Measuring Wealth Effects Using U.S. State Data

Xia Zhou[1]   Christopher Carroll[2]

[1]Fannie Mae

[2]Johns Hopkins University

March 18, 2011

Motivation

Q: What is the relation between movements in wealth and subsequent movements in spending?

Problem: Not clear this can be answered using aggregate data:

- Not enough aggregate data.
- Too many other things move along with wealth and consumption.

Contribution of this paper:

- Construct state-level data on consumption and wealth.
- Examine wealth effects using these data.

Further motivation: Distinguish housing vs. financial wealth effects

Financial and housing wealth effects could be different:

- Changes in one type of wealth might be viewed as more permanent than the other.

- Tax treatment of capital gains on the two types of wealth may be different.

- Stockholders might behave differently from homeowners.

Current literature finds mixed results, varying with data employed.

Data

Previous literature has used aggregate and household-level data

- Aggregate data: aggregation problems, simultaneity problems.

- household-level data: poor measurement of important variables.

Advantages of regional data

- All states share the same monetary and federal system.

- Because of heterogeneity across states, regional data should have less simultaneity problems than aggregate data.

Data

Previous literature has used aggregate and household-level data

- Aggregate data: aggregation problems, simultaneity problems.

- household-level data: poor measurement of important variables.

Advantages of regional data

- All states share the same monetary and federal system.

- Because of heterogeneity across states, regional data should have less simultaneity problems than aggregate data.

Contribution: Construct the regional data needed to conduct the wealth effect study.

Some regional data exists, but has issues

The state-level financial wealth data used in Case, Quigley and Shiller (2002): 1982:1-1999:4

- There is no state-level financial assets data $\Rightarrow$ use mutual funds data; assume constant proportion of mutual funds out of financial assets.

- Mutual funds data is only available for 5 nonconsecutive years $\Rightarrow$ assume constant asset distribution across states for years without real data; lose regional variations.

- Proportion of mutual funds of total stock market wealth
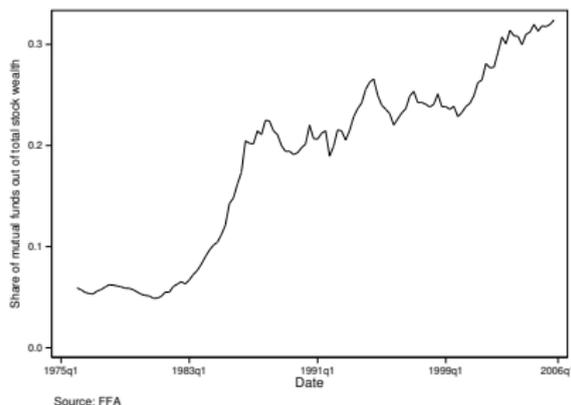
Source: FFA

Limitations with currently available state-level consumption data

- No state-level consumption data exists.

Limitations with currently available state-level consumption data

- No state-level consumption data exists.
  - Solution: use state-level retail sales data.

Limitations with currently available state-level consumption data

- No state-level consumption data exists.
  - Solution: use state-level retail sales data.
- Several sets of retail sales measures are available for U.S. states.

Limitations with currently available state-level consumption data

- No state-level consumption data exists.
  - ▶ Solution: use state-level retail sales data.
- Several sets of retail sales measures are available for U.S. states.
  - ▶ No systematic research comparing their quality.

Description of existing state-level consumption data

	Data sources	Works using data	Time range	States
C^{HS}	Monthly Retail Trade - Survey	Hess and Shin (1998) Del Negro (1998)	1978M1-1996M12	19
C^{SMM}	Sales & Marketing - Management	Asdrubali, Sorensen, and Yosha (1996) Del Negro (1998) Luengo-Prado and Sorensen (2006)	1963-1998 & 2000-present	51
C^{CQS}	Regional Financial Associates	Case, Quigley and Shiller (2002)	1977Q3-2006Q4	51
C^{GHO}	State Government - Sales Tax Collections	Garrett, Hernandez-Murillo, and Owyang (2004)	1970Q1-present	45
C^{ZHOU}	C^{GHO} + taxable retail sales gross retail sales	Ravina (2005) Zhou (2010)	1970Q1-present	45

Contributions of this study

- Creates a new panel dataset for the financial wealth of U.S. states, which I argue is a reliable measure of financial wealth growth at the state level.

Contributions of this study

- Creates a new panel dataset for the financial wealth of U.S. states, which I argue is a reliable measure of financial wealth growth at the state level.

- Constructs a state-level measure of consumption that improves significantly on existing data sources.

Contributions of this study

- Creates a new panel dataset for the financial wealth of U.S. states, which I argue is a reliable measure of financial wealth growth at the state level.

- Constructs a state-level measure of consumption that improves significantly on existing data sources.

- Estimates stock and housing wealth effects using these data.
  - ▶ Large but sluggish housing wealth effect (consistent with the existing literature).
  - ▶ No evidence of significant stock wealth effects (current literature shows if stock wealth effect exists, it shows much faster than housing wealth effect; but could just be simultaneity).

Quality of the new financial wealth data

- Data source: a private company has ALL data for each and every individual account from more than 85 financial institutions.
  - ▸ Among them, there are 15 of the top 20 banks, and all the top 15 annuity issuers.

- There are tens of millions of records for each time period.
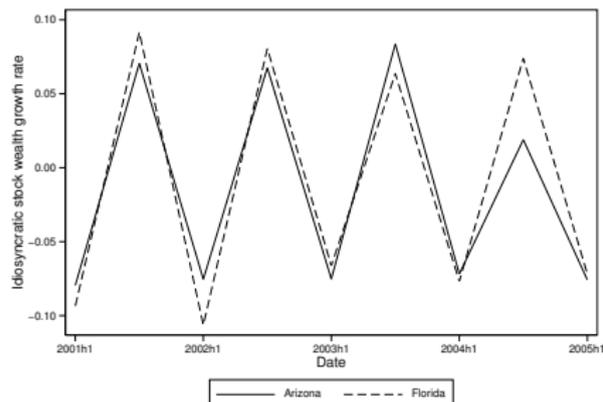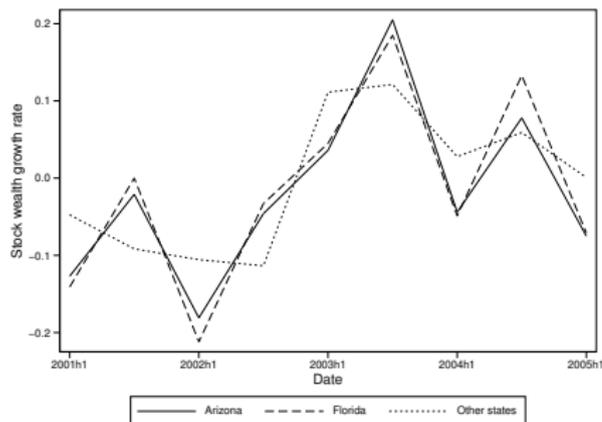 - ▸ Covers about 40% of total U.S. financial assets.

Quality of the new financial wealth data

The new financial wealth data at the aggregate level
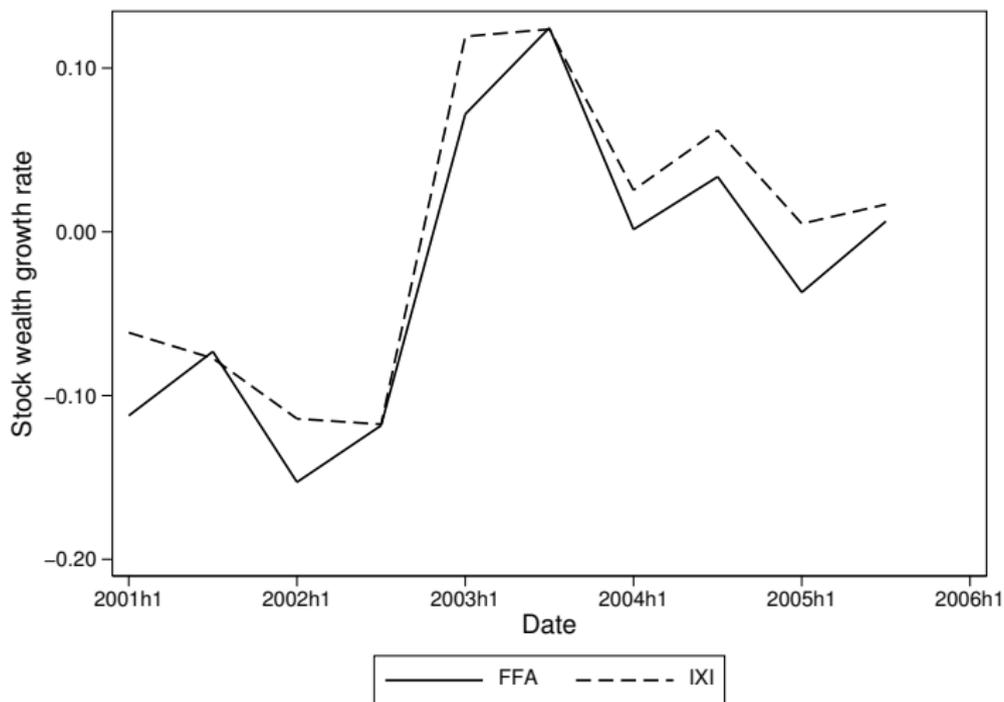
Quality of the new financial wealth data

The new financial wealth data at the state level

Note: Idisyncratic growth is defined as the difference in growth rates between AZ and FL, and other states

Quality of the new consumption data

- It improves C^{GHO} by incorporating gross retail sales or taxable retail sales published by state tax agencies.
- The construction of its growth rate is transparent and does not involve any assumed models.

- At the aggregate level
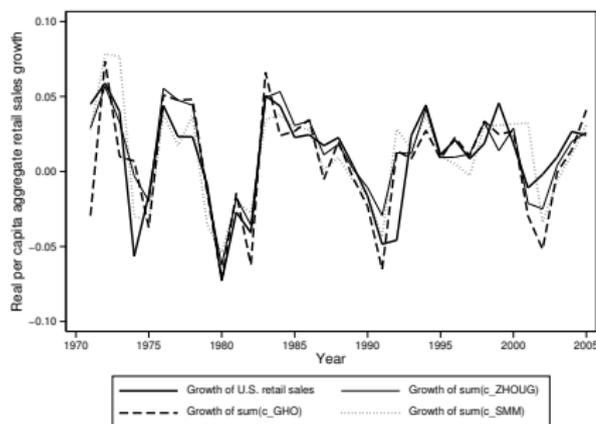
- At the state level: Virginia
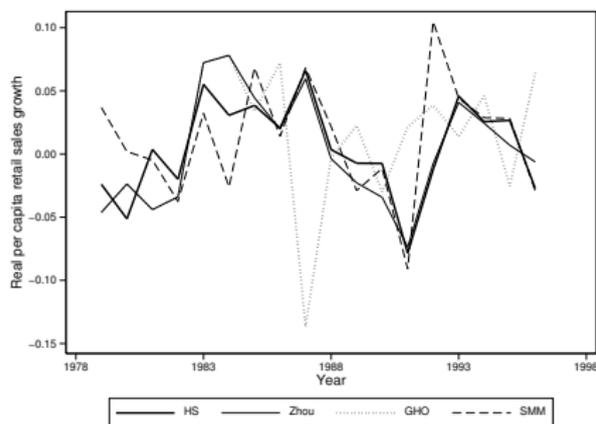
The wealth effect estimation

Three sets of consumption data were used

- "Best Data": gross retail sales or taxable retail sales published by state tax agencies only.
- "All Data": "Best Data" plus C^{GHO}.
- "Good Data": "All Data" with outliers taken care of.

Estimation equation is

$$\Delta \tilde{c}_{i,t} = \alpha_t + \beta_1 \Delta \tilde{y}_{i,t-2} + \beta_2 \Delta \tilde{w}_{i,t-2}^f + \beta_3 \Delta \tilde{w}_{i,t-2}^h + \Delta \tilde{\varepsilon}_t,$$

where $\Delta \tilde{c}_{i,t} = \frac{C_{i,t} - C_{i,t-1}}{Y_{i,0}}$, $\Delta \tilde{y}_{i,t} = \frac{Y_{i,t} - Y_{i,t-1}}{Y_{i,0}}$,
$\Delta \tilde{w}_{i,t}^h = \frac{W_{i,t}^h - W_{i,t-1}^h}{Y_{i,0}}$, and $\Delta \tilde{w}_{i,t}^f = \frac{(W_{i,t}^f - W_{i,t-1}^f)}{Y_{i,0}}$.

The wealth effect estimation

- Impact on consumption of a one dollar change in housing wealth that took place two years prior: about 5 cents.
- The stock wealth effect: insignificant and economically small.
- Large standard errors indicate statistically insignificant differences between housing and stock wealth effects.

Regression results

	Best Data	All Data	Good Data
$\Delta y_{i,t-2}$	0.578 (0.533)	0.962** (0.382)	0.775*** (0.297)
$\Delta w_{i,t-2}^f$	-.028 (0.033)	-.002 (0.031)	0.002 (0.022)
$\Delta w_{i,t-2}^h$	0.046 (0.041)	0.051* (0.026)	0.042** (0.019)
$\beta_2 = \beta_3$	2.478 (Accepted)	2.37 (Accepted)	2.466 (Accepted)
OBS	24	90	90
$\bar{R}^2$	0.206	0.051	0.116
Partial $\bar{R}^2$	-.004	0.06	0.11

Housing wealth and consumption during the recession

Q: What fraction of the consumption declines after 2006 can be associated with the concurrent housing wealth changes.

Actual vs. predicted consumption growth: 6 states with the highest/lowest housing wealth growth
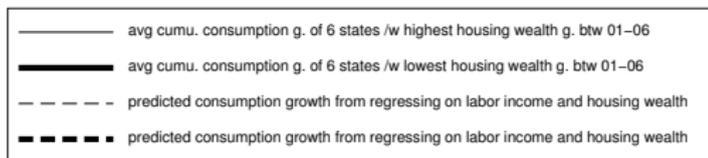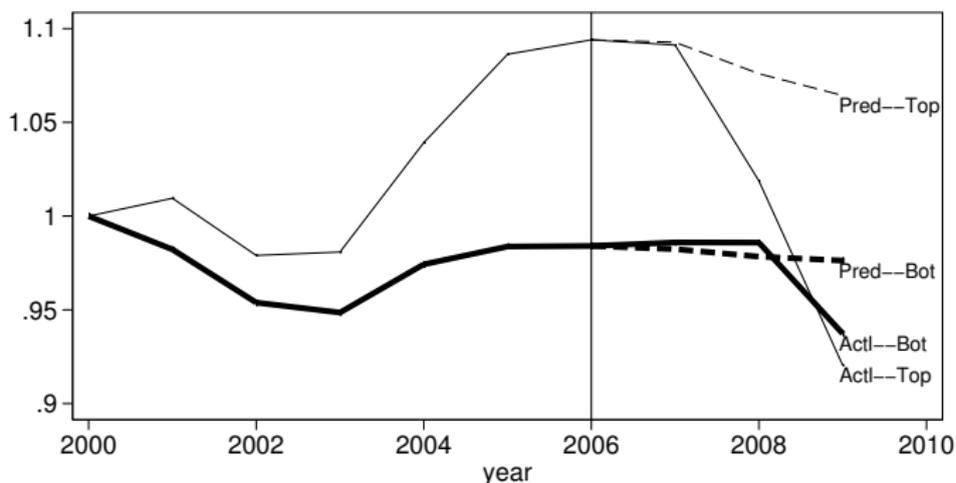
- For the top 6 states, almost 50 percent of the consumption drop in 2007 can be associated with the housing wealth decline in the same year.
- This possible association, however, declines over time to 23 percent in 2008, and finally about 11 percent in 2009.
- There is no evidence for strong association between consumption change and housing wealth change for states with bottom housing wealth growth.

	Year	Index of actl. c	Index of pred. c	actl. $\Delta c_{i,t}$	pred. $\Delta c_{i,t}$	%$\Delta c_{i,t}$ associated with $\Delta w_{i,t}^h$
Top States	2006	1.0940	1.0940			
	2007	1.0912	1.0927	-0.26%	-0.12%	47.43%
	2008	1.0188	1.0760	-6.64%	-1.53%	23.04%
	2009	0.9204	1.0643	-9.65%	-1.08%	11.23%
Bot States	2006	0.9841	0.9841			
	2007	0.9859	0.9824	0.19%	-0.17%	-92.34%
	2008	0.9859	0.9784	-0.01%	-0.41%	4856.95%
	2009	0.9373	0.9763	-4.92%	-0.22%	4.43%

Conclusion

Contributions:

- Creates a new panel dataset for the financial wealth of U.S. states.

- Constructs a state-level measure of consumption.

- Estimates stock and housing wealth effects using these data; help us understand consumption changes during the recession.

Conclusion

Contributions:

- Creates a new panel dataset for the financial wealth of U.S. states.

- Constructs a state-level measure of consumption.

- Estimates stock and housing wealth effects using these data; help us understand consumption changes during the recession.

THANK YOU!