The Perils of Narrowing Fiscal Spaces

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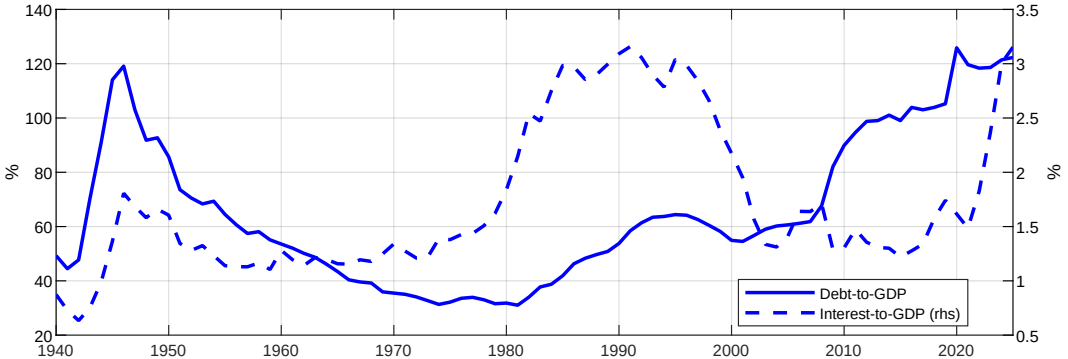
Motivation



Current environment:

- High public debt increases fiscal costs of fighting inflation
- Inflationary shocks may become more frequent and persistent

A Nonlinear Model of State-Dependent Fiscal Dominance

- A **nonlinear model** in which high public debt may constrain monetary tightening
  - A government may seek to expand deficits further without accepting higher debt
  - It does so by forcing the central bank to keep rates low
    $\rightarrow$ a **state-dependent upper bound on nominal rates**

- Monetary policy affects **fiscal space both directly and indirectly**
  - Direct channel: Fiscal constraint depends on interest rates
  - Indirect channel: Fiscal constraint varies with output and inflation

  $\Rightarrow$ State-dependent interaction between MP, fiscal constraint, and macro dynamics

- Key Mechanism: Interaction between **supply disruption risks** and **state-dependent fiscal constraint** $\Rightarrow$ role for **long-run inflation risks**

Main results

1. High debt can generate an **inflationary bias** even though:
   - fiscal policy remains passive and debt is fully backed
   - monetary policy remains active whenever feasible.

2. **Inflationary supply shocks are especially challenging**
   - Fiscal constraint becomes tighter as inflation accelerates, limiting hikes
     $\rightarrow$ higher and more persistent inflation

3. Interaction between higher supply side risks and limited fiscal space can explain **"ratcheting-up" dynamics of inflation**

Literature

- Monetary-fiscal interactions and their implications for inflation dynamics
  - Sargent & Wallace (1981); Leeper (1991); Sims (1994); Woodford (1994, 1995, 2001); Cochrane (1998, 2001); Bianchi & Melosi (2017), Bianchi et al. (2023) ...
  - $\Rightarrow$ Fiscal inflation arises endogenously and in a state-dependent manner (not because debt is unbacked or fiscal policy turns active)
- Fiscal inflation outside canonical FTPL
  - Angeletos et al. (2024); Angeletos et al. (2025)
  - $\Rightarrow$ Fiscal limit generates inflationary pressure due to constraint on MP
- Fiscal limits and monetary policy space
  - Davig et al. (2010, 2011); Bi (2012); Bi et al. (2018); Wolf and Zessner-Spitzenberg (2022); Arellano et al. (2025)
  - $\Rightarrow$ Tractable nonlinear framework with an endogenous interest-rate ceiling

Roadmap

1. Simple model to explain the mechanism
2. Fiscal limit may bind after negative supply shocks
3. Supply disruption risks and inflation ratcheting

The model with fiscal limit

NK model featuring a fiscal limit on debt issued by the government

- Representative household consumes, supplies labor, holds one-period gov. bonds
- Monopolistically competitive firms set prices subject to Rotemberg adj. costs
- Two shocks drive business cycle dynamics:
  - Preference shock ζ_t (demand): moves output and inflation in the same direction
  - Markup shock μ_t (supply): moves output and inflation in opposite directions

The model with fiscal limit: Fiscal and Monetary Policy

- **Fiscal authority** collects taxes τ_t and issues one-period bonds b_t (debt-to-GDP)

$$\frac{b_t}{R_t} = b_{t-1}\frac{Y_{t-1}}{\Pi_t Y_t} - \tau_t, \qquad \tau_t = \tau + \delta(b_{t-1} - b) + \delta_Y(Y_t - Y)$$

- **Monetary authority** sets nominal interest rate via a Taylor rule

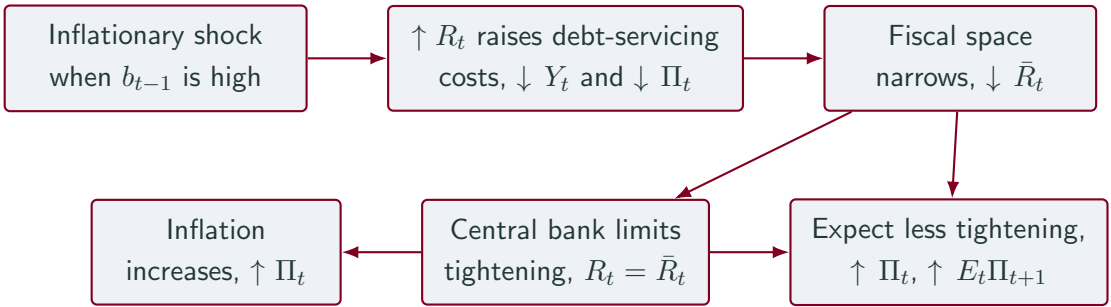
$$R_t^N = R\left(\frac{\Pi_t}{\Pi}\right)^{\phi_\Pi}\left(\frac{Y_t}{Y}\right)^{\phi_Y}$$

- **Fiscal limit**: ceiling on debt-to-GDP $b_t \leq \bar{b}$ which maps into upper bound on rates

$$R_t \leq \bar{R}_t \equiv \bar{b} \cdot \underbrace{\left[b_{t-1}\frac{Y_{t-1}}{\Pi_t Y_t} - \tau_t\right]^{-1}}_{\Theta_t} \qquad \Rightarrow \qquad R_t = \min\left[R_t^N,\ \bar{R}_t\right]$$

- **Upper bound is endogenous**: Θ_t varies with inflation, output, and fiscal stance
  - MP affects fiscal space directly (interest rate) and indirectly (output, inflation)

Overview of mechanism



$\Rightarrow$ **Fiscal inflation and inflationary bias due to upper bound on interest rates**

- Even before constraint binds, risk of future binding can lift inflation!

Calibration and solution

- Calibration broadly matches postwar U.S. moments:
  Shock volatilities match inflation and GDP growth volatility and their near-zero correlation

Parameters	Sign	Value	Parameters	Sign	Value
Discount factor	β	0.993	Relative risk aversion	σ	1
Inverse Frisch elasticity	η	1.33	Disutility of labor	ψ	0.87
Price elasticity of demand	ϵ	7.67	Rotemberg pricing	φ	78.36
Fiscal response to debt	δ	0.1	Fiscal response to output	δ_Y	0.5
Monetary response to inflation	ϕ_Π	1.5	Monetary response to output	ϕ_Y	0.1
Persistence Pref. Shock	ρ_ζ	0.6	Std. Dev. Pref. Shock	σ_ζ	0.012
Persistence Markup Shock	ρ_μ	0.6	Std. Dev. Markup Shock	σ_μ	0.18
Inflation target	(Π-1)*4	2%	Steady-state debt-to-output	b	2.4
Fiscal limit	$\bar{b}$	2.45			

- Model solved in nonlinear specification using **time iteration** (Richter et al., 2014)

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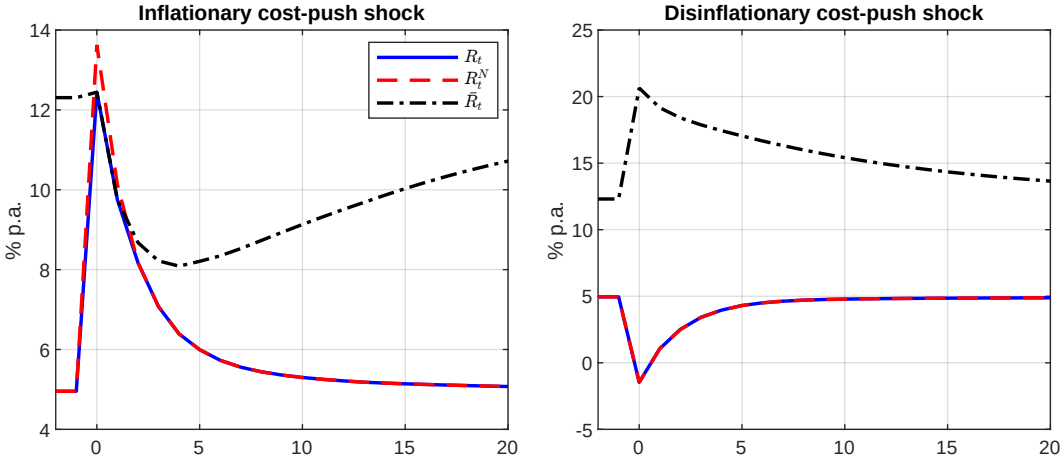
Cost-push shock and the fiscal limit

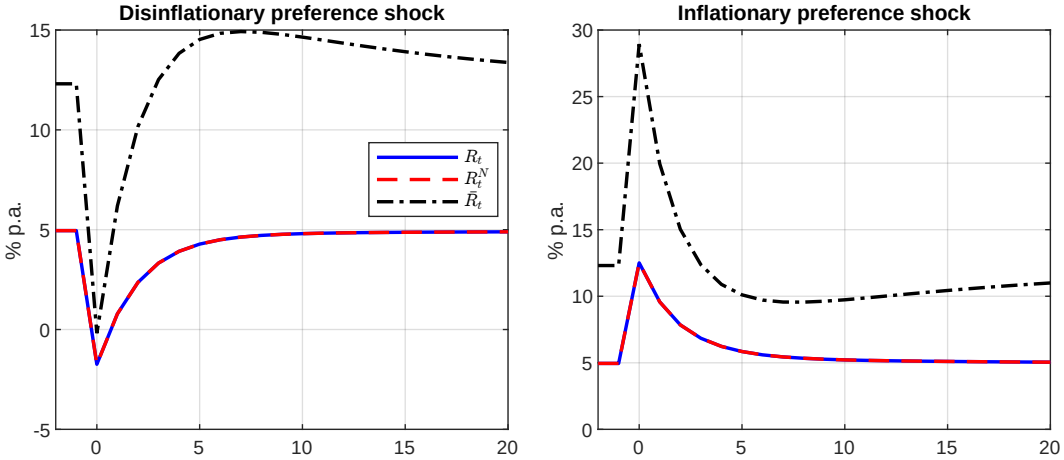


Notes: Dynamics of nominal, notional and upper bound interest rate in response to a four-standard-deviation inflationary (left panel) and disinflationary (right panel) cost-push shock. Shock happens in period 0.

Cost-push shock and the fiscal limit

- **Inflationary cost-push shock**
  - Inflation rises, while output growth slows, with ambiguous net effect for fiscal space
    - Higher inflation erodes real debt value, while weaker growth tightens the constraint
  - Fiscal authority adopts a more expansionary stance, creating additional fiscal pressure
  - Central bank raises policy rate so that debt-servicing costs increase
  - However, policy rate is constrained due to fiscal limit and tightens less
    - Conditional on a large shock or a high starting government debt level
- **Disinflationary cost-push shock**
  - Lowers inflation and increases output, with ambiguous net effect
  - Central bank lowers interest rate, which creates additional fiscal space
  - Shock does not trigger fiscal sustainability concerns

Demand shock and the fiscal limit



Notes: Dynamics of nominal, notional and upper bound interest rate in response to a four-standard-deviation disinflationary (left panel) and inflationary (right panel) preference shock. Shock happens in period 0.

Demand shock and the fiscal limit

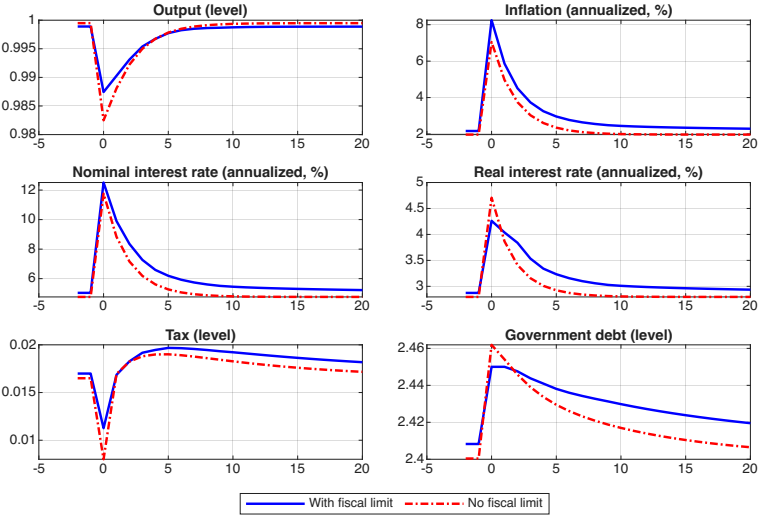
- **Inflationary preference shock**
  - Output and inflation increases, relaxing the fiscal constraint
  - Countercyclical fiscal policy additionally increases the space
  - While monetary policy hikes, policy space also increases, resulting in an increased upper bound
  - In total, more room for tightening
- **Disinflationary preference shock**
  - Effects via inflation, output, and fiscal policy are reversed
  - However, the central bank cuts the rate, resulting in increased space, and more distance to the upper bound
  - In total, fiscal constraint tightens relatively more than policy rate
  - Monetary policy space shrinks in a recession
    - Plus, fiscal constraint could require an upper bound below the ZLB

Importance of shock type

- Supply shocks are the main source of binding episodes
  - Coming from large inflationary markup shocks
- Demand shocks can also trigger the upper bound
  - Policy space gets curtailed in a recession, but implying a more loose policy

Scenario	Bind frequency
All shocks active	8%
Only supply shocks	7%
Only demand shocks	1%

Economic impact of an inflationary markup shock



Notes: Dynamics in response to four-standard-deviation inflationary markup shock. Shock happens in period 0.

Economic Effects of an Inflationary Markup Shock

- Inflation rises while output contracts.
- Higher debt-to-GDP ratios induce fiscal pressure for a weaker monetary response.
  - The central bank still tightens, but less than implied by the notional rule.
  - Real interest rates rise by less.
- Relative to the unconstrained case, the economy experiences:
  - higher inflation,
  - stronger output growth.

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1. Simple model to explain the mechanism
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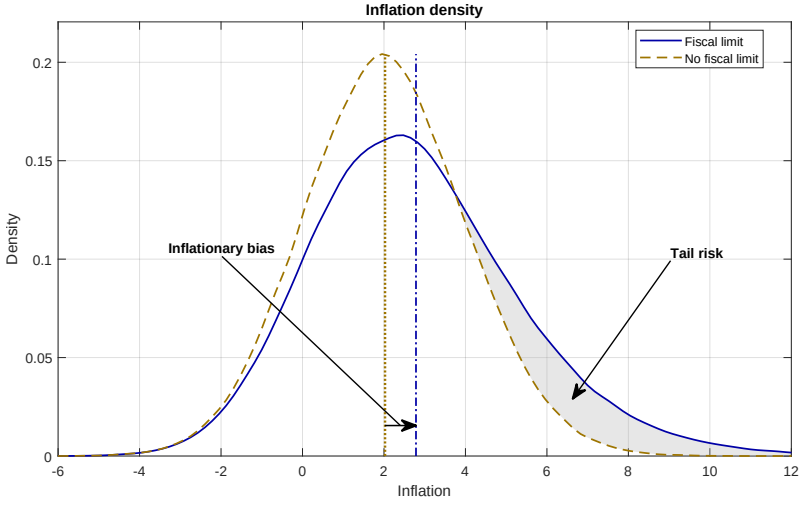
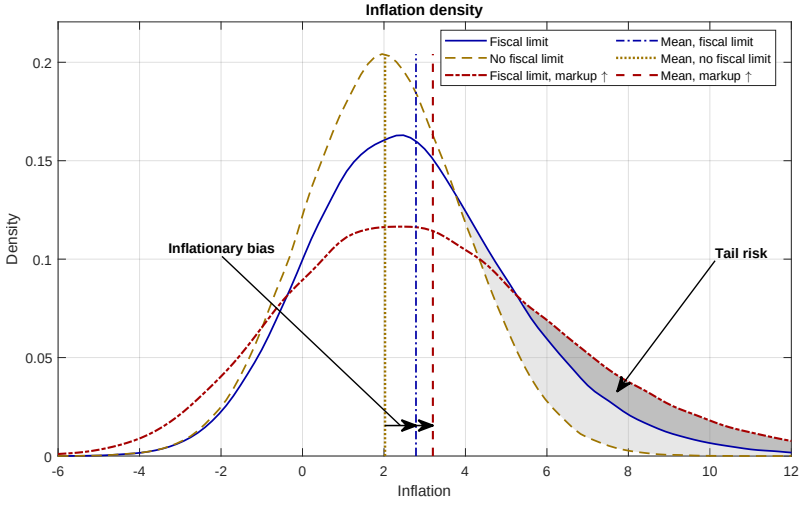
Long-Run Inflation Risks and Bias



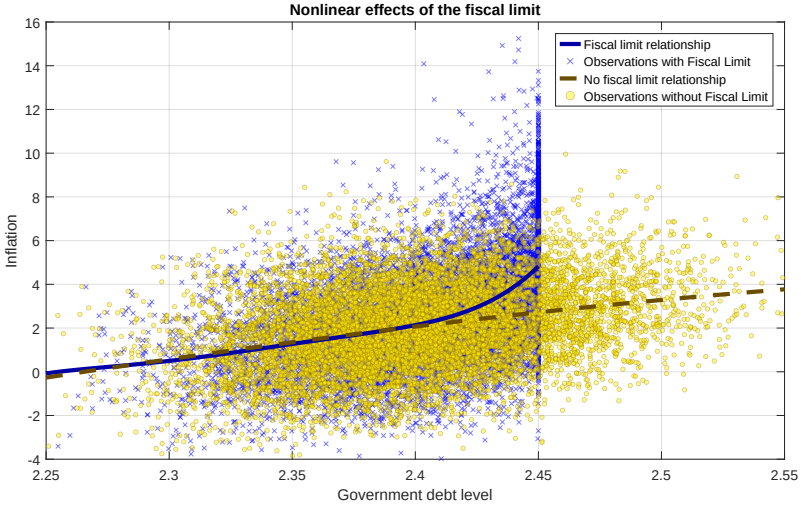
Notes: Simulated distribution of inflation outcomes under model with fiscal limit (blue) and without (yellow).

Long-Run Inflation Risks and Bias: Higher Supply Shock Volatility



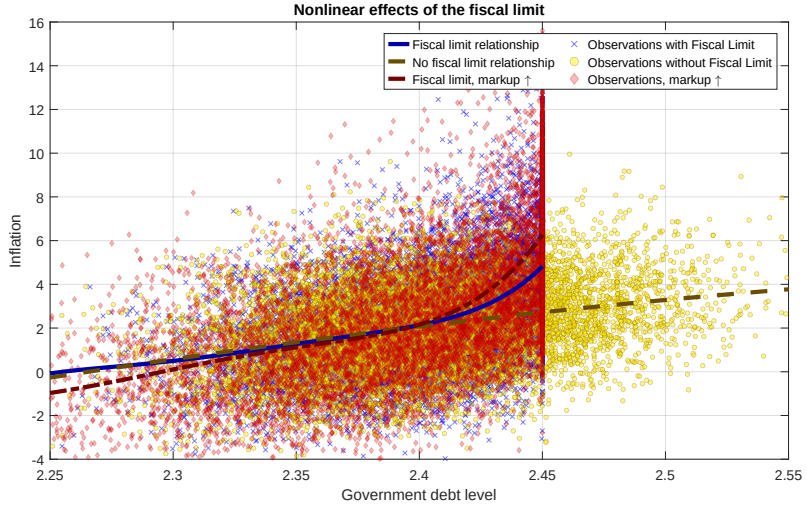
Notes: Simulated distribution of inflation outcomes under model with fiscal limit (blue: low supply shock volatility, red: high supply shock volatility) and without (yellow).

Supply Disruption Risks and Inflation Ratcheting



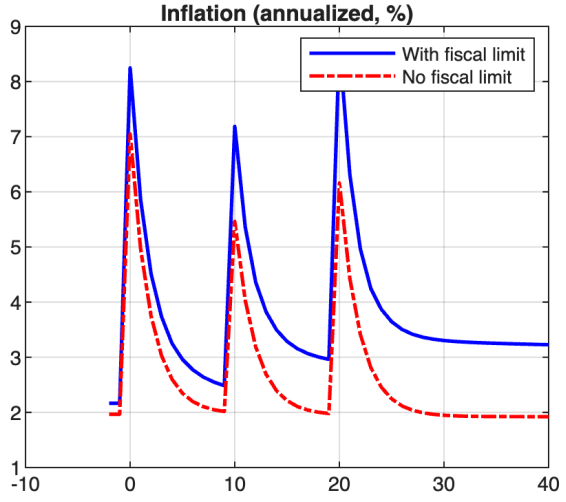
Notes: Simulated distribution of inflation and government debt outcomes under model with fiscal limit (blue) and without (yellow).

Supply Disruption Risks and Inflation Ratcheting: Higher Volatility



Notes: Simulated distribution of inflation and government outcomes under model with fiscal limit (blue: low supply shock volatility, red: high supply shock volatility) and without (yellow).

Ratcheting-up Inflation: Sequence of Supply Shocks



Notes: Dynamics of inflation in response to sequence of inflationary supply shocks with increase in supply shock volatility. ▸ Time-varying supply shock volatility

Concluding Remarks

- **Supply Disruption Risks, High Debt, and Inflation Ratcheting**
  - Persistent global supply disruptions call for monetary tightening.
  - Yet high public debt makes tightening more fiscally costly by compressing fiscal space and raising debt-servicing pressures.
  - When debt is high, constrained policy responses can amplify the macroeconomic effects of geopolitical risks and supply disruptions, leading to inflation ratcheting.

$\Rightarrow$ **Macroeconomic stability is a global public good.**

- Limiting geopolitical fragmentation is crucial in a world with high public debt.

Thank you!

Time-varying supply shock volatility

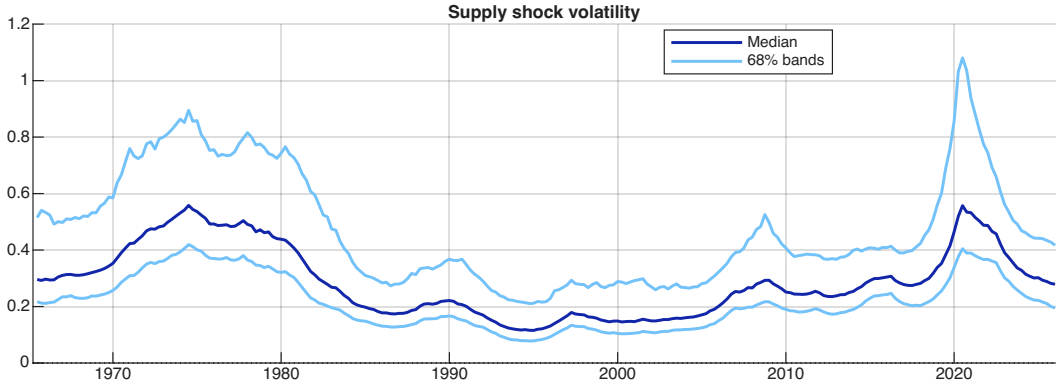


Figure 1: Estimated supply shock volatility from bivariate time-varying BVAR

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