Measuring Systemic Risks in the Household Sector

preliminary

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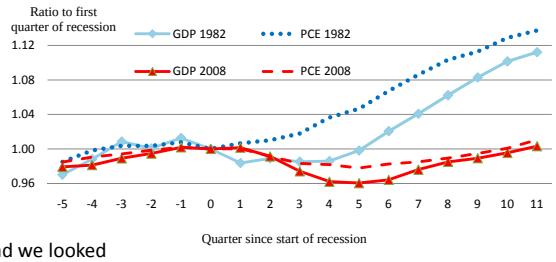
Maintained Hypotheses

1. Movements in household expenditures can amplify and propagate shocks to the economy
   a) Prior to Great Recession, exposure to macro risk factors built up due to increased access to credit and expectations of high future incomes
      • Exposure to house prices, credit availability, interest rates, asset prices, income prospects
   b) During and following recession, sluggish household expenditures have amplified and propagated slowdown

GDP and PCE during Two Recessions

1982: PCE doesn't fall, rises first

2008: GDP rises ahead of PCE



2. The exposures were observable had we looked
   a) Information – raw data and processed – would have been useful for market participants and regulator

3. The bank monitoring by the Federal Reserve System worked for traditional (FDIC) banks
   a) The monitoring of systemic risk can be done

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Missing from current data on households

1) Detail on exposures to macroeconomic risk factors
   - Far too little detail on particular asset and credit instruments held

2) Measures of the sophistication or skills of the decision makers
   - No recognition of the quality of "management" which is crucial in the measurement of bank risk and their regulation

3) Data dissemination and release of summary information on exposures

Organizing framework: analogy to bank's CAMELS ratings
- Had examiners looked at AIGFP, they would have been rated low for M
- Had examiners looked at subprime borrowers, they would have been rated low for M
- May have seen unsophisticated agents where credit was flowing and prices rising

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Why are households "systemic"?

a) Time inconsistency and bailouts
   - Want to observe risk exposure in groups of households that might end up bailed out
     - Examples: natural disasters, Social Security for the elderly post-GD, Illinois?, PGBC?
   - Solution: measure group exposures and/or deter behavior

b) Private markets tend to produce too little information on common exposures
   - Solution: measure and inform agents (raw data and analyzed data)

c) Unsophisticated agents can make mistakes
   - Costs: Poor smoothing of lending/consumption, poor asset allocation
   - Spillovers: distort (noise or bias) prices on which others make decisions
     - For financial markets, see AIG and Fannie and Freddie; any underwater bank
     - For households, subprime borrowers and housing prices
   - Solution: measure exposure, inform and protect households/lean against behavior

d) Non-linear responses to net worth/equity cushion
   - For prediction, want to observe risk factors for transfers between different MPC hh's
   - Solution: exposures by group not just individual agents and not just aggregate

Many concerns about systemic risk in the household sector are analogous to concerns about systemic risk in the financial sector, **therefore start from a similar structure of data collection and analysis**

Other similarities with banks : importance of claims on sector, inefficiencies in bankruptcy/foreclosure, importance of credit/use of leverage, . . .

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CAMELS for Banks

For financial institutions: CAMELS ratings based on bank-reporting, audits, and on-site regulator checks

Sensitivity to market risk (added 1997) – dimension to examine for all each CAMEL ratings

For banks	**For households**	
Capital adequacy	Net worth = Assets – Liabilities	Data exist
Assets	Asset risks Subsumed above	Little data exist, categories too broad
Management	Financial sophistication	Very little data exist
Earnings	Earnings	Current data strong (PSID, NLSY, CPS, ACS, IRS)
Liquidity	Cash on hand	Reasonable data exist, but not on exposures, especially credit risks

For all categories, ratings include management's plans to deal with contingencies and management's evaluation of risks. Bank examiners judge the quality of these expectations and look for common "unrealistic" macro expectations

Poor: in general, ratings on each category reflect other categories

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LEADS for Households

Collect at the household level

- Liabilites Measure terms of each borrowing instrument and calculate exposure -- collateral information, commitment/term, interest rate determination, penalties, etc.

  Details completely lacking in current data

- Assets Details on each investment, self-reports and from administrative data (e.g. Vanguard). Examples: name of hedge fund, REIT, house address, etc.

  Details almost completely lacking in current data

- Earnings Measure of current and past incomes at the household level as well as dynamics

  Current data strong (PSID, NLSY, CPS, ACS, IRS)

- Demographics (age, family structure, geographic location, occupation, industry, etc.) For grouping households into groups to study exposure, for public data

- Financial Sophistication: Measure households expectations and subjective probabilities of different scenarios, and responses to tests of understanding of investment choices and consumption smoothing in the markets in which they are operating (even if just a saving account)

  Completely lacking in current data

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Overview: LEADS on Systemic Risk in the Household Sector

1. Collect administrative data from banks and financial institutions (FI's) on terms of credit and investments made by households
2. Survey financial sophistication and other household assets
3. Estimate risk exposure of each asset and liability
4. Estimate systemic exposure of both cash flow and wealth for households
5. Combine the data and group households by demographics such as age, income, state and release to the public cell averages, variances, (covariances within cell) of holdings and sophistication levels and exposures and random sub samples

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1. Administrative data from banks and financial institutions on terms of credit and investments

OFR needs administrative data from universe of FI's, merge by household (SSN?)

Already have in place regulation and reporting from financial institutions

- Household survey response rates low and falling

Can get details on assets and liabilities (all the contingencies, covenants, etc)

- Households don't know the details

Must avoid select sample (e.g. Mint.com) but can do sample of hh's from all FI's

Some information on financial sophistication from detailed holdings and information on offers and responses by households

- e.g. Dominated choices; Agarwal et al (2006, 2007, etc.)
- e.g. Economist's choices; Calvet, Campbell, Sodini (2009)

Include as broad a swath of institutions as possible: payday lending, auto loans, student loans, hedge fund investments, REITS, limited partnerships, etc.

Problem: miss some holdings such as peer-to-peer lending, international, etc.

- Incentive to hide investments or move them into non-reporting sector?

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2. Survey: households assets and financial sophistication

Supplemental survey of households with two goals

i) to report assets to cover assets and liabilities outside of FI's

ii) Financial sophistication

- Three types of questions
  - Plans for financial contingencies (looking for flawed plans)
  - Understanding of financial products (focus on assets/credit in use)
  - Expectations of future price, returns, etc.
- HRS has "tested" questions
  - Lusardi and Mitchell (many years)
- Example: Consumption smoothing of tax rebates . . .

Example: Economic Stimulus Payments of 2008

Many people sometimes buy things that they later wish they had not bought. About how often do you or other household members make purchases that you later regret?

- ○ Often
- ○ Occasionally
- ◉ Rarely
- ○ Never

Percent change in Homescan expenditures

	Rarely or never		Often or occassionally	
ESP	2.41	3.64	0.84	0.76
	(1.29)	(1.66)	(1.63)	(2.12)
Lagged ESP	2.39	4.33	-0.56	-0.36
	(2.04)	(2.55)	(2.57)	(3.20)
Twice lagged ESP	1.87	3.86	-4.11	-1.90
	(2.71)	(3.32)	(3.54)	(4.37)
Cumulative	**6.67**	**11.80**	**-3.82**	**-1.50**
SE	**(5.52)**	**(6.82)**	**7.07**	**8.78**
Number of Households	13,188	13,147	8,563	8,534

Note: First column of each pair does not control for means of receipt, the second treats by mail and by EFT as separate experimental groups

3. Estimate risk exposure of each asset and liability

Choose factors, estimate structure for cash flows at different horizons and returns

$$c_i(\tau) = b_{i1}(\tau)*f_1(\tau) + b_{i2}(\tau)*f_2(\tau) + ... + b_{im}(\tau)*f_m(\tau) + e_i(\tau)$$

$$r_i = b_{i1}*f_1 + b_{i2}*f_2 + ... + b_{im}*f_m + e_i$$

$r_i(\tau)$ = the return on asset i

$c_i(\tau)$ = the cash flow from income or due on liability i over horizon τ (e.g. income, credit loss, dividend)

$b_{ij}(\tau)$= the change in the return/cash flow on asset i per change in factor j

$f_j(\tau)$ = the value of factor j -- systemic risk scenarios such as increases in interest rates, decline in value of asset classes, increase in tax rates, income declines, credit tightening, declines in collateral values, etc.

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4. Estimate systemic exposure of cash flow and wealth

Liquidity exposure: sum of cash flows and liquid asset values

$$\Sigma_i c_i(\tau) = \Sigma_i [\, b_{i1}(\tau)*f_1(\tau) + b_{i2}(\tau)*f_2(\tau) + ... + b_{im}(\tau)*f_m(\tau)) \,]$$

$$+ \Sigma_{\text{Liquid i}} w_i r_i(\tau) = \Sigma_{\text{Liquid i}} w_i \; [\, b_{i1}*f_1 + b_{i2}*f_2 + ... + b_{im}*f_m \,]$$

Wealth exposure

$$\Sigma_i w_i r_i(\tau) = \Sigma_i w_i \; [\, b_{i1}*f_1 + b_{i2}*f_2 + ... + b_{im}*f_m \,]$$

where w_i are the initial assets in each category

Liquidity exposure measures exposure of cash-on-hand to income and credit shocks, more important for debt overhang or slumps

Wealth exposure measures exposure of wealth, more important for bailout issues

This simple version misses re-balancing; do not want to assume optimal rebalancing

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5. Combine the data, group households, release data

Groups households into demographic groups – education, age, region, and sophistication cells

Disclose raw means, quantiles, and covariances of holdings of classes of assets (slight improvement on prior data)

Disclose analysis of systemic exposures of wealth and liquidity by group

Disclose anonymous, random subsamples for analysis

Look particularly for concentration of an aggregate risk factor in a group of households that lack sophistication

Conclusions

Lacking data: financial sophistication and detail on credit and assets

Recommend: **LEADS**

- Administrative data first , survey second
- Analyze:
  - estimate factor exposures (robustly)
  - measure exposure of cash-on-hand and lifetime wealth
- Distribute