



# Stagflationary fiscal expansions

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## Motivation

- EME “puzzle”
  - Fiscal deficits associated with higher inflation (eg Fischer et al (2002) and Catão and Terrones (2005))
  - But estimates of fiscal multipliers at best zero, often negative (eg Ilzetzki et al (2013)).
- In the absence of an output boost from fiscal expansions, where is inflation coming from?

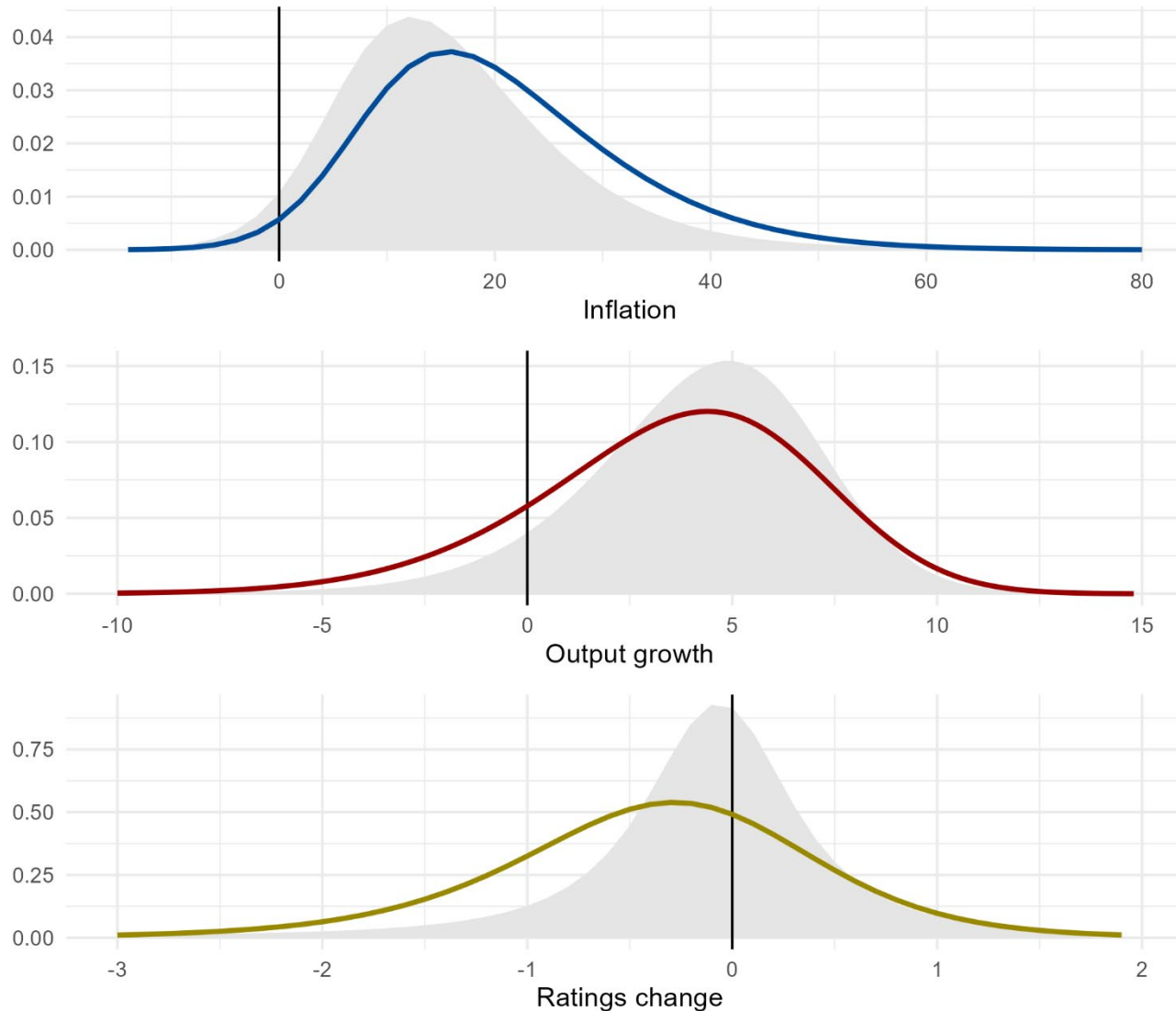
## Motivation II

- Potential solution to the puzzle - influence of fiscal expansions on sovereign default risk
- Arellano et al (2024) - Sovereign default risk in a New Keynesian model.
- Default state associated with economic turmoil
  - Weak economic activity
  - High inflation
- When default risk rises, forward-looking agents anticipate the turmoil
  - Lowers current output and raises current inflation.

## This paper

- Examine this channel in the data
- Do so within an “At-risk” framework (Banerjee et al (2024))
- Examine how fiscal expenditure shocks impact the conditional forecast distributions of
  - Inflation
  - Output
  - Sovereign risk
  - (also exchange rates and money growth)
- Sample of 26 EMDEs, annual data from 1960 onwards.
- The tails are important

# Main results



- Conditional forecast densities
  - Grey area: evaluated at means
  - Lines: evaluated with + 2 SD expansionary fiscal expenditure shock (other variables at means)
- **Inflation**
  - Large effect in the right-tail
  - Exacerbated by exchange rate depreciation
- **Output**
  - Increased dispersion of the conditional distribution
- **Ratings**
  - Increase in downgrade risk

## Main results

- Expansionary fiscal shocks associated with
- **Inflation:** Upside inflation risks - rightward shift of the conditional distribution
  - Larger effect in the right-tail
  - Exacerbated by exchange rate depreciation
- **Output:** Increased dispersion of the conditional distribution
  - Left-tail -> increase in downside
  - Right-tail -> fiscal expenditure shocks can be expansionary
- **Sovereign ratings:** Increase in downgrade risk - leftward shift of the conditional distribution
- Policy frameworks can mitigate the negative risks
  - **Large FX reserves** and **inflation targeting** mitigate the adverse influence of fiscal expansions

## Literature

- Effects of fiscal deficits on inflation (eg Catao and Terrones (2005); Lin and Chu (2013); Fischer et al (2002))
- Government spending on output and exchange rates (eg Monacelli and Perotti (2010); Kim and Roubini (2008); Ilzetzki et al (2013))
- Sovereign risk, inflation and exchange rates (eg Calvo (1998); Amador, Farhi and Gopinath (2013); Arellano (2024))
- How inflation targeting affects inflation and inflation expectations (eg Ball and Sheridan (2004); Lin and Ye (2007); Gurkaynak et al (2010))
- Inflation risks and non-linearities in the Phillips curve (eg Lopez-Salido and Loria (2024); Korobilis et al (2021); Buseti et al (2021); Forbes et al (2021); Banerjee et al (2024))
- Risk management approach to monetary policy (eg Kilian and Manganelli (2007, 2008))

## Methodology I

- Quantile panel Phillips curves with fixed effects (Machado and Santos Silva (2019))
- Allows to analyse how the entire inflation forecast distribution changes, instead of focusing on the conditional mean of inflation
- $Q_{yt+1}(\tau | X_{it}) = (\alpha_i + \delta_i q(\tau)) + X'_{it}\beta + X'_{it}\gamma q(\tau) + u(q(\tau))_{it}$ 
  - where  $X_{it} = (\text{fiscal shock}_{i,t}, \Delta y_{i,t}, \pi_{i,t}, \Delta exc_{i,t}, \Delta oil_{i,t}, \Delta \text{broad money}_{i,t})$
  - LHS variables: one-year-ahead inflation, log change in output, change in sovereign rating, log change in nominal exchange rate and log change in broad money
  - RHS variables: fiscal expenditure shock; current inflation; real GDP growth; log changes in exchange rate, oil price and broad money
- We check with a Monte Carlo simulation to understand bias when deviating from underlying assumptions in Machado and Santos Silva (2019)



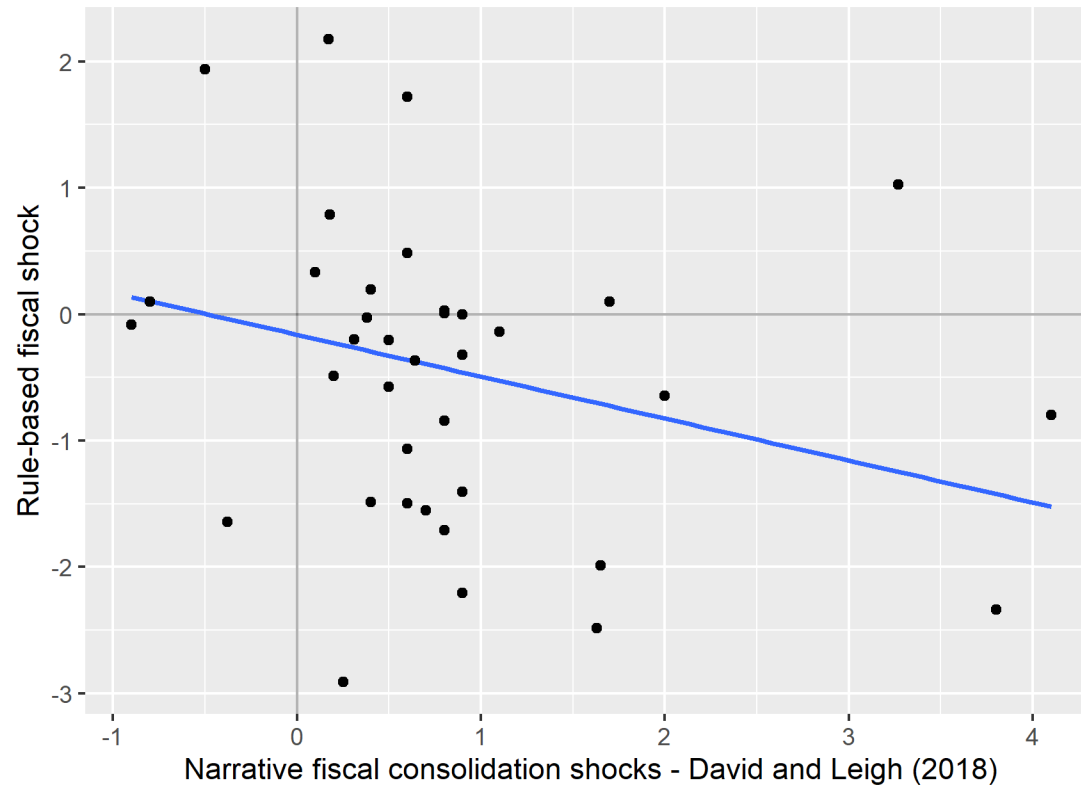
## Methodology II

- Obtain coefficients at 5%, 25%, 50%, 75% and 95% quantiles
- Distributions smoothed to follow a skewed- $t$  distribution (Adrian et al (2019))
- Also consider linear models for various dependent variables
  - $y_{i,t+1} = X'_{it}\beta$

## Fiscal expenditure shocks

- Fiscal multiplier literature – many studies examine shocks to government consumption
- We deviate from this and use government expenditure
  - Fiscal sustainability concerns often driven by challenges in financing transfers
  - Problem -> fiscal transfers can be cyclical
- Method - residual from estimated country specific fiscal rules following Corsetti et al (2012)
  - Method is very similar to recovering fiscal shocks from VAR methods (eg Blanchard and Perotti (2002). Born and Müller (2012) show can be applied to annual data.
  - $\Delta exp_t = \alpha + \beta \mathbf{Z}_{t-j} + u_{it}$
  - $\Delta exp_{it}$  = cyclically adjusted government expenditures to GDP
  - $\mathbf{Z}_{t-j}$  = two lags of cyclically adjusted expenditures, real GDP growth, government debt-to-GDP and banking crisis indicator.

## Validating the fiscal expenditure shock measure

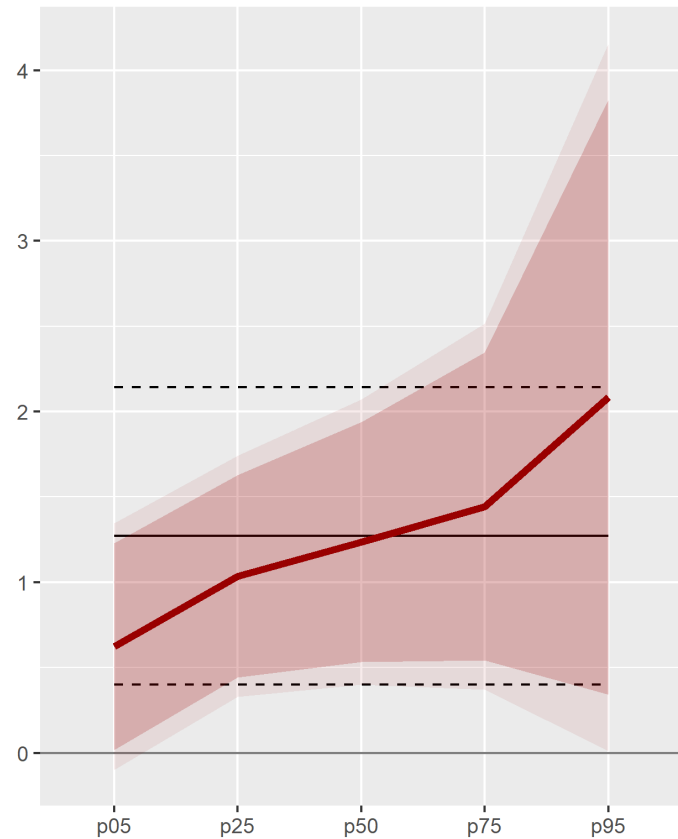


● Fitted line: P-value of 0.08

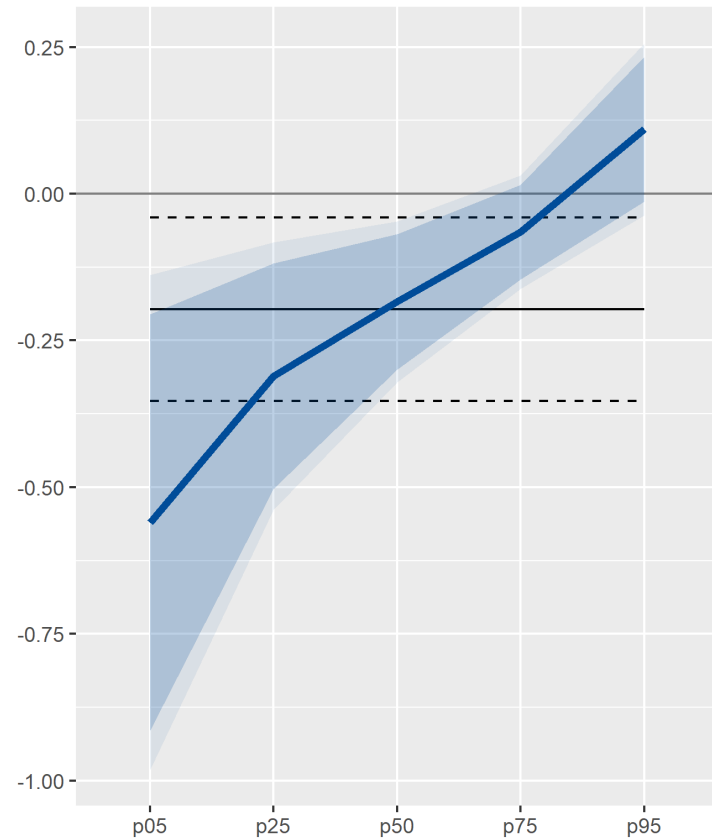
# How do expansionary fiscal shocks affect the conditional distributions of...

Impact of fiscal shock on ...

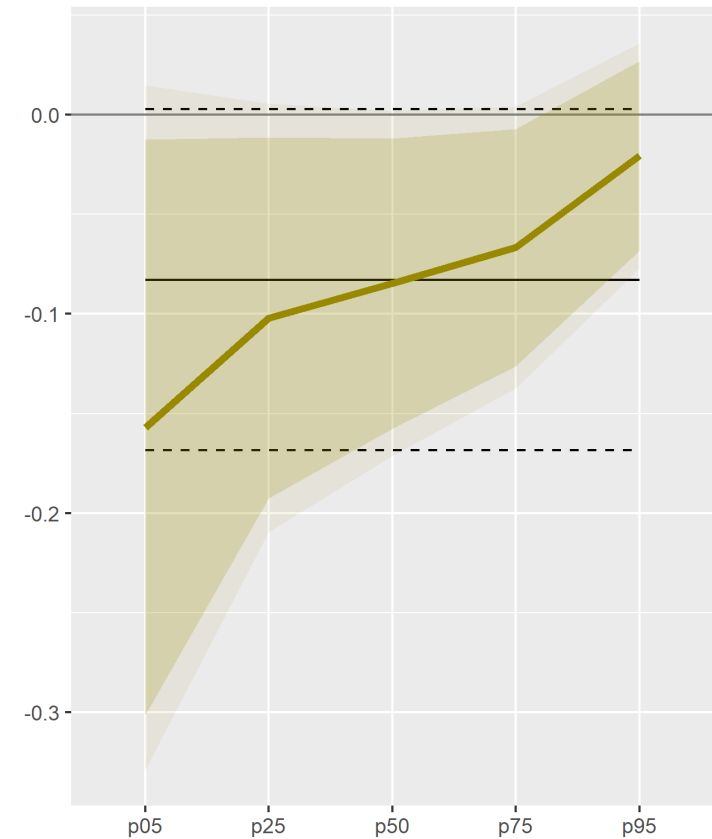
### Inflation



### Output growth



### Ratings



Black lines: OLS estimates and 95% confidence bands

## Baseline results – inflation risks

Inflation forecast quantiles	5%	25%	50%	75%	95%	OLS
	$\pi_{t+1}$	$\pi_{t+1}$	$\pi_{t+1}$	$\pi_{t+1}$	$\pi_{t+1}$	$\pi_{t+1}$
Fiscal shock <sub>it</sub>	0.624* (0.370)	1.035*** (0.362)	1.236*** (0.429)	1.444*** (0.550)	2.086** (1.063)	1.272*** (0.447)
$\pi_{it}$	0.212* (0.109)	0.550*** (0.104)	0.715*** (0.0999)	0.887*** (0.119)	1.415*** (0.183)	0.745*** (0.0580)
$\Delta y_{it}$	0.798* (0.469)	0.484** (0.212)	0.331 (0.268)	0.172 (0.395)	-0.318 (1.052)	0.304 (0.255)
$\Delta exc_{it}$	0.0633 (0.130)	0.143* (0.0756)	0.181** (0.0734)	0.221** (0.0980)	0.345* (0.204)	0.188*** (0.0552)
$\Delta oil_{it}$	0.0277 (0.0365)	0.0300 (0.0304)	0.0312 (0.0288)	0.0324 (0.0313)	0.0360 (0.0519)	0.0314 (0.0298)
$\Delta Money_{it}$	-0.0259 (0.278)	0.0236 (0.0965)	0.0478 (0.118)	0.0729 (0.197)	0.150 (0.557)	0.0522 (0.0391)
<i>SovereignCrisis</i> <sub>it</sub>	5.907 (5.981)	10.66* (5.486)	12.97* (6.795)	15.39* (8.905)	22.81 (17.10)	13.40* (6.972)
Observations	1,036	1,036	1,036	1,036	1,036	1,036

# How do expansionary fiscal shocks affect the conditional distributions of ...

Impact of fiscal shock on ...

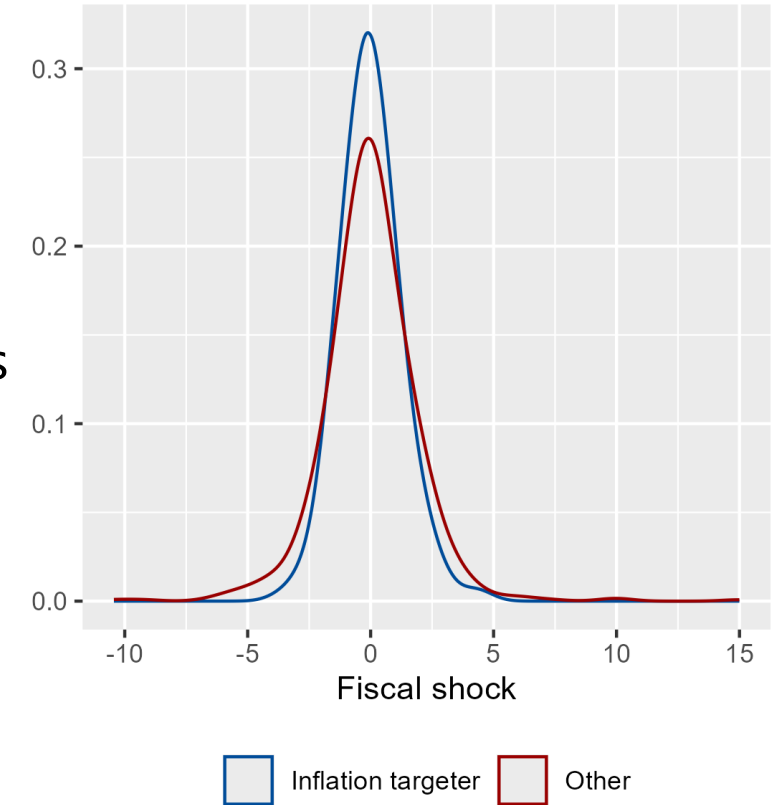


- Exchange rate depreciation compounds inflationary consequences
- Monetary conditions (captured by broad money growth) indicate risk that monetary authorities tend to accommodate the expansionary fiscal shock

Black lines: OLS estimates and 95% confidence bands

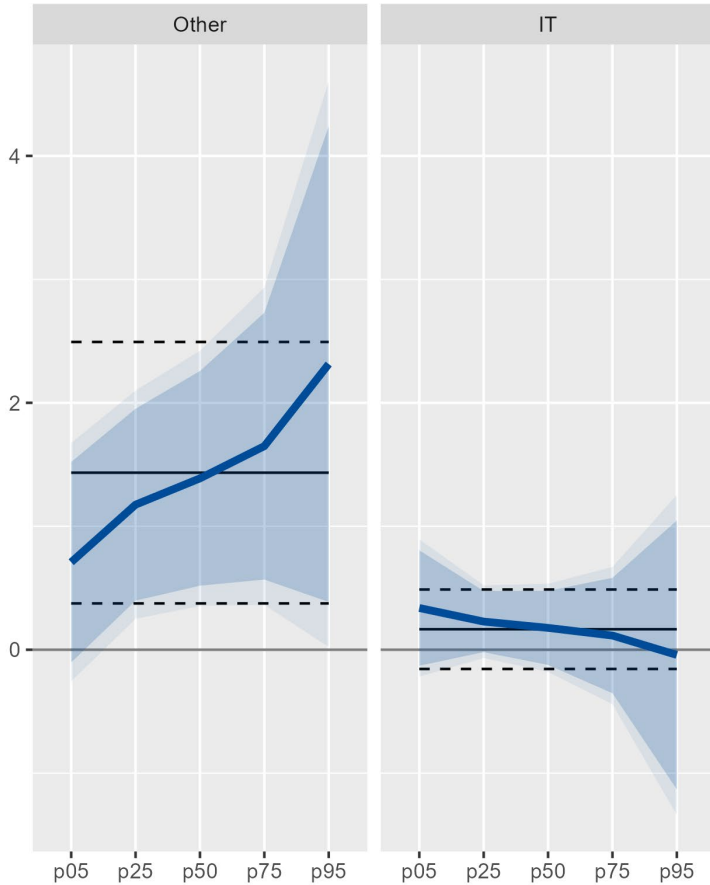
## Monetary policy frameworks I

- What aspects of monetary policy frameworks might break the nexus between fiscal expansions, default risks, inflation and output losses?
- Many countries have adopted inflation targeting (IT) mandates in recent decades
- IT (and central bank independence) reduces upside inflation risks
- In addition, IT also usually involves a fiscal-monetary compact
  - Government agrees to stabilise debt
  - Indeed estimated fiscal shocks have smaller variance in IT regimes (and fiscal deficits are less persistent)

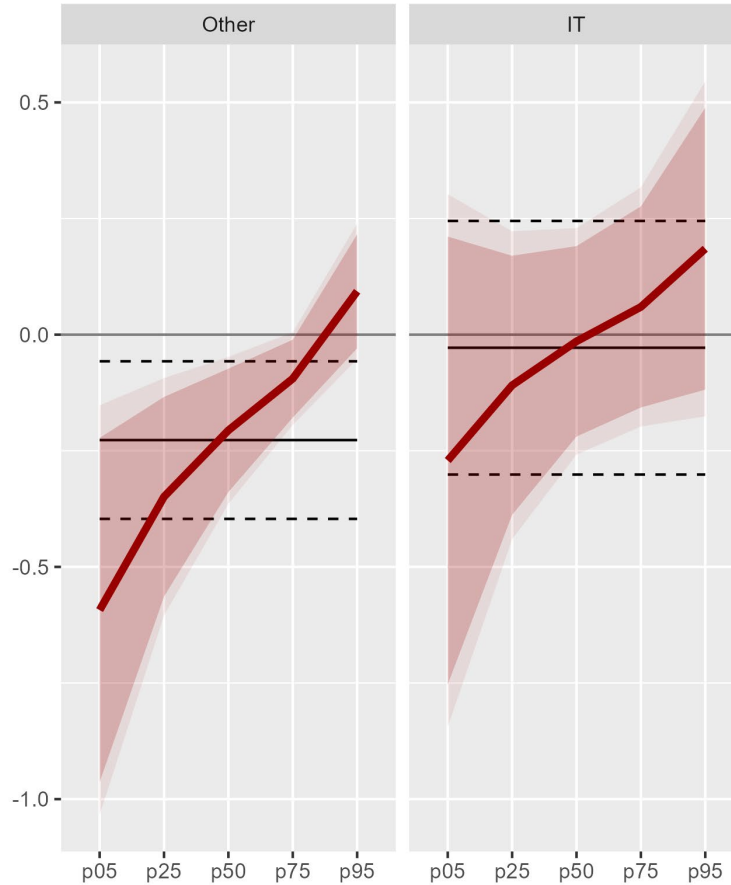


Impact of fiscal shock on ...

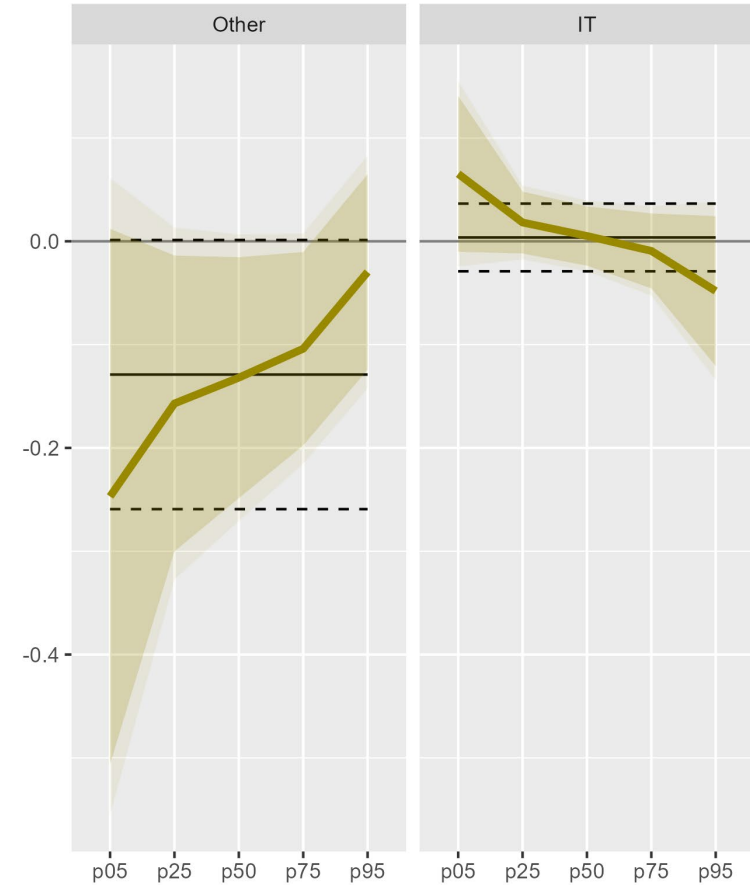
Inflation



Output



Ratings



Black lines: OLS estimates and 95% confidence bands

- Additionally, results for broad money growth indicate no accommodation of fiscal shock in IT regimes – unlike in other regimes.

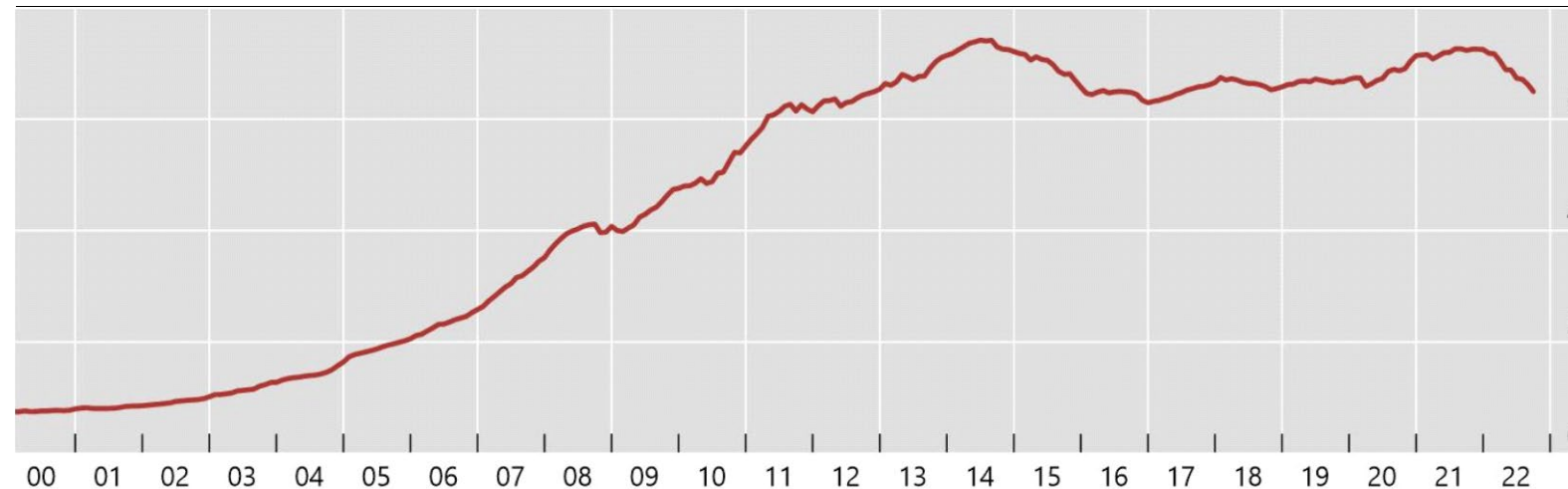


## Monetary policy frameworks II

- Several EMDEs have accumulated large **FX reserves**
  - Could mitigate default risk, and incentives to default
- Broadly similar story to IT - but with subtle differences

EMEs FX reserves

USD trillions



EMEs: AR, BR, CL, CN, CO, CZ, HK, HU, ID, IN, KR, MX, MY, PH, PL, SA, SG, TH, TR and ZA.

Source: IMF, *International Financial Statistics*.

## Conclusion

- Expansionary fiscal shocks appear to have been stagflationary in EMDEs
- Rise in sovereign credit risks due to fiscal expansion potentially resolves some of this “puzzle”
- Capturing non-linearity helps to understand the broad range of outcomes
- Policy frameworks can help to mitigate the negative consequences
- Still more work needed to understand to what extent monetary policy alone can do this without cooperation of fiscal authorities.

Additional slides

## Non-linearities in conditional inflation forecast on (other) risk factors

- Higher current inflation increases likelihood of high future inflation
  - Consistent with more frequent price adjustments at high inflation rates (eg Alvarez et al (2019))
- Exchange rate effects also larger at the right tail
- Real GDP growth has larger effects at left tail

## Baseline results – output growth risk

Forecast quantiles	5%	25%	50%	75%	95%	OLS
	$\Delta y_{t+1}$	$\Delta y_{t+1}$	$\Delta y_{t+1}$	$\Delta y_{t+1}$	$\Delta y_{t+1}$	$\Delta y_{t+1}$
$FiscalShock_{it}$	-0.560*** (0.216)	-0.311*** (0.117)	-0.184*** (0.0702)	-0.0654 (0.0493)	0.110 (0.0752)	-0.197** (0.0801)
$\pi_{it}$	-0.0235 (0.0262)	-0.00718 (0.0137)	0.00116 (0.00911)	0.00894 (0.00906)	0.0204 (0.0140)	0.000318 (0.00723)
$\Delta y_{it}$	0.539*** (0.0824)	0.400*** (0.0534)	0.328*** (0.0476)	0.262*** (0.0477)	0.163*** (0.0583)	0.335*** (0.0475)
$\Delta exc_{it}$	0.00889 (0.0264)	0.00427 (0.0151)	0.00191 (0.0115)	-0.000297 (0.0122)	-0.00355 (0.0175)	0.00215 (0.0116)
$\Delta oil_{it}$	-0.0158*** (0.00518)	-0.0112*** (0.00339)	-0.00884*** (0.00333)	-0.00665* (0.00353)	-0.00343 (0.00496)	-0.00908** (0.00329)
$\Delta Money_{it}$	0.00445 (0.0216)	0.00620 (0.00880)	0.00709 (0.00884)	0.00792 (0.0137)	0.00915 (0.0208)	0.00700** (0.00263)
$SovereignCrisis_{it}$	-1.803 (3.217)	-1.213 (1.960)	-0.911 (1.315)	-0.630 (1.023)	-0.214 (1.424)	-0.942 (1.303)
Observations	1,036	1,036	1,036	1,036	1,036	1,036

## Baseline results – sovereign rating risk

Forecast quantiles ( <i>Inverse sovereign ratings</i> )	5% Rating <sub>t+1</sub>	25% Rating <sub>t+1</sub>	50% Rating <sub>t+1</sub>	75% Rating <sub>t+1</sub>	95% Rating <sub>t+1</sub>	OLS Rating <sub>t+1</sub>
FiscalShock <sub>it</sub>	0.0206 (0.0290)	0.0667* (0.0363)	0.0847* (0.0444)	0.102* (0.0552)	0.157* (0.0881)	0.0829* (0.0439)
$\pi_{it}$	-0.0152 (0.0141)	-0.00819 (0.0110)	-0.00546 (0.0119)	-0.00286 (0.0134)	0.00556 (0.0220)	-0.00573 (0.0102)
Rating <sub>t</sub>	-0.0181 (0.118)	0.0519 (0.0806)	0.0792 (0.0792)	0.105 (0.0881)	0.190 (0.145)	0.0765 (0.0822)
$\Delta y_{it}$	0.00339 (0.0348)	-0.0166 (0.0238)	-0.0244 (0.0261)	-0.0318 (0.0299)	-0.0559 (0.0521)	-0.0236 (0.0270)
$\Delta exc_{it}$	0.00947 (0.0112)	0.0143 (0.00959)	0.0162 (0.0104)	0.0180 (0.0121)	0.0239 (0.0203)	0.0160 (0.0106)
$\Delta oil_{it}$	0.00192 (0.00245)	0.000921 (0.00160)	0.000532 (0.00176)	0.000163 (0.00220)	-0.00104 (0.00383)	0.000571 (0.00178)
$\Delta Money_{it}$	-0.00527 (0.0158)	-0.00200 (0.00787)	-0.000718 (0.00703)	0.000498 (0.00762)	0.00444 (0.0158)	-0.000847 (0.00706)
<i>SovereignCrisis</i> <sub>it</sub>	2.209 (4.198)	5.272** (2.550)	6.468*** (2.277)	7.605*** (2.464)	11.29*** (4.334)	6.348*** (2.027)
Observations	564	564	564	564	564	564