Consumption Heterogeneity: Micro Drivers and Macro Implications

Edmund Crawley       Andreas Kuchler
Federal Reserve Board Danmarks Nationalbank

CFPB Research Conference
December 12, 2019

Viewpoints and conclusions stated in this paper are the responsibility of the authors alone and do not necessarily reflect the viewpoints of the Federal Reserve Board or Danmarks Nationalbank.
We estimate the consumption response to permanent and transitory shocks to income for different groups of households.
Hasn’t This Been Done Before?

Yes, but...

Our **method** addresses bias in previous results

Our **data** allows sharp focus on household heterogeneity
Hasn’t This Been Done Before?

Yes, but...

Our method addresses bias in previous results

Our data allows sharp focus on household heterogeneity
Hasn’t This Been Done Before?

Yes, but...

Our **method** addresses bias in previous results

Our **data** allows sharp focus on household heterogeneity

**Time Aggregation Problem**

Sample size in millions

Detailed balance sheet
Identifying Restrictions on

Income

and

Consumption

In Continuous Time
How Do We Do This? Reduced Form Approach

Identifying Restrictions on

**Income**
- Permanent (random walk) shocks
- Transitory (<2 years) shocks

and

**Consumption**

In **Continuous** Time
Identifying Restrictions on

**Income**
- Permanent (random walk) shocks
- Transitory (<2 years) shocks

and

**Consumption**
- Permanent (random walk) response
- Transitory (<2 years) response

In *Continuous* Time
Identifying Restrictions on

- Income: Permanent (random walk) shocks
- Transitory (<2 years) shocks

- Consumption: Permanent (random walk) response
- Transitory (<2 years) response

In Continuous Time → Time Aggregation Bias
Time Aggregation Problem

Permanent Income Flow

Observed Annual Income

Time

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

$0
$25,000
$50,000
$75,000
$100,000

Permanent Income Flow

MPC: Marginal Propensity to Consume

Blundell, Pistaferri and Preston (2008) MPC ≈ 0.13

Introduction

Empirical Strategy

Data

Results

Conclusion
Time Aggregation Problem

Introduction

Empirical Strategy

Data

Results

Conclusion

Time Aggregation Bias is large:

Our average MPC \approx 0.5

Blundell, Pistaferri and Preston (2008) MPC \approx 0.13

MPC: Marginal Propensity to Consume

Permanent Income Flow

Observed Annual Income
Time Aggregation Problem

Time Aggregation Bias is large:

Our average MPC $\approx 0.5$

Blundell, Pistaferri and Preston (2008) MPC $\approx 0.13$

MPC: Marginal Propensity to Consume
Data

What we need:
- Panel Data on **Income** and **Expenditure**
- Household **Balance Sheets**
What we need:

- Panel Data on **Income** and **Expenditure**
- Household **Balance Sheets**

What we have: Registry data for all Danish households

- **Income**
  - Third party reported
- **Balance Sheet**
  - Wealth on 31 Dec
  - Asset category, mortgage tenure
- **Expenditure**
  - No *direct* measure of spending
Household budget constraint

\[ \text{Expenditure} = \text{Income} - \text{Saving} \]
Data: Expenditure

Household budget constraint

Expenditure = Income − Saving

\[ \downarrow \]

= Change in Net Worth (adj. for capital gains)
Household budget constraint

\[
\text{Expenditure} = \text{Income} - \text{Saving} \downarrow \\
= \text{Change in Net Worth (adj. for capital gains)}
\]

- Works well for households with simple financial lives
- Problem: Capital gains
  - Houses off balance sheet (exclude transaction years)
  - Exclude business owners
  - Capital gains based on a diversified index
- Noisy, but perhaps better than surveys (Kuchler et al. 2018)
- Huge sample size advantage: sample covers 7.6 million observations over 2004-2015
MPC by Liquid Wealth Quintile

Empirical Strategy
Data
Results
Conclusion

Introduction

Liquid Wealth

Permanent MPC
Transitory MPC

MPC

$0−2,000
$2,000−6,000
$6,000−12,000
$12,000−30,000
> $30,000

$0−2,000
$2,000−6,000
$6,000−12,000
$12,000−30,000
> $30,000

0.0
0.2
0.4
0.6
0.8
1.0

MPC

Liquid Wealth

0.0
0.2
0.4
0.6
0.8
1.0

Liquid Wealth

$0−2,000
$2,000−6,000
$6,000−12,000
$12,000−30,000
> $30,000

Permanent MPC
Transitory MPC
Monetary Policy: Interest Rate Exposure Channel

Introduction
Empirical Strategy
Data
Results
Conclusion
Monetary Policy: Interest Rate Exposure Channel

Introduction

Empirical Strategy

Data

Results

Conclusion

Debt

Interest Rate Hike

Debt

Debt

Money

Debt

Money
Monetary Policy: Interest Rate Exposure Channel

1yr rate $\uparrow$ 1%

Aggregate Spending $\downarrow$ 26 basis points

Through this redistribution channel alone

Medium MPC $\approx 0.5$

High MPC $\approx 0.8$

Low MPC $\approx 0.25$
Conclusion

New Method to Estimate Consumption Behavior
- Corrects for Time Aggregation Bias
- Estimates align with natural experiment literature
- Potential to use on a wide variety of datasets and applications

Applied to Danish Registry Data
- Sample Size $\rightarrow$ Sharp Focus on Heterogeneity
- High MPC from transitory shocks, Low MPC from Permanent shocks
- Quantify Monetary Policy Transmission Channels

Thank you!