Five Facts about the Distributional Income Effects of Monetary Policy Shocks

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Overview of paper

Does the effect of monetary policy shocks on individuals' incomes vary over the income distribution? If so, how and why?

Why care?

1. Income inequality key concern in economic policy today. Role of monetary policy often discussed, but views differ.
2. Micro-level heterogeneities important for our understanding of the aggregate effects of monetary policy (e.g., HANK models)

A microeconometric approach

1. Identify monetary policy shocks using standard high-frequency approach + "poor-man's sign restriction" (Jarocinski and Karadi, 2020)
2. Estimate individual-level effects of MP shocks on total after-tax incomes separately for different bins of the income distribution
3. Decompose the total income effects into the parts attributable to each income component (labor, capital, transfers, and taxes)
4. Assess underlying drivers of heterogeneous effects: heterogeneous income composition or heterogeneous sensitivity to shocks?

Summary of findings: Five facts

1. Effects of MP shocks U-shaped over the income distribution: Expansionary shocks increase incomes in top and bottom relative to middle
2. Large effects in bottom accounted for by the labor-income response…
3. …and those in the top by the capital-income response
4. The heterogeneity in the labor-income response is due to the earnings-heterogeneity channel…
5. …and that in the capital-income response to the income-composition channel

Data and sample

Administrative registry data from Statistics Sweden

- All legal residents in Sweden 16 years or older
- Annual frequency
- Total income and all components
- Income variables not top coded

Sample: All 26-65 year olds with positive total after-tax income

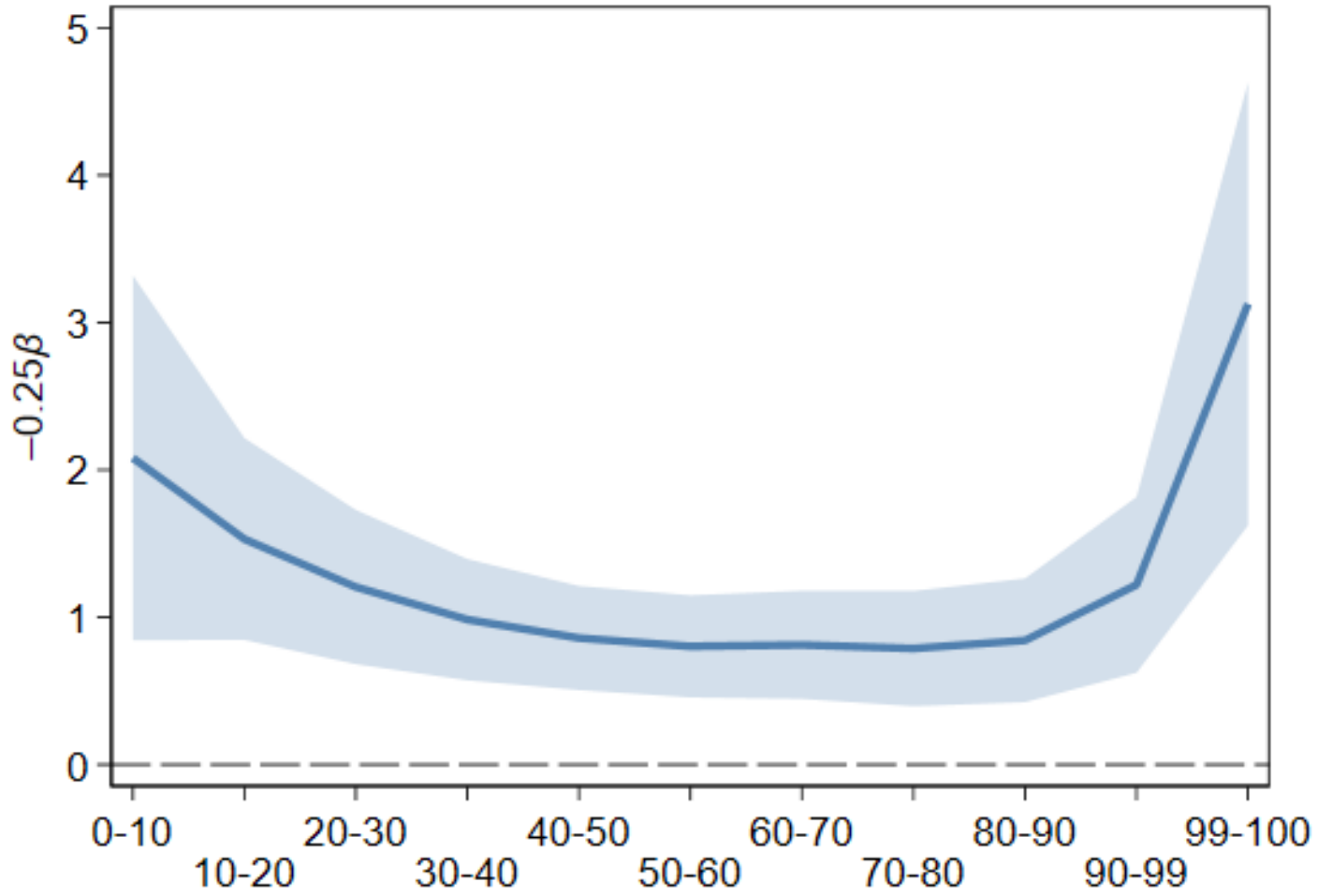
- Sample period 1999-2018
- 79.5 million individual-year observations and 6.7 million unique individuals

Empirical specification I: Total-income effects

$$\frac{Y_{i,t+h}^{T} - Y_{i,t-1}^{T}}{Y_{i,t-1}^{T}} = \sum_{g=1}^{11} G_{i,t,g} \cdot \left[\alpha_g^{T,h} + \boldsymbol{\beta_g^{T,h}} \cdot \widehat{\Delta i_t}\right] + \varepsilon_{i,t}^{T,h}$$

$Y_{i,t}^{T}$	Real total after-tax income of individual i in year t
$G_{i,t,g}$	Indicator equal to one if individual i in year t belongs to income group g, where $g = 1,2,\ldots,11$
$\widehat{\Delta i_t}$	Instrumented change in the policy rate during year t (instrument: information-adjusted monetary surprises)
$\boldsymbol{\beta_g^{T,h}}$	Effect of a 1pp increase in the policy rate on total after-tax incomes for individuals in group g over an h-year horizon

Fact 1: Total income effects U-shaped over the income distribution



Empirical specification II: A decomposition exercise

Let k denote the components of total income, where $Total\ income = Labor\ income + Capital\ income + Transfers - Taxes$. For each k, estimate

$$\frac{\boldsymbol{Y_{i,t+h}^{k} - Y_{i,t-1}^{k}}}{Y_{i,t-1}^{T}} = \sum_{g=1}^{11} G_{i,t,g} \cdot \left[\alpha_g^{k,h} + \boldsymbol{\beta_g^{k,h}} \cdot \widehat{\Delta i_t}\right] + \varepsilon_{i,t}^{k,h}$$

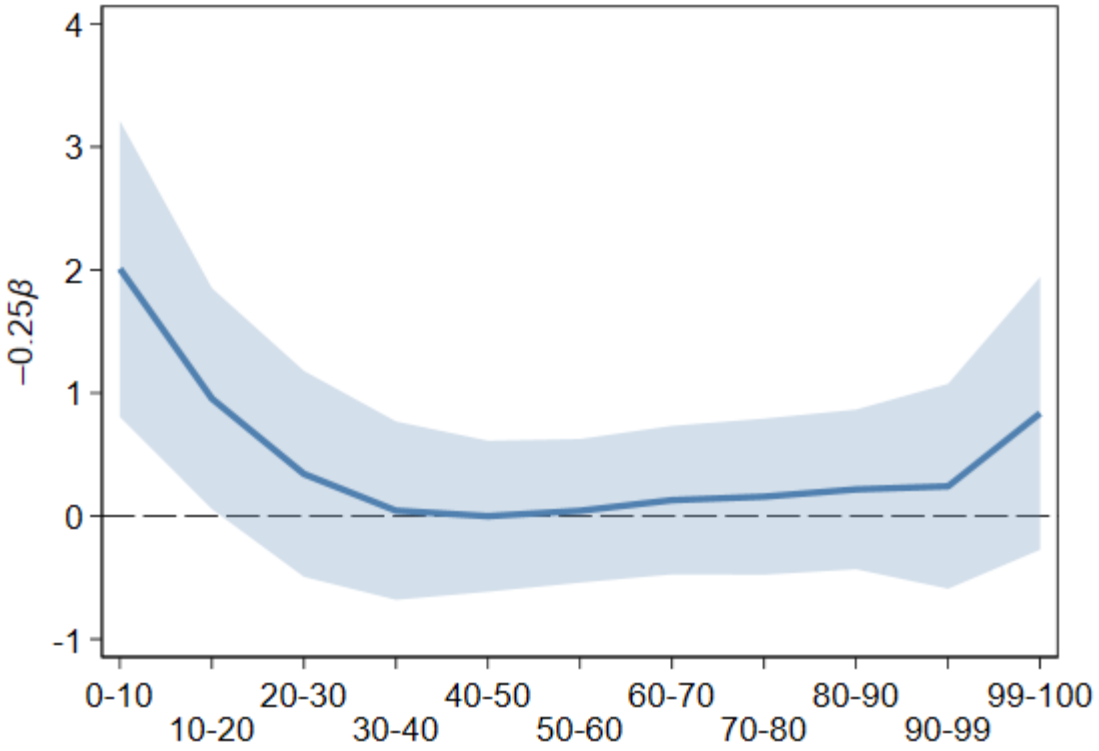
Yields an exact decomposition of the total-income effect, because

$\Delta Y_{i,t+h}^{T} = \sum_k \Delta Y_{i,t+h}^{k}$ implies that $\beta_g^{T,h} = \sum_k \beta_g^{k,h}$

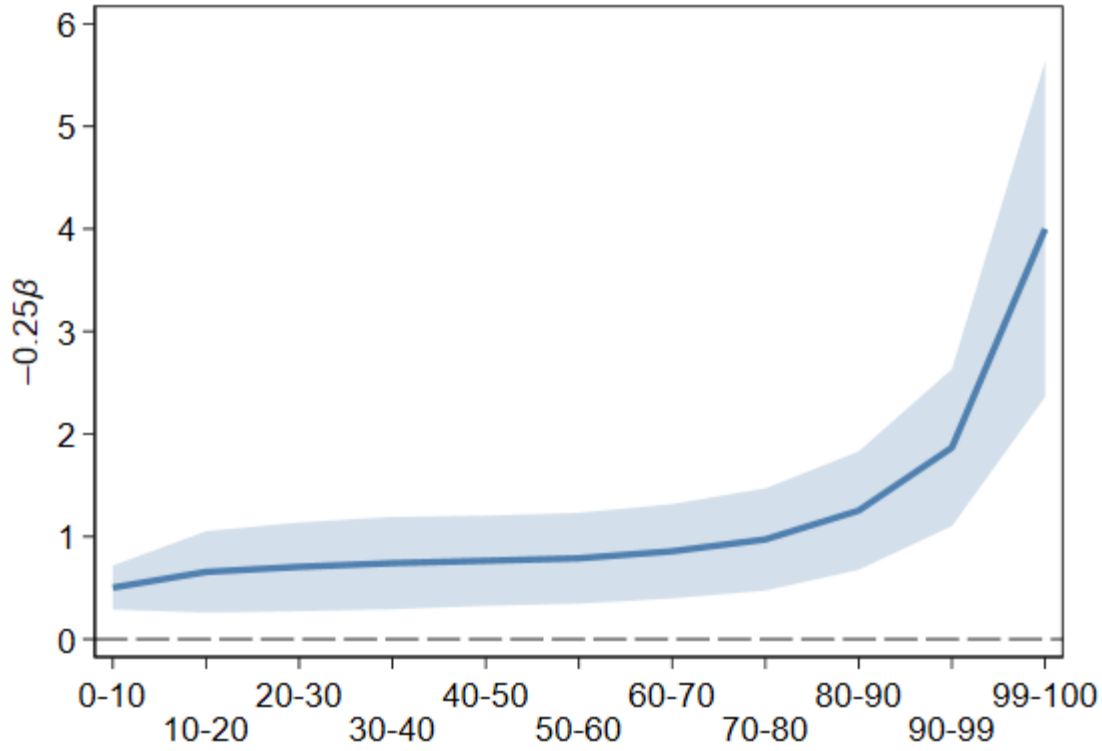
The contribution of component k to the total effect is thus $\boldsymbol{\beta_g^{k,h}/\beta_g^{T,h}}$

Facts 2-3: Total income effect driven by the labor-income response in bottom and the capital-income response in top

A. Labor income



B. Capital income



More detailed decomposition results

	Income group		
	0-10	50-60	99-100
1. Labor income	**2.0**	0.0	0.8
1a. Wage income	*1.9*	*0.1*	*0.8*
1b. Self-employment income	*0.1*	*0.0*	*0.0*
2. Capital income	0.5	**0.8**	**4.0**
2a. Realized capital gains	*0.3*	*0.5*	*3.0*
2b. Dividends and interest	*-0.1*	*0.0*	*0.6*
2c. Interest expenses (-)	*0.3*	*0.4*	*0.4*
2d. Other capital income	*0.0*	*0.0*	*0.0*
3. Market income	**2.6**	**0.8**	**4.9**
4. Transfer income	0.1	0.3	-0.1
4a. Pensions	*0.0*	*0.1*	*-0.1*
4b. Unemployment income	*-0.4*	*0.0*	*0.0*
4c. Other transfers	*0.4*	*0.2*	*0.0*
5. Total pre-tax income	**2.6**	**1.1**	**4.8**
6. Taxes (-)	-0.5	-0.3	-1.6
7. Total after-tax income	**2.1**	**0.8**	**3.1**

Labor income accounts for 77% of pre-tax income effect in bottom decile (2.0/2.6)

Capital income accounts for 83% of pre-tax income effect in top percentile (4.0/4.8)

Capital income response also dominates in the middle: 73% of pre-tax income effect

Summing up

The individual-level income effects of monetary policy shocks vary substantially over the income distribution

The effects are particularly large in the bottom, due to a strong labor-income response…

…and in the top, due to a strong capital-income response

Does expansionary monetary policy increase income inequality?

- Depends on the inequality measure used. E.g., Gini: no; top-1% share: yes.

Extras

Empirical specification III: Drivers of heterogeneity 1(2)

The dependent variables in the decomposition exercise can be expressed as

$$\frac{Y_{i,t+h}^{k} - Y_{i,t-1}^{k}}{Y_{i,t-1}^{T}} = \underbrace{\frac{Y_{i,t+h}^{k} - Y_{i,t-1}^{k}}{Y_{i,t-1}^{k}}}_{\substack{Percent\ change\ in \\ component\ k}} \cdot \underbrace{\frac{Y_{i,t-1}^{k}}{Y_{i,t-1}^{T}}}_{\substack{Share\ of\ k\ in \\ total\ income}}$$

Thus, two potential sources of heterogeneity in the effects of MP shocks on income component k:

1. Heterogeneity in income composition
2. Heterogeneity in the sensitivity of income component k to MP shocks

Empirical specification III: Drivers of heterogeneity 2(2)

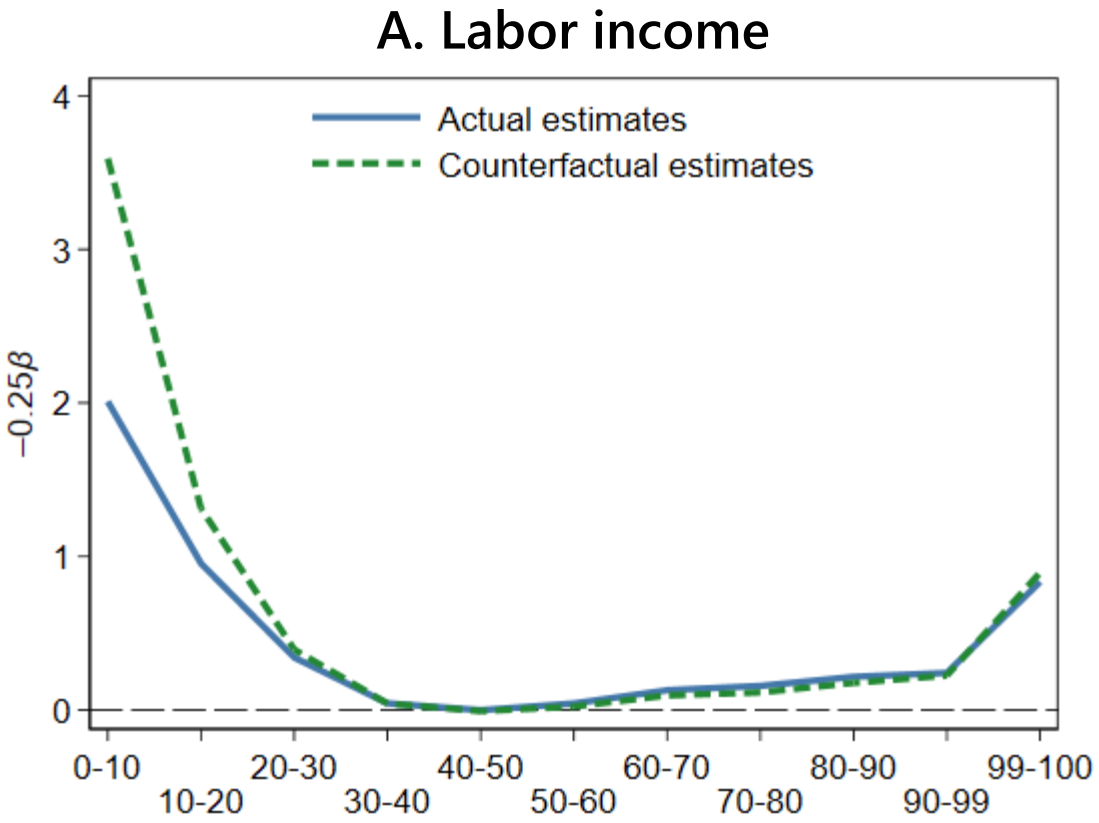
Create counterfactual dependent variables by replacing the actual income composition with the sample average. Roughly as follows:

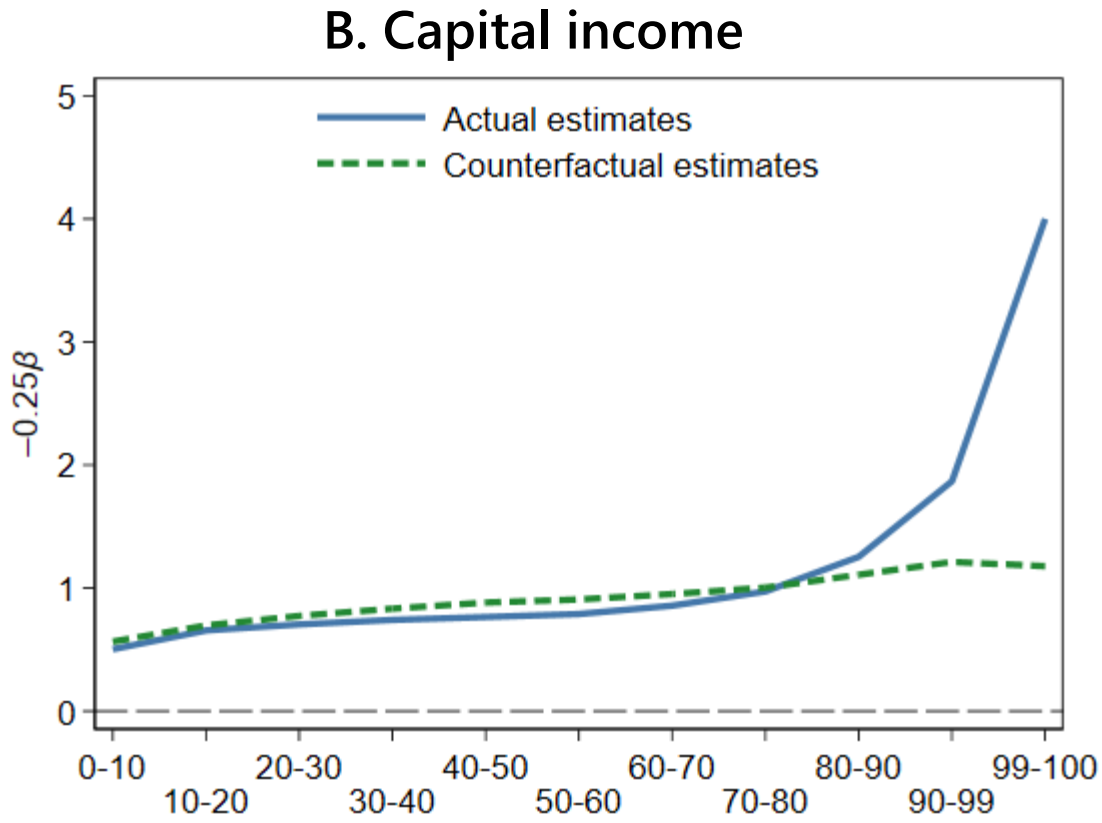
$$\underbrace{\frac{Y^k_{i,t+h} - Y^k_{i,t-1}}{Y^k_{i,t-1}}}_{Percent\ change\ in\ component\ k} \cdot \underbrace{\frac{Y^k}{Y^T}}_{Sample\ average\ share\ of\ k\ in\ total\ income}$$

Then reestimate the regressions with the counterfactual dependent variables

- Shuts down the income-composition channel; any heterogeneity due to differences in the sensitivity of component k to monetary policy shocks

Facts 4-5: Drivers of heterogeneity in labor- and capital-income responses





Construction of the monetary policy shock series 1(2)

Our monetary shock series is constructed by instrumenting changes in the repo rate, the Riksbank's main policy rate, with monetary surprises

Monetary surprises are identified using a high-frequency approach

- Changes in 1M T-bill rate on days of announcements of monetary policy decisions
- Similar-looking series when using three-hour changes in overnight index swaps, but only available from 2003 and onwards

The surprise series is adjusted for central-bank information effects using Jarocinski and Karadi's (2020) poor-man's sign restriction

- Involves setting the surprise to zero in case stock prices move in the same direction as the interest-rate surprise on announcement days

Construction of the monetary policy shock series 2(2)

The shock series consists of the fitted values, $\widehat{\Delta i_m}$, from the following regression:

$$\Delta i_m = \alpha + \beta \cdot \Delta i_m^{TBill'} + \varepsilon_m$$

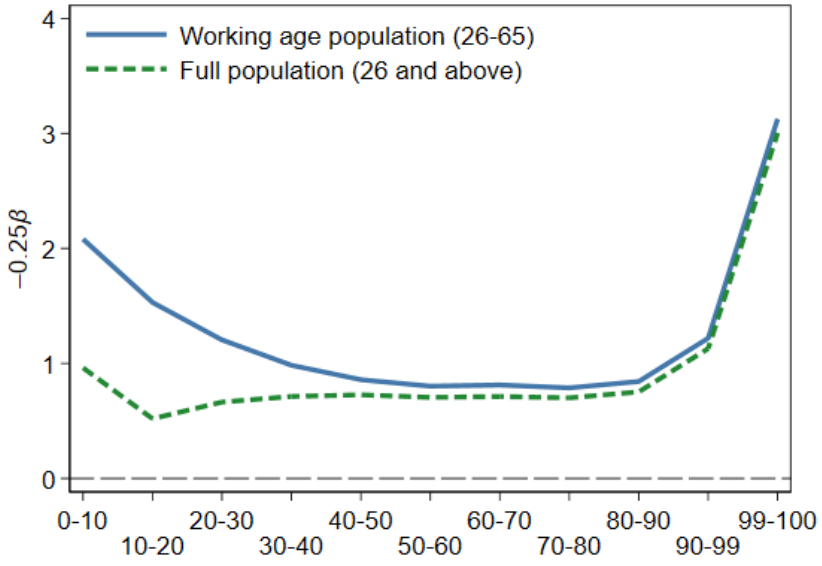
where

- Δi_m is the change in the repo rate decided on monetary policy meeting m
- $\Delta i_m^{TBill'}$ is the change in the 1M T-bill rate on the day of the announcement of the decision from meeting m, adjusted using the poor-man's sign restriction

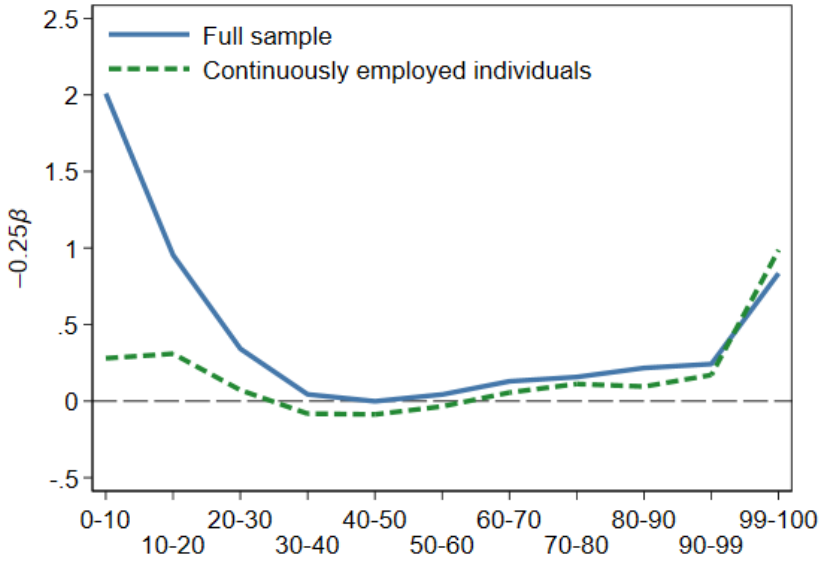
We aggregate the shocks to annual frequency for the main part of the analysis: $\widehat{\Delta i_t} = \sum_{m \in t} \widehat{\Delta i_m}$

Additional results and robustness checks ($h = 2$)

Total-income response when including people above retirement age (65+)



Labor-income response when only including continuously employed individuals



Total-income response when excluding the global financial crisis (2007-10)