Household Balance Sheets, Consumption, and the Economic Slump

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Motivation
What We Do

• We utilize U.S. county-level data on shocks to net worth and spending to answer two fundamental questions in macroeconomics:

1. Do households cut spending in response to a shock to their net worth?

2. Do households respond to the same decline in home value differentially based on balance sheet position?
What We Do

• We utilize U.S. county-level data on shocks to net worth and spending to answer two fundamental questions in macroeconomics:

1. Do households cut spending in response to a shock to their net worth?
   • Yes, and effects are very large

2. Do households respond to the same decline in home value differentially based on balance sheet position?
   • Yes, poorer and more levered households cut back significantly more for same dollar decline in wealth
Implications

• Households respond aggressively to household-specific net worth shocks, which implies a failure of consumption risk-sharing in the aggregate

• We must therefore appreciate heterogeneity in macroeconomic models – representative agent frameworks cannot explain decline in spending

• Differential MPCs means the distribution of wealth and debt matters

• If a collapse in asset prices concentrates losses on poor and levered households, effect on aggregate consumption will be more severe
Defining Shocks to Net Worth

• Suppose we write household net worth as follows:

\[ NW_{i,t} = S_{i,t} + B_{i,t} + H_{i,t} - D_{i,t} \]

• % shock to net worth in Great Recession can be written as:

\[ \Delta NW_{i,t} = \Delta P^s_{i,t} \frac{S_{i,t-1}}{NW_{i,t-1}} + \Delta P^b_{i,t} \frac{B_{i,t-1}}{NW_{i,t-1}} + \Delta P^h_{i,t} \frac{H_{i,t-1}}{NW_{i,t-1}} \]

• Housing net worth shock (our focus) can be rewritten:

\[ H_{i,t-1} \Delta P^h_{i,t} \frac{1}{(1 - LTV_{i,t-1})} \]

where \[ LTV_{i,t-1} = \frac{D_{i,t-1} - (S_{i,t-1} + B_{i,t-1})}{H_{i,t-1}} \]
The Housing Net Worth Shock

• The crucial variable is the housing net worth shock

\[ H_{i,t-1} \times \Delta P^h_{i,t} \times \frac{1}{(1 - LTV_{i,t-1})} \]

• It can be interpreted as the percentage change in total net worth coming from the shock to home equity

• Notice, it is the product of two critical factors:
  • The collapse in house prices
  • The “leverage multiplier”

• Leverage exacerbates effect of house price declines on net worth!
Variation across Country in Housing Net Worth Shock

Distribution of housing net worth shock by decile

Housing net worth shock, 2006-2009

1 2 3 4 5 6 7 8 9 10
Empirical Approach

• Use variation across U.S. counties in the housing net worth shock during the Great Recession

• Estimate the effect of housing net worth shocks on spending using this variation

• Then see whether this effect varies by 2006 net worth or leverage

• In everything that follows, a unit of observation is a county
Housing Net Worth Shock and Spending

![Graph showing the relationship between housing net worth shock and spending growth from 2006 to 2009.](image-url)

- The x-axis represents the housing net worth shock from 2006 to 2009, ranging from -0.6 to 0.
- The y-axis represents the growth in spending, also ranging from -0.6 to 0.
- The data points are scattered across the graph, with a general trend indicating a positive relationship between the two variables.

This visual representation helps illustrate how housing net worth shocks may influence spending patterns during the specified period.
## Housing Net Worth Shock and Spending

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Total spending growth, 2006 to 2009</td>
<td></td>
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<tr>
<td>Housing net worth shock, 2006-2009</td>
<td>0.634**</td>
<td>0.613**</td>
<td>0.590**</td>
<td>0.774**</td>
<td>0.457**</td>
<td>0.869**</td>
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<td>(0.125)</td>
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<td>(0.239)</td>
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<td>Financial net worth shock, 2006-2009</td>
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<td></td>
<td>(1.032)</td>
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<td>Construction employment share (2006)</td>
<td>-0.448**</td>
<td>-0.287</td>
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<td>(0.150)</td>
<td>(0.216)</td>
<td>(0.127)</td>
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<td>Tradable employment share (2006)</td>
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<td>0.011</td>
<td>0.042</td>
<td>-0.027</td>
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<td>(0.067)</td>
<td>(0.092)</td>
<td>(0.066)</td>
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<td>Other employment share (2006)</td>
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<td>-0.045</td>
<td>-0.057</td>
<td>-0.058</td>
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<td>(0.038)</td>
<td>(0.050)</td>
<td>(0.037)</td>
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<td>Non-tradable employment share (2006)</td>
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<td>(0.157)</td>
<td>(0.167)</td>
<td>(0.137)</td>
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<tr>
<td>Ln(income per household, 2006)</td>
<td>-0.002</td>
<td>0.024</td>
<td>-0.006</td>
<td>0.028</td>
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<tr>
<td></td>
<td>(0.033)</td>
<td>(0.047)</td>
<td>(0.046)</td>
<td>(0.045)</td>
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<tr>
<td>Ln(net worth per household, 2006)</td>
<td>-0.028</td>
<td>-0.035</td>
<td>-0.023</td>
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<tr>
<td></td>
<td>(0.018)</td>
<td>(0.023)</td>
<td>(0.020)</td>
<td>(0.025)</td>
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<tr>
<td>Constant</td>
<td>-0.034*</td>
<td>-0.092</td>
<td>0.167*</td>
<td>0.147</td>
<td>0.120</td>
<td>0.132</td>
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<td>(0.015)</td>
<td>(0.099)</td>
<td>(0.077)</td>
<td>(0.092)</td>
<td>(0.090)</td>
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- N: 944, 944, 944, 540, 944, 833
- R²: 0.298, 0.301, 0.355, 0.319, 0.547, 0.230
The Role of Credit Constraints

- Why is spending sensitive to housing net worth shocks?
- One explanation is credit constraints
- Decline in home value leads to difficulties borrowing via home equity, lower credit card limits, lower credit scores, inability to refinance into lower interest rates
- We find strong evidence that credit constraints matter
- We construct a “credit constraints factor” which captures the observed decline in credit card and home equity limits
The Role of Credit Constraints

Credit tightening from 2006 to 2009

Housing net worth shock, 2006-2009
Switching to MPCs

- So far we have been estimating *elasticities*: a 10% decline in net worth due to the housing shock leads to a 6% decline in spending.

- A marginal propensity to consume measures the dollar response in spending to a $1 decline in home value.

- Theories on the importance of wealth distribution have a very specific prediction on MPCs:
  - MPCs should be higher for poorer households.
  - This could be true either because of precautionary saving or because of liquidity constraints.
Estimating the MPC out of Home Value Changes

Marginal propensity to consume out of housing

Change in spending per household, $ thousands

Change in home value per household, $ thousands
MPC by Product

MPC by type of spending

- Total: 0.054
- Auto: 0.023
- Non-durables: 0.016
- Other durables: 0.011
- Groceries: 0.004
Interpreting the MPC

- MPC estimation shows that households cut spending by about 6 cents per $1 of home value decline.
- From 2006 to 2009, home values in the United States fell by $5.6 trillion.
- Then, the MPC estimate implies a drop in household spending of 0.06* $5.6 trillion = $333 billion due to the housing net worth shock.
- Total decline in spending relative to pre-trend: $870 billion.
- Our MPC estimate suggests ~40% of spending decline during Great Recession due to housing net worth shock.
Does the MPC Vary by Net Worth or Leverage?

• The answer to this question is based on an interaction effect, which requires a lot of statistical power to estimate.

• We are asking the question: for the same dollar decline in house prices, do rich and poor counties cut spending differently?

• Unfortunately, there is not enough variation in net worth across counties to precisely estimate the interaction term.

• We must move to zip code level data, where we have much more variation in net worth.

• But the drawback is that we only have auto spending available at zip code level.
MPCs Across the Income Distribution

Marginal propensity to spend on autos out of housing wealth

- AGI <= 35K
- 35K < AGI <= 50K
- 50K < AGI <= 100K
- 100K < AGI <= 200K
- 200K < AGI
MPCs Across the Leverage Distribution
MPCs by Fraction Underwater

Marginal propensity to spend on autos out of housing wealth:

- UW <= 15%
- 15% < UW <= 25%
- 25% < UW <= 40%
- 40% < UW <= 50%
- 50% < UW

Marginal propensity range: 0 to 0.025
MPCs Vary Substantially!

- We find that MPCs vary substantially by both net worth and leverage
- Interestingly, these two effects are independent
  - Fixing net worth, more leverage leads to higher MPC
  - Fixing leverage, lower net worth leads to higher MPC
- Both lower net worth and higher leverage independently predict households being underwater on their mortgages
- MPC for zip codes with more than 50% underwater is five times larger than MPC for zip codes with fewer than 15% under water
Conclusion

• Household-specific net worth shocks had dramatic effect on spending during the Great Recession

• The effect of housing net worth shocks on spending was much larger for poorer and more levered households

• The distribution of losses matters: if asset price declines concentrate losses on poor and levered households, the effects on spending will be much more severe

• Supports an old idea first put forth by Fisher (1933): debt matters for the macro-economy because of the distribution of losses when asset prices collapse