Fiscal Dominance

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How are fiscal and monetary policies determined?

Central banks have gained independence from fiscal and political institutions.

This independence is chronically tested, most evidently during crises.

How is policy determined when fiscal and monetary authorities disagree?

How we think about this issue has been greatly influenced by Sargent & Wallace.

- one authority must *relent* to satisfy the government budget constraint
- active vs. passive authorities (Leeper, 1991)

Commitment (or first-mover advantage) is a critical assumption in this tradition, but itself unpleasant as it typically leads to time-inconsistent prescriptions.

How is policy determined with rival authorities?

Consider fiscal and a monetary authorities that:

- disagree on their preferred policy outcomes
- are endowed with different policy instruments

Key frictions and mechanisms:

- limited commitment
- simultaneous policy actions (no first-mover advantage)
- (consolidated) GBC needs to be satisfied

Institutional design:

- active vs. passive policy instruments
- affects how preferences of competing government agencies are internalized

Related Literature

- **Tax-smoothing:** Barro (1979); Lucas & Stokey (1983); Lucas (1986); Chari et al. (1991); Aiyagari et al. (2002).
- **Time-consistency:** Kydland & Prescott (1977); Calvo (1978); Barro & Gordon (1983).
- **Fiscal vs. monetary policy:** Sargent & Wallace (1981, 1987); Leeper (1991); Sims (1994); Basetto & Sargent (2020); Barthelemy, Mengus & Plantin (2021).
- **Instrument choice:** Poole (1970); Canzoneri, Henderson & Rogoff (1983); Carlstrom and Fuerst (1995); Benhabib, Schmitt-Grohe & Uribe (2001); Schabert (2006,2010); King and Wolman (2004); Collard and Dellas (2005); Niemann, Pichler & Sorger (2013).
- **Limited commitment and policymaker's biases:** Martin (2015, 2021).

Environment: a monetarist framework

	FIRST MARKET	**SECOND MARKET**
Government authorities announce policy		Government authorities implement policy
	Ex ante flow utility: $\eta u(x) - (1-\eta)\phi\kappa$	Flow utility: $U(c) - \alpha n + v(g)$
	Resource constraint: $\eta x = (1-\eta)\kappa$	Resource constraint: $c + g = n$
	Liquidity constraints: $m + \ell - p_x x \geq 0; \ \ d \geq 0$	
Initial portfolio: (m, b)	Intra-period bank portfolio: (d, ℓ) at interest i	Portfolio choice: (m', b')

Government agencies **cannot commit** to policy choices beyond the current period.

Government Budget Constraint (GBC)

Government budget constraint:

$$\underbrace{\mathcal{M} + \mathcal{B}}_{\text{old money \& bonds}} + \underbrace{\mathcal{P}_c g}_{\text{expenditure}} = \underbrace{\mathcal{P}_c \tau n}_{\text{tax revenue}} + \underbrace{\mathcal{M}' + (1+R)^{-1}\mathcal{B}'}_{\text{new money \& bonds}}$$

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Normalize nominal variables by $\mathcal{M}$ and use $\mathcal{M}' = (1+\mu)\mathcal{M}$:

$$\underbrace{1 + B}_{\text{old money \& bonds}} + \underbrace{p_c g}_{\text{expenditure}} = \underbrace{p_c \tau n}_{\text{tax revenue}} + \underbrace{(1+\mu)\left[1 + (1+R)^{-1} B'\right]}_{\text{new money \& bonds}}$$

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Primal approach: use monetary equilibrium conditions to write prices and policies $(p_x, p_c, i, R, \mu, \tau)$ in terms of current and future allocations and debt levels.

Monetary Equilibrium $\Rightarrow$ primal approach

$$p_x = \frac{1}{\eta x} \qquad p_c = \frac{U_c}{\eta \phi x}$$

$$i = \frac{u_x}{\phi} - 1 \qquad R = \frac{u'_x}{\phi} - 1$$

$$\mu = \frac{\beta u'_x x'}{\phi x} - 1 \qquad \tau = 1 - \frac{\alpha}{U_c}$$

Government policy and monetary equilibrium

Tax rate distorts intratemporal margin:

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Short- and long-term nominal interest rates:

$$i = \frac{u_x}{\phi} - 1 \qquad R = \frac{u_x'}{\phi} - 1$$

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Government budget constraint:

$$(U_c - \alpha)\, c - \alpha g + \eta \left\{\beta x'(u_x' - \phi) + \beta\phi x'(1 + B') - \phi x(1 + B)\right\} = 0$$

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$$\varepsilon(B, B', x, x', c, g) = 0$$

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Government budget constraint:

$$\varepsilon(B, B', x, \mathcal{X}(B'), c, g) = 0$$

Limited commitment: $x' = \mathcal{X}(B')$

Fiscal policy vs. Monetary policy

Two government authorities/agencies:

F: provides public good; sets tax rate; issues debt

M: sets interest rates and growth rate of monetary aggregates

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No classical dominance: each period, both authorities announce period policy simultaneously, before markets open.

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Some instruments are *actively* chosen while others adjust *passively* to satisfy government budget constraint and equilibrium conditions.

Preliminaries: primal approach

- Government budget constraint in a monetary equilibrium:

$$(U_c - \alpha)c - \alpha g - \phi x(1 + B) + \beta\phi x'(1 + B') + \beta\eta x'(u'_x - \phi) = 0$$

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- Government budget constraint in a monetary equilibrium:

$$\varepsilon(B, B', x, \mathcal{X}(B'), c, g) = 0$$

- Government agencies best-respond to each other and both their future-selves.

- Anticipated policy $\{\mathcal{B}, \mathcal{X}, \mathcal{C}, \mathcal{G}\} \Rightarrow$ continuation values $\{\mathcal{F}, \mathcal{M}\}$:

$$\begin{aligned} \mathcal{F}(B) &\equiv \mathcal{U}_F(\mathcal{X}(B), \mathcal{C}(B), \mathcal{G}(B)) + \beta(1 - \delta_F)\mathcal{F}(\mathcal{B}(B)) \\ \mathcal{M}(B) &\equiv \mathcal{U}_M(\mathcal{X}(B), \mathcal{C}(B), \mathcal{G}(B)) + \beta(1 - \delta_M)\mathcal{M}(\mathcal{B}(B)) \end{aligned}$$

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- Markov-Perfect Monetary Equilibrium: $\{\mathcal{B}, \mathcal{X}, \mathcal{C}, \mathcal{G}, \mathcal{F}, \mathcal{M}\}$.

Consolidated government policy

Suppose there is a single government authority endowed with the preferences of the fiscal authority (i.e., there is no independent central bank).

Problem of the government:

$$\max_{x,c,g,B'} \ \mathcal{U}_F(x,c,g) + \beta(1-\delta_F)\mathcal{F}(B')$$

subject to

$$\varepsilon(B, B', x, \mathcal{X}(B'), c, g) = 0$$

Benchmark to determine whether fiscal dominance arises with competing authorities.

Key property: there is no time-consistency problem in steady state when $\delta_F = 0$.

Central bank actively chooses short-term rate

From equilibrium condition, $i = u_x/\phi - 1$, choosing i is equivalent to implementing x.

The money growth rate adjusts passively, satisfying equilibrium condition, $\phi x(1+\mu) = \beta u'_x x'$, where $x' = \mathcal{X}(B')$ and determined by future policy.

In addition to g, fiscal authority may actively choose τ or B'.

From equilibrium condition, $\alpha = U_c(1-\tau)$, choosing τ is equivalent to c.

The government budget constraint, $\varepsilon(B, B', x, \mathcal{X}(B'), c, g) = 0$, resolves the passive fiscal instrument.

Fiscal authority actively chooses tax rate

Problem of the fiscal authority:

$$\max_{c,\ g} \mathcal{U}_F(\mathcal{X}(B), c, g) + \beta(1 - \delta_F)\mathcal{F}(B')$$

where B' solves $\varepsilon(B, B', \mathcal{X}(B), \mathcal{X}(B'), c, g) = 0$.

Fiscal authority actively chooses tax rate

Problem of the fiscal authority:

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where B' solves $\varepsilon(B, B', \mathcal{X}(B), \mathcal{X}(B'), c, g) = 0$.

Problem of the monetary authority:

$$\max_{x} \mathcal{U}_M(x, \mathcal{C}(B), \mathcal{G}(B)) + \beta(1 - \delta_M)\mathcal{M}(B')$$

where B' solves $\varepsilon(B, B', x, \mathcal{X}(B'), \mathcal{C}(B), \mathcal{G}(B)) = 0$.

First-order conditions (short-term rate vs. tax rate)

With λ_F and λ_M as Lagrange multipliers on GBC we obtain:

$$\begin{aligned}\mathcal{U}_{M,x} + \lambda_M \varepsilon_x &= 0 \\ \mathcal{U}_{F,c} + \lambda_F \varepsilon_c &= 0 \\ \mathcal{U}_{F,g} + \lambda_F \varepsilon_g &= 0\end{aligned}$$

and

$$\varepsilon_{B'}[\lambda_F - (1-\delta_F)\lambda'_F] + \lambda_F \varepsilon_{x'} \mathcal{X}'_B + \beta(1-\delta_F)\lambda'_F \Delta'_x \mathcal{X}'_B = 0$$

$$\varepsilon_{B'}[\lambda_M - (1-\delta_M)\lambda'_M] + \lambda_M \varepsilon_{x'} \mathcal{X}'_B - \beta(1-\delta_M)\lambda'_M \left(\Delta'_c \mathcal{C}'_B + \Delta'_g \mathcal{G}'_B\right) = 0$$

where

$$\Delta_j \equiv \frac{\mathcal{U}_{F,j}}{\lambda_F} - \frac{\mathcal{U}_{M,j}}{\lambda_M}$$

Short-term rate vs. tax rate

Proposition. When the monetary authority sets the short-term rate, i, and the fiscal authority sets the tax rate, τ:

1. There is no possibility of fiscal dominance.
2. There is always a time-consistency problem in steady state.

Fiscal authority actively chooses debt

Problem of the fiscal authority:

$$\max_{g,\ B'} \mathcal{U}_F(\mathcal{X}(B), c, g) + \beta(1 - \delta_F)\mathcal{F}(B')$$

where c solves $\varepsilon(B, B', \mathcal{X}(B), \mathcal{X}(B'), c, g) = 0$.

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Problem of the fiscal authority:

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where c solves $\varepsilon(B, B', \mathcal{X}(B), \mathcal{X}(B'), c, g) = 0.$

Problem of the monetary authority:

$$\max_{x} \mathcal{U}_M(x, c, \mathcal{G}(B)) + \beta(1 - \delta_M)\mathcal{M}(\mathcal{B}(B))$$

where c solves $\varepsilon(B, \mathcal{B}(B), x, \mathcal{X}(\mathcal{B}(B)), c, \mathcal{G}(B)) = 0.$

First-order conditions (short-term rate vs. debt)

With λ_F and λ_M as Lagrange multipliers on GBC we obtain:

$$\begin{aligned} \mathcal{U}_{M,x} + \lambda_M \varepsilon_x &= 0 \\ \mathcal{U}_{F,c} + \lambda_F \varepsilon_c &= 0 \\ \mathcal{U}_{F,g} + \lambda_F \varepsilon_g &= 0 \end{aligned}$$

and

$$\varepsilon_{B'}[\lambda_F - (1-\delta_F)\lambda_F'] + \lambda_F \varepsilon_{x'} \mathcal{X}_B' + \beta(1-\delta_F)\lambda_F' \Delta_x' \mathcal{X}_B' = 0$$

$$\Delta_c = 0$$

where

$$\Delta_j \equiv \frac{\mathcal{U}_{F,j}}{\lambda_F} - \frac{\mathcal{U}_{M,j}}{\lambda_M}$$

Short-term rate vs. debt

Proposition. When the monetary authority sets the short-term rate, i, and the fiscal authority sets the debt level, B':

1. There is fiscal dominance when $\mathcal{U}_{M,x} = \mathcal{U}_{F,x}$ and $\mathcal{U}_{M,c} = \mathcal{U}_{F,c}$.
2. Central bank patience, δ_M, is irrelevant.
3. If $\mathcal{U}_{M,c} = \mathcal{U}_{F,c}$ then $\lambda_M = \lambda_F$.
4. There is no time-consistency problem in steady state when $\delta_F = 0$.

Proposition. When the fiscal authority sets the debt, B', setting the short-term rate, i, or the money growth rate, μ, are equivalent policies for the central bank.

Central Bank actively chooses the money growth rate

Proposition. When the monetary authority sets the money growth rate, μ, and the fiscal authority sets the tax rate, τ:

1. There is no possibility of fiscal dominance.
2. There is always a time-consistency problem in steady state.

Summary of results

Active instrument	Fiscal dominance possible?	Time-consistency problem in steady state	Relevant discounting
Tax rate	No	Always	Both
Debt	Yes	Eliminated when $\delta_F = 0$	Fiscal
Long-term rate	No	Almost Always	Monetary
Yield curve	No	Almost Always	Monetary

How is policy determined when fiscal and monetary authorities disagree?

- Institutional design on active vs. passive instruments shapes policy outcomes.
- Fiscal dominance may only be achieved when debt is the active fiscal instrument.
- Careful design of central bank may counteract fiscal dominance
  - endow it with a special concern for liquidity markets
  - central bank patience not effective
- Time-consistency is a perennial problem in the presence of policy disagreement.
- Central bank control of long-term rates is effective to address fiscal impatience.

Appendix

Problem of the Agent

First market:

$$
\begin{aligned}
V^c(m,b,B) &= \max_{x,\ell} \; u(x) + W(m+b-p_x x - i\ell, B) \\
&\text{s.t.} \quad p_x x \leq m + \ell \\
V^p(m,b,B) &= \max_{\kappa,d} \; -\phi\kappa + W(m+b+p_x\kappa + id, B) \\
V(m,b,B) &= \eta V^c(m,b,B) + (1-\eta)V^p(m,b,B)
\end{aligned}
$$

Second market:

$$
\begin{aligned}
W(m+b,B) &= \max_{c,n,m',b'} \; U(c) - \alpha n + v(g) + \beta V(m',b',B') \\
&\text{s.t.} \quad p_c c + (1+\mu)(m' + (1+R)^{-1}b') = p_c(1-\tau)n + m + b
\end{aligned}
$$

Central Bank actively chooses the long-term rate

Proposition. When the monetary authority sets the long-term rate, R, and the fiscal authority sets the tax rate, τ:

1. There is no possibility of fiscal dominance.
2. Fiscal authority patience, δ_F, is irrelevant.
3. If $\mathcal{U}_{M,x} = \mathcal{U}_{F,x}$ then $\lambda_M = \lambda_F$.
4. There is no time-consistency problem in steady state when $\delta_M = 0$, $\mathcal{U}_{M,x} = \mathcal{U}_{F,x}$, $\mathcal{U}_{M,c} = \mathcal{U}_{F,c}$ and $\mathcal{U}_{M,g} = \mathcal{U}_{F,g}$.

Proposition. When the monetary authority sets the short- and long-term rates, $i \& R$:

1. There is no possibility of fiscal dominance.
2. Fiscal authority patience, δ_F, is irrelevant.
3. If $\mathcal{U}_{M,c} = \mathcal{U}_{F,c}$ then $\lambda_M = \lambda_F$.
4. There is no time-consistency problem in steady state when $\delta_M = 0$, $\mathcal{U}_{M,c} = \mathcal{U}_{F,c}$ and $\mathcal{U}_{M,g} = \mathcal{U}_{F,g}$.