Household Inequality and the Transmission of QE in Euro Area Countries

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Johanna Krenz (UHH) and Stylianos Tsiaras (EPFL & E3Modelling)

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Research question

- (How) does the presence of liquidity-constrained households affect the reaction of GDP to Quantitative Easing (QE) shocks in the euro area?

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- (How) does the presence of liquidity-constrained households affect the reaction of GDP to Quantitative Easing (QE) shocks in the euro area?
    - What is the role of labor markets therein?

Motivation

- In Latvia 63% of households are hand-to-mouth (HtM), in Malta only 10%, in the entire euro area 28%.
- Monetary policy transmission with household heterogeneity:
  - *Direct channels*: asset prices, long term rates, mortgages, credit ...
  - *Indirect/ general equilibrium channels*: wages, unemployment ...

  $\Rightarrow$ Monetary policy can have redistributive consequences.
- Is redistribution a side effect or a channel itself? (McKay and Wolf, 2023; Auclert, 2019)
- Does redistribution amplify or dampen the aggregate response to monetary policy shocks? (e.g., Bilbiie)
- QE has been the main monetary policy tool for stimulating the economy during ELB period.

Our contribution

1. We estimate country-specific dynamic impulse responses to a high-frequency identified union-wide QE shock (Altavilla et al., 2020), over the period 2014m6–2019m6, and find that
   - impulse responses of GDP differ considerably between countries, with a slightly positive total effect;
   - QE shocks, generally, behave as demand shocks.
2. Exploiting the panel structure of our dataset, we document that
   - a higher fraction of liquidity-constrained households amplifies the elasticity of output to QE shocks.
   - Higher labor market elasticity amplifies the reaction of output to QE shocks.
3. Using a TANK model, we rationalize our empirical results.

Rel. lit.

Country LPIV

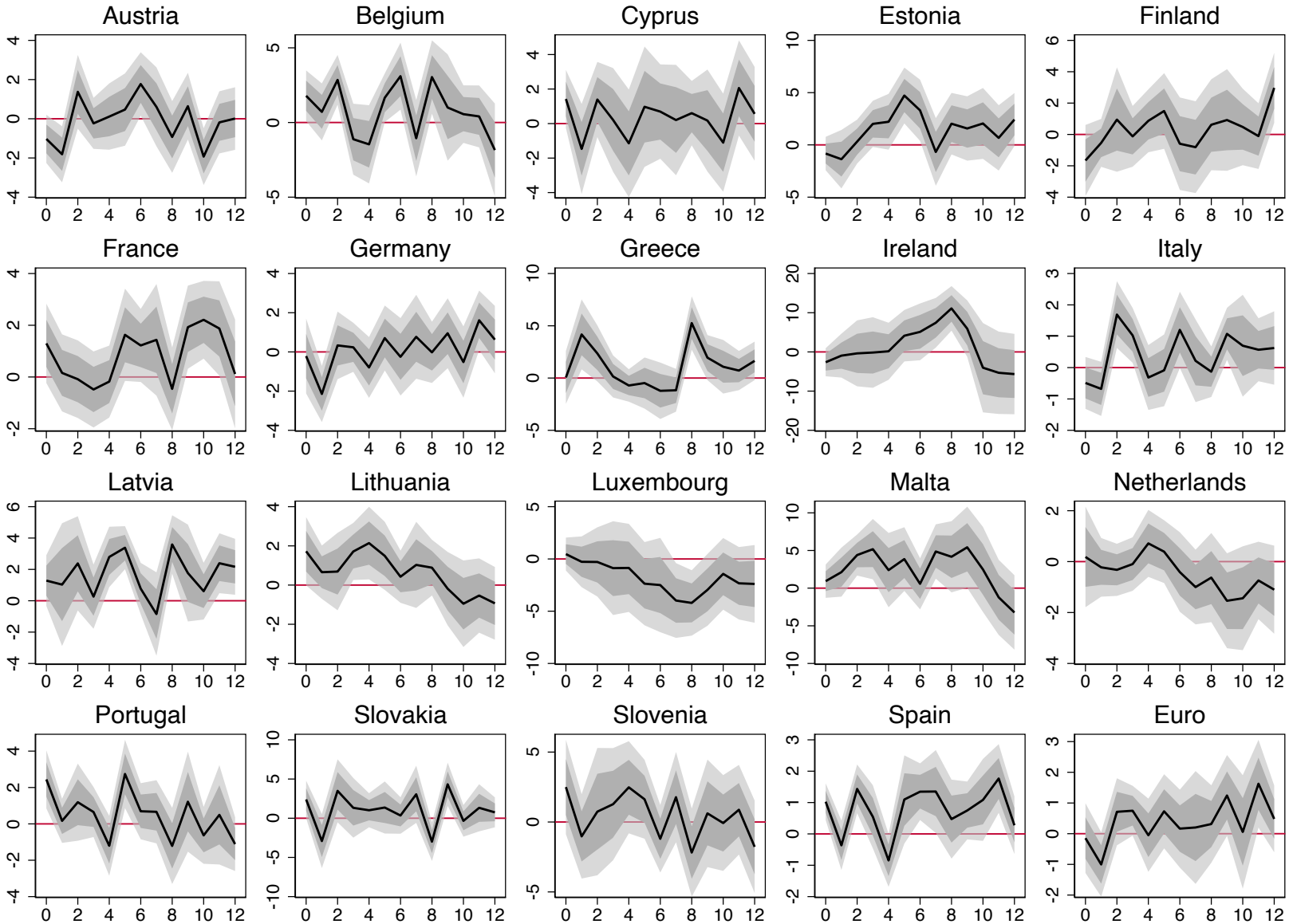
We estimate the following sequence of regressions for each country n,

$$y_{n,t+h} - y_{n,t-1} = \alpha_n^h + \beta_n^h \text{QE}_t + \sum_{j=1}^{3} \Gamma_{n,j}^h X_{t-j} + \sum_{j=1}^{3} \Lambda_{n,j}^h y_{n,t-j} + u_{n,t+h},$$

- y_n – log variable of interest (output/unemployment/HICP) in country n,
- QE – monthly shock scaled to reflect a 30 bps impact reduction in the long-term euro area interest rate,
- X – union-wide controls: log HICP, log GDP, QE shock,
- α_n^h – country FE.

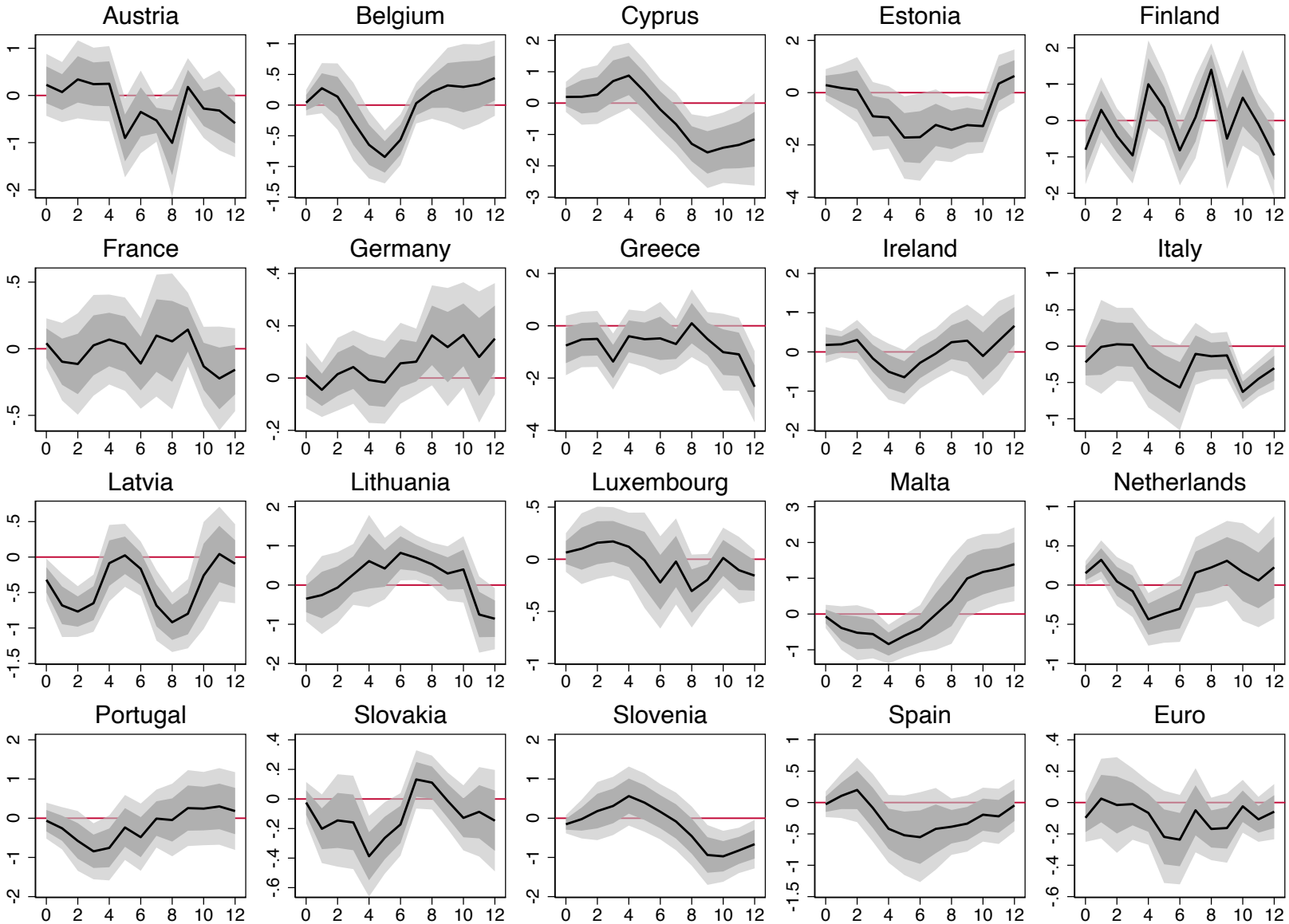
Shock Data

GDP



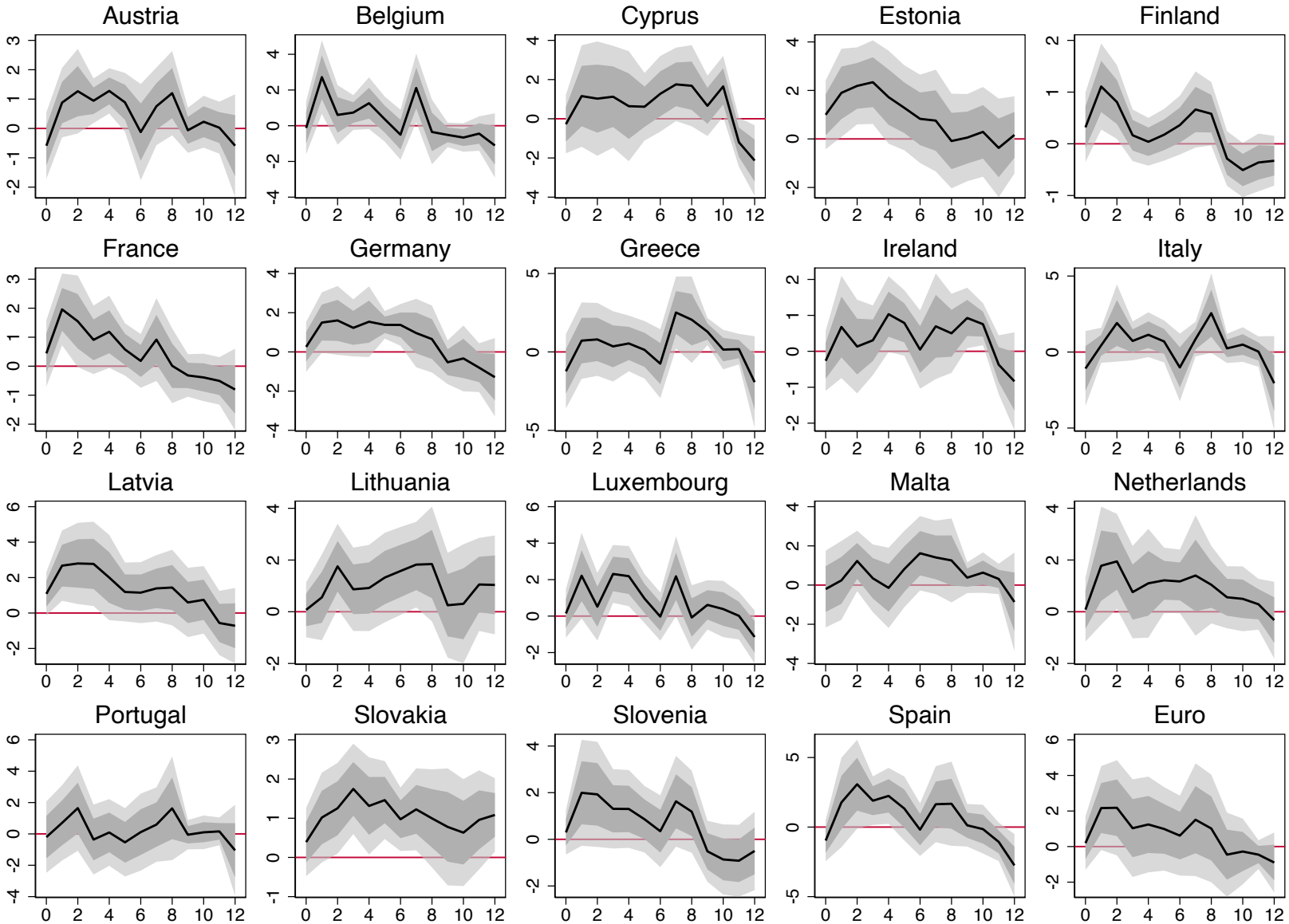
Shock scaled to reflect a 30 bps impact reduction in the long-term euro area interest rate; y-axis: percentage change in GDP; light and dark gray areas represent 68 and 90% confidence intervals, respectively.

Unemployment rate



Shock scaled to reflect a 30 bps impact reduction in the long-term euro area interest rate; y-axis: percentage point change in the unemployment rate; light and dark gray areas represent 68 and 90% confidence intervals, respectively.

HICP



Shock scaled to reflect a 30 bps impact reduction in the long-term euro area interest rate; y-axis: percentage change in the HICP; light and dark gray areas represent 68 and 90% confidence intervals, respectively.

Can parts of the cross-country heterogeneity with respect to the GDP reaction be explained with differences in the fraction of liquidity-constrained households?

Panel LPIV

We estimate the following sequence of panel regressions,

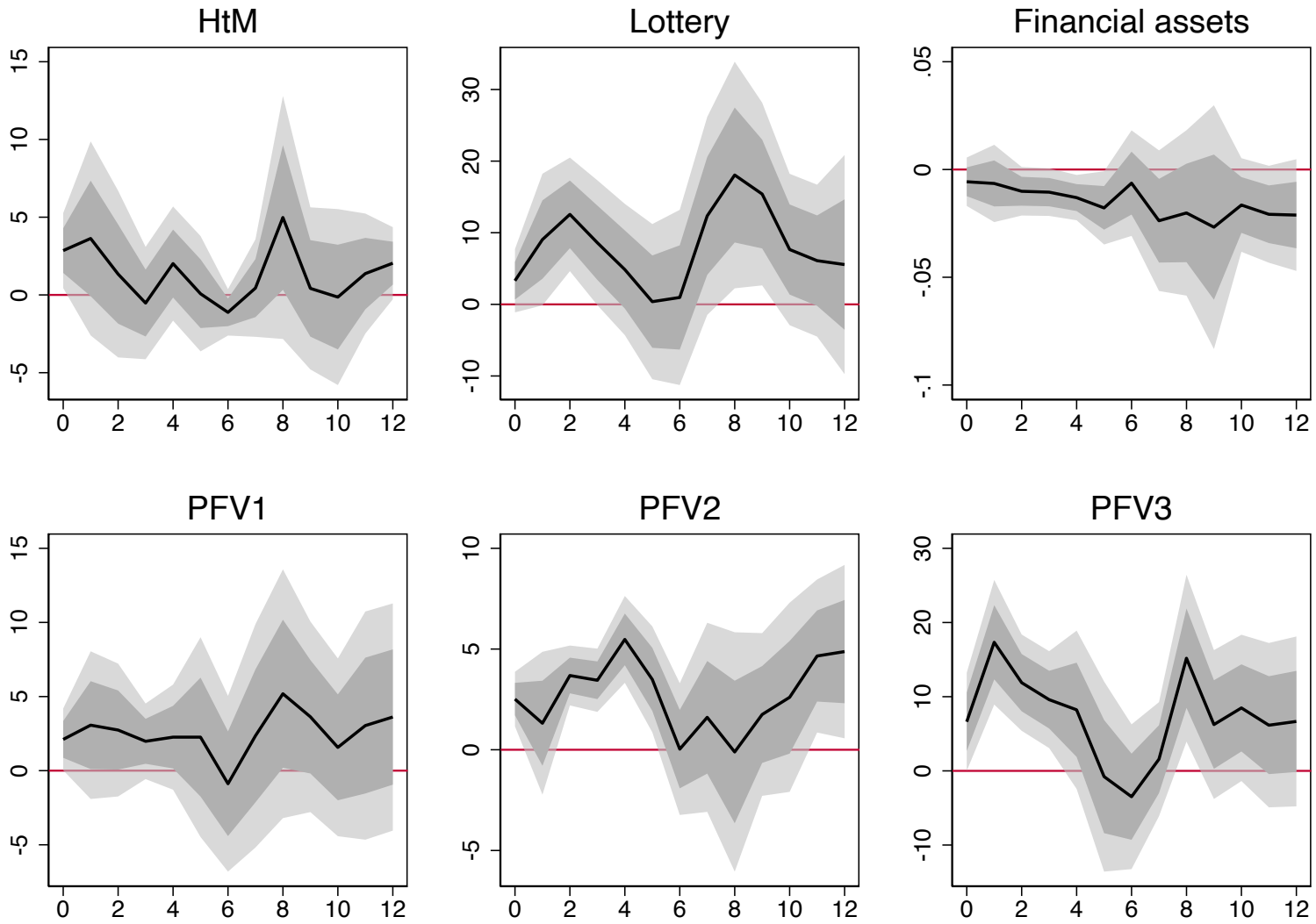
$$y_{n,t+h} - y_{n,t-1} = \alpha_n^h + \alpha_t^h + \beta^h (x_n - \bar{x}) \mathrm{QE}_t + \sum_{j=1}^{p} \Lambda_{n,j}^h y_{n,t-j} + u_{n,t+h},$$

- y_n – log GDP in country n,
- $x_n - \bar{x}$ – demeaned country-specific measure of asset market participation of households, Measures
- α_t^h – time FE.

$\rightarrow$ β^h captures the marginal effect of a one std. dev. higher value of $x_n - \bar{x}$ on the responsiveness of GDP with respect to the QE shock.

Role of asset market participation

Measures



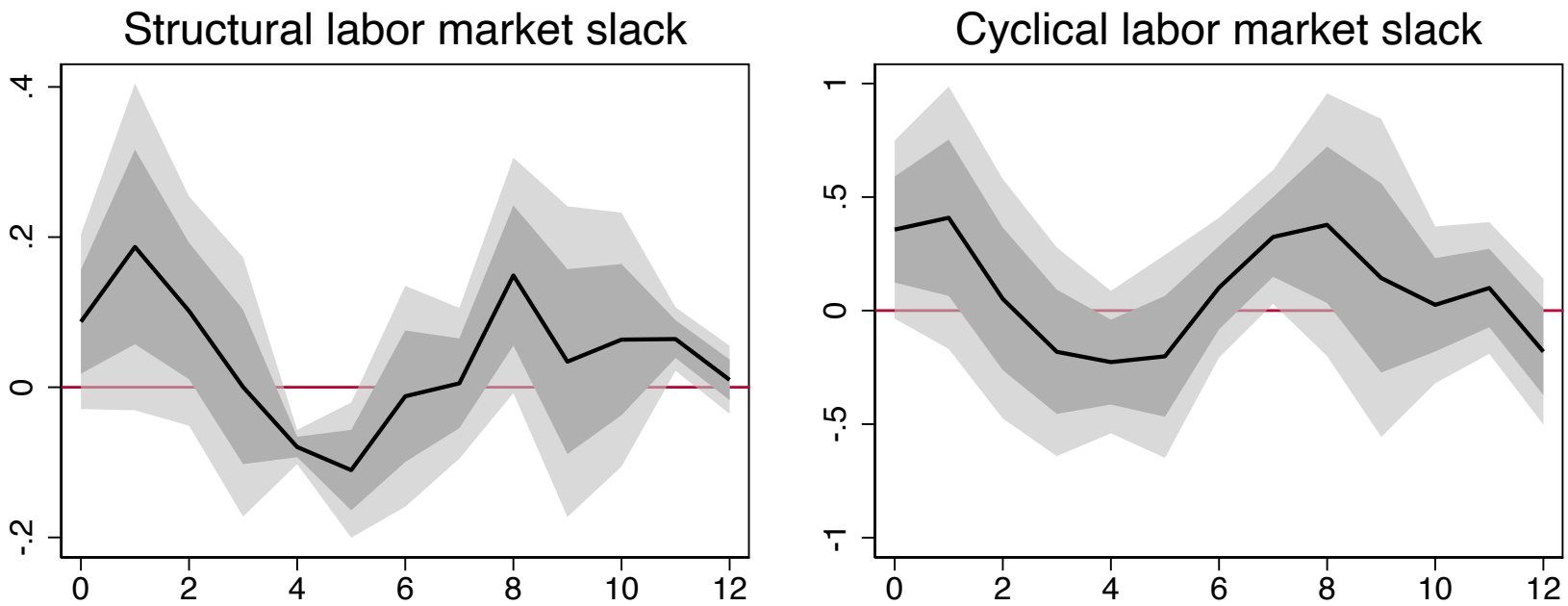
Y-axis measures effect of a one std. dev. higher value of the given measure of asset market participation on the responsiveness of real GDP with respect to an expansionary QE shock. Light and dark gray areas represent 68 and 90 per cent confidence intervals, respectively. Measures taken from Almgren et al., 2022, with data from HFCS and EU-SILC. PFV stands for Potentially Financially Vulnerable.

Results suggest the presence of a redistribution channel of QE, which amplifies the GDP response.

This suggests that general equilibrium effects via the labor market play an important role in the transmission of QE in the euro area.

We verify this proposition next. First, by considering labor market slack, and, second, by considering labor market responsiveness.

Role of labor market slackness



Y-axis measures effect of a one std. dev. higher value of the given measure of labor market slackness on the responsiveness of real GDP with respect to an expansionary QE shock. Light and dark gray areas represent 68 and 90 per cent confidence intervals, respectively. Structural labor market slack: mean unemployment rate of country compared to cross-sectional mean. Cyclical labor market slack: unemployment rate at $h = 0$ compared to country mean.

Panel LPIV with KBO decomposition

We estimate the following sequence of panel regressions (Cloyne et al., 2021),

$$y_{n,t+h} - y_{n,t-1} = \alpha_n^h + \alpha_t^h + \beta_{\text{KBO}}^h \Theta_n^h \text{QE}_t + \sum_{j=1}^{3} \Lambda_{n,j}^h y_{n,t-j} + u_{n,t+h},$$

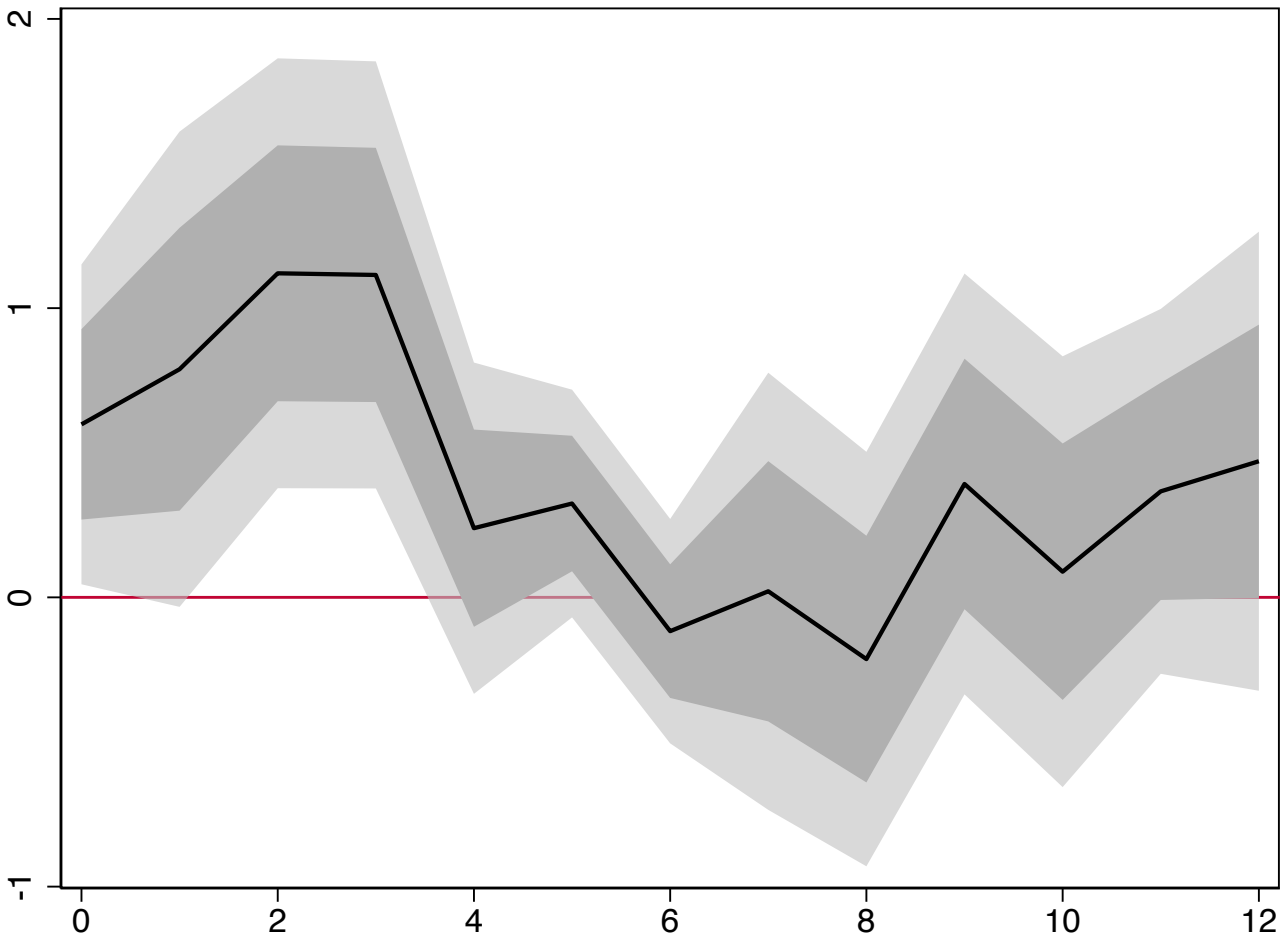
- Θ_n^h – demeaned and standardized sensitivity of country n's unemployment rate in period $t+h$ to a QE shock in period t, obtained from estimating the following sequence of panel regressions,

$$U_{n,t+h} - U_{n,t-1} = \alpha_n^h + \sum_{j=1}^{p} \gamma_j^h U_{n,t-j} + \sum_{i=1}^{N} \text{QE}_t \cdot \mathbb{1}_{n=i} \cdot \tilde{\Theta}_n^h + u_{n,t+h},$$

- U_n – log unemployment rate in country n.

→ β_{KBO}^h captures the marginal effect of a one std. dev. higher unemployment sensitivity on the responsiveness of GDP with respect to the QE shock.

Role of labor market responsiveness



Y-axis measures effect of a one std. dev. higher responsiveness of the unemployment rate to QE shocks on the real GDP reaction to QE shocks. Light and dark gray areas represent 68 and 90 percent confidence intervals, respectively.

Conclusion

- Very heterogeneous transmission of QE in euro area countries, in particular, with respect to GDP.
- QE shock, generally, behaves as classical demand shock.
- Income inequality increases the sensitivity of output to QE shocks.
- Labor market slackness initially increases the sensitivity of output to QE shocks.
- Labor market responsiveness increases the sensitivity of output to QE shocks.

Appendix

Related empirical literature (1)

- *Effects of unconventional monetary policy shocks in euro area*:
  - Boeckx et al. (2017) Burriel/Galesi (2018): GVAR; policy measures as unexpected changes in the size of the ECB's balance sheet; time periods: 2007m1 to 2015m9 and 2007m1 to 2014:m1, respectively; find positive GDP responses to expansionary unconventional monetary policy shocks in most countries
  - Lenza/Slacalek (2024): multi-country VAR; same policy measure and same time period as we; only include France, Germany, Italy, Spain; find positive GDP responses to expansionary QE shock

Back

Related empirical literature (2)

- *Effects of QE shock on inequality in euro area*:
  - Lenza/Slacalek (2024): distribute the aggregate effects of QE across households using a reduced-form simulation on micro data; find that QE compresses income distribution via labor market channel
  - Tsiaras (2023): SVAR for entire euro area; same policy measure and same time period as we use; find reduction of Gini coefficient for income
- *Role of inequality in transmission of monetary policy in euro area*:
  - Almgren et al. (2022): country-wise LPIV for high-frequency identified shock; role of different inequality measures in the shock transmission analyzed via scatterplots; find that elasticity of output to shocks larger in countries with larger fraction of constrained households

Back

Macro and financial data

- Monthly macro and financial data from Eurostat and ECB Statistical Data Warehouse; currently from 2014m6–2019m6
- Real GDP only available at quarterly frequency: interpolated to monthly frequency using monthly data for industrial production and retail trade (Almgren et al., 2022; Burriel/Galesi, 2018)
- QE shock is the Euro area 10-year Government Benchmark bond yield instrumented by QE factor identified by Altavilla et al. (2019) based on Euro Area Monetary Policy Event Study Database (EA-MPD, v. 10/2022) and Gürkaynak et al. (2005) and Swanson (2017) methodology

Back

Identification of QE shock

- EA-MPD: intraday asset price changes around policy decision announcements and press conferences
- By PCA, four factors are extracted (Altavilla et al., 2020):
  - QE-related policy factor dominant in the recent period (from 01/2014 onwards); active in press conference window; effects get larger with increasing maturity, peaking at 10-year maturity
- Daily QE factor $\rightarrow$ monthly QE shock (Gertler/Karadi, 2015):

$$QE_d^{cum} = \begin{cases} QE_{d-1}^{cum} & \text{if } QE_d^{PCA} = 0 \text{ on day } d \\ QE_{d-1}^{cum} + QE_d^{PCA} & \text{otherwise.} \end{cases}$$

$$QE_m = \frac{1}{D_m} \sum_{D \in m} QE_d^{cum} - \frac{1}{D_{m-1}} \sum_{D \in m-1} QE_d^{cum},$$

where D_m is the number of days in month m.

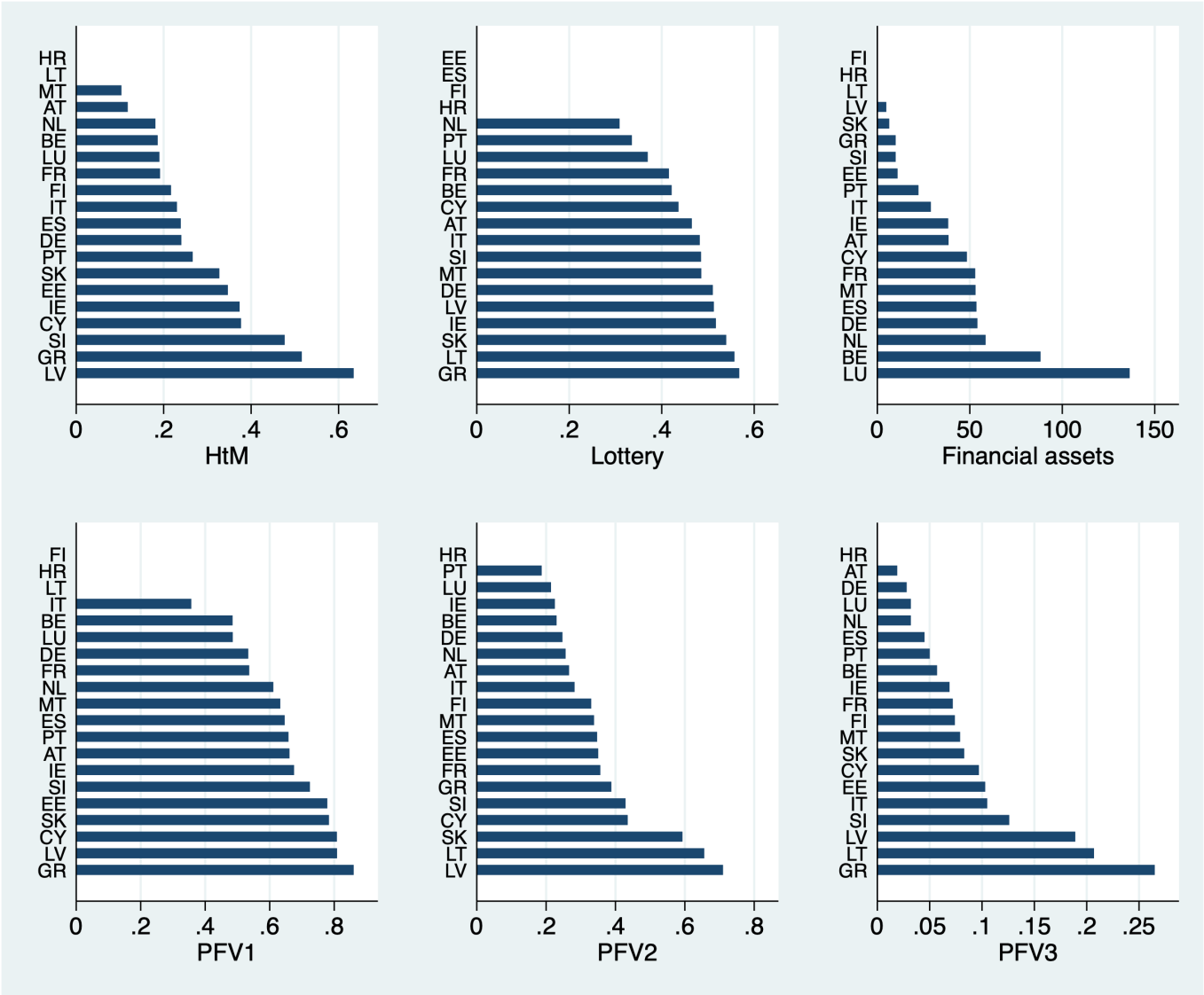
Back

Measures of financial constraints of households

Measure	Definition	Source
HtM	Fraction of households whose liquid wealth is smaller than 50% of monthly income	HFCS 2016
Lottery	Mean percentage of a hypothetical lottery win households would spend over the next 12 months	HFCS 2020
Financial Assets	Mean financial asset holdings of households (in thousand euros)	HFCS 2016
PFV1	Fraction of households whose expenses were about the same as or exceeded income over the last 12 months	HFCS 2016
PFV2	Fraction of households, who out of their own resources, would not be able to cover a hypothetical, unexpected, required financial expense equal to the national monthly at-risk-of-poverty threshold	HFCS 2016
PFV3	Fraction of households who were unable to pay utility bills on time during the last year (have been in arrears) due to financial difficulties	EU-SILC 2005

Measures of liquidity constraints taken from Almgren et al., 2022. PFV stands for Potentially Financially Vulnerable. Distribution Back

Measures of financial constraints across euro area countries



Back

Correlations between measures of financial constraints

	h2m	lottery	finass	PFV1	PFV2	PFV3
h2m	1					
lottery	0.496	1				
finass	-0.604*	-0.535*	1			
PFV1	0.678**	0.395	-0.619**	1		
PFV2	0.674**	0.575*	-0.556*	0.616**	1	
PFV3	0.798***	0.639**	-0.567*	0.562*	0.668**	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Back