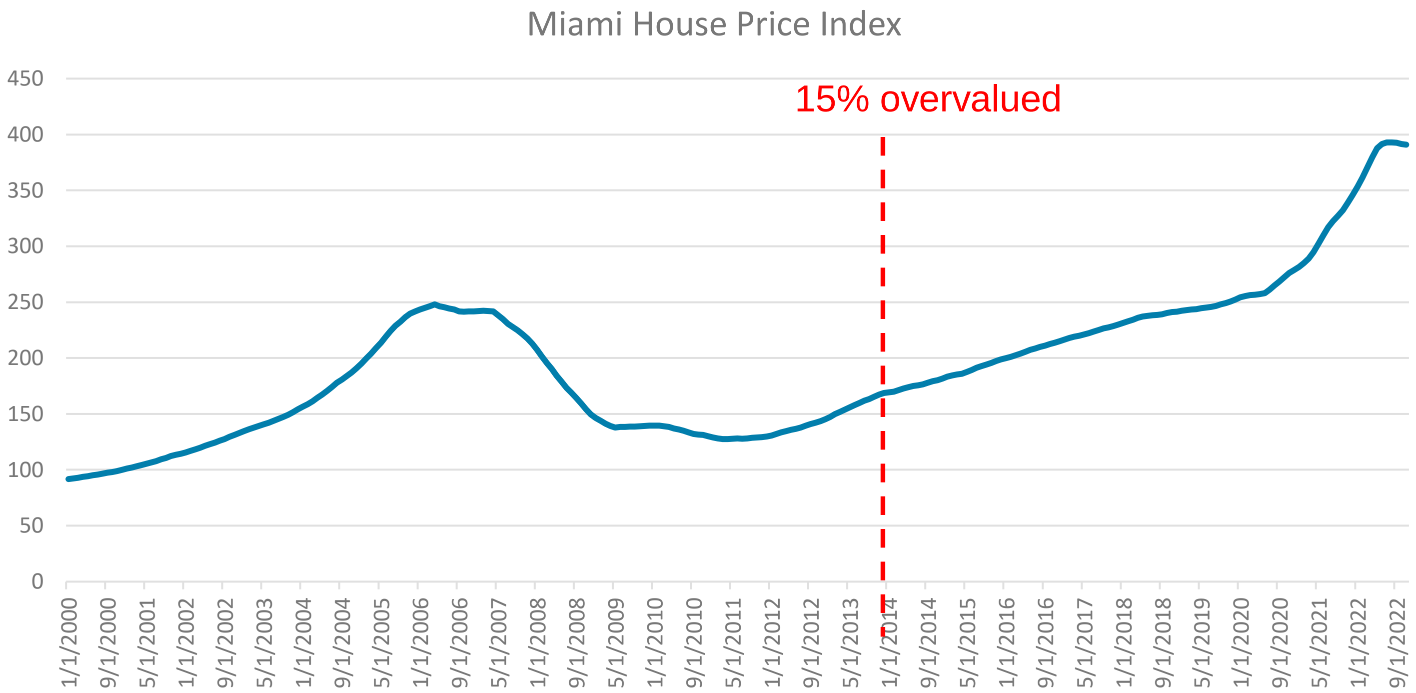
Monte Carlo Simulation



Determining When an Overvalued Market will Decline is a Challenge

Not all overvalued markets will decline. An “overvalued” market can stay overvalued for extended periods of time. For example,

- Miami had been called 15% overvalued in 2014 Q1 by one of the industry models.
- However, Miami grew 132+% further over 8 years since 2014 (annualized 11+% per year) and did not show negative monthly growth rates until August 2022.



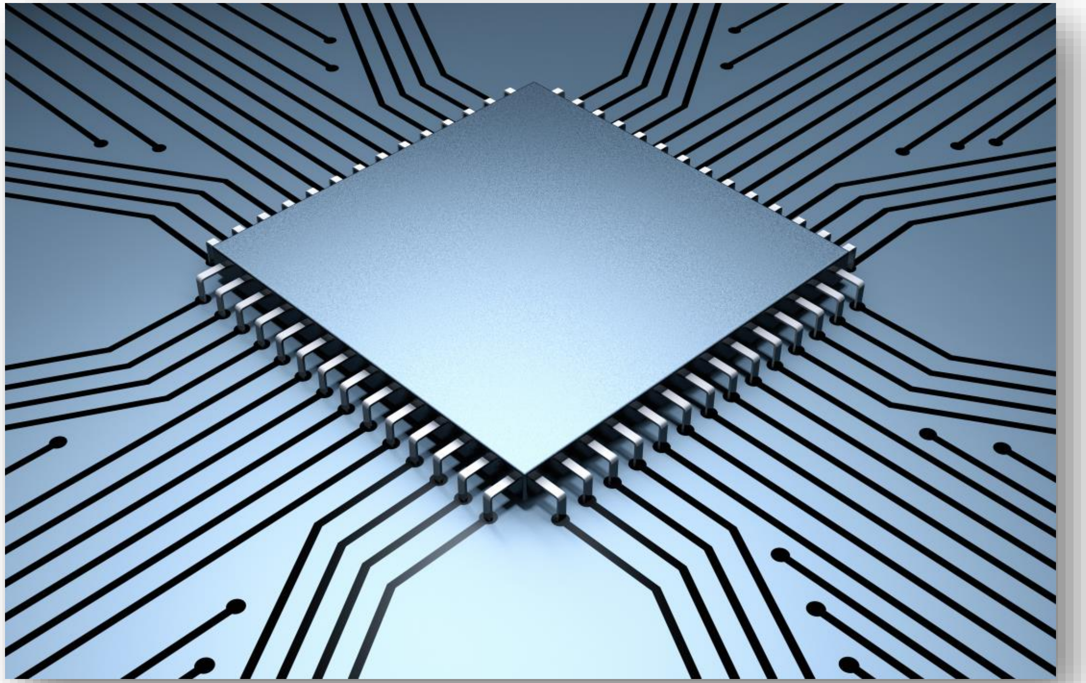
Market Overvaluation: Summary

- Determining whether a housing market is overvalued based on statistical models can be a challenging task.
- It is equally difficult to determine how long a market can remain overvalued.
- Better to monitor key indicators and economic trends to get a sense of where a particular market may be headed, instead of relying on statistical models.
- Despite the challenges, we can and should try our best to predict house prices.

Freddie Mac's AI/ML Journey: The Rationale & Examples

Benefits of Machine Learning

- Our major models allow us to scale massively
- Others are using AI in an attempt to disrupt our business model
- Humans predictably make mistakes – “Thinking Fast and Slow”

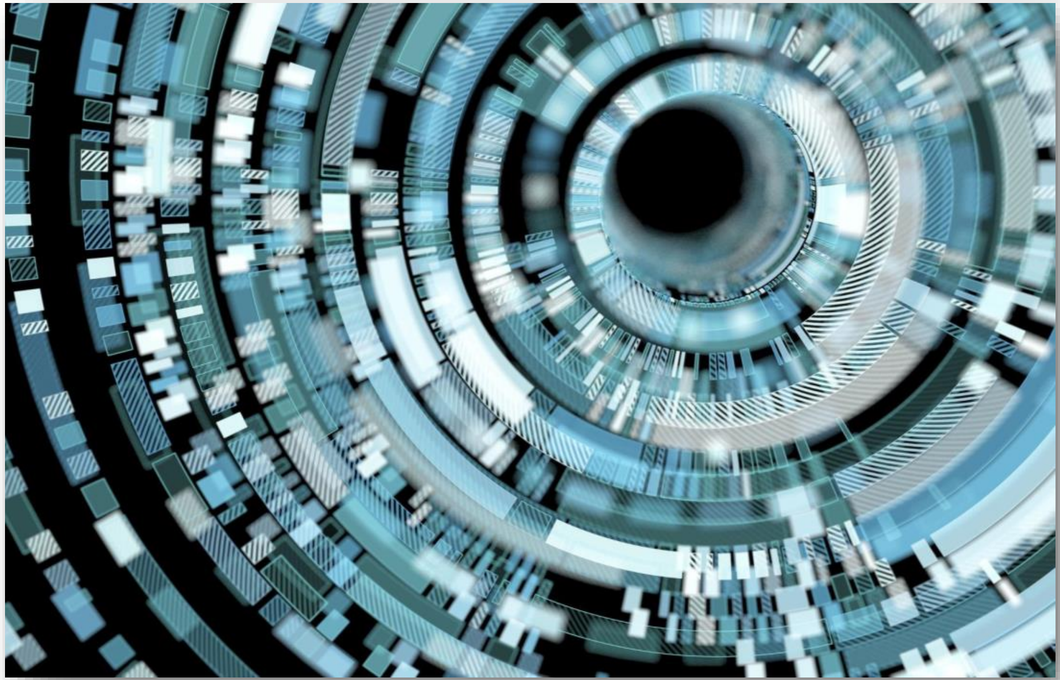


Why We Need AI

- Captures nonlinearities and interactions better than traditional methods, which maps to improved business outcomes.

- Has potential to greatly improve outcomes (including expanding access to credit) for consumers, businesses and other stakeholders across wide range of applications and industries.

- Helps us reduce “noise” and improve loan manufacturing, leading to superior risk management.

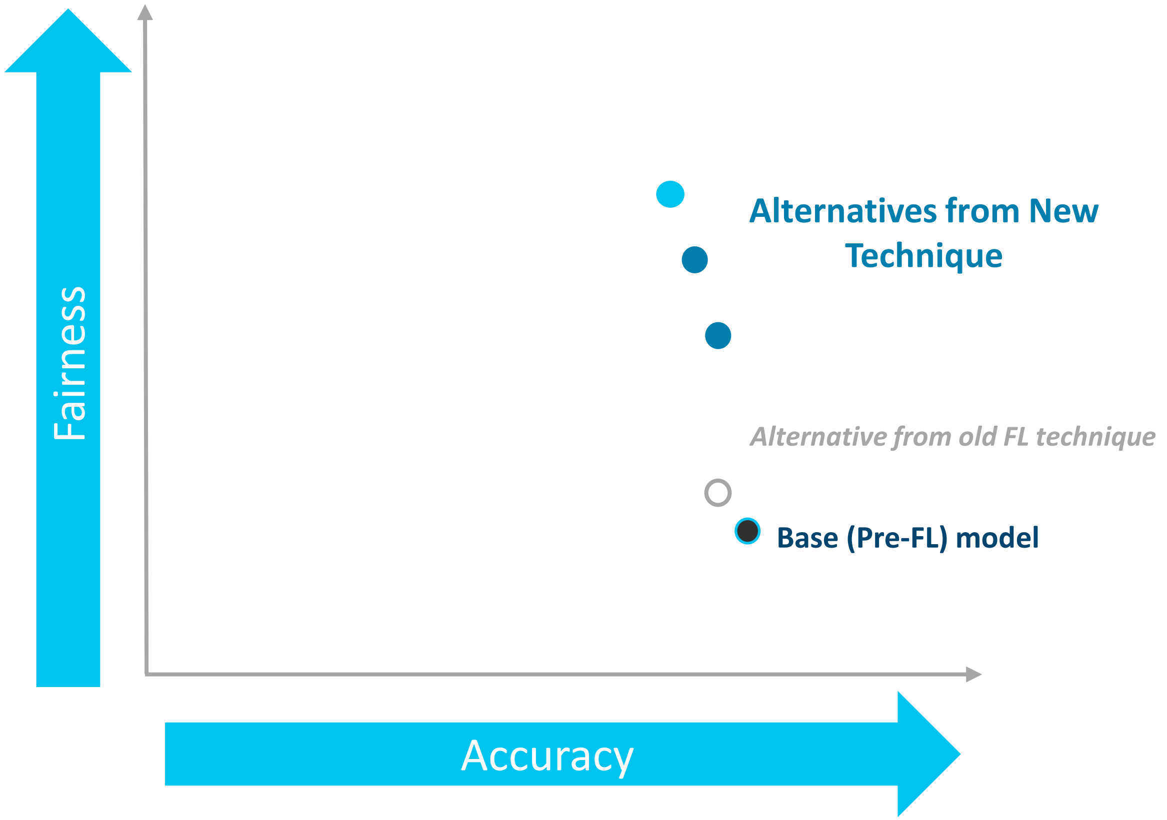


LPA and Fair Lending Testing

Fair Lending testing of LPA uses innovative techniques to identify Less Discriminatory Alternatives

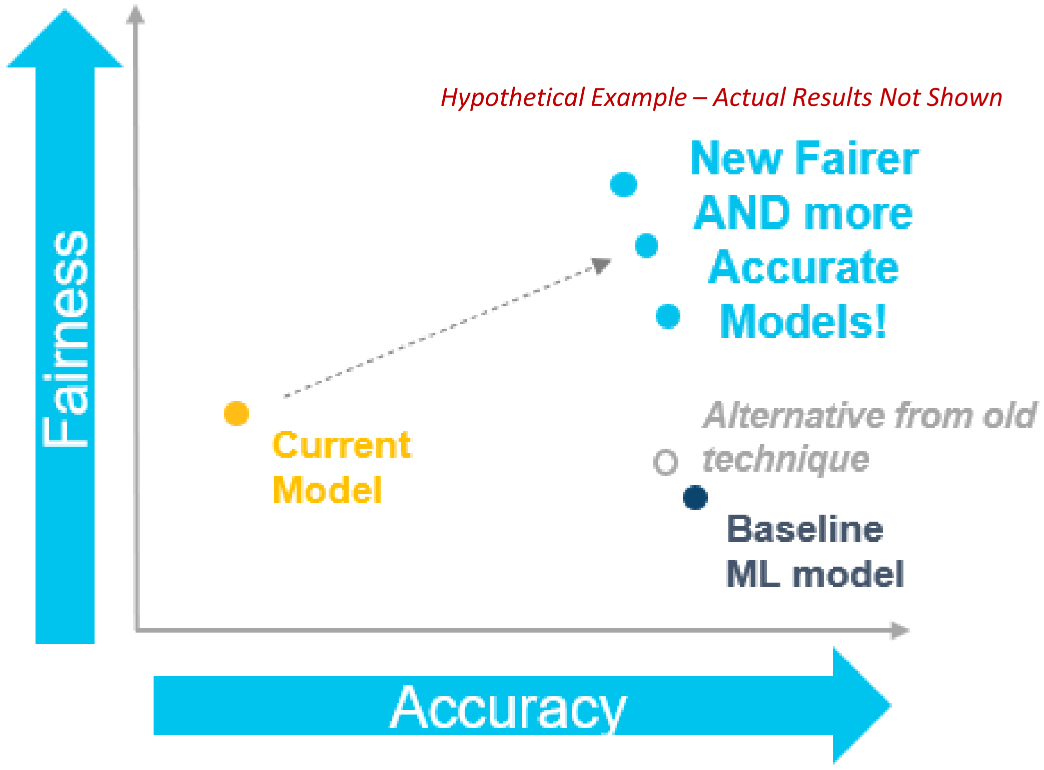
Less Discriminatory Alternatives (LDA):

- Alternative model specifications that lower impact on protected classes without a material degradation in performance. If found, such alternatives are called LDAs.
- LPA relies on an innovative adversarial debiasing technique, the **Generative Adversarial Network (GAN)**, that smartly searches for alternative model specifications.
- By greatly expanding the search relative to previous methods, the GAN allows us to find much **larger improvements in fairness** than were possible before.



Results are hypothetical. Actual results are not shown.

LDA Search Results from GAN – An Example



- The graph shows impact/accuracy tradeoff for alternatives created from the GAN process.
- Currently in use for LPA fair lending testing.

By greatly expanding the search relative to previous methods, the GAN allowed us to find much larger improvements in fairness than were possible before.

Asset Income Modeler (AIM) Helps Manage Risks

Using new auto-labeling techniques to build future versions of our models increases accuracy and speed.

Continually Managing Risk:

- Removes subjectivity & manual errors by applying consistent rules to all loans.
- Receives data directly from the source via trusted third parties, thereby reducing fraud associated with traditional documentation.
- Moves QC review "up front" on all loans and eliminates highest frequency defects.

Condition & Quality Analysis

Applying AI/MI algorithms to develop solution for property condition and quality assessment

Understanding the type of **characteristics** to determine the **overall property quality** and **condition** are needed to understand **market expectations** and how that influences **value**.

Condition Assessment

A Tale of Two Kitchens

- Updated / Not Updated
- Damaged / Not damaged
- Upgraded / Not Upgraded

Score: 30 (Q5, C4)
No damage but no update

Score: 80 (Q4,C3)
No damage and updated

Conclusion

- Freddie Mac is harnessing the power of AI and ML to drive faster, more accurate decisioning, manage risk effectively and create value, liquidity and stability within the housing ecosystem.
- Freddie Mac's investment in AI/ML and research of new applications is enhancing our understanding of loan performance and strengthening risk management.
- From improving and optimizing credit scoring, to determining overvalued markets, to ensuring accuracy, fairness and equity in lending, AI and ML are a driving force in Freddie Mac's pursuit of its mission and objectives.

Questions?

Thank You

INVESTOR DAY 2023

Quality Control & Operational Risk Management

Freddie Mac SINGLE-FAMILY | Credit Risk Transfer

Today’s Speaker

Jeffrey Smith

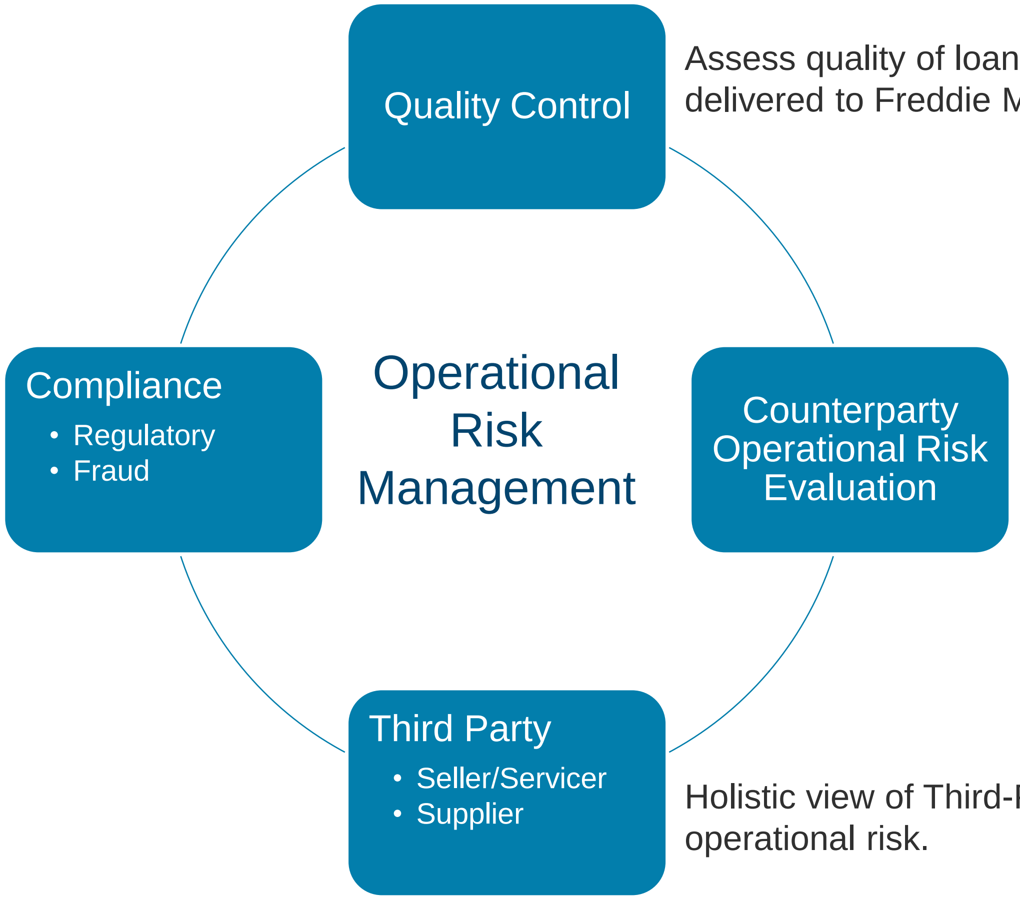
Vice President, Quality Control & Operational Risk Management

Jeff Smith is vice president of Single-Family quality control and operational risk management in the Freddie Mac Single-Family Acquisitions Division. He leads quality control (QC) activities associated with new loan purchases and our fraud program related to the division’s business activities. He also oversees the Counterparty Operational Risk Evaluation (CORE) program and governance and serves as Acquisitions Division Risk Officer (DRO) for operational risk. Joining Freddie Mac in 2022, Mr. Smith has 35 years of experience in consumer financial services, including 25 years with Wells Fargo Home Mortgage, where he most recently served as executive vice president of mortgage servicing. Prior to that, he was their senior vice president of compliance and operational risk.

Our Agenda

1. SF Acquisitions Operational Risk Management
2. Quality Control Holistic View
3. CORE Review Process
4. Third Party: Seller/Servicer Operational Risk Management Activities

SF Acquisitions Operational Risk Management



Assess quality of loans being delivered to Freddie Mac.

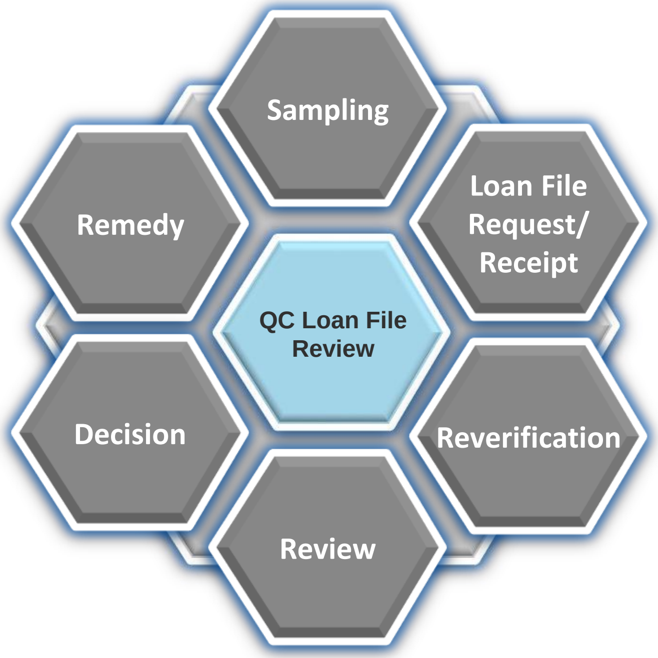
Assess the regulatory risk and fraud posed by SF counterparties.

Assess the operational control environment of SF counterparties.

Holistic view of Third-Party operational risk.

Quality Control Holistic View

Freddie Mac Single-Family manages risk at every step of the loan manufacturing process from pre-funding, at funding and post-funding through a combination of technology (Loan Advisor Suite of applications), process automation and loan documentation reviews.



Post-Funding QC Loan File Review Process		
Sampling	• Random Sample • Targeted	• Non-Performing • Responsible Lending Compliance
Loan File Request/Receipt	Loan file must be requested and received from Seller	
Reverification	Key information is reverified	
Review	• Loan file reviewed against Guide requirements and Seller contract, as well as to confirm accuracy of data delivered to Freddie Mac • Review may be full scope or only a component (e.g. collateral)	
Decision	Based on the review, a decision is made by SF QC that the loan was either acceptable quality or not acceptable quality	
Remedy	• Repurchase request issued on not acceptable quality loans • Seller may appeal; if successful, repurchase request is rescinded • When Seller accepts repurchase alternative (recourse/indemnification) or repurchases a loan selected in the Random Sample, the defect will influence future sampling	

CORE Review Process

Counterparty Operational Risk Evaluation (CORE) is responsible for conducting Single-Family counterparty reviews to assess the design and operating effectiveness of operational controls, as well as identifying potential risks to Freddie Mac.

- Review are conducted on a cyclical schedule ensuring over a three-year period approximately 90% of exposure is reviewed.
- A standard full scope review give a consistent, holistic operational control environment view of the SF counterparty.

Annual Plan

- The Annual Plan determines the reviews to be conducted by CORE each year.
- Quarterly ongoing monitoring is performed to determine when counterparties should be added to the Plan.

Review Planning

- CORE has a standard scope review that is the base line for all reviews.
- Analysis is performed to determine if the scope should be expanded.

Review Execution

- Review execution incudes both design and operating effectiveness.
- The review objectives are met using inquiry, detailed testing and review of documentation.

Post Review

- Findings are communicated internally and externally with an Exit Meeting with the Counterparty.
- Final Report distributed internally and Letter to the Counterparty.

Quality Assessment (PSR)

- Review to assess CORE's adherence to procedures and consistency in execution.

Issue Mgmt

- Track and monitor the status of all outstanding findings.
- Assess adequacy of remediation plans.
- Validation of remediation prior to closure.

Third Party: Seller/Servicer Operational Risk Management Activities

Single-Family has multiple risk management program established to monitor and manage the operational risk of approved Seller/Servicers. These program ensure risk is identified and effectively managed to protect Freddie Mac.

Ongoing Internal Risk Management Activities

Compliance Risk Assessments

Review and risk assessment of regulatory actions, legal actions, and negative news for individual Seller/Servicers.

Quality Control

Review of the quality of loans purchased from the Seller/Servicer to determine people, process, and system effectiveness for underwriting.

CORE (Control Effectiveness & Residual Risk)

Assessment of process and control effectiveness of a wide range of key Seller/Servicer functions. The assessment enables a Control Effectiveness and Residual Risk rating.

Annual Certifications

Annual certifications by all Seller/Servicers that includes key information on compliance with the Seller/Servicer Guide and relevant risk management information.

Issue Management

Continuous monitoring of issues identified by CORE including review of submitted action plans and validation of completed remediation.

Comprehensive Risk Ratings

Monthly risk rating that consolidates key operational risk management information into a single rating for the highest risk Seller/Servicers.

Inherent Risk Assessments

Assessment of the Seller/Servicer inherent risk to support the identification of the highest risk Seller/Servicers and CORE examination scoping.

Servicing Performance

Assessment of risk focused on key servicing metrics and servicing reviews.

Cyber & Privacy Incidents

Risk assessment and review of all cyber or privacy related incidents that occur at a Seller/Servicer.

Third Party: SF Supplier Risk Management

- SF SRM is responsible for Risk oversight and execution of requirements from Federal Housing Finance Agency (FHFA), Freddie Mac's Enterprise Third Party Office, and Freddie Mac's Enterprise Supply Chain.
- SF SRM performs activities throughout the Supplier Third Party Lifecycle and serves as a central point to provide guidance to SFs Supplier Relationship Managers and oversight of SFs Supplier Engagements.
- SF SRM Administers the Enterprise Operational Critical Third-Party Program which mandates enhanced due diligence for critical Suppliers.

Supplier Third-Party Risk Lifecycle / SF SRM Activities

Business Area	Due Diligence[1]	Contracting[1]	Ongoing Monitoring	Terminations
SF Supplier Risk Management	Supplier Inherent Risk Assessment (IRA) Approval	Supplier Contract Monitoring	• Enterprise Operationally Critical Third-Party Risk Management • Troubled Supplier Watchlist • IRA Findings Monitoring • SF Significant Supplier Monitoring • Supplier Contingency Plan Approval/Oversight • Supplier Performance Monitoring • Supplier Inventory Maintenance • Risk Subject Matter Experts	Supplier Terminations / Non-Renewals Monitoring

1-In partnership with Freddie Mac Enterprise Supply Chain

Single-Family Fraud Risk Program

Freddie Mac's Single-Family Fraud Risk (SFFR) manages a broad spectrum of fraud-related matters and risks through two teams.

- One focuses on Detection and Compliance issues through Suspicious Activity Report filing, Key Risk Indicators, analytics, reporting, and training.
- The other conducts onsite Investigations and drives Resolution through internal referrals for repurchase and policy changes, external referrals to law enforcement and regulatory bodies. Their work includes evaluation for placement on our Exclusionary List which precludes further business with identified fraudsters.

Prevention
- Internal Partnerships
- External Partnerships
- Exclusionary List

Detection
- Receiving Fraud Tips
- Analytics/Key Risk Indicators
- Seller/Servicer Monitoring
- Internal Targeted Training

Investigation
- Researching Fraud Tips
- Investigations/Fieldwork
- Exclusionary List
- Closure

Resolution
- Exclusionary List Additions
- Law Enforcement Referrals
- Civil/Criminal Tracking
- Regulatory Referrals
- Internal Referrals
- Policy Feedback

Regulatory Compliance
- Suspicious Activity Reports
- Immediate Notifications
- Suspended Counterparty Program
- Monthly/Quarterly Reports
- Fraud Case Management System
- Know Your Customer

Questions?

Thank You

INVESTOR DAY 2023

Single-Family Servicing and Loss Mitigation

Freddie Mac SINGLE-FAMILY | Credit Risk Transfer

Today’s Speaker

Benjamin Gottheim

Vice President, Servicing Policy

Ben and his team are responsible for creating policy regarding all aspects of mortgage servicing, including updates to the Freddie Mac Single-Family Seller/Servicer Guide and other terms of business. He has been with Freddie Mac for almost 12 years: 10 years in Servicing Policy, and his first two years managing a department responsible for foreclosure performance, timelines and compensatory fees. He earned his B.S. in management from Binghamton University (SUNY) with a double concentration in finance and MIS.

Our Agenda

1. **Ongoing Servicing Oversight**
2. **COVID-19 Response & Servicing Performance**
3. **Reimagine Servicing®**
4. **Questions**

Ongoing Servicing & Oversight

Experienced Industry Leaders

Single-Family servicing leaders have an average of 25+ years of industry experience and championed resiliency during the housing crisis.

Bill Maguire

Ben Gottheim

Vice President
Servicing Policy

Sujatha Viswanathan

Sr. Director
Servicing Quality Assurance, Business Management & Communications

Bill Lyons

Sr. Director
Servicing Capital

Tricia McKitty

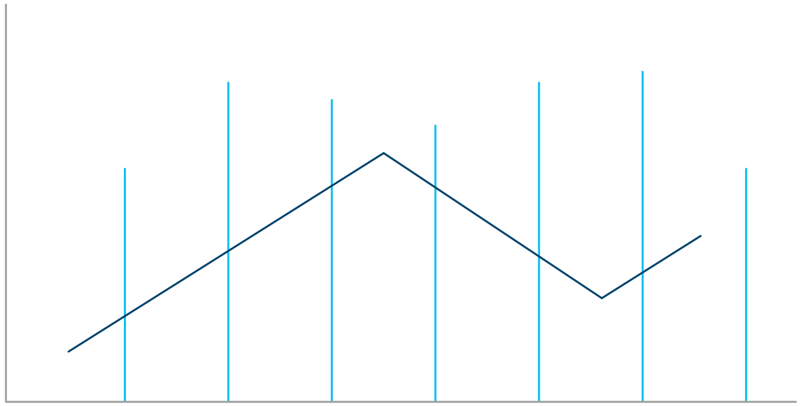
Director
Structured Transactions

Donna Spencer

Vice President
Servicer Relationship Management

Our Teams Influence Positive Portfolio Outcomes

Superior Servicer Portfolio Performance



Quality Servicing

Risk Management

Sustainable Homeownership

Policy and program development

Servicer Success Scorecard and data analytics

Servicer Relationship Management

Quality Assurance and Operational Reviews

Regulatory and compliance oversight

Loss reduction

What We Do…

Servicing Policy	Servicing Quality Assurance	Servicing Capital	Structured Transactions	Servicing Relationship Management
Supporting effective credit management by managing servicing policies to: • Minimize credit losses to Freddie Mac caused by borrower defaults. • Maximize servicer efficiencies to reduce the cost of servicing. • Create effective loss mitigation solutions, among other policies, that assist distressed borrowers in avoiding, or recovering from, default.	**The SQA and Business Mgmt. & Communications team is responsible for maintaining and executing:** • Servicer loan file reviews • Servicing remedy • Technology reporting • Business management • Servicing communications	**Servicing Capital Markets (SCM) supports Freddie Mac and customer/client objectives through execution of transactions where Freddie Mac acts as a Principal to a servicing transaction enabling:** • Improved servicing performance • Balance sheet management • Counterparty credit risk management • Terminations • Contingent servicing capacity management	**The Structured Transactions Team helps a servicer to meet its financing and other capital market needs. Typically, the team is involved in the follow types of transactions:** • SCR financing • Advance financing • Standard/Non-standard Servicing Contract Rights transfer/sale • Other – Any transactions with unusual arrangements or structures	**Well-rounded view of performance provides broad and in-depth analysis of servicing of performing and non-performing loans** **Supporting ongoing discussions with customers on performance strengths and challenges, as well as risk concentration and operational risk**

How We Monitor Performance

Servicer Relationship Mgmt

Average 25+ years of industry experience

All have worked in servicing through the housing crisis

Well-rounded view of performance provides broad and in-depth analysis of servicing of performing and non-performing loans

Supporting ongoing discussions with customers on performance strengths, challenges, as well as risk concentration and operational risk

Account Plans

- Focused on covered National, Regional and Community Servicers, Independent Mortgage Bankers, Specialty Servicers, Master Servicers, and Subservicers.
- Sets goals and objectives.
- Establishes agreed-upon action plans and milestones.

Scorecard

- Performance Categories:
  - Default Mgmt
  - Investor Reporting
  - File Review Defect Rates
- Performance evaluation:
  - Specific to servicer segments (rank groups)
  - Uses synthetics & ranks
- **SHARP℠** – Servicer Honors and Rewards Program

File Reviews, Rewards, and Remedies

- Identifies servicing performance gaps and trends. Resolve issues that prevent achievement of top performance.
- Encourages and rewards quality servicing.
- Provides consequences for poor data quality and servicing processes.

CORE

- Works closely with Servicer Relationship Mgmt to ensure review scope addresses new/ emerging risks.
- Identifies SF counterparty operational risk issues and monitors remediation.
- Provides assessment of Counterparty's compliance to Guide Requirements
- Conducts on-site due diligence of Servicers' preparedness for large MSR transfers.

Who Are Our Servicers?

Overview

1424 active Servicers

30 servicers added

46 terminated (voluntary/involuntary/acquired)

Significant growth in subservicing with a few new players in the market

$2,944 B UPB (as of December 2022)

32% Subservicing portfolio

Increasing concentration in non-banks

30% in 2014

48% in 2021

55% in 2022

2022 SHARP Award Winners

We Recognize Superior Servicing

Our Servicer Honors and Rewards Program (SHARP)SM enables eligible servicing clients to receive rewards and recognition based on their Servicer Success Scorecard annual rank.

SERVICER HONORS AND REWARDS PROGRAM

2022 Freddie Mac SHARP Award Winners

GOLD	SILVER	BRONZE
PENNYMAC	CHASE	PHH MORTGAGE
Guild mortgage	newrez	Onslow Bay Financial An Annaly Company
Specialized Loan Servicing	SWBC Mortgage	PODIUM

The SHARP awards represent quality servicing, risk management and sustainable homeownership – and we're excited to recognize the success of our clients."

Bill Maguire I Vice President, Portfolio Management

Freddie Mac

COVID-19 Response & Servicing Performance

Responsive Policies to Support the Industry

Since the start of the pandemic, Freddie Mac has made ongoing changes to support COVID-19 impacted borrowers. With the end of the CARES Act near, we are reviewing policies to determine applicability.

PRESENT

2020

Initial COVID-19 Related Flexibilities

Payment Deferral Options

Moratorium Extended (multiple times)

Disaster Payment Deferral

Reporting Updates

Forbearance Updates

2021

Moratorium Extended (multiple times)

COVID-19 Forbearances Extended to 18 months

COVID-19 Payment Deferral Expansion to 18 months

Flex Mod Eligibility enhanced

Expiration of the COVID Foreclosure Moratorium

CFPB Final Rule on COVID Servicing

Required Escrow Analysis for COVID PD

2022

Updated SS/DIL requirements for COVID impacted borrowers

Bulletin Issued: Temporary Guidance on Foreclosure Actions & HAF

NY Foreclosure Abuse Prevention Act – signed into law 12/30/22

JAN - MAR '23

On Jan. 30, 2023, the Biden Administration announced its intent to end the national emergency and public health emergency declarations on May 11, 2023, related to the COVID-19 pandemic

While our COVID policies are still in effect, we expect to wind them down in the near future.

Servicing Policy Updates 2022 to Date

To be responsive and support the dynamic servicing environment impacted by the pandemic, working together with Fannie Mae, FHFA and our Servicers, we developed and rolled out 9 new policies in 2022.

2022

- **2022-4**
  This Bulletin announces updates to Total MI Reconciliations, Acknowledgement Agreement Inc. Provisions, Streamlined Short Sale and DIL, and more.
- **03/17/2022 - Industry Letter**
  Reporting Security Incidents and Business Continuity
- **2022-8**
  Temporary Guidance on Foreclosure Actions and Homeowner Assistance Fund (HAF)
- **2202-9**
  This Bulletin announces updates to submitting short sale through Resolve, reimbursement of attorney fees, increased appraisal fees, alternative signatures on tax returns and more.
- **2022-12**
  This Bulletin announces updates to Resolve, LIBOR note review, temporary adjustment to property preservations costs, reimbursement of attorney fees, BPO clarification and more.
- **2022-17**
  This Bulletin announces updates to fair lending elements, requirements for approving a partial release or granting easement and more.
- **2022-19 – Seller/Servicer Financial Eligibility Requirements**
  This Bulletin announces updates to Seller/Servicer financial eligibility requirements.
- **2022-21**
  This Bulletin announces updates to Resolve, custodial account reconciliation requirements, Acknowledgement Agreement Inc. Provision and more.
- **2022-26**
  This Bulletin announces updates to Resolve, HAMP termination, new letter agreements for custodial accounts, mortgage insurance on unseasoned loans and more.

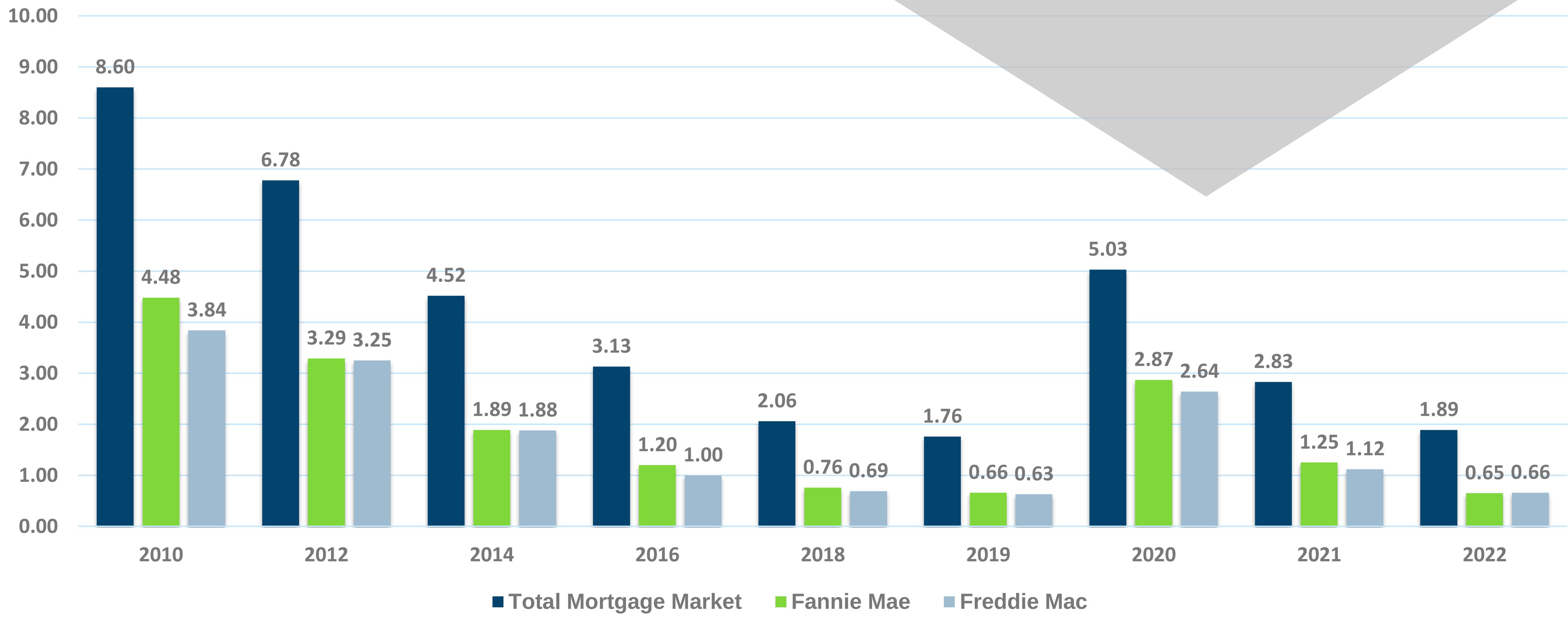
2023

- **2023-2 – LIBOR Transition**
  This bulletin announces the replacement index that Servicers must use after June 30, 2023, for Freddie Mac owned loans indexed to LIBOR.
- **2023-4**
  This bulletin announces a reminder for Resolve and updates related to property insurance, Seller/Servicer confidentiality, eMortgages and Loan Coverage Advisor.
- ***2023- 8***
  This bulletin announces the updated terms for Standard Payment Deferral
- **2023-10 (April 12th)**
  This bulletin announces updates to requirements for Eligible Depositories for custodial accounts, clarification of terms related to Servicing Contract, Servicing Contract Rights, and Transfers of Servicing and updates fees for BPOs.

With an SDQ rate resting below pre-pandemic levels…

In 2022, the overall market is still recovering from its peak in 2020, due to the continued loss mitigation efforts.

Throughout time, our SDQ has remained lower compared to the market.



Supported by results from our team and servicers…

2022
SDQ rate
1.12%

0.66% (EOY)

Initiatives to reduce the SDQ rate

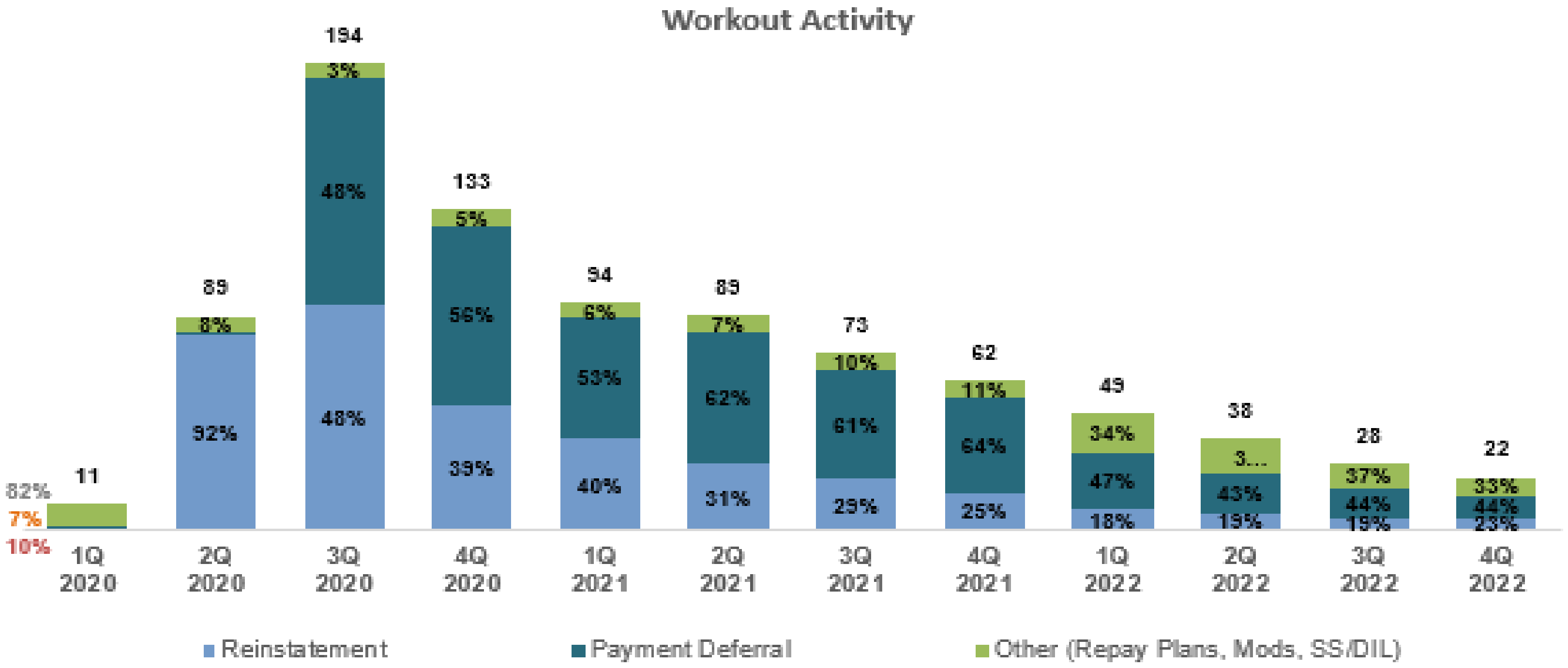
Issued **8** Servicing Bulletins & **1** Industry Letter

Hosted Servicer **9** webinars totaling **2,700+ attendees**

Held several advisory board meetings with **Top 15** Servicers

Helped homeowners with **77K** Forbearances, **61K** Payment Deferrals, and **44K** Flex modifications.

Resulting in workouts for homeowners…



- Freddie Mac's response (in alignment with Fannie Mae) to the crisis has remained swift and included the implementation of loss mitigation and servicing products designed to assist homeowners.
- Recent months have seen the volume of Flex Mod Trial Period Plans increase, while Payment Deferrals have begun to decrease.
- Workout Activity as decreased by 50% since January 2022, bringing us back to pre-pandemic levels.

FreddieMac SINGLE-FAMILY

Reimagine Servicing®

GO BEYOND

April 2023

We're Transforming the Servicing Lifecycle

Transforming the client experience

Creating an easier path to do business with us

Improving efficiencies

Eliminating manual processes, improving data quality and making access to servicing data easily available

Bringing innovation and speed to market

Developing and deploying solutions that meet our clients' needs and give them a competitive advantage

Reducing costs

Providing a no-cost servicing and default tool

Innovative Solutions Transforming Servicing

Resolve®
(Default Management)

Risk Mitigation
Automation and rule-based eligibility decisions means better data quality and rep and warranty relief

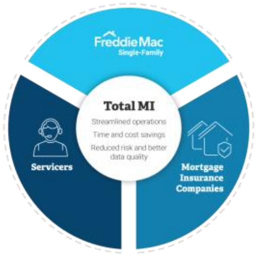
Speed to Market
Faster mortgage assistance provides a competitive advantage and benefits struggling homeowners

Operational Efficiency
Direction Integration Simplifies workflow saves time and resources

PAID
(Expense Reimbursement)

Cashflow
Faster reimbursement supports servicer and their partners operations

Operational Efficiency
Simplified workflow saves time and resources



Total MI[SM] (Mortgage Insurance)

Risk Mitigation
Reduced risk and controlled workflows make for more accurate and timely data exchange

Transparency
Tools connect the tri-party stakeholders and provide a clear view into processes

Investor Reporting

Transparency
Iterative enhancements to simplify the Servicer's workflow

Operational Efficiency
Simplified workflow and reporting saves time and resources

Key Reimagine Servicing Updates

Resolve (Default Management)

- Completed Resolve API integration and adoption with a total of 24 servicers to date.
- Mandate to adopt Workout Prospector/Bypass for Flex Mod and Payment Deferral submissions slated for 8/31.

PAID (Expense Reimbursement)

- Servicers can now enter expense dates up to a year in advance to account for work not yet performed.
- “Expense ID” is now available in eBill files to improve reconciliation of reimbursement payments from PAID.

Total MI Solutions

- 60% of claims volume now available for Servicer review due to Total MI Claims API adoption.
- Total MI Reconciliation fully adopted.
- 6 early adopters to begin testing Total MI Cancellations “single loan eligibility look-up” via UI in Q2-2023.

Investor Reporting (LLR, Cash Manager, Servicing Transfer Manager)

- Plans to increase loan submission capacity from 100,00 loans to 300,000 in Servicing Transfer Manager.

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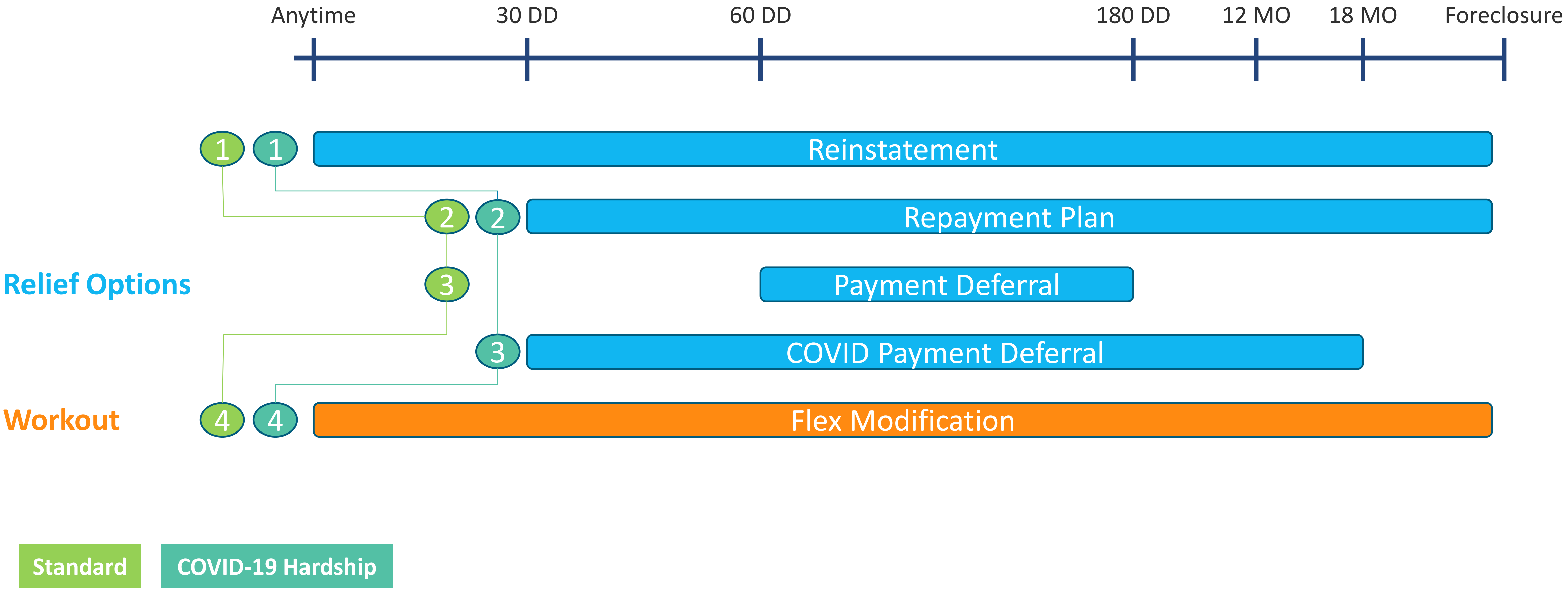
Questions?

Thank You

Appendix

Loss Mitigation Hierarchy

After forbearance, a borrower must be evaluated for a relief option or workout to bring the loan current. There are two evaluation hierarchy tracks – it depends if the hardship is related to COVID-19.



Loss Mitigation Hierarchy (cont.)

1. **Forbearance:** Relief option that provides a temporary reduction or suspension of payments to give Borrowers a period of time to improve their financial situation.

2. **Repayment Plan:** Borrowers that have had a short-term hardship, and now can begin making payments again, but either do not want or do not require a payment deferral or loan modification.

3. **Payment Deferral:** A relief option for Borrowers with a resolved hardship, who are between 60-180 days delinquent. Past due payments are deferred (non-interest bearing) and will be due and payable on the earlier of the Mortgage maturity date, refinance, payoff or transfer of the Mortgaged Premises.

    - **COVID-19 Payment Deferral:** An option to defer up to 18 monthly delinquent payments to create a non-interest-bearing balance that will become due and payable at the earlier of the Mortgage maturity date, refinance, payoff or transfer of the Mortgaged Premises. The hardship must be related to COVID-19.

4. **Flex Modification:** Permanently modifies the terms of the Mortgage in order to generate payment relief; the Flex Modification targets a 20% payment reduction by considering adjustments to term length, interest rate, and principal forbearance.

5. **Standard Short Sale:** Borrowers that wish to gracefully exit the home by selling the property for less than the total amount necessary to satisfy the mortgage. Cash or note contribution may be required in some instances.

6. **Standard Deed-in-Lieu:** Borrowers that wish to gracefully exit the home by voluntarily conveying clear and marketable title to the property to Freddie Mac in exchange for a discharge of debt.

INVESTOR DAY 2023

Portfolio Management & Analytics

Freddie Mac SINGLE-FAMILY | Credit Risk Transfer

Today's Speaker

Sacha Rosenthal

Vice President, Single-Family Servicing Portfolio Analytics

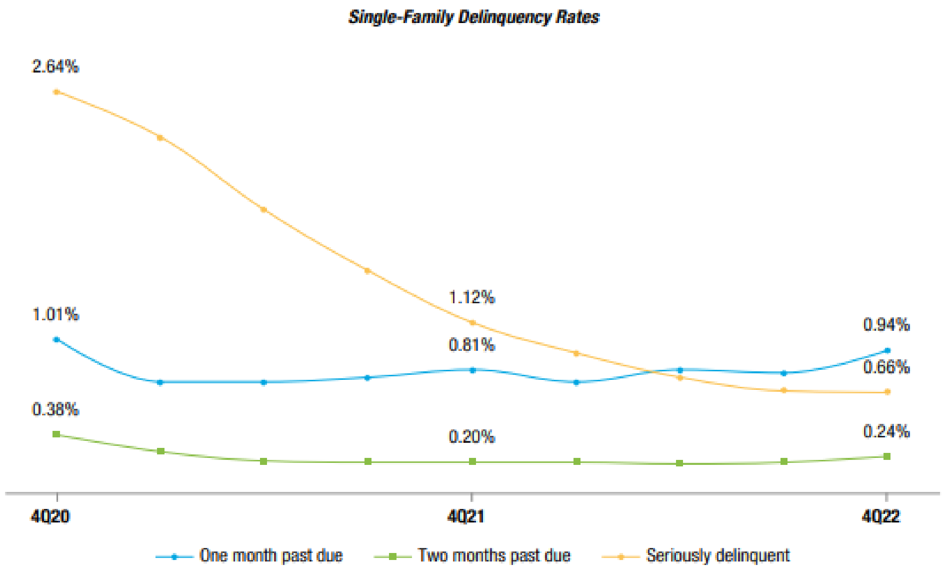
Sacha Rosenthal is accountable for developing strategies and analytics related to portfolio management, climate change and natural disasters, loss mitigation, distressed collateral liquidation, servicing policy, non-performing loan and re-performing loan transaction support as well as analytics to support Servicer relationship management. He is also responsible for servicing data, business intelligence applications and the Servicer Performance Profile. Mr. Rosenthal holds a BSc in biochemistry from the University of Bristol, UK.

Our Agenda

1. **Portfolio Delinquency Rates**
2. **Forbearance & Foreclosure Volumes**
3. **Natural Disasters**
4. **Climate Risk**

Portfolio Delinquency Rates

- Early delinquency rates have remained relatively consistent
  - D30 rates show volatility, which is normal
- We ended 2022 with 0.66% Serious Delinquency rate
- We are close to pre-pandemic levels (0.63% as of December 2019)
  https://www.freddiemac.com/investors/financials/pdf/10k_021320.pdf



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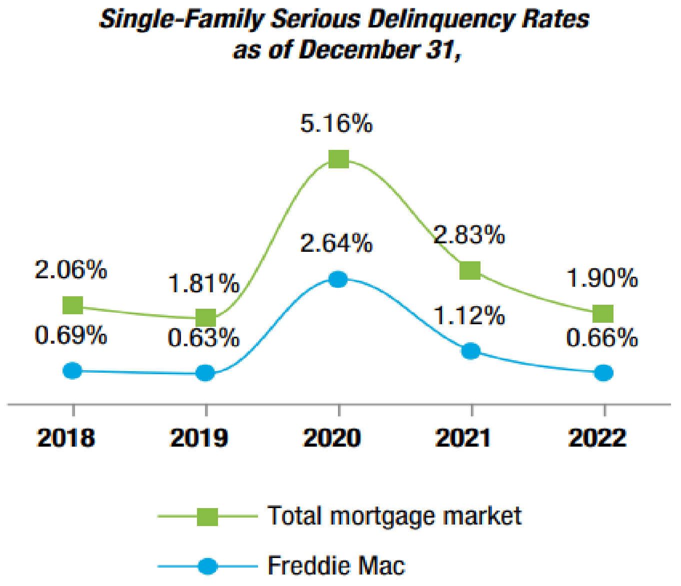
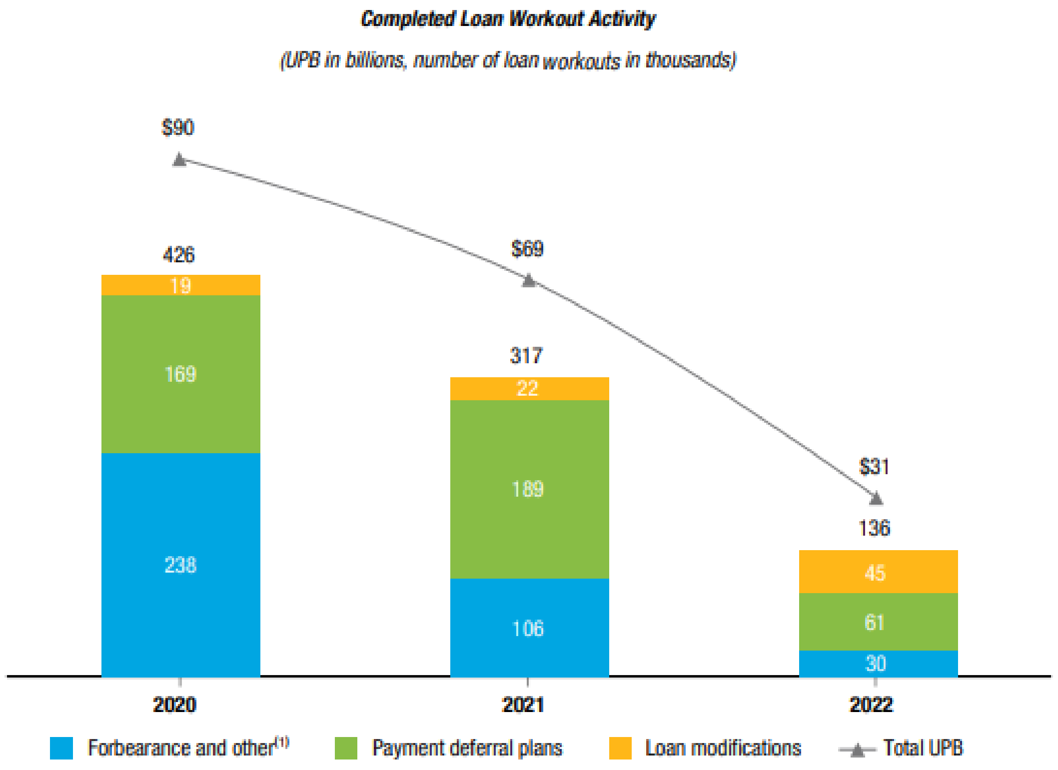


Source: National Delinquency Survey from the Mortgage Bankers Association. For 2022, the total mortgage market rate is as of September 30, 2022 (latest available information).

- Serious Delinquency Rates continue to improve and are lower than the total market average

Forbearance Volume and Workouts

- Forbearances continue to decline to low levels
- Payment Deferrals, designed for short-term/temporary hardship, continue to make up a large part of the loss mitigation activity
- We have seen a transition to Flex Modifications (designed for permanent/long-term hardships), but they are still less than 50% of our loss mitigation efforts



https://www.freddiemac.com/investors/financials/pdf/10k_022223.pdf

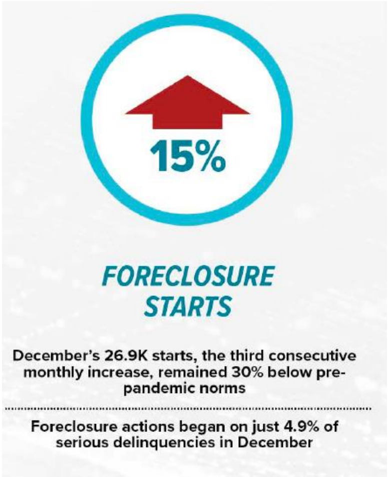
Foreclosure Volume - National

DECEMBER 2022 DATA SUMMARY

	Dec-22	Monthly Change	YTD Change	Yearly Change
Delinquencies	3.08%	2.31%	-6.68%	-8.89%
Foreclosure	0.37%	0.71%	31.76%	53.47%
Foreclosure Starts	26,900	14.96%	-18.24%	556.10%
Seriously Delinquent (90+) or in Foreclosure	1.38%	-0.55%	-26.83%	-31.38%
New Originations (data as of Nov-22)	322K	-18.1%	-64.7%	-65.6%

DECEMBER 2019 DATA SUMMARY

	Dec-19	Monthly Change	YTD Change	Yearly Change
Delinquencies	3.40%	-3.75%	-9.30%	-12.43%
Foreclosure	0.46%	-1.57%	-9.60%	-11.59%
Foreclosure Starts	39,500	17.91%	-21.31%	-14.69%
Seriously Delinquent (90+) or in Foreclosure	1.27%	-2.50%	-14.43%	-15.98%
New Originations (data as of Nov-19)	708K	-13.5%	57.6%	47.4%



	Oct-22	Sep-22	Aug-22	Jul-22	Jun-22	May-22	Apr-22	Mar-22	Feb-22	Jan-22	Dec-21	Nov-21	Oct-21
Delinquencies	3.08%	3.01%	2.91%	2.78%	2.79%	2.89%	2.84%	2.75%	2.80%	2.84%	3.36%	3.30%	3.38%
Foreclosure	0.37%	0.37%	0.35%	0.35%	0.35%	0.35%	0.36%	0.33%	0.32%	0.32%	0.31%	0.28%	0.24%
Foreclosure Starts	26,900	23,400	19,600	18,400	20,300	17,700	23,800	18,800	21,400	24,300	25,000	32,900	4,100
Seriously Delinquent (90+) or in Foreclosure	1.38%	1.39%	1.38%	1.39%	1.41%	1.46%	1.48%	1.45%	1.52%	1.62%	1.79%	1.89%	2.02%
New Originations		322K	393K	459K	523K	499K	600K	618K	676K	776K	675K	717K	910K

- Foreclosure referrals have begun and rising, yet are still below pre-pandemic levels
- There is a time lag before we see foreclosure referrals go to sale
  - Not every loan that is referred ultimately goes to sale

https://www.blackknightinc.com/wp-content/uploads/2023/02/BKI_MM_Dec2022_Report.pdf
https://www.blackknightinc.com/wp-content/uploads/2020/01/BKI_MM_Dec2019_Report.pdf

Things to Noodle

Is borrower behavior different this time around vs. the 2007-2008 crisis?

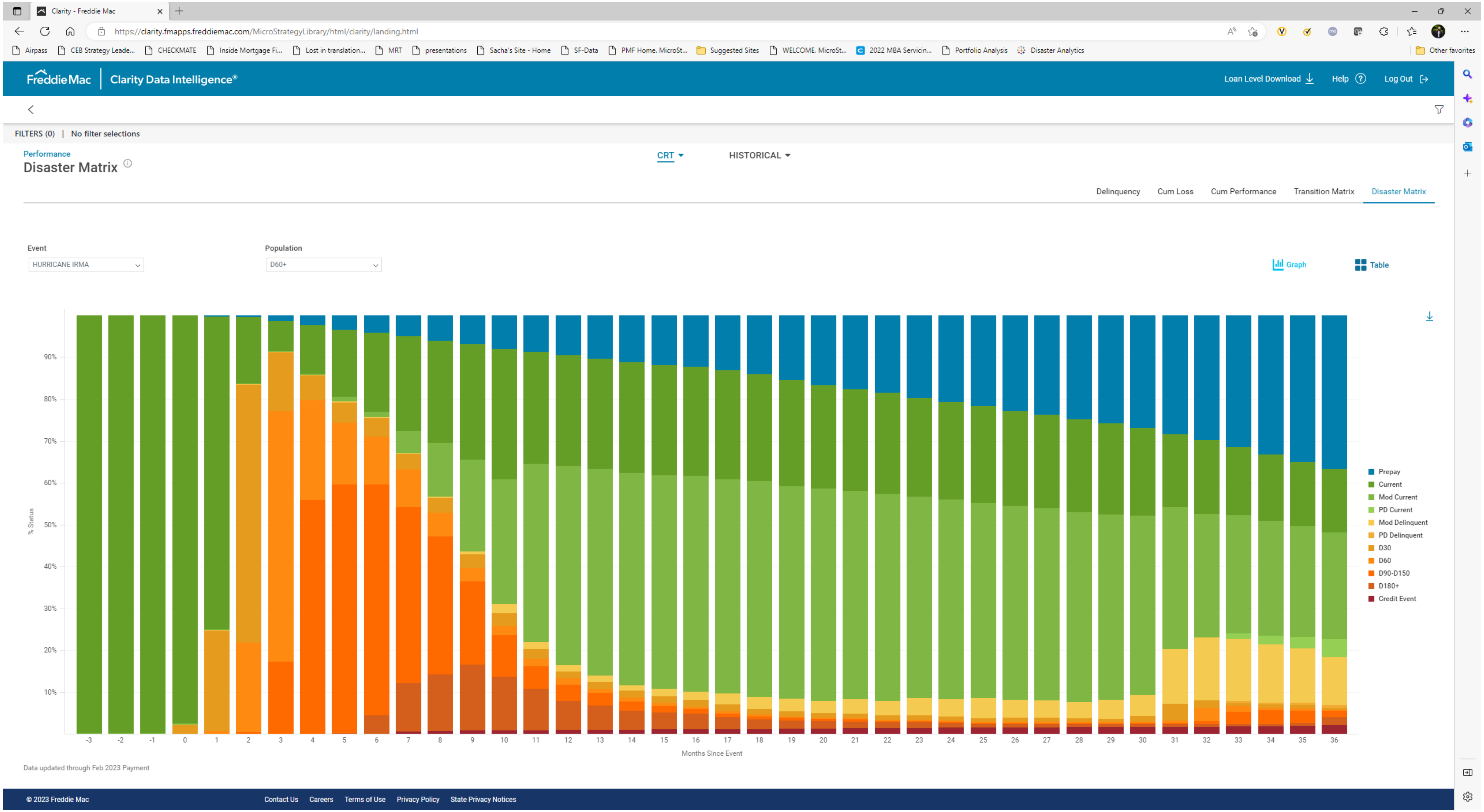
- Many borrowers have equity
- Unemployment is very low
- Are borrowers prioritizing mortgage payment over other debt as the house is their most valuable asset? Selling, moving and renting is expensive
- Forbearance could be considered commonplace; will we see a higher level of baseline Forbearance going forward?

Natural Disasters

Natural Disasters

- We have developed an application that checks FEMA's declaration page daily and maps/tags every loan in the portfolio that is impacted by Individual Assistance
- When large events strike (such as a hurricane), a full analysis on impacts is conducted
    - We leverage several external models to overlay windspeed, path of storm, storm surge, flood, fire boundary (if from wildfire) etc. to better understand risk
    - Most hurricanes show a similar pattern of increase in DQ in the months following, with a return to 'normal' within 12-18 months
    - It is very difficult to link a default with a natural disaster

Hurricane Delinquency Pattern – Example



Climate Risk

Physical Risk

Physical risk stems from the direct and indirect effects of physical hazards whose frequency/intensity may be worsening with climate change

- **Hazards** include:
  - Flood
  - Wind (including hurricanes)
  - Drought and water stress
  - Wildfire
  - Rising temperatures and heat waves

- Physical risk can be mitigated with **insurance, resiliency features** at the building or municipal level, disaster preparation, and disaster relief

Transition Risk

Transition risk stems from the societal and economic transition to a **low-carbon economy**

- **Regulations** that require energy efficiency can result in costly retrofits or fines
- Carbon taxes or strained supply can lead to increased **energy costs**
- Shifting **market demand** and **economic impacts** on carbon energy-intensive sectors
- Transition risk can be mitigated with **energy efficiency**; green mortgage programs help to incentivize efficiency and reduce credit risk

Residential emissions make up 15% of total U.S. emissions

Global emissions need to be cut by 45% by 2030 to keep warming under 1.5C

Municipalities with net-zero commitments will need to address residential emissions

Insurance

Increasing physical hazards make it a challenge for the insurance industry to offer **sufficient and affordable coverage**

Cost

- Premiums increase as a result of rising hazard risk
- Rising premiums increase the overall costs of homeownership

Coverage

- Property owners may purchase only the minimum required insurance
- Insurers and reinsurers may limit or add conditions for coverage

Availability

- For some hazards, in some locations, insurers have retreated
- States are stepping in to provide coverage; may not be sustainable

Borrower Impacts

Impacts will fall disproportionately on low income and minority populations, making it increasingly difficult to sustain safe, affordable housing

Affordability

- **Repair costs** for uninsured damage from physical hazards
- Higher **insurance premiums (or insurance cancellation)** from expectation of higher future risk
- Increased **energy consumption**, rising **utility costs** and **upgrade costs**
- Localized **macroeconomic impacts** leading to unemployment/ reduced income

Property Value

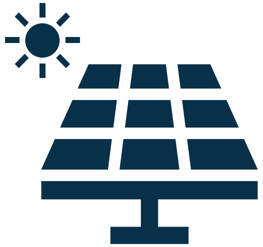
- Price adjustments for **unrepaired damages**
- Decreased demand due to **changing expectations** of future climate risk
- Decreased demand for properties lacking **resiliency and efficiency** features
- Localized **macroeconomic impacts** leading to property devaluation

Climate Scenario Analysis

Climate scenario analysis is a method to assess physical and transition risks based on different climate pathways over time

Climate scenario analysis can help us identify **risks**…

- Properties and locations most vulnerable to climate risks
- Circumstances that may lead to significant losses
- Disproportionate impacts to socially vulnerable communities



…and **opportunities**

- Targeted borrower education efforts
- Initiatives to increase resiliency and energy efficiency of the U.S. housing stock

Questions?

Thank You