Other days, other ways?
Fiscal and monetary policy reaction functions over the past seven decades
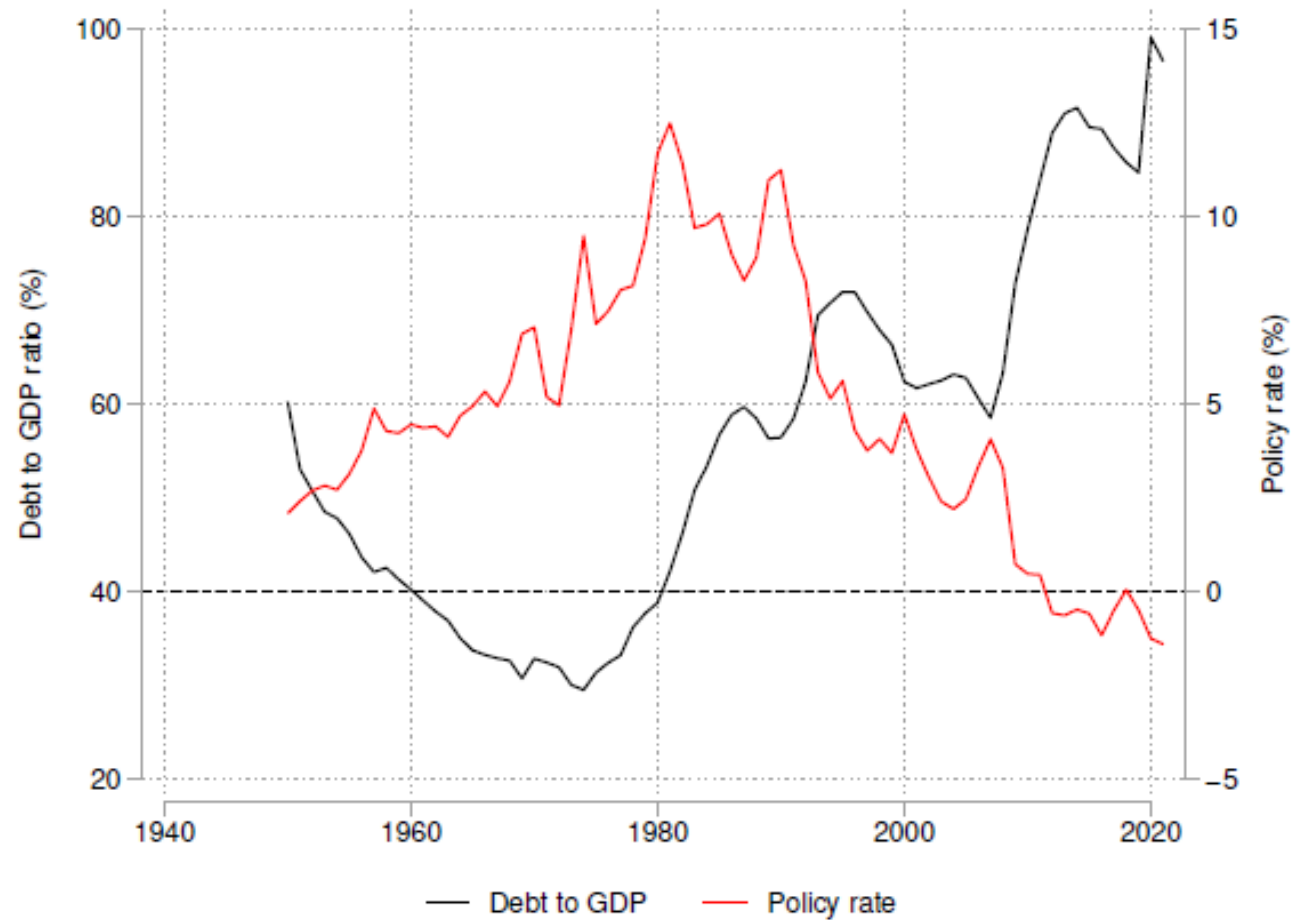
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Background

● High public debt and low policy rates in the decades before the inflation surge

Sources: Jorda, Schularick and Taylor (2017); IMF; OECD; Authors own calculations.

Research question: How did we get there?

- Was it fundamentals or policy?

- Fundamentals
  - Low policy rates reflected adjustment to low r-star
  - Higher debt levels could be sustained because of fundamentally lower interest rates (Blanchard (2023))

- Policy
  - High debt and low rates reflect asymmetric policy conduct and policy interactions (BIS (2023))
    - Asymmetric response to the business cycle with strong easing in downturns but little tightening in upswings
    - Lower rates facilitated public debt build up, while higher debt restrained monetary policy (debt trap)

What the paper does

- Test for business cycle asymmetries and monetary-fiscal policy interactions from a reaction function perspective

  - Fiscal policy reaction functions in the spirit of Bohn (1998) and Mauro et al (2015)

  - Monetary policy reaction functions in the spirit of Taylor (1993, 1999)

- Annual data for 17 AEs for the period 1950-2021

  - Long-horizon analysis to identify long-run trends in policy reactions

Fiscal and monetary policy reaction functions

- Fiscal reaction function following Bohn (1998) and Mauro et al. (2015):

$$pb_{i,t} = \alpha_0 + \alpha_1 d_{i,t-1} + \alpha_2 \hat{y}_{i,t} + \alpha_3 X_{i,t} + \epsilon_{i,t}$$

  - $pb_{i,t}$: Primary balance as a ratio to GDP

  - $d_{i,t-1}$: Lagged public debt as a ratio to GDP (expected direction of response positive)

  - $\hat{y}_{i,t}$: Output gap (expected direction of response positive)

- Monetary policy reaction function following Taylor (1993) (inertial Taylor rule)

$$r_{i,t} = \rho r_{i,t-1} + (1-\rho)(\alpha + \beta_\pi \pi_{i,t} + \beta_y \hat{y}_{i,t}) + \xi_{i,t}$$

  - $r_{i,t}$: Policy rate or closest equivalent (shadow rates from Krippner (2013) after 2008)

  - $\pi_{i,t}$: Headline inflation rate (expected direction of response positive)

  - $\hat{y}_{i,t}$: Output gap (expected direction of response positive)

◆BIS

Methodology

- Mean Group estimator (Pesaran and Smith (1995))
  - Averaging separate estimates for each group (economy) in the panel
  - Taking into account group heterogeneity and avoiding Nickell bias
  - Consistent estimator

- Estimation by OLS rather than IV
  - Carvalho et al (2021) argue in favour of OLS rather than IV in the estimation of MP rules
    - Finding valid instruments is difficult
    - OLS bias is small
    - OLS and IV estimates turn out to be very similar
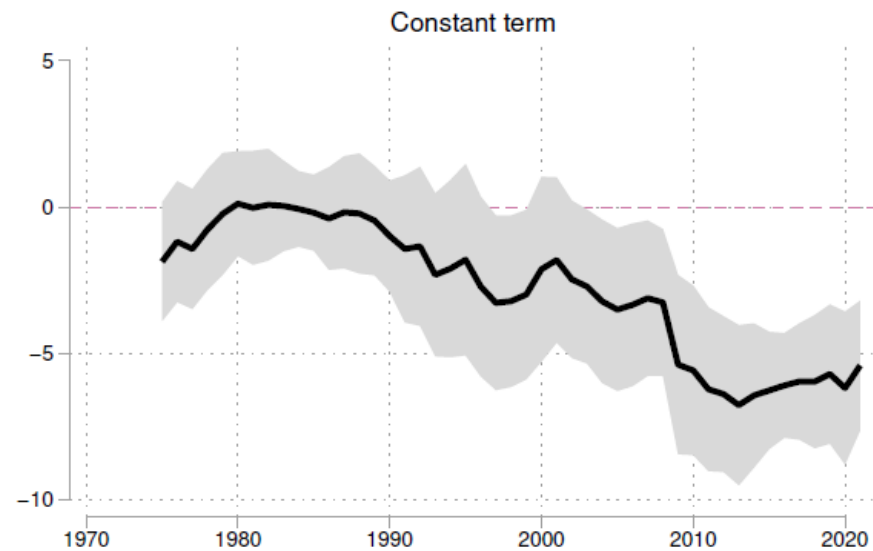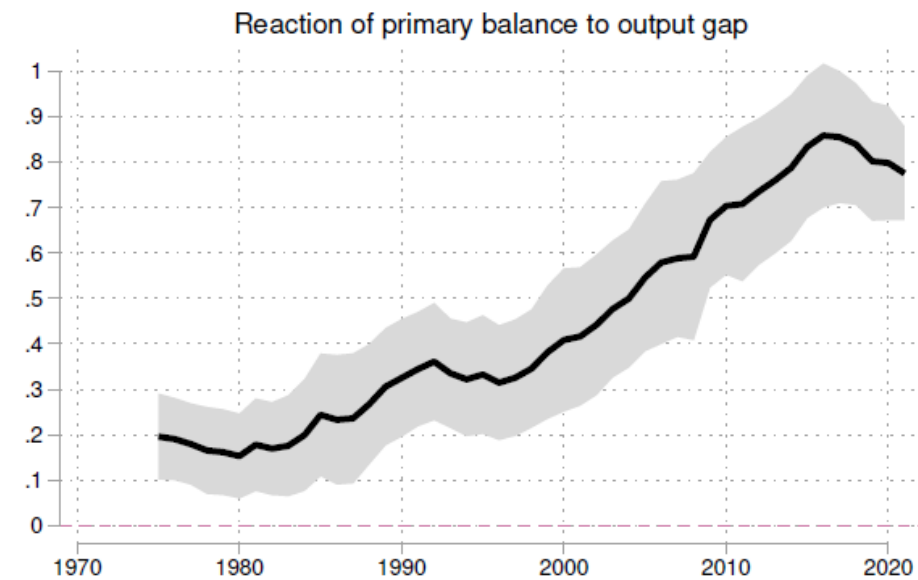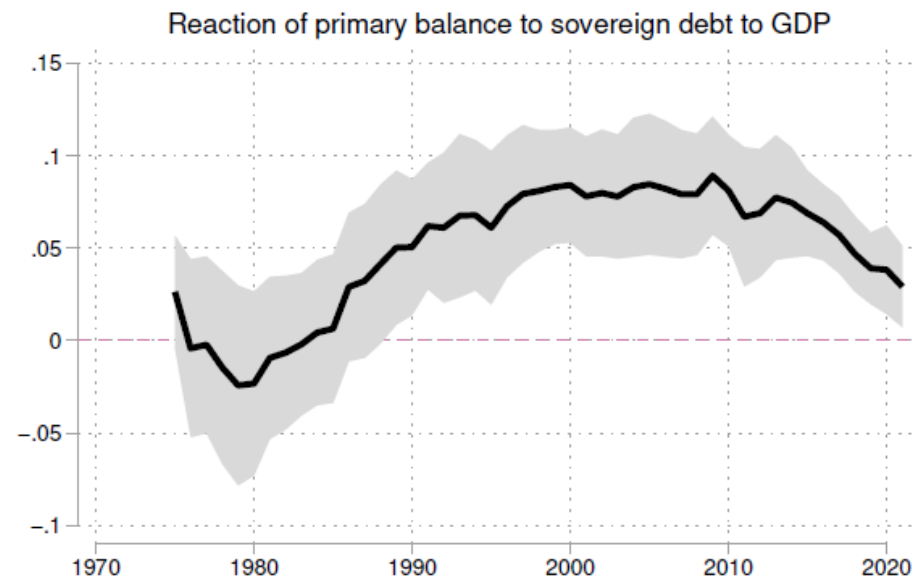 - We build on the same logic for FP rules

Empirical analysis

- Changes over time
  - Moving window estimation

- Asymmetries in cyclical reactions
  - Positive vs negative output gap

- Policy interactions
  - Interest paid on debt in FP reaction function, public debt in MP reaction function
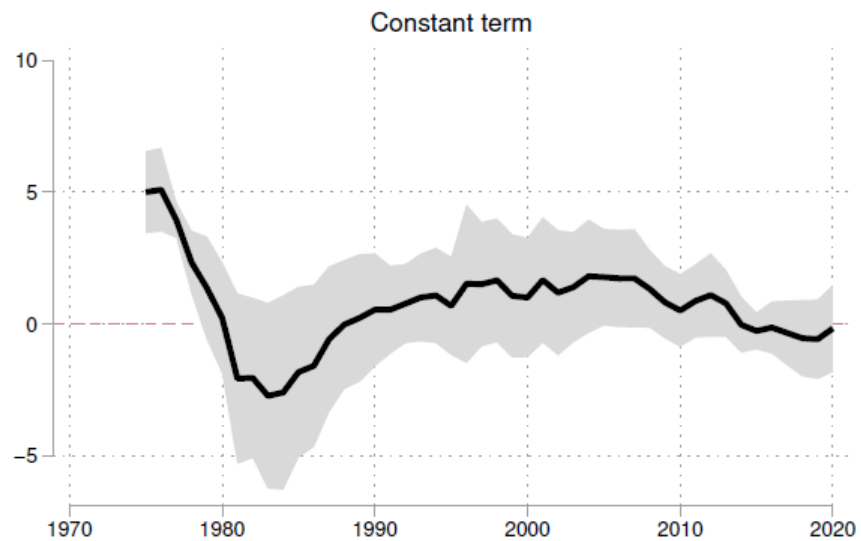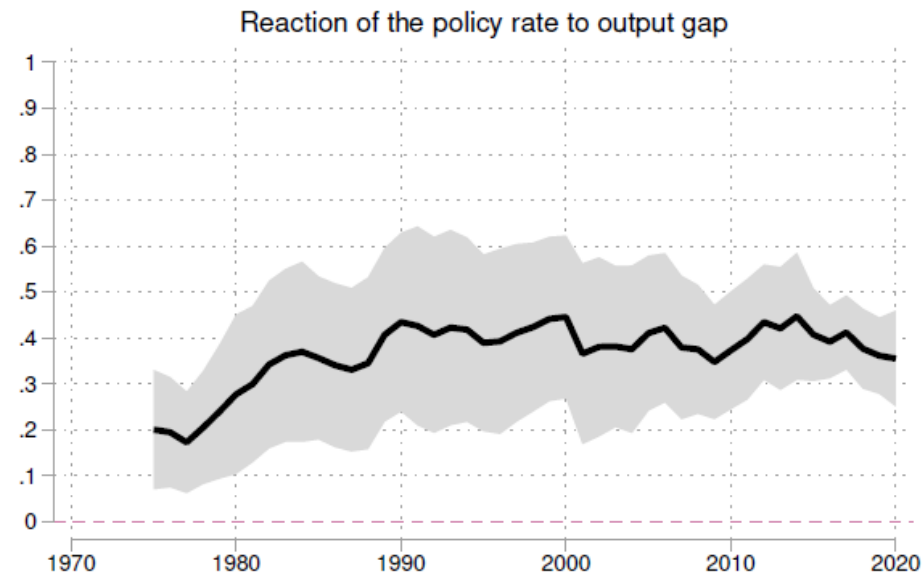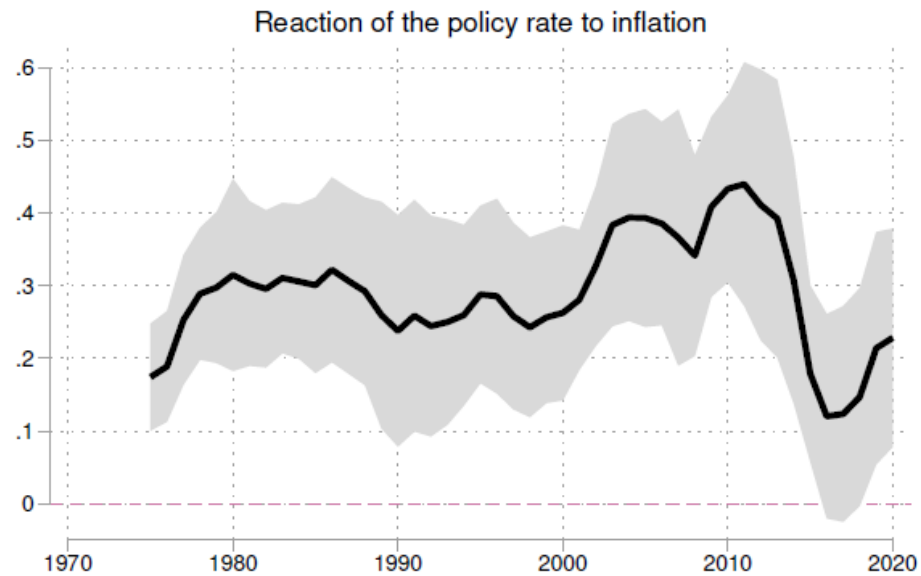
Changes over time

Policy reactions over time (25y moving window): Fiscal policy

Reaction of primary balance to sovereign debt to GDP

Reaction of primary balance to output gap

Constant term

Policy reactions over time (25y moving window): Monetary policy I

Reaction of the policy rate to inflation

Reaction of the policy rate to output gap

Constant term

Policy reactions over time (25y moving window): Monetary policy II

Long–run coefficients on inflation
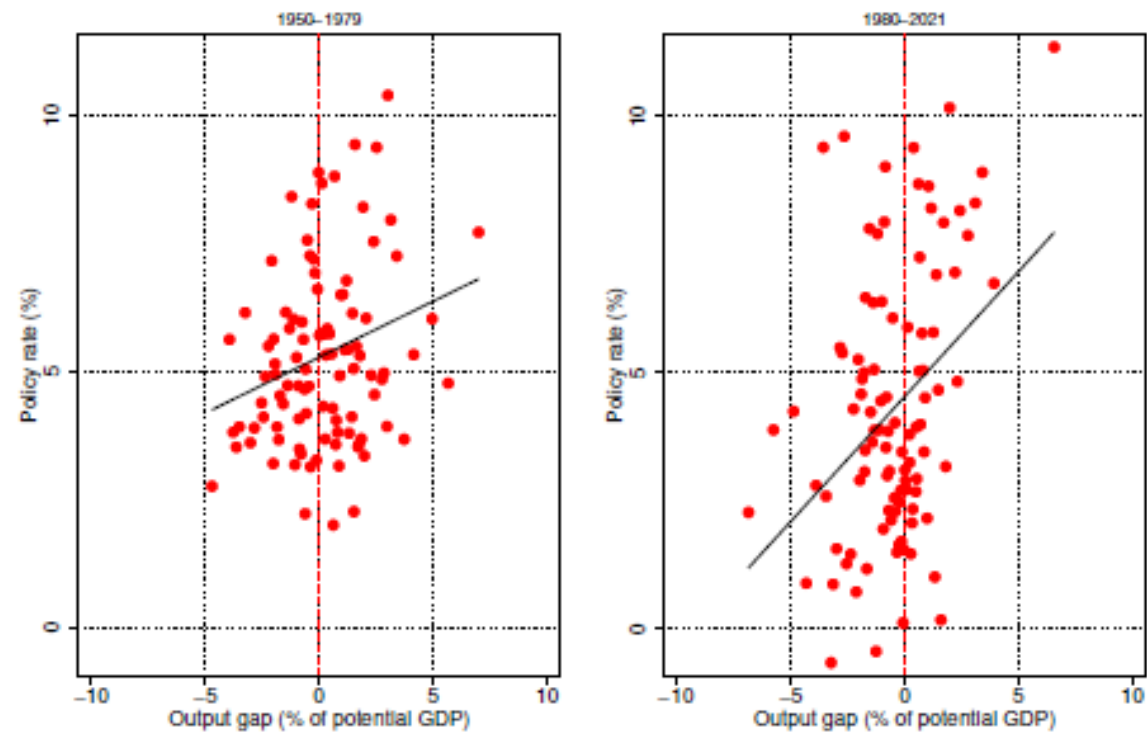

Long–run coefficients on output gap
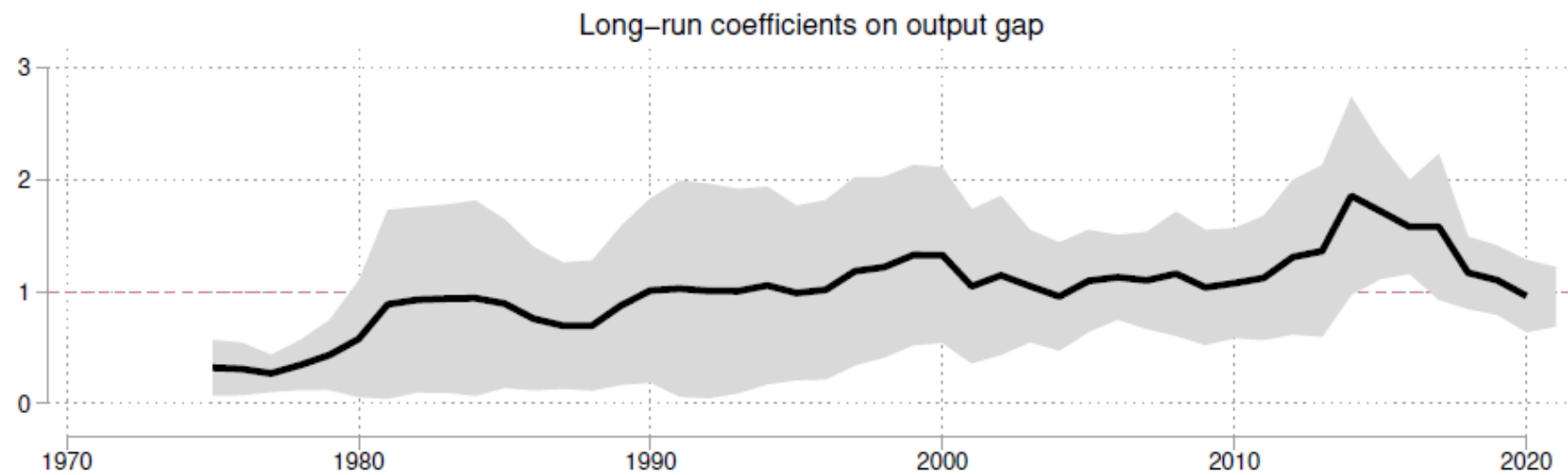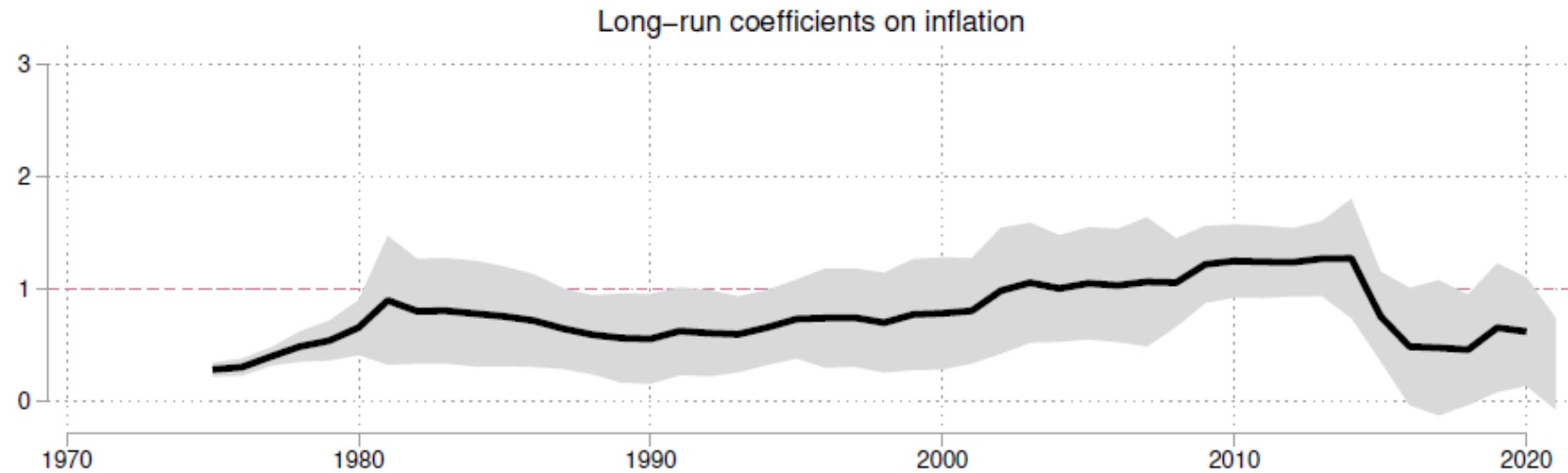
Business cycle asymmetries
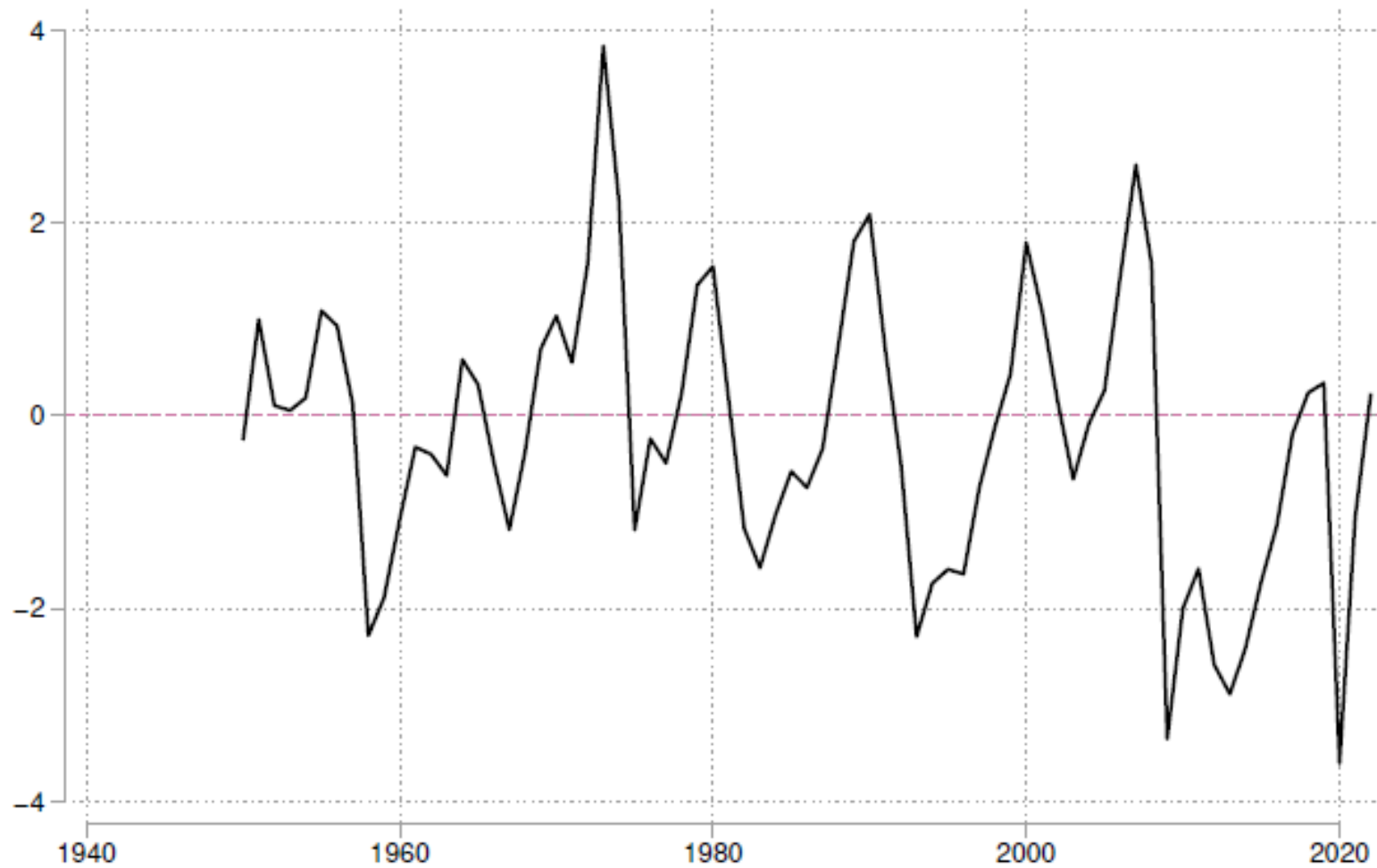
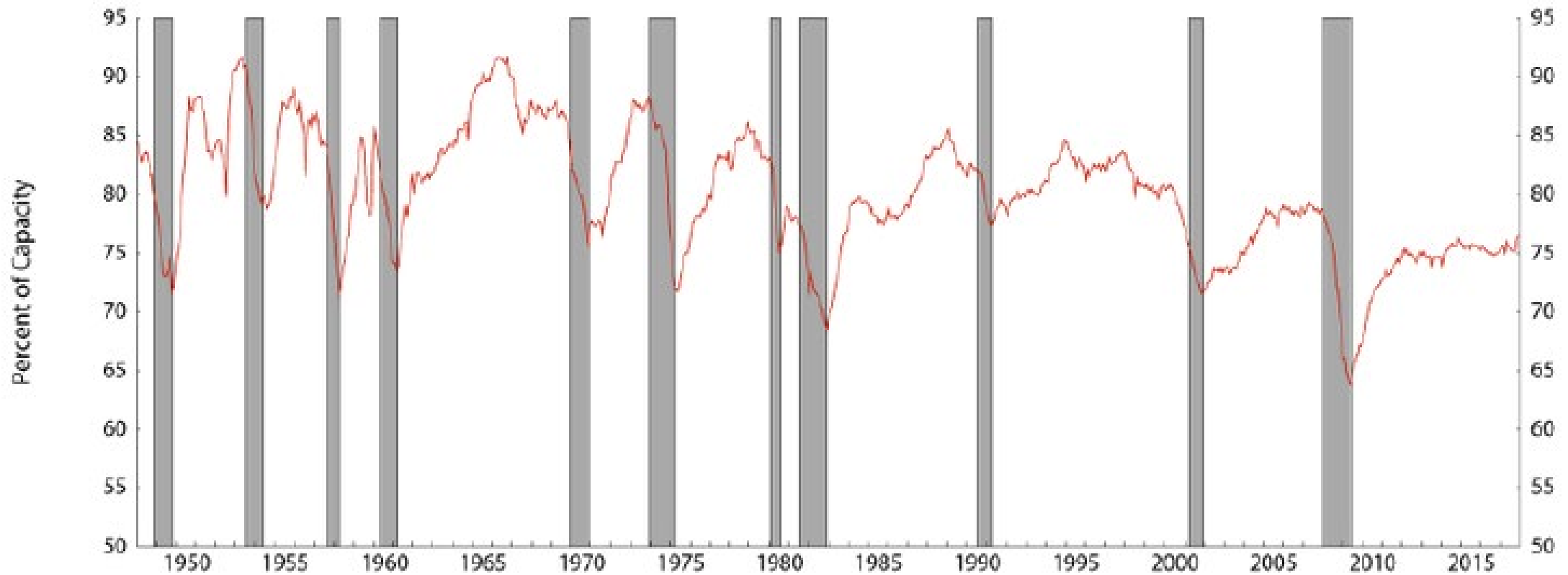# Increased cyclicality in the raw data

Primary balance
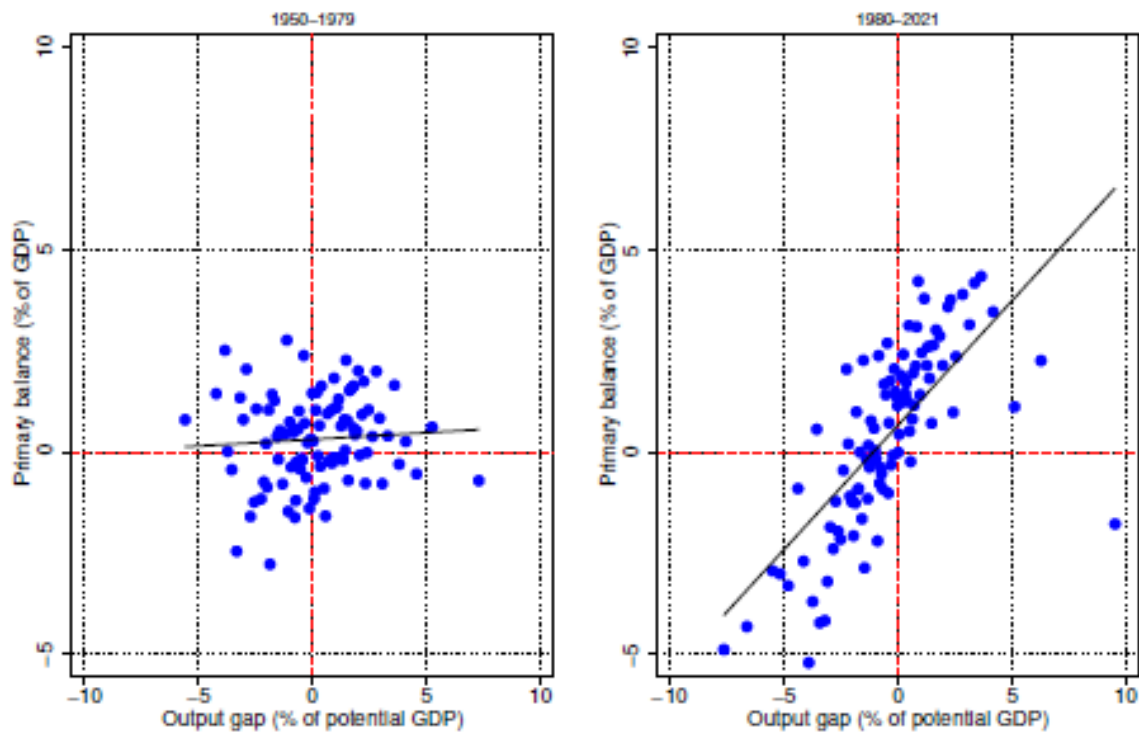
Policy rates

Downward drift in output gap estimates (average across 17 AEs)

Similar downward drift in capacity utilisation rates (U.S.)

Asymmetric cyclical responses

Fiscal policy reaction function

Primary balance	(1)	(2)
Lagged debt	0.0255*** (0.00970)	0.0276*** (0.0102)
Output gap	0.530*** (0.0722)	
Output gap (>0)		0.327*** (0.112)
Output gap (<0)		0.750*** (0.108)
Observations	1200	1200
No. of countries	17	17
R-squared	0.277	0.315
Wald output gap test	-	0.42**

Monetary policy reaction function

Policy rate	(1)	(2)
Lagged policy rate	0.814*** (0.0205)	0.815*** (0.0209)
Inflation	0.192*** (0.0258)	0.193*** (0.0253)
Output gap	0.285*** (0.0622)	
Output gap (>0)		0.239*** (0.0867)
Output gap (<0)		0.319*** (0.0498)
Long-term coefficient on inflation	1.03 (0.133)	1.05 (0.129)
Long-term coefficient on output gap	1.53 (0.374)	-
Observations	630	630
No. of countries	9	9
R-squared	0.888	0.887
Wald output gap test		0.068

Policy interactions

Policy interactions

Fiscal policy reaction function

Primary balance	(1)	(2)
Lagged debt	0.0334***	0.0356***
	(0.0101)	(0.0105)
Output gap	0.510***	
	(0.0698)	
Output gap (>0)		0.266**
		(0.114)
Output gap (<0)		0.758***
		(0.104)
Int. paid on debt	0.115**	0.132**
	(0.0495)	(0.0566)
Observations	1200	1200
No. of countries	17	17
R-squared	0.312	0.358
Wald output gap test	-	0.49***

Monetary policy reaction function

Policy rate	(1)	(2)
Lagged policy rate	0.764***	0.767***
	(0.0413)	(0.0422)
Inflation	0.193***	0.192***
	(0.0329)	(0.0306)
Output gap	0.272***	
	(0.0660)	
Output gap (>0)		0.227***
		(0.0879)
Output gap (<0)		0.302***
		(0.0580)
Sovereign debt	-0.00756**	-0.00725**
	(0.00334)	(0.00338)
Long-term coefficient on inflation	0.82	0.82
	(0.155)	(0.151)
Long-term coefficient on output gap	1.15	-
	(0.409)	
Observations	627	627
No. of countries	9	9
R-squared	0.890	0.889
Wald output gap test	-	0.074

Policy interactions II: Fiscal policy

Primary balance	(1)
Lagged debt	-0.00991
	(0.0121)
Output gap	0.498***
	(0.0719)
Int. paid on debt	-0.495**
	(0.213)
Sovereign debt × Int. paid on debt	0.00962***
	(0.00272)
Observations	1200
No. of countries	17
R-squared	0.609
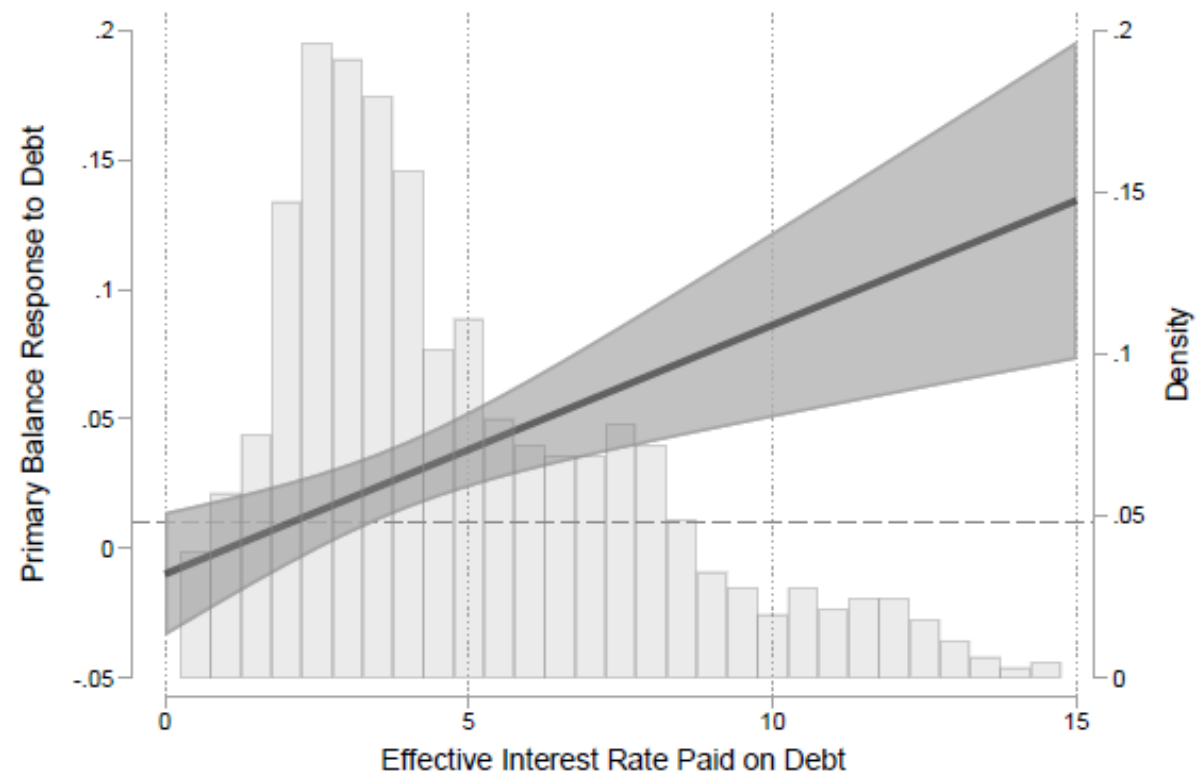
Policy interactions II: Monetary policy

Policy rate	(1)
Lagged policy rate	0.747*** (0.0384)
Inflation	0.251*** (0.0846)
Output gap	0.277*** (0.0676)
Sovereign debt	-0.00406 (0.00616)
Inflation × Sovereign debt	-0.000507 (0.00185)
Long-term coefficient on inflation	0.99 (0.356)
Long-term coefficient on output gap	1.09 (0.379)
Observations	627
No. of countries	9
R-squared	0.892
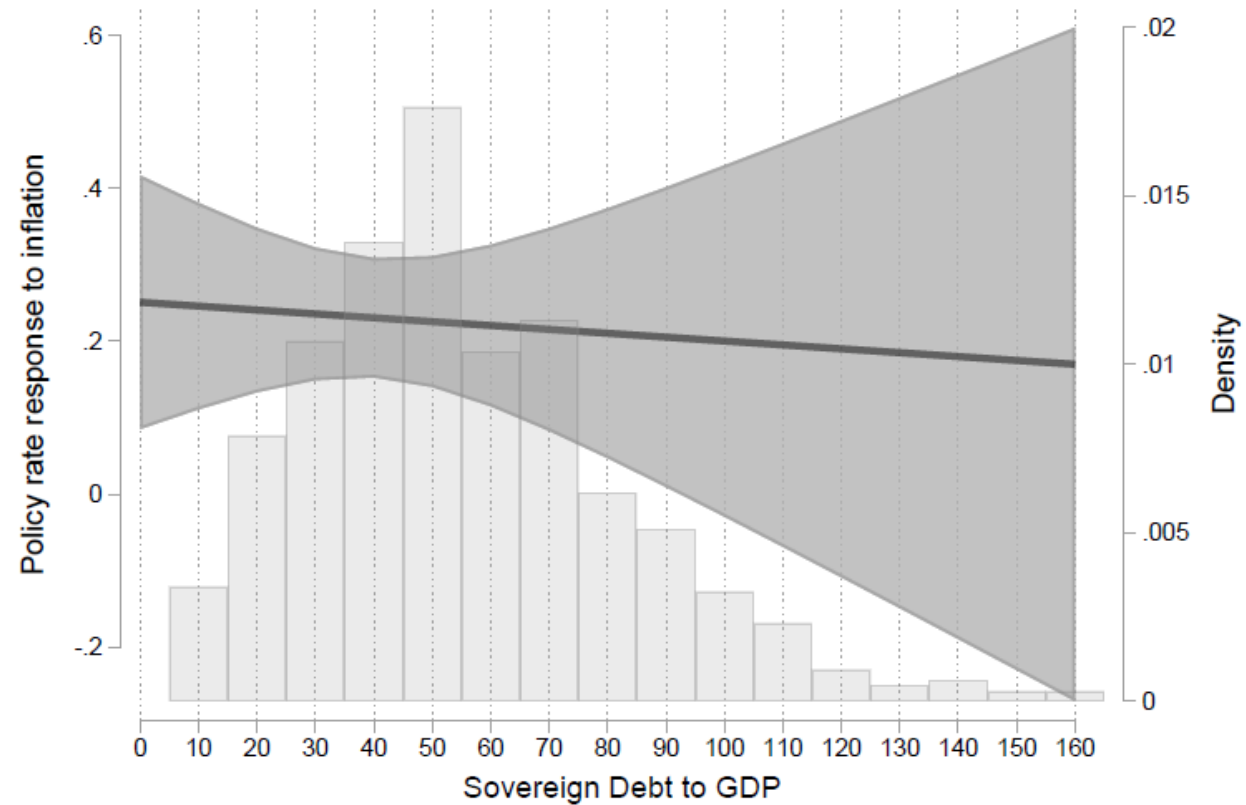
Conclusions

- Upward drift in public debt and downward drift in policy rates can be explained at least in part by policy reaction

  - Stronger response to cyclical fluctuations together with downward drift in estimates of economic slack introduced drift on policies

  - Policy interaction reinforce the drift

    - Falling interest rates appear to have pushed up deficits in particular in recent decades

    - No robust evidence of higher public debt restraining monetary policy