How Does Monetary Policy Affect Income and Wealth Inequality?

Evidence from Quantitative Easing in the Euro Area

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Disclaimer

The views expressed in this presentation are those of the authors and do not necessarily reflect the views of the European Central Bank and the Eurosystem.

Debate on impact of quantitative easing on inequality

- Widely diverging views on how QE may affect inequality (also Colciago Samarina de Haan, 2018):
  - QE boosted asset prices and financial wealth, it "made the rich richer" (eg FT, Oct 21, 2014)
  - However, QE also boosted house prices: these gains are more widely spread, as homeowners more evenly distributed than stock-holders
  - Expansionary monetary policy reduces unemployment, benefits poorer households most
- The monetary policy toolbox of the ECB includes quantitative easing (QE) ("Asset Purchase Programmes," APP) since 2015

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Question and method

- What are the effects of QE on **inequality** in the euro area?
- Income (composition and earning heterogeneity channel); Wealth (composition channel)

Step 1: Aggregate data

- **Multi-country VAR** with, among other things, aggregate unemployment, wages and asset prices $\Rightarrow$ **Impulse responses** to QE shock

Step 2: Household-level data, Household Finance and Consumption Survey

- Transpose IRFs over **household-level data** $\Rightarrow$ Estimate effects of QE on **wealth and income** inequality (Gini index)

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Main Results

One year after the occurrence of the QE shock:

- **QE reduces income inequality**
  - Key role of the earnings heterogeneity channel (extensive margin, transition out of unemployment)
  - Different "scenarios" on the financial sources of income do not change this result
- **Wealth inequality is unchanged**
  - Relatively diffuse home ownership is the critical aspect
  - Different "scenarios" on the changes in house prices and stock trading tilt the Gini index slightly to the upside

Existing literature

- **VARs with income / consumption Ginis:**

  Coibion et al. (JME, 2017); Mumtaz and Theophilopoulou (EER, 2017)

  - No wealth inequality, don't estimate effects of nonstandard MP
  - Recent papers using admin data: Broer et al 2020, Andersen et al 2021, Amberg et al 2021

- **Household wealth portfolios, inflation and asset prices:**

  Doepke and Schneider (JPE, 2006); Adam and Zhu (JEEA, 2016); Adam and Tzamourani (EER, 2016); Doepke et al. (2016)

  - Assume hypothetical scenarios, eg "10% increase in price level"

- **Model-based simulations:**

  Casiraghi et al. (2018) [Italy]; Bunn et al. (2018) [UK]

  - More calibrated than estimated, cross-country spillovers?

$\Rightarrow$ **Little quantitative, estimated work on effects of QE on inequality**

Corrado and Fantozzi (2021): comparison between conventional and unconventional monetary policy in Italy

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Outline

1. The aggregate effects of QE: multi-country VAR
2. Distributing the QE effects to individual households: HFCS
3. Robustness checks
4. Conclusions

Step 1: Multi-country VAR to estimate macro effects of QE

$$y_t = C + B_1 y_{t-1} + \cdots + B_p y_{t-p} + \epsilon_t$$
$$\epsilon_t = N(0, \Sigma)$$

- Mix of EA and country-level variables; 4 countries: DE, FR, IT, ES
  $\Rightarrow$ **Common MP + country heterogeneity in responses**
- Variables y_t (quarterly, 1999Q1–2016Q4, $p = 5$ lags)
  - Country-specific: real GDP, GDP defl, **wages, unemployment, house prices**
  - EA: **Long-term interest rates, stock prices**
- Large dimension $\Rightarrow$ **Bayesian estimation** (Litterman 1979; Doan et al 1984; Sims 1992; Banbura et al 2010; Giannone et al 2015)

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Identification of the QE shock

- Identification of the shock by means of an external instrument approach
  Stock 2008; Stock Watson 2012; Mertens Ravn 2013; Ramey 2016; Miranda-Agrippino Ricco 2019)

  Idea:

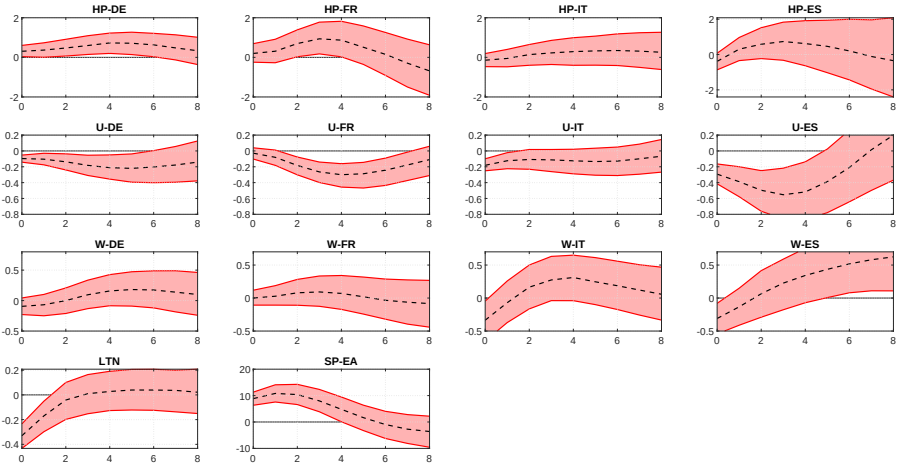
  1. Find "external information" on the shock of interest with following features (IV logic):
     - ⋆ Correlated with shock of interest
     - ⋆ Uncorrelated with other shocks
  2. Use standard regression techniques to "unbundle" the QE shock from the others combined in the VAR reduced form innovation (Swanson 2021)

Identification of the QE shock

- **Where can we find external information on the QE shocks**?
- High frequency changes in financial variables recorded during the policy announcements of central banks used as external instruments for policy shocks (Gertler Karadi 2015)
- We use term-structure of OIS rates from monetary policy database of Altavilla et al 2019
- To address the "multi-dimensionality" of the policy announcements, we derive the QE factor as in Swanson 2021 and Altavilla et al 2019:
  - QE factor is orthogonal to conventional policy and forward guidance factors and has "low variance" before Great Financial Crisis

Impulse responses of some key aggregate variables

QE shock to long-term rate scaled to **–30 bp** on impact (Altavilla et al 2015, Andrade et al 2016)



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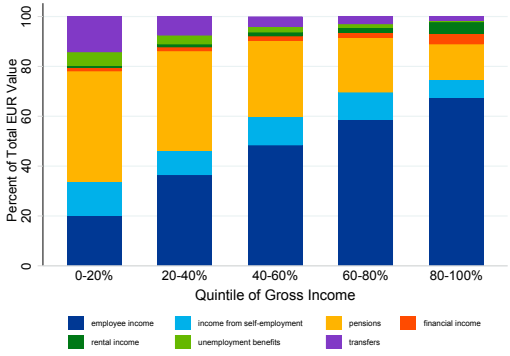
Bringing impulse responses to HFCS micro data—Income

1. Earnings heterogeneity channel (extensive margin)
   Distribute aggregate decline in unemployment across people using a simple probit simulation, some unemployed become employed
2. Income composition channel (intensive margin)
   Income of employed increases in line with the IRF for wages



Unemployment simulation—Extensive margin [Ampudia et al. (2016)]

1. Who becomes employed? Probit model

- Country (c)-specific at individual level (not Hh):

$$\Pr(Y = 1|X = x) = \Phi(x'_{c,i}\hat{\beta}_c)$$

  Y empl status, X demographics (gender, education, age, mar status, children)
- Collect fitted probability to be employed: $\hat{Y}_{c,i}$
- Simulation: those with an higher $\hat{Y}_{c,i}$ are more likely to become employed
- $\sum$ newly employed people $=$ aggregate decline in unemployment implied by VAR

2. Which wages do newly employed get? Estimate unobserved wages

- Income of the newly employed **increases** as implied by wage regression (Heckman): wage instead of (lower) unempl benefits
- The wage is based on demographic characteristics

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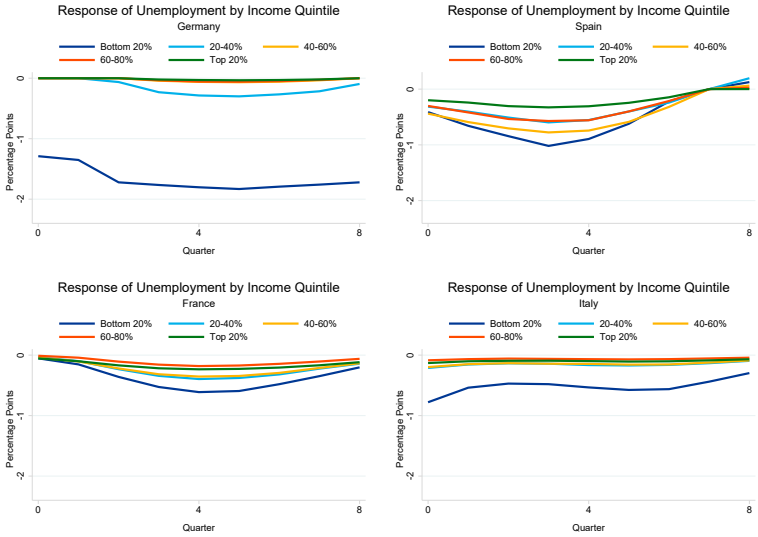
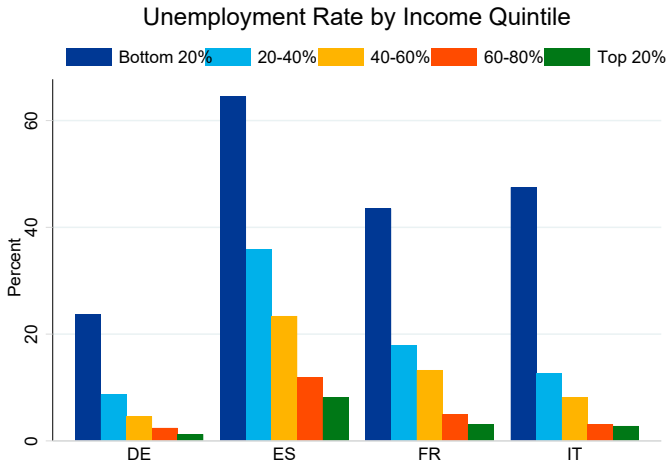
Unemployment: More pronounced decrease for low income

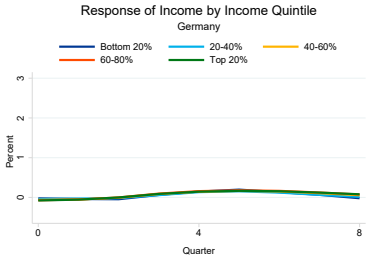


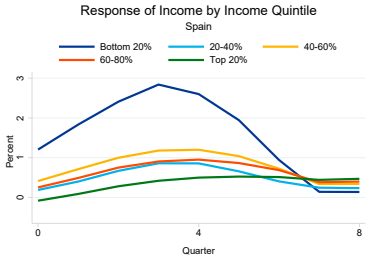
Unemployment

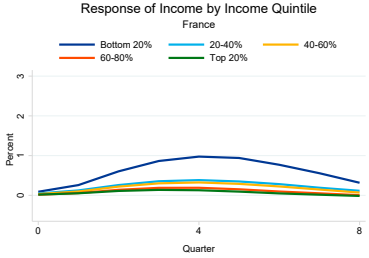
Distribution of the unemployment rate per income quintile, across countries

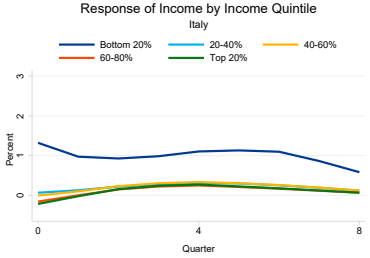


Income inequality: Unempl benefits more generous in DE, FR than in ES, IT



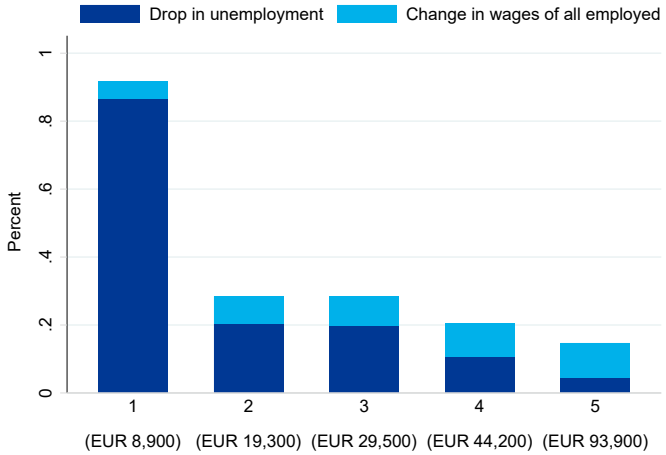






Euro area income inequality lower: Gini goes down from 43.15 to 43.07

Key importance of extensive margin (Unemp → Emp)

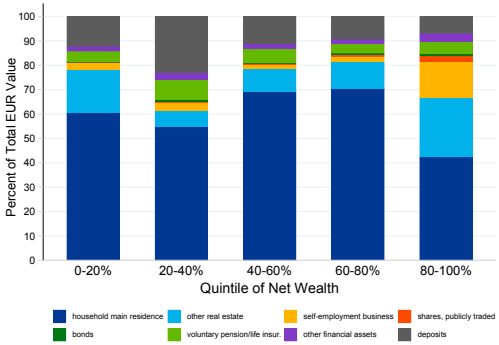


Response of mean income 4 quarters after QE shock. Numbers in brackets: Initial levels of mean gross Hh income.

Wealth Inequality

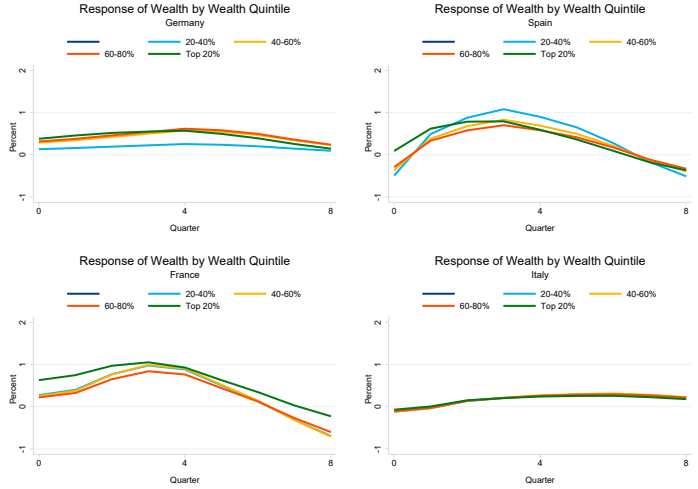
- Estimate effects on household-level net wealth using holdings of housing wealth, stocks and bonds (in €)
- Housing, stock, bonds account for about 70–80% of value of wealth
- Assumption: no rebalancing of portfolios (Ameriks Zeldes 2004; Bilias et al 2010)

Composition of total assets



EA wealth inequality

Very small effect: Gini goes down from 69.168 to 69.147



Summary table: Gini coefficients in the baseline scenario

Table: Effects of Quantitative Easing on Income and Wealth Inequality

	Gini Coefficient (%)	
	Income	Net Wealth
Actual Data	43.145	69.168
Baseline Simulation	43.071	69.147
	(43.006, 43.121)	(69.085, 69.198)

The table shows the Gini coefficients for gross household income and net wealth for actual data in the baseline scenario. The scenarios report the Gini coefficients four quarters after the impact of the quantitative easing shock. Numbers in parentheses report the 90% credible intervals, obtained by running the micro-simulations for 1000 draws of the posterior distribution of the VAR impulse responses.

Impact on income Gini coefficients varies across countries

Depends on response of aggregate unemployment: high in Spain, low in Germany

France: $37.372 \rightarrow 37.284$

Germany: $44.851 \rightarrow 44.853$

Italy: $41.611 \rightarrow 41.551$

Spain: $43.241 \rightarrow 43.067$

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Robustness checks

Using flow of funds data and local linear projections

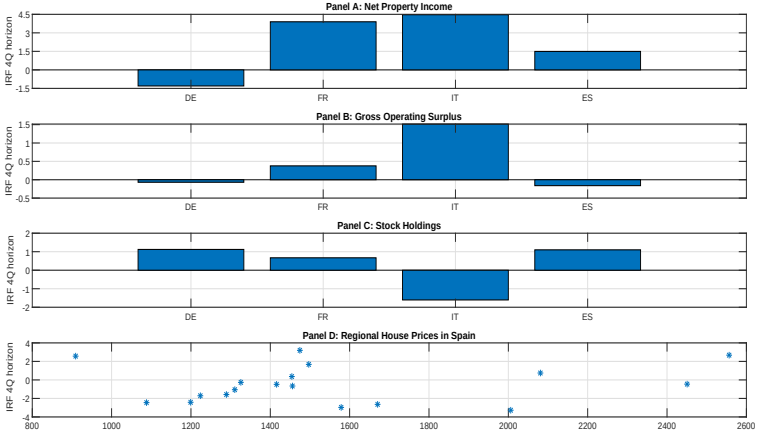
Income: What about the dynamics of financial income?

- Financial income proxied by profits
- Financial income proxied by net property income

Net wealth

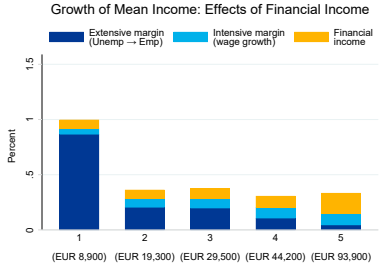
- What if there is portfolio rebalancing?
- What if prices of more expensive houses react more to the QE shock?

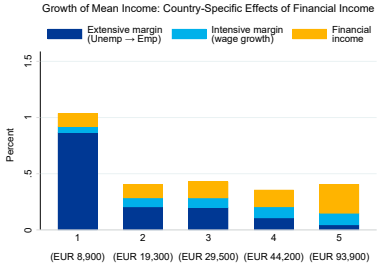
Robustness results: local linear projections

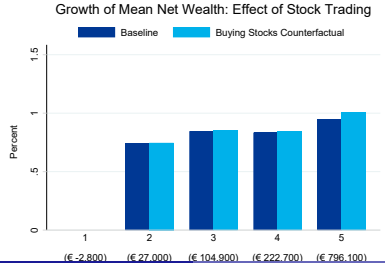


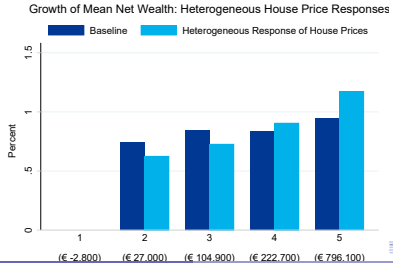
Note: GOS: gross operating surplus; NPI: net property income; SH: stock holdings.

Robustness results: income and wealth









Summary table: Gini coefficients in baseline and robustness scenarios

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	(43.006, 43.121)	(69.085, 69.198)
Robustness Scenarios		
1. Effects of Financial Income	43.095	
(Country-Specific Response −0.2 to 1.5%)	(43.007, 43.123)	
2. Effects of Financial Income	43.102	
(Country-Specific Response −1.3 to 4.5%)	(43.018, 43.133)	
3. Stock Trading		69.156
(Household- & Country-Specific Response −1.6 to 1.1%)		(69.095, 69.206)
4. Local House Prices		69.180
(Country-Specific Response −0.5 to 3%)		(69.119, 69.231)

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Conclusions

- **QE reduces income inequality**
  - Substantial impact on employment in bottom tail
- **The effect of QE on wealth inequality is likely to be small**
- **Effects vary across countries depending on structure of assets and income**

Background slides

Why is this important?

- This method allows us to:
  - Estimate the effects of QE on inequality and
  - Quantify some transmission channels of QE to households in France, Germany, Italy, Spain
- Why is this important?
  - Are there unintended effects of monetary policy?
  - Multi-country perspective
  - Inequality/heterogeneity and the transmission mechanisms of shocks

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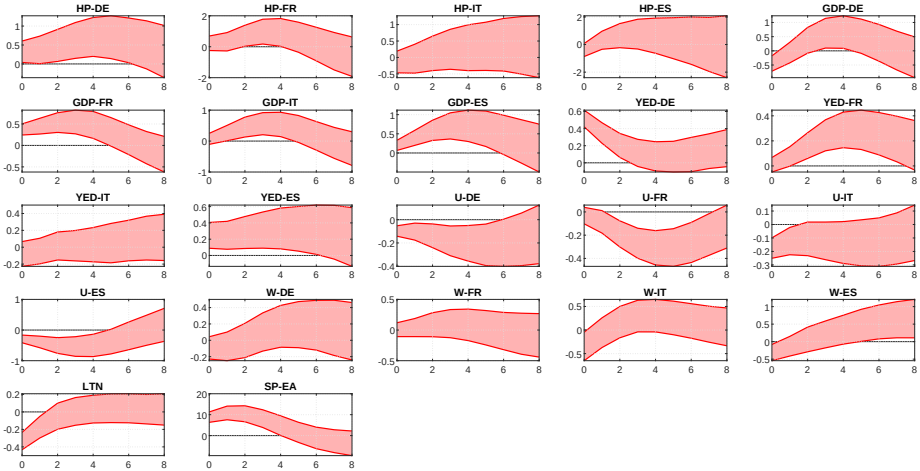
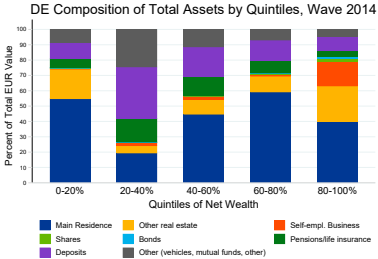
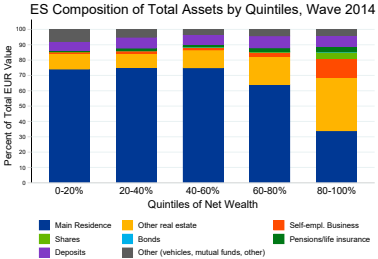
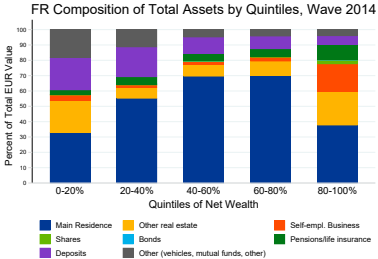
The full set of impulse responses

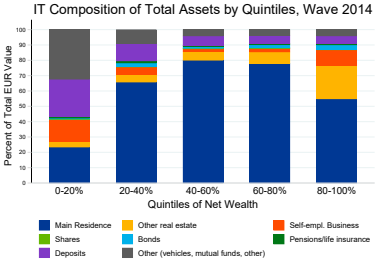


Composition of assets across countries

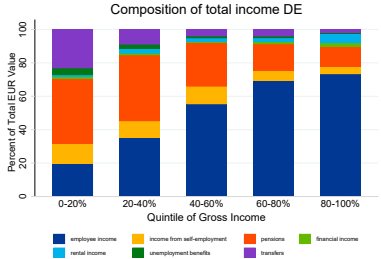


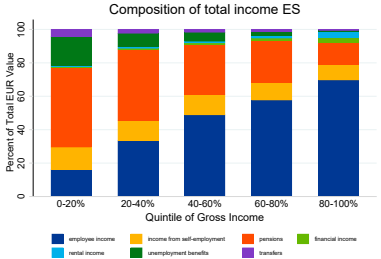


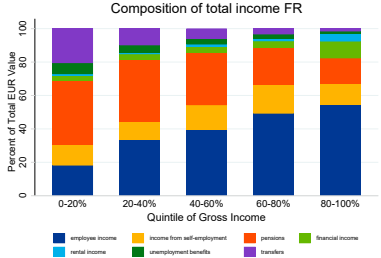


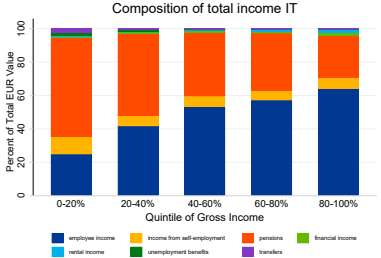


Composition of income across countries









Robustness checks on income inequality

- Overarching question: what about the dynamics of financial income?
- Issue: lack of good data on financial income
  - Proxy 1: profits for the four countries
  - Proxy 2: net property income for the four countries
- Local linear projections (Jordà, 2005):
  How do these variables respond to QE shock?

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Robustness checks on wealth inequality

- Question 1: What if there is portfolio rebalancing?
  - Flow-of-funds data on stock holdings (not so clean, valuation effects are also there)
- Question 2: What if prices of more expensive houses react more to the QE shock?
  - Regional house prices in Spain
- Local linear projections (Jordà, 2005):
  How do these variables respond to QE shock?

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  - Flow-of-funds data on stock holdings (not so clean, valuation effects are also there)
- Question 2: What if prices of more expensive houses react more to the QE shock?
  - Regional house prices in Spain
- Local linear projections (Jordà, 2005):
  How do these variables respond to QE shock?