Monetary Policy and Inequality

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Introduction

Does monetary policy affect households *differentially* across the income distribution?

- Do lower monetary policy rates increase inequality?
- If so, why? Which channels matter most?
- Evidence so far is mixed

This question has important implications for:

- Understanding the transmission mechanism of monetary policy
- Heterogeneous agents models in macro and monetary theory (e.g., HANK models)
- Potentially for explaining rising inequality in income and wealth

This paper

Question: How does the income, wealth and consumption gains of expansionary monetary policy vary across the income distribution?

Data: Administrative data from Denmark with detailed information about households' income and wealth

Design:
- Monetary policy shocks in Germany / Euro area
- Exploit that Denmark imports monetary policy due to currency peg
- Control for spillovers and secular trends in inequality

Preview of results

Main take-away: Strong income gradient in the effects of expansionary monetary policy on disposable income, consumption and wealth $\rightarrow$ high-income households benefit more

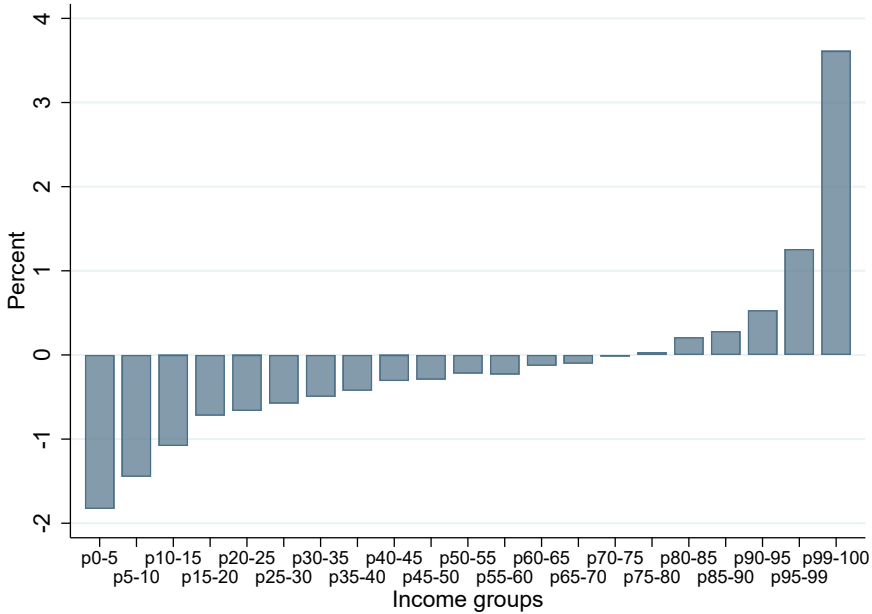
Disposable income: larger increase at the top due to:

- larger drop in mortgage interest payments
- stronger increase in business income
- stronger increase in dividend and realized capital income

Wealth: larger increases at the top (absolute and rel. to disp. inc.) due to

- larger capital gains on real estate
- larger capital gains on securities (e.g. stocks)

Preview of results



Literature

Empirical evidence on monetary policy and inequality:

Coibion et al. (2017), Mumtaz & Theophilopoulou (2017)

Theory on the direct and indirect channels of monetary policy:

Auclert (2019), Dolado et al. (2018), Kaplan, Moll og Violante et al. (2018); Alves, Kaplan, Moll og Violante et al. (2020)

Empirical evidence on the heterogeneous effects of monetary policy:

Di Maggio et al. (2017); Cloyne et al. (2019); Holm et al. (2020)

Data and Identification

Administrative micro data

Micro data form 1987-2014

- Entire Danish population $\rightarrow$ panel dimension
- Income and wealth data from annual tax returns: Third-party reported
- Family structure $\rightarrow$ households
- Car purchases $\rightarrow$ durable consumption

We impute capital gains on stocks and real estate

- stock wealth in year t-1 * change in national stock index
- housing wealth in year t-1 * change in local price index

Sample: 72,859,463 observations

Exposure to monetary policy channels varies across the income distribution

	p0-p20	p20-p40	p40-p60	p60-p80	p80-p90	p90-p99	p99-p100
Panel A: income components (% of disposable income)							
salary income	40%	96%	118%	128%	135%	130%	73%
business income	4%	5%	6%	8%	12%	27%	62%
stock market income	0%	0%	1%	1%	2%	6%	41%
interest income	1%	2%	2%	2%	3%	5%	10%
net government transfers	58%	5%	-18%	-35%	-51%	-67%	-80%
interest expenses	8%	13%	15%	16%	18%	21%	23%
private pension	4%	5%	6%	10%	15%	17%	11%
other income	1%	1%	1%	1%	2%	3%	7%
Panel B: net wealth components (% of disposable income)							
deposits	64%	67%	66%	82%	96%	129%	234%
stocks	8%	10%	11%	16%	23%	42%	180%
housing	283%	348%	366%	435%	506%	604%	578%
debt	145%	210%	235%	263%	294%	337%	321%
net wealth	210%	214%	208%	270%	331%	438%	670%
Panel C: descriptive indicators							
is net creditor	64%	71%	74%	77%	81%	84%	87%
has no debt	30%	25%	23%	20%	18%	16%	15%
holds stocks	19%	27%	31%	40%	48%	58%	70%
owns real estate	37%	54%	59%	68%	74%	82%	90%
is self-employed	8%	9%	10%	12%	16%	26%	49%
buys new car	1%	3%	3%	4%	5%	6%	7%

Identification

Isolate monetary policy shocks in Germany / Euro area

(residual after controlling for macro variables)

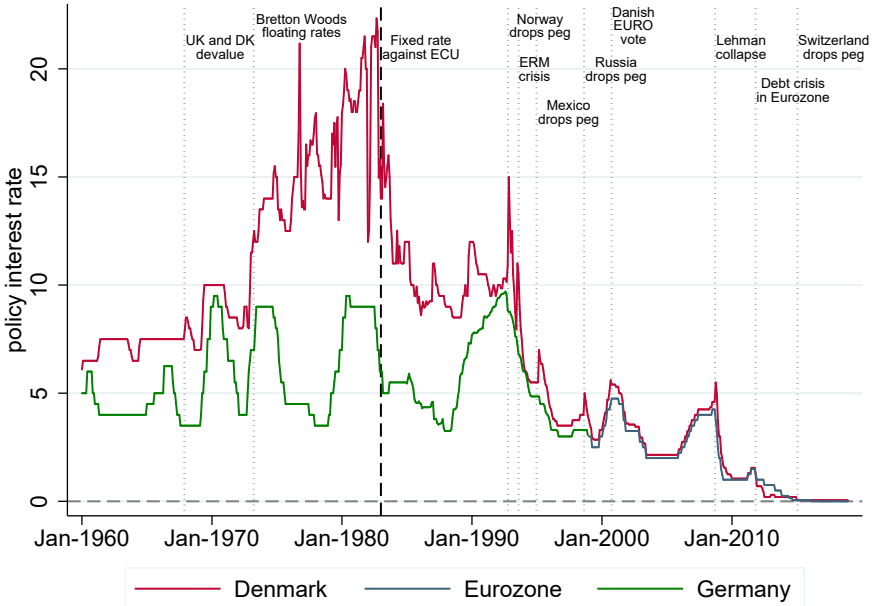
Instrument changes in Danish monetary policy with these shocks

(Currency peg: Denmark imports monetary policy changes from DE / EA)

Handle spillovers

- control for ex post export, investments fra DE/EA
- control for ex post stock and macro variables in DE/EA

Monetary policy rates in Denmark and Germany/Euro area



Model

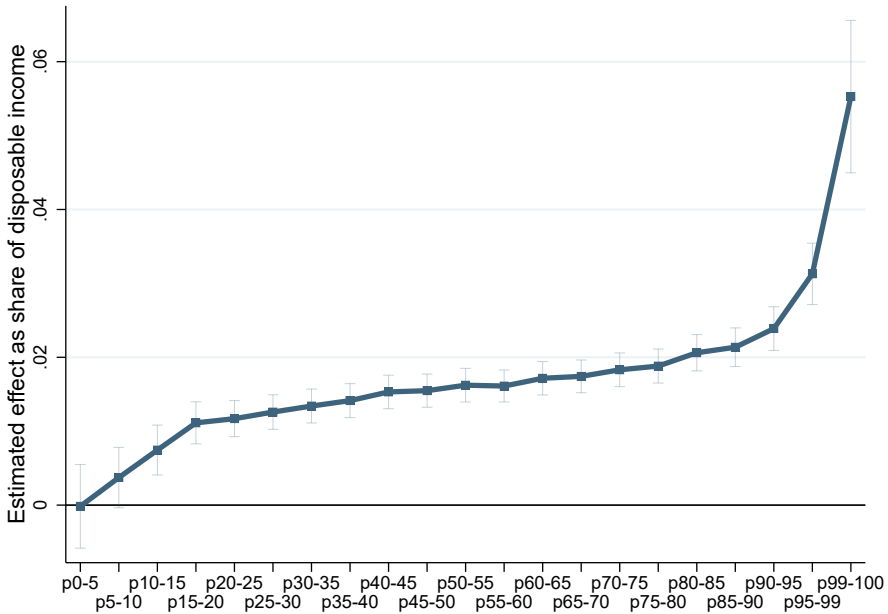
Denoting households with j, years with t and income groups with k:

$$\frac{Y_{j;t+n} - \overline{Y}_{j;t-3,t-1}}{\overline{Disp}_{j;t-3,t-1}} = \sum_{k=1}^{K} \mathbb{1}[j \in k]\left[\beta^k(-\Delta i_t) + \delta^k Z_t + \alpha^k\right] + \varepsilon_{j,t}$$

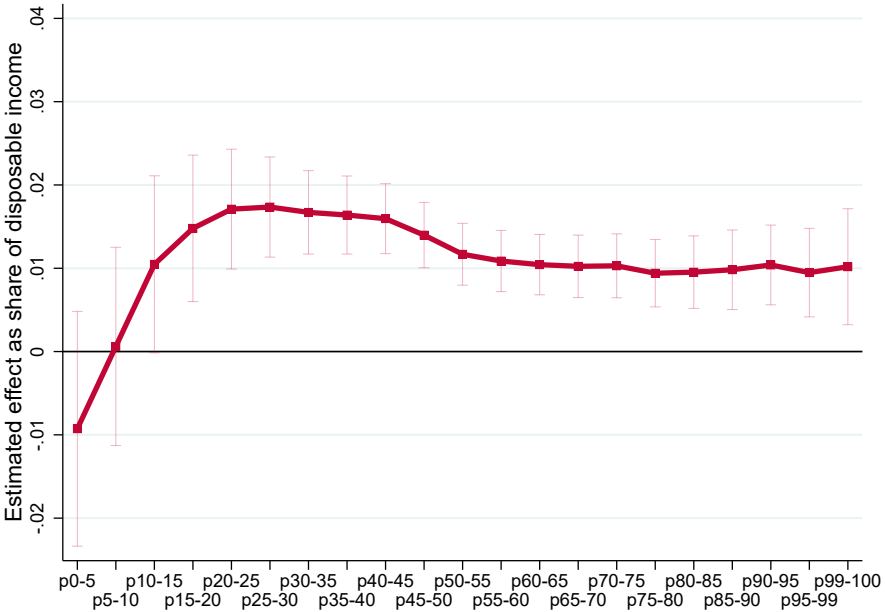
$Y_{j;t+n}$:	outcome (disp. income, wealth) in year $t+n$
$\overline{Y}_{j;t-3,t-1}$, $\overline{Disp}_{j;t-3,t-1}$:	averages over 3-yr ex ante period
$\mathbb{1}[j \in k]$:	indicator for belonging to income group k in 3-yr ex ante period
Z:	macro controls (in t and $t-1$)
n:	time horizon (=1,2)

Results

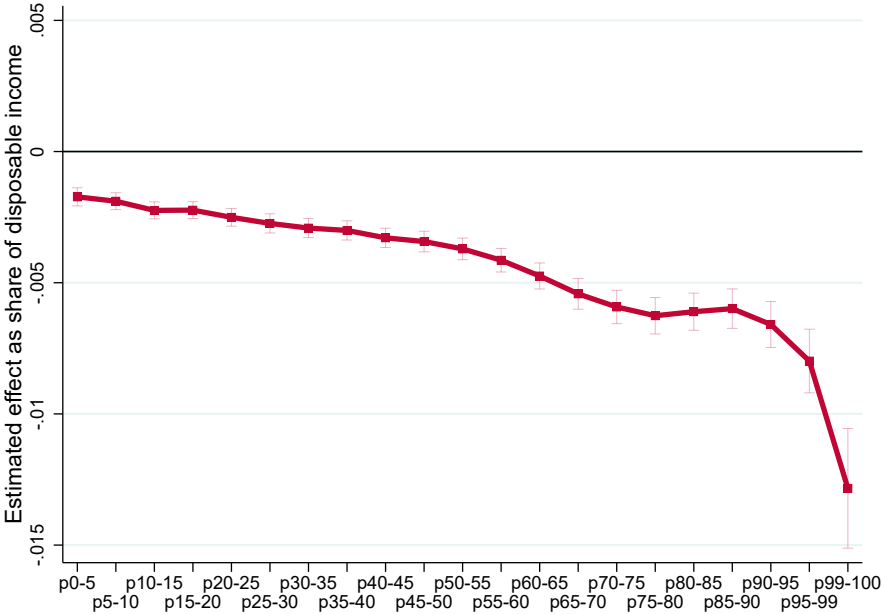
Very clear income gradient in **disposable income**



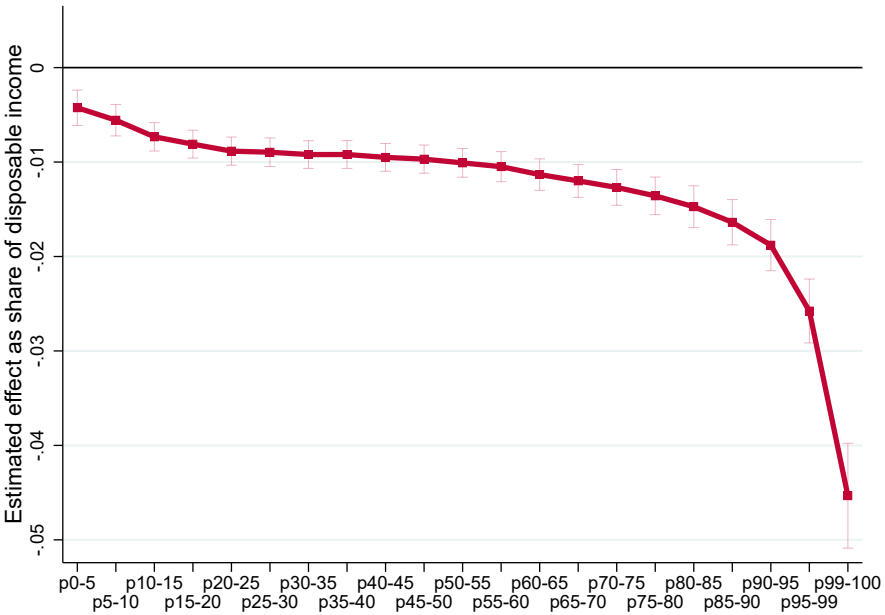
The largest impact on **salary** is around the 25th percentile



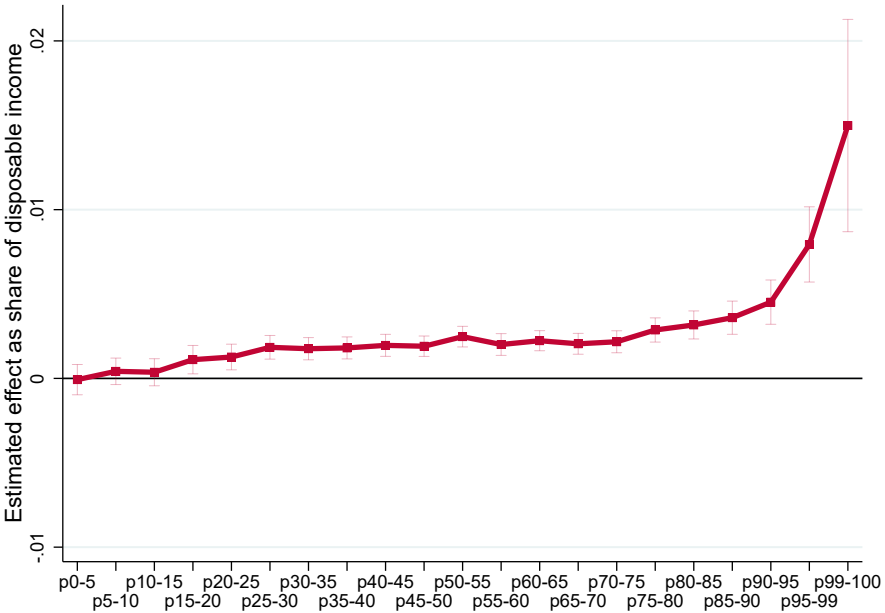
The largest decrease in **interest income** is among the top income groups



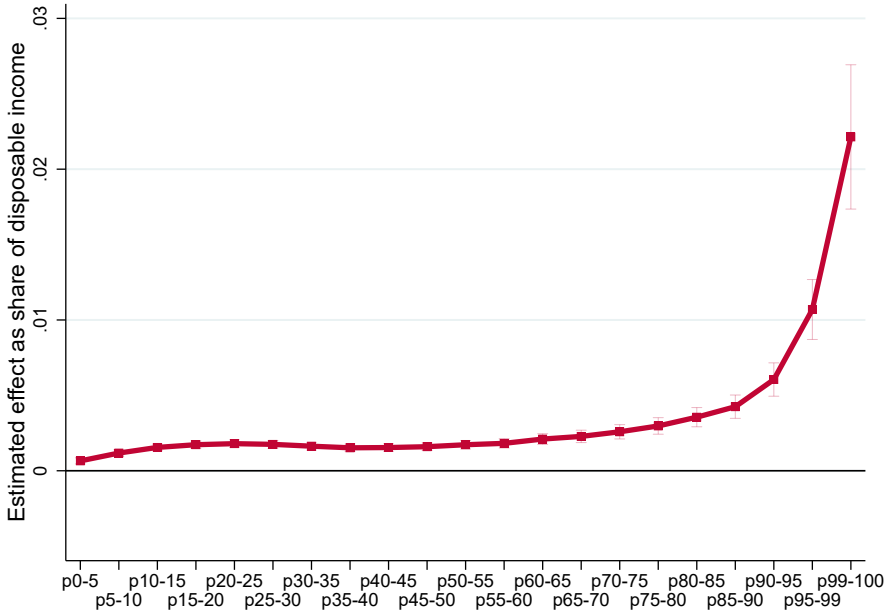
However, they also experience the largest decrease in **interest expenses**



They also experience the largest gain in **business income**



The largest increase in capital income is also concentrated among the top income groups

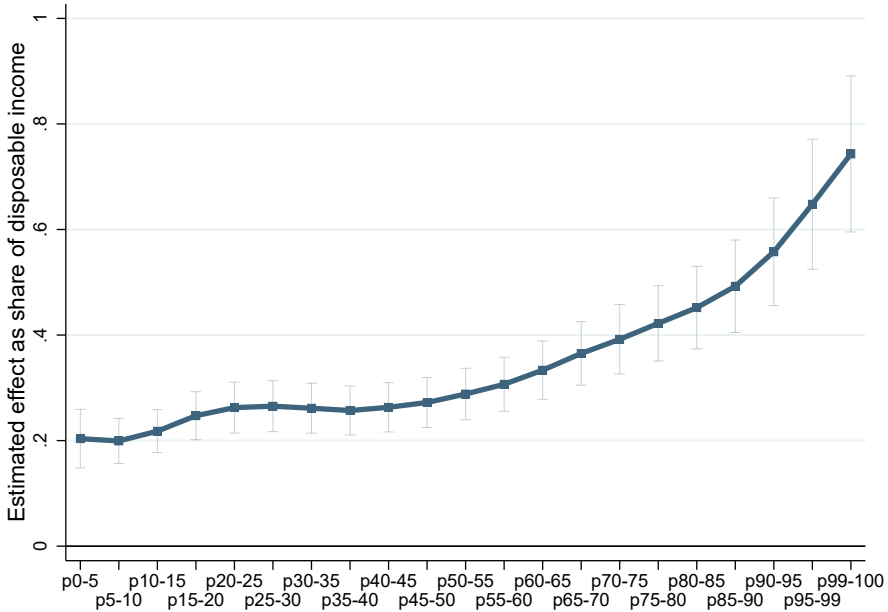


Monetary policy and disposable income

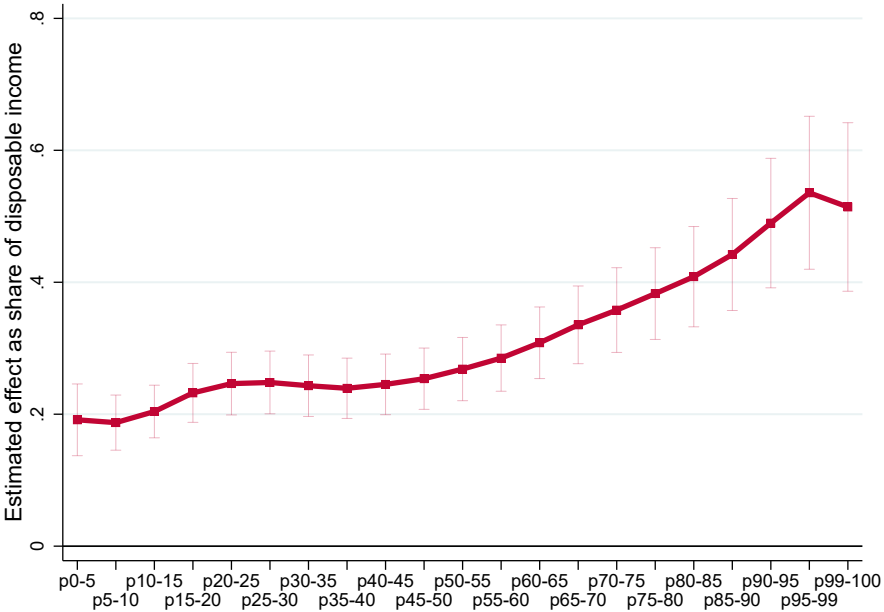
- Lowering monetary policy rates by 1 pp increases disposable income
  - 5% for top-1%
  - 1% for mid-income
  - no effect in the bottom
- Positive income gradient driven by stronger impact for high-income groups on:
  - interest payments
  - dividend and realized capital income
  - business income

  $\Rightarrow$ dominate effect on unemployment and salary

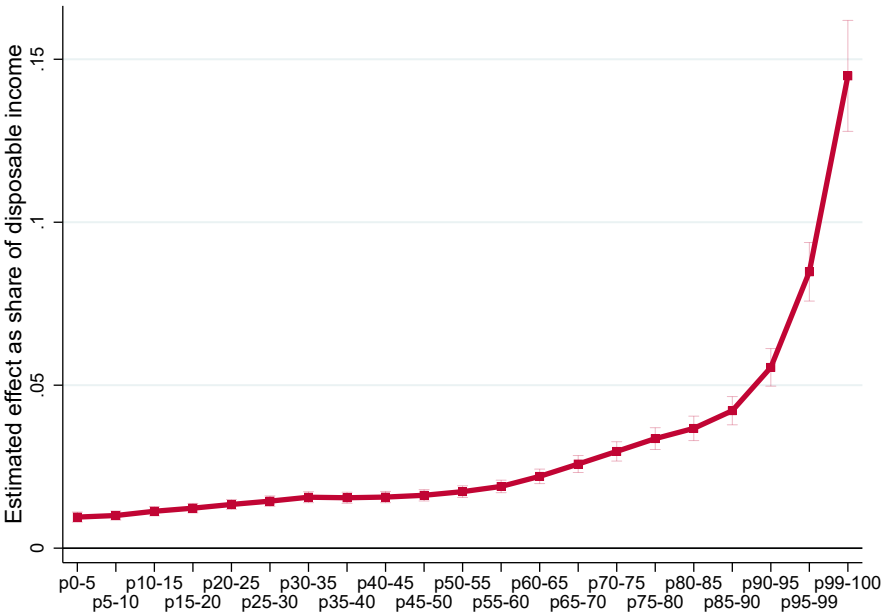
Clear gradient in **wealth** capital gains



Large price effect on **housing wealth** across all income groups



Steep income gradient in the price effect on **stocks**



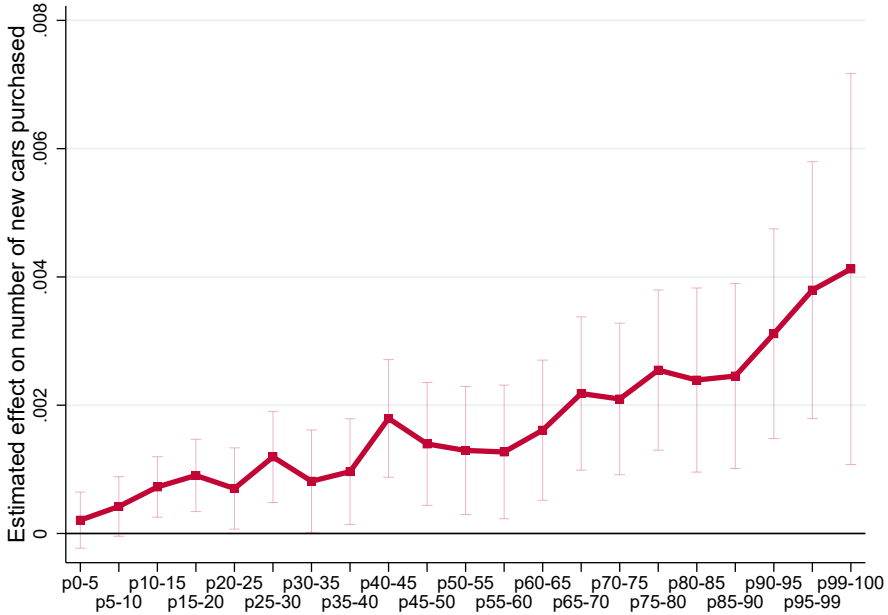
Monetary policy and wealth

Capital gains following expansionary monetary policy are very unequally distributed

Following a 1 percentage point reduction of the monetary policy rate:
- wealth increases by 80% of disposable income in the top
- wealth increases by 20% of disposable income in the bottom

The gradient mainly reflects that wealth relative to income increases along the income distribution

The **consumption gains** are also concentrated in the top (measured by purchases of new cars)



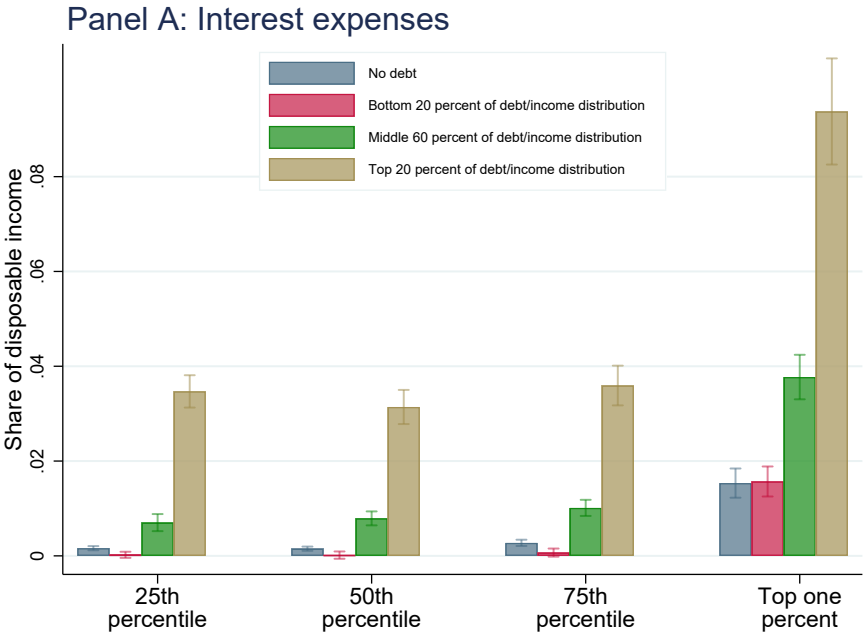
How does our results depend on **debt**?

The most direct channel of monetary policy works through household debt:

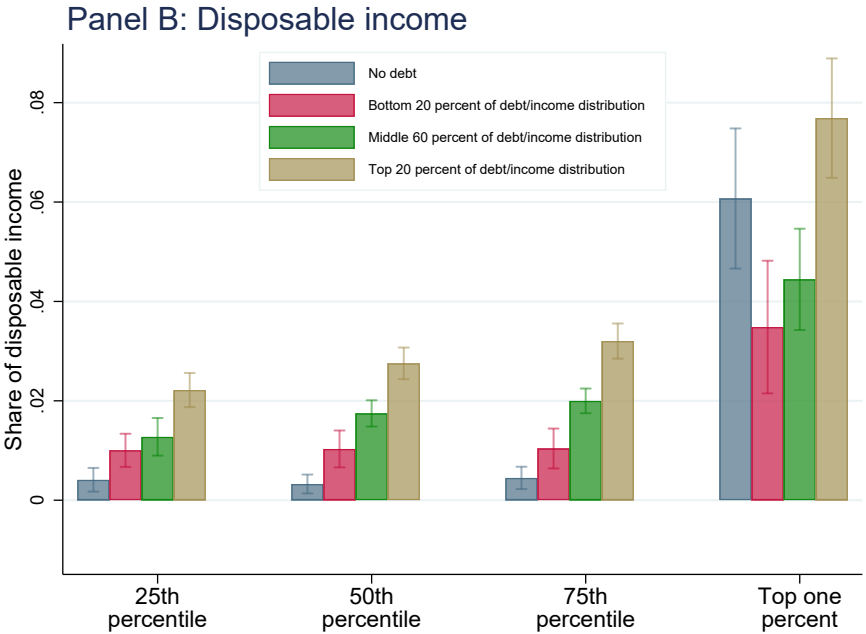
- lower monetary policy rate $\rightarrow$
- lower market rate $\rightarrow$
- lower interest payments?

Other channels are also impacted by household debt

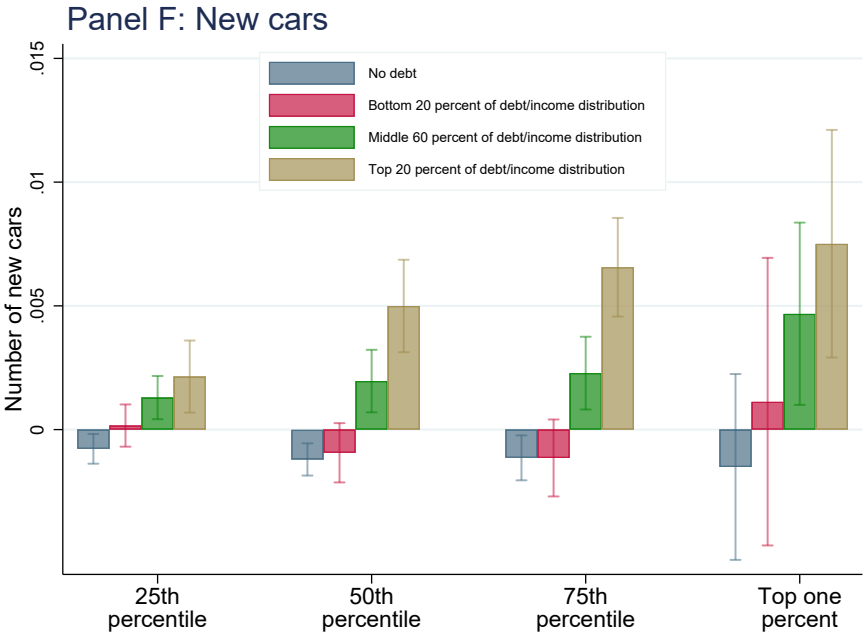
Strong debt gradient in the impact on **interest expenses**



...which passes on to the impact on **disposable income**



...and to the impact on **consumption**



Conclusion

Conclusion

We use a long panel of rich individual-level administrative data from Denmark

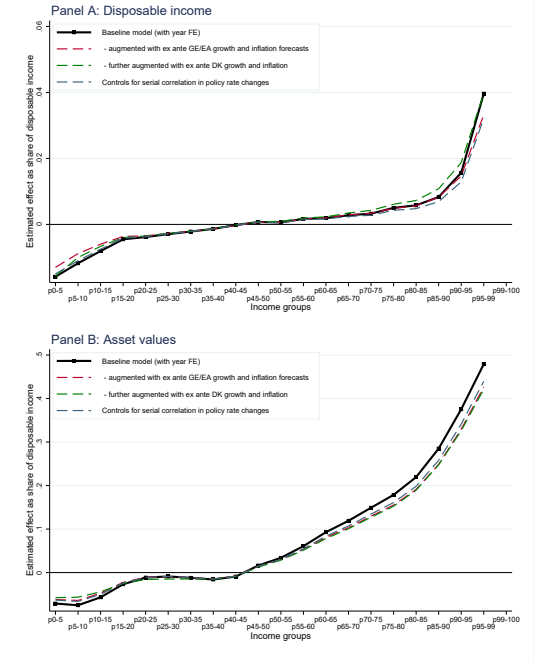
We estimate how monetary policy rate affects disposable income, wealth and consumption at different positions in the income distribution

We find a strong income gradient in the gains of expansionary monetary policy

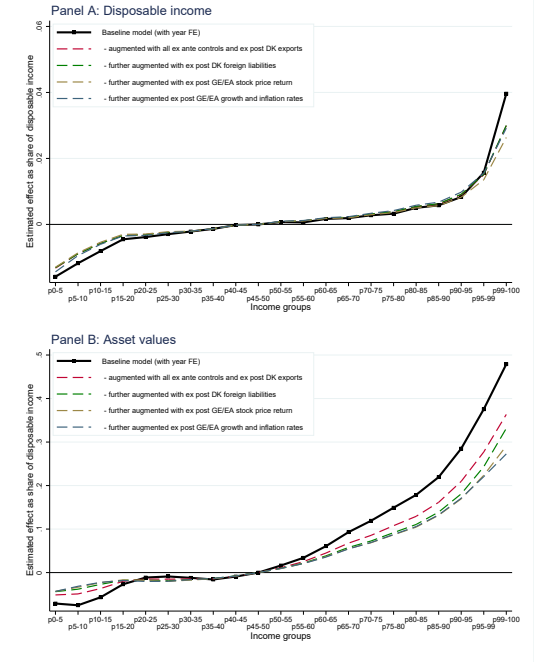
Expansionary monetary policy increases the top income households share of aggregate disposable income and reduces the share in the bottom

Appendix

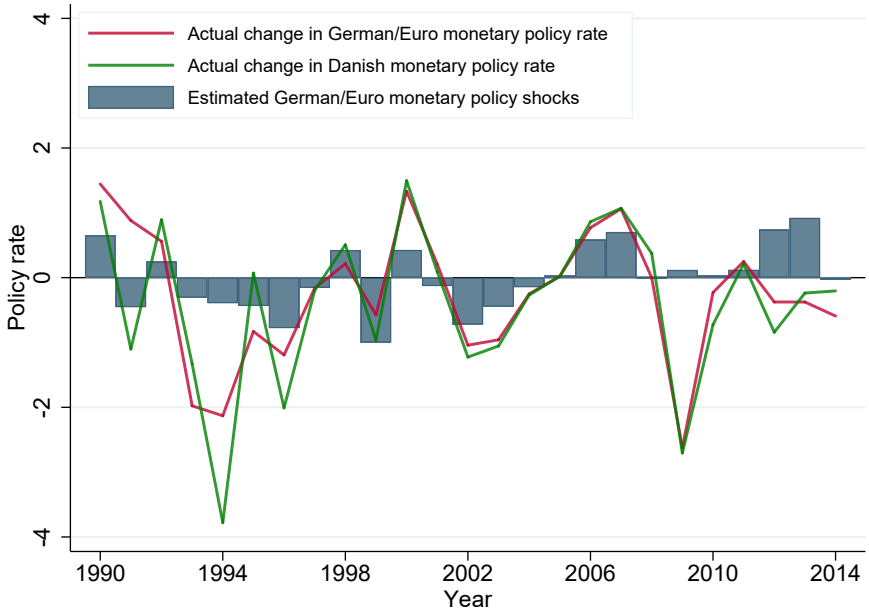
Robustness to set of ex ante macro controls



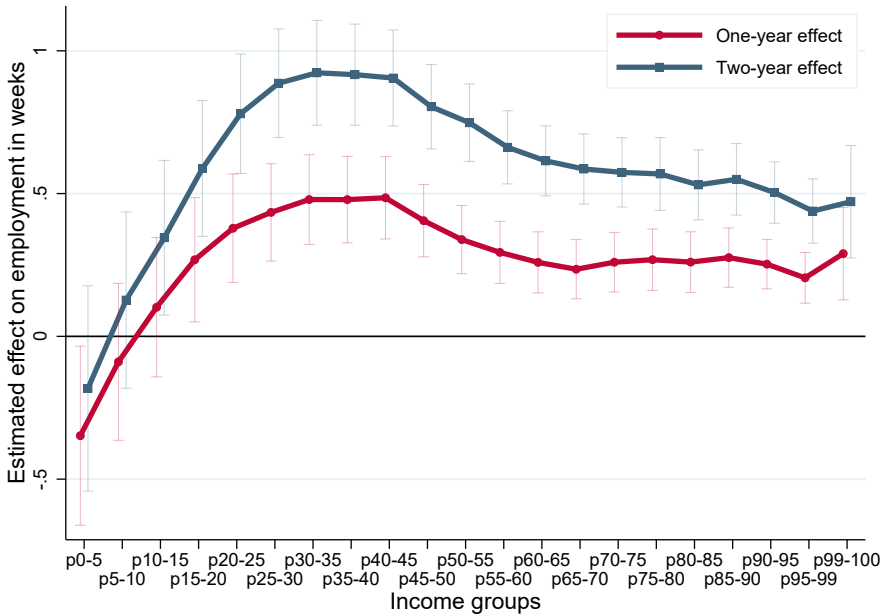
Robustness to set of ex post macro controls



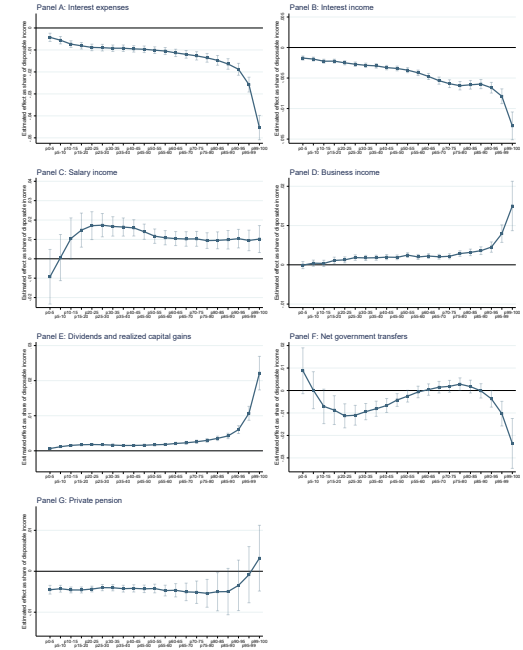
Monetary policy rates



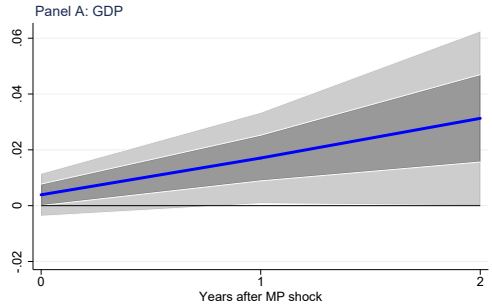
Salary effect works through employment (no. of weeks)

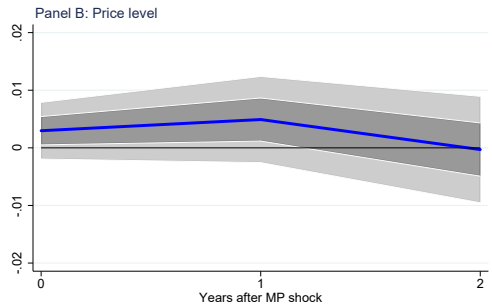


Other income components



Impulse responses to Euro Area MP shock





Debt-to-income ratios across income distribution in the US

Table 2: Mean of debt to income ratios

year	all	≤20th	20-40th	40-60th	60-80th	>80th	80-85th	85-90th	90-95th	>95th
1949	31.8	31.0	22.3	34.1	37.6	33.6	42.5	35.2	29.2	27.4
1962	50.3	33.3	40.6	54.1	65.8	59.7	66.5	61.3	52.9	57.7
1970	46.2	24.5	36.5	54.1	64.3	52.0	55.0	54.3	53.4	45.2
1983	55.0	41.7	43.8	51.9	64.5	73.0	75.2	70.2	71.2	75.6
1992	70.1	49.9	59.3	70.6	84.8	86.1	85.6	84.0	95.4	79.1
2001	85.5	62.6	77.3	97.2	99.5	90.5	97.9	102.4	89.6	73.1
2013	111.0	80.9	101.3	116.2	133.6	122.6	140.1	140.2	127.9	82.4

Source: U.S. survey of Consumer Finances. Table copied from Kuhn et al. (2015).

Bond holders

Non-financial firms	5.5%
Financial firms	42.4%
Insurance companies and pension funds	26.4%
Public Sector	4.6%
Households	6.3%
Foreign investors	12.1%
Unallocated	1.4%