Introduction

Question: How and why do returns on wealth permanently differ between U.S. households and vary over the wealth distribution?

Method:
- Propose panel-data measures for returns on U.S. household assets and wealth using the PSID.
- Estimate type-dependence using fixed effects with empirical Bayes shrinkage.
- Document how and why returns vary over the wealth distribution – like Fagereng et al. (2020) for Norway.
- Examine correlation of household-specific wages and returns.

Findings:
- Leverage exhibits permanent heterogeneity - explains most of the permanent heterogeneity in the U.S. returns on wealth.
- Returns on assets heterogeneity, 3.8 p.p.s.d, understate the permanent heterogeneity in returns to wealth – 3.8 versus 9.2 p.p, respectively.
- Returns to wealth decline on average with scale / returns to non-financial assets decline with specialization.
- Household-specific returns and wages are correlated.

U.S. Data
Panel Study of Income Dynamics (PSID) from 1999—2019
Returns to wealth, \( r_i = \frac{x_i}{c_i} \), and \( c_i \) are observed:

- \( j(t) = (j=a), \) primary household, secondary household, private businesses, public equities, and risk-free assets
- \( r_{i,t} = \sum_{j=1}^{J} \{ r_{j,i,t} + \Delta x_{j,i,t} - x_{j,i,t} \} \Sigma_{j=1}^{J} \{ x_{j,i,t} - \tilde{x}_{j,i,t} \} \)

for household \( i \) at time \( t \), \( x_{j,i,t} \) is flow net dividends, \( \tilde{x}_{j,i,t} \) is asset value, \( x_{j,i,t} \) is net investment, \( \Delta x_{j,i,t} \) debt, and debt service costs \( c_{j,i,t} \)

Data advantages:
- Net investment included in the measures of capital gains
- Encompassing assets; not just taxable (retirement)
- U.S. estimates (no wealth tax, representative, no top debt, and debt service costs)
- Does not require hedonic pricing estimates for housing

SUMMARY STATISTICS FOR RETURNS TO ASSET AND WEALTH

<table>
<thead>
<tr>
<th>Obs</th>
<th>Mean</th>
<th>Total</th>
<th>Within</th>
<th>Between</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets</td>
<td>15232</td>
<td>3271</td>
<td>3.5</td>
<td>10.6</td>
</tr>
<tr>
<td>Primary House</td>
<td>1611</td>
<td>3144</td>
<td>5.2</td>
<td>10.4</td>
</tr>
<tr>
<td>Secondary House</td>
<td>1766</td>
<td>408</td>
<td>9.7</td>
<td>33.1</td>
</tr>
<tr>
<td>Private Business</td>
<td>859</td>
<td>235</td>
<td>38.0</td>
<td>99.3</td>
</tr>
<tr>
<td>Risk-Free</td>
<td>23923</td>
<td>4594</td>
<td>1.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Public Equity</td>
<td>8901</td>
<td>1918</td>
<td>0.6</td>
<td>36.8</td>
</tr>
<tr>
<td>Total Wealth</td>
<td>15232</td>
<td>3271</td>
<td>8.2</td>
<td>28.2</td>
</tr>
<tr>
<td>Primary House</td>
<td>1611</td>
<td>3144</td>
<td>14.5</td>
<td>39.1</td>
</tr>
<tr>
<td>Secondary House</td>
<td>1766</td>
<td>408</td>
<td>13.6</td>
<td>53.3</td>
</tr>
<tr>
<td>Private Business</td>
<td>859</td>
<td>235</td>
<td>53.1</td>
<td>152.1</td>
</tr>
</tbody>
</table>

Note: Annualized rates of return for households, in percentage points, 1999-2019.

Household-Specific Returns
- First stage removes age and year fixed effects, \( z_{i,t} \): \( r_{i,t} = x_{i,t} + \beta + \xi_{i,t} \)
- Second stage controls for observable household and portfolio characteristics, \( z_{i} \): \( r_{i,t} = x_{i,t} + \beta + \xi_{i,t} \)
- Unexplained component is the sum of a household-specific return, \( \varepsilon_{i,t} \), and idiosyncratic error, \( \eta_{i,t} \): \( \xi_{i,t} = \varepsilon_{i,t} + \eta_{i,t} \)
- Standard deviation of household-specific returns, \( \bar{\sigma}_{i} \), estimated with FE with empirical Bayes shrinkage - unabated
- Idiosyncratic returns on wealth, \( \tilde{\sigma}_{i} \), are calculated \( \eta_{i,t} \) in the same way and for every asset class \( i \)
- The contribution of borrowing to the standard deviation in the household-specific returns to wealth, \( \gamma_{i} \): \( \gamma_{i} = \bar{\sigma}_{i} \tilde{\sigma}_{i} + \bar{\sigma}_{i} \)

Results - Type Dependence
Leverage explains 58 percent of household-specific returns to wealth

| Total Assets | 0.83 (0.069) | 0.13 |
| Primary House | 1.34 (0.402) | 0.09 |
| Secondary House | 0.76 (0.128) | 0.01 |
| Private Business | 1.44 (0.351) | 0.16 |
| Risk-Free | 0.35 (0.17) | 0.19 |
| Public Equity | 0.41 (0.313) | 0.01 |
| Total Wealth | 1.98 (0.728) | 0.11 |
| Primary House | 1.32 (0.531) | 0.12 |
| Secondary House | 0.579 (0.912) | 0.01 |
| Private Business | 0.59 (1.761) | 0.16 |

Note: \( \bar{\sigma}_{i} \) is flow net dividends, \( \tilde{\sigma}_{i} \) is standard deviation of household-specific returns, in percentage points.

Permanent Heterogeneity in Returns to Assets (Fagereng et al., 2020) attributes the permanent heterogeneity in returns to wealth – 3.8 versus 9.2 p.p, respectively.
- Portfolio Allocation and Risk Account for Little of Permanent Heterogeneity
- Robustness
- Empirical Bayes understates the permanent heterogeneity in returns to wealth.
- Non-homeowners do not display permanent heterogeneity.
- Non-business owners display permanent heterogeneity.

Household-Specific Returns Robust to Various Assumptions

- Returns on assets heterogeneity, 3.8 p.p.s.d, understate the permanent heterogeneity in returns to wealth – 3.8 versus 9.2 p.p, respectively.
- Returns to wealth decline on average with scale / returns to non-financial assets decline with specialization.

Implications
- Returns on assets understates permanent heterogeneity.
- Returns on wealth heterogeneity primarily due to leverage.
- Helps generalize and reconcile evidence from Scandinavia: returns to wealth decrease on average (Bach et al 2020) returns to assets increase on average (Fagereng et al 2020).
- Debt should not be ignored as part of portfolio choice; it is needed for type and scale dependence in returns – understanding wealth inequality more generally.

References

Acknowledgements
The author thanks Brant Abbott, Giulio Ferrari, Giovanni Gallipoli, Allen Head, James MacKinnon, Alex Mayeda, Frank Milne, and Ginger Smith for their comments. This research was supported by the Social Sciences and Humanities Research Council of Canada. SSHRC Award Number: 430-2020-61202.