Inflation and Inequality

Xavier Jaravel, *London School of Economics*

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Introduction

- What are the distributional effects of inflation?

  ▸ Cost-of-living inequality

  ▸ Assets and liabilities

  ▸ Earnings (indexation, bargaining)

  ▸ Markups

- In this talk, focus on:

  1. the measurement of cost-of-living inequality

  2. the implications for monetary and fiscal policy according to benchmark economic models

Roadmap

1. Measurement

   - Real-time inflation inequality: new estimates

   - Long run trends

2. Policy implications

Real-Time Inflation Inequality: New Estimates

- Constructs high-frequency and timely inflation distributions for the United States from public data sources

  - In the spirit of distributional national accounts
    (e.g., Saez-Zucman 2022 for nominal income)

- Simple methodology to estimate monthly inflation by income groups, race, age, etc., consistent with monthly releases of CPI

  - Use only publicly-available statistics:
    CPI price series (monthly), CEX expenditure microdata

  - Follow exact same price index construction steps as BLS:
    CEX used to update product weights in December of every other year

  - Add one disaggregation step to obtain expenditure shares and price indices by socio-demographic groups

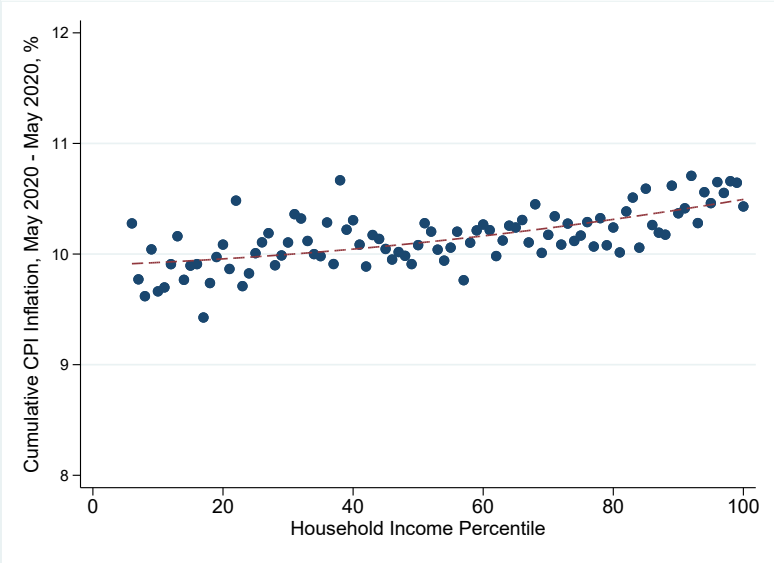- This approach also delivers monthly household-level price indices

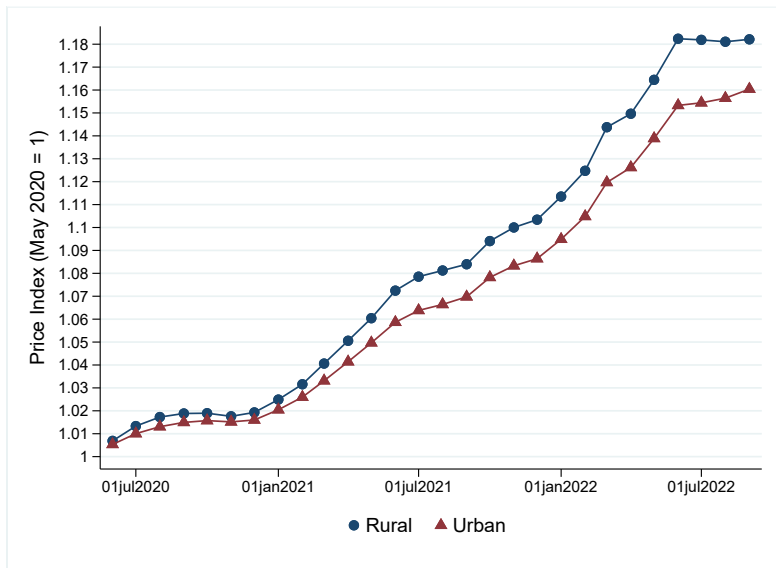# Inflation Inequality: Baseline
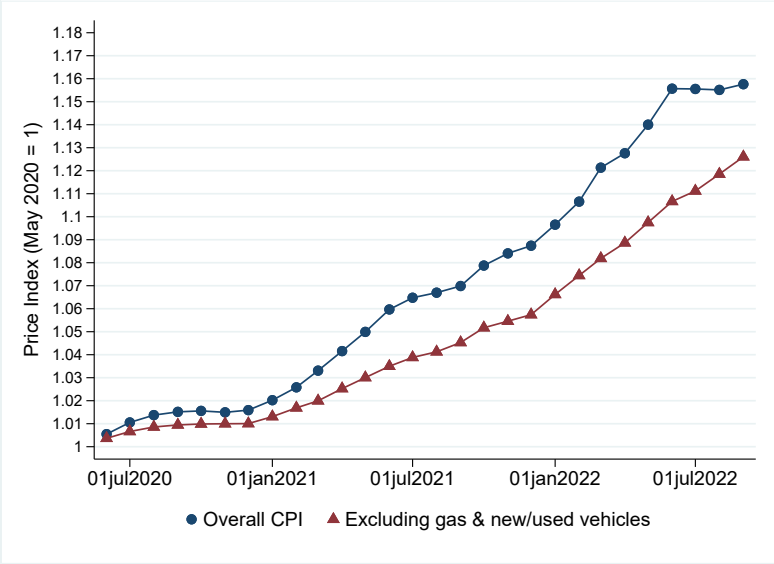
Inflation Inequality by Income Percentile
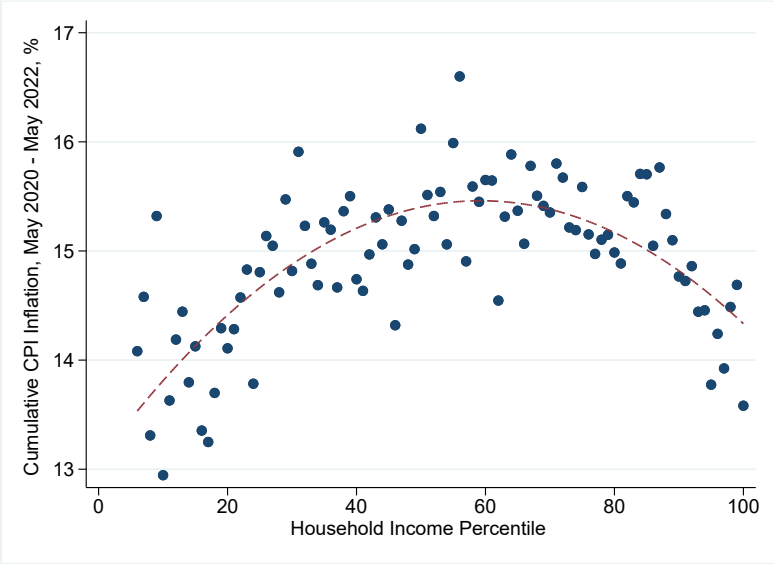
Inflation Inequality by Income Percentile:
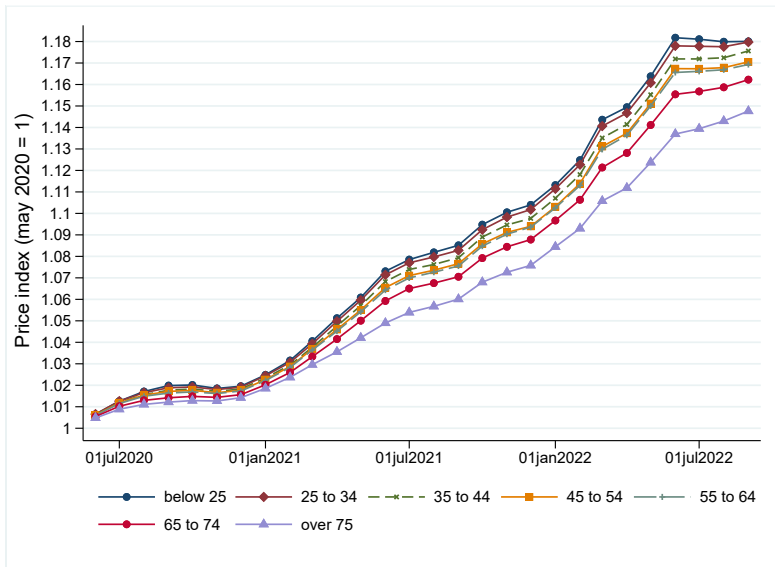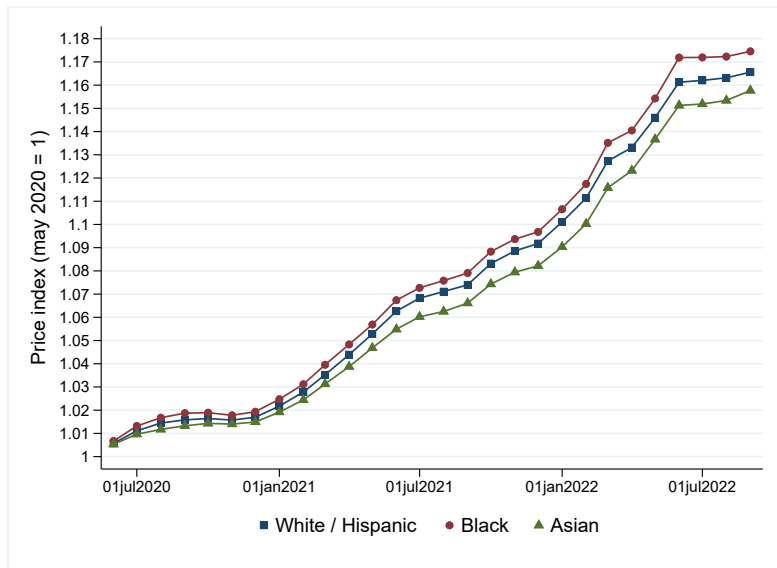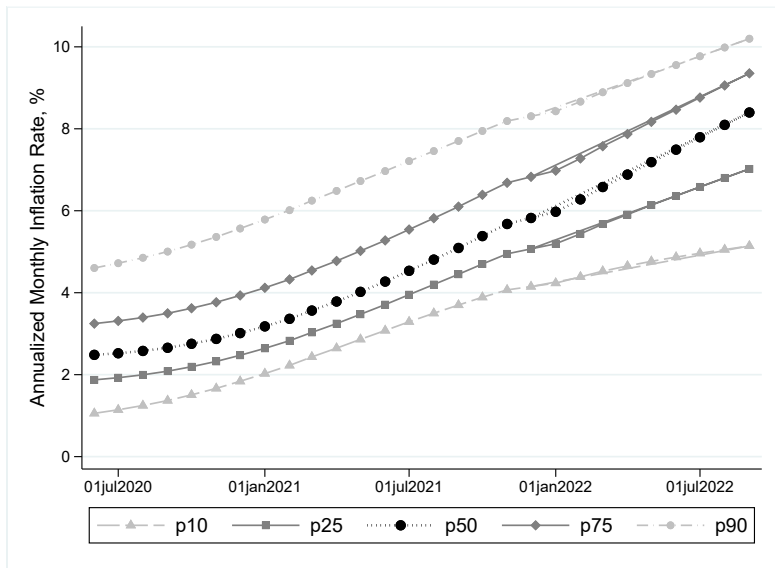# Excluding Gas & Vehicles

Inflation Inequality: Rural vs. Urban

Inflation Inequality: Age

Inflation Inequality: Race

Household-Level Inflation Inequality (with HP filter)

Inflation inequality in the United States in the Long-Run

- Using scanner data for consumer packaged goods (Nielsen) and linked CEX-CPI data, Jaravel (QJE 2019) estimates a long-run trend of inflation inequality in the United States

  ▶ Lower inflation for the rich: inflation is about 30-40 basis point lower on average per year for top income quintile vs. bottom quintile

  ▶ Large magnitude of aggregation bias: important to get micro data for each sector of the economy to accurately measure expenditure shares, effective prices paid, and product variety across sociodemographic groups

- Using internal BLS datasets, Klick and Stockburger (BLS working paper, 2021) confirm these findings

- Sizable implications for the measurement of real income growth across the income distribution

Implications for Real Income Growth

(Collyer, Jaravel, Wimer 2019)

Percent change in real household income growth from 2004 to 2018, by quintile, under official metrics and after adjusting for inflation inequality

Legend:
- Official metric
- After accounting for inflation inequality

	Income Quintile 1	Income Quintile 2	Income Quintile 3	Income Quintile 4	Income Quintile 5
Official metric	-0.9%	7.3%	9.4%	10.3%	16.6%
After accounting for inflation inequality	-6.7%	2.6%	6.1%	8.5%	16.6%
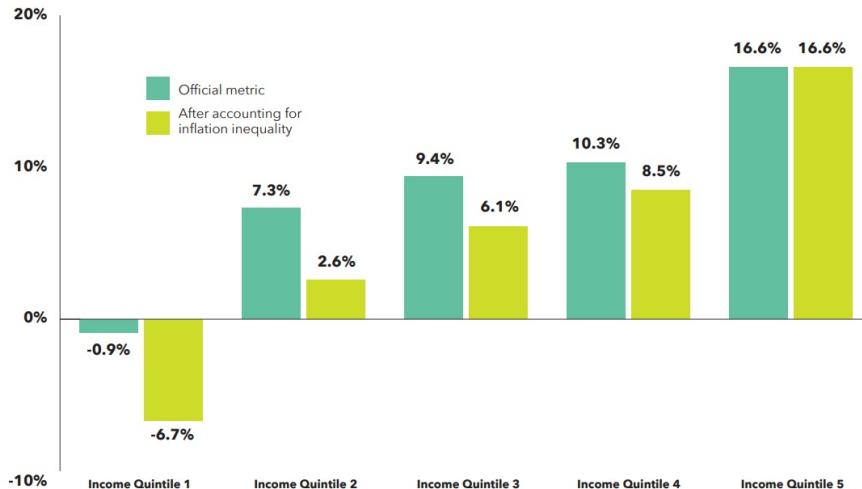
Roadmap

1. Measurement

2. **Policy implications**

   1. Monetary policy

   2. Taxes & transfers

Monetary Policy & Inflation Inequality: Heterogeneous Price Rigidities and Consumer/Worker MPC

- Need to think about how the transmission mechanisms of monetary policy interact with inflation inequality

  - Are consumers / workers exposed differently to disinflationary policies?

  - Benchmark New Keynesian model: price rigidities, which are heterogeneous across sectors (e.g., Nakamura & Steinsson 2009)

- Clayton, Jaravel and Schaab (2022) study the covariance between price rigidities and consumer/worker MPCs across sectors

  - Stylized fact 1: prices are more rigid in product categories *selling to* more educated/richer households

  - Stylized fact 2: prices are more rigid in product categories *employing* more educated/richer households

Implications for Monetary Policy: Intuition

- Due to both earnings and expenditure channel, exposure to monetary policy across households (i.e., to rigidities) covaries with households' marginal propensities to consume

- Consider a contractionary monetary policy shock: increase in nominal rate, demand falls, output & prices today fall

- Expenditure channel: because of differences in price rigidities, prices fall more for the consumption basket of the poor $\rightarrow$ distributional effects via price indices are "pro-poor"

  - the monetary policy shock reduces "real income" more for richer households, who have a lower MPC

  - this leads to a smaller fall in aggregate demand in general equilibrium—that is, this channel *dampens the aggregate effect of monetary policy*

Implications for Monetary Policy: Intuition

- Earnings channel: prices fall more in sectors employing the poor, which increases relative labor demand for the poor through changes in consumer demand $\rightarrow$ distributional effect via nominal earnings are "pro-poor"

    - the monetary policy shock reduces labor earnings more for richer workers, who have a lower MPC

    - this leads to a smaller fall in aggregate demand in general equilibrium—that is, this channel *also dampens the aggregate effect of monetary policy*

- Thus, accounting for heterogeneous price rigidities and their covariance with MPCs suggests that:

    - monetary policy tightening has *better distributional properties* (pro-poor) than commonly thought

    - compared with a model with homogeneous price indices and households, *stronger tightening* is required to achieve the same aggregate outcome

Comparison with Debtor-Savor Channel

- In contrast, the common view emphasizes differences between savers and debtors, implying that household heterogeneity amplifies the effectiveness of monetary policy, because changes in interest rates have a larger direct effect on high-MPC agents (e.g., Auclert 2019)

    - an increase in the nominal interest rate reduces consumption more for debtors, who have a higher MPC; this channel *amplifies* the intended fall in aggregate demand in equilibrium

    - moreover, monetary policy tightening has *pro-rich* distributional effects through the debtor-savor channel

- Quantifying the relative importance of the two channels (savor-debtor vs. heterogeneous price rigidites) is work in progress...

Fiscal Policy with Inflation Inequality

- Taxes & transfers:
  - Indexation of social benefits and the poverty line
  - Optimal taxation

Optimal Taxation

- Jaravel and Olivi (2022) study optimal taxation in a Mirrlees model with non-homotheticities

- Consider heterogeneous inflation shocks across product categories:

  - Heterogeneity in consumption baskets affects the value of redistribution at different points of the income distribution

- If inflation is higher at the bottom of the income distribution, how does the equity-efficiency tradeoff change?

  - Main force: the social marginal utility of redistributing an additional dollar to low-income groups *decreases*
    (other forces: substitution/income effects on labor supply)

  - Bottom line: in a utilitarian framework, observed heterogeneous inflation rates, which are lower for luxuries relative to necessities in the United States, generate a *regressive* optimal tax response

Optimal Taxation: Result

Figure 1: The Response of the Optimal Tax Schedule to Observed Price Shocks (2004-2015), CEX-CPI data
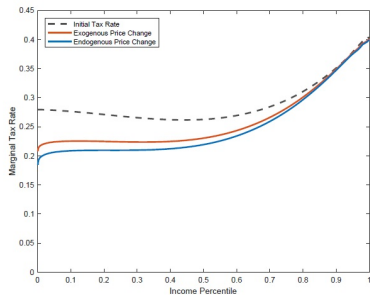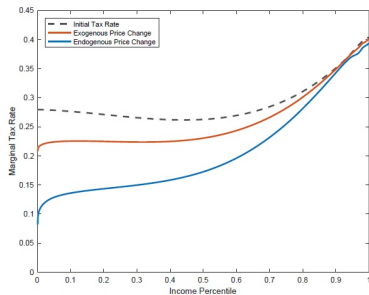
(i) $\sigma = 0.6$ (ii) $\sigma = 2$

Notes: the IRS parameter is set to $\alpha = 0.3$ and the labor supply elasticity to $\varepsilon = 0.21$; the CEX-CPI dataset is used in both panels and the initial tax schedule is taken from Hendren (2020). See Section 5.2.1 for a description of the quantitative model and counterfactuals.

Conclusion

Conclusion

- Recent evidence suggests that inflation inequality can be first-order, and that taking into account the distributional consequences of price changes is essential in several areas of policy making, from redistributive taxation to monetary policy

- Much remains to be learned:
  - Getting access to granular price and expenditure data for all sectors of the economy
  - Accounting for inflation inequality for optimal monetary + fiscal policy in a unified framework, including political economy considerations / reference dependence

- More detail in Annual Review of Economics survey article (Jaravel 2021)
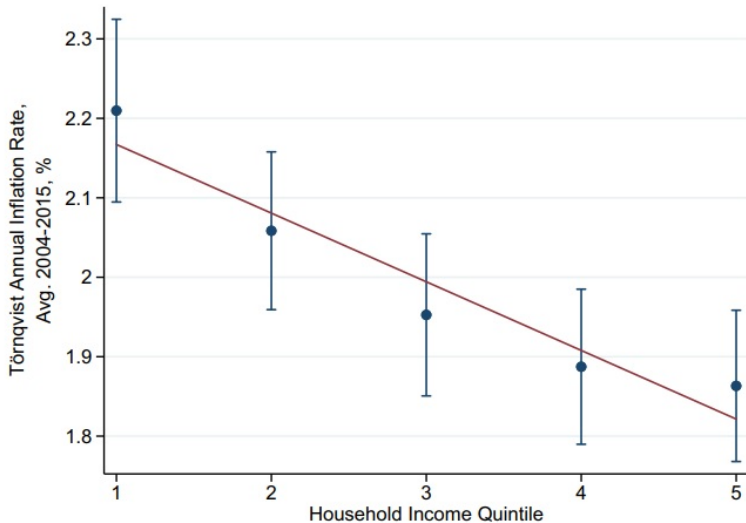
Appendix

Monthly CPI
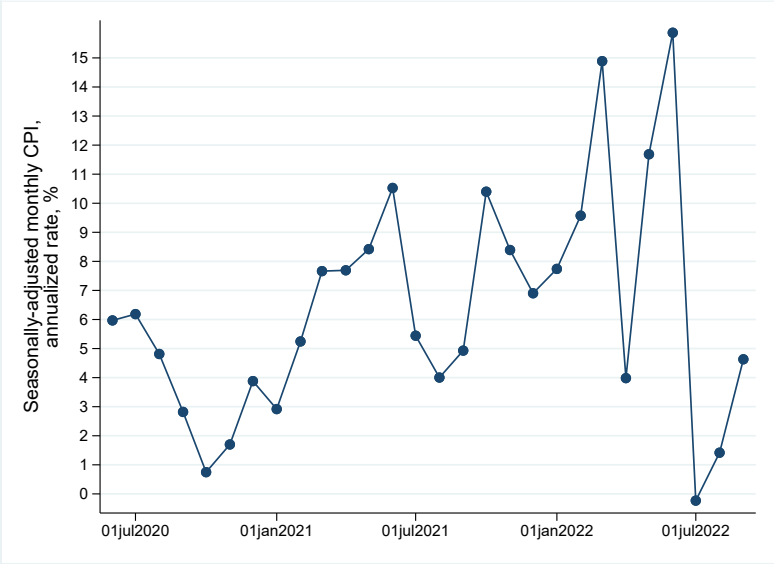
Inflation Inequality – CEX (Jaravel 2019)

A: Törnqvist, All Spending

Aggregation Bias – Nielsen (Jaravel 2019)

	HMS (2004–2015)			
	Δ Inflation rates, continuing products		Δ Log Feenstra variety adj.	
Aggregation Level	pp (1)	% Explained (2)	pp (3)	% Explained (4)
Barcodes $N = 2,240,278$	0.541	100	1.487	100
Product Modules by price deciles $N = 10,371$	0.479	88.6	0.974	65.5
Product Modules $N = 1,042$	0.358	66.2	0.578	38.9
Product groups $N = 112$	0.291	53.9	0.493	33.2
Departments $N = 10$	0.071	13	−0.048	−3.3

Klick and Stockburger (BLS Working Paper, 2021)

Table 6: Laspeyres index annualized percent changes from December 2003 to December 2018

Item Category	All urban households (U)	62 years or older (E)	Wage earner (W)	Lowest income quartile	Highest income quartile
All items	**2.07**	**2.17**	**2.06**	**2.25**	**1.97**
Apparel	0.14	0.05	0.10	-0.09	0.23
Education and communication	1.39	0.69	0.86	1.84	1.77
Food and beverages	2.19	2.14	2.18	2.13	2.23
Other goods and services	2.65	2.52	3.07	3.03	2.25
Housing	2.31	2.32	2.36	2.45	2.17
Medical care	3.21	3.08	3.29	3.11	3.29
Recreation	0.70	1.17	0.54	0.92	0.63
Transportation	1.85	1.92	1.93	2.11	1.68

Monetary Policy: Theory

Proposition: In response to our proposed aggregate perturbation, the change in aggregate demand can be decomposed as

$$dY_1 = \left[\text{Cov}_I \left(\mu\text{MPC}_{i,1}, b_{i,2} \right) - \frac{1}{\gamma} \mathbb{E}_I (\mu\text{MPS}_{i,1} c_{i,1}) \right] \frac{dR}{R} - \text{Cov}_I \left(\mu\text{MPC}_{i,1}, \frac{b_{i,1}}{\pi^A} \right) \frac{dP^A}{P^A}$$

$$+ \underbrace{\sum_s \frac{P_t^s}{P_t^A} \left(\mathbb{E}_I (\text{MPC}_{i,1}) + \text{Cov}_I (\mu\text{MPC}_{i,1}, \gamma_i^s) \right) dY_1^s}_{\text{Heterogeneous earnings effect}}$$

$$+ \underbrace{\sum_t \frac{1}{R^{t-1}} p \left(\mathbb{E}_I (\text{MPC}_{i,1}) + \text{Cov}_I (\mu\text{MPC}_{i,1}, \gamma_i^B) \right) Y_t^B \frac{dp}{p}}_{\text{Relative price effect on earnings}}$$

$$- \underbrace{\sum_t \frac{1}{R^{t-1}} \mathbb{E}_I \left(\mu\text{MPC}_{i,1} \alpha^i p^{\alpha^i} c_{i,t} \right) \frac{dp}{p}}_{\text{Relative price effect on expenditures}} .$$