The Subprime Crisis:
Can problems in a small part of the mortgage market disrupt the entire economy?

Paul Willen
Federal Reserve Bank of Boston

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- The views expressed today are mine.
- The do not necessarily reflect the views of
  - The Boston Fed
or the Federal Reserve System

When I say “we”, I mean members of the research department.
Caveat

- Everything I’m about to say could be wrong:

- Example:

  Until [the depression], mortgages were not fully amortized, as they are now..., but were balloon instruments in which the principal was not amortized, or only partially amortized at maturity, leaving the debtor with the problem of refinancing the balance.

  Fabozzi and Modigliani (1992)

- Is this true?
Essentially no.

<table>
<thead>
<tr>
<th></th>
<th>Mutual svgs banks</th>
<th>Life Insurers</th>
<th>Savings and Loans</th>
<th>Commercial Banks</th>
<th>Individuals and Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Amortized</td>
<td>14.3</td>
<td>94.6</td>
<td></td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>Partially Amortized</td>
<td>61.5</td>
<td>0</td>
<td></td>
<td>38.3</td>
<td></td>
</tr>
<tr>
<td>Non-amortized</td>
<td>24.1</td>
<td>5.1</td>
<td></td>
<td>50.3</td>
<td></td>
</tr>
<tr>
<td>Percentage of market (1929)</td>
<td>10.5</td>
<td>11.8</td>
<td>40.3</td>
<td>12.1</td>
<td>25.2</td>
</tr>
<tr>
<td>As % of dollar value of all loans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Economists find a new theory...
Old theory is “wrong”, new theory is “right”
New theory will be old some day!
Figure: Theodoric of York, Medieval Barber (and intellectual)

*Why, just fifty years ago, they thought a disease like your daughter’s was caused by demonic possession or witchcraft. But nowadays we know that Isabelle is suffering from an imbalance of bodily humors, perhaps caused by a toad or a small dwarf living in her stomach.*
Short answer

- Can problems in a small part of the mortgage market disrupt the entire economy?
- Answer: No.
- Because we have tools to address problems in the mortgage market. (Point 1)
- But...
  - Problems in mortgage market are symptom of more serious problem: House prices (Point 2)
  - House prices could derail the economy
  - But we believe they probably won’t. (Point 3)
### Forecast

#### Quarterly Percent Changes, annual rate

<table>
<thead>
<tr>
<th>Component</th>
<th>Share</th>
<th>Q2</th>
<th>Q3 (last)</th>
<th>Q4 (last)</th>
<th>Q1 (last)</th>
<th>Q2 (last)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>100</td>
<td>4</td>
<td>2.5 (2.2)</td>
<td>1.9 (2.5)</td>
<td>2.7 (2.4)</td>
<td>2 (2.3)</td>
</tr>
<tr>
<td>Consumption</td>
<td>70.3</td>
<td>1.4</td>
<td>2.4 (2.4)</td>
<td>2.1 (2.3)</td>
<td>2.8 (2.4)</td>
<td>1.7 (2)</td>
</tr>
<tr>
<td>Residential Inv</td>
<td>5</td>
<td>-11.6</td>
<td>-15 (-12)</td>
<td>-20.8 (-10.8)</td>
<td>-3.3 (-0.3)</td>
<td>-1.2 (0.4)</td>
</tr>
<tr>
<td>Prod. Dur. Equip.</td>
<td>7.3</td>
<td>4.2</td>
<td>5.3 (4)</td>
<td>5.9 (4.6)</td>
<td>3.3 (3.8)</td>
<td>4.7 (4)</td>
</tr>
<tr>
<td>Nonres. Struct.</td>
<td>3.3</td>
<td>27.7</td>
<td>0 (0)</td>
<td>4 (4.7)</td>
<td>1.2 (1.4)</td>
<td>0.3 (0.3)</td>
</tr>
<tr>
<td>Contrib. of NX</td>
<td>1.3</td>
<td>0.2</td>
<td>(0)</td>
<td>0.4 (0.3)</td>
<td>0.2 (0.1)</td>
<td>0.1 (0.1)</td>
</tr>
<tr>
<td>Exports</td>
<td>11.5</td>
<td>7.6</td>
<td>8.5 (6.5)</td>
<td>8.6 (8.3)</td>
<td>8.5 (8.2)</td>
<td>8.4 (8.3)</td>
</tr>
<tr>
<td>Imports</td>
<td>-16.7</td>
<td>-3.2</td>
<td>4 (4.5)</td>
<td>3.1 (3.6)</td>
<td>4.1 (5)</td>
<td>4.9 (4.5)</td>
</tr>
<tr>
<td>Unemployment</td>
<td>4.5</td>
<td>4.6</td>
<td>(4.5)</td>
<td>4.6 (4.5)</td>
<td>4.6 (4.5)</td>
<td>4.6 (4.5)</td>
</tr>
<tr>
<td>Overall CPI</td>
<td>6</td>
<td>2.4</td>
<td>(2.5)</td>
<td>2.2 (2.2)</td>
<td>1.7 (2.3)</td>
<td>1.9 (2.1)</td>
</tr>
<tr>
<td>Core PCE</td>
<td>1.3</td>
<td>2</td>
<td>(2.1)</td>
<td>2.2 (2.3)</td>
<td>2.1 (2.2)</td>
<td>2 (2)</td>
</tr>
</tbody>
</table>
Reckless lenders, new products, mortgage resets
Problems spread
Source of problems is stagnant or falling house prices
We will focus on:

1. Addressing the credit crunch
2. It’s the house prices...
3. The housing wealth-consumption link
The Credit Crunch

- Paul Krugman \( (NYT, 9/20/2007) \)

\textit{It makes more funds available to depository institutions, a k a old-fashioned banks but old-fashioned banks aren t where the crisis is centered. And the Fed doesn t have any clear way to deal with bank runs on institutions that aren t called banks.}
“New Housing Finance System”

No banks necessary
Banks still at the center of it all!

1. Margin Credit
2. Warehouse lines
3. Direct lending
The Fed – the lender of last resort.

Can we get the ball rolling again?
Figure: Rates on 30-year, fixed rate mortgages. Source: Bankrate.com.
Forecasters have historically overestimated the impact of financial crises.

Will we do that again?

<table>
<thead>
<tr>
<th>Global Insight’s Forecast of Real GDP q-o-q, annual rate. Forecast Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Aug. 2007</td>
</tr>
<tr>
<td>Sept. 2007</td>
</tr>
</tbody>
</table>
Some financial crises in the past

1. 1970 Q2: Penn Central bankruptcy.
2. 1982 Q3: Latin American defaults (e.g. Mexico) and crises in commercial banks and thrift institutions.
3. 1987 Q4: Stock market crash (Black Monday).
5. 1998 Q3: Russian default and LTCM crisis.
6. 2001 Q3: September 11th attacks in NYC and Washington DC.
Figure: Forecasting experience with 9/11.

Sources: Bureau of Economic Analysis/Haver Analytics, Board of Governors, Data Resource Review/Global Insight Inc.
Introduction
1. Credit Crunch
2. It’s the house prices
3. Housing wealth and consumption

Fed response

**Figure:** Forecasting experience with the Russia Crisis in 1998.

*Panel A*
Green Book Forecasts of Real GDP
LTCM Crisis

*Panel B*
DRI Forecasts of Real GDP
LTCM Crisis

Quarterly Percent Change, Annual Rate

Sources: Bureau of Economic Analysis/Haver Analytics, Board of Governors, Data Resource Review/Global Insight Inc.

Figure: Forecasting experience with the 1987 stock market crash.

Panel A
Green Book Forecasts of Real GNP
1987 Stock Market Crash

Panel B
DRI Forecasts of Real GNP
1987 Stock Market Crash

Sources: Bureau of Economic Analysis/Haver Analytics, Board of Governors, Data Resource Review/Global Insight Inc.
Figure: Impulse Responses to a Liquidity Crisis
Fed response

- Banks still matter!
- Fed policy tools still matter!
A theory (more of a story)

- Conventional wisdom right now:
  - Lenders threw out 100 years of best practice and did stupid things:
    - Reduced documentation
    - “Exploding ARMs”
  - Our theory:
    - It’s house prices
    - even if they had followed reasonable guidelines, we’d still have a problem, even if not as big as the problem that we now face.
It’s not the products...

- Loan Performance data for Middlesex county
- All securitized, non-agency mortgages
- Divided up by documentation
- Composition doesn’t matter

<table>
<thead>
<tr>
<th>Year</th>
<th>Delinq. Rate</th>
<th>Full Doc Share</th>
<th>Delinq. Rate</th>
<th>Red. Doc Share</th>
<th>Delinq. Rate</th>
<th>Overall Share</th>
<th>Delinq. Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006 Level 7.6</td>
<td>38</td>
<td>7.6</td>
<td>62</td>
<td>7.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005 Level 6.4</td>
<td>43</td>
<td>6.7</td>
<td>57</td>
<td>6.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004 Level 5.2</td>
<td>49</td>
<td>5.7</td>
<td>51</td>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003 Level 3.5</td>
<td>58</td>
<td>3.0</td>
<td>42</td>
<td>4.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Paul Willen (Boston Fed)
The Subprime Crisis:
October 25, 2007

It’s not the products
It’s not the resets
It’s the house prices
Subprime outcomes
It’s not the resets

- There is no such thing as a low teaser on subprime loan
- Focus on 2/28s because
  - More than half of all subprime loans
  - Almost all the subprime ARMs
  - Disproportionate delinquencies
- Source: LoanPerformance data

<table>
<thead>
<tr>
<th>Year</th>
<th>“Teaser”</th>
<th>1-yr Prime ARM</th>
<th>Fully indexed rate at origination</th>
<th>Fully indexed rate at reset</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>7.5</td>
<td>3.76</td>
<td>7.12</td>
<td>9.93</td>
</tr>
<tr>
<td>2004</td>
<td>6.96</td>
<td>3.90</td>
<td>7.66</td>
<td>11.12</td>
</tr>
<tr>
<td>2005</td>
<td>7.3</td>
<td>4.49</td>
<td>9.52</td>
<td>11.02</td>
</tr>
<tr>
<td>2006</td>
<td>8.35</td>
<td>5.54</td>
<td>11.27</td>
<td>11.41</td>
</tr>
</tbody>
</table>
Subprime business model
- Extract high fees
- High interest rates prior to reset
- Borrowers refinance (or defaults) prior to reset.
- NOT the same as credit cards.

Old vintages of 2/28s

<table>
<thead>
<tr>
<th></th>
<th>Before the reset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% prepaid</td>
</tr>
<tr>
<td>2003</td>
<td>76</td>
</tr>
<tr>
<td>2004</td>
<td>68</td>
</tr>
</tbody>
</table>
- More recent vintages of 2/28s
- As of 3/2007

<table>
<thead>
<tr>
<th>Origination</th>
<th>Reset</th>
<th>% prepaid</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>2007</td>
<td>56</td>
</tr>
<tr>
<td>2006</td>
<td>2008</td>
<td>34</td>
</tr>
</tbody>
</table>
Subprime outcomes

- Do subprime loans lead to problems?
- Look at delinquency rates on subprime loans.
- Deceptive for two reasons
  1. Most subprime loans are refinances – people are already in trouble when they get them. Causality goes the wrong way.
  2. Subprime purchase loans? Most end with refinance
- Look at whole *homeownership experience*
  - How often do borrowers who buy houses with subprime loans get into trouble?
- We estimate that between 13% and 18% of subprime purchase experiences end in foreclosure.
Credit channel and consumption

- Main difference with many others has to do with consumption.
- How does a change in wealth affect consumption?
- Some says $1 fall in housing wealth reduces spending by 5 cents
- We think it’s closer to 2 cents.
Figure: Consumption to housing wealth relationship over time, based on NIPA data.
We attempted to put some numbers on it.

Essentially, we estimated that the wealth effect after 1996 is about half what it was before.

A one-dollar increase in net worth
- led to a 5.4 cent long-run increase in consumption before 1/1/1996.
- led to a 2.2 cent long-run increase in consumption after 1/1/1996.

A one-dollar increase in housing equity
- led to a 10 cent increase in consumption before 1/1/1996.
- led to a 0 cent increase in consumption after 1/1/1996.
“Financial innovations” have made it easier to borrow against your house since the 1990s
- No paperwork!
- No fees!

So doesn’t this mean that spending should be more sensitive to house prices?
- No, just the opposite.
  - Level of borrowing will go up.
  - Sensitivity of borrowing goes down.
Increased house prices relax a borrowing constraint
  - Households have more debt...
  - But the constraint matters to fewer consumers.

For most consumers, borrowing self-limited.
Conclusion

Two key things to worry about:

- Can the Fed manage the liquidity squeeze?
- How much will house prices fall and how much will that affect consumption?