Mortgage Composition and Risk Evaluation

Taylor J. Wilson
Economist
Division of Consumer Expenditure Surveys
George Mason University Seminar
21 February 2017
Introduction

1. Mortgages in the CE Survey.
3. Connecting mortgages to risk.
4. Risk abatement strategies.
5. Modeling risk with insurance proxies.
Terms and Definitions

- **Mortgage Composition**: The number of various mortgage instruments reported in the sample as a proportion of the total number of reported mortgages.

- **Mortgage Choice**: The decision to select one type of mortgage over another.

- **Risk Preference**: The type of behavior a consumer unit exhibits.

- **Risk Evaluation**: Understanding the sources of risk and how they apply to the various instruments.

- **FRM**: Fixed Rate Mortgage

- **ARM**: Adjustable Rate Mortgage
Mortgage Composition in CE

CE Variables
- Term
- Interest rate type (i.e. Fixed Rate or Non-Fixed Rate)

Mortgage Instruments
- 30yr FRM
- 15yr FRM
- Other term FRM
- Non-FRM

<table>
<thead>
<tr>
<th></th>
<th>30yr FRM</th>
<th>15yr FRM</th>
<th>Other Term FRM</th>
<th>Non-FRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Mortgages</td>
<td>107,991</td>
<td>25,717</td>
<td>17,221</td>
<td>24,685</td>
</tr>
<tr>
<td></td>
<td>(61.49)</td>
<td>(14.64)</td>
<td>(9.81)</td>
<td>(14.06)</td>
</tr>
</tbody>
</table>

Source: 2004-2014 CE Pooled Sample - Percentage of Sample in Parentheses
Mortgage Choice

Number of Mortgages in Sample

- Fixed Rate 30yr
- Fixed Rate 15 yr
- Fixed Rate Other Term
- Non-Fixed Rate

Risk Preferences

- Risk Averse
  - Concave utility of wealth function

- Risk Neutral
  - Linear utility of wealth function

- Risk Loving
  - Convex utility of wealth function
Risk Preferences

- There is good reason to believe that most consumer units will be risk averse. Friend and Blume (1957) and Latane (1959)

- Concavity, negative second derivative, along all values of w assumes absolute risk aversion (i.e. Well behaved utility functions).

\[
\frac{\partial U^2}{\partial w^2} < 0
\]
Risk Preferences

- Utility functions are not estimable.
- General shape inferred based on behavior of the consumer units.
Risk Evaluation

- How do the mortgage instruments fit onto a utility of wealth function?
- Why would risk averse individuals ever select an ARM?
Risk Evaluation

\[ E(U(w)) = \alpha_1 U(w_1) + \alpha_2 U(w_2) \]

If \( \alpha_1 = \alpha_2 \)
Risk Evaluation

- $w_3$ represents the guaranteed wealth from an FRM in this forward looking period.
- Utility Floor at $U(w_3)$
Risk Evaluation

\[ E(U(w)) = \alpha_1 U(w_1) + \alpha_2 U(w_2) \]

If \( \alpha_1 \ll \alpha_2 \) such that \( E(U(w)) \in A \) then \( E(U(w)) > U(E(w)) \)
Mortgage Choice

- 2008 is a large shock to the mortgage market.
  - Size of the market shrunk.
  - Non-Fixed Rate Mortgages diminished as a share of the market.

- How did consumer choice change before and after the shock?
Mortgage Choice

- Risk preferences changed in the sample.
  - Perhaps risk loving people became more risk averse.
  - Risk loving people chose not to buy houses anymore.

- \[ E(U(w)) = \alpha_1 U(w_1) + \alpha_2 U(w_2) \]
  - \(\alpha_1 \ll \alpha_2\) turned into \(\alpha_1 \gg \alpha_2\)
  - Individuals moved from ARMs into FRMs.
Contact Information

Taylor J. Wilson
Economist
Division of Consumer Expenditure Surveys
www.bls.gov/cex
202-691-6550
wilson.taylor@bls.gov