

The Dire Effects of the Lack of Monetary and Fiscal Coordination¹

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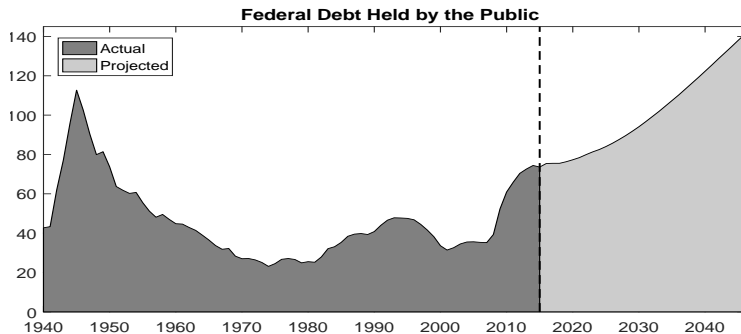
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Recessions, Fiscal Imbalances, and Inflation

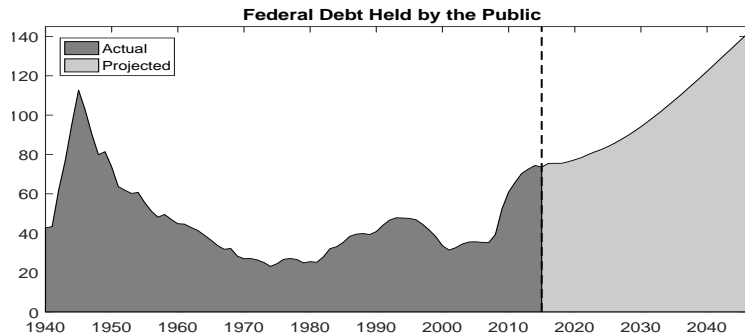
- Legacies of the Great Recession include a large public debt
- Some scholars have argued that fiscal imbalances have implications for price dynamics
Sargent and Wallace (1981), Leeper (1991), Sims (1994), Woodford (1994), Cochrane (2001), Bassetto (2002)
- Emphasis on **monetary and fiscal coordination**
- This paper is mainly about the consequences of **lack of coordination**

Is Lack of Coordination a Possibility?



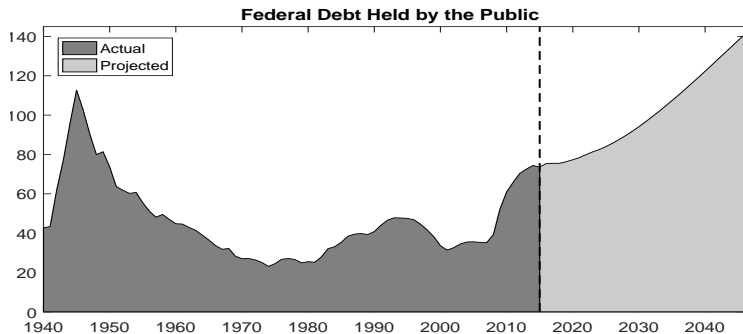
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- CBO projections imply that debt is on an **unstable path**
- Fed ha insisted that **inflation stability** remains a central goal
- Suggestive of **possibility of conflict between the two authorities**: Ability of the Fed to control inflation requires fiscal backing

This Paper

We develop a NK model that features

- Large **contractionary shocks** that trigger large recessions and **debt accumulation**
- Agents understand that:
 - 1 Fiscal adjustments would be needed after the large recession
 - 2 Government might be unable or unwilling to make such adjustments
 - 3 Absent these fiscal adjustments, central bank could let inflation rise to stabilize debt
 - 4 Central bank might oppose such a change in policy

We use the model to study:

- The **consequences** of the **conflict** between the two authorities
- A policy proposal that resolves the conflict by separating **short-run** and **long-run** fiscal stabilizations

Main Results

- Lack of coordination has **dire effects**
 - 1 A spiral of low output, high inflation, and high debt arises
 - 2 Expectation of conflict jeopardizes attempts to mitigate the recession

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- **Coordinated strategy** to inflate away only debt accumulated during the recession
 - ⇒ Milder recession and rather stable inflation

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- Absent fiscal backing, the Fed loses control of inflation. **Hawkish monetary policy is counterproductive**
- **Coordinated strategy** to inflate away only debt accumulated during the recession
 - ⇒ Milder recession and rather stable inflation
- This coordinated strategy also useful to **rule out liquidity traps**

Private Sector: Households

- The representative household maximizes expected utility

$$E_0 \left[\sum_{t=0}^{\infty} \beta^t \exp \left(\bar{d}_{\zeta_t^d} \right) [\log C_t - h_t] \right]$$

subject to the budget constraint:

$$P_t C_t + P_t^m B_t^m + P_t^s B_t^s = P_t W_t h_t + B_{t-1}^s + (1 + \rho P_t^m) B_{t-1}^m + P_t D_t - T_t + TR_t$$

- Discount factor shock, $\bar{d}_{\zeta_t^d}$, can assume two values, high or low (\bar{d}_H or \bar{d}_L)
- ζ_t^d follows a Markov-switching process:

$$H^d = \begin{bmatrix} \rho_{hh} & 1 - \rho_{ll} \\ 1 - \rho_{hh} & \rho_{ll} \end{bmatrix}$$

Private Sector: Firms

Representative firm faces:

- Monopolistic competition
- Sticky prices (Quadratic adjustment cost)
- TFP shocks
- Production function in which labor is the only input

The Government Budget Constraint

- The government budget constraint

$$b_t^m = b_{t-1}^m R_{t-1,t}^m / (\Pi_t Y_t / Y_{t-1}) - \tau_t + e_t$$

where all variables are normalized with nominal output

- Government expenditures: $e_t = g_t + tr_t$ with
 - Government purchases (exogenous) as a fraction of output: g_t
 - Transfers-to-output ratio: tr_t

$$\frac{tr_t}{tr_t^*} = \left(\frac{tr_{t-1}}{tr_{t-1}^*} \right)^{\rho_{tr}} \left(\frac{Y_t}{Y_t^*} \right)^{(1-\rho_{tr})\phi_y}$$

Policy Rules

- Fiscal Rule

$$\tilde{\tau}_t = \rho_{\tau, \zeta_t^p} \tilde{\tau}_{t-1} + \left(1 - \rho_{\tau, \zeta_t^p}\right) \left[\delta_{b, \zeta_t^p} \tilde{b}_{t-1}^m + \delta_y (\hat{y}_t - \hat{y}_t^*) \right]$$

- Monetary Rule

$$R_t/R = (R_{t-1}/R)^{\rho_{R, \zeta_t^p}} \left[(\Pi_t/\Pi)^{\psi_{\pi, \zeta_t^p}} (Y_t/Y_t^*)^{\psi_{y, \zeta_t^p}} \right]^{(1 - \rho_{R, \zeta_t^p})}$$

- The Markov-switching process ζ_t^p determines the policy mix *conditional* on the state of demand ζ_t^d

Monetary/Fiscal Policy Mix

When policy regimes are taken in **isolation**, the two policy rules and the linearized budget constraint are key to determine existence and uniqueness of a REE:

$$\hat{R}_t = \psi_\pi \hat{\pi}_t + \dots$$

$$\tilde{\tau}_t = \delta_b \tilde{b}_{t-1}^m + \dots$$

$$\tilde{b}_t^m = \beta^{-1} \tilde{b}_{t-1}^m + \dots + b^m \beta^{-1} (\hat{R}_{t-1} - \dots - \tilde{\pi}_t) - \tilde{\tau}_t$$

$$\rightarrow \tilde{b}_t^m = (\beta^{-1} - \delta_b) \tilde{b}_{t-1}^m + \dots + b^m \beta^{-1} (\psi_\pi \hat{\pi}_{t-1} - \dots - \tilde{\pi}_t)$$

Policy Regimes

- **High state of demand** ($\bar{\zeta}_t^d = H$):

- Coordination: Monetary led policy mix (*AM/PF*):

$$\psi_\pi = \psi_\pi^M > 1 \quad \delta_b = \delta_b^M > \beta^{-1} - 1$$

- Coordination: Fiscally led policy mix (*PM/AF*):

$$\psi_\pi = \psi_\pi^F < 1 \quad \delta_b = \delta_b^F = 0 < \beta^{-1} - 1$$

- Non-Coordination: Conflict Regime (*AM/AF*):

$$\psi_\pi = \psi_\pi^C > 1 \quad \delta_b = \delta_b^C = 0 < \beta^{-1} - 1$$

- **Low state of demand** ($\bar{\zeta}_t^d = L$): **Fiscally-led policy mix** (*PM/AF*)

Evolution of Regimes

The matrix Q^H controls the evolution of regimes in the high state of demand:

$$Q^H = \left[\begin{array}{cc|cc} p_{MM} & 1 - p_{FF} & 1 - p_{CC} & 0 \\ 1 - p_{MM} & p_{FF} & 0 & 1 - p_{CC} \\ \hline 0 & 0 & p_{CC} & 0 \\ 0 & 0 & 0 & p_{CC} \end{array} \right]$$

The matrix Q governs the overall evolution of regimes:

$$Q = \left[\begin{array}{cc} p_{hh} Q^H & (1 - p_{ll}) \cdot I_4 \\ (1 - p_{hh}) \cdot \mathbf{1}_{4 \times 4} & p_{ll} \cdot I_4 \end{array} \right]$$

⇒ Agents take into account the possibility of large recessions and the consequent changes in policy makers' behavior

Solution

- We solve the MS DSGE model using the method proposed by Farmer, Waggoner, and Zha (2009):

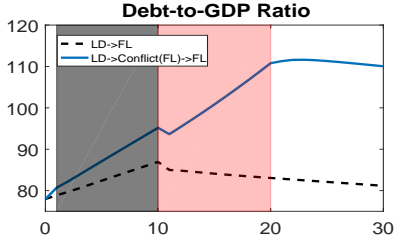
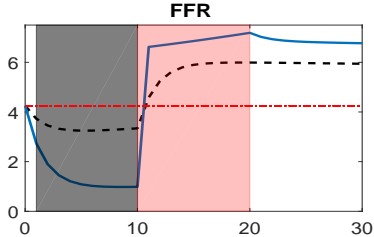
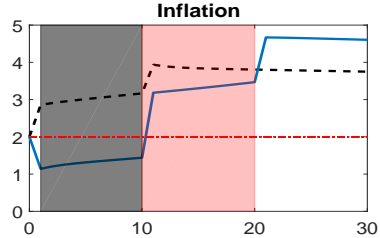
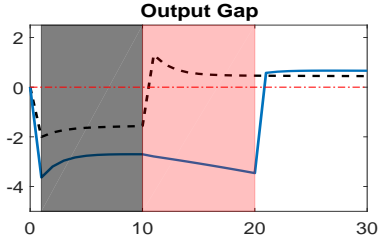
$$S_t = C(\tilde{\zeta}_t, \theta, Q) + T(\tilde{\zeta}_t, \theta, Q) S_{t-1} + R(\tilde{\zeta}_t, \theta, Q) \varepsilon_t$$

- Agents are aware of regime changes and their beliefs matter for the solution of the model
- **Temporary explosive dynamics** are allowed, as long as the model is overall stationary
- This important feature allows us to study the properties of the conflict regime

Parameters (Bianchi and Melosi AER 2017)

Parameter	Value	Parameter	Value	Parameter	Value
$\psi_{\pi,M}$	1.7890	$\rho_{\tau,F}$	0.6501	ρ_{hh}	0.9999
$\psi_{y,M}$	0.4413	$\psi_{\pi,C}$	2.0000	ρ_{ll}	0.9465
$\rho_{R,M}$	0.8697	$\rho_{\tau,C}$	0.6501	ρ_{MM}	0.9902
$\delta_{b,M}$	0.0778	δ_y	0.2814	ρ_{FF}	0.9932
$\rho_{\tau,M}$	0.9666	ϕ_y	-2.0000	κ	0.0072
$\psi_{\pi,F}$	0.6903	ρ_{tr}	0.4620	$b_0^m / 4$	0.7700
$\psi_{y,F}$	0.2655	\bar{d}_h	0.0429	100γ	0.4120
$\rho_{R,F}$	0.6576	\bar{d}_l	-0.1300	100π	0.5000

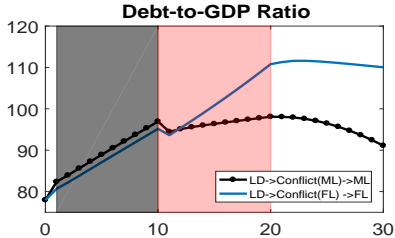
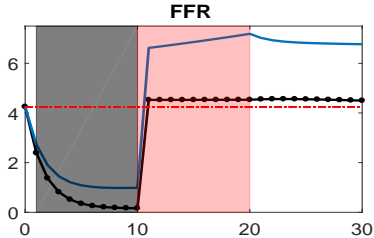
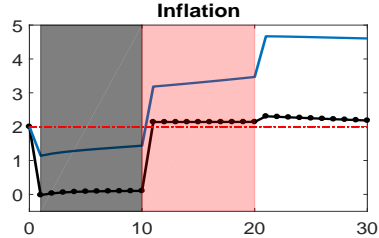
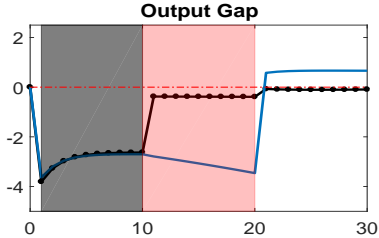
Conflict with Fiscally-led Resolution



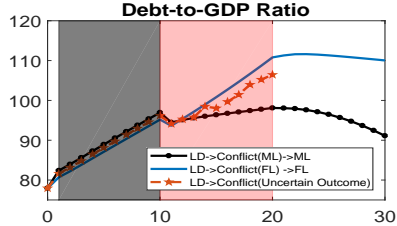
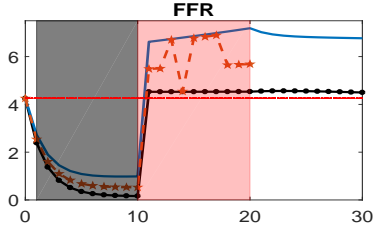
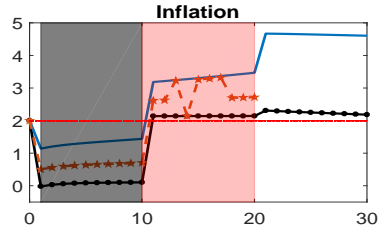
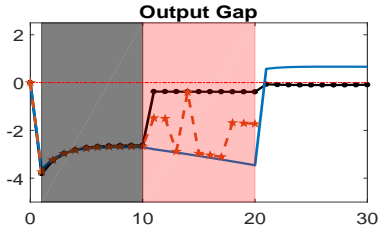
Vicious Circle

- Key mechanism:
 - 1 Large recession generates debt accumulation: $b \uparrow$
 - 2 Expectation that eventually debt will be inflated away: $\pi \uparrow$
 - 3 Central bank increases interest rate more than one-to-one: **Real interest rate** \uparrow
 - 4 Real activity goes down: $y \downarrow$
 - 5 Low real activity + high real interest rate induce further debt accumulation: $b \uparrow$
- Spiral of low growth, high(er) inflation, debt accumulation
- **Vicious Circle** ends when one of the two authorities gives up

Conflict with Monetary-led Resolution



Conflict with Uncertain Resolution



Take Away

If the fiscal authority is not **expected** to take the necessary fiscal adjustments

- 1 The central bank can accommodate these beliefs
⇒ **persistently high inflation**
- 2 The central bank can fight back
 - if the central bank is **expected** to eventually give up ⇒ **spiral of low output, high inflation, and high debt**
 - if the government is **expected** to eventually give up ⇒ **recession coupled with persistently low inflation, and high debt**

⇒ **CB cannot stabilize inflation without fiscal backing**

⇒ Institutional conflicts inevitably lead to **bad outcomes**: **Ineffective** or **detrimental** policy interventions

A Coordinated Strategy

- We propose a policy that separates the issue of **long-term fiscal sustainability** from the need of **short-run fiscal intervention**
- Policy makers commit to **inflate away just the amount of debt resulting from the large recession itself....**
- ... in response to private sector's loss of confidence that the necessary fiscal adjustments will ever be taken
- We model a **shadow economy** to keep track of the amount of debt deriving from the discrete demand shock. Policy makers...
 - 1 ...do not react to debt and inflation caused by the discrete demand shock, while...
 - 2 ...follow a monetary-led policy mix in response to all other shocks

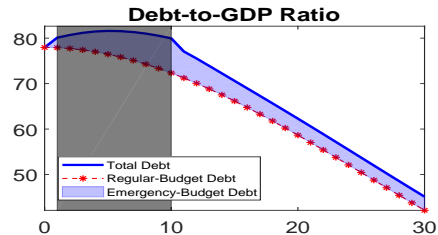
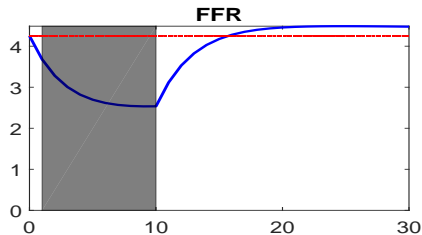
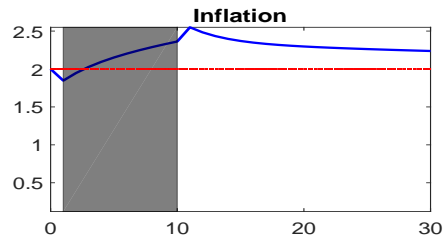
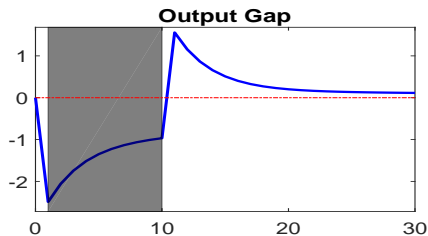
A Coordinated Monetary and Fiscal Rule

- Policymakers announce policies for regular debt and the **emergency budget** debt

$$\begin{aligned}\tilde{\tau}_t &= (1 - \rho_\tau^M) \left[\delta_b^M \tilde{b}_{t-1}^S + \tilde{\delta}_b^F (\tilde{b}_{t-1} - \tilde{b}_{t-1}^S) \right] + \dots \\ \tilde{R}_t &= (1 - \rho_R^M) \left[\psi_\pi^M \tilde{\pi}_t^S + \tilde{\psi}_\pi^F (\tilde{\pi}_t - \tilde{\pi}_t^S) \right] + \dots\end{aligned}$$

- The fiscal authority is not responsible for the **emergency budget** debt $\tilde{b}_t - \tilde{b}_t^S$:
 $\tilde{\delta}_b^F = \tilde{\psi}_\pi^F = 0$
- The central bank allows inflation to rise by $\tilde{\pi}_t - \tilde{\pi}_t^S$, which is the amount needed to stabilize the **emergency budget** $\tilde{b}_t - \tilde{b}_t^S$
- The targeted inflation and debt are determined in a shadow economy where
 - 1 There is **no discrete demand shock**
 - 2 Policymakers always follow the **monetary-led policy mix**

Implementation of Coordinated Policies

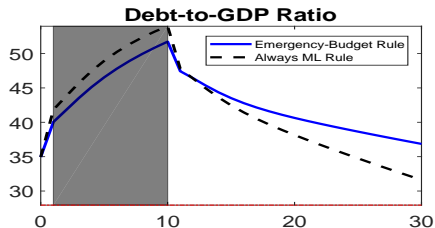
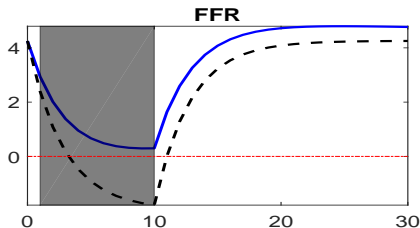
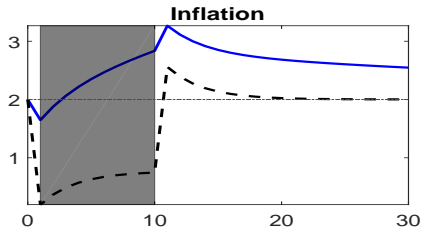
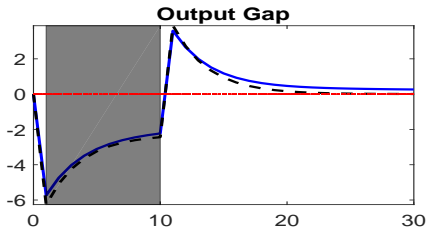


Avoiding Liquidity Traps

- The **zero lower bound** can be a significant constraint on the ability of a central bank to combat deflation
- Krugman (1998) and Eggertsson and Woodford (2003) suggest to use forward guidance to promise that monetary policy will drive a boom when the central bank will have again room to maneuver
- Our coordinated strategy can also be used to promise a boom at the end of large recessions
- Policymakers can adopt this strategy to rule out liquidity traps (Benhabib, Schmitt-Grohe, Uribe (2002) and Woodford (2003))
- Possible advantage: Easier to convince public if fiscal policy involved
- Historical relevance: Roosevelt's **emergency budgets**

Avoiding Liquidity Traps

- Our proposed policy makes a liquidity trap **fiscally unsustainable**



Conclusions

- Non-coordinated policies inevitably lead to bad outcomes
- The central bank cannot stabilize inflation if the govt is expected to withdraw its backing
- Not only hawkish monetary policy is **ineffective**, but it can also **backfire**
- A coordinated strategy to inflate away just a fraction of debt:
 - 1 mitigates the recession and stabilizes price dynamics
 - 2 can be useful to prevent monetary policy from hitting the ZLB

Private Sector: Households

- The representative household maximizes expected utility

$$E_0 \left[\sum_{s=0}^{\infty} \beta^s \exp(\zeta_t^d) [\log C_t - h_t] \right]$$

subject to the budget constraint:

$$P_t C_t + P_t^m B_t^m + P_t^s B_t^s = P_t W_t h_t + B_{t-1}^s + (1 + \rho P_t^m) B_{t-1}^m + P_t D_t - T_t + TR_t$$

- Shocks to the discount factor: $\zeta_t^d = \bar{d}_{\zeta_t^d}$, which can assume two values, high or low (\bar{d}_H or \bar{d}_L)
- ζ_t^d follows a Markov-switching process:

$$H^d = \begin{bmatrix} \rho_{hh} & 1 - \rho_{ll} \\ 1 - \rho_{hh} & \rho_{ll} \end{bmatrix}$$

Private Sector: Firms

- Firms choose their price $P_t(j)$ so to maximize the PV of future profits subject to
 - 1 A downward-sloping demand curve:

$$Y_t(j) = (P_t(j)/P_t)^{-1/v} Y_t$$

- 2 Quadratic price adjustment cost:

$$AC_t(j) = .5\varphi (P_t(j)/P_{t-1}(j) - \Pi)^2 Y_t(j) P_t(j) / P_t$$

- 3 The production function

$$Y_t(j) = h_t^{1-\alpha} (j)$$

Woodford's (2001) Bonds

- Govt bonds B_t^m : perpetuity with coupons that decay exponentially
 - A bond issued in period t pays ρ^j dollars $t + j$ periods later with $0 \leq \rho < \beta^{-1}$
 - It can be shown that: $P_{t-j}^m = \rho^j P_t^m$ for any $j > 0$
- ⇒ The equilibrium prices of the (infinitely) many perpetuities are function of the price of the current bond
- ⇒ A bond of this type issued k periods ago is equivalent to ρ^k current bonds
- ⇒ Do not need to keep track of infinitely many maturities

▶ Back

Policy Regimes

- **High state of demand** ($\zeta_t^d = H$):

- Monetary led policy mix (*AM/PF*):

$$\psi_\pi = \psi_\pi^M > 1 \quad \delta_b = \delta_b^M > \beta^{-1} - 1$$

- Fiscally led policy mix (*PM/AF*):

$$\psi_\pi = \psi_\pi^F < 1 \quad \delta_b = \delta_b^F = 0 < \beta^{-1} - 1$$

- Two Fight Regimes (*AM/AF*):

$$\psi_\pi = \psi_\pi^C > 1 \quad \delta_b = \delta_b^C = 0 < \beta^{-1} - 1$$

- **Low state of demand** ($\zeta_t^d = L$):

- Four FL regimes that differ on beliefs about the post-recession policy mix