Aligning the stars: Monetary-fiscal coordination when debt is rising and inflation is falling

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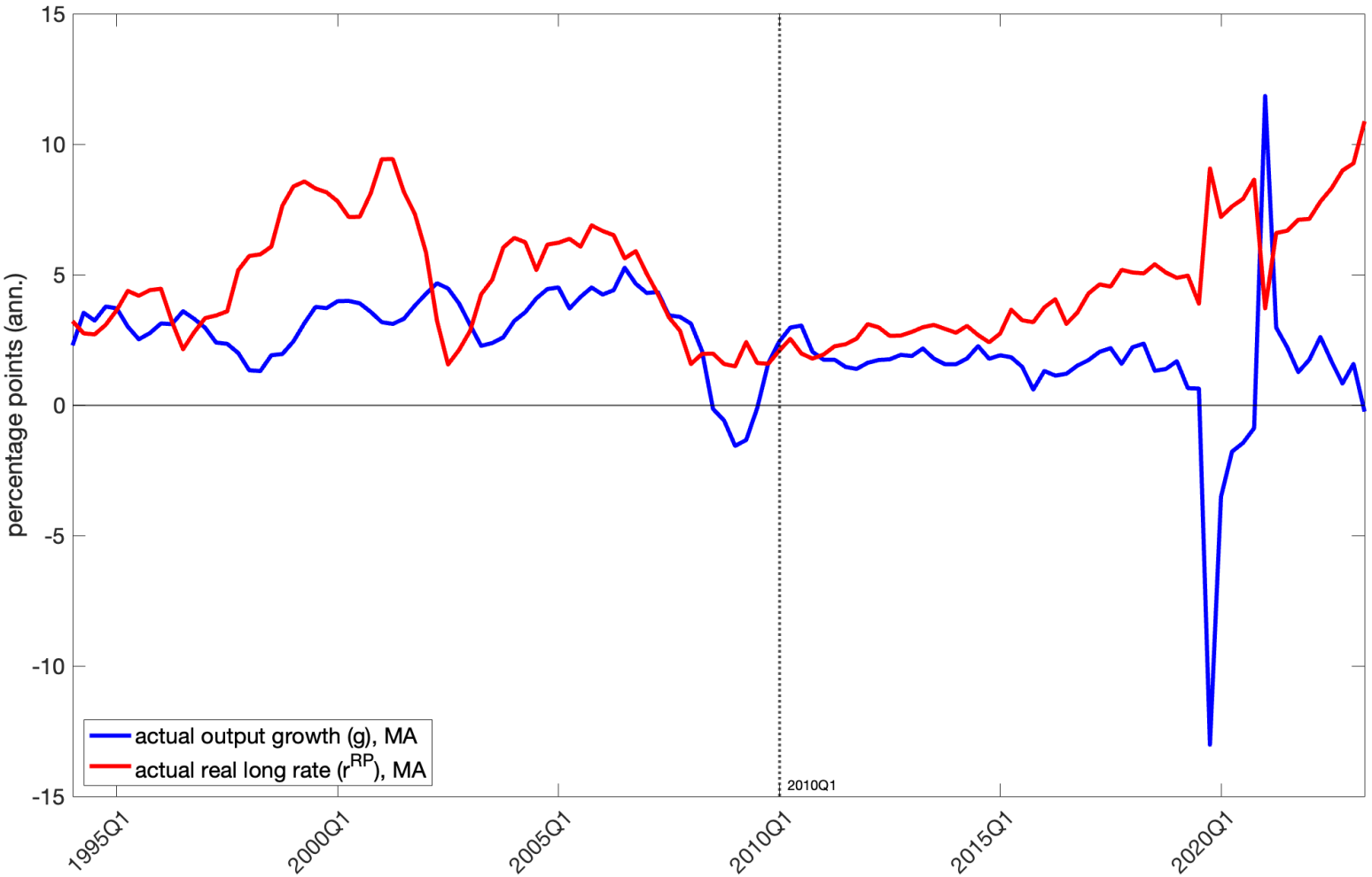
Overview

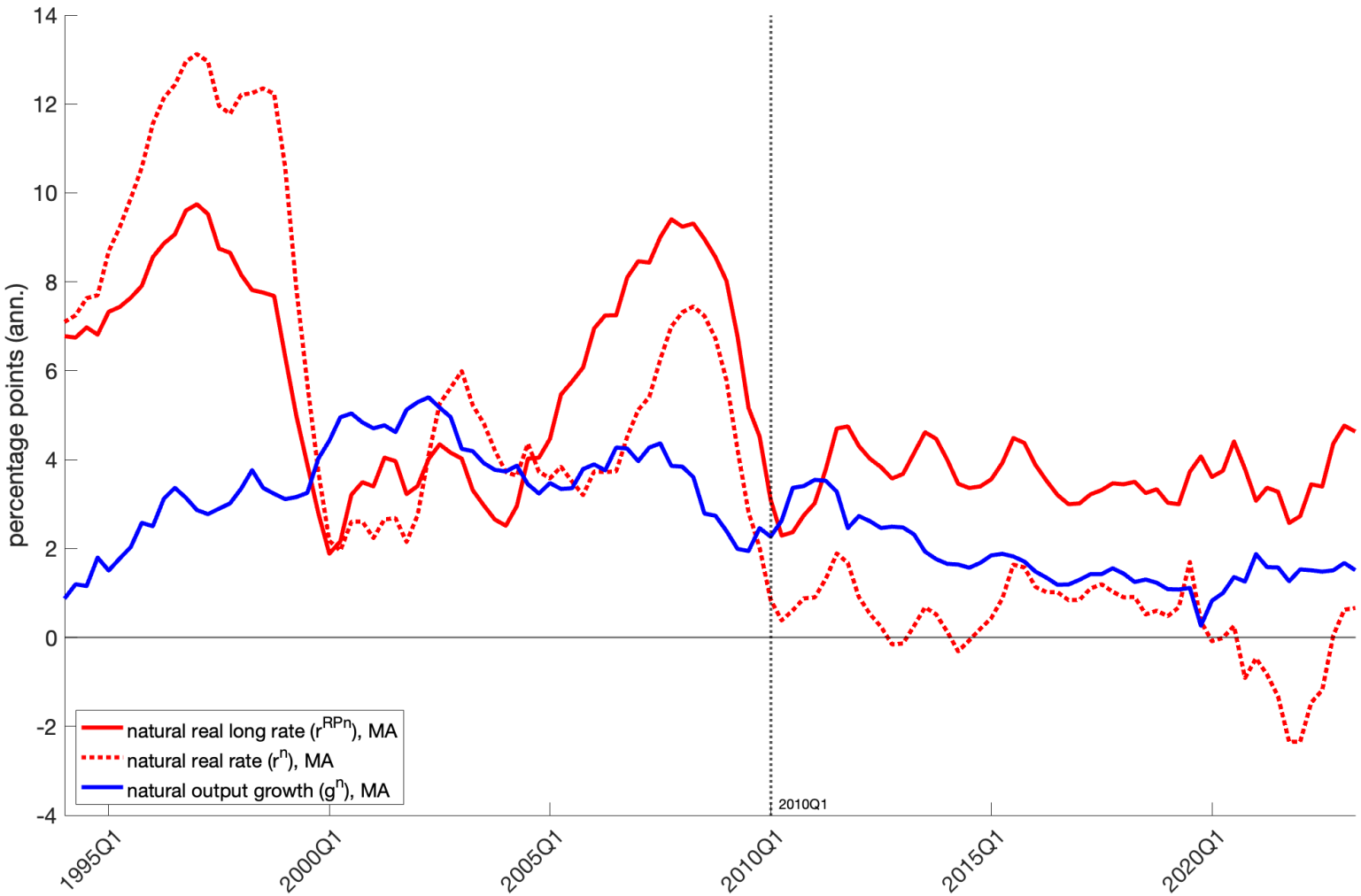
Motivation: $r > g$

- How can we think about fiscal-monetary coordination when fiscal sustainability is under pressure? (Havemann and Hollander, 2024)



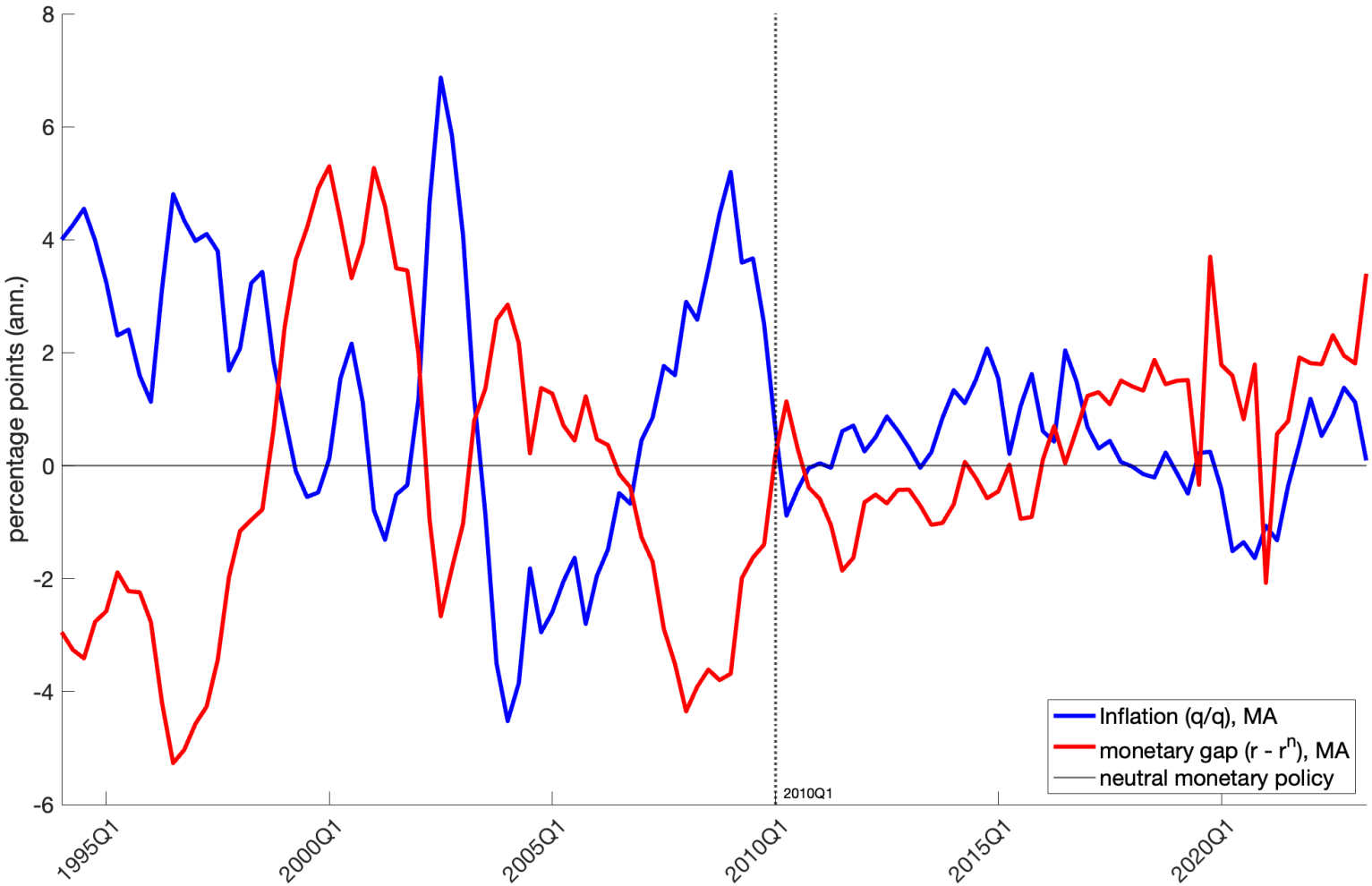
Motivation: $r^{RP} > r > g$

- Persistently high risk premium threatens fiscal sustainability and growth



Motivation: $r - r^n \rightleftharpoons \pi - \bar{\pi}$

- Monetary policy appears constrained:
  $\rho(r - r^n, \pi - \bar{\pi})$ from -0.78 to -0.33



Aims

- What is the **fiscal-neutral** interest rate ('fiscal r-star') and how does it relate to the **natural** interest rate ('monetary r-star')?
- How does the **monetary-fiscal gap** evolve over time?
- Do fiscal pressures constrain monetary policy? (**fiscal dominance**)
- Should monetary policy respond to fiscal pressures? (**optimal policy coordination**)

Quick detour: terminology definitions

- **Fiscal dominance**: 'active fiscal policy' or 'fiscal profligacy', whereby the primary balance tends to be set exogenously to the debt level. (Bohn, 1995, 2007)
- Under an active fiscal policy regime, the debt-stabilising real interest rate ('fiscal r-star') serves as a better indicator of debt sustainability relative to the debt-stabilising primary balance. (Bolhuis et al., 2024)
- **Financial repression**: defined as any policy through which the government uses the banking sector to avoid default.[1] (Jeanne, 2025)
- Optimal financial repression progresses through successive stages with increasing levels of distortion. It can yield substantial welfare gains but is a policy of last resort. (Jeanne, 2025)

Quick detour: definitions of interest rates

Market rates (r^{RP} and r): Observable short- and long-term interest rate relevant for monetary policy and government debt servicing costs.

$$\begin{aligned} i_t &= \phi_i i_{t-1} + (1-\phi_i)\left(\bar{\pi}_t + \phi_\pi \tilde{\pi}_t + \phi_y \tilde{y}_t\right) + \varepsilon_t^i \\ i_t^{RP} &= i_t + \underbrace{\gamma_B\left(b_t - y_t\right) + \varepsilon_t^{RP}}_{\text{risk premium } (RP_t)}, \quad \text{where } i_{t-1} = \pi_t + r_{t-1}. \end{aligned}$$

Monetary r-star (r^n): the flexible price equilibrium ('neutral' or 'natural') interest rate consistent with inflation at target and output at potential.[2]

$$\tilde{\pi}_t = \tilde{y}_t = 0\ , \quad r_t \to r_t^n$$

Fiscal r-star (r^f): the fiscal-neutral interest rate which ensures the debt-to-GDP ratio remains stable.

$$r_t^f \approx g_t + pb_t - b_{t-1}$$

Key tension: $r_t \neq r_t^f$ creates a conflict between inflation control and debt sustainability.

Contribution

Bolhuis et al. (2024):

1. Single equation estimations based on ITGB constraint.[3]
2. Panel of 16 Advanced Economies over 140 years.
3. Comprehensive literature review and conceptual framework for 'fiscal r-star' with broad-ranging policy implications and suggestions for future research.

Our contribution:

1. Estimate the fiscal-neutral rate in a DSGE model: well-suited for policy analysis.
2. Focus on an inflation targeting emerging market economy with fiscal tensions
3. Explicitly evaluate the usefulness of the monetary-fiscal gap for guiding policy analysis.

   Identify optimal simple rules under monetary-fiscal misalignment.

Main Findings

The monetary-fiscal gap is relevant for policy analysis in South Africa:

- Monetary policy can be too loose/tight from a fiscal viewpoint.
- Evidence that the monetary authority (indirectly) takes the monetary-fiscal gap into account
- Fiscal dominance occurs predominately through the risk premium which can lead to *quasi-fiscal financial repression*.[4]
- For stabilisation policy, an optimal simple rule with the monetary-fiscal gap outperforms the standard Taylor rule.

We discuss practical policy implications at the end.

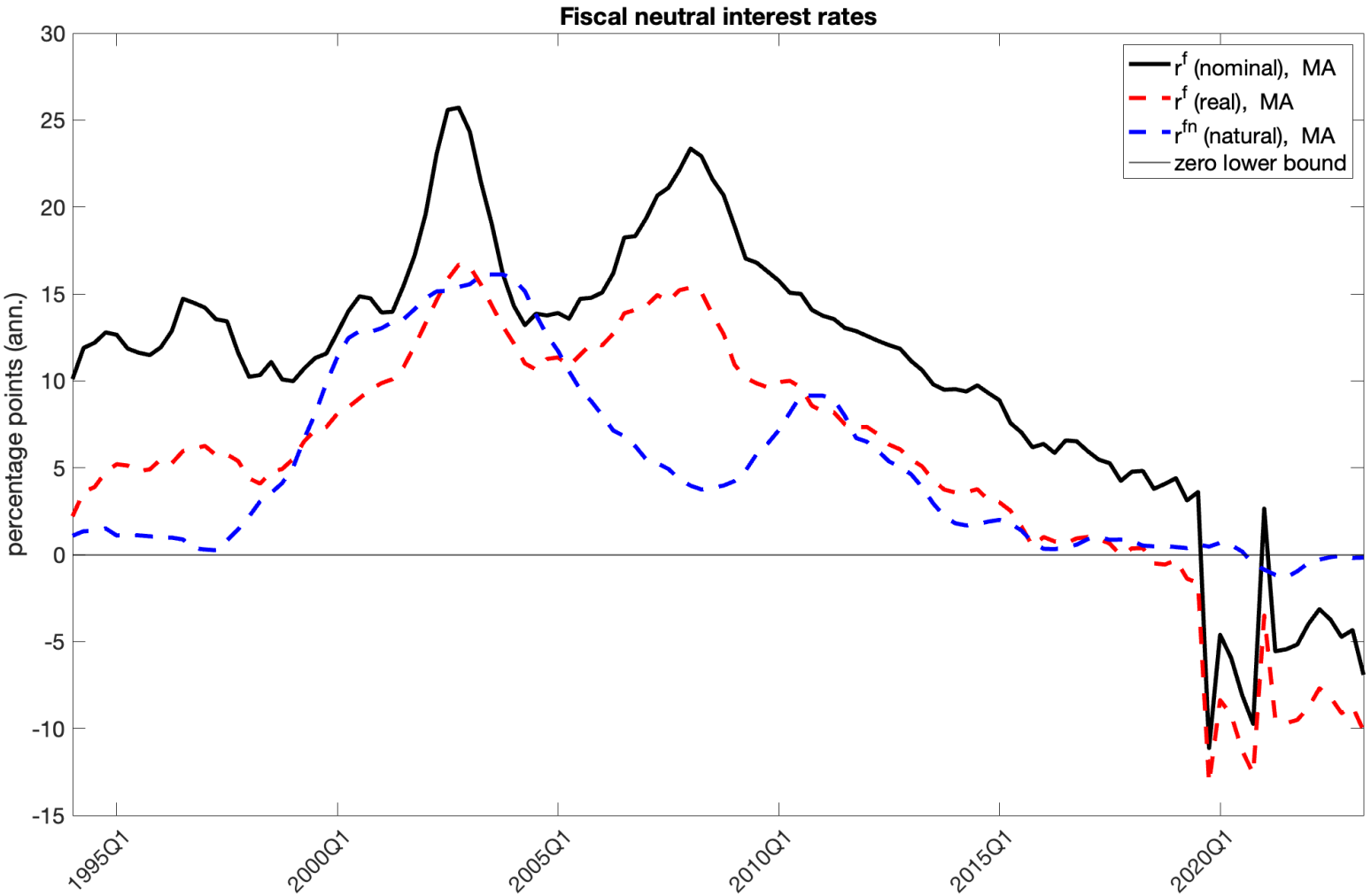
The Two-Agent Fiscal DSGE model

- **Two-agent** New Keynesian (TANK) DSGE model: Ricardian and Non-Ricardian households
- **Nominal rigidities**: price and wage stickiness for all goods and labour
- **Real rigidities**: habit formation, investment adjustment costs
- **Monetary policy**: Taylor-type reaction function
- **Fiscal policy**: six fiscal reaction functions (spending and tax instruments) responding to debt and output
- **Government**: redistribution, crowding in/out, risk premium
- **Open economy**: consumption and investment goods (BoP), access to foreign bonds (UIP)
- **Flexible price equilibrium**: allows us to generate model-implied 'natural' variables.

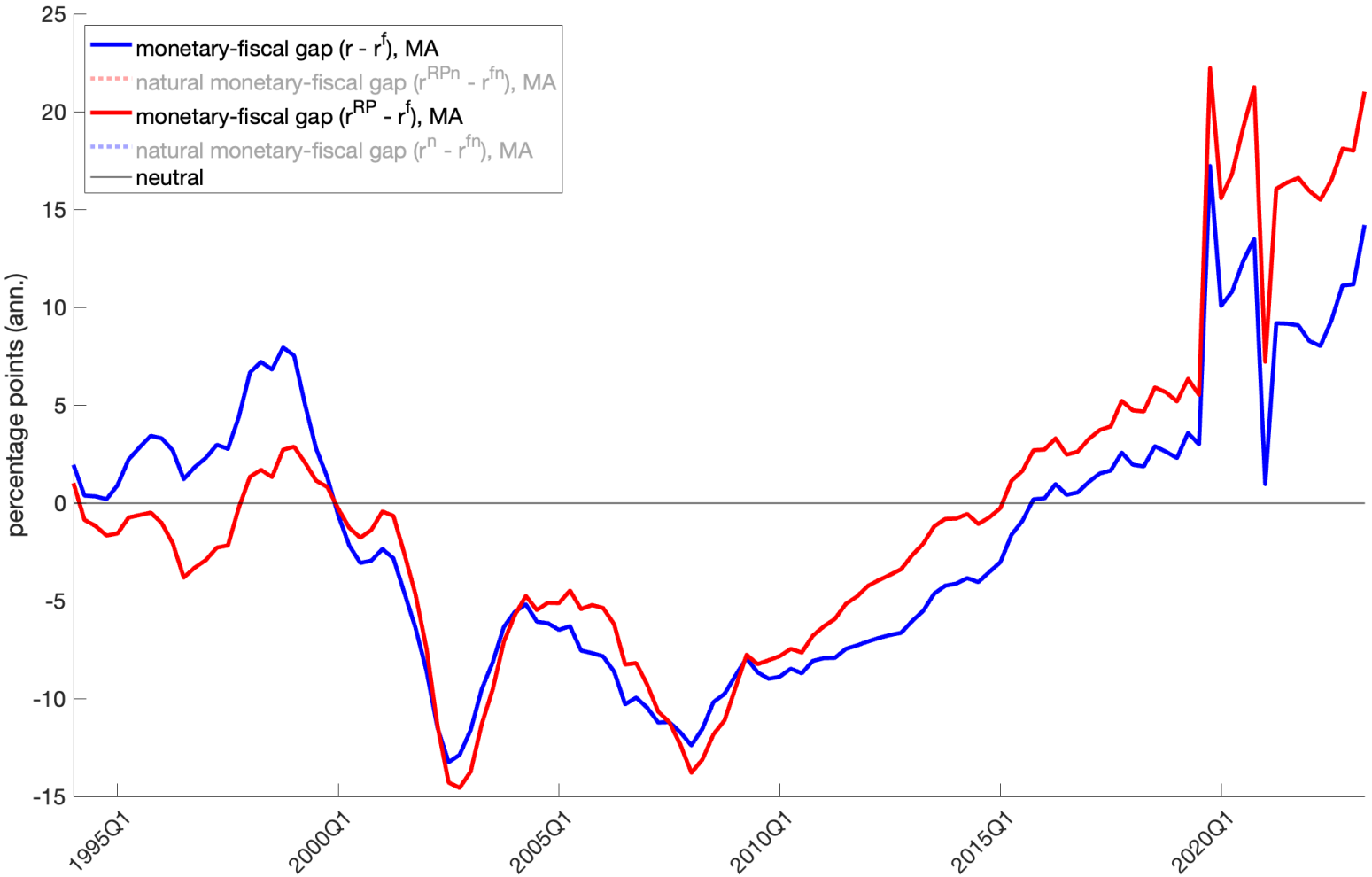
Bayesian estimation

- South African data over the period 1994Q1−2023Q2
- 18 observable variables; 21 exogenous shocks.
- The flexible price (natural) equilibrium excludes 9 shocks (monetary policy, price and wage markups, foreign economy).
- Metropolis-Hastings Markov Chain Monte Carlo (MCMC) algorithm with 200,000 draws per chain across three chains.
- The first 50% of draws were discarded as burn-in.
- To ensure adequate exploration of the posterior distribution, including its tails, the scale of the proposal distribution is set to achieve an acceptance rate of approximately 25%.

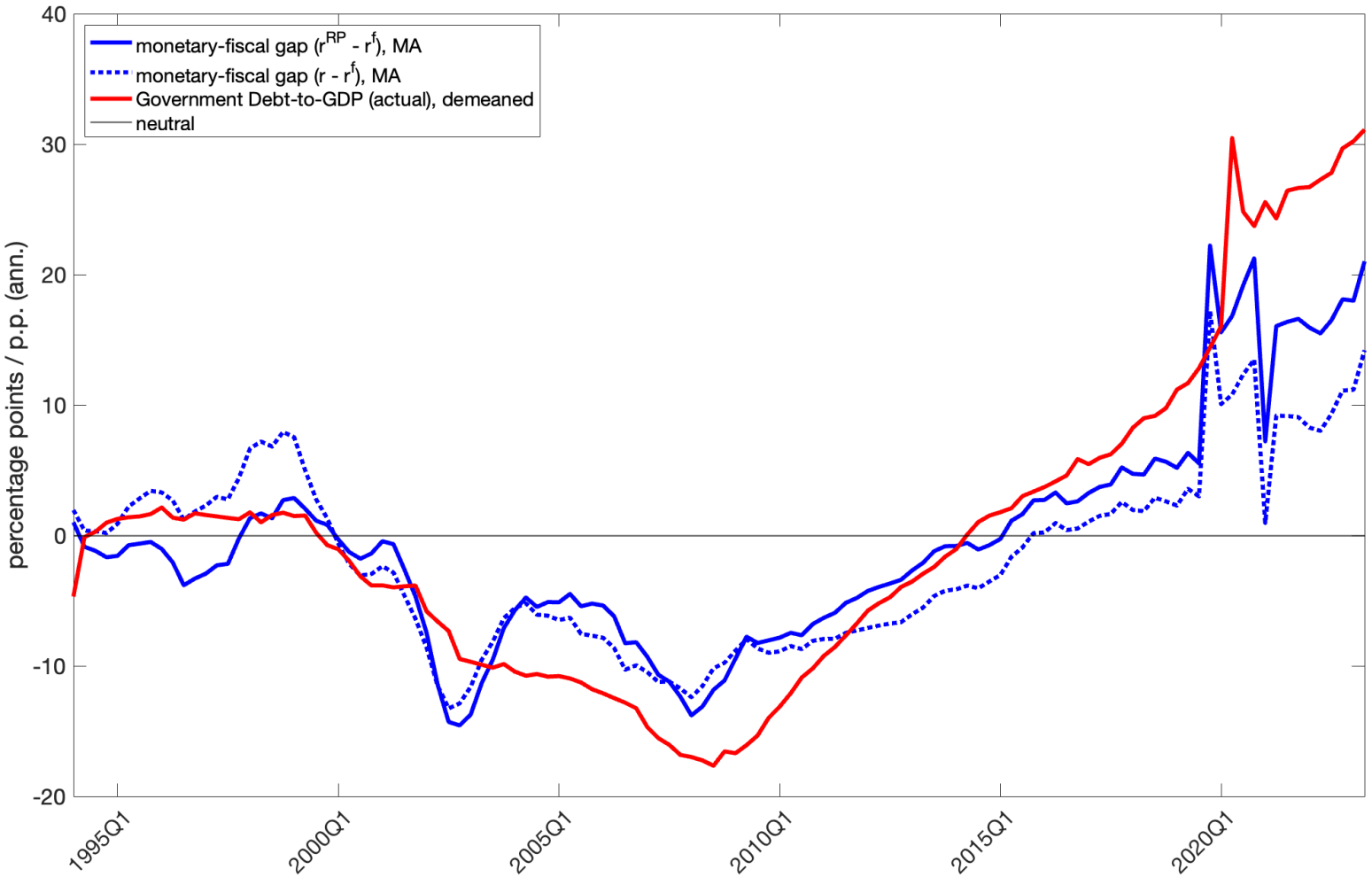
Fiscal-neutral rates



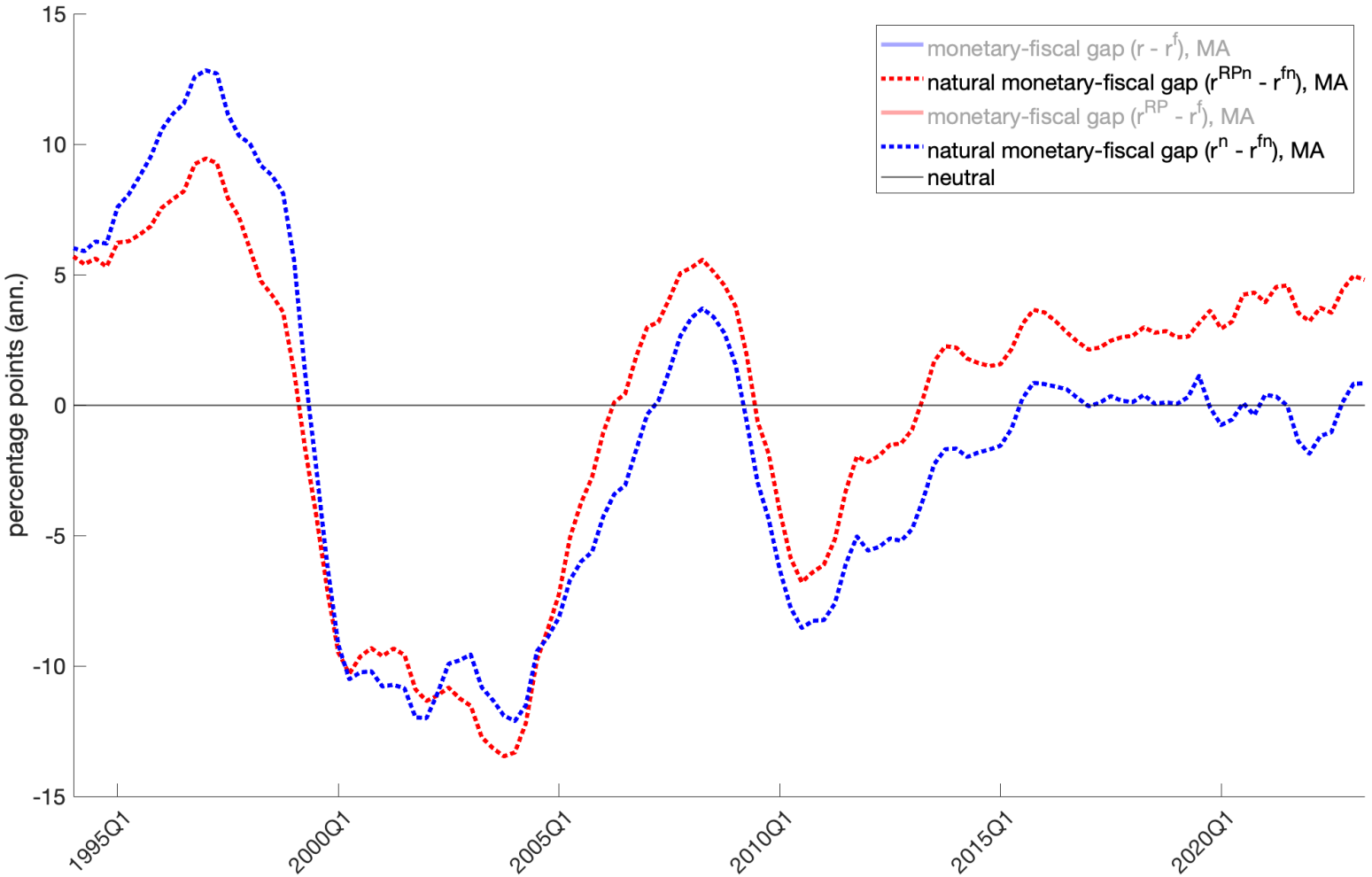
Monetary-fiscal gap



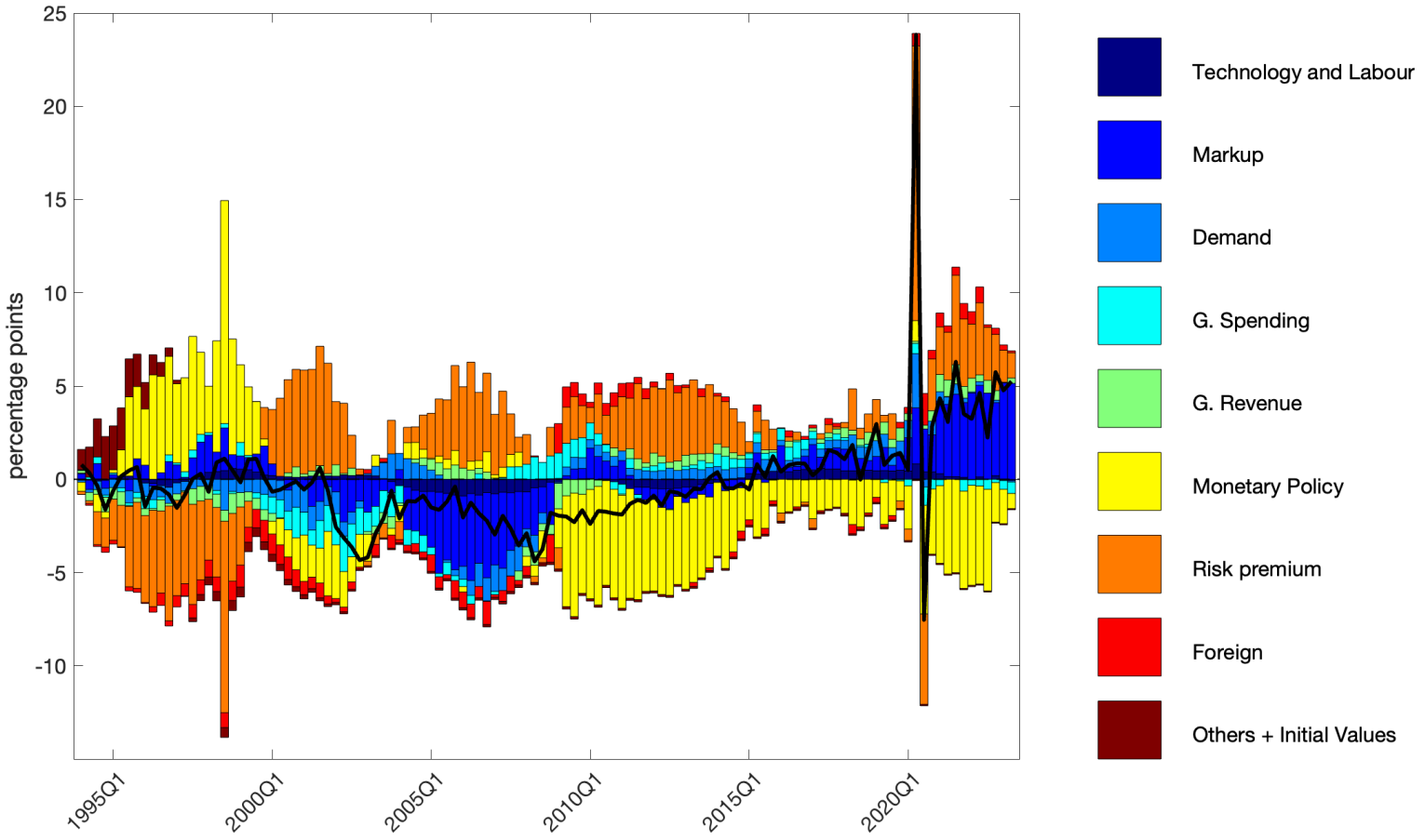
Monetary-fiscal gap and government debt



Natural monetary-fiscal gap



Historical decomposition: monetary-fiscal gap



FEVD:

- Monetary policy shocks contribute 19%
- Risk premium shocks contribute 44%

Optimal policy: the loss function

The success of policy can be measured by its ability to minimise instability in the target variables—a loss function:

$$\min \mathcal{L}_t = y_t^2 + \Theta_{\mathbb{X}}.\mathbb{X}_t^2 \ ,$$

where the welfare loss ($\mathcal{L}$) is an increasing function of deviations to output (y_t) and one or more variables in the vector $\mathbb{X}$. $\Theta_{\mathbb{X}}$ is a vector of weights corresponding to the policy target variables.

- Monetary policy: output and inflation (π_t)
- Fiscal policy: output and the monetary-fiscal gap ($r_t^{m-f} = r_t^{RP} - r_t^f$)
- $\Theta_{\mathbb{X}}$ also controls for instability in the policy instrument because the policy authority may find it undesirable to have a volatile policy instrument.

Optimal policy: optimal simple rules

Monetary policy follows a Taylor-type reaction function:

$$i_t = \phi_i i_{t-1} + (1-\phi_i)(\phi_\pi \tilde{\pi}_t + \phi_y \tilde{y}_t - \phi_f r_t^{m-f}) + \varepsilon_t^i \tag{1}$$

The fiscal instrument – government consumption expenditure – follows a simple feedback rule:

$$g_t = \phi_G g_{t-1} - \theta_{g,y} y_t - \theta_{g,b} b_t + \varepsilon_t^g$$

Policymakers must choose ϕ's and θ's to minimise $\mathcal{L}_t \to 0$.

In the results we show the normalised (relative) gain by dividing the minimised $\mathcal{L}_t$ with the initial value of the objective function.

Optimal policy: estimated policy rules

Taylor-type rule with with priors $\phi_i \sim \beta(0.75, 0.1)$; $\phi_\pi \sim \mathcal{N}(1.5, 0.1)$; $\phi_y \sim \mathcal{N}(0.35, 0.05)$; $\phi_f = 0$:

$$i_t = \underset{[0.88,0.92]}{0.9}\, i_{t-1} + (1-0.9)\Big(\underset{[1.43,1.71]}{1.57}\, \pi_t + \underset{[0.32,0.47]}{0.40}\, y_t\Big)$$

Taylor-type rule with prior $\phi_f \sim \mathcal{N}(0, 1)$:

$$i_t = \underset{[0.91,0.95]}{0.93}\, i_{t-1} + (1-0.93)\Big(\underset{[1.32,1.65]}{1.48}\, \pi_t + \underset{[0.28,0.44]}{0.36}\, y_t - \underset{[0.23,0.66]}{0.43}\, r_t^{m-f}\Big)$$

Fiscal policy rule with priors $\phi_g \sim \beta(0.75, 0.1)$; $\theta_{g,y} \sim \mathcal{G}(0.2, 0.1)$; $\theta_{g,b} \sim \mathcal{G}(0.4, 0.2)$:

$$g_t = \underset{[0.72,0.92]}{0.82}\, g_{t-1} - \underset{[0.01,0.07]}{0.05}\, y_t - \underset{[0.06,0.17]}{0.12}\, b_t + \varepsilon_t^g$$

Optimal monetary policy rules

Weights on policy variables: $y, \pi, r = 1$ (top); $y, r^{m-f}, r = 1$ (bottom).[5]

Parameters	*Optimal values*			*Estimated*
ϕ_π	4.79	1.67	2.11	1.57 / 1.48
ϕ_y	1.10	0.42	0.52	0.40 / 0.36
ϕ_i	-	0.19	-	0.90 / 0.93
ϕ_f	-	-	2.83	- / 0.43
$\mathcal{L} \to 0\%$:	46%	43%	18%	-
ϕ_π	4.70	1.65	3.17	1.57 / 1.48
ϕ_y	1.27	0.42	0.84	0.40 / 0.36
ϕ_i	-	0.29	-	0.90 / 0.93
ϕ_f	-	-	8.26	- / 0.43
$\mathcal{L} \to 0\%$:	43%	36%	11%	-

Top panel: active MP; **Bottom panel**: quasi-active MP.

Optimal fiscal policy rules

There appears to be no meaningful gains for government spending to actively target the monetary-fiscal gap, output, and/or inflation – in any combination – whilst taking monetary policy as given.

As in Havemann and Hollander (2024), for a given monetary policy rule that determines inflation, it is always better for fiscal policy to maintain debt sustainability – coordination is not necessary.

Optimal policy coordination: fiscal dominance

Weights on policy variables: $r^{m-f} = 1$

Parameters	*Optimal values*		*Estimated*
ϕ_π	1.79	0.95	
ϕ_y	2.47	0.52	
ϕ_R	-0.34	0.30	
ϕ_f	250.1	37.322	
$\theta_{g,y}$	0.26	-0.16	
$\theta_{g,b}$	4.76	0.49	
ϕ_g	–	0.88	
$\theta_{g,f}$	–	0.16	
$\mathcal{L} \to 0\%$	0%	0%	

Left column: mandate change, volatile MP, quasi-fiscal repression
Right column: fiscal dominance (active FP, passive MP).

Optimal policy coordination: joint objectives

Weights on policy variables: $y, \pi, r, r^{m-f}, g = 1$

Parameters	*Optimal values*				*Estimated*
ϕ_π	3.01	1.72	3.20	2.07	
ϕ_y	0.76	0.45	0.89	0.59	
ϕ_R	-	0.16	-	-2.42	
ϕ_f	-	-	10.13	2.74	
$\theta_{g,y}$	-0.11	0.08	0.16	0.17	
$\theta_{g,b}$	-0.04	0.04	0.10	-0.04	
ϕ_g	-	0.55	-	-0.79	
$\theta_{g,f}$	-	-	0.20	-0.01	
$\mathcal{L} \to 0\%$	44%	28%	16%	12%	

Far left column: very hawkish MP allows for fiscal profligacy
Far right column: fiscal profligacy requires quasi-fiscal repression.

Policy implications (let's discuss)

- **Transparency**: publishing monetary-fiscal gap estimates brings to light latent fiscal dominance, which will make monetary policy decisions more transparent and increase market confidence (because it becomes explicit where constraints on monetary policy originate).
- **Coordination**: joint consideration of 'neutral rate' concepts reduces policy tension because it can improve policy coordination (provides a common language)
- **Pragmatism**: fiscal feedback in Taylor rule can stabilise expectations more effectively (future path of monetary policy rate).

Conclusion

- South Africa faces rising debt and persistent macroeconomic uncertainty.
- The monetary-fiscal gap offers a useful gauge for monetary-fiscal tensions.
- The monetary-fiscal gap can guide policy coordination in an inflation-targeting regime.
- DSGE models can help calibrate optimal/coordinated policy rules.

References

Bohn, H. (1995). The Sustainability of Budget Deficits in a Stochastic Economy. *Journal of Money, Credit and Banking*, 27(1):257–271.

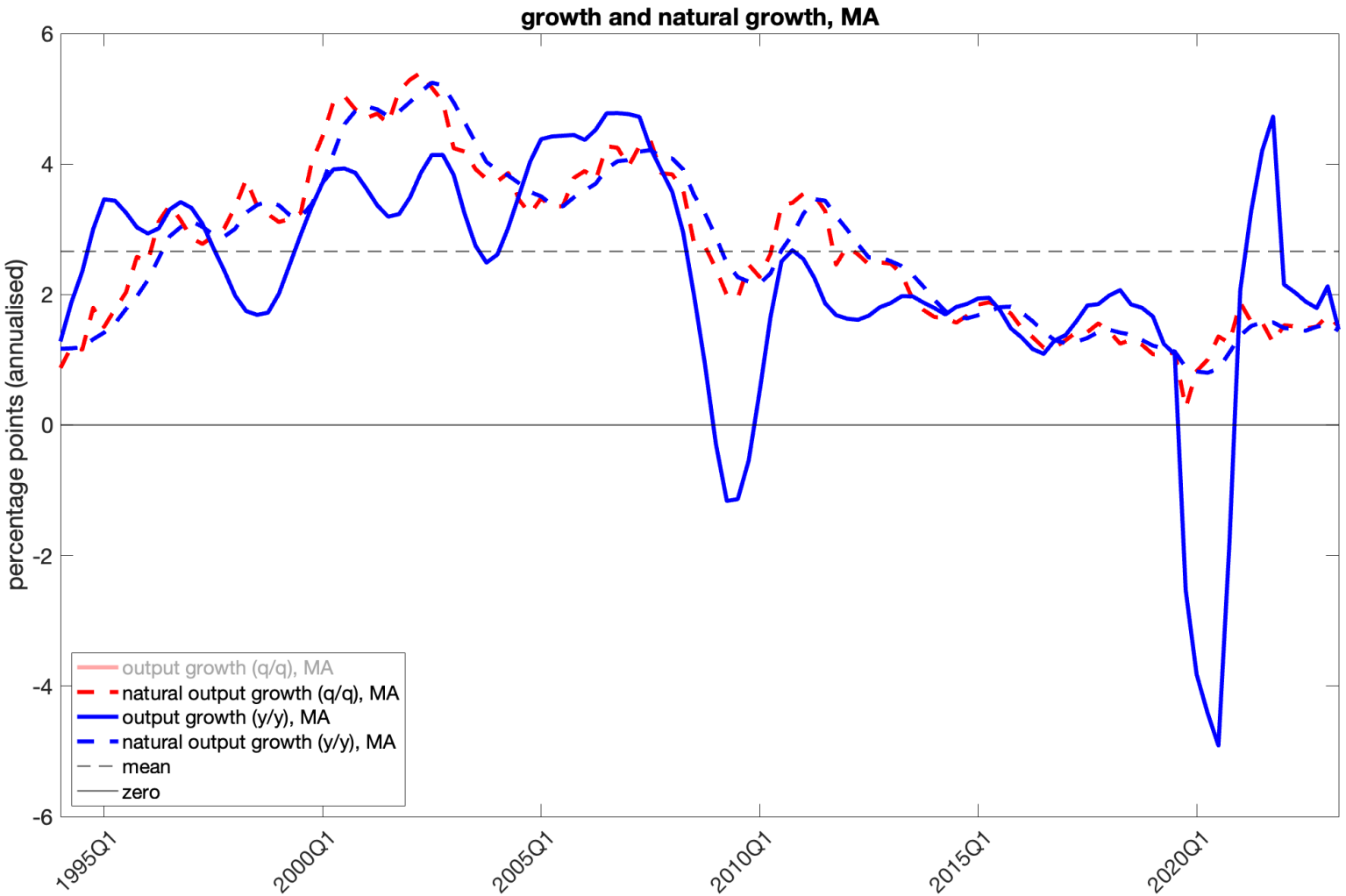
Bohn, H. (2007). Are stationarity and cointegration restrictions really necessary for the intertemporal budget constraint? *Journal of Monetary Economics*, 54(7):1837–1847.

Bolhuis, M. A., Koosakul, J., and Shenai, M. N. (2024). Fiscal R-Star: Fiscal-Monetary Tensions and Implications for Policy. IMF Working Papers 2024/174, International Monetary Fund.

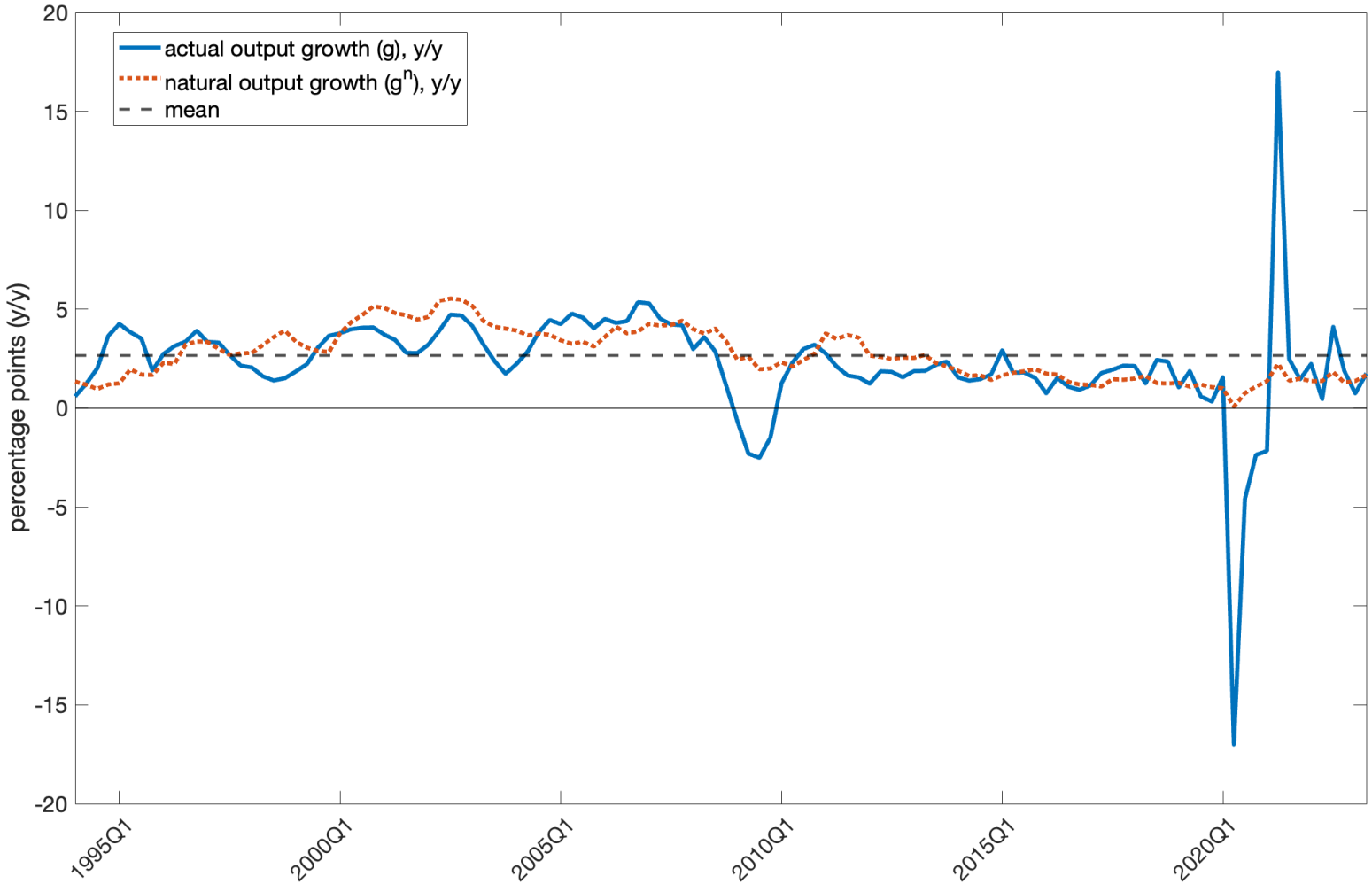
Havemann, R. and Hollander, H. (2024). Fiscal policy in times of fiscal stress (or what to do when $r > g$). *Journal of Policy Modeling*, 46(5):1020–1054.

Jeanne, O. (2025). From Fiscal Deadlock to Financial Repression: Anatomy of a Fall. NBER Working Papers 33395, National Bureau of Economic Research, Inc.

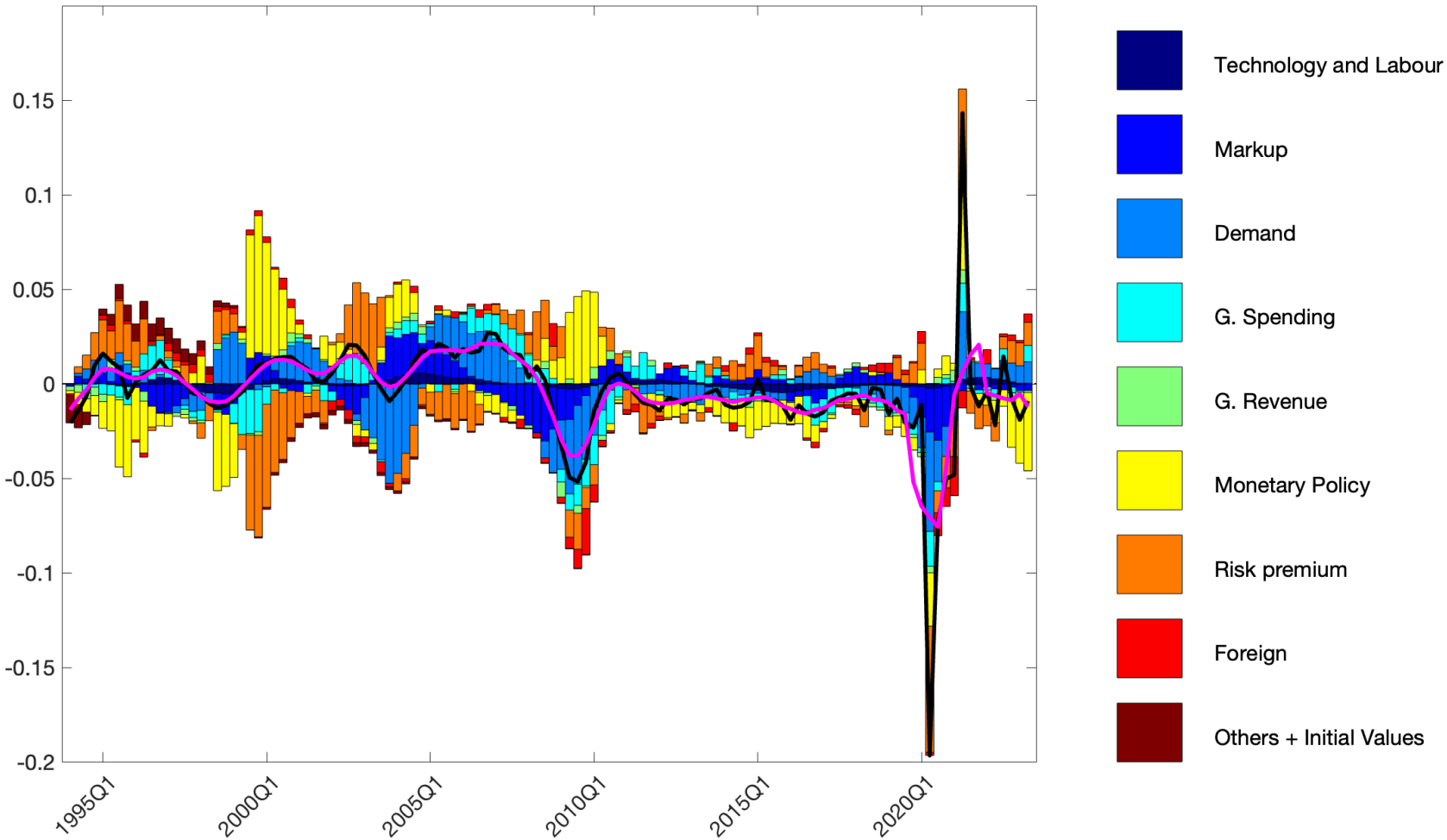
Appendix: growth figures



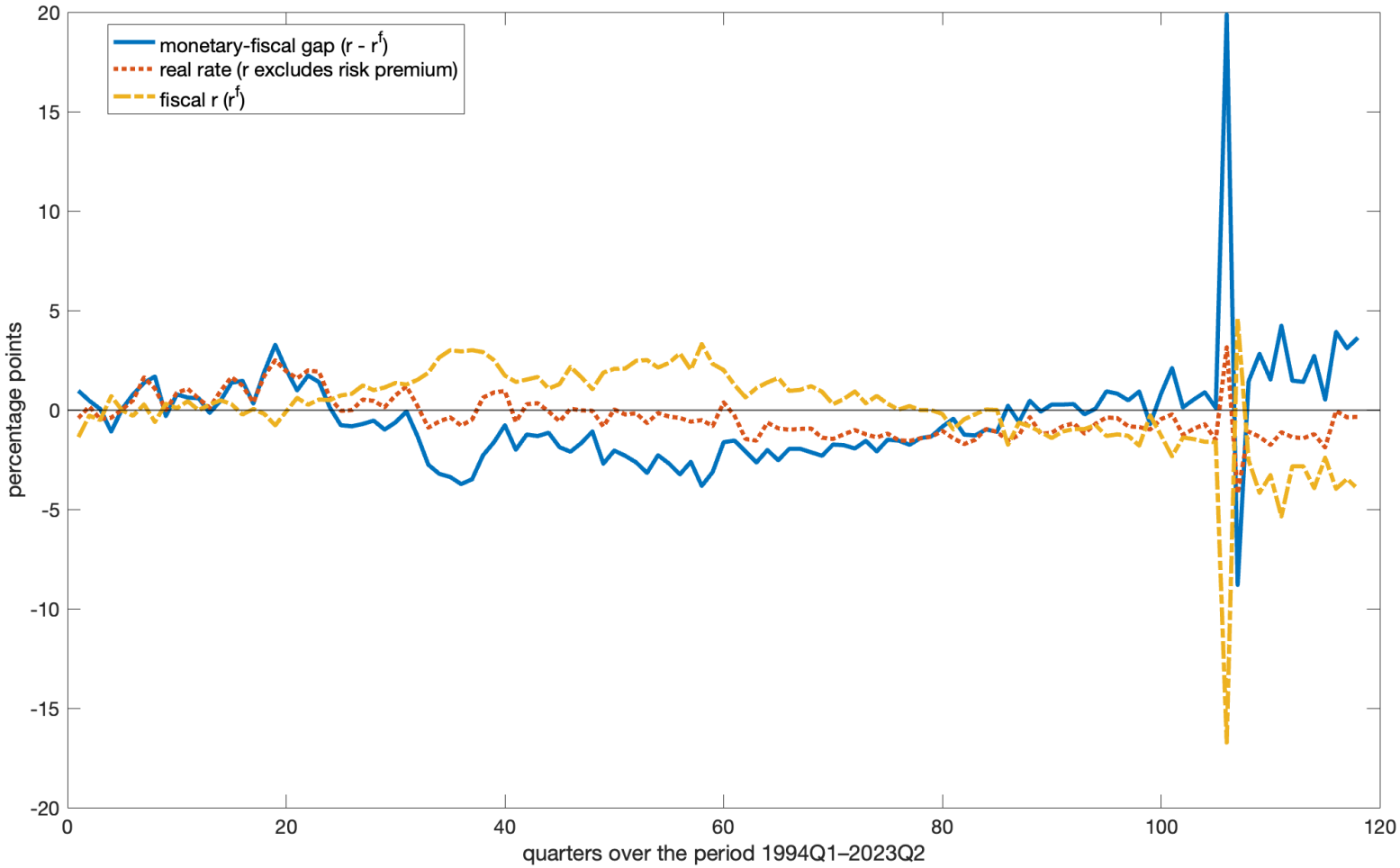
Appendix: growth figures



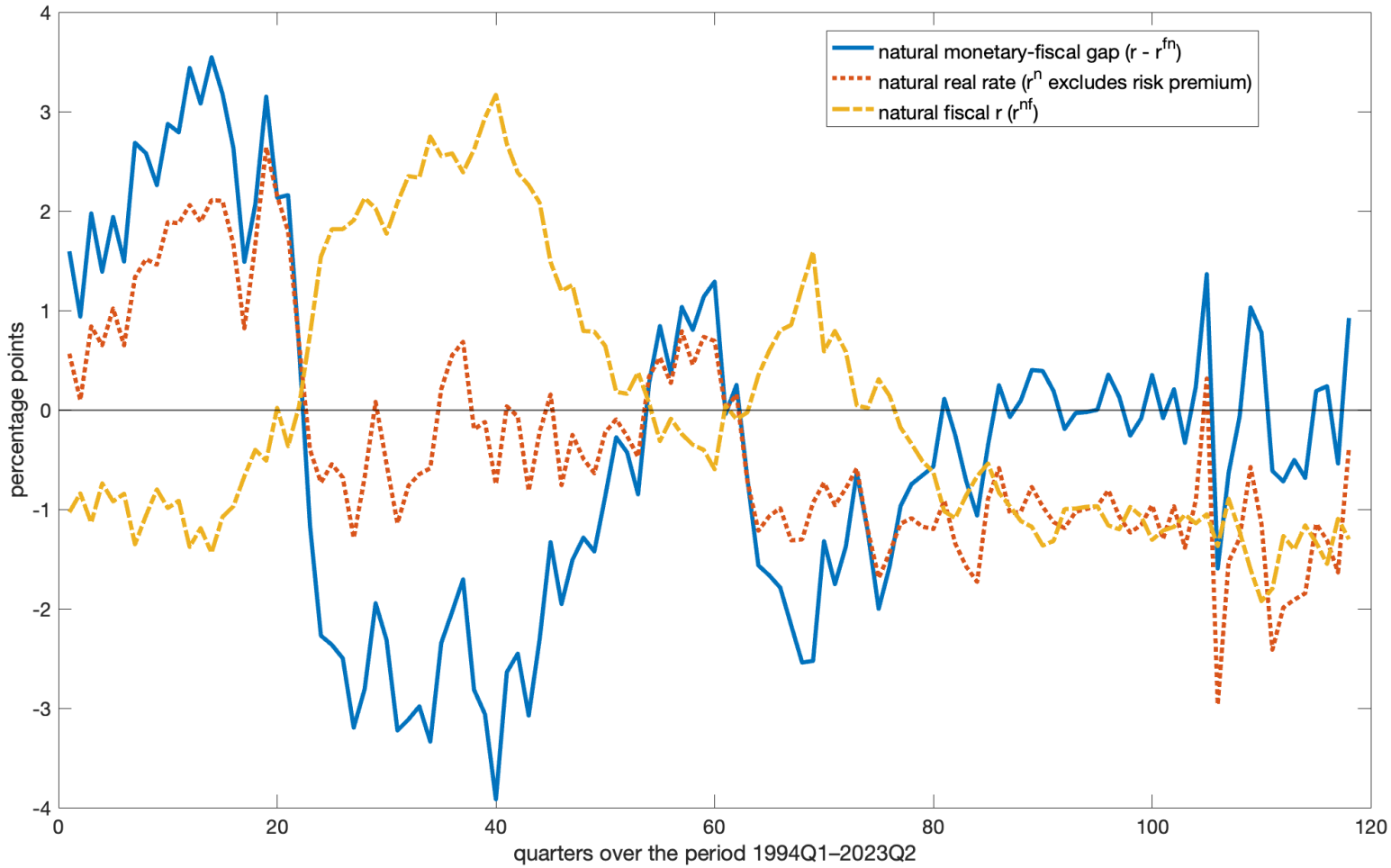
Appendix: growth historical decomposition



Appendix: actual rates comparison



Appendix: natural rates comparison



Appendix: deriving the fiscal-neutral rate

Core intertemporal government budget constraint (in nominal GDP terms)

$$b_t = \left(\frac{1 + r_{t-1}}{(1 + \pi_t)(1 + g_t)} \right) b_{t-1} - pb_t$$

- Debt dynamics driven by real interest rate r_{t-1}^{real}, growth g_t, and primary balance pb_t.
- Underpins fiscal r-star and sustainability rule-of-thumb.
- Fiscal-neutral rate is derived from the intertemporal government budget constraint.
- The real interest rate that stabilizes the debt-to-GDP ratio ($b_t = b_{t-1}$):

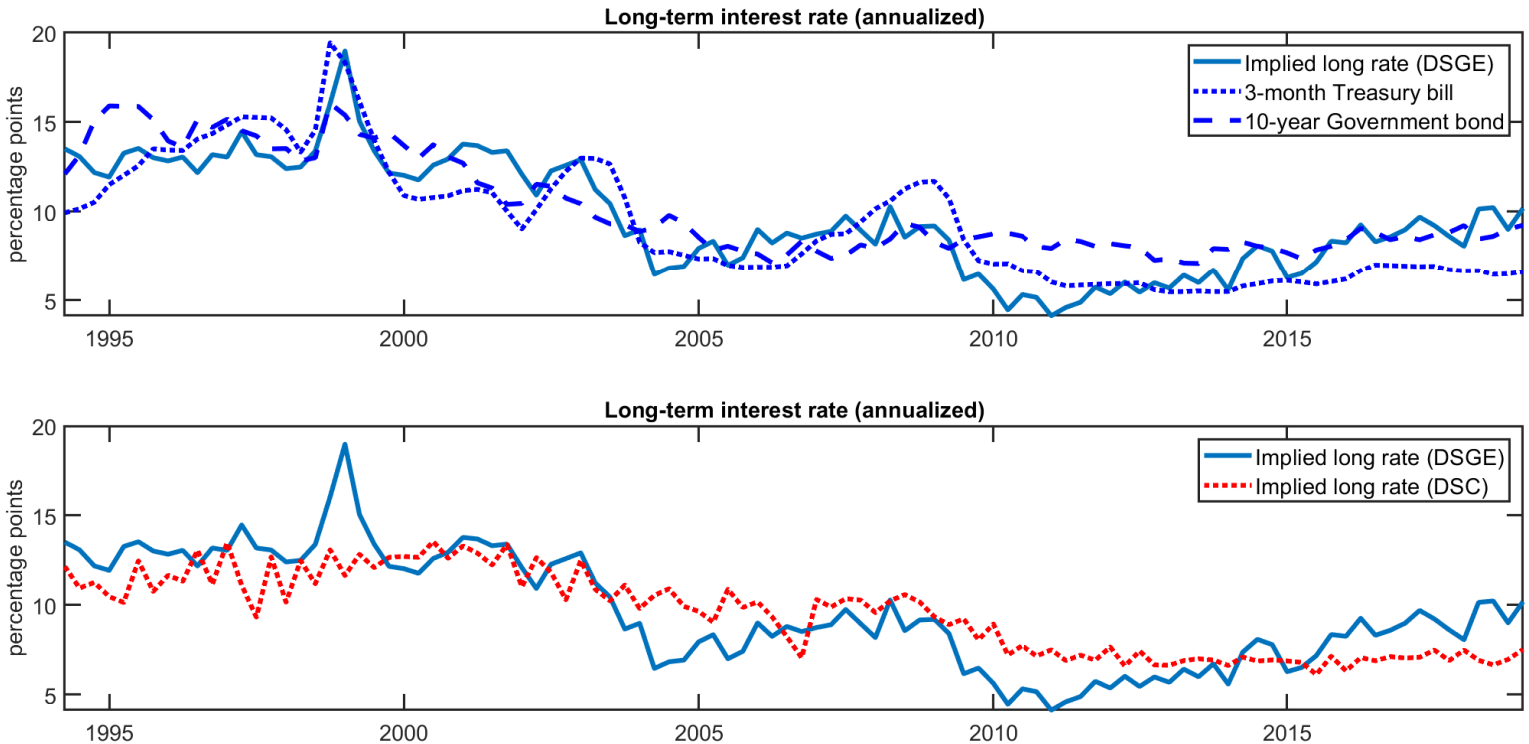
$$r_t^{f*} \approx g_t + \frac{pb_t}{b_{t-1}}$$

- Steady-state fiscal r-star:

$$r^{f*} \approx g^* + \frac{pb^*}{b^*}$$

Appendix: implied vs actual long rates and debt service costs

Figure: Long rate: implied vs actual

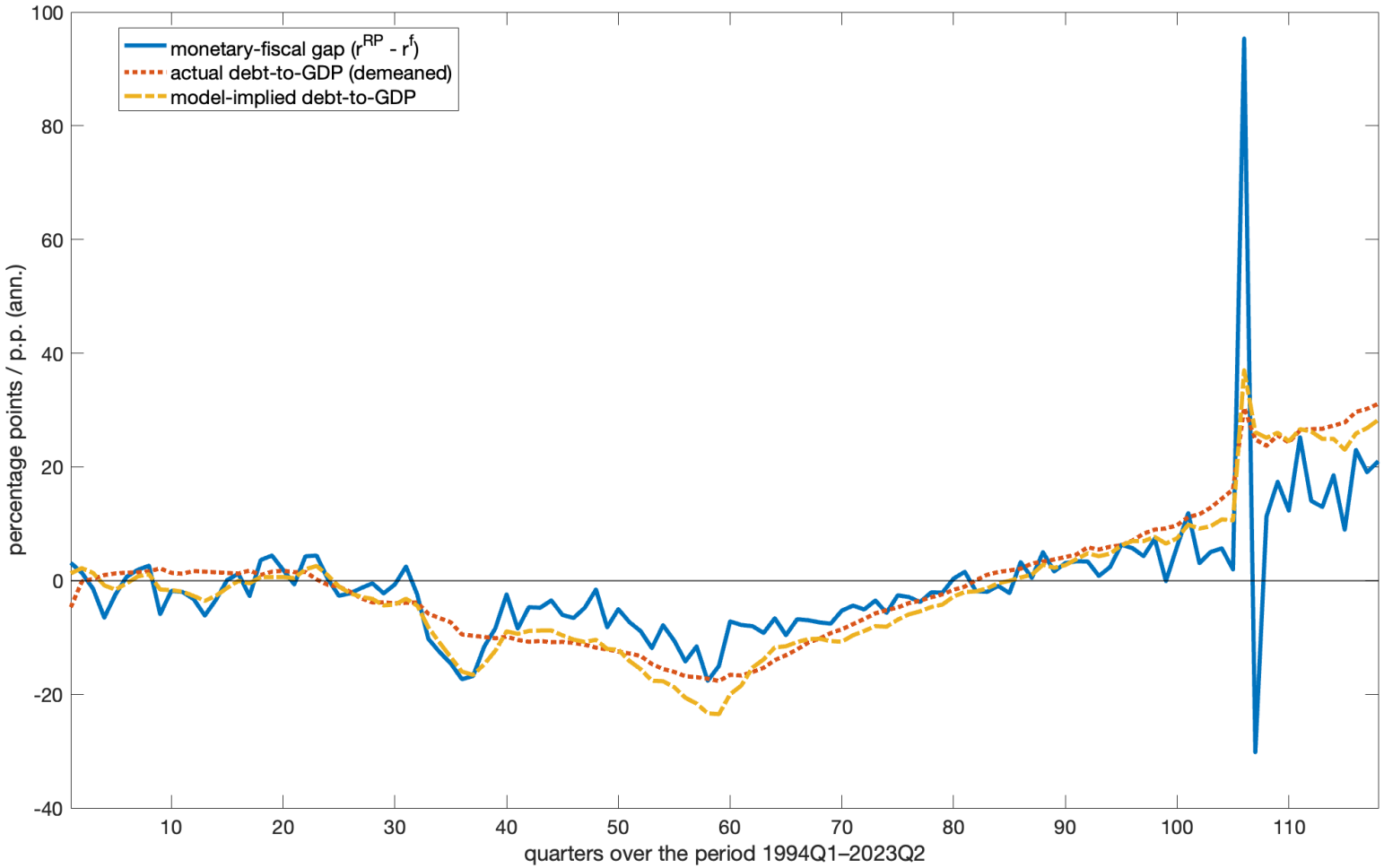


Appendix: observable variables

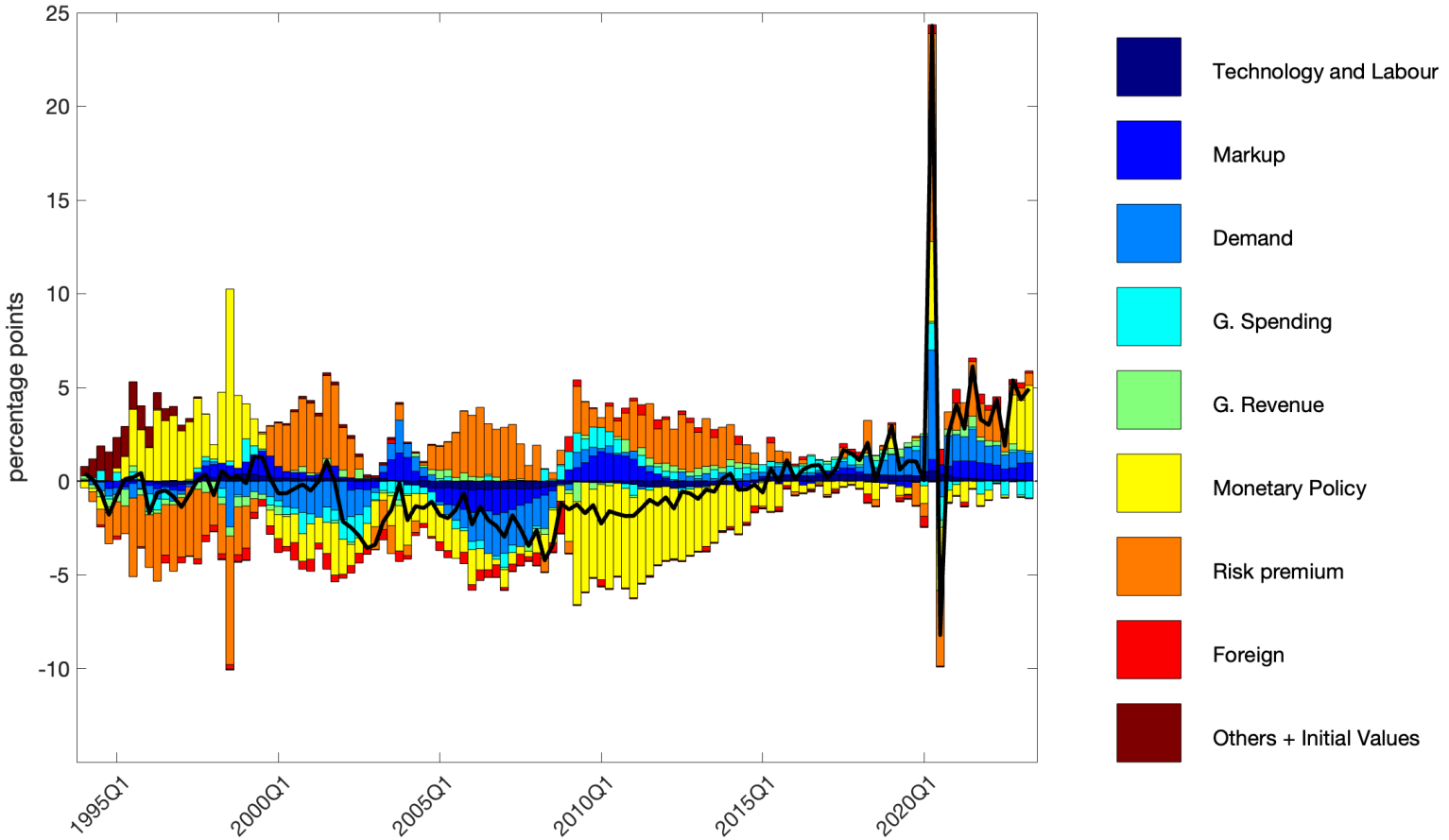
Observable variables used for Bayesian estimation of the model

- Domestic: output, inflation, employment, real wages, short-term interest rate, import inflation, export inflation, government debt-to-GDP, the inflation target, and six fiscal instruments (VAT, PIT, CIT, consumption, investment, transfers).
- Foreign: output, inflation, and the short-term interest rate. (US as proxy; better than weighted-average series from South Africa's main trading partners)

Appendix: monetary-fiscal gap and government debt



Appendix: monetary-fiscal gap historical decomposition



FEVD (estimation including $r^{RP} - r^{f}$ in Taylor rule):

- Monetary policy shocks contribute 22%
- Risk premium shocks contribute 41%