



EUROPEAN CENTRAL BANK

EUROSYSTEM

The effect of monetary policy on inflation heterogeneity along the income distribution

Conference on Diversity, Equity
and Inclusion in Economics,
Finance, and Central Banking

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Introduction

- Effect of distribution on monetary policy
 - E.g. via different MPCs along the distribution (HANK models)

- Distributional effects of monetary policy
 - Known for long with respect to standard policy
 - Reignited interest and public debate following unconventional monetary policy

- Distributional effects arise via
 1. Wealth distribution
 2. Income distribution
 3. Consumption distribution: Monetary policy affects household-specific inflation differently

Research question

What are the effects of monetary policy on inflation heterogeneity along the income distribution?

Income groups might differ in their

(1) consumption baskets

- Cravino et al. (2020): inflation for high-income HHs responds less to monetary policy shocks.
- Kiss & Strasser (2023): product choice within category important source of inflation heterogeneity

(2) prices paid

- Kaplan & Schulhofer-Wohl (2017): cross-sectional variation in US inflation largely due to differences in prices paid
- Argente & Lee (2021): high-income HHs had lower inflation following Great Recession by changing shopping behaviour and substituting product qualities

Main result

- Monetary policy affects inflation differently along the income distribution
- Two different channels
 1. Differences in **consumption baskets**:
inflation of high-income HHs responds **less**
 2. Differences in **prices paid**:
inflation of high-income HHs responds **more**

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HICP category and micro price data

Income-specific inflation based on the HICP and the Household Budget Survey (HBS)

(1) **HBS expenditure shares** for top and bottom income quintile at 2-digit COICOP level

- 1999, 2004, 2010, 2015
- linearly interpolated for missing years



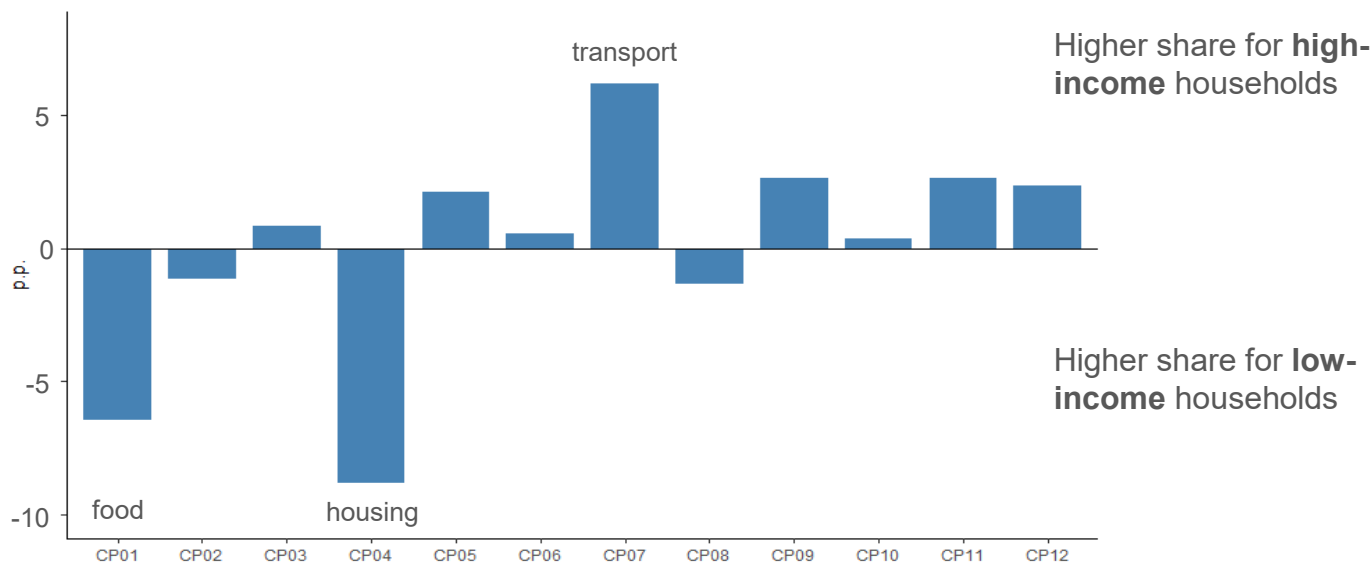
(2) **HICP inflation** at 2-digit COICOP level

- seasonally adjusted (Banbura and Bobeica 2020)
- (same for all households)

- Output: Inflation series by income quintile
- Time period: 1999-2018 (2005-2018 to match household panel)

Largest expenditure share difference in food, housing, transportation

Category expenditure share differences between high and low income households (euro area, percentage points)

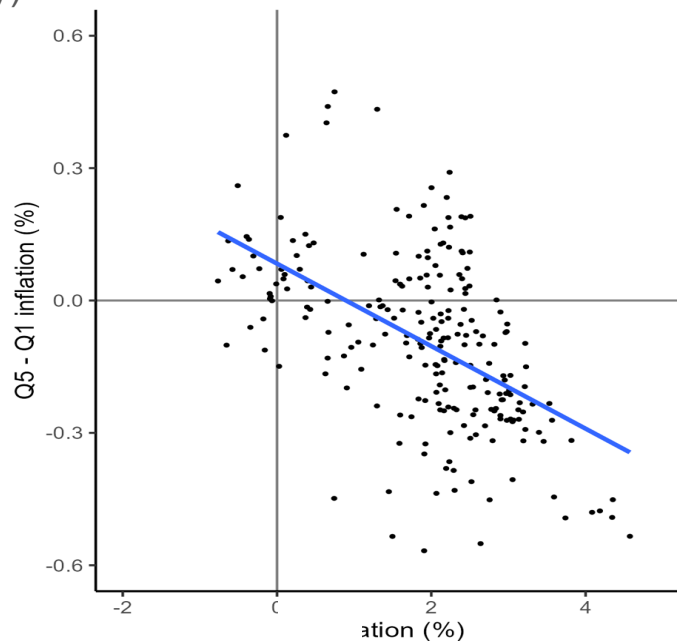
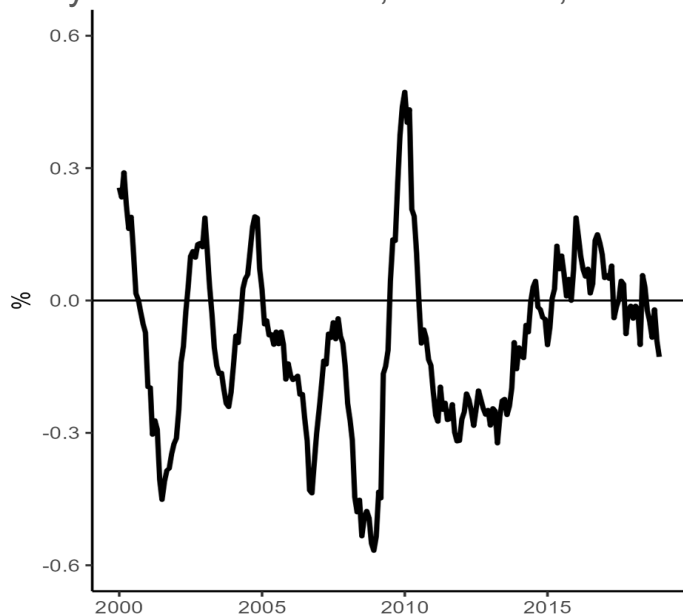


Data: HBS, averaged over all waves until 2015

Inflation for low-income households is higher than inflation for high-income households when inflation is high

Inflation differential between high and low income households

(year-on-year HICP inflation, euro area, monthly)



Micro price data: household panel

- Household panels of GfK and Kantar
- Information on purchases (transaction date, barcode, price, quantity purchased)
- Socio-demographic information (income, social class for IT & ES); specific income composition of panel
- 2005 (BE, DE) / 2008 (FR, NL, ES) / 2011 (IT) – 2018
- 160k-420k barcode items per country after data cleaning
- High frequency tracking of i) differences in baskets and ii) prices paid by household
- Limited scope of products (fast-moving consumer goods “FMCG”)
 - Here: food and beverages only (COICOPs 1.1,1.2, 2.1)
 - 15% of consumption, 4.5 pp exp. difference between high and low-income HHs
 - Prominent product differentiation

Inflation by income in household panel

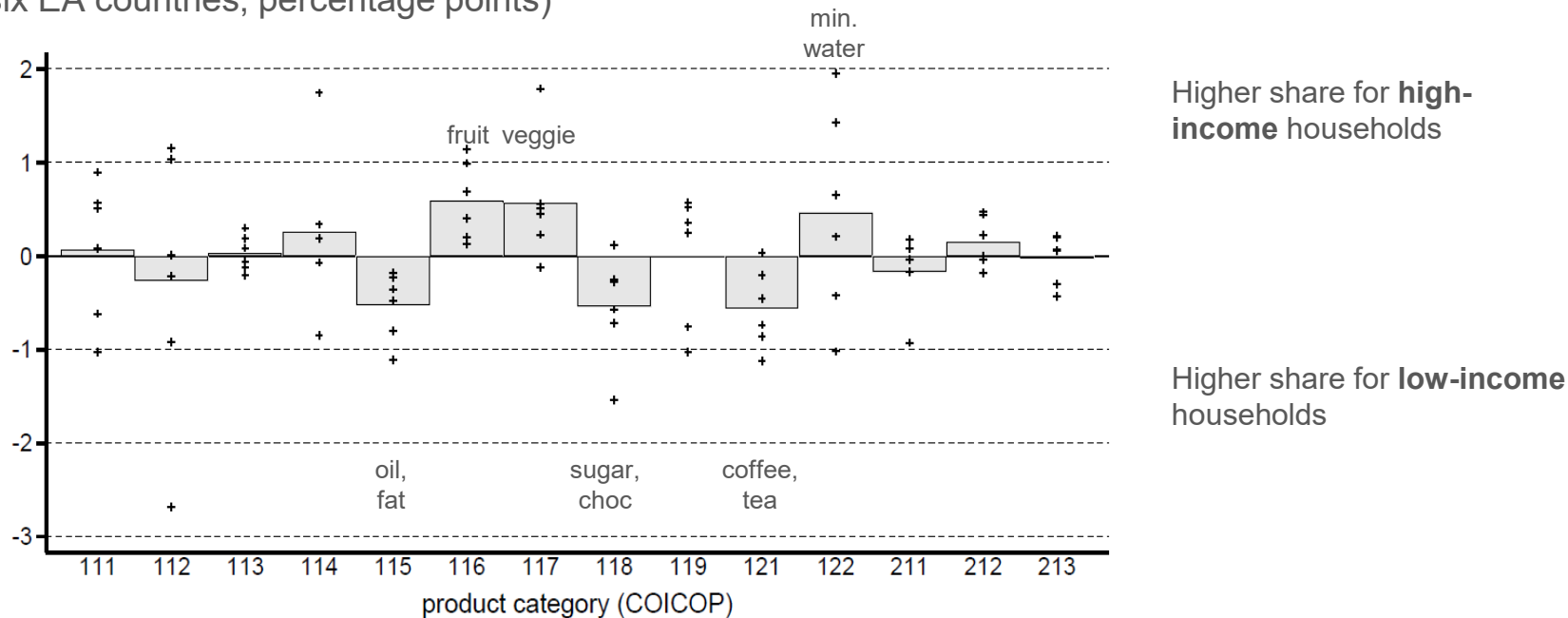
Income-specific inflation based on household panel

- For each month, aggregate all shopping transactions by households belonging to income group for each barcode item (quantity-weighted average price paid)
- Repurchased items only
- 12month rolling weights (Laspeyres backward, Paasche forward)
- Output: Inflation series by income quintile (Laspeyres, Paasche)

Expenditure share differences within FMCG smaller than between HIPC categories

FMCG expenditure share differences between high and low income HHs

(six EA countries, percentage points)



Monetary policy shocks

Monetary policy shocks

- Identified in a narrow window around ECB policy announcements
- Jarocinski and Karadi (2020) identification of monetary policy shocks
- “Poor man’s” identification: negative co-movement of interest rates and stock market returns

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Estimation methodology

Estimation methodology

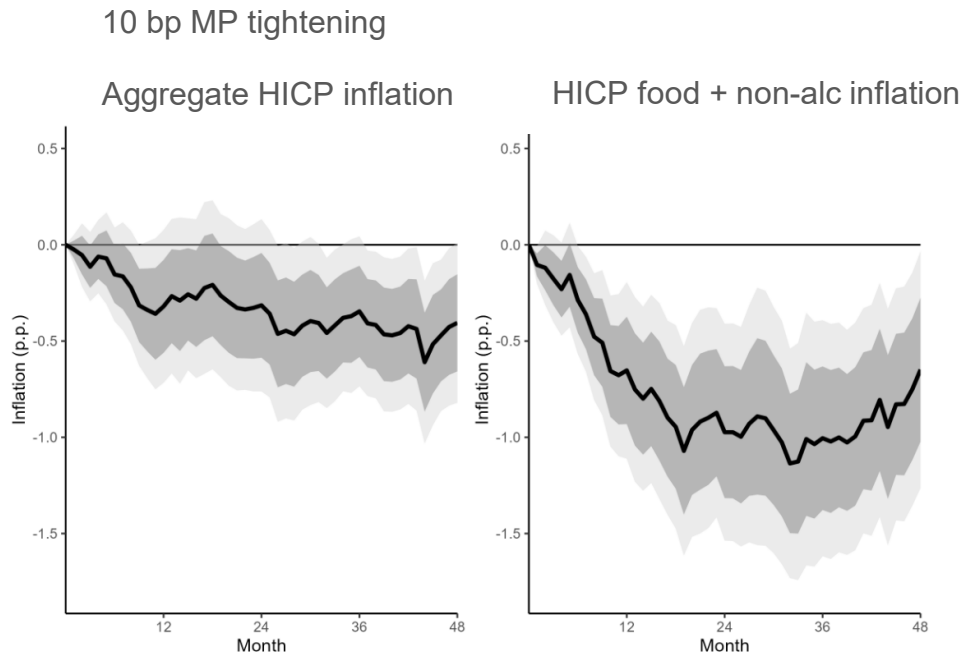
Local projections (Jorda 2005)

- Response of cumulative inflation $\pi_{t,t+h}$ to monetary policy shock ϕ_t
- Panel set-up with country fixed effects.
- Control for lagged values of one-year OIS rate x_t
- For parsimony: drop lags of inflation, group lags of shocks and controls

$$\begin{aligned}\pi_{cty,t,t+h} &= \alpha_h + \theta_h \phi_t \\ &+ \gamma_h^{1M} \phi_{t-1} + \gamma_h^{2M3M} \phi_{t-2,t-3} + \gamma_h^{4M12M} \phi_{t-4,t-12} + \gamma_h^{2Y} \phi_{t-13,t-24} + \gamma_h^{3Y} \phi_{t-25,t-36} \\ &+ \kappa_h^{1M} x_{t-1} + \kappa_h^{2M3M} x_{t-2,t-3} + \kappa_h^{4M12M} x_{t-4,t-12} + \kappa_h^{2Y} x_{t-13,t-24} + \kappa_h^{3Y} x_{t-25,t-36} \\ &+ \delta_{cty} + \epsilon_{cty,t},\end{aligned}$$

Estimation methodology

- Aggregate effects same ballpark as Jaroncinski and Karadi (2020)
- Response of COICOP01 larger and more tightly estimated
- Starting sample in 2005 significance is lost but pattern remains
- Pattern also found for high and low-income groups
- Pattern and magnitude similar across countries

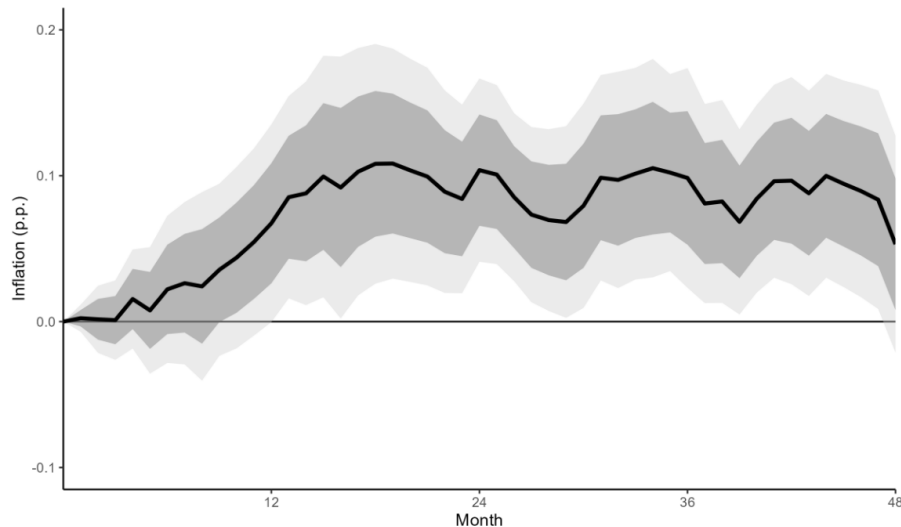


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Results

Response of inflation differential (high-low income)

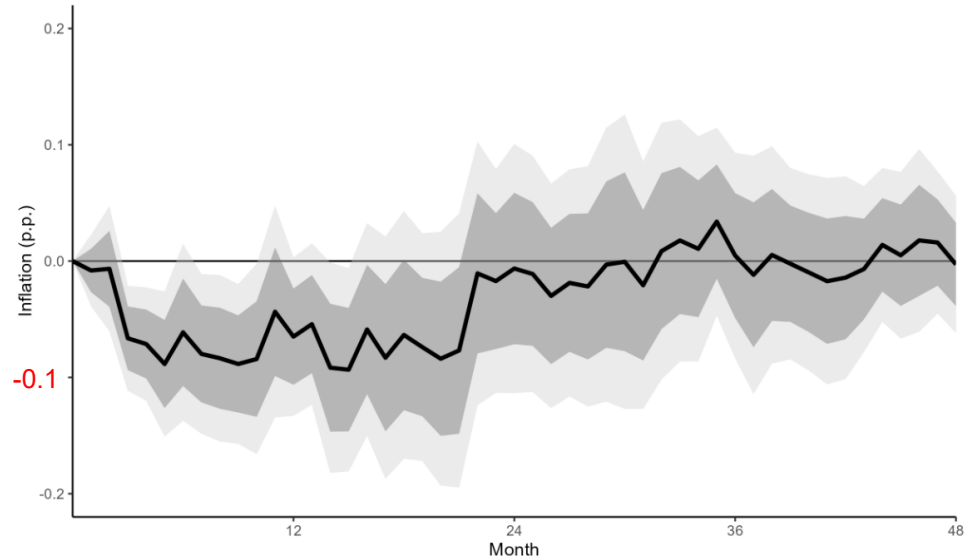
- **HBS/HICP** data, six largest euro area countries
- High-income inflation responds **less**
- Sign and magnitude similar to Cravino et al. (2020)



10 bp MP tightening, Laspeyres index

Response of FMCG inflation differential (high-low income)

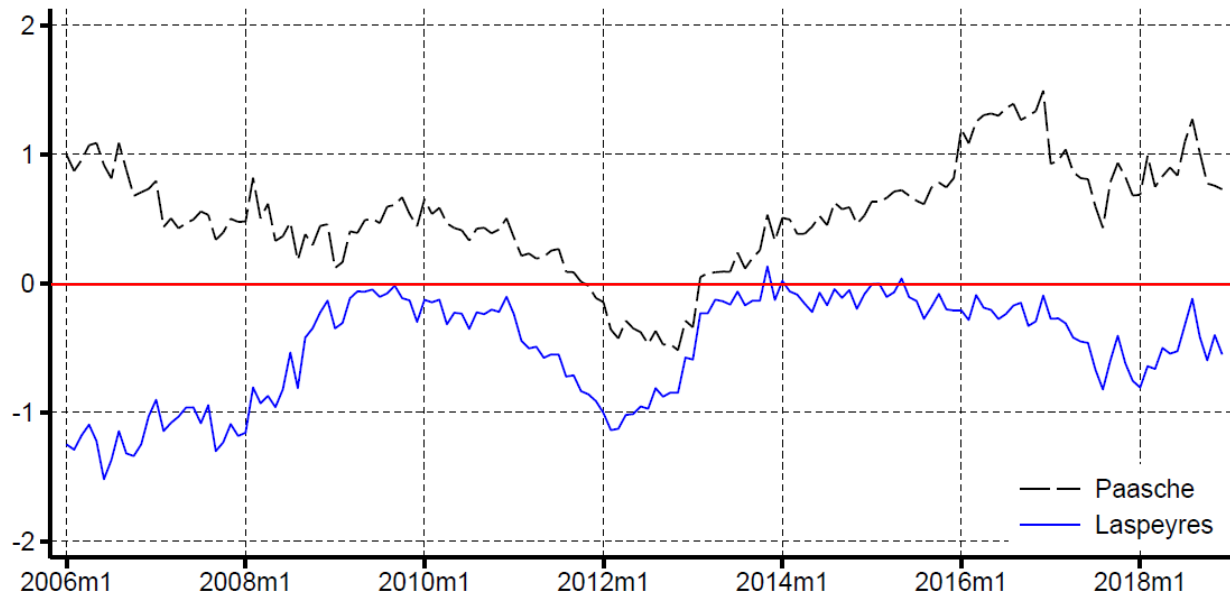
- **Household panel** data, food and beverage only, six largest euro area countries
- High-income inflation responds **more**
- *Within* food+bev category, high-income household inflation is more affected
- But HBS weighting assigns average (HICP) food category effect more on low-income households



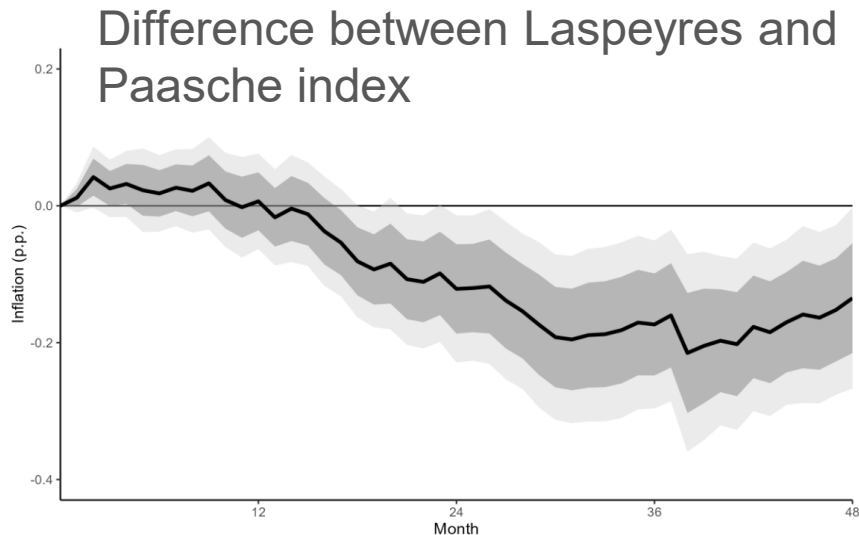
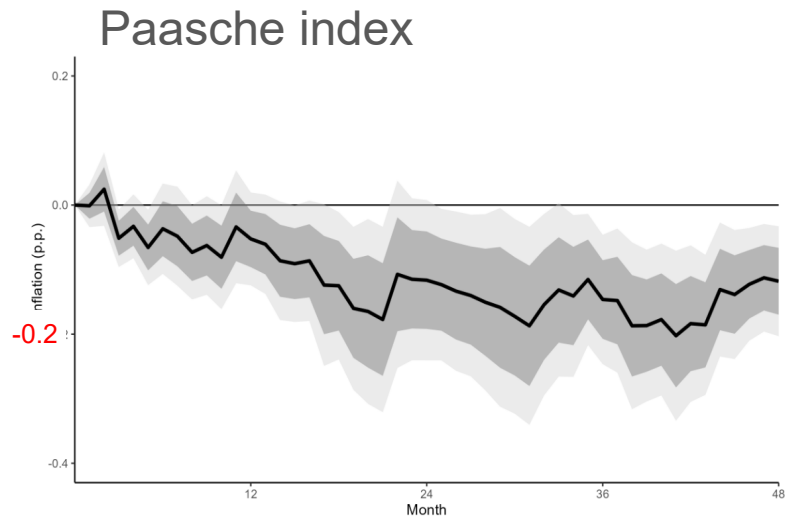
10 bp MP tightening, Laspeyres index

Difference in shopping behaviour: Paasche vs Laspeyres indices

Inflation difference between top and bottom income groups
(12-months rolling avg. of six-country weighted avg. inflation rate)



Substitution: Paasche vs Laspeyres indices

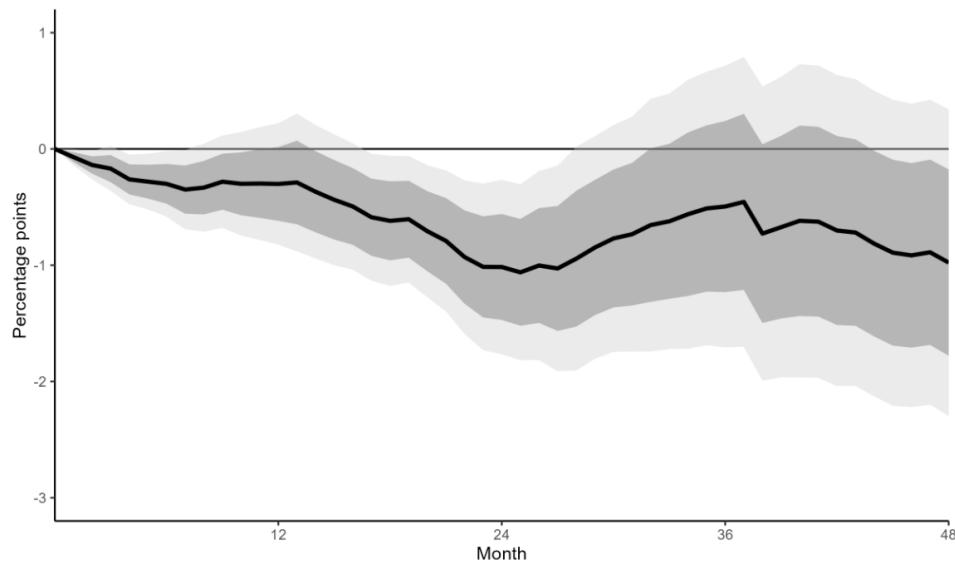


- Initial response: high-income hh change their shopping behaviour relative to low-income hh, but still purchase the same barcode item.
- Over time: product substitution, high-income hh lower their individual inflation rates relative to low-income hh in a more persistent manner.

Shopping behaviour: changes in quantities

- Decomposition of inflation into expenditure change and quantity change components.
- High-income households
 - adjust consumption of barcode items they had purchased previously by relatively more
- Timing of IRF = delayed substitution

Difference in quantities purchased



10 bp MP tightening

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Conclusion

Conclusion

Monetary policy affects inflation differently along the income distribution

- Differences in **consumption baskets**: high-income inflation responds **less**
- In line with Cravino et al. (2020)
- Allowing for differences in **prices paid**, high-income inflation responds **more**
- In line with Argente and Lee (2021)

Determining the overall sign for HICP would require (timely) quantities for all HICP categories.

Net effect of wealth, income, and consumption basket?