



EUROPEAN CENTRAL BANK

EUROSYSTEM

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

Miguel Ampudia (BIS), Michael Ehrmann (ECB), Georg Strasser (ECB)

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Introduction

- Monetary policy and distributional aspects
 - Distributional effects **of** monetary policy
 - Known for long wrt standard policy
 - Reignited interest and public debate following unconventional monetary policy tools
 - Effect of distribution **on** monetary policy
 - Renewed interest due to better tools (e.g. HANK models)
 - Focus on income / wealth / consumption, less on inflation
 - Level of (surprise) inflation has distributional effects
 - Monetary policy affects household-specific inflation differently

Introduction

- Effects of monetary policy on inflation heterogeneity along the income distribution
 - Different consumption bundles
 - Cravino et al. (2020): inflation for high-income HHs responds less to mon pol shocks
 - Different shopping behaviour
 - Kaplan and Schulhofer-Wohl (2017): cross-sectional variation in inflation largely due to differences in prices paid
 - Argente and Lee (2021): high-income HHs had lower inflation following great recession by changing shopping behaviour and through product quality substitution

Introduction

- This paper
 - Applies Cravino et al. (2020) to the 6 largest euro area countries
 - Differences in consumption baskets along income distribution for HICP
 - Extends the analysis to allow for differences in shopping behaviour
 - Differences in prices paid along the income distribution for food and beverages

Introduction

- Key findings
 - Monetary policy affects inflation differently along income distribution
 - Substantial cross-country heterogeneity
 - Different channels
 - Differences in consumption baskets: inflation of high-income HHs responds **less**
 - Differences in shopping behaviour: inflation of high-income HHs responds **more**

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Data and estimation methodology

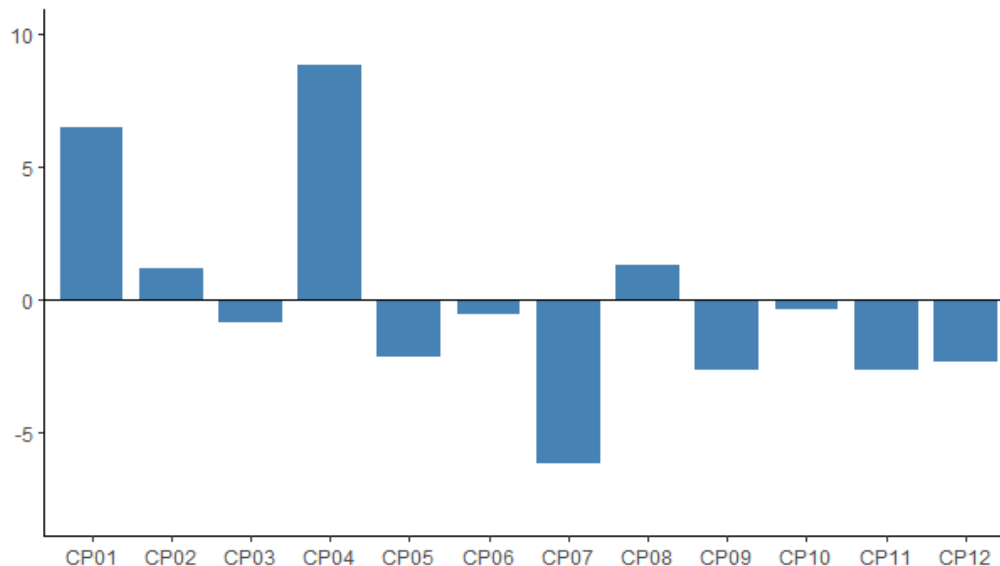
Data

- Income-specific inflation based on the HICP and the Household Budget Survey (HBS)
 - 1999-2018 (2005-2018 to match 2nd dataset)
 - HICP inflation at 2-digit COICOP level, seasonally adjusted (Banbura and Bobeica 2020)
 - HBS expenditure shares for top and bottom income quintile at 2-digit COICOP level
 - 1999, 2004, 2010, 2015, linearly interpolated for missing years



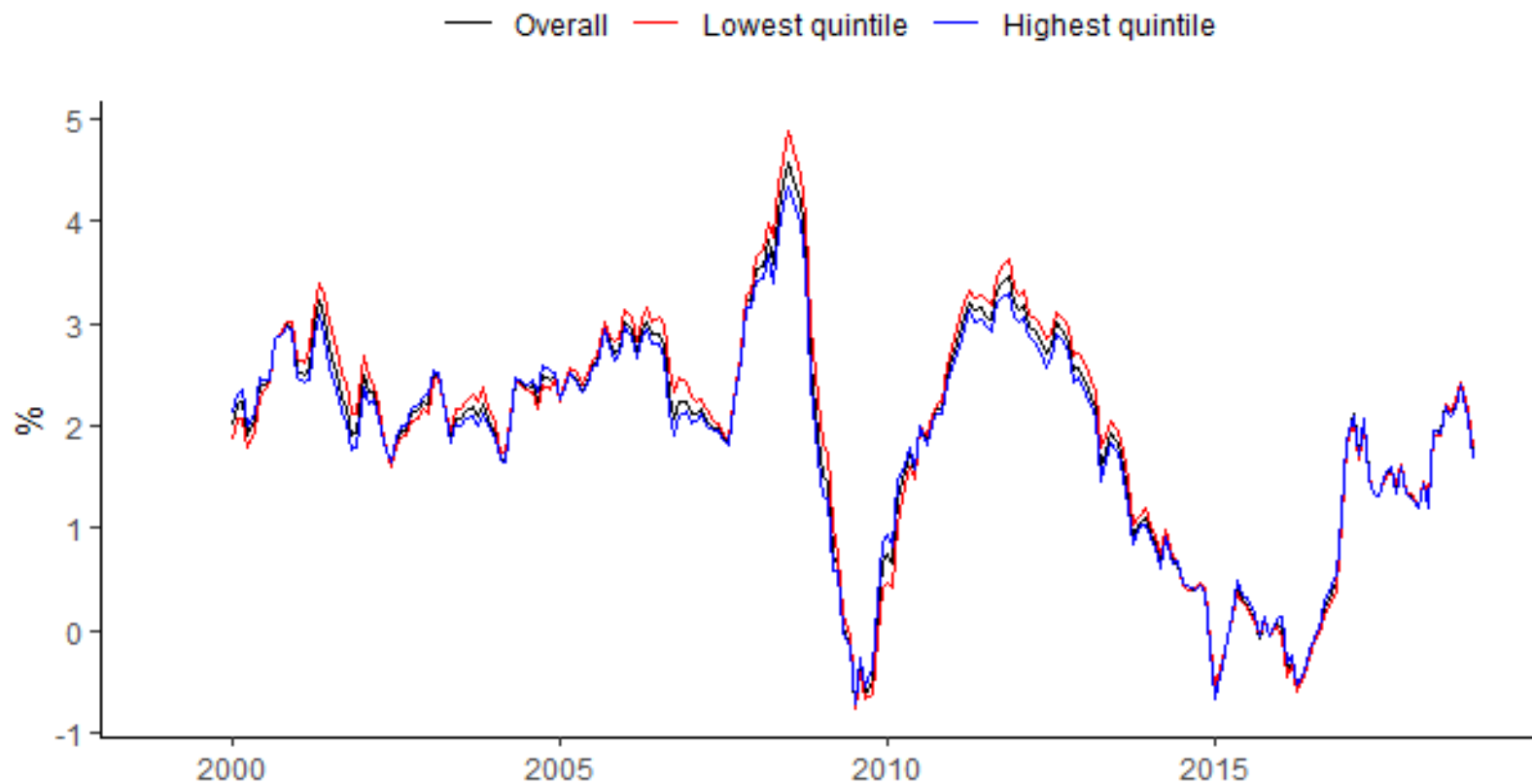
Data

- Differences in expenditure shares between high and low income HHs



Notes: euro area, averaged over all HBS waves. Numbers are in percentage points. Categories: Food and non-alcoholic beverages (01), alcoholic beverages, tobacco and narcotics (02), clothing and footwear (03), housing, water, electricity, gas and other fuels (04), furnishings, household equipment and routine household maintenance (05), health (06), transport (07), information and communication (08), recreation and culture (09), education (10), restaurants and hotels (11) miscellaneous goods and services (12).

Data



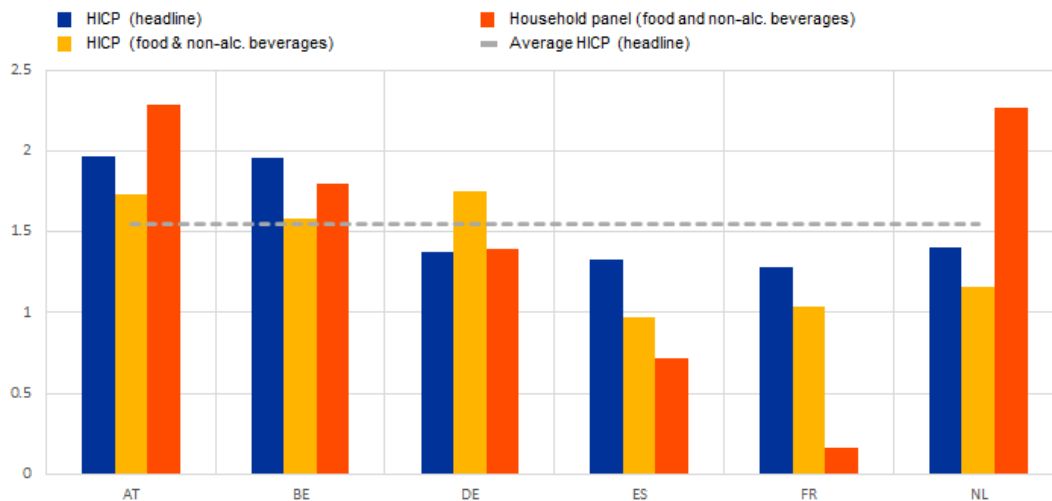
Notes: y-o-y HICP inflation in the euro area, overall and for the lowest and highest income quintile

Data

- Income-specific inflation based on a household panel
 - 2005 (BE, DE) / 2008 (FR, NL, ES) / 2011 (IT) - 2018
 - Gesellschaft für Konsumforschung (GfK)/Kantar
 - Information on purchases (transaction date, barcode, price, quantity purchased), plus socio-demographic information (4 or 5 income groups or social class in IT and ES)
 - High frequency tracking of i) differences in baskets and ii) prices paid
 - But: limited scope of products; here: food and beverages (COICOP 1.1,1.2,2.1)
 - 15% of consumption, 4.5.pp difference between high and low-income HHs
 - Prominent product differentiation

Data

- Income-specific inflation based on a household panel
 - Careful data cleaning results in data for 100.000-250.000 barcode items
 - For each month, aggregate all shopping transactions by households belonging to income group for each barcode item (quantity-weighted average price paid)
 - Generate m-o-m inflation indices, and chain-link to other horizons



Data

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

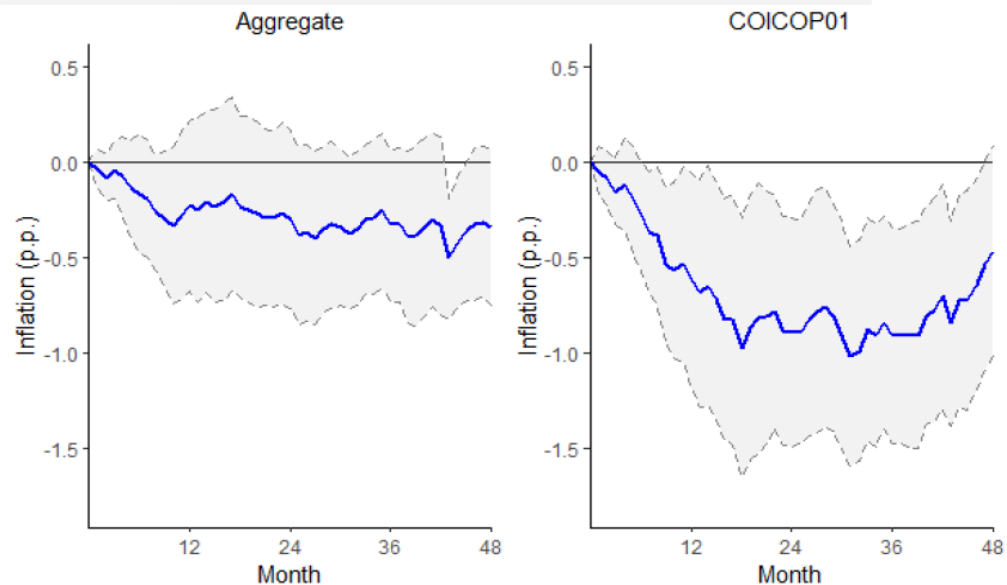
Estimation methodology

- Local projections (Jorda 2005)
 - Response of the cumulative inflation $\pi_{t,t+h}$ to the monetary policy shock ϕ_t
 - Control for lagged values of the one-year OIS rate x_t
 - For parsimony, group lags of shocks and controls
 - Inclusion of lagged inflation does not alter results

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

Estimation methodology

- Response to 10 bp tightening
 - Euro area HICP and COICOP1
 - Same ballpark as Jarocinski and Karadi (2020)
 - Pattern and magnitude similar across countries
 - Response of COICOP1 larger and more tightly estimated
 - Starting 2005, significance lost, but pattern remains
 - Pattern also found for high and low-income groups



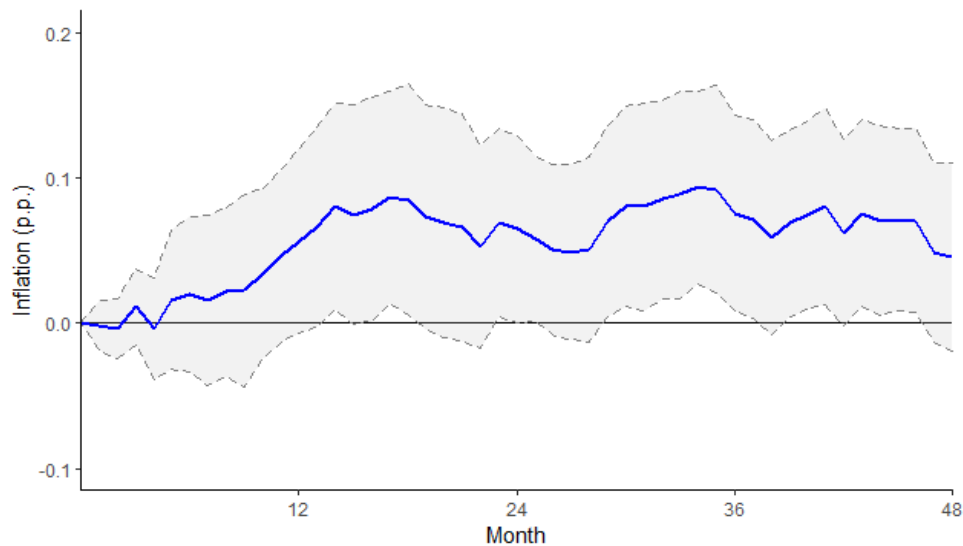
Notes: impulse response of euro area aggregate HICP inflation (left panel) and euro area HICP COICOP category 1 inflation (right panel) to a 10 basis point tightening monetary policy shock; shaded areas denote 90% confidence intervals

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The effect of monetary policy on inflation heterogeneity

Response of inflation differential (high-low income)

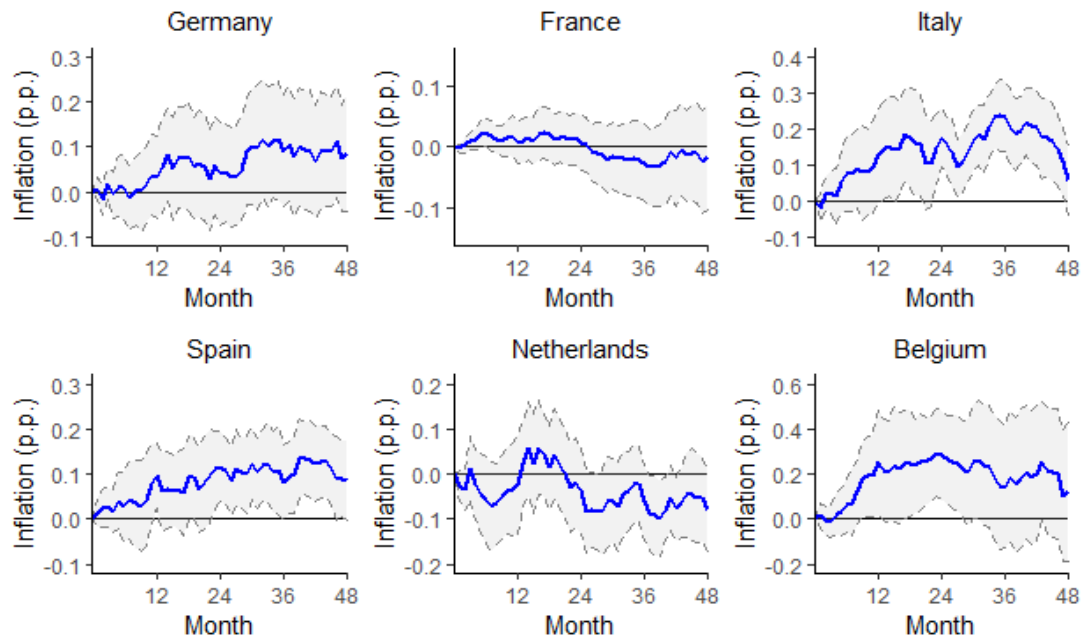
- HICP/HBS data, euro area
 - High-income inflation responds *less*
 - Sign and magnitude similar to Cravino et al. (2020)



Notes: impulse response of euro area inflation differential between high and low income households to a 10 basis point tightening monetary policy shock; shaded areas denote 90% confidence intervals

Response of inflation differential (high-low income)

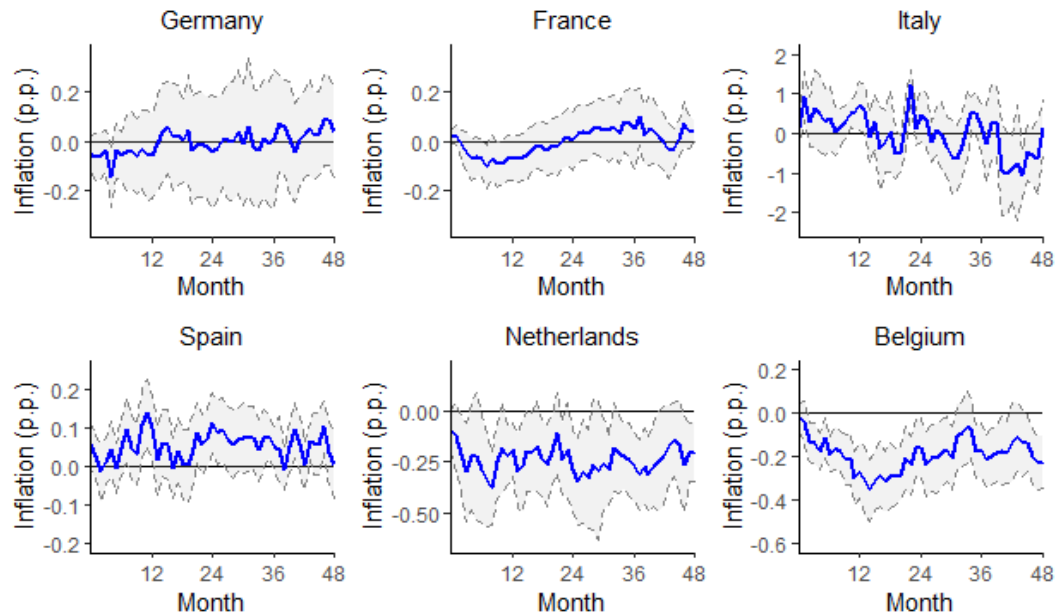
- HBS data, countries
 - Substantial cross-country heterogeneity
 - Increase in IT, ES, BE (and DE)
 - These countries have relatively larger differences in consumption shares across income groups (ES in COICOP1)



Notes: impulse response of inflation differential between high and low income households to a 10 basis point tightening monetary policy shock; shaded areas denote 90% confidence intervals

Response of inflation differential (high-low income)

- GfK/Kantar data
 - Less significance (shorter sample, see above)
 - High-income inflation responds *more* in NL and BE
 - In line with Argente and Lee (2021): shopping behaviour or product quality substitution?

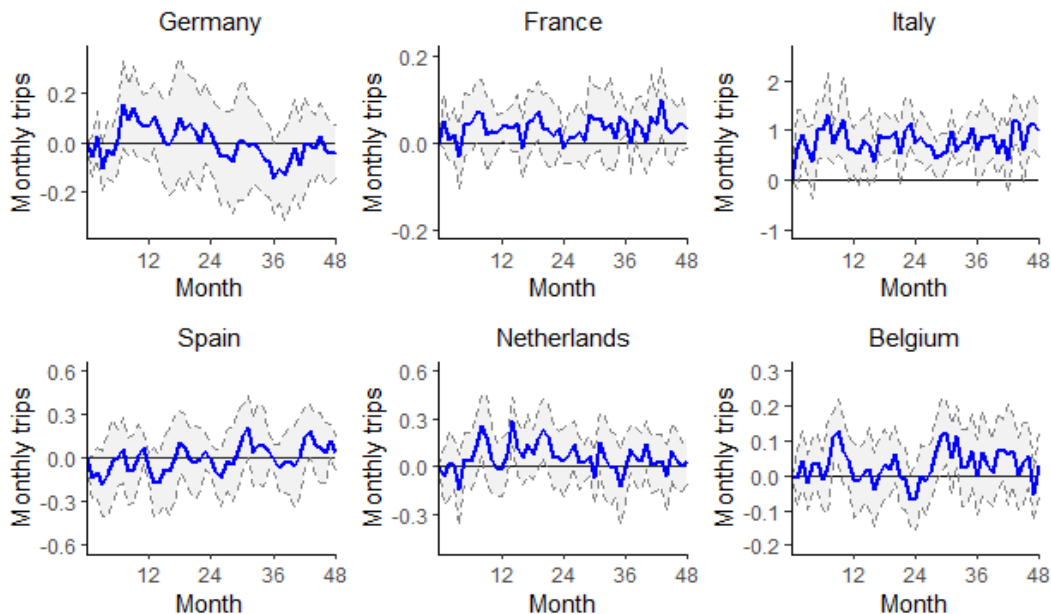


Notes: impulse response of inflation differential between high and low income households to a 10 basis point tightening monetary policy shock; shaded areas denote 90% confidence intervals

Response of number of shopping trips (high-low income)

- GfK/Kantar data

- Not cumulative!
- Overall little significance
- High-income shopping trips *increase* overall, and relative to low-income in IT (and FR, NL and BE)

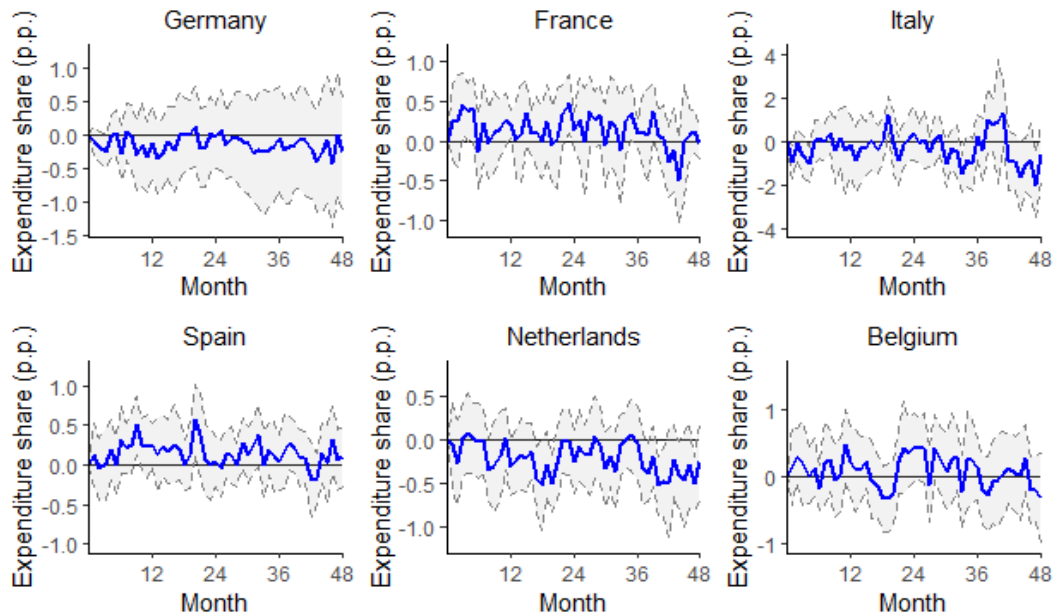


Notes: impulse response of difference in the average number of monthly shopping trips between high and low income households to a 10 basis point tightening monetary policy shock; shaded areas denote 90% confidence intervals

Response of share of branded items (high-low income)

- GfK/Kantar data

- Not cumulative!
- Even less significance, response often oscillating around zero (both overall and relative)
- If anything, adjustment in shopping behaviour more than product quality substitution



Notes: impulse response of the difference in the share of branded items between high and low income households to a 10 basis point tightening monetary policy shock,; shaded areas denote 90% confidence intervals

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Summary

Summary

- Monetary policy affects inflation differently along the income distribution
- Differences in consumption baskets: high-income inflation responds *more*
 - In line with Cravino et al. (2020), but large cross-country heterogeneity
- Allowing for differences in prices paid, high-income inflation responds *less*
 - In line with Argente and Lee (2021)
 - Highly tentative: changes in shopping behaviour more than product quality substitution
- Overall sign of effect unclear
 - Cannot be addressed with our data

Thank you!
