The Inflationary Consequences of Prioritising Central Bank Profits

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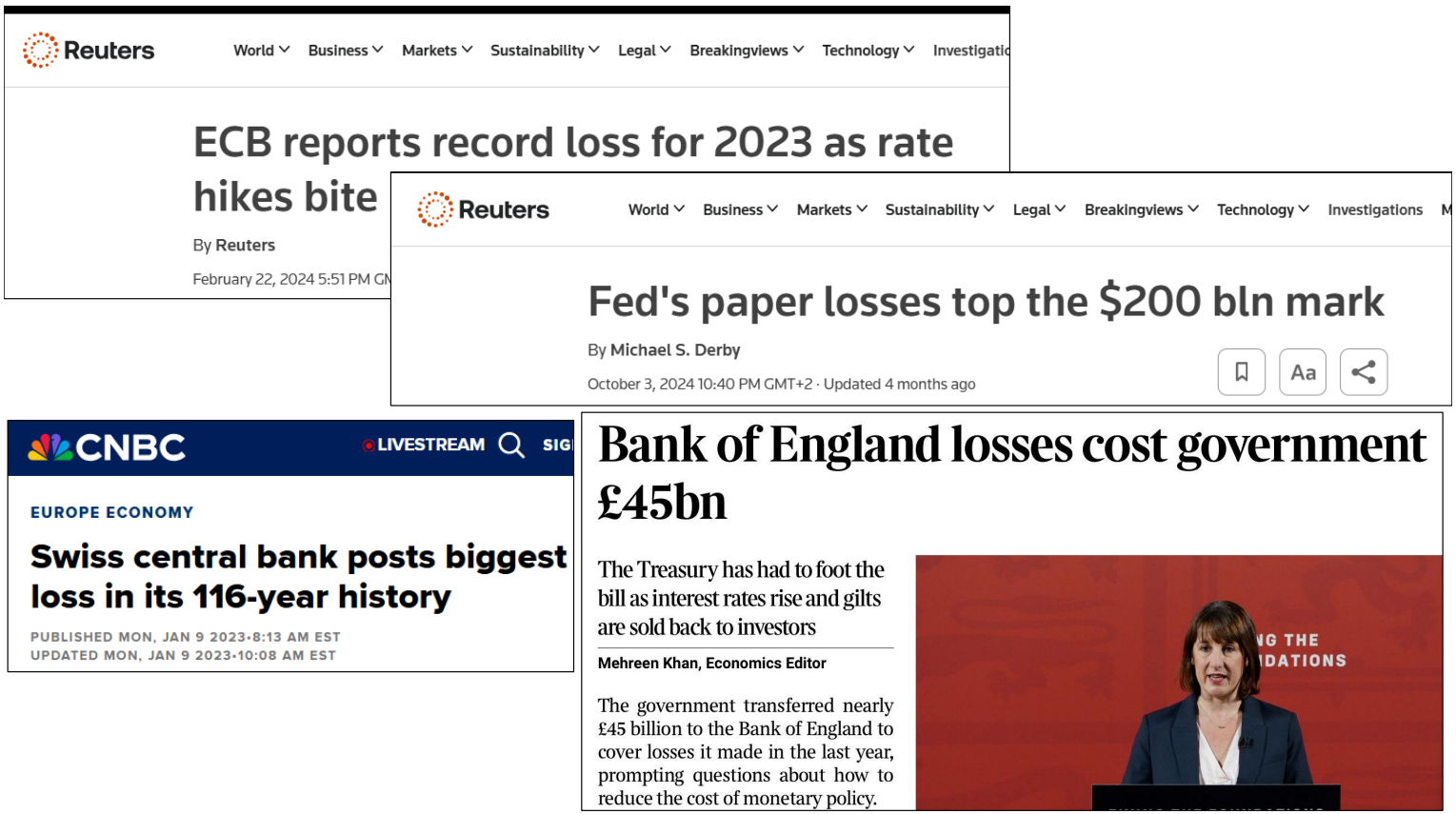
Motivation



Reuters

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ECB reports record loss for 2023 as rate hikes bite

By Reuters

February 22, 2024 5:51 PM GM

Reuters

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Fed's paper losses top the $200 bln mark

By Michael S. Derby

October 3, 2024 10:40 PM GMT+2 · Updated 4 months ago

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EUROPE ECONOMY

Swiss central bank posts biggest loss in its 116-year history

PUBLISHED MON, JAN 9 2023•8:13 AM EST
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Bank of England losses cost government £45bn

The Treasury has had to foot the bill as interest rates rise and gilts are sold back to investors

Mehreen Khan, Economics Editor

The government transferred nearly £45 billion to the Bank of England to cover losses it made in the last year, prompting questions about how to reduce the cost of monetary policy.

Motivation

Figure: The ECB's policy rate and annual pre-tax profits

Notes: Figure shows the sum of the annual profits of the central banks of the euro area after transfers to/from the provisions for general risks, but before taxes and transfers from other reserves. The sample includes the 18 countries that had adopted the euro as of 2014 (AT, BE, CY, DE, EE, ES, FI, FR, GR, IE, IT, LU, LV, MT, NL, PT, SI, SK).

Motivation

- **Decline in central banks' profitability** in recent years
  - ⇒ Reported profits of the ECB/Eurosystem declined by $\approx 2/3$ from peak in 2019 to 2022
  - ⇒ ECB: loss of €7.9bn for 2024, after €1.3bn for 2023
  - ⇒ Fed: loss of $77.5bn for 2023, after $114.3bn for 2023
  - ⇒ **However:** Negative financial results follow decade of substantial profitability
- **Temporary mismatch of interest income and expenses** in light of rising policy rates
- **CBs' usual claim:** Fluctuations in profitability expression of primacy of independent monetary policy

Research Question

Does central bank profitability matter for the conduct of monetary policy?

Method and Analysis

- Detailed **Eurosystem net income model**
- **Several exercises** to assess implications of central bank losses
  - ⇒ **Long-term:** Are losses threatening Eurosystem solvency?
  - ⇒ **Cyclical:** Cash-flow analyses on relation of CB losses and monetary policy
- Profitability implications of **alternative balance sheet paths**

Key Findings

- Expected Eurosystem losses **do not endanger solvency**
- Ability to report temporary losses **crucial for independent conduct of monetary policy**
- Counterfactual **"zero-loss" policy requires higher (lower) inflation (policy rate) trajectory**

Literature on Central Bank Profitability

- **Theoretical findings:**
  - ⇒ Central bank's profit distribution can help select a "good" equilibrium (Del Negro and Sims, 2015; Reis, 2013)
  - ⇒ Balance sheet purchases can create inflation risks under budgetary separation (Corsetti and Dedola, 2016)
  - ⇒ Trade-off between macro objectives and monetary-fiscal arrangements (Adrian et al., 2025, 2024; Fornaro and Grosse-Steffen, 2024; Ize, 2005)
- **Empirical evidence:**
  - ⇒ Financial strength linked to better inflation outcomes (Wang and Zwinkels, 2024; Stella, 2008)
  - ⇒ Mixed evidence on profitability-inflation trade-offs (Goncharov et al., 2021; Benecká et al., 2012)
- **ECB losses:** Modest projected losses should not affect monetary policy (Belhocine et al., 2023; Cecchetti and Hilscher, 2024)

Income Model

- Stylized version of the **per-period Eurosystem income statement**
  - $\Rightarrow$ Features simple **central bank dividend rule**
  - $\Rightarrow$ CB **profits fully distributed** to fiscal authority, **losses reported in "deferred asset"** (Hall and Reis, 2015)
- **Real net income** determined by:
  1. Fixed-income bond portfolio B_t with return r_t^b capturing interest rate/maturity risks
  2. Assets (A_t) and liabilities (L_t) earning/remunerated at i_t
  3. Assets (A_t^n) and liabilities (L_t^n) earning/remunerated at $i_t^* = 0$

$$y_t = \frac{r_t^b B_t + i_t(A_t - L_t) - i_t^*(A_t^n - L_t^n)}{P_t}, \tag{1}$$

Income Model

- Central bank **only transfers positive net income to government**
  $\Rightarrow$ **Losses in "deferred asset"** (Hall and Reis, 2015)
- Per-period dividends:

$$d_t = \max(y_t - D_{t-1}, 0), \tag{2}$$

- Law of motion deferred asset:

$$D_t = \min\left(\bar{D}, D_{t-1} - \max(y_t - d_t, 0) + \max(-y_t, 0)\right) \tag{3}$$

Data

- **End-2023 "snapshot"** based on publicly available data
  - ⇒ **Eurosystem balance sheet projections:** December 2023 Survey of Monetary Analysts (SMA)
  - ⇒ **Macro-financial variables:** Eurosystem December 2023 macroeconomic projections
  - ⇒ **Market-based expectations for the policy rate:** December 2023 €STR forward curve
- **Consolidated Eurosystem balance sheet statistics**
- **Bond return** r_t^b
  - ⇒ Based on APP/PEPP securities holdings ⇒ relative size of bonds determined by outstanding amount
  - ⇒ Double-weights accounting for outstanding amount of each bond (cross-sectional weighting) and relative size of gross purchases in specific month (time-series weighting)
  - ⇒ Only take bonds that will not have matured by the end of each year into account to project the future average yield on the remaining future bond holdings

Exercise 1: Eurosystem profitability from a net worth perspective

- Eurosystem net worth:

$$NW_t = \sum_{k=0}^{\infty} \mathbb{E}_t \left\{ \frac{P_{t+k} y_{t+k}}{\prod_{\tau=0}^{k} (1 + i_{t+\tau})} \right\}, \tag{4}$$

- Income effect of future policy rate adjustments:

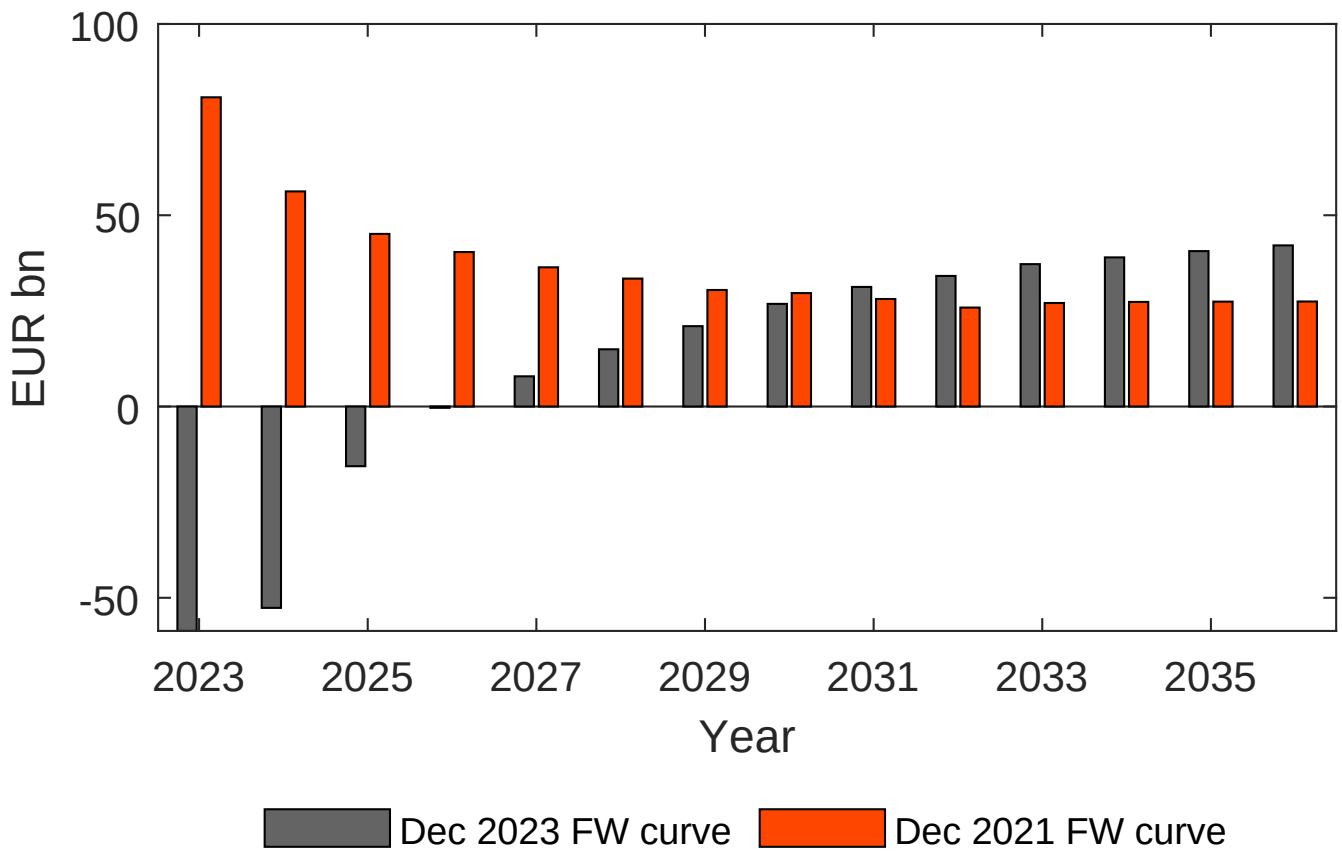
$$\frac{\partial NW_t}{\partial i_{t+k}} = \mathbb{E}_t \left\{ \frac{A_{t+k} - L_{t+k}}{(1 + i_{t+k}) \prod_{\tau=0}^{k} (1 + i_{t+\tau})} \right\}, \tag{5}$$

- Simulate net income
- Discount nominal cash flows w/ expected future policy rates
- Use €STR forward curves as in Dec 2021 and Dec 2023

Exercise 1: Eurosystem profitability from a net worth perspective

- Increase in expected rates **dampened near-term income**
- Offset by **higher NPV of future seigniorage income**

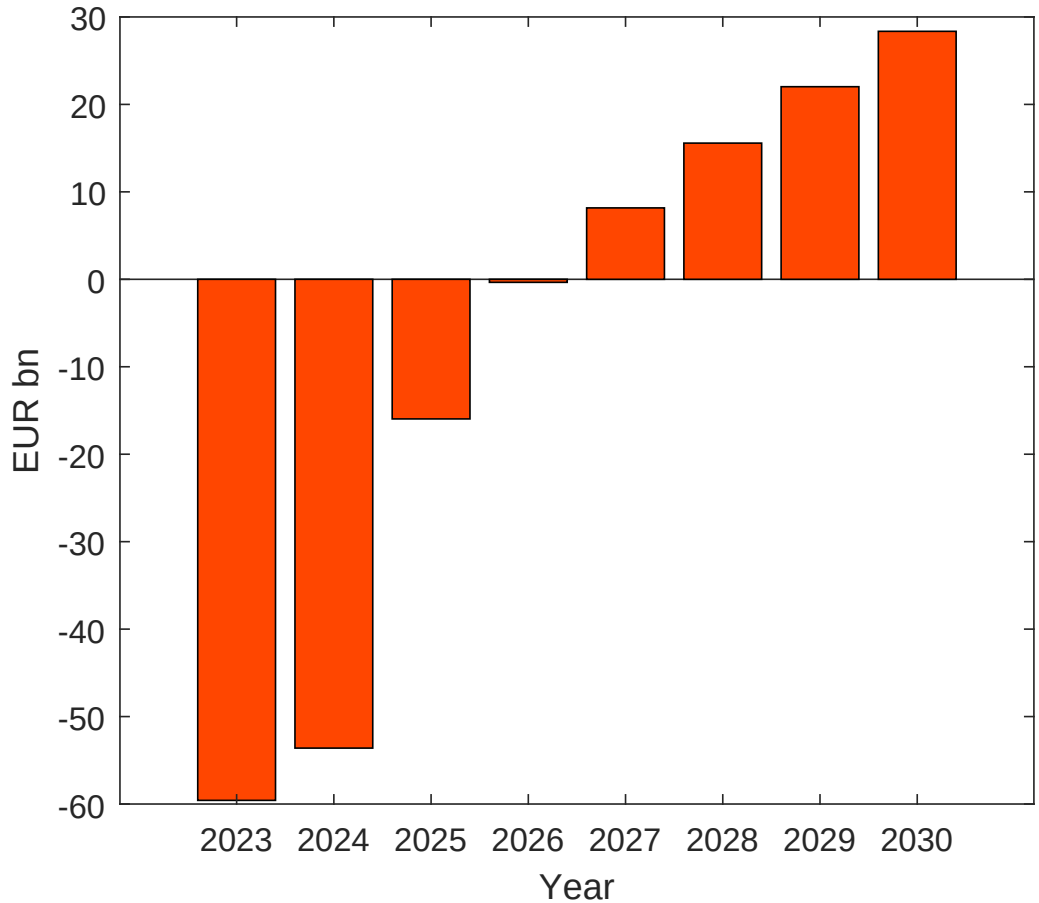
Figure: Model-based discounted ECB cash flow



Exercise 2: Ex-post inflation tax under a zero-loss interest rate policy

- **Baseline scenario:** ECB net income negative for 2023-2026, with ≈ €130bn cumulative losses

Figure: Model-based ECB net income path



Exercise 2: Ex-post inflation tax under a zero-loss interest rate policy

- Determine **excess inflation needed to eliminate accruing losses ex-post**
  1. Simulate income model for 2023–2030
  2. Derive paths for i_t, π_t **consistent w/ zero losses**
     - **Counterfactual income path:**

$$\check{y}_t = \max(y_t, 0) \tag{6}$$

     - **Counterfactual policy rate:**

$$\check{i}_t = \frac{P_t \check{y}_t - r_t^b B_t + i_t^*(A_t^n - L_t^n)}{A_t - L_t}. \tag{7}$$

     - **Counterfactual inflation:**

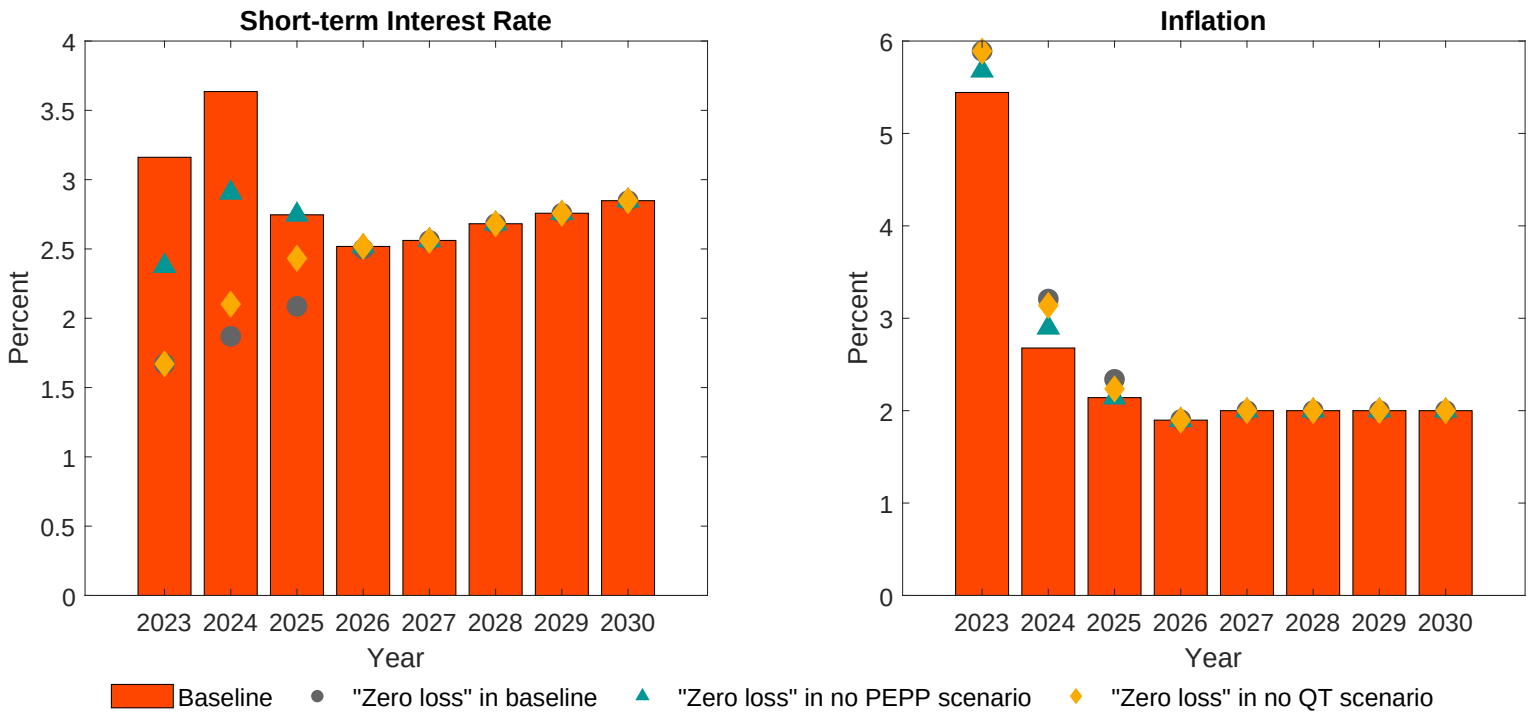
$$\tilde{\pi}_t = (\check{\pi}_t - \pi_t) = \alpha(\check{i}_t - i_t), \check{\pi}_t = \pi_t + \tilde{\pi}_t \tag{8}$$

- Conducted for baseline and alternative balance sheet scenarios
  - $\Rightarrow$ **Counteractual 1:** "No PEPP"
  - $\Rightarrow$ **Counteractual 2:** "No QT"

Exercise 2: Ex-post inflation tax under a zero-loss interest rate policy

- Steering monetary policy to avoid losses **requires lower policy rate/higher ex-post inflation**
  - ⇒ Inflation gap (baseline): 50/50/20/6bp for 2023-2026
  - ⇒ Interest rate gap (baseline): 150/170/60/0bp for 2023-2026

Figure: Projected and counterfactual interest rates and inflation



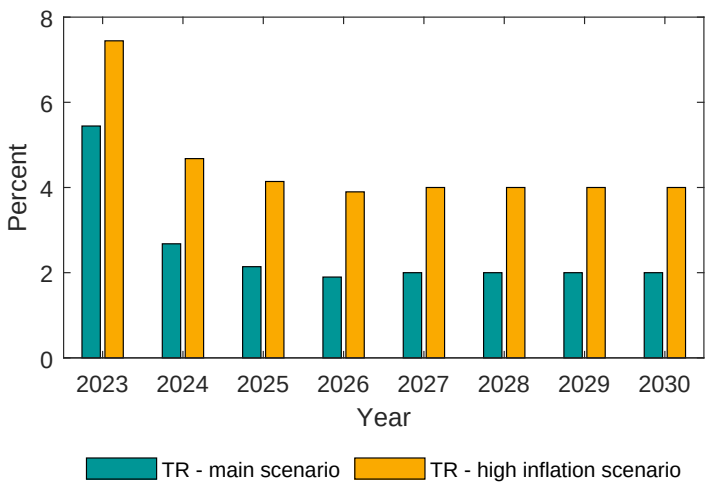
Exercise 3: Ex-ante loss reporting ability and monetary policy

- Define an **alternative high-inflation scenario**
- Derive **interest rate paths using a Taylor-type reaction function**(Coenen et al., 2019)

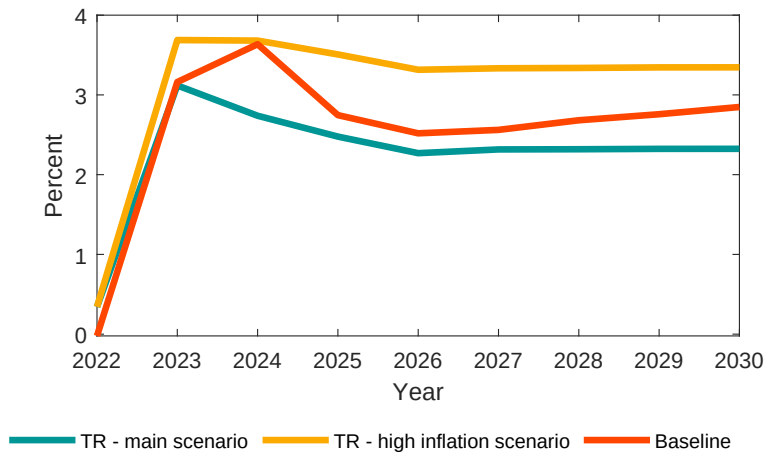
⇒ **Income implications of monetary policy responses to exogenous inflation paths**

Figure: Scenario HICP and nominal interest rate paths

(a) Scenario HICP inflation



(b) Nominal interest rates

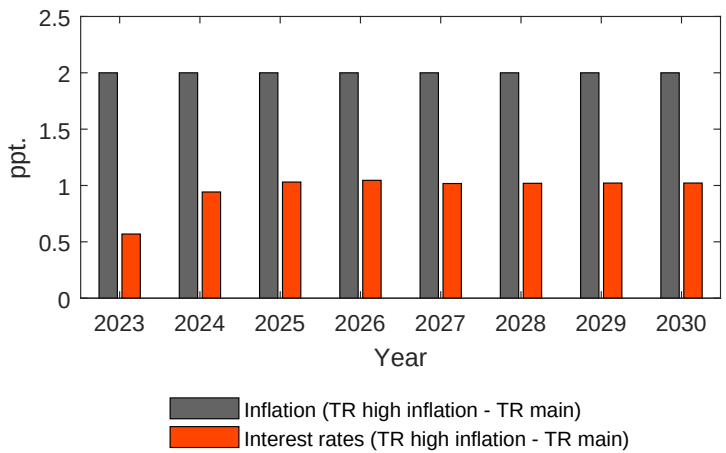


Exercise 3: Ex-ante loss reporting ability and monetary policy

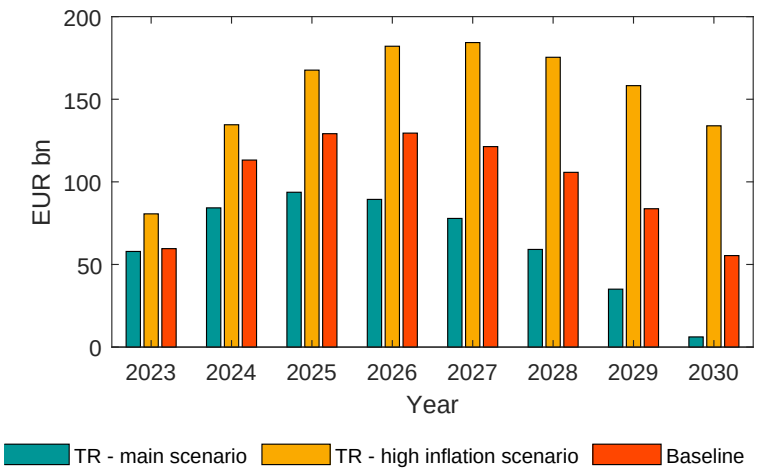
- **Tighter policy stance** in high-inflation scenario **reduces near-term profitability**
- **Possibility to cover losses** by withholding dividends **facilitates policy tightening**

Figure: Differences in interest rates, inflation, and deferred assets

(a) Interest Rates and Inflation



(b) Deferred Assets



Conclusion

- Recent decline in Eurosystem income attributed to a **temporary mismatch of interest income and expenses** due to rising policy rates
- **This paper: Impact of rising interest rates on central bank profitability** through the lens of a **granular Eurosystem net income model**
- **Key takeaways:**
  1. (Expected) losses not worrisome from NPV perspective
  2. Ability to report temporary losses is crucial for the independent conduct of monetary policy
     - $\Rightarrow$ Monetary policy space would be significantly limited ex-ante
     - $\Rightarrow$ Upward bias in tolerated ex-post inflation paths to raise "inflation tax income"
- **(Possible) future analyses:**
  - $\Rightarrow$ Nest net income model in general equilibrium environment
  - $\Rightarrow$ Strengthen monetary-fiscal link ("remittances channel")
  - $\Rightarrow$ Assess "credibility channel" associated with CB independence

Thank you very much for your attention!

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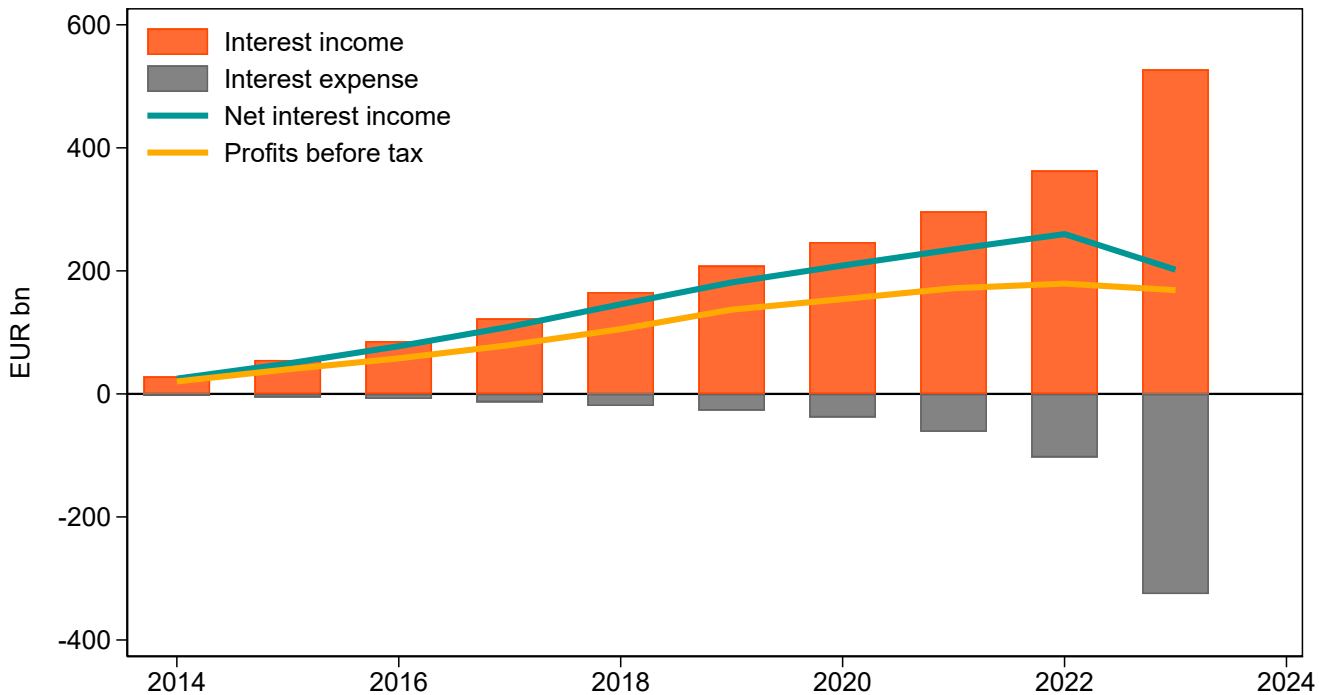
Introduction: Stylized facts

Figure: The ECB's policy rate and annual pre-tax profits

Notes: Figure shows the sum of the annual profits of the central banks of the euro area after transfers to/from the provisions for general risks, but before taxes and transfers from other reserves. The sample includes the 18 countries that had adopted the euro as of 2014 (AT, BE, CY, DE, EE, ES, FI, FR, GR, IE, IT, LU, LV, MT, NL, PT, SI, SK).

Introduction: Stylized facts

Figure: National central banks' cumulative interest income and profits



Notes: Cumulative interest income and expenses starting from 2014 for the national central banks of the 18 countries that had adopted the euro as of 2014 (AT, BE, CY, DE, EE, ES, FI, FR, GR, IE, IT, LU, LV, MT, NL, PT, SI, SK).

Data: Bond portfolio

- Project volume of bond holdings in line with **ECB's Survey of Monetary Analysts**
  - $\Rightarrow$ Consistent with Governing Council decisions on QT
- Approximate r_t^b with **publicly available data**
  - $\Rightarrow$ No public information on security-level portfolio composition or purchase yield
  - $\Rightarrow$ **However:** ECB discloses list of public and corporate sector securities held in **securities lending facility portfolios**
  - $\Rightarrow$ Start from this list and collect **average monthly yields since start of purchase programs**
- **Three-step approach** to approximate aggregate portfolio return

Data: Bond return - Step 1

- Account for **purchase pace over time**
  - $\Rightarrow$ **Assumption:** Weight of specific ISIN n in country c and asset class k high if traded during months of high purchase volumes
  - $\Rightarrow$ **Purchase-volume weighted average yield over purchase period (Oct 2014-Dec 2024)**
  - $\Rightarrow$ **Consider total volume of bond purchases in any given month during the life of each bond ($\textbf{Purchases}_{n,t}$), relative to total aggregate volume of purchases during the life of each bond ($\sum_{t=1}^{T} \textbf{Purchases}_{n,t}$)**
- Multiply with ISIN-specific yield $\text{Yield}_{n,c,k,t}$

$$\overline{\text{Yield}}_{n,c,k} = \sum_{t=1}^{T} \frac{\text{Purchases}_{n,t}}{\sum_{t=1}^{T} \text{Purchases}_{n,t}} \text{Yield}_{n,c,k,t} \tag{9}$$

Data: Bond return - Step 2

- Use purchase-volume weighted yield to approximate return on **aggregate QE portfolio holdings**
  - $\Rightarrow$ Weigh yields by **bonds' relative outstanding amount ($a_{n,t}$)** and the **number of months the bond was traded on the market during the purchase period (m_n)**
  - $\Rightarrow$ $\mathbf{a_{n,t}}$**:** market-neutral distribution of purchases across outstanding universe of bonds $\Rightarrow$ assume that **fraction of eligible bonds bought each month = fraction of that bond's outstanding amount in overall bond universe**
  - $\Rightarrow$ $\mathbf{m_n}$**:** assume that **security traded over whole purchase period has larger portfolio share**

$$r^b_{c,k,t} = \sum_i^I \frac{m_n a_{n,t}}{\sum_{n=1}^N m_n a_{n,t}} \overline{\text{Yield}_{n,c,k}} \tag{10}$$

Data: Bond return - Step 3

- **Weighting of public vs. private sector bonds**
- **Public bond purchases:** cross-country weighting according to **ECB's capital key** (ck_c)

$$r^b_{\text{public},t} = \sum_c^C ck_c r^b_{c,\text{public},t} \tag{11}$$

- **Corporate bond purchases;** distributed in proportion to eligible outstanding amounts $\Rightarrow$ no country weighting needed
- **Ratio of 92-8% of public vs. private bond purchases:**

$$r^b_t = 0.08 r^b_{private,t} + 0.92 r^b_{public,t} \tag{12}$$

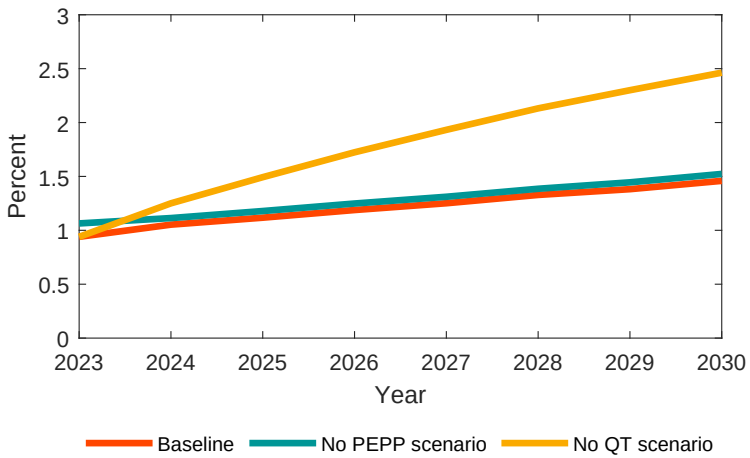
Data: Refinancing Operations (Repos)

- **TLTROs:** Second-largest ECB asset (€2.1tn peak in 2022, rapid decline since).
  - ⇒ Outstanding TLTRO-III operations expected to mature by 2024
  - ⇒ Average TLTRO-III borrowing rate per operation calculated considering:
    - Special interest rate periods (2020–2022)
    - November 2022 recalibration
    - Early bank repayments
    - €STR forward curve for policy rates until 2024
  - ⇒ Assumes 92% of banks meet lending benchmarks, borrowing at DFR (ECB, 2022)
  - ⇒ Feedback effects of policy rate changes on TLTRO-III returns omitted due to limited impact
- **MROs and LTROs:** Assume borrowing rates on future operations equal to MRO rate

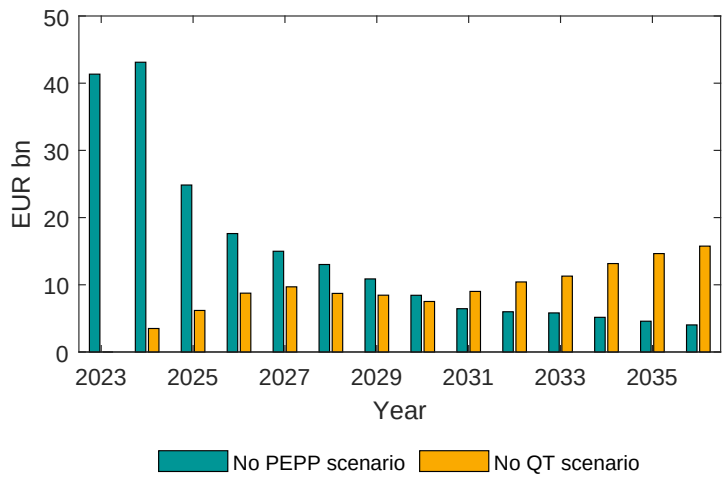
Exercise 2: Ex-post inflation tax under a zero-loss interest rate policy

Figure: Alternative balance sheet scenarios

(a) Projected bond portfolio returns



(b) Change in net income from baseline



Exercise 3: Ex-ante loss reporting ability and monetary policy

- Taylor rule as in NAWMII (Coenen et al., 2019):

$$\hat{i}_t = \rho_i \hat{i}_{t-1} + (1-\rho_i)\left[\rho_r + \phi_\pi \hat{\pi}_t + \phi_y \hat{y}_t + \phi_{\Delta\pi}(\hat{\pi}_t - \hat{\pi}_{t-1}) + \phi_{\Delta y}(\hat{y}_t - \hat{y}_{t-1})\right] \tag{13}$$

Table: Calibration Taylor (1993)-type monetary policy rule

Parameter	**Description**	**Value**
ρ_i	Interest rate smoothing	0.2325
ϕ_π	Inflation response	2.74
ϕ_y	Output gap response	0.03
$\phi_{\Delta\pi}$	Inflation change response	0.04
$\phi_{\Delta y}$	Output gap change response	0.1
ρ_r	Productivity growth component	0.94
$\overline{\pi}$	Inflation objective (%)	2
$\bar{i}$	Long-run nominal interest rate (%)	4