Financial Literacy and Mortgage Outcomes

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The views expressed here are solely those of the authors and not of the Federal Reserve System.
Did Borrowers Make Informed Decisions?

*Source: The Economist.*
Adjustable-Rate Mortgages Prone to Default

- Differences in observed borrower characteristics (FICO, DTI) or loan characteristics (LTV, documentation status) are small.

![Graph showing fraction foreclosed in 30 months vs. FICO Score for ARM and FRM mortgages originated in 2005 and 2006]

*Note: Own calculation based on subprime sample from McDash Analytics, LLC data. Subprime first-lien mortgages used for home purchases only.*
What is the right interpretation of this difference?

- **Product**: Do ARMs simply provide stronger incentives to default as house prices decline?

- **Borrowers**: Do worse borrowers select into ARMs?

- **Product × Borrowers**: Do borrowers select into ARMs, not anticipating how to handle difficult times?

Research Question: What is the role of financial literacy?

- Do financially illiterate borrowers select into risky products?
  - Are they more likely to have ARMs, high leverage?
  - Are they aware of the terms of their mortgage?

- Is financial literacy associated with delinquency? (later this year)
  - Is the association specific to ARMs?
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- **Product**: Do ARMs simply provide stronger incentives to default as house prices decline?
- **Borrowers**: Do worse borrowers select into ARMs?
- **Product \times Borrowers**: Do borrowers select into ARMs, not anticipating how to handle difficult times?

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Behavioral Biases and Credit Markets

Are borrowers well-equipped to make financial decisions?

- Borrowers make informed decisions
  
  “(. . .) I am more open to the idea that some borrowers were making rational decisions about risk and rewards. Providing more information would not change these people’s decisions.” (Ian Ayres in NYtimes.com, October 14, 2008)

- Borrowers make uninformed decisions
  
  “Many (. . .) buyers who took out high loan-to-value mortgages with adjustable rates did not have ready access to information about what they were doing (. . .) and so made serious mistakes” (Robert Shiller in Wall Street Journal, October 9th, 2008)

  “Take the greed and the financial misrepresentation out of it, and the root of this crisis is massive levels of financial illiteracy” (John Bryant in The Economist, April 3rd, 2008)
Literature on consumption paints bleak picture of financial literacy, and shows associations with "bad" outcomes.

- Many individuals get even most basic questions wrong.
- Financially illiterate individuals have lower retirement savings (Banks and Oldfield, 2007) and engage less in planning for retirement (Lusardi and Mitchell, 2005).
- Less financially literate incur more debt (Stango and Zinman, 2008).
- Low ability to budget finances is associated with lower household assets (Ameriks et al., 2003).

- Literature on mortgage choice is largely silent on role of financial literacy on mortgage choice.

- Results raise possibility that financial literacy plays an important role in mortgage choices.
Our Research

- Survey of 585 subprime borrowers in the North East
  - Financial literacy questions
  - Questions about their mortgages

- Combine survey and actual mortgage outcomes (N=348)
  - Actual mortgage info from Registry of Deeds and LoanPerformance
  - For a matched sample of subprime borrowers (vintage 2005/06)...
    - Written invitation to participate in 15-minute phone survey.
    - Called subjects to conduct survey
    - Participants received $20
  - We match their survey answers to the actual mortgage information

1 No diff. in observable characteristics between participants and non-participants
## The Data

<table>
<thead>
<tr>
<th>Registry of Deeds/LP</th>
<th>Survey Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM or FRM</td>
<td>⇔ ARM or FRM?</td>
</tr>
<tr>
<td>Mortgage Amount</td>
<td></td>
</tr>
<tr>
<td>Low Doc</td>
<td></td>
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<tr>
<td>FICO</td>
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<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>HH income</td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
</tr>
<tr>
<td>Immigrant status</td>
<td></td>
</tr>
<tr>
<td>Preferences</td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>Financial literacy</td>
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</tbody>
</table>

\(^a\)“Does your mortgage have a fixed interest rate and monthly payment or does your mortgage have an interest rate and monthly payment that can change in the future (that is, a variable rate)?”
Overview of Study

The Survey

Financial Literacy

Financial Literacy Questions (Banks and Oldfield, 2007)

1. In a sale, a shop is selling all items at half price. Before the sale, a sofa costs $300. How much will it cost in the sale?
2. If the chance of getting a disease is 10 per cent, how many people out of 1,000 would be expected to get the disease?
3. A second hand car dealer is selling a car for $6,000. This is two-thirds of what it cost new. How much did the car cost new?
4. If 5 people all have the winning numbers in the lottery and the prize is $2 million, how much will each of them get?
5. Let’s say you have $200 in a savings account. The account earns ten per cent interest per year. How much will you have in the account at the end of two years?

Following Banks and Oldfield (2007), we classify borrowers into four groups of financial literacy:
I: worst (15%), II (57%), III (18%), IV: best (11%)
Does Financial Literacy Affect the Contract Choice?

1. Results
   - What Contract Did The Borrowers Sign?
   - What Contract Do The Borrowers Think They Signed?

2. Conclusion
   - Summary
   - Questions for Further Research
Does Financial Literacy Affect Mortgage Choices?

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Financial Literacy and ARMs

Note: N = 316. Control variables: Socio-demographics, mortgage info, preferences, and predicted interest rate difference between ARM and FRM.
Results

What Contract Did The Borrowers Sign?

Financial Literacy and ARMs

Coefficients of OLS regressions with mean-adjusted control variables:
Socio-demographics (Age, income, etc.), Mortgage info (Rate, FICO, LTV, Amount, etc.), Preference Parameter, Predicted Interest Rate Diff

Note: N = 316. Control variables: Socio-demographics, mortgage info, preferences, and predicted interest rate difference between ARM and FRM.

Lorenz Goette (University of Geneva) Financial Literacy and Mortgage Outcomes
Results

Financial Literacy and ARMs

Note: N = 316. Control variables: Socio-demographics, mortgage info, preferences, and predicted interest rate difference between ARM and FRM.
Debt-to-Income

Results

What Contract Did The Borrowers Sign?

Note: N = 329. Control variables: Socio-demographics, and Mortgage info.

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Verification of Borrower’s Income and Asset (Low Doc)

Proportion of Mortgages with Low Documentation

Financial Literacy Groups

Note: N = 331. Control variables: (1) Socio-demographics, and (2) Mortgage info.
Financial Literacy and Search Behavior

A: Attending Home Buyer Class (=1)

B: Asking Friend & Family for Info (=1)

C: Searching the Internet for Info (=1)

D: Shopping Around (=1)

Financial Literacy Groups

Note: N = 331. Control variables: Socio-demographics.
Summary & Interpretation

- Financial literacy is not correlated with the choice of adjustable-rate mortgages.

- Financial illiterate individuals are as likely to get complicated contract as sophisticated individuals

- Further results show that low financial literacy is associated with some differences in mortgage choices.
  - More likely to have low-doc loan.
  - Higher mortgage-to-income ratio.
  - Tend to search less for information / competing offers.

- Consistent with results from consumption literature. Broadly "worse" outcomes and little planning associated with poor financial literacy.
Does Financial Literacy Affect Mortgage Choices?

1. Results
   - What Contract Did The Borrowers Sign?
   - What Contract Do The Borrowers Think They Signed?

2. Conclusion
   - Summary
   - Questions for Further Research
Do Borrowers Know That They Have an ARM?

30% think FRM while having ARM!

Proportion of ARM holders who think they have FRM

Financial Literacy Groups

I: worst
II
III
IV: best

Note: N = 208. Control variables: Socio-demographics.

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Large fraction do not know basic terms of their mortgage

Least financially literate are most likely to think that they have a FRM when they have an ARM

Financial illiteracy leads individuals to have other contracts than they think they have (than they want to have?)

Does this mistake predict default on mortgages?
Does Financial Literacy Affect Mortgage Choices?

1. Results
   - What Contract Did The Borrowers Sign?
   - What Contract Do The Borrowers Think They Signed?

2. Conclusion
   - Summary
   - Questions for Further Research
Our research provides evidence whether financial literacy is a serious concern in the mortgage market.

The results show:

- Like in earlier studies, lack of basic financial literacy is widespread in population of subprime borrowers. We also find that many borrowers are wrong about crucial aspects of their mortgage.

- Financial literacy is associated with some differences in mortgage terms and choices, but **does not predict propensity to have ARM instead of FRM**.

- However, financial literacy predicts who mistakenly thinks they have an FRM.
Does Financial Literacy Affect Mortgage Choices?

1. Results
   - What Contract Did The Borrowers Sign?
   - What Contract Do The Borrowers Think They Signed?

2. Conclusion
   - Summary
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So what explains the abysmal performance of ARMs?

- Our results do not favor a simple selection story as an interpretation of high ARM defaults.
  - Differences in financial literacy do not predict the type of mortgage they chose.

- However, our results leave open the possibility that individuals were unaware of the contracts they got themselves into. Then they lost control as market conditions got worse.
  - Evidence on default rates will address this issue.
THANK YOU
### Financial Literacy among Subprime Borrowers

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
<th>N</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I: worst</td>
<td>Either: q1, q2, q3 all incorrect</td>
<td>85</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Or: q1 correct; q2, q3, q4 all incorrect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group II</td>
<td>At least one of q1, q2, q3, q4 incorrect</td>
<td>331</td>
<td>57%</td>
</tr>
<tr>
<td>Group III</td>
<td>q1, q2, q3, q4 all correct; q5 incorrect</td>
<td>104</td>
<td>18%</td>
</tr>
<tr>
<td>Group IV: worst</td>
<td>q1, q2, q3, q4, q5 all correct</td>
<td>65</td>
<td>11%</td>
</tr>
</tbody>
</table>

*Notes:* Following Banks and Oldfield (2007).
Financial Literacy and College

![Diagram showing financial literacy by college degree and financial literacy levels (I: worst, II, III, IV: best).]

Financial Literacy and Cognitive Abilities

Financial Literacy and Income Quartiles

Do Borrowers Know That They Have a FRM?

13% think ARM while having FRM!

Note: N = 108. Control variables: Socio-demographics.
Pre-Payment Penalty

Note: N = 325. Control variables: (1) Socio-demographics and (2) Mortgage info.
Knowledge About Existence of Prepayment Penalty

26% not aware of their pre-payment penalty!

Proportion of Borrowers with Penalites who are not aware of it

Financial Literacy Groups

Note: N = 143. Control variables: (1) Socio-demographics.