Consumption Wedges: Measuring and Diagnosing Distortions

by Sasha Indarte, Raymond Kluender, Ulrike Malmendier, and Michael Stepner

Discussion by Taha Choukhmane

MIT Sloan

MIT MANAGEMENT SLOAN SCHOOL

GT-FRBA Household Finance 2025

Motivation

Data: Taha spends 98% of his income.

Why does he spend this much?

- He's impatient (e.g., low discount factor & EIS)
- He expects …
  - … future earnings will be high
  - … future inflation will be high
  - … rate of return on saving will be low
- **Behavioral biases** (wanted to save more but fell for temptation)
- **Liquidity constraints** (wanted to consume even more but couldn't borrow)
- **Inertia** (e.g., can't adjust committed spending such as rent, subscriptions, etc.)

Calibrate standard preferences

Elicit subjective beliefs in a survey

Consumption wedge

Part I

The Setting

earn in

How it works

01

Sign up in minutes

Securely link your bank account, then verify your identity and employment.

02

Access your money

Transfer up to $150/day (with a max of $750 per pay period[1]) to a linked bank account.

03

Get more out of every day

Get your paycheck up to 2 days early[2], help avoid overdrafts[3], and plan for what's next.

Get your paycheck up to 2 days early in your bank[2]

Why wait for payday?

Access your money in 1–3 business days at no cost / in minutes starting at $2.99.[1] No mandatory fees, no credit check, no interest.

Learn more

earn in

EarnIn's Fees, Tips Are Usurious, Ga. Consumers Say

By Emilie Ruscoe (August 5, 2024, 8:14 PM EDT) -- Pay advance app EarnIn has been hit with a proposed class action alleging its optional fees and tips are hidden interest payments that, on average, far exceed fair rates for consumer lending. . . .

Bloomberg

Fintech EarnIn Sued by DC Attorney General Over 300% Rates

- Customers must pay fee for instant access, according to suit
- Suit 'demonstrates a fundamental misunderstanding': EarnIn

By Paige Smith

November 19, 2024 at 8:30 AM EST

Part II

Measuring Consumption Wedges

Measuring Consumption Wedges

$$\textbf{Cons. wedge} = \frac{\textit{Actual Cons.} - \textit{Frictionless Cons.}}{\textit{Frictionless Cons.}}$$

Actual consumption: **Admin data bank transaction data**

Frictionless Consumption: **Calibrated model** (Beliefs on earnings, inflation & interest rates from 3-wave survey , Calibrated standard preference parameters)

Rich frictionless benchmark

In a general model, approximating frictionless consumption is not straightforward!

$$\ln\left(\frac{C_t^\star}{Y_t}\right) \approx \alpha_0 + \alpha_1 \frac{A_t R_t}{Y_t} + \sum_{j=1}^{T} \left\{ \left[\alpha_Y \widetilde{E}_t \ln G_{t+j}^Y + \alpha_\pi \widetilde{E}_t \ln \pi_{t+j} + \alpha_R \widetilde{E}_t \ln R_{t+j} \right] \left(\sum_{k=j}^{T} \rho^k \right) \right\}$$

Coefficient	Formula
α_0	$(1-\kappa_1)\left(\frac{1-\rho}{C/Y}\right) - \frac{\ln\beta}{\gamma}\frac{\rho}{(1-\rho)}$
α_1	$\frac{1-\rho}{C/Y}$
α_Y	$\frac{1-\rho}{C/Y}$
α_π	$-\alpha_Y \frac{C}{Y}\left(1-\frac{1}{\gamma}\right)$
α_R	$-\alpha_Y\left(1-\frac{C}{Y}+\frac{C/Y}{\gamma}\right)$
ρ	$\frac{1+\frac{AR}{Y}-\frac{C}{Y}}{\frac{AR}{Y}}$
κ_0	$\frac{C}{Y}+\left(\frac{C}{Y}-1\right)\frac{\rho}{1-\rho}$
κ_1	$0 - \frac{C}{Y}\frac{\ln\frac{C}{Y}}{1-\rho} - \left(\frac{C}{Y}-1\right)\ln\rho\left[\frac{\rho}{(1-\rho)^2}\right]$

A simpler frictionless benchmark

Perfect foresight, constant interest rate and CRRA utility:

$$\max \sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma}}{1-\sigma}$$

Subject to intertemporal budget constraint (IBC):

$$\sum_{t=0}^{\infty} \frac{c_t}{R^t} = \frac{PI_0}{R-1} \qquad \text{with} \quad PI_0 = (R-1)\left[a_0 + \sum_{t=0}^{\infty} \frac{y_t}{R^t}\right]$$

Assuming $\beta^{\frac{1}{\sigma}} R^{\frac{1-\sigma}{\sigma}}$<1, frictionless consumption is a constant fraction of permanent income:

$$c_0 = \left(1 - \beta^{\frac{1}{\sigma}} R^{\frac{1-\sigma}{\sigma}}\right) \frac{\mathbf{PI_0}}{R-1}$$

Identification Challenge I:
Preference Heterogeneity

Assume that in fact β is heterogeneous such that $\boldsymbol{\beta_i = \beta\gamma_i}$

The consumption wedge between predicted consumption under homogeneous preference c_0 and the actual consumption given the heterogeneity in preferences c_0^i is equal to:

$$wedge = \frac{\beta^{\frac{1}{\sigma}} R^{\frac{1-\sigma}{\sigma}}}{1 - \beta^{\frac{1}{\sigma}} R^{\frac{1-\sigma}{\sigma}}} \left(1 - \gamma_i^{\frac{1}{\sigma}}\right)$$

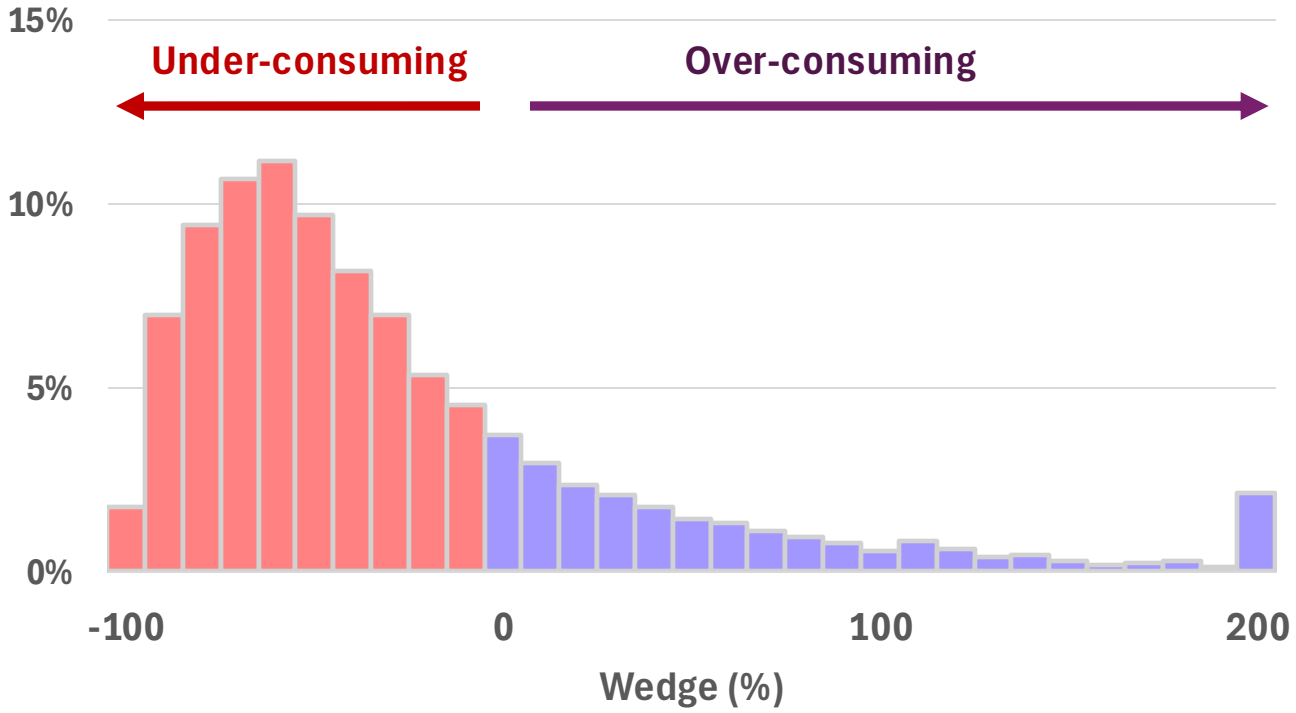
Given an estimate of the wedge, can back out β_i:

$$\beta_i = \beta \left(1 + \left(1 - \frac{1}{\beta^{\frac{1}{\sigma}} R^{\frac{1-\sigma}{\sigma}}}\right) \times \hat{wedge}\right)^{\sigma}$$

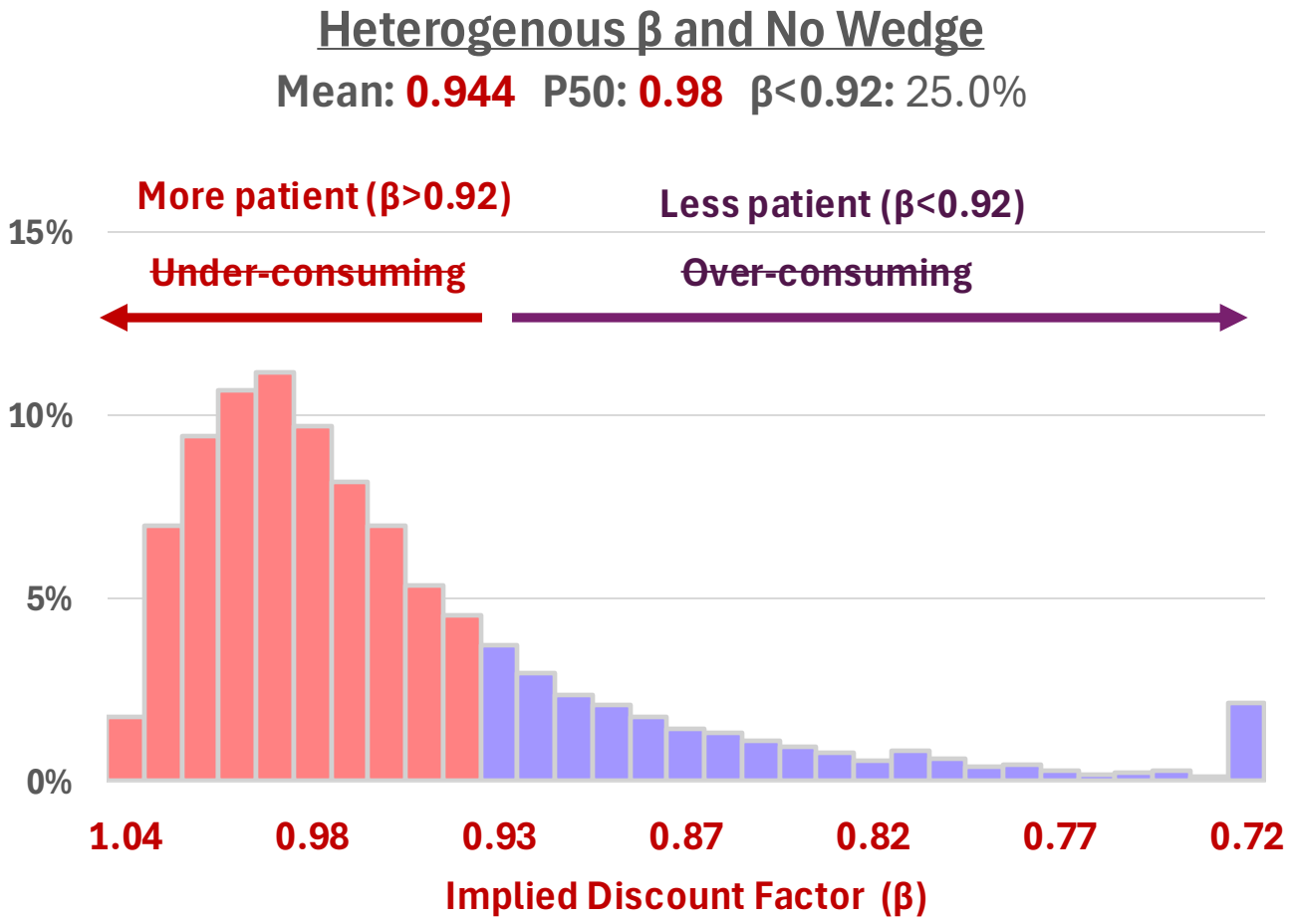
Identification Challenge I:
Preference Heterogeneity

Baseline: Homogeneous β

Mean: -19.2% **P50:** -39.9% **Wedge>0:** 25.0%



Identification Challenge I:
Preference Heterogeneity



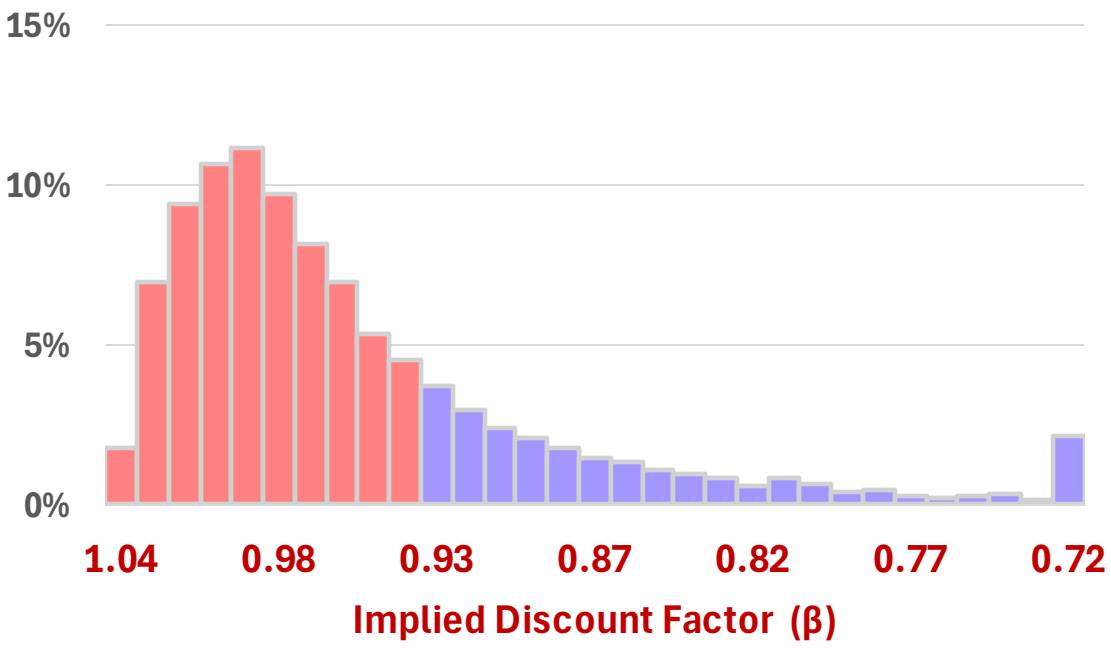
$$\beta_i = \beta\left(1+\left(1-\frac{1}{\beta^{\frac{1}{\sigma}}R^{\frac{1-\sigma}{\sigma}}}\right)\times \hat{wedge}\right)^{\sigma}$$

Calibration
β=0.92
σ=2
R=1.035 (avg. expected interest rate on saving)

Identification Challenge I:
Preference Heterogeneity

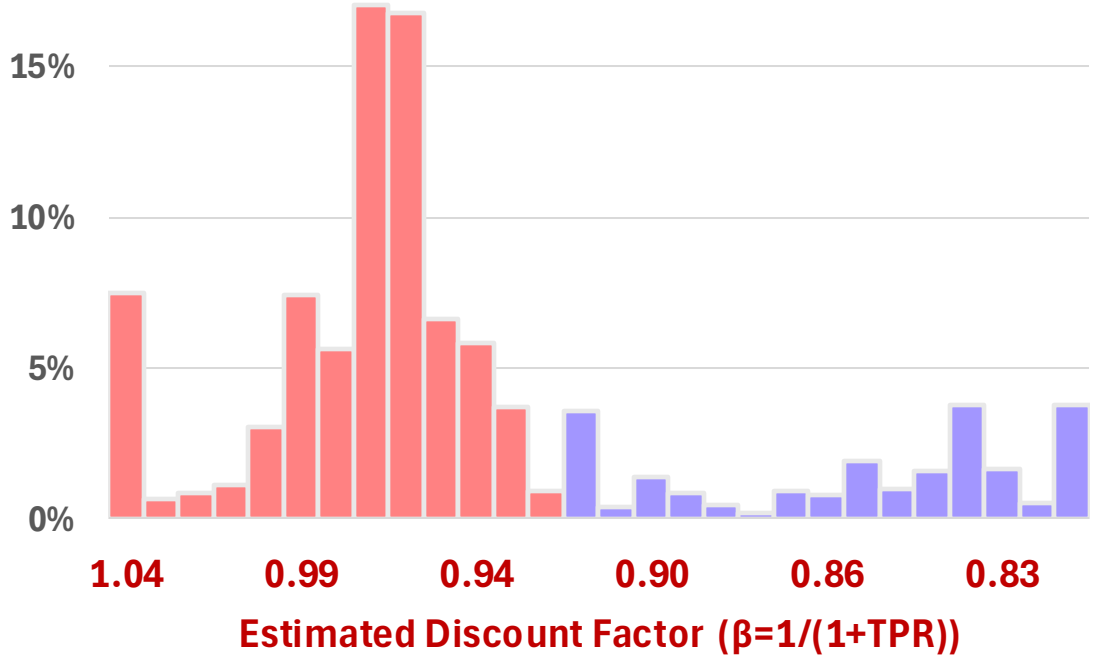
Heterogenous β and Zero Wedges

Mean: **0.944** P50: **0.98** β<0.92: **25.0%**



Calvet, Campbell, Gomes, Sodini (2022)

Mean: **0.95** P50: **0.97** β<0.92: **22.5%**



Caveat: Calvet, Campbell, Gomes, Sodini (2022) sample of older/richer Swedish households.

Identification Challenge I: Preference Heterogeneity

How do we reconcile these results with the low sensitivity of wedge to calibration?

Table 6. Sensitivity Analysis: Impact of Alternative Calibration Choices

	Parameter Range			Overconsumer (%)		P50 Abs(Wedge) (%)	
	Calibration	Min	Max	Min	Max	Min	Max
β	0.92	0.80	0.98	18.5	28.3	50.0	56.0
γ	2.0	1.0	5.0	23.1	27.0	45.4	59.9
Approx. point for nondurable $\frac{C}{Y}$	0.6987	0.55	0.75	23.2	28.8	51.5	63.3
Nondurable share of spending	0.7937	0.72	0.90	19.8	33.5	51.7	81.4
Approx. point for $\frac{AR}{Y}$	-0.4139	-0.81	-0.31	24.6	27.0	49.5	64.5

I am not sure, but plausibly heterogeneous β could jointly affect β, C/Y and AR/Y

(e.g. more patient individuals have higher β and AR/Y and lower C/Y)

Identification Challenge I:
Preference Heterogeneity

How to address preference heterogeneity?

Hard but one possibility would be to assume time preferences are time-invariant at the individual level. Could use the three survey rounds to control for individual fixed effects (?)

A simpler frictionless benchmark

Perfect foresight, constant interest rate and CRRA utility:

$$\max \sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma}}{1-\sigma}$$

Subject to intertemporal budget constraint (IBC):

$$\sum_{t=0}^{\infty} \frac{c_t}{R^t} = \frac{PI_0}{R-1} \qquad \text{with} \quad PI_0 = (R-1)\left[a_0 + \sum_{t=0}^{\infty} \frac{y_t}{R^t}\right]$$

Assuming $\beta^{\frac{1}{\sigma}} R^{\frac{1-\sigma}{\sigma}}$<1, frictionless consumption is a constant fraction of permanent income:

$$c_0 = \left(1 - \beta^{\frac{1}{\sigma}} R^{\frac{1-\sigma}{\sigma}}\right) \frac{\mathbf{PI_0}}{R-1}$$

Identification Challenge II: Permanent Income

Expectations about one-year ahead (not permanent) income!

Beyond 1st year, the paper assumes one-year-ahead expected nominal income growth exponentially decays with age (calibrated to match SCE).

Identification Challenge II:

Permanent Income

Imagine 2 individuals with the same age (25), same income ($50k) and same elicited beliefs (e.g. expect income to grow by 5% next year)

=

Same frictionless consumption

Identification Challenge II:

Permanent Income

Imagine 2 individuals with the same age (25), same income ($50k) and same elicited beliefs (e.g. expect income to grow by 5% next year)

How EarnIn's Early Pay Gave Me the Financial Flexibility I Needed as a College Student

HBCU Editors | Posted on Mar 18, 2025

By Imani Brown, College Student and Assistant Manager, Raleigh, NC

Identification Challenge II:
Permanent Income

Imagine 2 individuals with the same age (25), same income ($50k) and same elicited beliefs (e.g. expect income to grow by 5% next year)

$$PI_0^i = (1 + \vartheta_i)\, PI_0$$

- **High Permanent Income ($\vartheta_i > 0$): consume more (positive wedge)**

e.g., student who knows their income will grow substantially after they graduate

- **Low Permanent Income ($\vartheta_i < 0$): consume less (negative wedge)**

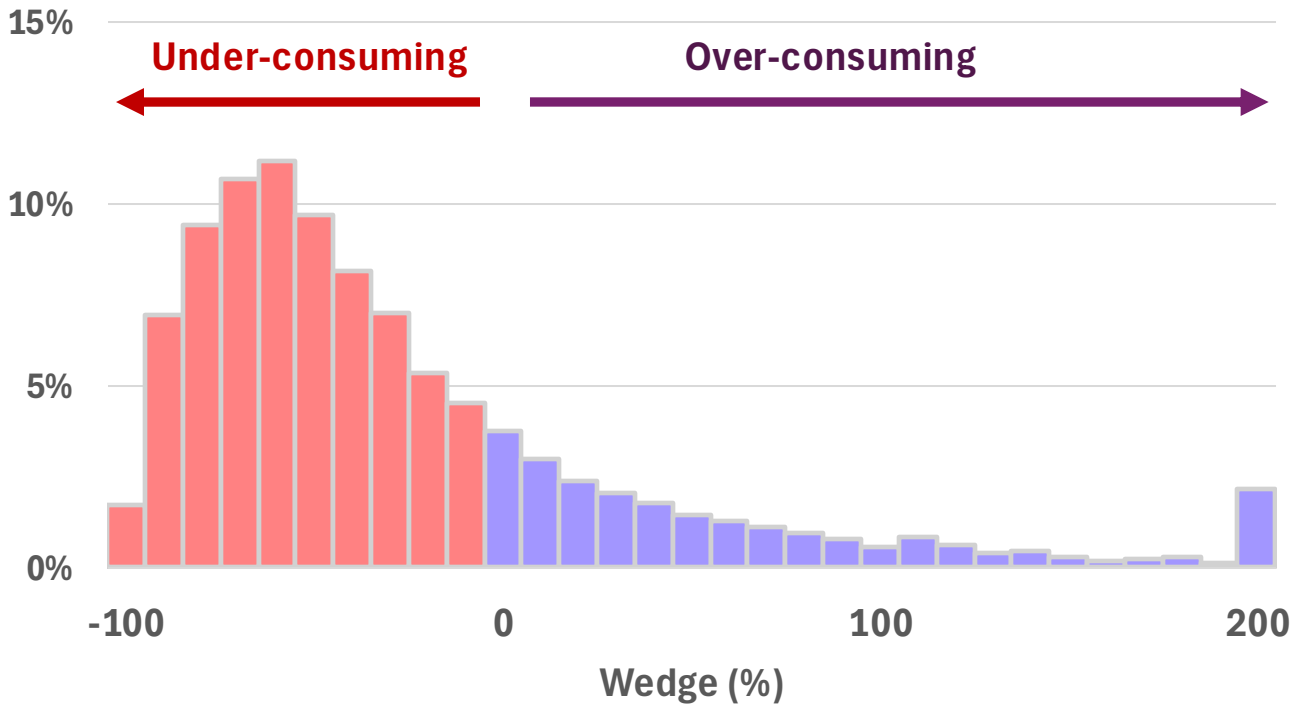
e.g., expects a 5% bonus next year but not much wage growth thereafter

Identification Challenge II:

Permanent Income

Baseline homogeneous PI | observables

Mean: -19.2% **P50:** -39.9% **Wedge>0:** 25.0%

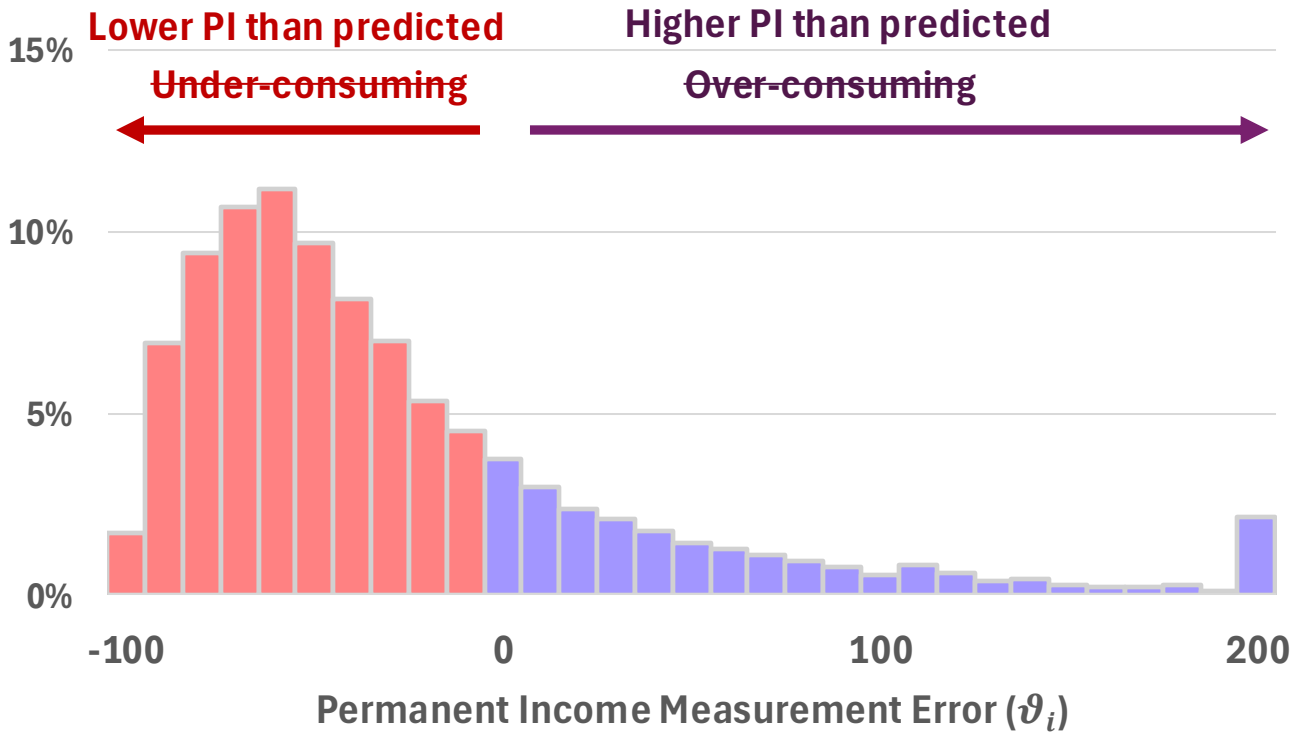


Identification Challenge II:

Permanent Income

Heterogeneous PI | observables

Mean: -19.2% **P50:** -39.9% ϑ_i**>0:** 25.0%



$$\vartheta_i = \frac{c_0^i - c_0}{c_0} = \hat{wedge}$$

Part III

Using Consumption Wedges

Using Consumption Wedges

Can consumption wedge improve the **identification** of structural consumption-saving models?

Proof of concept. Compute consumption wedges in model-simulated data and test whether targeting consumption wedges improves identification relative to traditional estimation targets (e.g., lifecycle moments, MPC distributions, etc.)

Conclusion

Fantastic paper!

Pushes the frontier of consumption-saving modeling!

Great data linking administrative & survey data,
analysis grounded in theory,
lots of robustness and thoughtful discussion.