Paying Too Much? Price Dispersion in the US Mortgage Market

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The views expressed are those of the authors and do not necessarily reflect those of the Federal Reserve Board, the Federal Reserve System, or the Swiss National Bank.
Introduction

- Price dispersion in household credit markets highly welfare relevant
  - Potential redistribution from unsophisticated to sophisticated borrowers
  - Increase in vulnerability / default risk (with externalities)
  - May inhibit pass-through of monetary policy
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Study price dispersion in the world’s largest household credit market: the US mortgage market
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Study price dispersion in the world’s largest household credit market: the US mortgage market

Market appears highly competitive
- There are over 100 lenders making loans per market/day (over 7,000 unique lenders in HMDA data)
- Most mortgages are homogeneous products guaranteed by government-backed entities (Fannie/Freddie/FHA)
Questions

- Question 1: How much price dispersion is there for identical products in the mortgage market?

- Question 2: Are mortgage borrowers effective at searching/negotiating for rates?
  - How far are they from the lowest rates they could obtain?

- Question 3: Does this vary over time, with the level of market rates?
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- Question 2: Are mortgage borrowers effective at searching/negotiating for rates?
  - How far are they from the lowest rates they could obtain?
- Question 3: Does this vary over time, with the level of market rates?

Existing evidence sparse, due to data limitations
- Other credit types: Stango and Zinman (2017), Argyle-Nadauld-Palmer (2017)
Data

Our data come from an online industry platform, *Optimal Blue*

- Used by mortgage banks, credit unions, etc. for pricing mortgages, processing applications, managing pipeline, and selling to investors
  - Many act as “correspondents” for large banks like JPMC or WF
- About 25% of new loans in the US are processed through the platform
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Two separate components:

- **Lenders’ Best Offers**: real-time distribution of each lender’s best offer for a loan with certain characteristics, in a given MSA
  - “Customer facing”, i.e. including all fees etc.
  - Used by lenders for competitive benchmarking
  - Available since April 2016
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- **Contracted Mortgage Terms**: transaction-level data on “rate locks”
  - Includes exact time and terms of rate lock, mortgage and borrower characteristics, and lender ID
  - Typically leads to loan origination 15-60 days later
  - Available since late 2013; use starting Jan 2015
Institutional background

- US market: no such thing as “the mortgage rate”
  - lenders offer a menu of rates, fees (points/rebates) and lock periods
  - in our data 1 discount point on average buys the rate down by 16bp

<table>
<thead>
<tr>
<th>Freddie 30yr OpenAccess</th>
<th>CF30OA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>15 day</td>
</tr>
<tr>
<td>4.375</td>
<td>(3.651)</td>
</tr>
<tr>
<td>4.250</td>
<td>(3.123)</td>
</tr>
<tr>
<td>4.125</td>
<td>(2.540)</td>
</tr>
<tr>
<td>4.000</td>
<td>(1.834)</td>
</tr>
<tr>
<td>3.875</td>
<td>(1.210)</td>
</tr>
<tr>
<td>3.750</td>
<td>(0.561)</td>
</tr>
<tr>
<td>3.625</td>
<td>0.193</td>
</tr>
<tr>
<td>3.500</td>
<td>1.125</td>
</tr>
<tr>
<td>3.375</td>
<td>2.124</td>
</tr>
</tbody>
</table>
## Data: Offer rates

<table>
<thead>
<tr>
<th>MSA</th>
<th>Phoenix-Mesa, AZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan Amount</td>
<td>$300,000</td>
</tr>
<tr>
<td>Product Type</td>
<td>Conforming</td>
</tr>
<tr>
<td>Term</td>
<td>30 Yr</td>
</tr>
<tr>
<td>Purpose</td>
<td>Purchase</td>
</tr>
<tr>
<td>LTV</td>
<td>80</td>
</tr>
</tbody>
</table>

- **Lock Period**: 30
- **DTI**: 36
- **Amortization Type**: Fixed
- **ARM Fixed Term**: Not Applicable
- **FICO**: 750
- **Price**: 100
- **User**: None
- **Property Type**: Single Family
- **Auto U/W System**: Not Specified
- **Number of Units**: 1 Unit

[Show Defaults]
Sample distribution of offers

- *Best* offer each lender could make for this loan
- Note: “*Price*” = 100 + points
Dispersion in offered rates: example

- Daily offer data in Los Angeles, April 2016-April 2018 ($N \approx 120$/day):

- Across products and MSAs: going from the 90th to 10th percentile lender would save about 40-45 bps in rates, or about 2.5 points
Dispersion in locked rates

- Dispersion in offers need not result in dispersion in contracted rates, if borrowers search/negotiate effectively
  - Or maybe some of dispersion is due to some lenders offering “better” product (e.g. more convenience)
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- Test in lock data: do identical borrowers who choose the same mortgage product, in the same market, at the same time pay different prices?
  - And how much of dispersion is across lenders vs. within lenders?

- Regress locked mortgage rates on all the relevant underwriting variables
  - Borrower and loan characteristics, time effects, and an increasingly fine set of fixed effects

- Our outcome of interest is the remaining dispersion in the residual
## Dispersion in locked rates

<table>
<thead>
<tr>
<th>Residual Dispersion</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75-25th percentile</td>
<td>0.25</td>
<td>0.22</td>
<td>0.14</td>
</tr>
<tr>
<td>90-10th percentile</td>
<td>0.54</td>
<td>0.48</td>
<td>0.32</td>
</tr>
</tbody>
</table>

FICO $\times$ LTV $\times$ DTI $\times$ Loan Amount $\times$...  
... $\times$ Points $\times$ Program grid (7,680 values)

| Lock date $\times$ MSA F.E. | Yes | Yes | Yes |
| Lender F.E.                | Yes |
| Lender $\times$ MSA $\times$ Week F.E. | Yes |
| Lender $\times$ FICO $\times$ LTV $\times$ Program $\times$ Week F.E. | Yes |
| Lender $\times$ Points $\times$ Week F.E. | Yes |

Observations: 1,939,237  
Adjusted R-squared: 0.72, 0.76, 0.84
Comparing dispersion in locked and offered rates

- Dispersion larger among (likely) more constrained/less sophisticated borrowers
- Likely driven by consumer search/negotiation process rather than supply
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Locked - Offered Rate Gap: Jumbo Mortgages

- Average Jumbo borrower pays 17bp less than the median offered rate.
- Equivalently, they save about 1% of mortgage balance in points/fees.
Locked - Offered Rate Gap: Jumbo Mortgages

- Locked rate minus the median best offer for an identical mortgage

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Locked - Offered Rate Gap: Conforming

- Locked rate minus the median best offer for an identical mortgage

Average Conforming borrower pays 10bp *more* than the median offer.
- equivalent to 0.8% of mortgage balance in upfront points/fees
Locked - Offered Rate Gap: FHA

- Locked rate minus the median best offer for an identical mortgage.

- Average FHA borrower pays 30bp more than the median offer.
  - Equivalent to 2% of mortgage balance in upfront points/fees.
Regression analysis: who (over)pays more?

- We estimate:

\[
rate_{imt}^{lock} - rate_{imt}^{offer} = \alpha + f(X_i) + \mu_t + \lambda_l + \xi_m + \varepsilon_{imt}
\]

- \(X_i\): FICO, LTV, DTI, loan amount, first-time homebuyer, age
- \(\mu_t, \lambda_l, \xi_m\): month, lender and MSA fixed effects (or month \(\times\) lender \(\times\) MSA)
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![Loan amount coefficients and 90% CI](image-url)
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![FICO coefficients and 90% CI](image)
Comparing LORG to pricing differences in offered rates

- Additional rate paid by low-FICO borrowers about 1/2 as large as rate premia due to credit risk
Comparing LORG to pricing differences in offered rates

- Offered rates for loans with LTV > 80 not higher (due to required mortgage insurance) but locked-offered gap positive
Locked-offered rate gap: takeaways

- Proxies for being more constrained / less sophisticated are associated with obtaining a rate that is substantially above what lenders offer in the market
  - Same borrower/loan types for which there is also more dispersion
  - Also larger locked-offered gaps for first-time homebuyers, older borrowers (not shown)

- Coefficients on borrower/loan characteristics almost unchanged as add lender FE, or lender $\times$ location $\times$ time
  $\Rightarrow$ suggests that not driven by sorting into cheap/expensive lenders; may instead reflect negotiation/bargaining (e.g. matching outside offers)
### Time-series variation

We create an average Locked-Offered Rate Gap by taking the month fixed effects from previous regression. The average LORG is strongly negatively correlated with Treasury yields:

- Coefficient on monthly changes: -0.13;
- $R^2 = 0.37$

Effects stronger for higher DTI or low FICO borrowers, suggesting that both behavioral factors and constraints play a role.
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Policy implications

- If results are driven by search/negotiation frictions
  - Most vulnerable part of the borrower population is overpaying
  - Subsidies by government entities (GSEs and FHA) may not fully pass-through to borrowers

- Mitigating this problem would leave these borrowers with more disposable income, or allow GSEs and FHA to increase guarantee fees without affecting affordability

- Potential ways of doing this:
  - Disclose to borrowers savings from choosing median lender (in real time)
  - Don’t guarantee mortgages with too high of a locked-offered rate gap

- Of course need to consider “GE implications” on pricing
**Policy implications 2**

- The negative relationship between level of market rates and the locked-offered rate gap matters for monetary policy transmission.

- As rates fall (e.g. in response to central bank actions), borrowers tend to do worse relative to the distribution of offered rates:
  - Contract rates do not fall as much as they could
  - Mortgage spreads increase for reasons unrelated to risk leading to more lender profits

- This relationship is stronger for low-FICO borrowers, whose spending and default hazard might respond most strongly to a larger drop in their mortgage rate.

- Overall, time-series variation in LORG adds friction to the pass-through of monetary policy to the mortgage market:
  - In addition to e.g. inefficient refinancing (Campbell, 2006; Keys et al., 2016; Andersen et al., 2018)