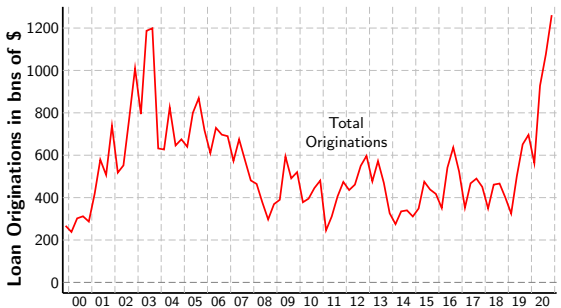
How Resilient is Mortgage Credit Supply? Evidence from the COVID-19 Pandemic

Andreas Fuster Aurel Hizmo Lauren Lambie-Hanson
James Vickery Paul Willen

CFPB Research Conference
May 6, 2021

The mortgage market has been booming

- 2020 was an extraordinary year for the US mortgage market:
  - $\approx$ \$4tr of mortgage originations, a new record
  - 30-year fixed rate fell below **3%** for first time
  - Surge in profits for lenders (e.g., Rocket: \$9.4bn; up 950%)

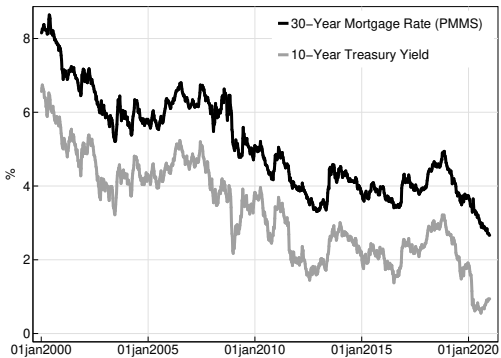


2000-2020 Quarterly Originations, Source: Mortgage Bankers Association

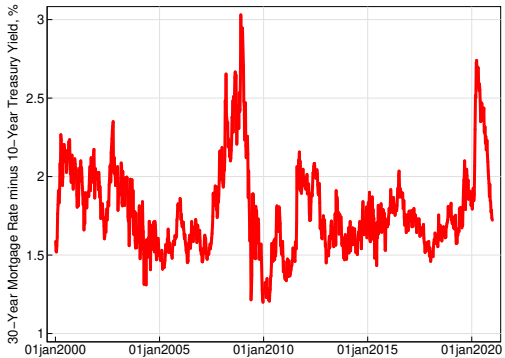
Despite good news, signs of market not functioning normally

- Spread of mortgage rates over Treasury yields spiked by 50-100bp, to levels not seen since 2008 financial crisis
- Reports from industry participants of tightening in credit standards

(a) Interest Rates



(b) Mortgage-Treasury Spread



This paper

Research question: Has the pandemic led to tighter mortgage credit supply? If so, *how* has that manifested itself, and *why*?

Main findings:

1. High mortgage spread entirely due to markup in primary market, not MBS spreads (except March 2020). Stark contrast to 2008.

2. Markup usually rises with demand, but this explains only part of recent increase. Supply elasticity currently low. Interpretation: operational frictions.
   - Labor scarcity & shift to fintech (easier to scale).
   - Not due to extent of macro & virus shock or limited search, competition etc.

3. Rates up for loans with high default risk for lender (e.g, jumbo, low-FICO FHA)
   - Government guarantee ensures resilience of credit supply in conforming market
   - Jumbo rates also up in part because not QE-eligible

Roadmap

1. Conforming market
    - Decomposing the Mortgage-Treasury spread
    - Evolution of intermediation markups ("gain-on-sale")
    - Drivers of high intermediation markups
2. Mortgage supply outside the conforming market (highlights, see paper for more)
    - FHA
    - Jumbo

Conforming market: Decomposition of Mortgage-Treasury spread

$$FRM_{30\text{yr}} - UST_{10\text{yr}} = \underbrace{FRM_{30\text{yr}} - \text{MBS yield}}_{\text{primary-secondary spread}} + \underbrace{\text{MBS yield} - UST_{10\text{yr}}}_{\text{MBS yield spread}}$$

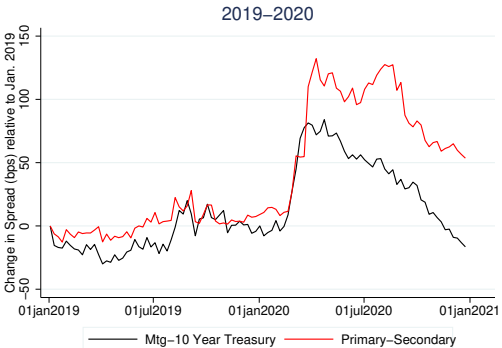
where *MBS yield* is the yield corresponding to new production MBS

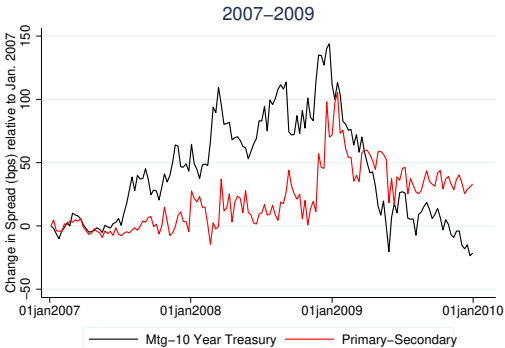
Decomposition of Mortgage-Treasury spread

Takeaway: High Mortgage-Treasury spread in 2020 due to larger intermediation markups (primary-secondary spread), except for volatility in mid-March.

- Rise in primary-secondary spread $\approx$ 120bp (peak); 50bp (November).

In 2007-09 crisis, elevated mortgage rates driven by large MBS yields.





Alternative to primary-secondary spread: gain-on-sale

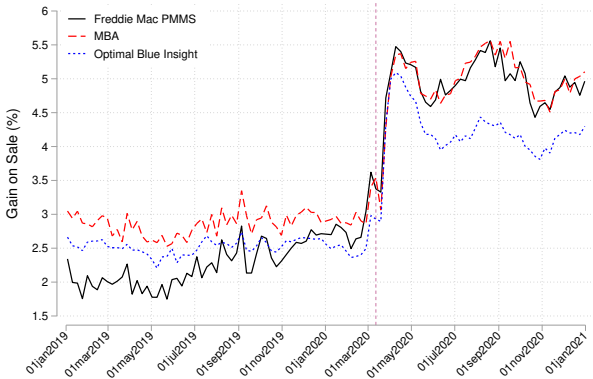
Net gain from originating mortgage, then securitizing it and selling the servicing rights

- Direct intermediation markup (or "price of intermediation"; Fuster et al. 2017).
- Reflects *present value* of primary-secondary spread.

$$\text{gain-on-sale}_{r_m} = \underbrace{p_{MBS}^{r_m - g - s} - fee_{GSE}}_{\substack{\textbf{mortgage value ex servicing rights} \\ \text{(net of upfront \& flow g-fees)}}} + \underbrace{(s \times m)}_{\substack{\textbf{value of} \\ \textbf{servicing} \\ \textbf{rights}}} - \underbrace{(100 - points)}_{\substack{\textbf{net amount} \\ \textbf{paid to borrower}}}$$

- To compute gain-on-sale:
  - MBS prices (p_{MBS}): J.P. Morgan Markets (TBA market)
  - servicing multiples (m): SitusAMC (based on secondary market trades etc.)
  - mtg rates r_m & points: Freddie Mac PMMS, MBA or Optimal Blue Insight

Evolution of gain-on-sale



- Sharp rise in gain-on-sale ($\approx$ 150-250bp).
  - In line with industry reports (e.g., Rocket/Quicken: $\approx$ 200bp rise in 2020:Q2)
  - Given >\$3tr originations in Q2-Q4, estimate total gain-on-sale of \$162bn, or \$80bn additional income for lenders relative to gain-on-sale at 2.5%

▸ More

Why did intermediation markups go up so much?

1. **Capacity constraints?** Mortgage markups typically rise during refi booms, because supply not perfectly elastic

   $\Rightarrow$ Not sufficient to explain increase in 2020

   $\Rightarrow$ Will argue that **operational challenges** related to pandemic made supply particularly inelastic

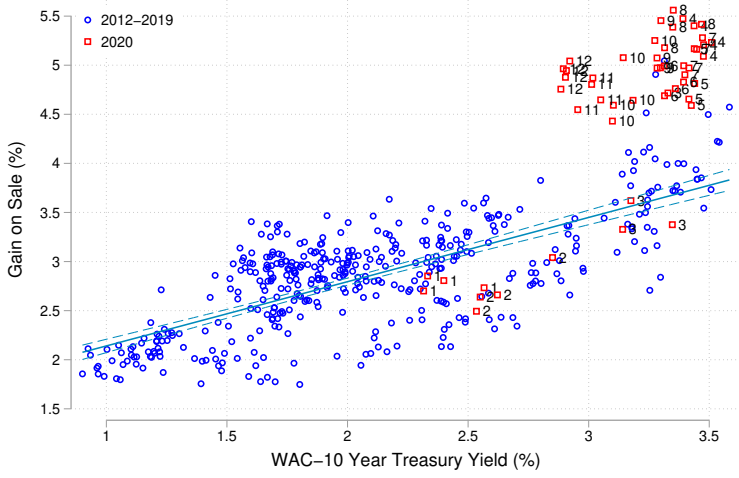
2. **Alternative explanations?**
   - Forbearance and default risk
   - Macro and health shock
   - Market power and shopping

Capacity constraints

- Intermediation markups typically increase in response to spikes in mortgage demand (Fuster-Lo-Willen, 2017)
  - Rate-driven refinancing generates large periodic demand shocks, leading to higher markups & processing times
- To what extent can historical relationship explain high recent markups?
- Two measures of demand:
  - **Refinancing incentive:** average coupon (WAC) of mtg stock - 10yr Tsy yield
  - **Application volume:** MBA applications index

Capacity constraints: evidence

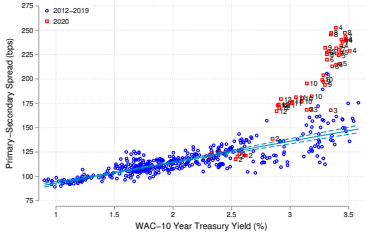
Gain on sale vs refinancing incentive [Mortgage WAC - 10 yr Tsy]



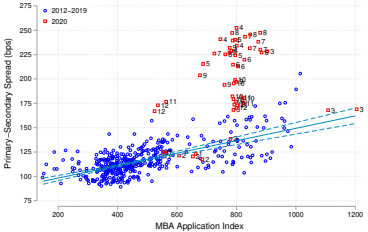
Notes: numbers next to red squares denote the calendar month in 2020. Trend line based on data from 2012-2019.

Intermediation markups vs demand: four measures

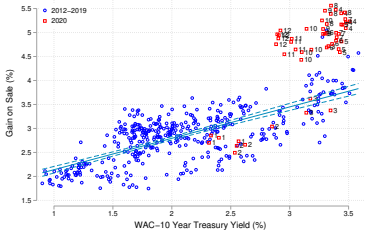
prim-sec spread vs. refi incentive



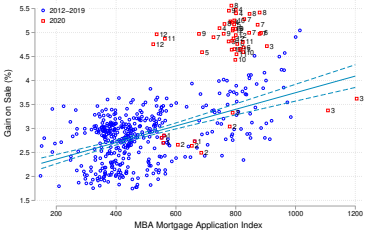
prim-sec spread vs application vol



gain-on-sale vs. refi incentive



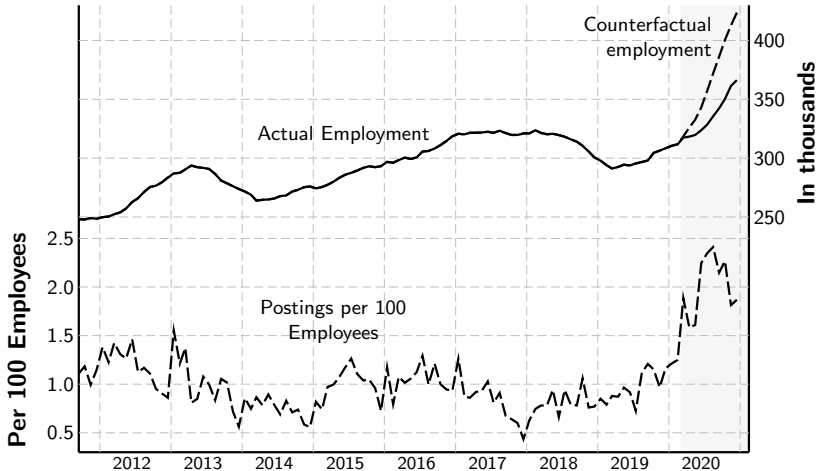
gain-on-sale vs. application vol



Why was mortgage supply so inelastic during the pandemic?

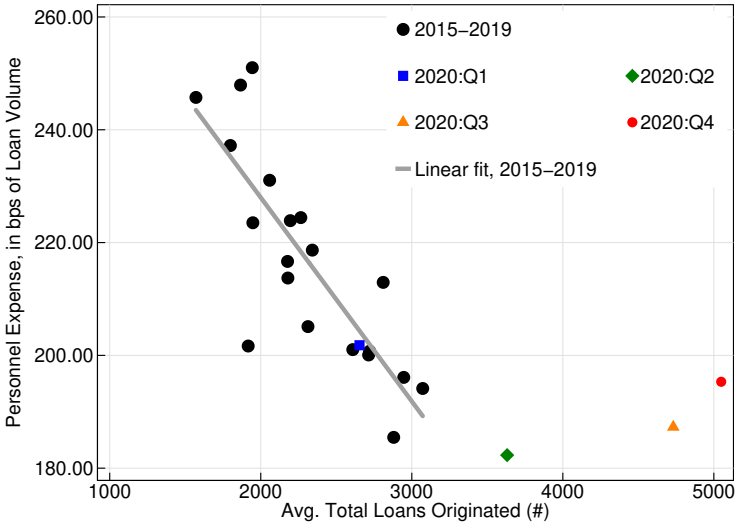
1. Challenges in originating and closing loans:
   - Hard to document borrower employment & income (many businesses closed + high rate of job loss required frequent rechecking of employment status)
   - County recorder offices closed or on limited schedules
   - Property appraisals, notarized closing etc. more difficult due to social distancing
2. Labor market frictions:
   - Practitioners say hard to train & monitor new loan officers remotely
   - Preference for experienced employees (often poached from competitors) that are "ready to go" and don't require close supervision
3. Licensing:
   - New loan officers, or those moving across states or from banks to nonbanks must legally be licensed through NMLS
   - Most testing and fingerprinting locations closed in first phase of pandemic

Figure: **Mortgage Loan Officer Job Postings and Employment Growth**



Sources: BLS Establishment Survey and Burning Glass Technologies. Counterfactual based on regression $\log MLO_{t+1} - \log MLO_t = \alpha + \beta_1 p_t + \beta_2 p_{t-1} + \beta_2 p_{t-2} + \varepsilon_t$ over 3/2012-12/2020.

Per unit labor costs vs. volume



Source: Mortgage Bankers Association Quarterly Performance Report

Growth in fintech lending

Implication of operational issues: Shift towards technology-based lenders with greater use of automation + online tools?

[Rocket CEO] *"Farner also said Rocket was able to scale more aggressively than competitors due to its tech stack and business model, which he said is far more efficient because it doesn't require disproportionately high headcounts."* – HousingWire (2020)

Examine using eMBS loan-level data + classification in Fuster et al. (2019)

- Regress Fintech dummy on loan/borrower characteristics and dummy for pandemic period (Apr 2020 onward)
- Sample period Jan 2019 - Dec 2020; use non-banks only

Fintech estimates

- Finding: significant growth in fintech share during the pandemic
  - More pronounced for mortgages which are labor intensive to underwrite and close – purchase mortgages, low FICO loans (cf. Sharpe and Sherlund, 2016)

Dependent variable = 100 if mortgage originator is a fintech lender, zero otherwise

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Purchase Mortgages			Refinancings			All Loans		
Pandemic	2.74***	2.17***	1.48***	-0.78	-0.33	-0.79∼	4.20***	1.71***	1.32***
	(0.28)	(0.27)	(0.26)	(0.62)	(0.35)	(0.39)	(0.29)	(0.27)	(0.26)
Pandemic × FICO<680			2.67***			4.04***			2.10***
			(0.26)			(0.34)			(0.21)
Num obs.	5147358	5147358	5147358	5473513	5473513	5473513	10620871	10620871	10620871
Mean of dep. var.	10.74	10.74	10.74	27.14	27.14	27.14	19.19	19.19	19.19
Loan controls	N	Y	Y	N	Y	Y	N	Y	Y

Standard errors clustered by state. $\sim p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Alternative explanations: did forbearance & default risk drive up rates?

Default risk may still matter for intermediaries despite government guarantee

- **Strategy:** Examine rates on conforming mortgages with high vs low credit risk (measured by credit score).
  - Increase in COVID delinquency/forbearance much larger for low-FICO mortgages.

a. Optimal Blue mortgage rate locks data:

$$\text{rate}_{ilmt} = \alpha_{mt} + \delta_{lt} + \beta_t \times \text{FICO bin}_i + \Gamma X_{ilmt} + \varepsilon_{ilmt},$$

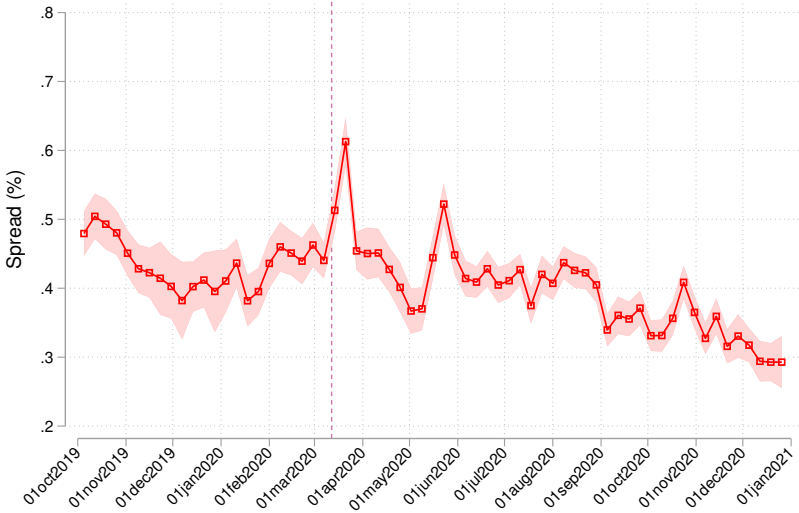
b. Optimal Blue Insight [offer rates: 680 vs 750 credit score]:

$$\text{rate}_{imt} = \alpha_{mt} + \beta_t \times (\text{FICO}_i = 680) + \varepsilon_{imt},$$

- **Test:** Higher rate premium on riskier mortgages as pandemic unfolds and delinquencies rise? [path of β_t]
  - Answer: No, for conforming loans (later will show effects for other segments)

Rate spread on low-FICO loans: conforming market

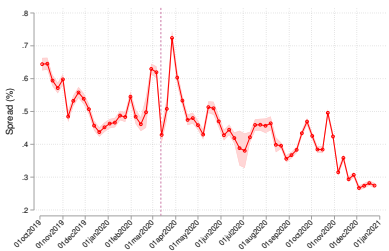
Time-series of β_t for FICO [680,699] vs. 740+ based on Optimal Blue rate locks data:



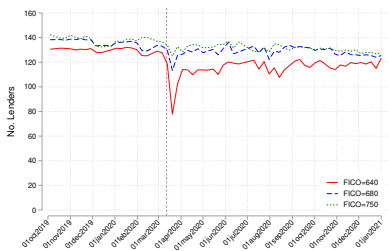
Rate spread on low-FICO loans: conforming market

- Other supporting evidence:
  i. No increase in low-FICO rate premium based on offer rates
  ii. Little change in number of lenders offering low-FICO loans
  iii. No drop in share of purchase mtgs to low-FICO borrowers (paper)

low-vs-high FICO spread: offer rate



number of lenders



Other alternative explanations

- **Macro and health shock?** Direct effects of virus spread on local public health, economic conditions?

  $\Rightarrow$ Across MSAs, essentially no link between mortgage rates and (i) measures of "COVID intensity", and (ii) local unemployment rate changes

- **Market power & shopping?** Lower interest rate passthrough due to mkt concentration (Scharfstein-Sunderam)? Or are borrowers shopping less?

  $\Rightarrow$ No variation in rate decrease across MSAs with more vs. less market concentration;

  $\Rightarrow$ Concentration actually seems to have *decreased* over 2020;

  $\Rightarrow$ Online activity suggests that people were shopping *more* than usual

Federal Housing Administration (FHA) market

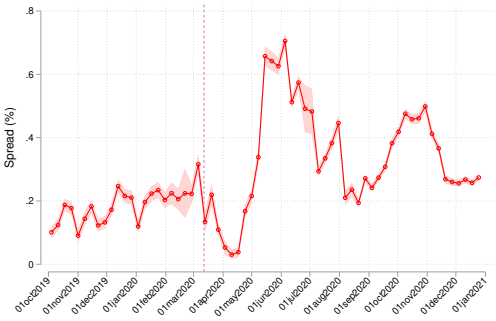
- FHA mortgages are originated mostly to less creditworthy low-income borrowers & first-time-buyers. LTV generally >95%.
  - Overall market share 2019: 11% ($) /15% (#)

- Government guaranteed. But lender/servicer still exposed to borrower default risk (Kim et al. *BPEA* 2018):
  - **Liquidity risk.** Servicer must advance payments if borrower defaults
  - **Foreclosure costs.** FHA doesn't reimburse everything, slow to pay.
  - **Servicing costs.** Delinquent loans more labor-intensive to service.
  - **Pipeline risk.** Loan may enter forbearance before sale.

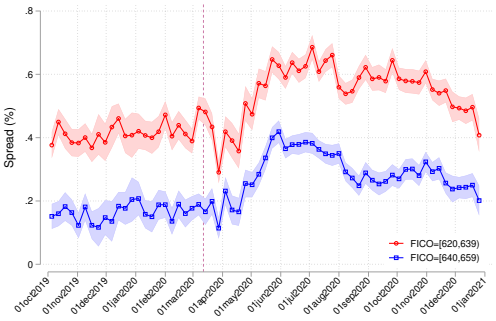
- **Finding:** These risks are priced into the mortgage rate. Risk premium increased during height of first wave of pandemic, then recovered.
  - We study wedge between (i) low- vs high-FICO FHA; (ii) FHA vs conforming

Results: FHA market

Offer Rate Spread: FICO 640 vs 680



Rate lock spread by FICO (vs 680-699)



Jumbo market

- Jumbos = large mortgages ineligible for agency securitization (no gov. guarantee)
  - Market share 2019: 16% ($) / 5% (#)
  - Banks dominate originations; most loans held in portfolio. Not directly influenced by Fed QE (agency MBS purchases).
  - "Super-conforming" loans in high-cost counties can appear in agency MBS, but those are less likely to be purchased by Fed.

Findings:

- Significant rise in jumbo-conforming rate spread (40bp+)
- Large drop in number of lenders willing to provide credit to lower credit-score jumbo borrowers (Optimal Blue Insight)
- In high-cost counties, origination volume falls both above county limit and above national limit, suggesting that both QE and credit guarantees bolstered supply in conforming market
  - Effect around local limit larger, suggesting that guarantees were more important

Conclusions

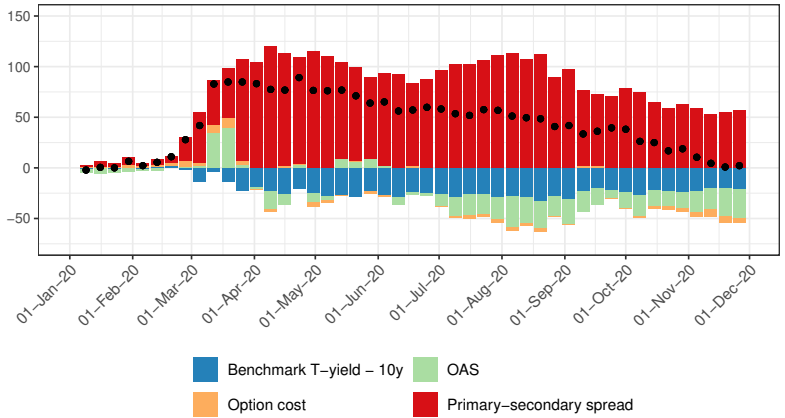
- US mortgage market has boomed during the pandemic: record origination volumes & lender margins
- Intermediation frictions have limited pass-through of low rates to borrowers
- Capacity constraints provide a partial explanation
  - ... but elasticity lower than historical experience, consistent with operational frictions
  - Some substitution to technology-based lenders
- Government credit guarantees have supported mortgage supply in "plain vanilla" conforming market
  - ... but not enough to fully insulate riskier lending in FHA market
  - Highlights benefits of mortgage designs that adjust automatically to downside shocks (e.g. ARMs; Eberly-Krishnamurthy 2014 design)

Extra slides

Decomposition of Mortgage-Treasury spread

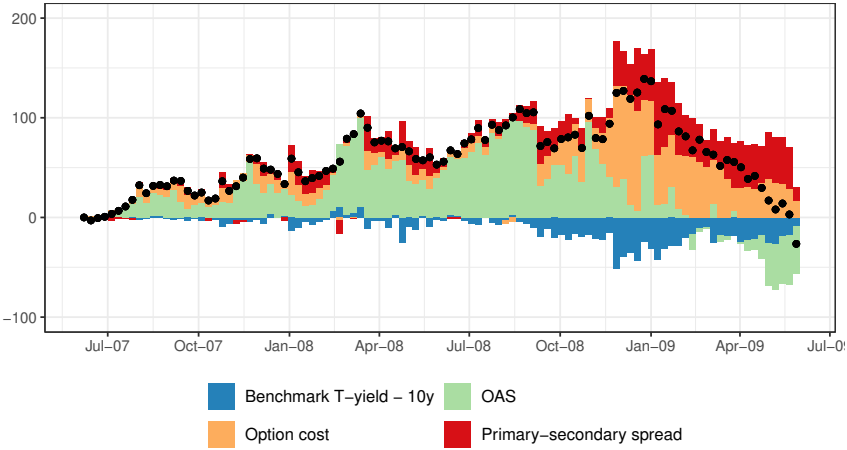
Takeaway: High mortgage rates are due to rise in intermediation markups (primary-secondary spread), except for volatility in March.

- Rise in primary-secondary spread $\approx$ 120bp (peak); 50bp (November).



Contrast with 2007-09 financial crisis

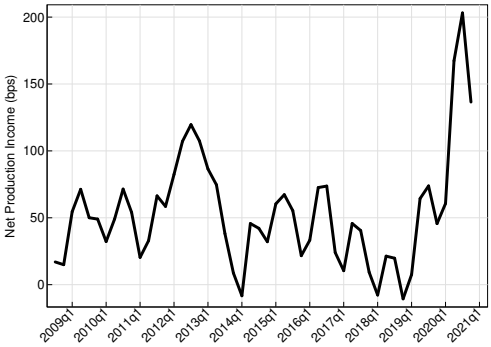
In 2007-09 crisis, elevated mortgage rates driven by spread of MBS over Treasuries. Primary-secondary spread not particularly high.



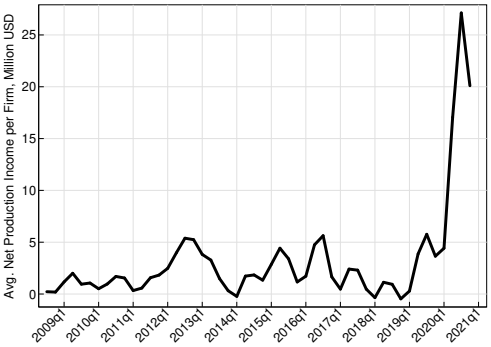
Direct evidence on profitability (Mortgage Bankers Assoc.)

Back

A. In basis points



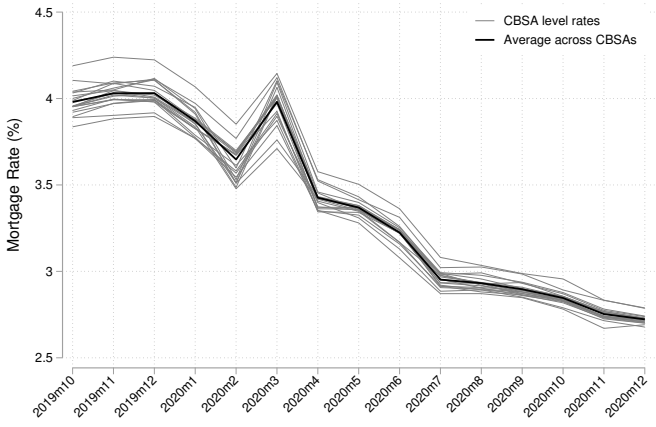
B. Multiplied by average originated loan volume



Data source: Mortgage Bankers Association Quarterly Performance Report.

Mortgage rates by geography

- Decline in mortgage rates is national. No obvious fanning out across cities (20 largest CBSAs). Also: purchase vs refi rates evolve similarly.



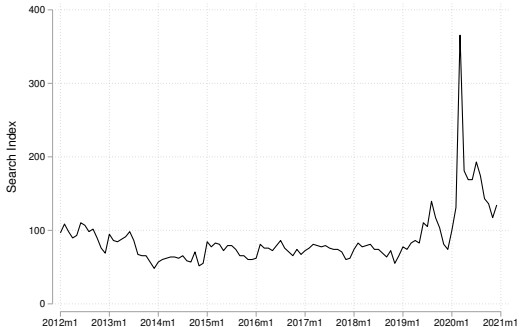
Shopping

- Even with many lenders, each originator may have market power if borrowers don't search (e.g., Wolinsky 1986; Bhutta et al. 2020).
- But no evidence that search intensity was unusually low in 2020, however; in fact the opposite may be true:
  - Google trends: record web searches for refinance-related terms
- Share of borrowers refinancing with prior lender only 18% – lowest rate in at least 15 years (Black Knight)

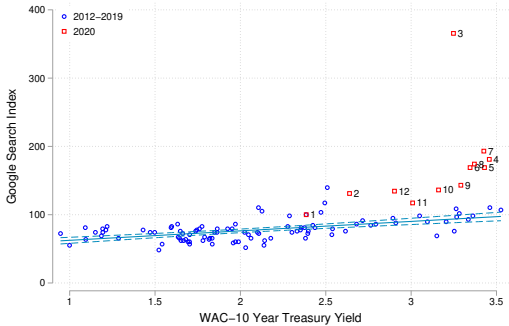
Mortgage search activity vs refi incentive

High recent search activity. Not accounted for simply by refi incentive.

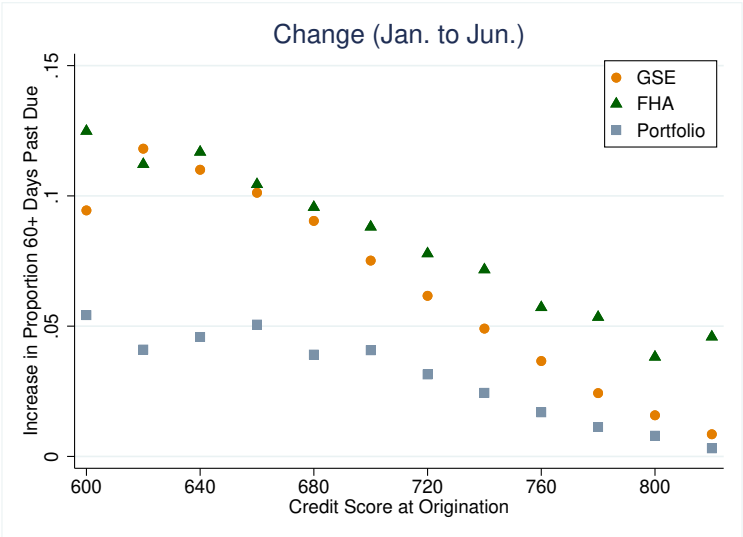
A. Search activity for refinance terms



B. Google searches vs. refi incentive

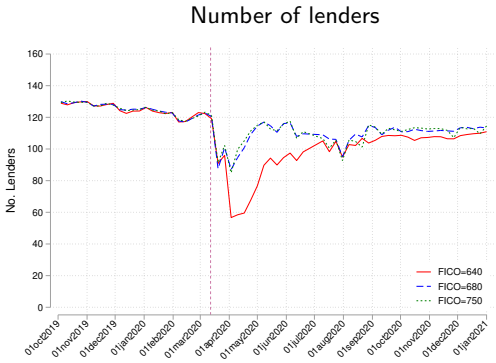


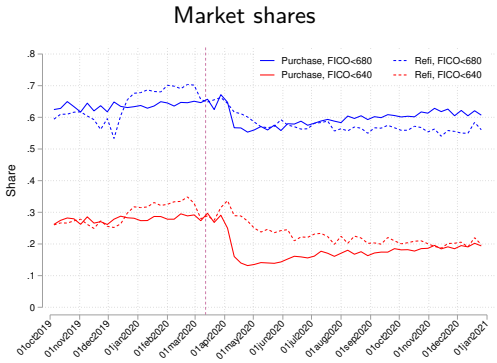
Changes in non-payment rates (Jan. to Jun. 2020), by FICO score



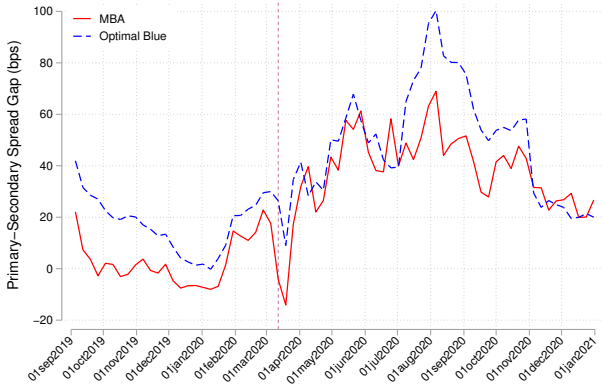
Data source: Black Knight McDash Data.

Results: FHA market





Primary-secondary spread: FHA – conforming

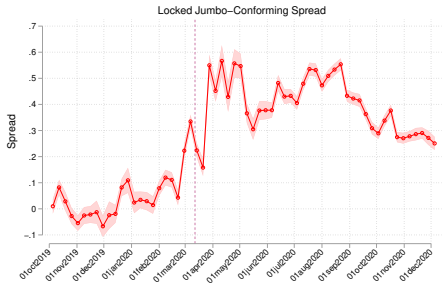


- Post-COVID rise in intermediation costs for FHA (vs conforming/GSE)
  - Magnitude $\approx$ 30-60bp. Consistent with rising risks of FHA lending.

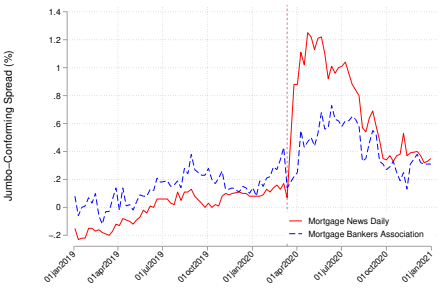
Jumbo-conforming spread

Finding: Significant rise in jumbo-conforming rate spread (40bp+)

Optimal Blue

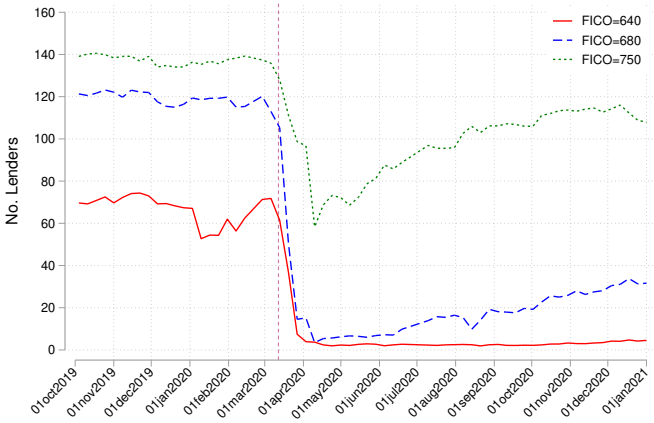


Other data sources



Drop in availability of lower credit-quality jumbos

- Evaporation of Optimal Blue lenders willing to provide credit to lower credit-score jumbo borrowers:



Change in jumbo and super-conforming shares

Dependent Variable = 100 if mortgage is above national or local conforming loan limit

	> national CLL (super-conf.)			> local CLL (jumbo)		
	(1)	(2)	(3)	(4)	(5)	(6)
Pandemic	-5.175***	-6.487***	-7.825***	-8.604***	-12.68***	-11.14***
	(0.319)	(0.191)	(0.179)	(0.293)	(0.372)	(0.273)
N	152005	325164	492240	99478	133618	242839
Mean Y	35.59	27.02	29.76	20.61	19.38	20.55
Origination type	Purchase	Refinance	All	Purchase	Refinance	All
Loan controls	Y	Y	Y	Y	Y	Y

- Col. 1-3: drop in super-conf. share
- Col. 4-6: larger drop in jumbo share (>50% in relative terms)

$\Rightarrow$ Suggests effects of both QE and government guarantee; larger for the latter