Credit strikes back: The Macroeconomic Impact of the 2022-23 ECB Monetary Tightening and the Role of Lending Rates

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Outline

Introduction

Empirical Framework

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Conclusions

Motivation

- In the summer of 2021, euro-area **inflation** woke up after many years
- Exceptionally strong **monetary policy response** by the ECB
  - Announced end of the net asset purchases under PEPP (starting March 2022) and gradual reduction of those under APP (starting 2023 Q2)
  - July 2022 – September 2023: policy rates increased by 450 basis points
- Strong and rapid **pass-through** to composite cost of borrowing on new loans to non-financial corporations (NFCs)

Goal

- Comparative analysis of monetary policy tightening cycles of 2005-07 and of 2022-23. Focus on behaviour of **banks' lending policies**
- Evaluate **determinants of increase in lending rates** in 2022-23, distinguishing between impact of monetary policy and rise in banks' lending margin
- Quantitative assessment of **macroeconomic impact** of 2022-23 tightening, using BVAR and DSGE models

Connections to the literature

- **Monetary Transmission Mechanism** in the euro area
  Peersman and Smets (2003); Lenza, Pill and Reichlin (2010); Altavilla et al. (2019); Altavilla et al. (2020); Jarocinski and Karadi (2020)

- **Credit channel**
  Gerali et al. (2010); Altunbas et al. (2014); Giannone et al. (2019); Conti et al. (2023)

- **Survey-augmented models**
  Bassett et al. (2014); Ciccarelli et al. (2015); Del Giovane et al. (2011, 2017), Altavilla et al. (2019); D'Amico and King (2023)

Preview of results

- Compared to the 2005-07 tightening, in 2022-23 key interest rates increased much more and at **unprecedented** speed. **Strong transmission** of policy rate hikes to credit markets
- **Banks' risk perception** was a major driver of lending rates in 2022-23 and contributes to explaining stronger transmission of monetary policy to the cost of credit
- 2022-23 tightening has (and is still having) **large macroeconomic effects**. Banking channel played a substantial role

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Data

Quarterly dataset starting in 2003:Q1

- **Macro** variables
- **Financial** variables
- **Lending rates and volumes**
- **Survey data from the Euro Area Bank Lending Survey**

Methods

1. **Simple pass-through equations**
   - Out-of-sample forecasts
   - One-step-ahead forecasts
2. **Medium-scale Bayesian VAR models** (Giannone et al., 2019; Crump et al., 2024; Conti et al., 2023). Counterfactual scenarios to assess:
   - Determinants of increase in lending rates
   - Banks' risk perception from Eurosystem Bank Lending Survey (BLS) responses
   - Macroeconomic effects of 2022-23 tightening
3. **DSGE model with financial frictions** (Gerali et al., 2010)

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Lending rates: pass-through equations

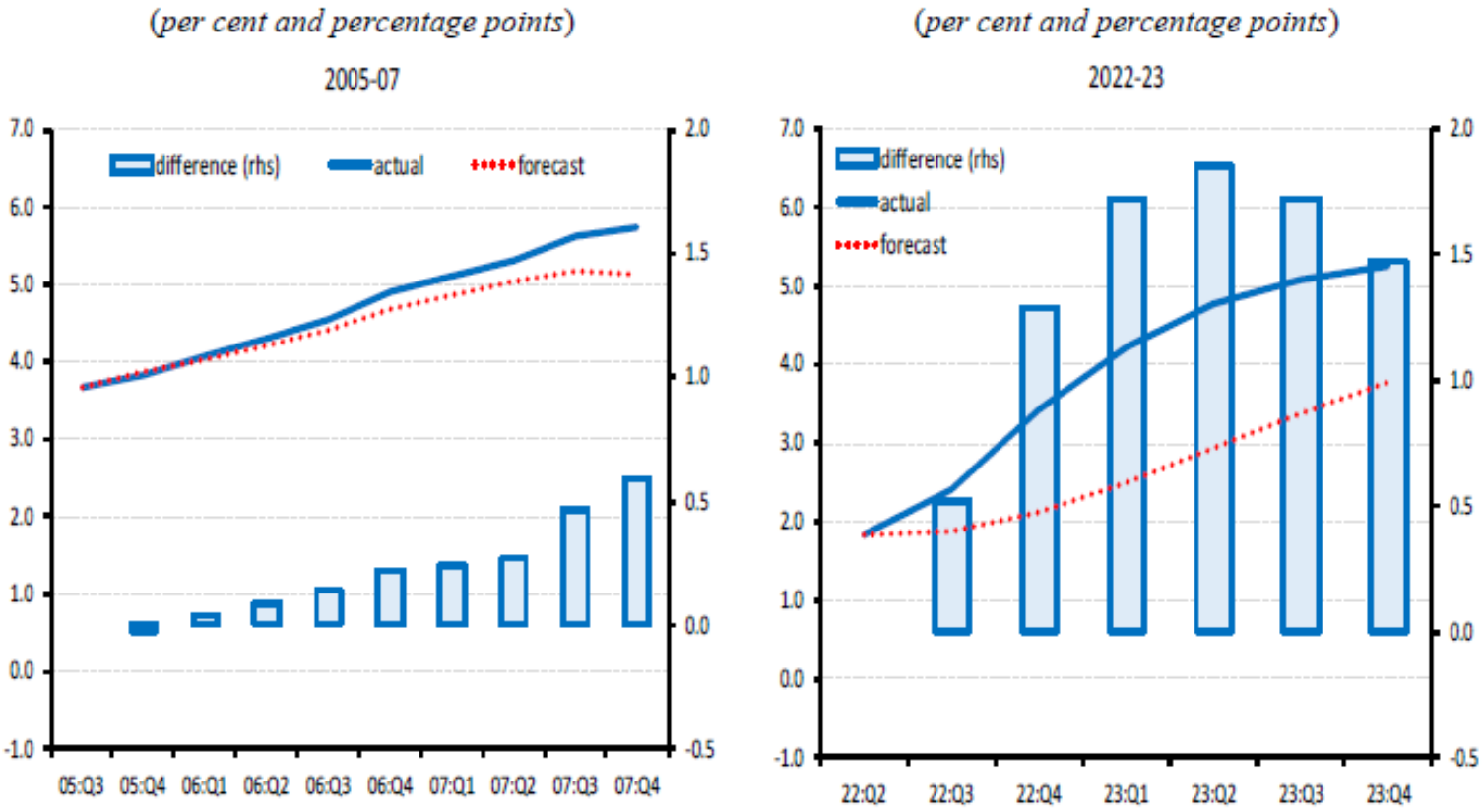
- Estimate the following pass-through equation:

$$i_t^L = \alpha + \alpha_{GFC} + \beta i_t^{ON} + \gamma i_{t-1}^L + \varepsilon_t$$

- Sample:
  - 1999:Q2–2005:Q3 (2005–07 tightening)
  - 1999:Q2–2022:Q2 (2022–23 tightening)
- i_t^L : composite lending cost to NFCs
- α_{GFC}: dummy = 1 in 2008:Q4 and 2009:Q1 (Global financial crisis)
- i_t^{ON}: overnight rate

Lending rates: large out-of-sample forecast errors

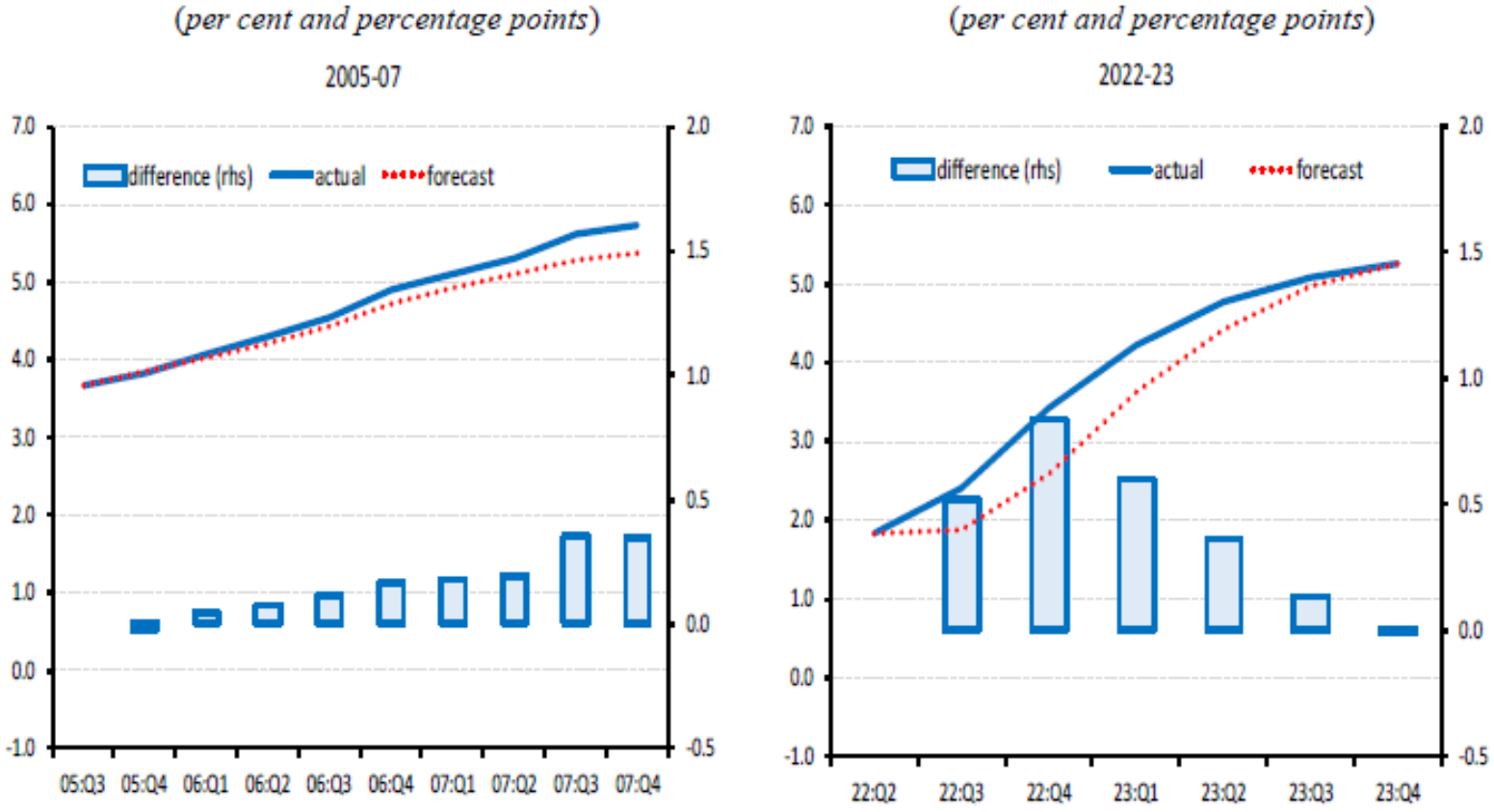
FIGURE 2. LENDING RATES TO NFCS IN THE 2005-07 AND 2022-23 TIGHTENING CYCLES: OUT-OF-SAMPLE FORECASTS



Source: authors' calculations based on ECB data. *Notes*: the sample period goes from 1999:Q2 to 2005:Q3 in the case of the 2005-07 cycle, and from 1999:Q2 to 2022:Q2 in the 2022-23 cycle case. Out-of-sample forecasts are produced starting in the quarter immediately before the first rate hike in each cycle (2005:Q3 and 2022:Q2, respectively).

Lending rates: large one-step-ahead forecast errors

FIGURE 3. LENDING RATES TO NFCS IN THE 2005-07 AND 2022-23 TIGHTENING CYCLES: ONE-STEP AHEAD FORECASTS

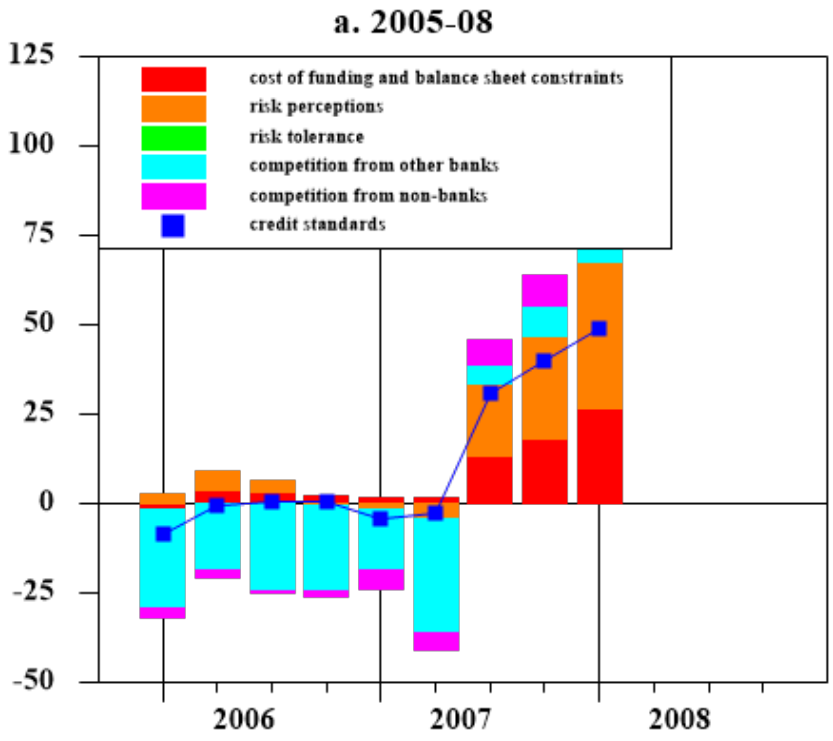


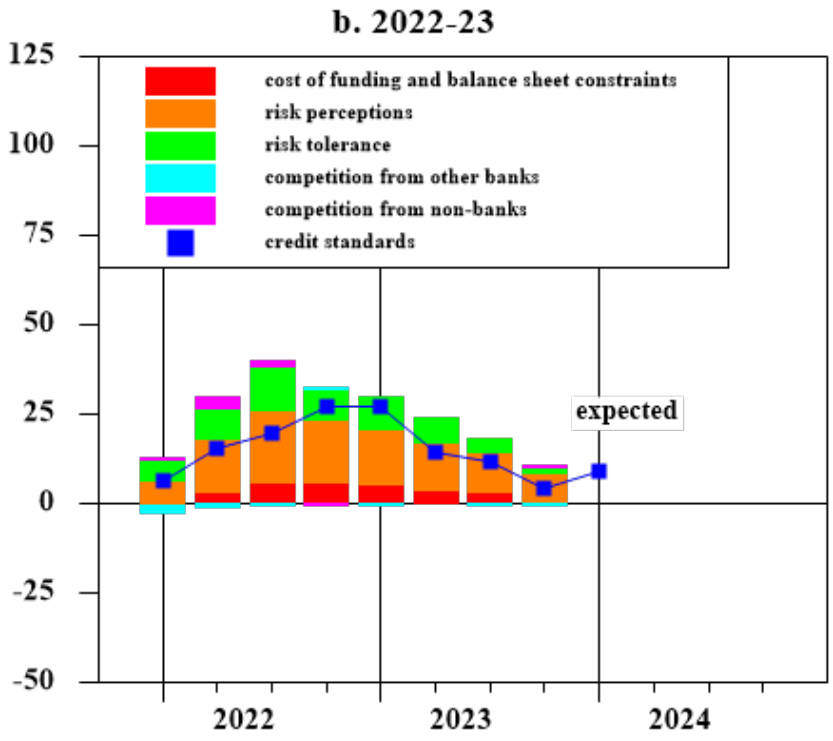
Source: authors' calculations based on ECB data. *Notes*: see note to Figure 1.

Explaining lending rates dynamics

- Pass-through equations: large forecast errors in 2022–23, but not in 2005–07
- One main differences across the two tightening cycles: **banks' risk perception**, as reported in BLS data
- **2005–07**: banks competed for granting loans to NFCs and households in a context of **limited perception of borrowers' riskiness**
- **2022–23**: **perception of borrowers' riskiness** led to a progressive tightening of credit standards already in late 2021
- Other possible factors: banks' liquidity availability; quantitative tightening

Banks' risk perception from BLS data





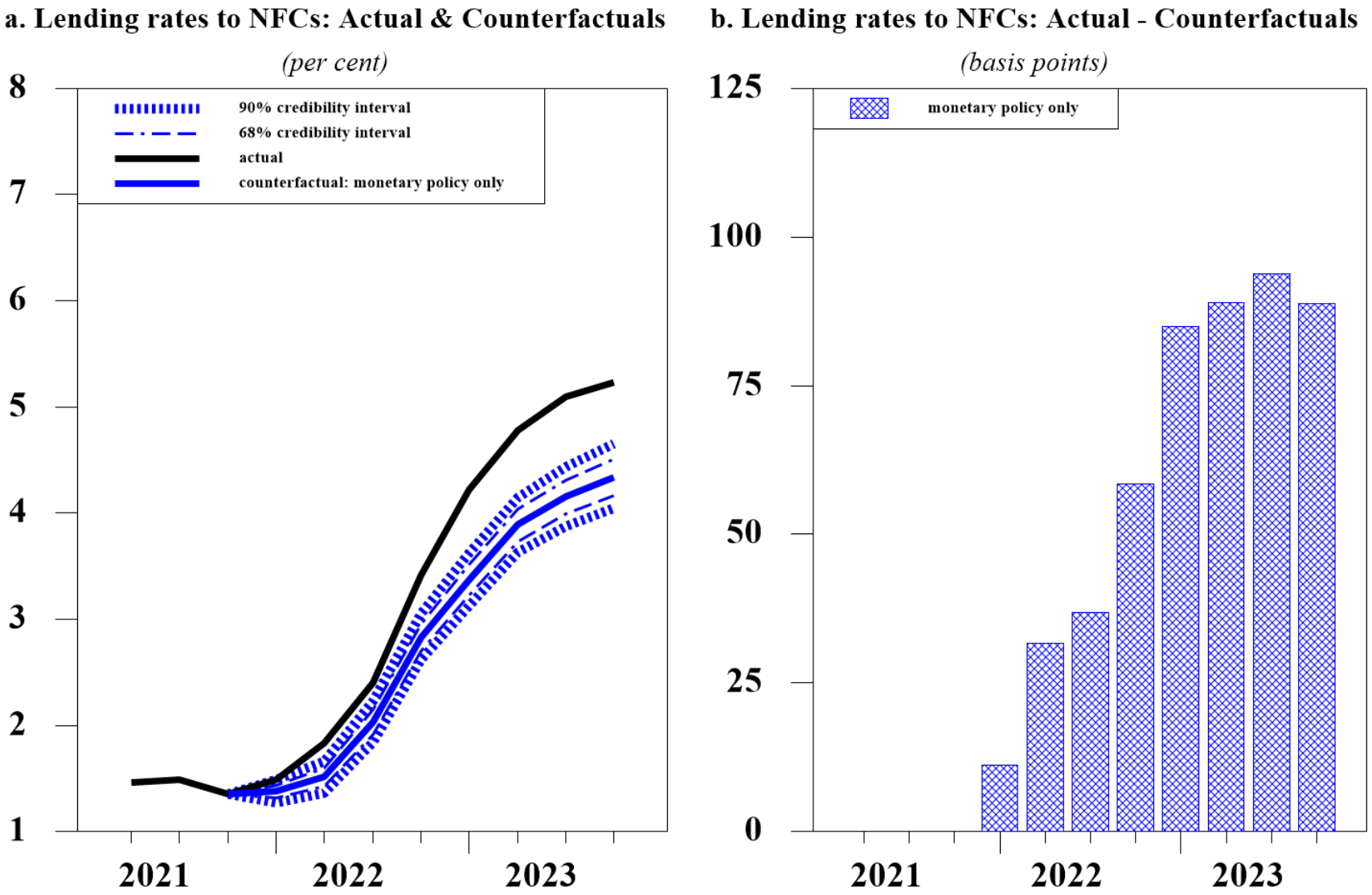
2022–23 tightening transmission to lending rates

- Bayesian VAR specification:

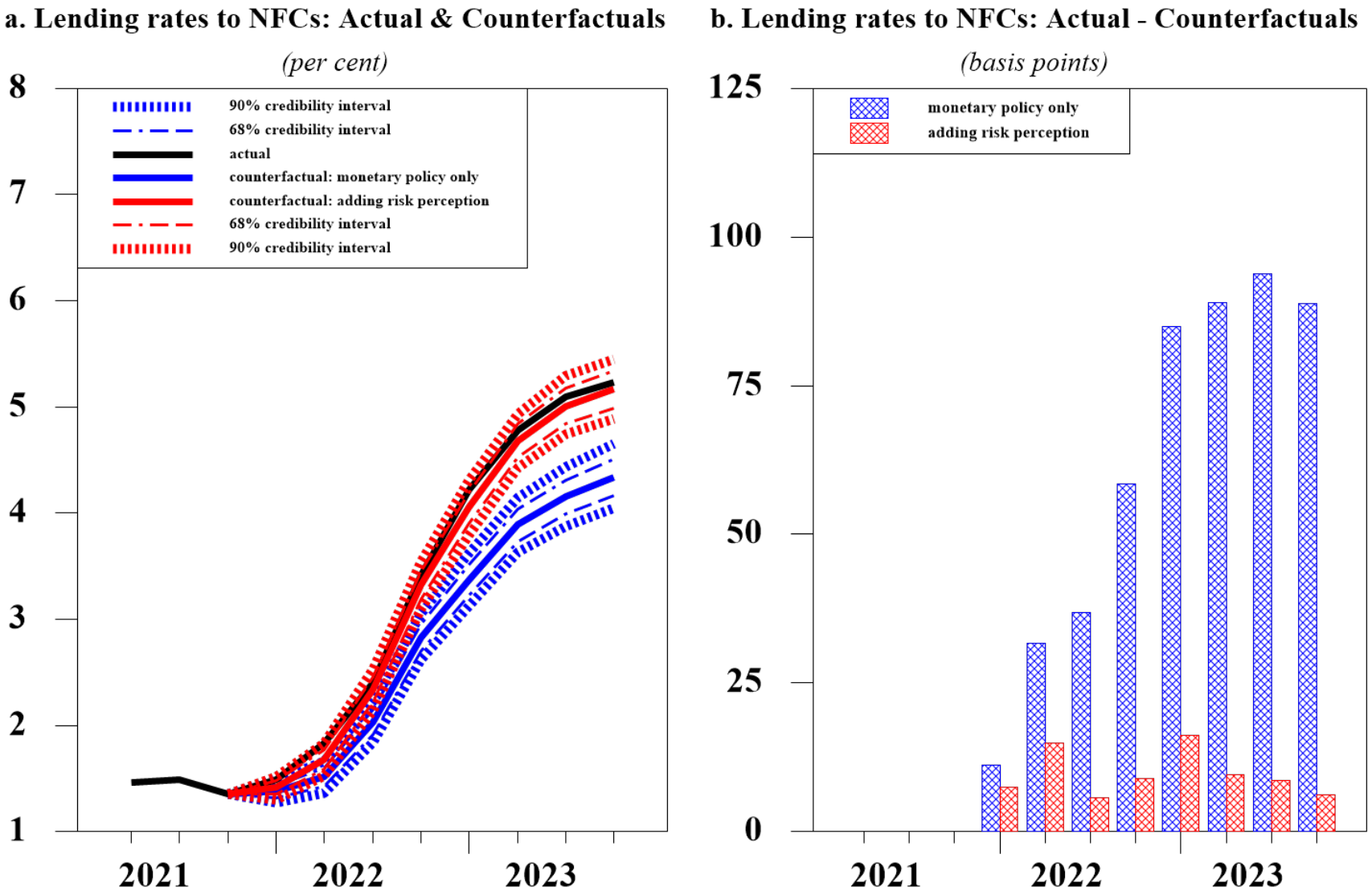
$$Y_t = c + B(L)Y_{t-1} + u_t$$

- Sample: 2003:Q1 – 2021:Q4. $L = 4$. Minnesota prior
- Y_t includes alternatively 1–3 or 1–4:
  1. composite cost of borrowing to NFCs
  2. 3-month Euribor rate
  3. 10-year IRS
  4. **BLS risk perception factor**
- **Counterfactual** exercise:
- Feed estimated model with **realized** path of **2–4** rates from 2022:Q1 to 2023:Q4 and compute **conditional forecast** for lending rates (**1**)
- Repeat estimation and conditional forecast including (**4**)

2022–23 tightening transmission to lending rates



2022–23 tightening transmission to lending rates



2022–23 tightening transmission to lending rates

- **Robustness** analysis
  - Drivers of credit supply tightening:
    - Bank competition
    - Margins on riskier loans
    - Risk perception and bank competition
  - Priors setup: replace Minnesota with sum-of-coefficients prior, which allows to better underpin cointegration relations (see Giannone et al., 2015, Aastveit et al., 2017)
  - Exclude Covid-19 period from estimation
  - Short and long-term components of the composite cost of borrowing

2022–23 tightening: macroeconomic effects

- Assess effects of 2022–23 tightening on euro-area **inflation** and **output growth**
- Scenario analysis in a **BVAR** augmented with economic activity and consumer prices
- Simulations of a **DSGE** model with banking sector for the euro area (Gerali et al., 2010, re-estimated)

Scenario analysis in the BVAR

- Methodology: compare two alternative BVAR-based conditional forecasts, with and wihtout monetary policy tightening
- Interpret difference as an impulse response to the tightening shock (see Altavilla et al. 2016 and Crump et al. 2024)
- Estimate larger BVAR including:
  - Real GDP
  - Harmonized Index of Consumer Prices (HICP)
  - 3-month €STR and the 10-year IRS rate
  - lending rates to NFCs
  - banks' risk perception from BLS
  - stock prices
  - oil prices
- Sample: 2003:Q1 -– 2022:Q2. Conditional forecasts over 2022:Q3 –2024:Q4

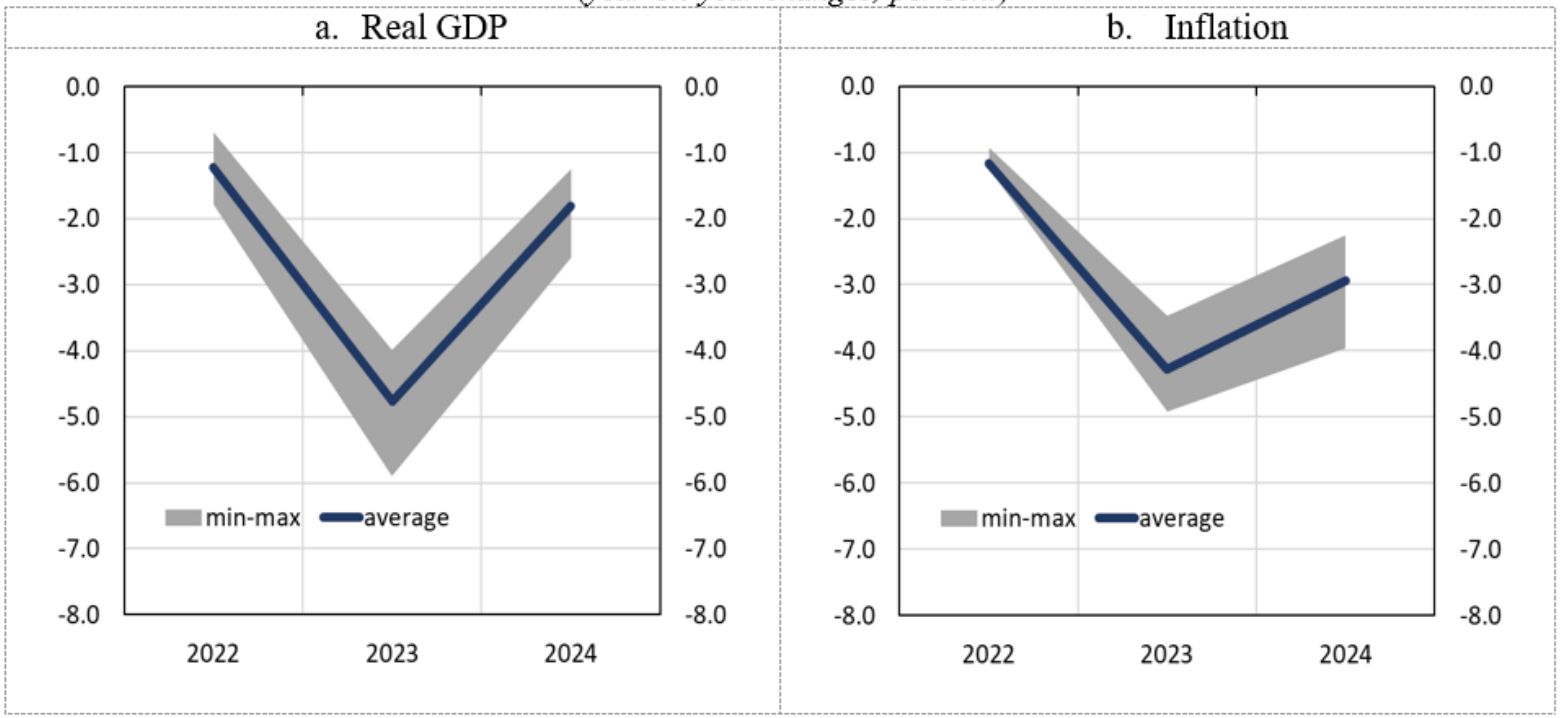
Scenario analysis in the BVAR

- Assumptions

1. **Shift in the path of short-term market rates** : 3-month rate increases by about 400 bps over 3-year projection horizon under tightening relative to no-tightening scenario
2. Monetary policy shocks – **not central bank information shocks** – drive the shift in the path of short-term market rates
3. **No other domestic drivers of the tightening beyond monetary policy**
4. **Same path of global factors over the two scenarios**

Impact of the ECB 2022-23 tightening: BVAR

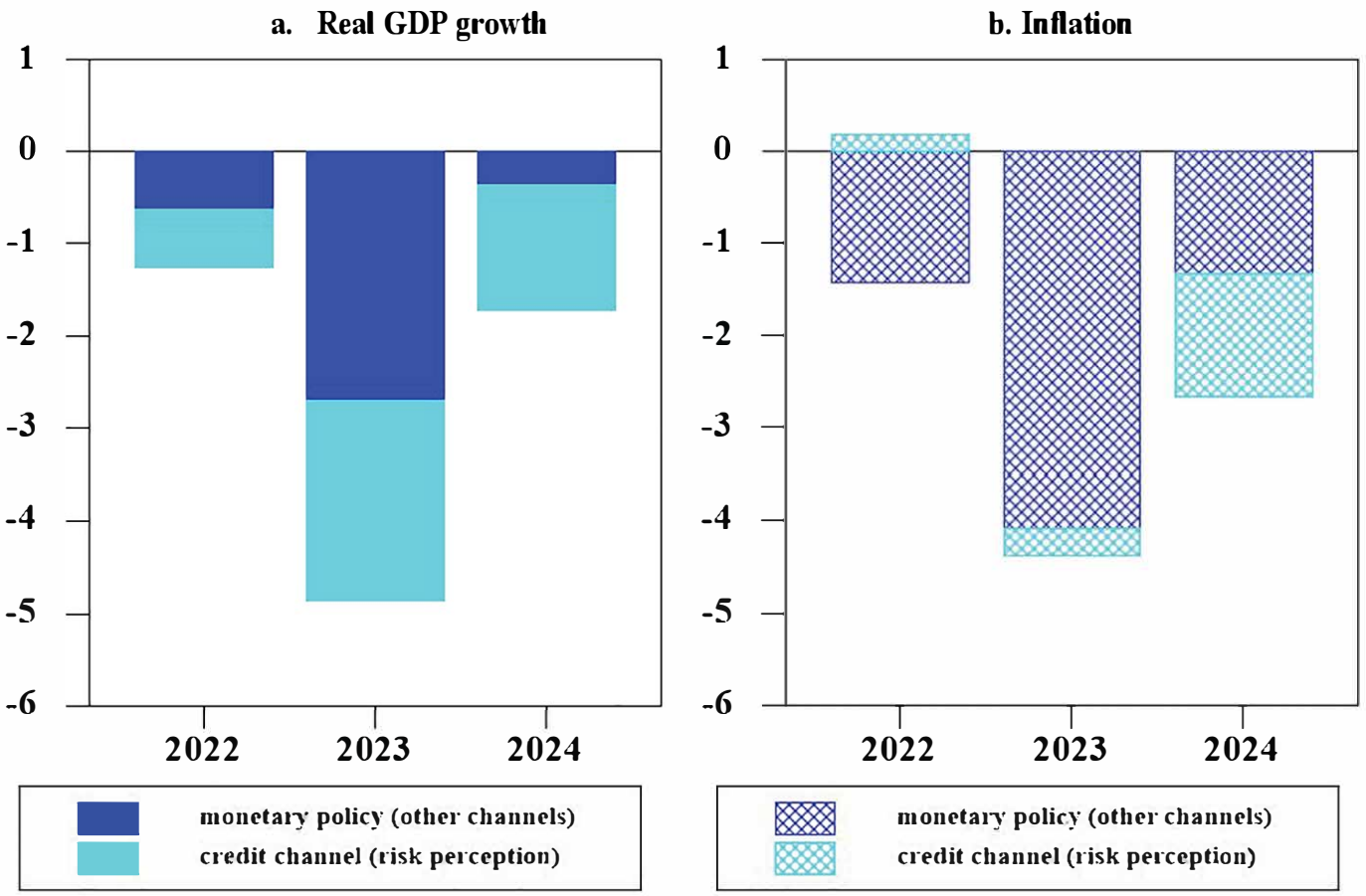
FIGURE 8. MACROECONOMIC EFFECTS OF THE 2022-23 TIGHTENING IN THE BVAR MODEL
(*year-on-year changes; per cent*)



Source: authors' calculations based on the BVAR model. *Notes*: Simulations based on the posterior mean of the distribution of the parameters. The blue line refers to the average impact across six simulations the baseline and the five alternative specifications); the grey shaded areas represent the intervals defined by the minimum and maximum across simulations.

- estimates in the ballpark of ECB exercises using DSGE models (see also next Section)
- as for BVARs, results consistent with D'Amico and King (2023) for US economy

Role of credit channel: BVAR



DSGE model-based analysis

- DSGE model in Gerali et al. (2010): imperfectly competitive banking sector
- Update **Bayesian estimation**
- Two alternative estimation samples (Covid-19 and 2021-22 energy shocks):
  - 1998:Q1 –2019:Q4
  - 1998:Q1 –2023:Q4
- **Detrending**: 3 alternative methods:
  - 2-sided Hodrick-Prescott (HP) filter. Drawback: imposes patterns that could not be recognized in real time (Hamilton, 2018)
  - 1-sided HP filter. Problem: end-of-sample filtered values very different from those in the middle (Hamilton, 2018)
  - Revised Beveridge-Nelson decomposition (see Kamber, Morley and Wong, 2018)

DSGE model-based analysis

- Model-based simulations
- **Monetary policy shocks**: unexpected shocks to Taylor rule, to reproduce difference between market expectations over overnight rate path as of September 2023 (last hike) and those of December 2021 (tightening start)
- Imperfect pass-through from policy rate to lending rates
- To allow the model to reproduce observed path of lending rates to NFCs, also include **shocks to banks' markup on lending rates**
- Such markup shocks may help capture, among other drivers, increase in banks' risk perception, not explicitly included in the model

DSGE model-based analysis

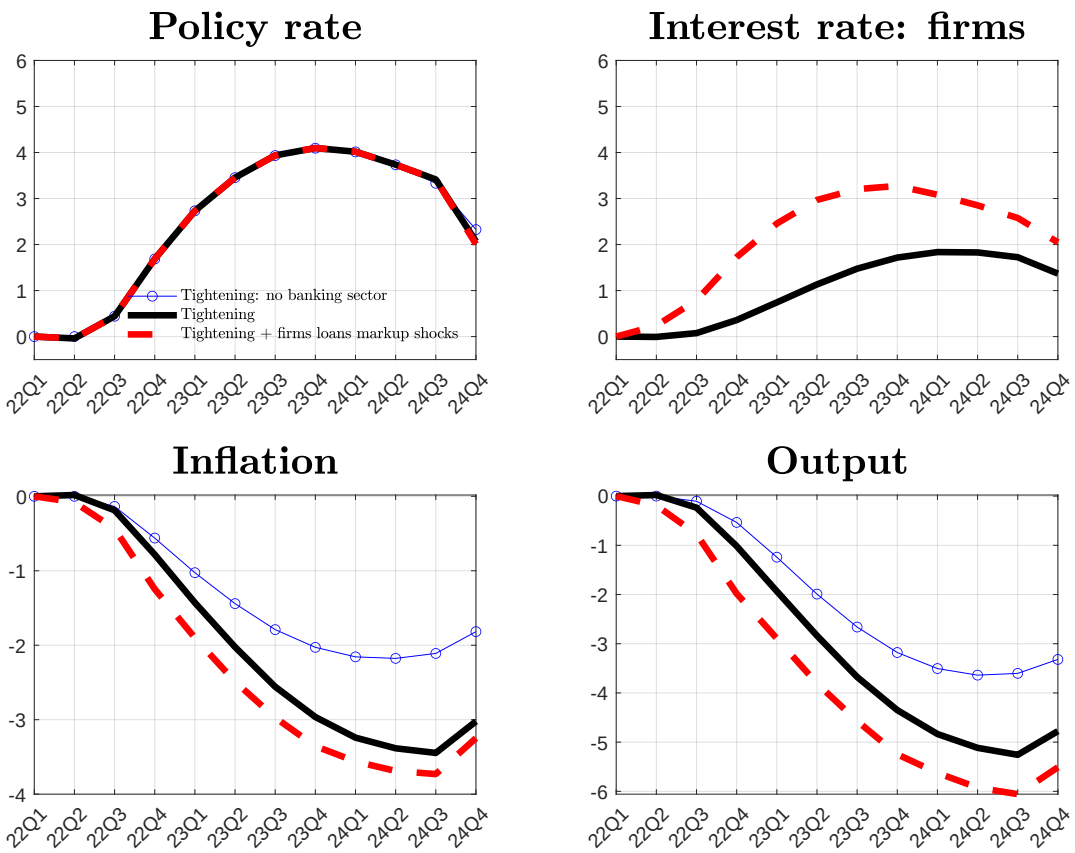
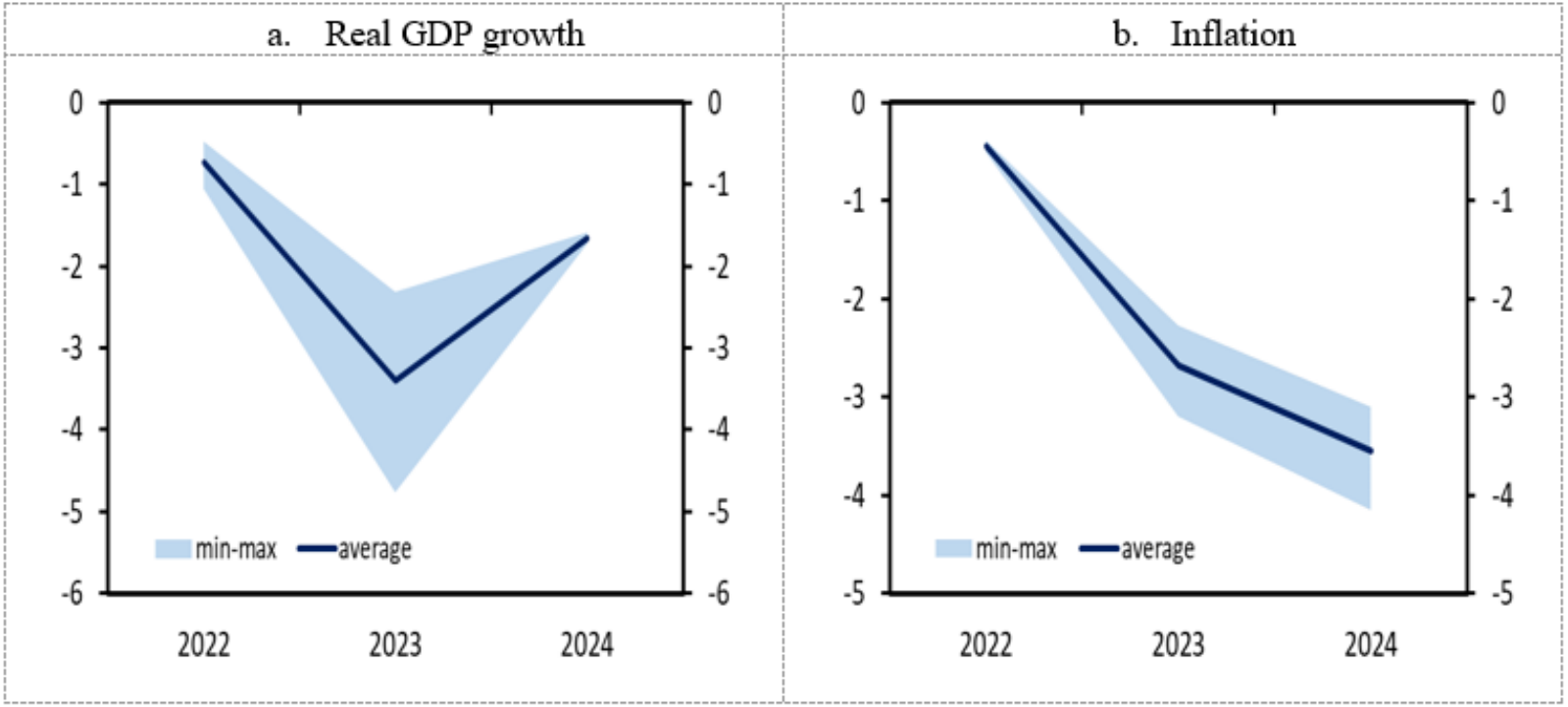


Figure: Source: authors' calculations based on the model in Gerali et al. (2010). Notes: Each line corresponds to the average effect across six different model parameterizations, each corresponding to an alternative combination of detrending methods and sample periods. In each case, simulations are performed based on the posterior mean of the distribution of the parameters. The policy rate, interest rate on loans to firms, and inflation are in annualized percentage point deviations from the baseline. Output is in percent deviations from the baseline.

Impact of the ECB 2022-23 Tightening: DSGE

FIGURE 11. MACROECONOMIC EFFECTS OF THE 2022-23 TIGHTENING

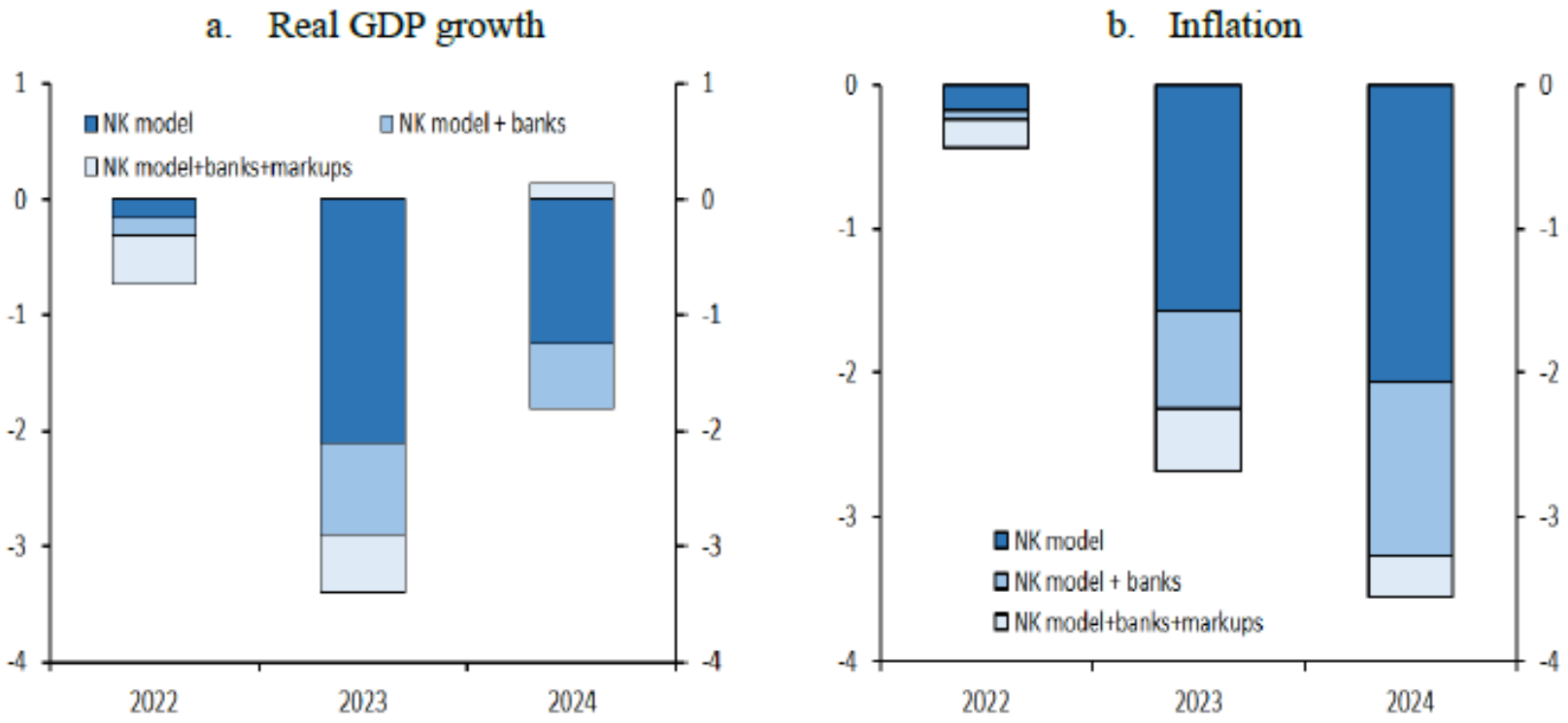
(year-on-year changes; per cent)



Source: authors' calculations based on the model in Gerali et al. (2010). *Notes*: Simulations based on the posterior mean of the distribution of the parameters. The blue line refers to the average impact across the six simulations; the light blue shaded areas to the intervals defined by the minimum and maximum across the simulation.

Role of credit channel: DSGE

FIGURE 12. MACROECONOMIC EFFECTS OF THE 2022-23 TIGHTENING: THE ROLE OF THE BANKING SECTOR
(*percentage point*)



Source: authors' calculations based on the model in Gerali et al. (2010). *Notes*: each bar measures the average effects of shocks to the monetary policy and lending rates in the three versions of the model that are considered.

Discussion

- Possible confounding factors
- Large liquidity available to firms and households' savings could contribute to a reduction in recourse to bank credit
- This may point to a lower-than-usual strength of banking channel, but the magnitude of such effect is difficult to quantify
- Evidence of higher frequency of price adjustments in the face of the large energy shocks (Cavallo et al., 2024). If so, impact of tightening on price inflation likely to be more frontloaded, output decline more muted
- However, relative contribution of banking channel arguably unaltered, if nominal price rigidities do not directly affect banks' lending decisions
- Labour market resilience may cushion macroeconomic impact of 2022-23 tightening

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Concluding remarks

1. Compared to the 2005-07 tightening cycle, in 2022-23 key interest rates increased much more and at unprecedented speed
2. **Stronger-than-expected transmission of policy rate hikes to lending rates**
3. **Banks' risk perception was a major driver** of lending rates in 2022-23
4. **Substantial effect of the ECB monetary tightening on output and prices**
5. Range of results broadly in line with the one reported by ECB using similarly constructed model-based simulations (ECB, 2023)
6. **Banking channel significantly contributed to these macroeconomic effects**
7. Future directions:
   - what about households?
   - larger BVAR (labor markets, inflation expectations...)?
   - ...