Measuring Wealth Effects Using U.S. State Data

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

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Contribution: Construct the regional data needed to conduct the wealth effect study.
Some regional data exists, but has issues


- 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

![Graph showing the proportion of mutual funds of total stock market wealth over time from 1975q1 to 2006q1.](source: FFA)
Limitations with currently available state-level consumption data

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

<table>
<thead>
<tr>
<th>Source Code</th>
<th>Data sources</th>
<th>Works using data</th>
<th>Time range</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Del Negro (1998)</td>
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<td>Del Negro (1998)</td>
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<td></td>
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<td>Luengo-Prado and Sorensen (2006)</td>
<td></td>
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</tbody>
</table>
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).
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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

![Graph showing stock wealth growth rate from 2001h1 to 2006h1 for FFA and IXI.]
Quality of the new financial wealth data

The new financial wealth data at the state level

Note: Idiosyncratic 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

```
<table>
<thead>
<tr>
<th>Year</th>
<th>Growth of U.S. retail sales</th>
<th>Growth of sum(c_ZHOUG)</th>
<th>Growth of sum(c_GHO)</th>
<th>Growth of sum(c_SMM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td></td>
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<td>1980</td>
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<td>1985</td>
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<td>1995</td>
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<tr>
<td>2000</td>
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<tr>
<td>2005</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>HS</th>
<th>Zhou</th>
<th>GHO</th>
<th>SMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>-0.15</td>
<td>-0.10</td>
<td>-0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>1983</td>
<td>-0.10</td>
<td>-0.05</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>1988</td>
<td>-0.05</td>
<td>0.00</td>
<td>0.05</td>
<td>0.10</td>
</tr>
<tr>
<td>1993</td>
<td>0.00</td>
<td>0.05</td>
<td>0.10</td>
<td>-0.10</td>
</tr>
<tr>
<td>1998</td>
<td>0.05</td>
<td>0.10</td>
<td>-0.10</td>
<td>0.10</td>
</tr>
</tbody>
</table>
```
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

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

where

$$\Delta \tilde{c}_{i,t} = \frac{C_{i,t} - C_{i,t-1}}{Y_{i,0}}, \quad \Delta \tilde{y}_{i,t} = \frac{Y_{i,t} - Y_{i,t-1}}{Y_{i,0}},$$

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

<table>
<thead>
<tr>
<th></th>
<th>Best Data</th>
<th>All Data</th>
<th>Good Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta y_{i,t-2}$</td>
<td>0.578</td>
<td>0.962**</td>
<td>0.775***</td>
</tr>
<tr>
<td></td>
<td>(0.533)</td>
<td>(0.382)</td>
<td>(0.297)</td>
</tr>
<tr>
<td>$\Delta w_{i,t-2}^f$</td>
<td>-0.028</td>
<td>-0.002</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.031)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>$\Delta w_{i,t-2}^h$</td>
<td>0.046</td>
<td>0.051*</td>
<td>0.042**</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.026)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>$\beta_2 = \beta_3$</td>
<td>2.478</td>
<td>2.37</td>
<td>2.466</td>
</tr>
<tr>
<td></td>
<td>(Accepted)</td>
<td>(Accepted)</td>
<td>(Accepted)</td>
</tr>
<tr>
<td>OBS</td>
<td>24</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>$\bar{R}^2$</td>
<td>0.206</td>
<td>0.051</td>
<td>0.116</td>
</tr>
<tr>
<td>Partial $\bar{R}^2$</td>
<td>-0.004</td>
<td>0.06</td>
<td>0.11</td>
</tr>
</tbody>
</table>
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

![Graph showing actual and predicted consumption growth with time]

- **Actual** consumption growth:
  - Top states: 0.9, 1.05, 1.1
  - Bottom states: 0.9, 1.05, 1.1

- **Predicted** consumption growth:
  - Top states: 0.95, 1.05, 1.1
  - Bottom states: 0.95, 1.05, 1.1

Note: Indexed to 2000.
- 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Index of actl. c</th>
<th>Index of pred. c</th>
<th>actl. $\Delta c_{i,t}$</th>
<th>pred. $\Delta c_{i,t}$</th>
<th>$% \Delta c_{i,t}$ associated with $\Delta w^h_{i,t}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top States</td>
<td>2006</td>
<td>1.0940</td>
<td>1.0940</td>
<td>$-0.26%$</td>
<td>$-0.12%$</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>1.0912</td>
<td>1.0927</td>
<td>$-6.64%$</td>
<td>$-1.53%$</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td>1.0188</td>
<td>1.0760</td>
<td>$-9.65%$</td>
<td>$-1.08%$</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>0.9204</td>
<td>1.0643</td>
<td>$-9.65%$</td>
<td>$-1.08%$</td>
</tr>
<tr>
<td>Bot States</td>
<td>2006</td>
<td>0.9841</td>
<td>0.9841</td>
<td>$0.19%$</td>
<td>$-0.17%$</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>0.9859</td>
<td>0.9824</td>
<td>$-0.01%$</td>
<td>$-0.41%$</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td>0.9859</td>
<td>0.9784</td>
<td>$-4.92%$</td>
<td>$-0.22%$</td>
</tr>
</tbody>
</table>
Conclusion

Contributions:

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