Fiscal deficits and inflation risks: the role of fiscal and monetary regimes

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Motivation

- Massive fiscal stimulus in response to the Covid-19 crisis and return of inflation
  - What is the contribution of fiscal deficits?
- The empirical literature does not provide a clear answer
  - Generally stronger effect of fiscal deficits in inflation in emerging markets or during periods of high inflation; eg Fischer et al (2002)
- We examine the influence of the fiscal-monetary regime on the fiscal-deficit inflation relationship

Motivation (2)

- Theory suggests that fiscal and monetary policy are jointly relevant in determining inflation and that regimes matter:
  - Sargent and Wallace (1981), Leeper (1991), Woodford (2011), Leeper et al (2017), etc
  - Bianchi, Faccini and Melosi (2023)

- Fiscal multipliers depend on the response of monetary policy (Ramey (2019))

Motivation (3)

- Monetary and fiscal regimes in AEs have changed
  - 1970s
    - Less central bank independence
    - Dominant fiscal authority
  - 1990s
    - Monetary policy independence
    - Fiscal rules
  - Today?
    - Changes to monetary policy frameworks (eg average inflation targeting)
    - Pre-pandemic, growing consensus regarding costs of fiscal austerity

Classifying the monetary regime

- We use both *de jure* and *de facto* definitions
- We classify the monetary policy regime as "independent" if:
  - *de jure*: the central bank legislation places sufficient limits on lending to the government – ie limited scope for MP accommodation of FP (Romelli (2022))
  - *de facto*: whether actual rates are below those prescribed by the Taylor rule
- In the baseline case, we use the *de jure* definition for MP high vs low independence

Classifying the fiscal policy regime

- We use both *de jure* and *de facto* definitions
- A fiscal policy regime is "prudent" if:
  - *de jure*: a fiscal rule for budget balance is in place
  - *de facto*: the primary surplus is an increasing function of the debt-to-GDP ratio, based on Mauro et al (2015) and Bohn (1998)

Classifying the fiscal policy regime

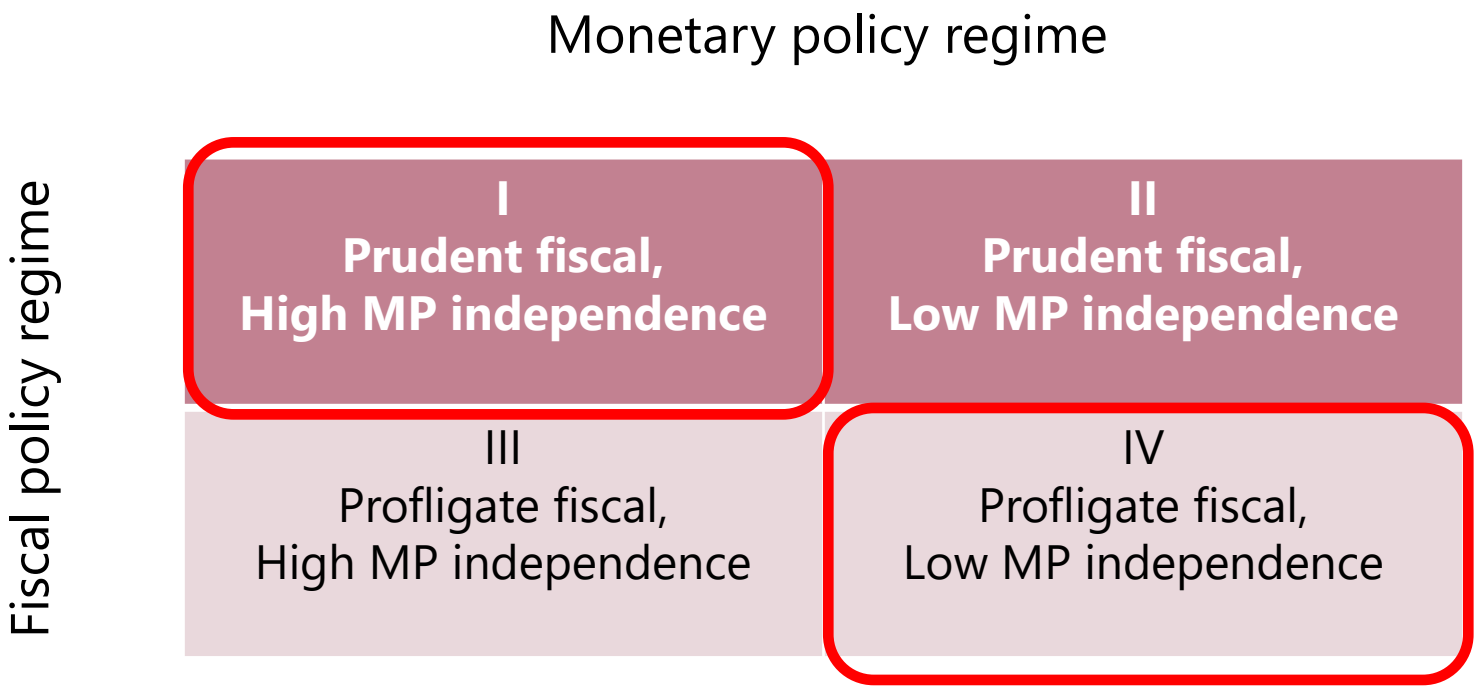
- Our *de facto* classification for fiscal prudence / profligacy is based on the following fiscal reaction function (Mauro et al (2015)):

$$s_t = \rho d_t + \alpha Z_t + \varepsilon_t$$

  - *s* is the primary balance; *d* is the debt to GDP ratio; *Z* includes the cyclical component of GDP, transitory government spending and commodity prices
  - Estimated over 25-year rolling windows for each country

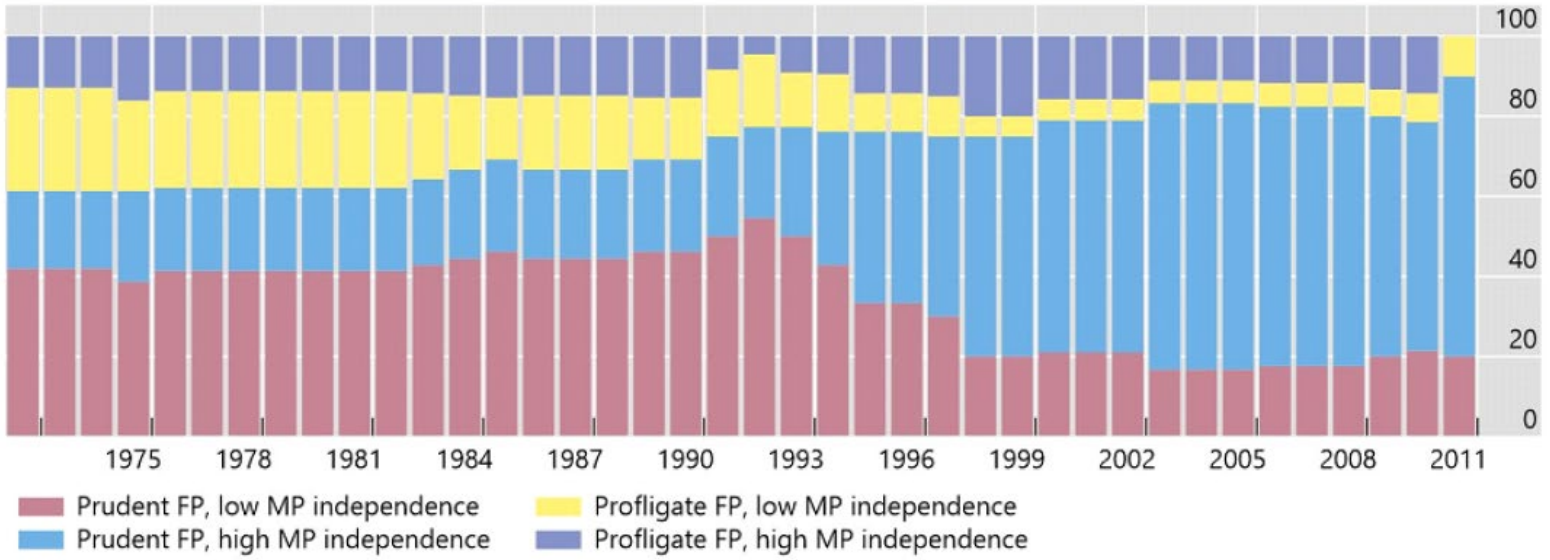
- If $\rho > 0$ with $p < .05$, fiscal policy is deemed "prudent" over the 25-year window

Four combinations of regimes



Regime classification over time

Share of economies, in %



Fiscal regimes are "prudent" if the primary surplus increases in response to a rise in debt. MP is independent if the CB has above-median legal limitations on lending to the public sector

Countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States.

Sample period: 1972-2011 (shorter series for some AEs)

Data and methodology

- Annual data 1970-2011, for 21 AEs
- Least squares and panel quantile regressions
- "Inflation at risk" framework to study the effect on the entire inflation forecast distribution (Banerjee et al (2020))
  - Quantile Phillips curves with fixed effects, augmented by fiscal deficits (Machado and Santos Silva (2019))

Methodology

- Phillips curve-type model

- $\bar{\pi}_{i,t+1,t+2} = \alpha_i + X_{it}\,\beta_t + \varepsilon_{it}$
  - where $X_{it} = \left(\Delta def_{i,t}, \Delta y_{i,t}, \pi_{i,t}, \Delta exc_{i,t}, \Delta oil_{i,t}\right)$
  - LHS variable: average of one- and two-year-ahead inflation
  - RHS variables: change in deficit; real GDP growth; current inflation; log change in exchange rate (NEER) and in oil price

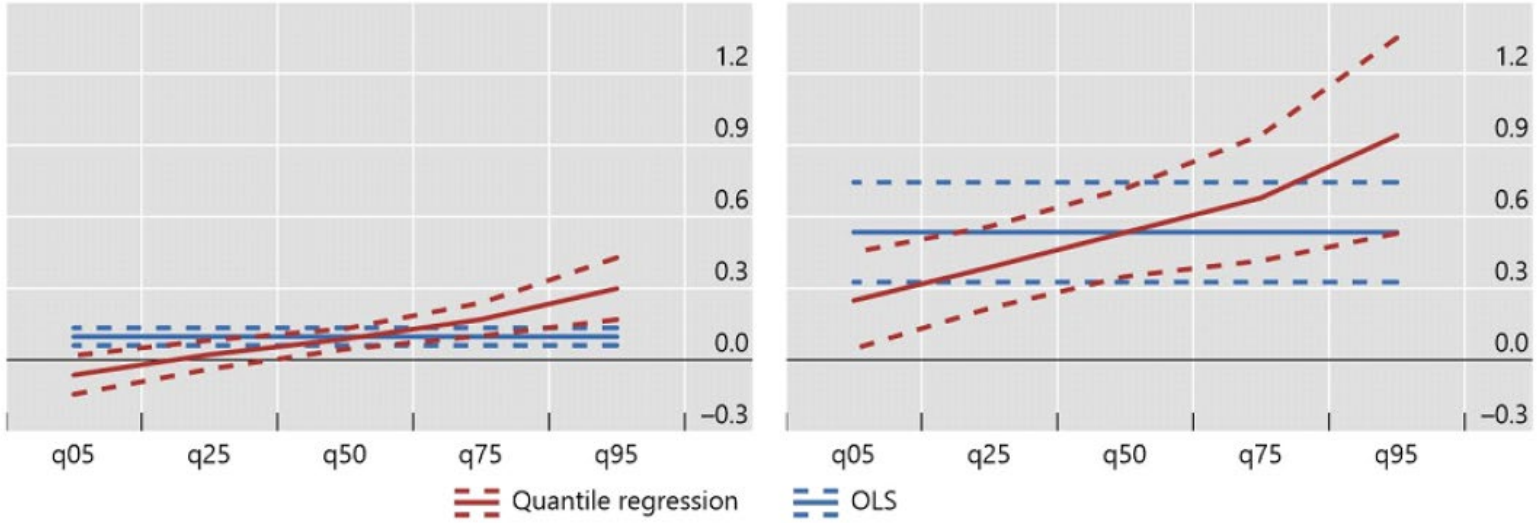
- Obtain coefficients at 5%, 25%, 50%, 75% and 95% quantiles

- Distributions smoothed to follow a skewed-*t* distribution (Adrian et al (2019))

Results - OLS

	Monetary dominance	Fiscal dominance	Prud FP low MP indep	Profl FP high MP indep
	$\overline{\pi}_{i,t+1,t+2}$	$\overline{\pi}_{i,t+1,t+2}$	$\overline{\pi}_{i,t+1,t+2}$	$\overline{\pi}_{i,t+1,t+2}$
Δdef_{it}	0.0974***	0.536***	0.363***	0.123
	(0.0222)	(0.128)	(0.107)	(0.126)
π_{it}	0.714***	0.722***	0.763***	0.463***
	(0.0263)	(0.0797)	(0.0363)	(0.0628)
Δy_{it}	0.301***	1.005***	0.752***	0.366***
	(0.0390)	(0.101)	(0.102)	(0.0556)
Δexc_{it}	-0.0757**	0.0149	0.0162	-0.0212
	(0.0307)	(0.0271)	(0.0209)	(0.0607)
Δoil_{it}	-0.00109	-0.00811	0.00298	0.00486
	(0.00479)	(0.00559)	(0.00531)	(0.00747)
Observations	314	152	341	126
R-squared	0.747	0.692	0.659	0.391
Number of countries	14	9	13	8

Results – Quantile regressions



(a) Monetary dominance regime

(b) Fiscal dominance regime

Figure: **Quantile regression estimates of fiscal deficits on inflation.** $\overline{\pi}_{i,t+1,t+2}$, on changes in the fiscal deficit-to-GDP ratio in year t. Quantile estimates are shown with 90% confidence bands using a block bootstrap clustered by country. OLS estimates are shown with 90% confidence bands clustered by country.

Inflation-at-risk distributions

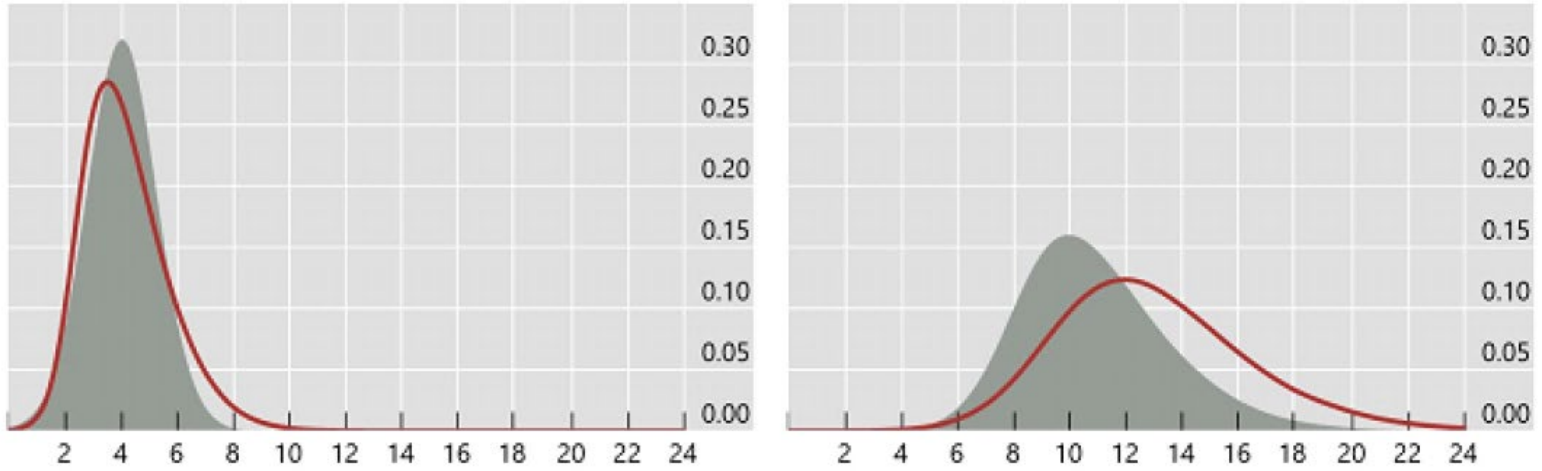


Figure: **Fiscal deficits increase inflation by more in fiscal dominance regimes.** The grey shaded density shows the conditional distribution evaluated at the sample means of all variables. The red density shows the conditional distribution evaluated at a two standard deviation increase in the change in the fiscal deficit, with other control variables at their means.

- The effect is larger at right tail of the inflation forecast distribution

Quantile regression results: Monetary dominance

Inflation forecast quantiles	5% $\overline{\pi}_{i,t+1,t+2}$	25% $\overline{\pi}_{i,t+1,t+2}$	50% $\overline{\pi}_{i,t+1,t+2}$	75% $\overline{\pi}_{i,t+1,t+2}$	95% $\overline{\pi}_{t+1,t+2}$
Δdef_{it}	-0.0630	0.0222	0.0879***	0.170***	0.299***
	(0.0522)	(0.0333)	(0.0297)	(0.0400)	(0.0785)
π_{it}	0.549***	0.636***	0.704***	0.788***	0.921***
	(0.0669)	(0.0418)	(0.0452)	(0.0822)	(0.161)
Δy_{it}	0.254***	0.279***	0.298***	0.322***	0.360***
	(0.0607)	(0.0400)	(0.0389)	(0.0577)	(0.104)
Δexc_{it}	-0.0882**	-0.0816**	-0.0764**	-0.0700**	-0.0599
	(0.0390)	(0.0339)	(0.0316)	(0.0351)	(0.0485)
Δoil_{it}	0.00319	0.000913	-0.000842	-0.00303	-0.00649
	(0.00601)	(0.00455)	(0.00423)	(0.00477)	(0.00651)
Observations	314	314	314	314	314

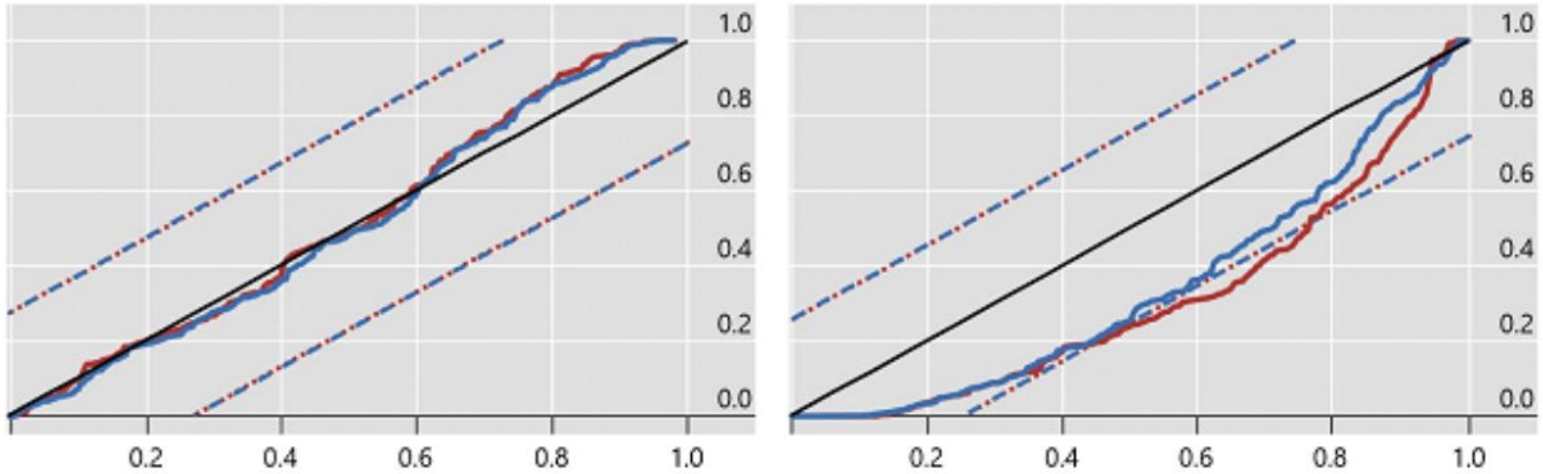
- Relatively small but non-linear effect of deficits on inflation
- Influence of output less non-linear

Quantile regression results: Fiscal dominance

Inflation forecast quantiles	5% $\overline{\pi}_{i,t+1,t+2}$	25% $\overline{\pi}_{i,t+1,t+2}$	50% $\overline{\pi}_{i,t+1,t+2}$	75% $\overline{\pi}_{i,t+1,t+2}$	95% $\overline{\pi}_{t+1,t+2}$
Δdef_{it}	0.251*	0.390***	0.536***	0.679***	0.941***
	(0.145)	(0.106)	(0.111)	(0.169)	(0.245)
π_{it}	0.653***	0.687***	0.722***	0.757***	0.821***
	(0.0878)	(0.0649)	(0.0718)	(0.0772)	(0.115)
Δy_{it}	0.745***	0.872***	1.005***	1.136***	1.374***
	(0.170)	(0.0983)	(0.0766)	(0.0976)	(0.194)
Δexc_{it}	-0.0483**	-0.0175	0.0149	0.0466*	0.105**
	(0.0234)	(0.0202)	(0.0219)	(0.0281)	(0.0447)
Δoil_{it}	-0.000343	-0.00413	-0.00810*	-0.0120*	-0.0191*
	(0.00527)	(0.00390)	(0.00475)	(0.00649)	(0.0106)
Observations	152	152	152	152	152

- Large and highly non-linear effect of deficits on the inflation forecast distribution
- Also large and highly non-linear effect of our output

Forecasting performance – probability integral transform



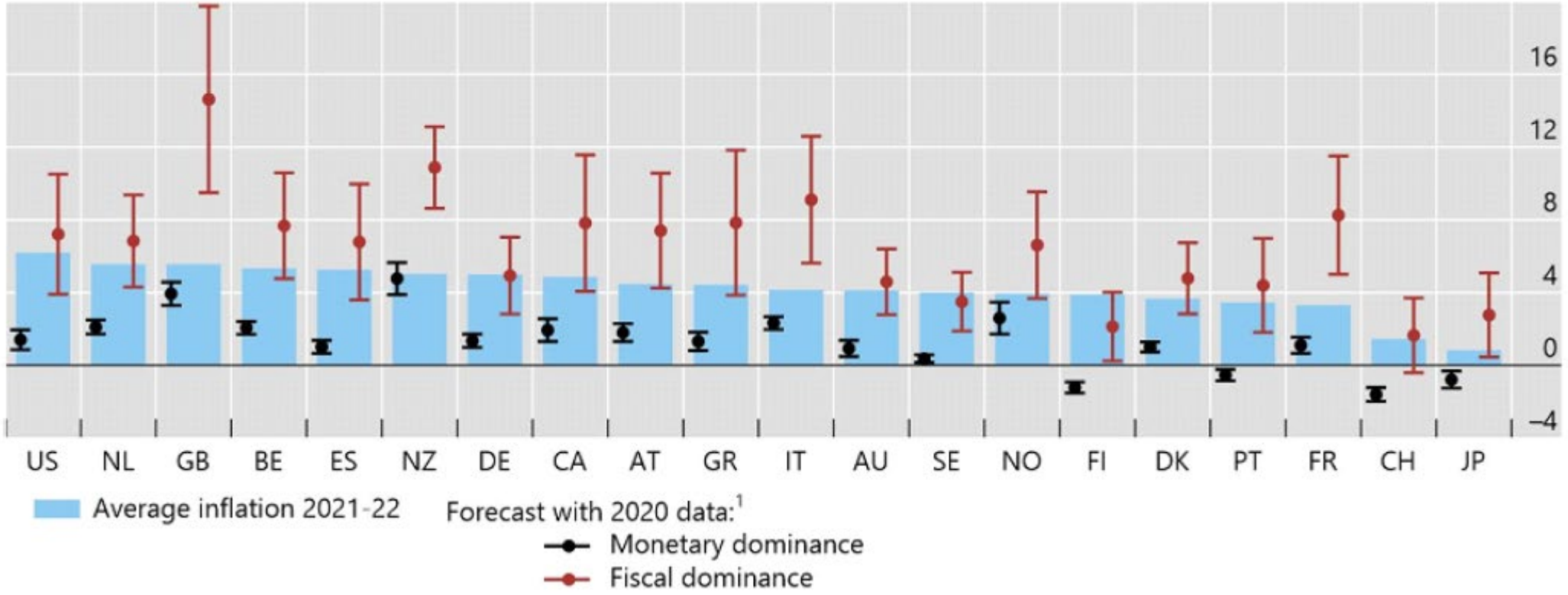
Blue line: baseline model; Red line model without fiscal deficits

- Inclusion of fiscal deficits on forecasting performance
  - Under monetary dominance -> virtually no improvement
  - Fiscal dominance -> improves forecasting performance

Robustness tests and extensions

- Using fiscal “shocks” instead of changes in deficits
- Sub-sample estimates covering only 1970s and 1980s
- Using different definitions of fiscal and monetary regimes
- Asymmetric effects (higher vs lower deficits)

Inflation outcomes compared to forecasts under monetary / fiscal dominance



- Inflation outcomes more consitent with fiscal dominance regime model

Conclusions

- Higher deficits are associated with higher future inflation
  - The effect is larger at right tail of the inflation forecast distribution
- The effect depends crucially on the monetary and fiscal policy regime
  - Fiscal dominance > Monetary dominance
- The regime matters also for the response of inflation to other variables
  - Sensitivity of inflation to economic activity
- Implications for inflation risks today?