The Central Bank, the Treasury, or the Market: Which One Determines the Price Level?

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Introduction: New interest in fiscal-monetary interactions

Unprecented issuance of public liabilities since 2008

- Government debts (125 % of US GDP and 100 % EA)
- Central bank reserves (more than 30 % of US GDP; 60 % in the EA)
- Low rates and low fiscal costs of deficits (Blanchard, 2019)

Uncertain inflation dynamics

- Stable and low inflation since 1990s
- Uncertainty about the persistence of recent surge in inflation
- Threat on central banks' ability to fulfill their price-stability mandate?

This paper: The conditions under which the price level is above central bank's target in order to ensure sovereign solvency – fiscal dominance

How does fiscal authority impose fiscal dominance?

Fiscal dominance in Sargent and Wallace (1981)

- Fiscal authority (F) first commits to path of debt and deficits
- Monetary authority (M) chickens out: raises seigneuriage revenues
- *M* chickens out to avoid default

But what happens if M "refuses" to chicken out ?

- to force F to raise more surpluses
- to avoid M to deviate from its objective

This paper: The game between *M* and *F* in the absence of commitment

The costs of fiscal dominance

If F wants M to chicken out, F must:

- **Exhaust its future fiscal capacity:**
  - Cannot raise resources (e.g. fiscal limit, distortionary taxation),
  - Cannot cut spending (e.g. political pressures, high fiscal multiplier).
- **Borrow against all its future ressources** and spend right away

Potential costs:

- Reduce future fiscal capacity to absorb adverse shocks,
- Push the real interest rate up [what we introduce in the paper];

Thus, monetary dominance when

- Small legacy liabilities
- Strong crowding out
- Large future fiscal capacity
- Patient fiscal authority

Roadmap

- Two dates
- More dates
- Infinite horizon

Building blocks of the two-date model

Three types of agents:

- M issues reserves and sets nominal interest rate
  Objective $-|P_0 - P_0^M| - \alpha_M \Delta_0 + \beta(-|P_1 - P_1^M| - \alpha_M \Delta_1)$
- F issues debt and consumes (g_0, g_1)
  Objective $g_0 - \alpha_F \Delta_0 + \beta(g_1 - \alpha_F \Delta_1)$
- Risk-neutral savers live for two dates and consume when old
  Optimal portfolio between debt, reserves, and a storage technology

Notation: $\Delta_t = 1$ when F defaults at date t

Additional assumptions:

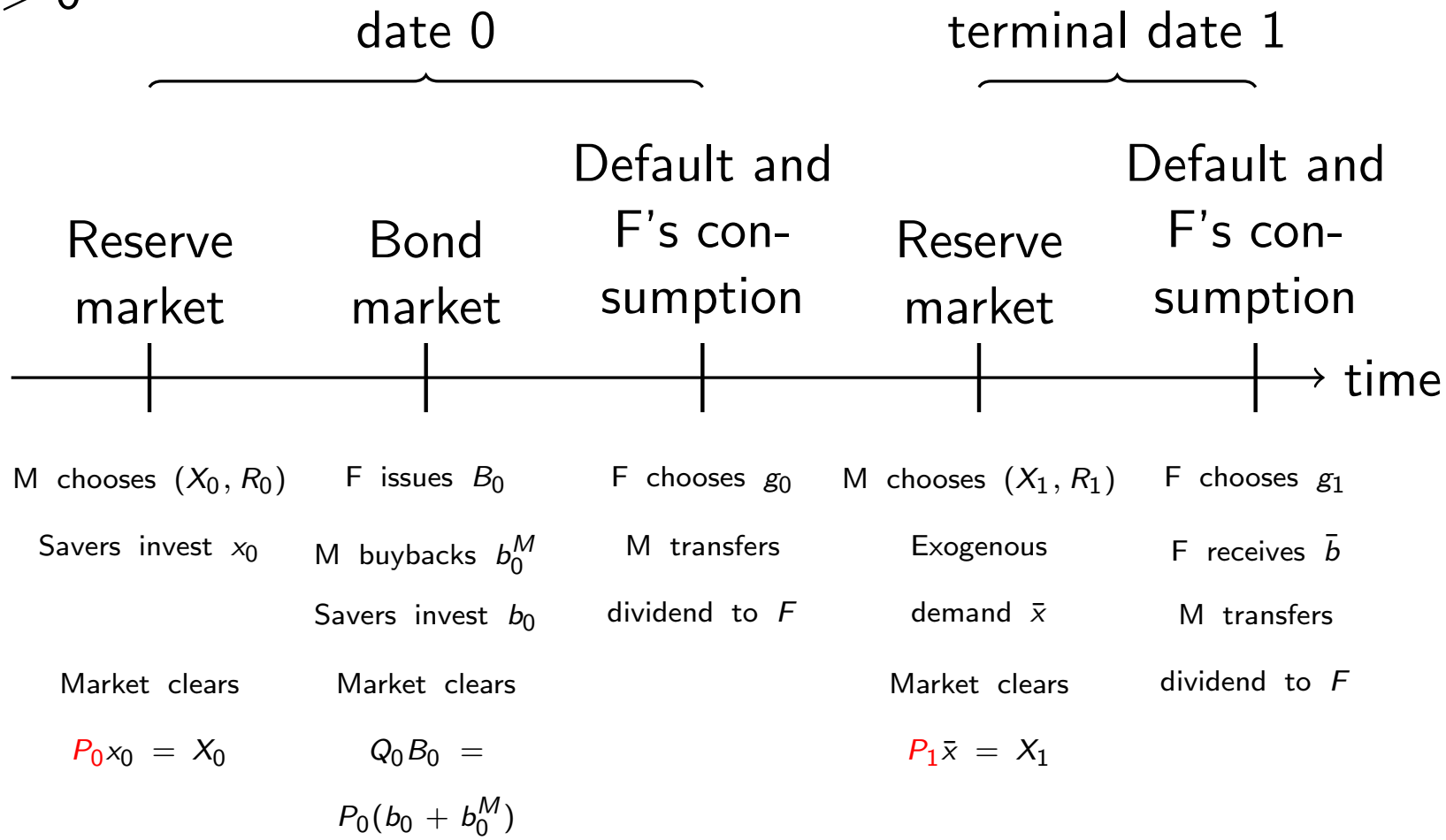
- For brevity, $\alpha_M < \alpha_F = \infty$
- $g_t \geq 0$ F's date-t spending (also measures distance to fiscal limit)
- Storage technology with decreasing and strictly convex return $r(.)$

Timing of the two-date game

- Old date-0 savers own reserves purchased in an unmodelled past, $X_{-1} > 0$
- At date 0
  1. **Market for reserves**: M selects R_0 and $X_0 \geq R_{-1}X_{-1}$ sold by old savers; then, young savers invest x_0; the price level clears $P_0 x_0 = X_0$
  2. **Market for bonds**: F issues B_0; then M invests b_0^M; then young savers invest b_0. The bond price Q_0 clears $Q_0 B_0 = P_0(b_0 + b_0^M)$
  3. **Default and consumption**: F selects a haircut l_0 and consumption $g_0 \geq 0$ given remittances θ_0
- At date 1, exogenous fiscal resources $\bar{b}$ and demand for reserves $\bar{x}$

Timeline of the game

Legacy reserves
$R_{-1}X_{-1} > 0$

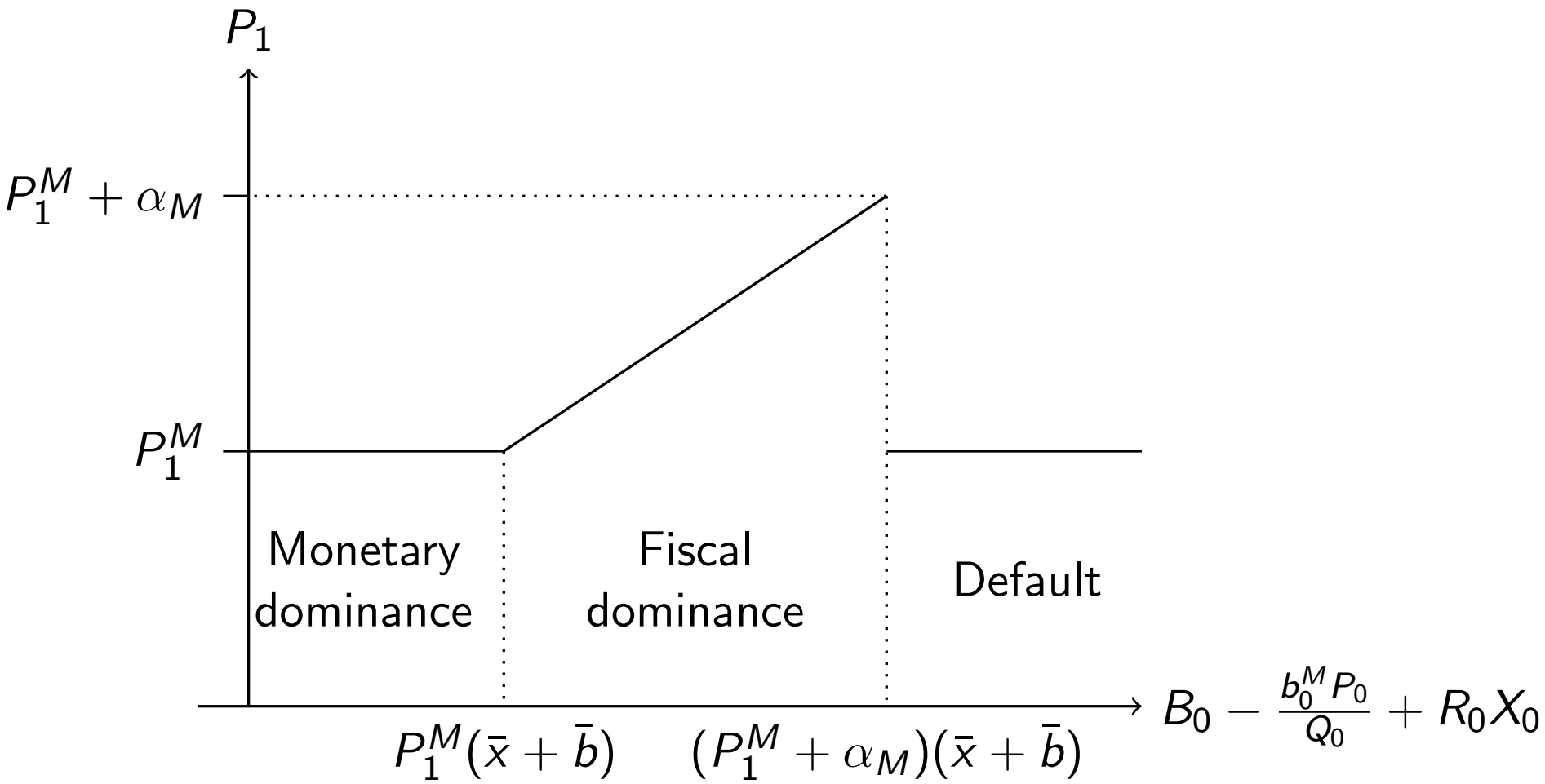


Equilibrium definition

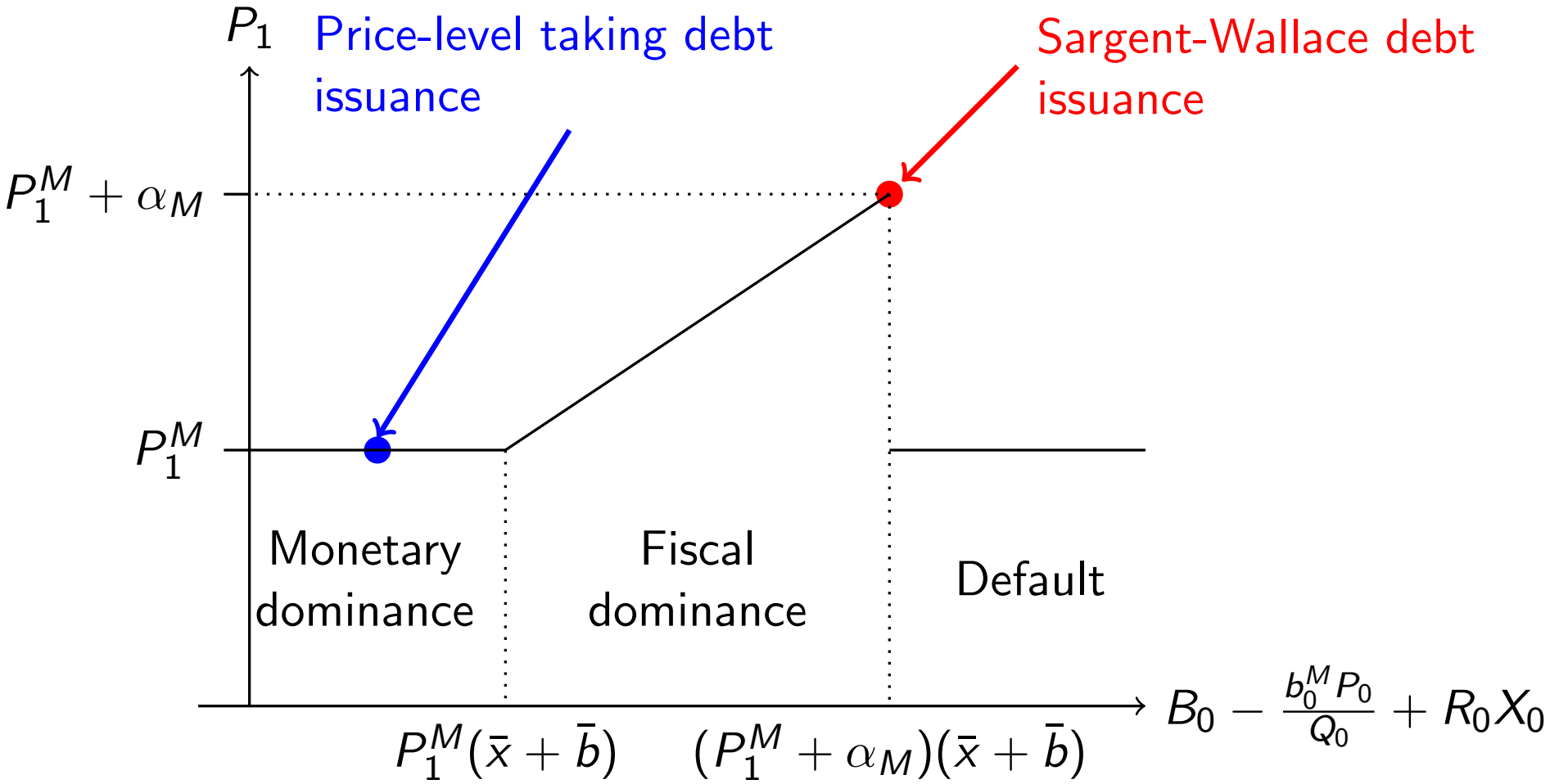
- Perfect foresight
- Standard subgame perfection for F and M
- Individual savers are price takers as in macroeconomic games (Bassetto, 2002; Ljungqvist-Sargent, 2018).
- Price level clears the reserve market and bond price the bond market

Finite horizon $\Rightarrow$ Backward induction

Date-1 price level and net public liabilities

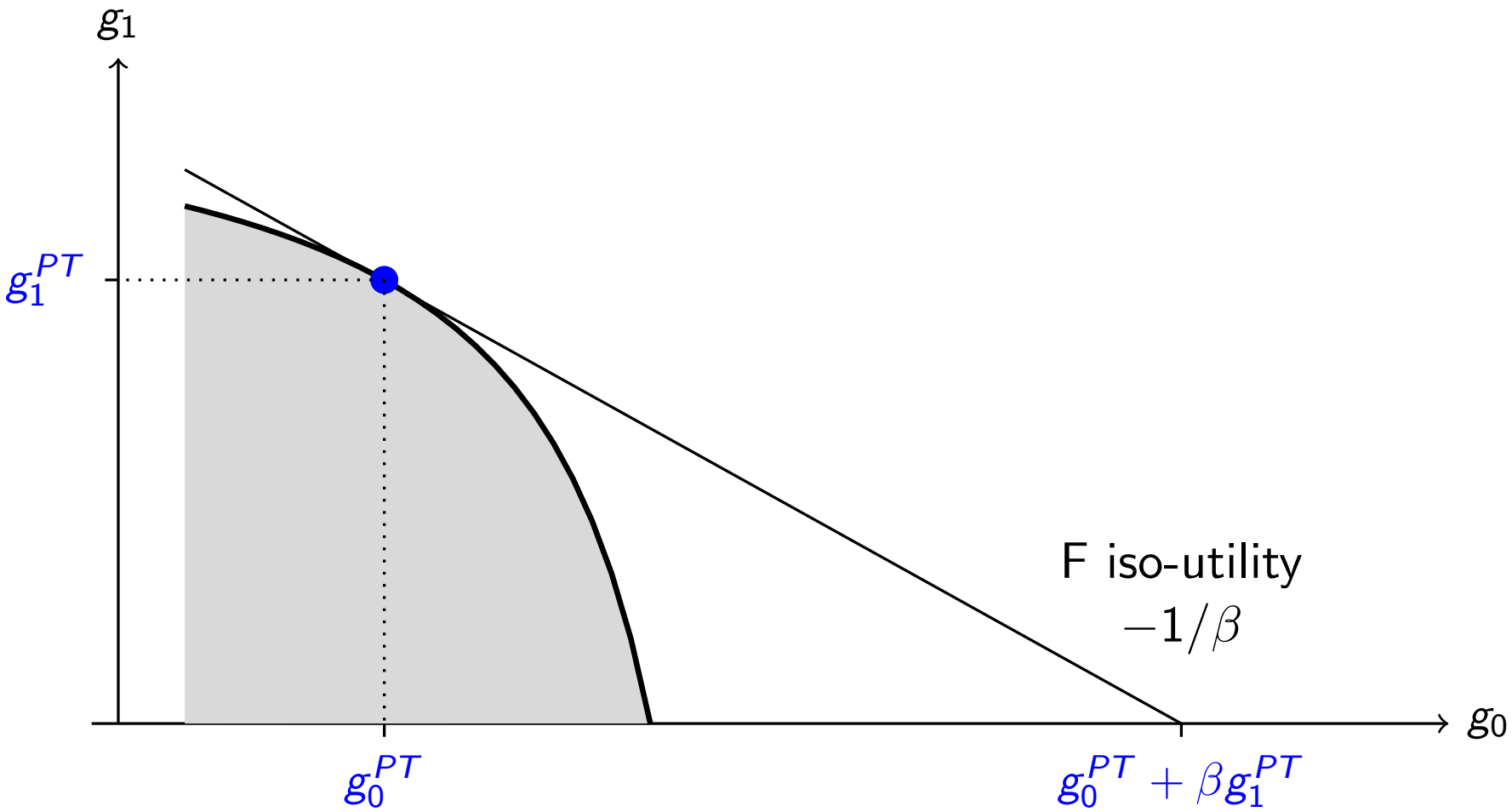


Two options for F on the date-0 debt market



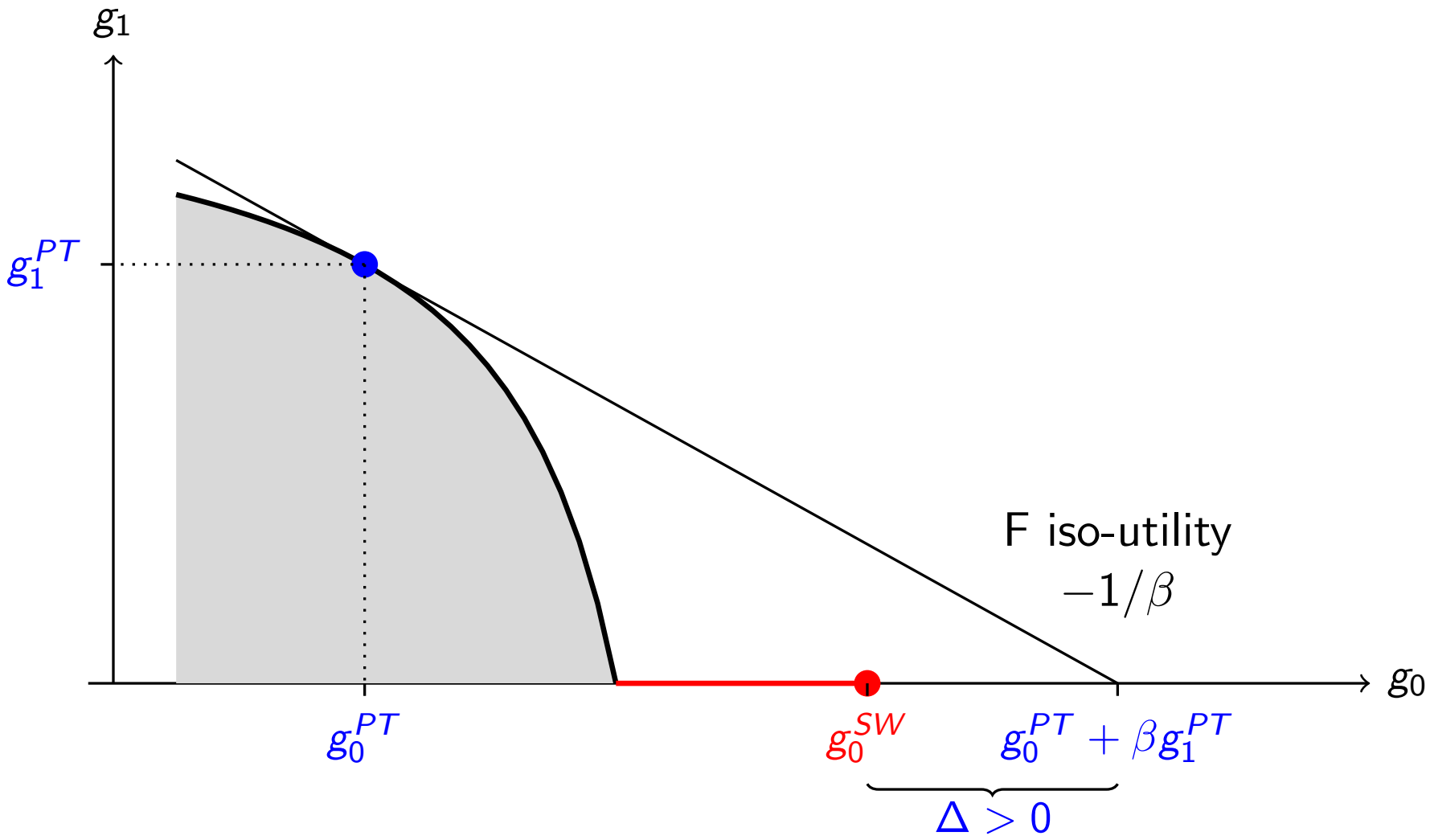
Tradeoff that F faces on the debt market

Price-level taking debt level: optimal consumption profile (g_0^{PT}, g_1^{PT}) given $P_1 = P_1^M$

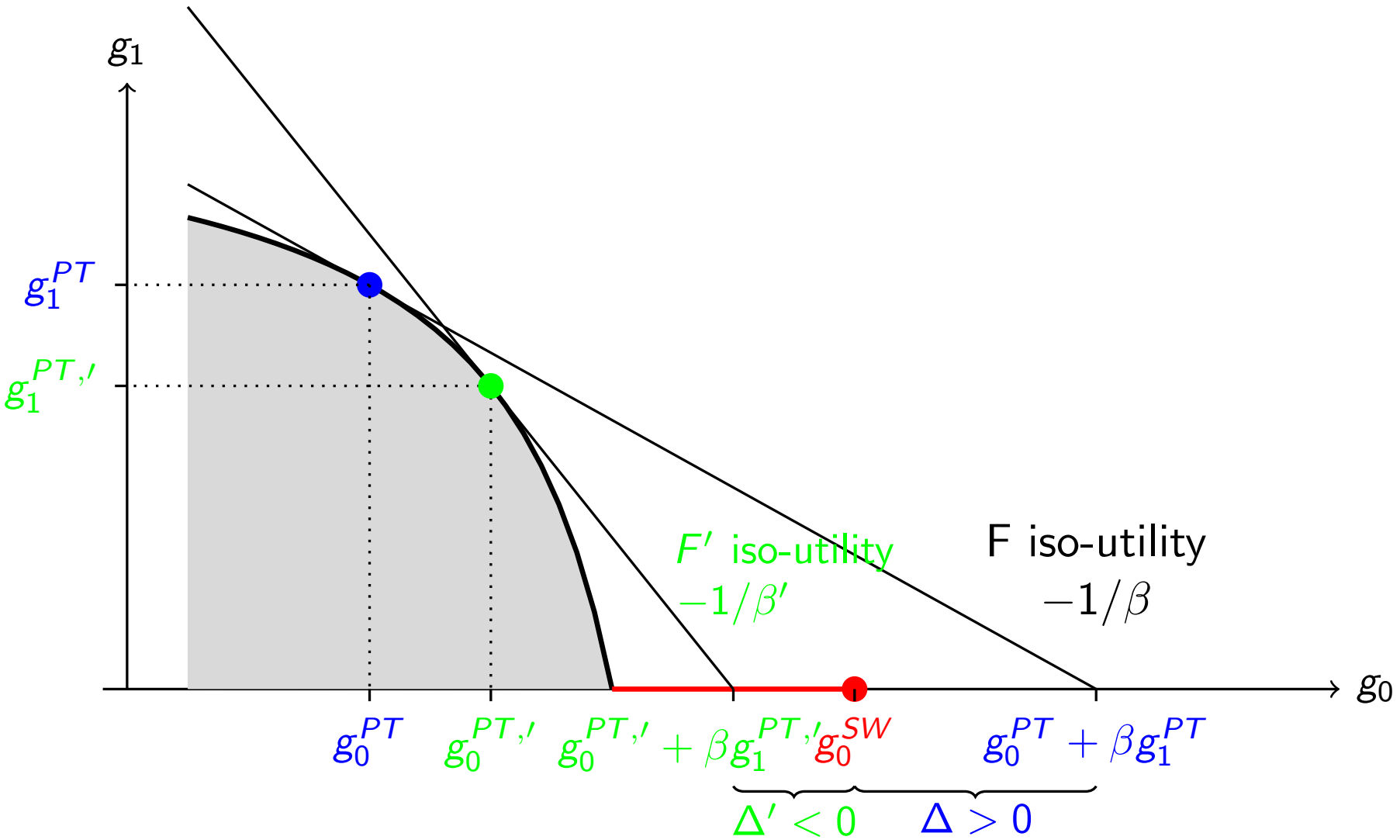


Tradeoff that F faces on the debt market

Sargent-Wallace debt level: consumption profile $(g_0^{SW}, 0)$ such that $P_1 = P_1^M + \alpha^M$ to reduce the cost of reserves already issued $R_0 X_0$



When is there monetary dominance? An example



When is there monetary dominance?

M imposes its views (monetary dominance):

- Even if M cannot commit on future actions
- Even if F does not commit on a fiscal support or a fiscal rule

When F finds costly to exhaust future fiscal capacity ($g_1 = 0$):

- F is sufficiently patient (β)
- Legacy reserves are small enough ($R_{-1}X_{-1}$)
- Future fiscal resources are large ($\bar{x} + \bar{b}$)
- Crowding effect is large ($r(.)$ steep)

More dates ($T \geq 2$) and low rates

- Assume $R_{-1}X_{-1}$ arbitrarily small $\Rightarrow$ all liabilities are endogenous
- Let b^* be the optimal (unconstrained) one-period issuance: $b^* = \arg\max_{b \in [0,1)} \{b(1 - \beta r(1 - b))\}$

Endogenous regime switching when $r(1 - b^*) < 1$

Suppose $r(1 - b^*) < 1$. There exists a unique equilibrium

- M does not issue new reserves between dates 0 and $T - 1$
- There exists $\tau \in \{0; ...; T\}$ such that $g_t > 0$ and there is monetary dominance ($P_t = P_t^M$) for $t \in \{0; ...; \tau\}$, and $g_t = 0$ and there is fiscal dominance ($P_t = P_t^M + \alpha_M$) for $t \in \{\tau + 1; ...; T\}$ (empty if $\tau = T$)

Dynamics for $T \geq 2$ and low rates

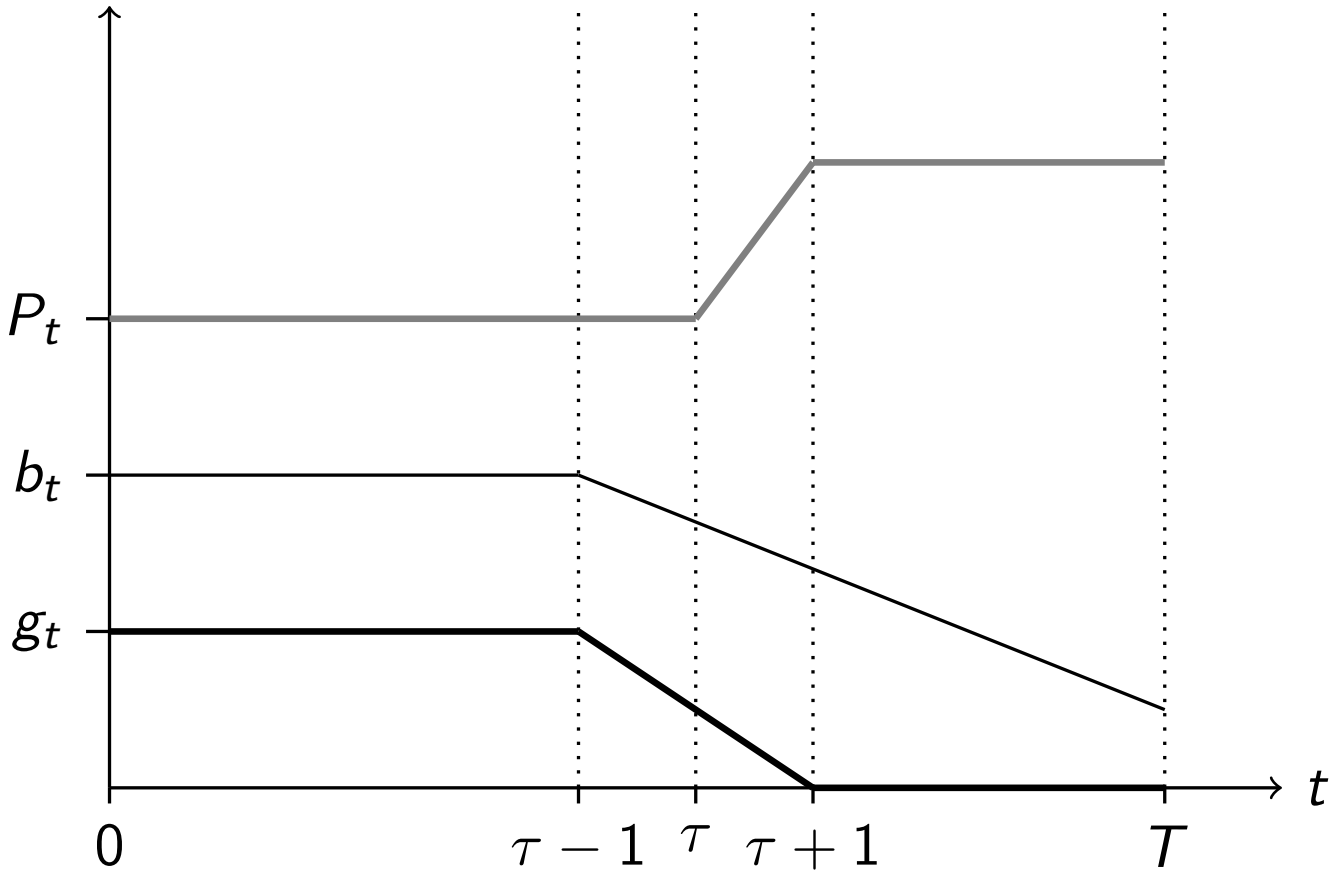


Figure : Dynamics of price level, debt, and deficit

$T \geq 2$ and low rates

- Case of "low rates" ($r(1 - b^*) < 1$): first stable price level despite large debt and deficits, and then inflation and fiscal consolidation
- Intuition: the present value of the terminal resources $\bar{x} + \bar{b}$ grows as they are more remote when discounted at $r(1 - b^*) < 1$
- If $r(1 - b^*) \geq 1$, possible regime switch the other way round: fiscal then monetary

Infinite horizon

Two significant departures from the economies studied thus far:

1. The public sector cannot back reserves and bonds with real resources $\bar{x} + \bar{b}$. Public liabilities are therefore pure bubbles

2. The private sector can enter into strategies that grant it significantly much more influence over fiscal and monetary policies than in the finite-horizon setting: Strategies whereby the bubbly path on which savers coordinate going forward is history dependent

Infinite horizon

Suppose $r(1) < 1$. Consider a series of strictly positive numbers $(\bar{x}_t, \bar{b}_t)_{t \geq 0}$ such that:

$$\bar{x}_0 > \frac{R_{-1} X_{-1}}{P_0^M},$$

and for all $t \geq 0$

$$\begin{aligned}
&\bar{x}_t + \bar{b}_t < 1, \\
&\bar{x}_{t+1} > r(1 - \bar{b}_t - \bar{x}_t)\bar{x}_t, \\
&\bar{b}_{t+1} + \bar{x}_{t+1} = r(1 - \bar{b}_t - \bar{x}_t)(\bar{b}_t + \bar{x}_t)
\end{aligned}$$

Given that $r(1) < 1$, such a series exists if $R_{-1} X_{-1} / P_0^M$ is sufficiently small, which we assume.

Infinite horizon

Market discipline may enforce monetary dominance

- **Fiscal-dominance equilibrium**. There exists an equilibrium in which the price level is $P_t = P_t^M + \mathbb{1}_{\{t>0\}}\alpha_M$. No new reserves are issued. The public sector collects $\bar{b}_t + \bar{x}_t$ at every date t. F consumes at date 0 and rolls over debt afterwards.

- **Monetary-dominance equilibrium.** There also exists an equilibrium in which the price level is $P_t = P_t^M$. No new reserves are issued. The public sector collects $\bar{b}_t + \bar{x}_t$ at every date t. F consumes at date 0 and rolls over debt afterwards.

Infinite horizon

- Same payoff for F but price on target when monetary dominance
- Only difference in strategies: off-equilibrium behavior of savers
  - FD: always purely forward looking
  - MD: history-dependent - Prick the bubbles on public liabilities if past departure from target
- Savers could actually fix any price level: Market dominance

Conclusion

Main result:

- Sargent and Wallace (1981): *"The question is, Which authority moves first, the monetary authority or the fiscal authority? In other words, Who imposes discipline on whom?"*

- M imposes its views if and only if sufficiently strong market forces imply that any fiscal victory in the "game of chicken" must be a Pyrrhic one via an excessively high real interest rate

Additional results:

- M can attenuate the cost of fiscal dominance (preemptive inflation)
- Fiscal rules are needed absent market forces
- Multi-period: Endogenous regime switch from Monetary to Fiscal dominance when low rates
- Infinite horizon and unbacked public liabilities (due to low rates): dominance depends on private sector reaction $\Rightarrow$ Market dominance