The Generational Divide: Who Gained and Who Lost from the 2021–23 Inflation Surge?

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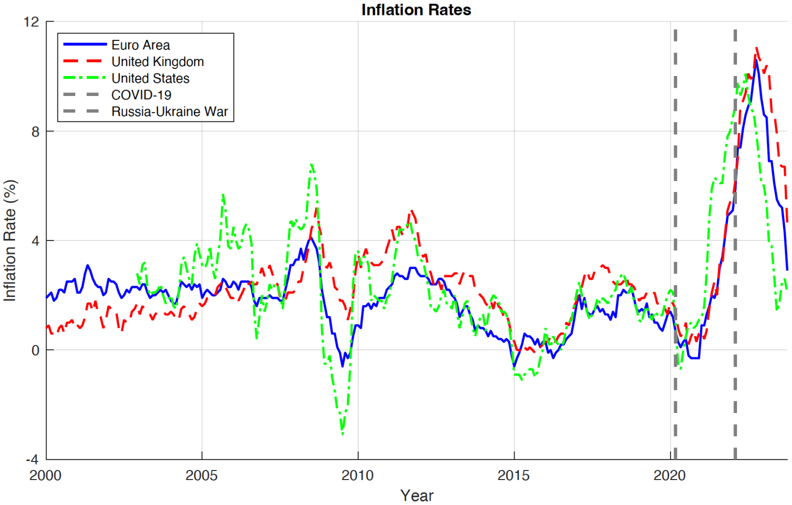
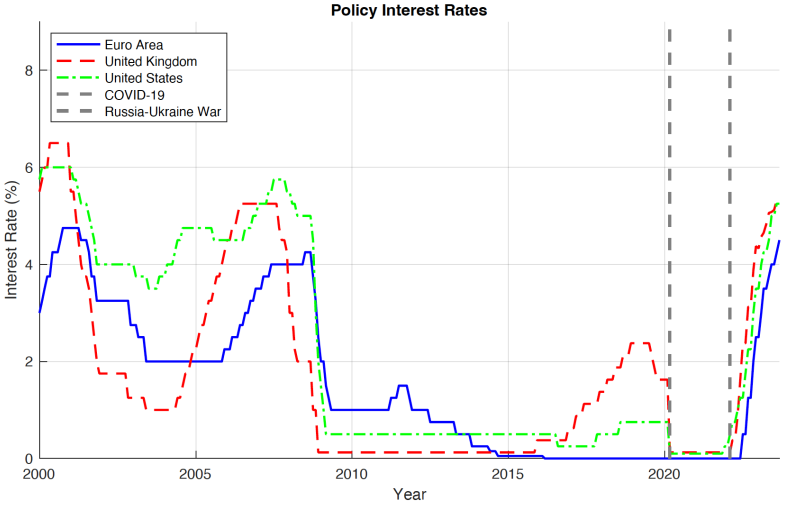
High inflation surge post pandemic



& aggressive monetary policy tightening



Why does it matter?

- High inflation and monetary policy tightening can have significant redistributive effects across age groups.
- Two Examples:
  - Inflation benefits the young: reduces real debt burdens.
  - Contractionary policy benefits the old: provides higher returns on savings.

What do I study?

- I study the intergenerational redistributive effects of:
  - Surprise inflation
  - Monetary tightening

Major Questions:

- Who gained and who lost from high inflation?
- How do redistributive effects differ across the age distribution and life cycle?
- What is the impact of stricter anti-inflationary policy on redistribution?

Model outline

- Builds on Bielecki et al. (2022, JEEA), O-HANK model.
- The model economy includes:
  - **Households:** 80 overlapping cohorts (ages 20–99).
  - **Firms** (4 types)
    - Final good producers: Create a homogeneous final good using intermediate inputs.
    - Intermediate goods producers: Produce differentiated goods using capital and labor.
    - Capital producers: Combine existing capital and investment goods to create new capital.
    - Investment funds: Intermediate nominal assets and rent physical capital.
  - **Government**: Fiscal authority and central bank
- The model parameters are calibrated to the Euro Area, and the model is solved non-linearly using perfect foresight simulation.

Key changes: inflation dynamics

- Introduce cost-push shock to firms' price markups to model high inflation.
- Model a stronger anti-inflation stance via increased policy rule responsiveness.
- Compare model responses with Euro Area data from the 2021–23 inflation surge.

Model in a nutshell: households

- A representative j-aged household maximizes her expected remaining lifetime utility:

$$U_{j,t} = \mathbb{E}_t \sum_{s=0}^{J-j} \beta^s \frac{N_{j+s,t+s}}{N_{j,t}} \left[\begin{array}{c} \log\left(c_{j+s,t+s} - \varrho \bar{c}_{j+s,t+s-1}\right) \\ +\psi_{j+s} \log \chi_{j+s+1,t+s+1} \\ -\varphi_{j+s} \frac{h_{j+s,t+s}^{1+\varphi}}{1+\varphi} \end{array} \right]$$

- Subject to the budget constraint:

$$\begin{aligned} & c_{j,t} + p_{\chi,t}\left[\chi_{j+1,t+1} - \left(1-\delta_\chi\right)\chi_{j,t}\right] + a_{j+1,t+1} \\ & \qquad = \left(1-\tau_t\right) w_t(\iota) z_j h_{j,t}(\iota) + \frac{R_{j,t}^a}{\pi_t} a_{j,t} + beq_{j,t} + beq_{j,t}^{\chi} + \Xi_{j,t}(\iota) \end{aligned}$$

Euler Equation

- A key optimality condition for households:

$$(c_{j,t} - \varrho c_{j,t-1})^{-1}(1-\varrho) = \beta E[(1-\omega_j)(c_{j+1,t+1} - \varrho c_{j+1,t})^{-1}(1-\varrho)(R_{t+1}/\pi_{t+1})]$$

- The Euler equation tells us how the household allocates consumption between today and tomorrow, depending on the interest rate.

Production sector: cost-push shock

- Final goods aggregated from differentiated intermediate products:

$$y_t = \left[\frac{1}{N_t}\int_0^{N_t} y_t(i)^{\frac{1}{\mu_t}}\,\mathrm{d}i\right]^{\mu_t}$$

- Markups (μ_t) are subject to an AR(1) stochastic cost-push shock:

$$\mu_t = \exp\left(\varepsilon_t^{\mu}\right)\mu, \quad \varepsilon_t^{\mu} = \rho_\mu \varepsilon_{t-1}^{\mu} + \epsilon_t^{\mu}, \quad \epsilon_t^{\mu} \sim \mathcal{N}(0, \sigma_\mu^2)$$

- Cost-push shock captures inflationary pressures by raising markups and marginal costs.

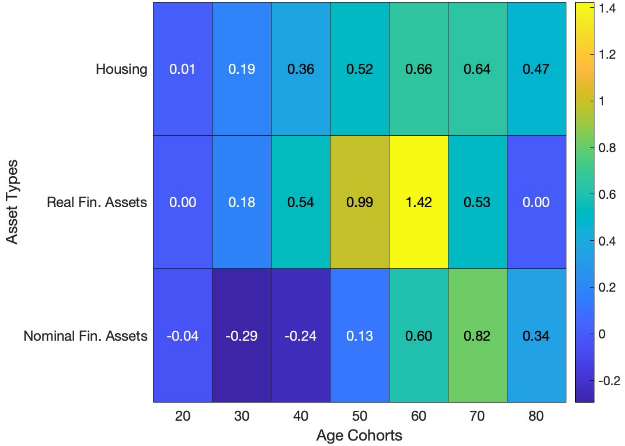
Central bank

- The nominal interest rate are set according to a Taylor rule:

$$\frac{R_t}{R} = \left(\frac{R_{t-1}}{R}\right)^{\gamma_R} \left[\left(\frac{\pi_t}{\pi}\right)^{\gamma_\pi} \left(\frac{y_t}{y_{t-1}}\right)^{\gamma_y}\right]^{1-\gamma_R} \exp\left(\varepsilon_t^R\right)$$

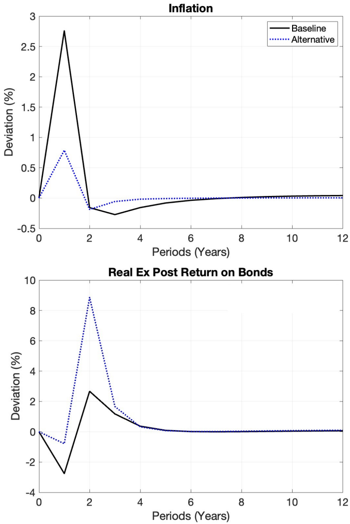
- Policy Scenarios:
  - Baseline: $\gamma_\pi = 1.97$, standard response to inflation.
  - Alternative: $\gamma_\pi = 21$, stricter anti-inflation stance.

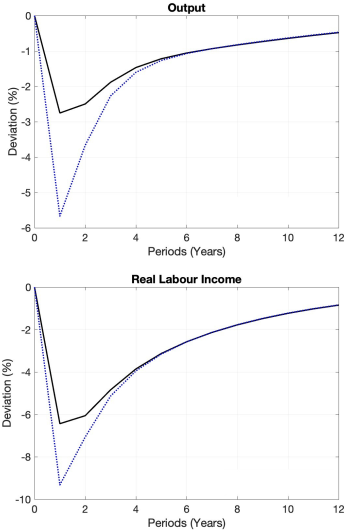
Smoothed age profiles of assets after matching raw data



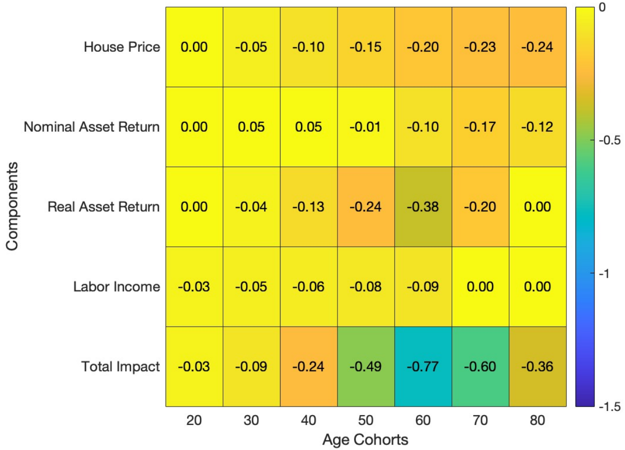
Note: Heatmap values are proportions relative to mean total assets across the entire life cycle. Positive values represent asset holdings, while negative values reflect debt.

Aggregate effects of a cost-push shock



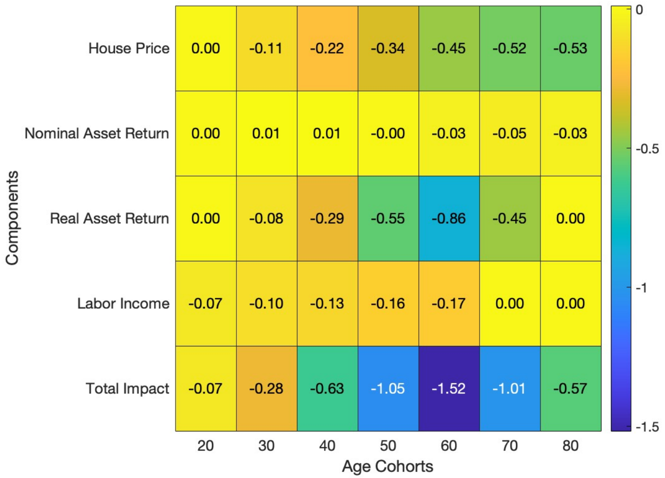

Output
Deviation (%)
Periods (Years)
Consumption
Deviation (%)
Periods (Years)
Real Labour Income
Deviation (%)
Periods (Years)
Real House Prices
Deviation (%)
Periods (Years)

On-impact redistribution (baseline scenario)



Note: Heatmap values represent the marginal utility of consumption at specified age.

On-impact redistribution (alternative scenario)



On impact vs life-time effects

- What matters for redistribution is where you are on the path of asset accumulation (Auclert, 2019).

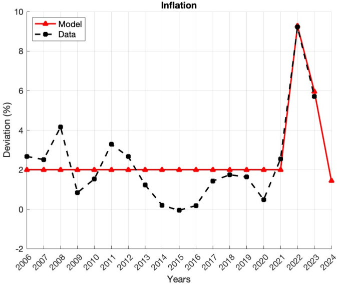
- Example: Lower house prices are good for a 40 year old HH despite a fall in house prices, because they are in the process of accumulating housing.

Lifecycle redistribution (baseline scenario)

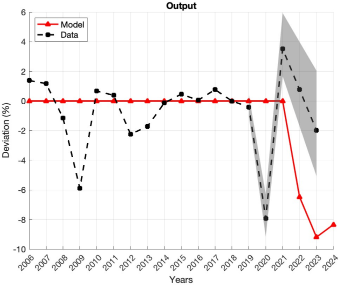
Note: Heatmap values represent welfare gains/losses, weighted by the marginal utility of consumption

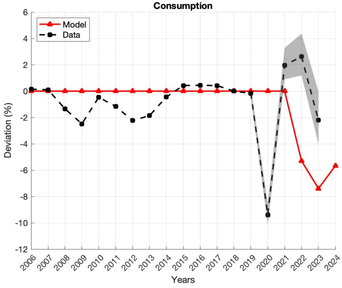
Lifecycle redistribution (alternative scenario)

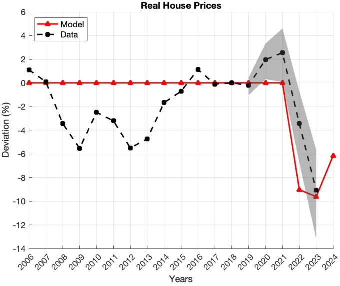
Inflation shock: model predictions & observed data

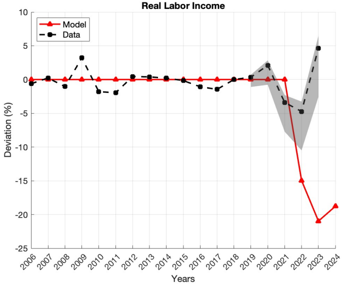


Note: IRFs to sequential cost-push shocks (12.8% in period 1, 6% in period 2) with γ_π adjusted (1.97 to 1.2). Compared with Euro Area annual data (2006–2023).


Output
Model
Data
Deviation (%)
Years
6
4
2
0
-2
-4
-6
-8
-10
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024


Consumption
Model
Data
Deviation (%)
Years
6
4
2
0
-2
-4
-6
-8
-10
-12
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024


Real House Prices
Model
Data
Deviation (%)
Years
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024


Real Labor Income
Model
Data
Deviation (%)
Years
10
5
0
-5
-10
-15
-20
-25
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Conclusion

- High inflation redistributes welfare unevenly across age cohorts.
- Immediate (on-impact) redistribution differs significantly from lifetime effects.
- Households in their late working years and early retirement phase (ages 50–70) benefit over the life cycle, while younger (ages 20–40) and older post-retirement cohorts (ages 80+) face welfare losses.
- A stricter anti-inflation stance amplifies immediate losses but improves welfare for individuals aged 50 and above over the life cycle.

Future work

- The complementarity of fiscal and monetary policy interactions.
- Assessing the properties of optimal monetary policies emphasizing welfare functions and the trade-offs faced by monetary authorities.

Thank You!

Welfare decomposition: key components

- **Framework:** Lifetime utility is decomposed into contributions from key economic variables.
- **Utility Decomposition:**

$$\mathrm{d}\mathcal{W}_{j,0} = \Gamma_j^{\chi} + \Gamma_j^{b} + \Gamma_j^{f} + \Gamma_j^{l} + \Gamma_j^{t} + \Gamma_j^{h}$$

- **Key Components:**
  - Γ_j^{χ} : House price changes
  - $\Gamma_j^{b}, \Gamma_j^{f}$: Returns on nominal and real assets
  - Γ_j^{l} : Labor income and taxes
  - Γ_j^{t} : Transfers and bequests
  - Γ_j^{h} : External habits
- **Key Insight:** Welfare impacts vary by cohort due to life-cycle positions and exposure to these variables.

Welfare decomposition

- Welfare effects decompose into contributions from key variables:

$$\mathrm{d}\mathcal{W}_{j,0} = \sum_{s=0}^{J-j} \left[\frac{\partial \mathcal{W}_{j,0}}{\partial p_{\chi,s}} \mathrm{d}p_{\chi,s} + \frac{\partial \mathcal{W}_{j,0}}{\partial r_s} \mathrm{d}r_s + \cdots \right]$$

- Example: House prices (Γ_j^{χ})

$$\Gamma_j^{\chi} = -\mathbb{E}_0 u_j^c \sum_{s=0}^{J-j} (1+r)^{-s} \left[(1-\delta_\chi)\chi_{j+s} - \chi_{j+s+1} \right] \mathrm{d}p_{\chi,s}$$

- Example: Labor income (Γ_j^{l})

$$\Gamma_j^{l} = \mathbb{E}_0 u_j^c \sum_{s=0}^{J-j} (1+r)^{-s} z_{j+s} \left[(1-\tau) h_{j+s} \mathrm{d}w_s + \frac{\mu_w - 1}{\mu_w} \mathrm{d}h_{j+s} \right]$$

- **Key Takeaway:** Each term quantifies how specific variables—such as house prices or labor income—contribute to welfare changes across cohorts.