INTEREST RATES AND EQUITY EXTRACTION

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*Views expressed do not necessarily represent those of the Federal Reserve Board
Household leverage rose in 2000’s

Mortgage debt accounts for most of the rise

- More people buying (more expensive) houses
- Homeowners extracting equity (e.g. taking out a 2$^{nd}$ mortgage)
Primary research question

- The Fed eased from 2000-2003 and into 2004 to combat weak economy
- Did the drop in (short term) mortgage rates help spur equity extraction?
Preliminary evidence: likelihood of extraction peaks in 2003
What else could have helped cause spike in extraction?

- Rising home prices?
Contributions of paper

• Estimate response of equity extraction to mortgage rates
• Quantify importance of different methods of extraction
• What do people do with money?
• What’s the effect of extraction on delinquency?
Data

- **FRBNY Consumer Credit Panel/Equifax**
  - 5% national sample of individuals with a credit record
  - Quarterly frequency, starting in 1999
  - Data on each mortgage account
  - Data on other debt, performance, credit scores, etc.
  - County, ZIP and census tract location of each individual → merge to:
    - CoreLogic ZIP house price indices
    - Employment data from BLS
    - Census tract demographic data
Sample design and identifying equity extractors

• Observe individuals at beginning and end of each year, 1999-2010

• Sample: individuals in year $t$ with a mortgage who don’t move (exclude those with multiple first lien mortgages)

• Extract: total mortgage balance increases by at least 5% by end of year
## Sample size by year

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>Fraction Who Extracts</th>
<th>Initial balance ($) (median)</th>
<th>% Change in balance (median)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>61,574</td>
<td>0.091</td>
<td>81,956</td>
<td>22.8%</td>
</tr>
<tr>
<td>2000</td>
<td>68,584</td>
<td>0.080</td>
<td>88,127</td>
<td>23.2%</td>
</tr>
<tr>
<td>2001</td>
<td>67,595</td>
<td>0.138</td>
<td>95,323</td>
<td>23.8%</td>
</tr>
<tr>
<td>2002</td>
<td>81,989</td>
<td>0.159</td>
<td>101,000</td>
<td>23.6%</td>
</tr>
<tr>
<td>2003</td>
<td>88,554</td>
<td>0.199</td>
<td>104,499</td>
<td>23.2%</td>
</tr>
<tr>
<td>2004</td>
<td>86,402</td>
<td>0.164</td>
<td>122,000</td>
<td>22.4%</td>
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<tr>
<td>2005</td>
<td>95,732</td>
<td>0.169</td>
<td>134,367</td>
<td>23.2%</td>
</tr>
<tr>
<td>2006</td>
<td>95,114</td>
<td>0.146</td>
<td>142,519</td>
<td>22.0%</td>
</tr>
<tr>
<td>2007</td>
<td>97,814</td>
<td>0.130</td>
<td>139,126</td>
<td>20.2%</td>
</tr>
<tr>
<td>2008</td>
<td>102,025</td>
<td>0.087</td>
<td>123,124</td>
<td>18.7%</td>
</tr>
<tr>
<td>2009</td>
<td>101,208</td>
<td>0.071</td>
<td>111,586</td>
<td>18.0%</td>
</tr>
<tr>
<td>2010</td>
<td>100,691</td>
<td>0.062</td>
<td>110,017</td>
<td>18.8%</td>
</tr>
</tbody>
</table>

**All Years**

1,047,282 | 0.124 | 114,872 | 22.1%
Several ways to extract equity

Cash-out Refi  HELOC  2nd mortgage  Other
Results: regression estimates of the effect of interest rates on equity extraction

- 100 bp drop in short-term mortgage rate → 3 percentage point rise (25%) in likelihood of equity extraction, conditional on:
  - ZIP code house price appreciation
  - County economic conditions (unemployment, recent wage growth)
  - Credit availability (constructed)
  - State fixed effects

- Interest rate effect almost as big as house price effect
Heterogeneity in extraction

**United States**

- **780+**
- **Between 660 and 780**
- **< 660**

**California**

- **780+**
- **Between 660 and 780**
- **< 660**
Extractors ratchet up mortgage debt

Average mortgage balance before and after extraction

[Diagram showing the average mortgage balance over years since first extraction, with a sharp increase around year 0.]
More expensive debt only partially paid down
Auto debt hardly paid down
How risky is extracting equity?

- Estimate the relationship between extraction and delinquency within 2 years
Conclusions

- Low mortgage rates in early 2000s stimulated home equity extraction
  - Over $1 trillion extracted from 2002-2005; over one-third due to low rates

- Cash-out refi’s provide incomplete picture of extraction

- Small fraction of extracted funds used for debt consolidation on average

- Extracting in 2006 nearly doubled risk of mortgage delinquency relative to those who didn’t extract