

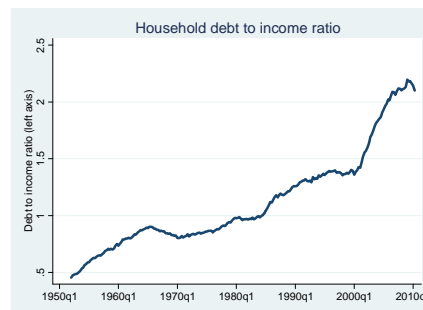
Detecting “Bad” Leverage

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The Regulator’s Problem

- Financial crises and severe economic downturns are often preceded by sharp increases in debt and leverage ratios
- Ex: U.S. Household Debt and the 2007 – 2009 recession



- The key question I hope to address: How does a regulator know if a sharp increase in leverage is “bad”?

Some Facts to Motivate Answer

- Fact 1: When fueled by a shift in the supply/availability of credit, dramatic increases in leverage end badly

Kindleberger: financial crisis often preceded by the “expansion of credit result[ing] from the development of substitutes for what previously had been traditional monies”

- Fact 2: A significant fraction of the population displays a very high elasticity of borrowing with respect to credit availability (Gross and Souleles (2002), Mian and Sufi (2010), Einav, Jenkins, Levin (2010))
- Fact 3: Asset prices are often a function of leverage – as a result debt to value ratios are often misleading

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- Conditional on seeing a sharp rise in leverage, the regulator must determine whether the increase is driven by:
 1. Productivity/permanent income shocks
 2. Credit supply
- My contention is that a sharp increase in leverage driven by credit supply should raise a red flag
- More formal derivation of this idea is in Mian and Sufi (QJE, 2009)
- Caveat: credit supply shifts may not always be a bad thing

Methodology for Isolating Credit Supply Shifts

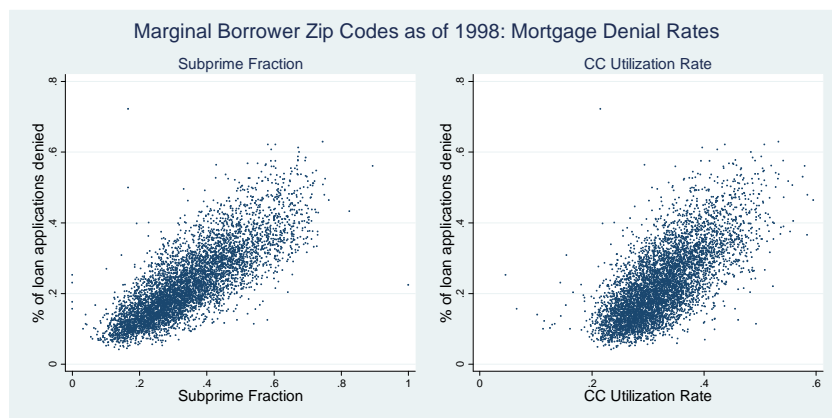
- Conditional on seeing a sharp increase in leverage, use micro-economic data for the following three steps
 1. Determine who are marginal borrowers who have a very high elasticity of borrowing with respect to credit availability (“constrained”)
 2. Has the flow of credit to these marginal borrowers increased substantially relative to non-marginal borrowers?
 3. If yes to #2, ask: is the relative increase in the flow of credit to marginal borrowers driven by productivity/permanent income shocks? Use current income growth as a proxy.
- If the answer to #2 is yes and the answer to #3 is no, it is likely that the rise in leverage is due to shifts in the supply of credit → Red flag

Further Comments

- By design, this methodology completely ignores asset prices and measures of interest payments
 - If asset prices are fueled by credit expansion, debt to value ratios are uninformative
 - Given teaser rates and unreasonable expectations, the stock of debt is more informative than flow of interest payments
 - Ex post, the stock of debt will be the main problem
- I focus on marginal borrowers not because they alone are important – I am trying to detect a broader pattern in the economy but using marginal borrowers to isolate it
- The more micro the better: if we know debt has increased sharply in specific areas/sectors of the economy, isolate the test to those specific areas/sectors

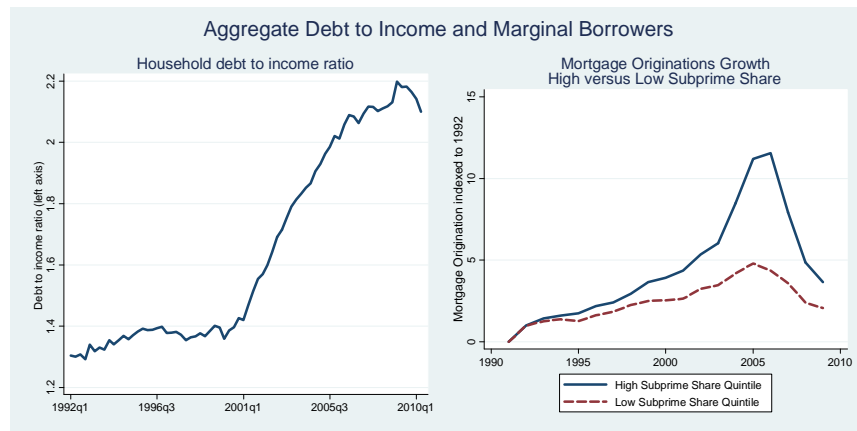
Example: Household Debt, 1992 - 2007

1. Determine who are marginal borrowers who have a very high elasticity of borrowing with respect to credit availability
 - My measure: Subprime share or CC utilization rates



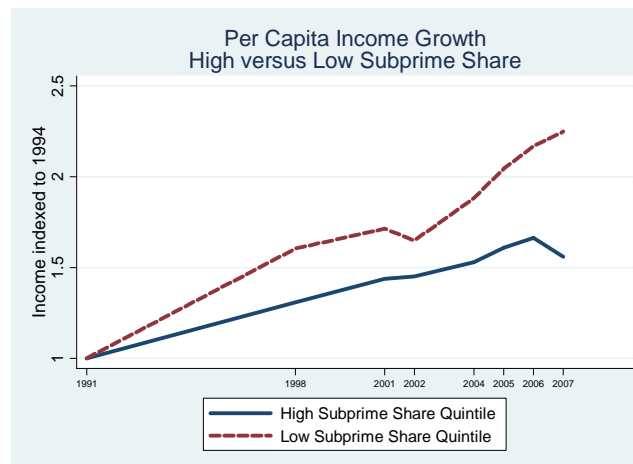
Step #2: Credit and Marginal Borrowers

2. Has the flow of credit to these marginal borrowers increased substantially relative to non-marginal borrowers? YES



Step #3: Income Growth of Marginal Borrowers

3. Is the relative increase in the flow of credit to marginal borrowers driven by productivity/permanent income shocks? NO.



The Micro Data Inform Macro Patterns

- This exercise is not just about “subprime lending”—the point is to use marginal borrowers to learn about aggregate patterns
- In the cross-section, states with the highest correlation between subprime share and mortgage originations are exactly the states that have the largest growth in total debt



Microeconomic Data is Key

- Microeconomic data allow us to see the underlying factors driving the aggregate increase
- In the aggregate, it may very well be that both income and debt are rising
- But if the income growth is driven by non-marginal guys and the debt growth is driven by marginal guys, we will miss the danger
- Example: see Bernanke and Greenspan testimony in 2005
 - Both assert house price growth is justified when looking at aggregate productivity
 - But not in the micro data!

Going Forward: Micro Data

1. What we have:

- Pretty good data on debt flows (HMDA for mortgages), debt levels and debt limits (Credit bureaus), and house prices (Zillow or FCSW)
- Pretty good data on income (IRS Statistics of Income)
- (See any of my research to locate data sources)

2. What we need:

- Better and more timely data from IRS Statistics of Income (most recent release – 2007!)
- Wealth data (for marginal guys it's the home and nothing else)
- Most of our analysis is at zip code level; we need a large panel of individuals with income (IRS), balance sheet (Credit bureaus), and consumption data (Credit card companies) matched

Going Forward: Robustness

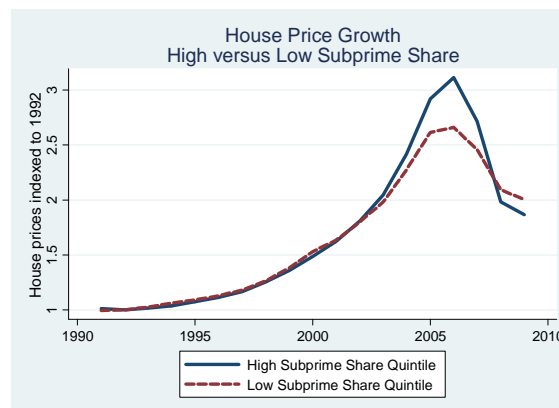
- Historical data would test robustness of this methodology
 - Great Depression was preceded by very sharp increase in household debt
 - Regional booms and busts in housing and leverage
 - Find more episodes to contradict my claim: when have there been large increases in credit supply unrelated to productivity that have not ended badly?
- Other markets – corporate credit for example
 - Evidence suggests that large credit expansion to marginal corporates (high yield) are followed by negative returns on bonds and recessions (Greenwood and Hanson (2010))
 - Emerging markets – current account deficit predict severity of recession (Rogoff)

Conclusion

1. Determine who are marginal borrowers who have a very high elasticity of borrowing with respect to credit availability
 2. Has the flow of credit to these marginal borrowers increased substantially relative to non-marginal borrowers?
 3. If yes to #2, ask: is the relative increase in the flow of credit to marginal borrowers driven by productivity/permanent income shocks? Use current income growth as a proxy.
- If the answer to #2 is yes and the answer to #3 is no, it is likely that the rise in leverage is due to shifts in the supply of credit → Red flag

Aside: Asset Prices

- Extremely dangerous to argue that asset values justify higher leverage, given effect of credit supply on asset values



- Recall income patterns – hard to see why house prices are rising more in subprime areas except due to credit (see Mian and Sufi, QJE, 2009)