Optimal Structure of Fiscal and Monetary Authorities

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Federal Reserve Board

Intro

Why don't we elect the Federal Reserve?

Fischer (1994)

- Goal Independence: Monetary and fiscal authority should partition goals (distribution, growth)
- Instrument Independence: Monetary and fiscal authority utilize different instruments to achieve goals (spending, interest rate)

The monetary authority should be both goal and instrument independent to minimize inflationary bias

Goal, instrument independence necessary, not sufficient.

- Elected fiscal authority, benevolent monetary authority

Model Overview

- Fiscal authority controls spending, taxation, nominal bonds
- Monetary authority controls price level (decides repayment)

Fiscal Authority \ Monetary Authority	Elected	Benevolent
Elected	Time inconsistency, Bonds $= 0$, Instrument independence	Bonds ≥ 0, Goal, instrument indep.
Benevolent	Time inconsistency, Bonds $= 0$, Goal, instrument indep.	Time inconsistency, Bonds $= 0$, Instrument independence

Literature

Political Economy/Macro

- Miller (2016)

Fiscal/Monetary Design

- Rogoff (1985)
- Fischer (1994)
- Persson, Tabellini (1993)

Model: Consumer

Consumer:

- n identical consumers, choose c, l
- $u(c, g, l) = c + A\log(g) - \frac{l^{1+1/\epsilon}}{\epsilon+1}$
- $U = \sum_t \beta^t u(c_t, g_t, l_t)$ subject to

$$c + qB_i' \leq w_\theta l(1-\tau) + \frac{B_i}{P(B)} + T_i, \ \left(B_i = \frac{B}{n}\right)$$

- $w_\theta \in \{w_h, w_l\}$ with probabilities $\pi, 1-\pi$
- $q(B') = \beta E_{\theta'}\left[\frac{1}{P'(B')}\right]$
- Indirect utility before transfers is

$$W_\theta(\tau, g) = \frac{\epsilon^\epsilon (w_\theta(1-\tau))^{\epsilon+1}}{\epsilon+1} + A\log(g)$$

Model: Fiscal, Firm, Monetary

Fiscal Authority:

- Chooses $g, \tau, B', T_i \geq 0$
- $\text{Rev}_\theta(\tau) = n\tau w_\theta(\epsilon w_\theta(1-\tau))^\epsilon$
- Budget Constraint:

$$g + \sum_i T_i + \frac{B}{P} \leq \text{Rev}_\theta(\tau) + qB'$$

Firm:

- $z = w_\theta l$
- $c + g = z$

Monetary Authority:

- Chooses P

Political Distortion

Voting each period

- One randomly chosen consumer proposes $\{\tau, g, T_i, B'\}$, P, or $\{\tau, g, T_i, B', P\}$
- Needs $m > n/2$ votes for approval
- If proposal isn't approved, new random consumer chosen
- Continues $T \geq 2$ rounds then dictator appointed

End result

- Look at Markov perfect equilibrium, first proposal is accepted
- Equivalent to maximizing the utility of m consumers

Coalition Overlap:

- Simplest: m-coalitions are identical
- Fiscal, monetary coalitions must overlap $> \frac{m}{2}$

Equilibrium Selection

Central Bank minimizes $|P-1|$ to produce level of welfare

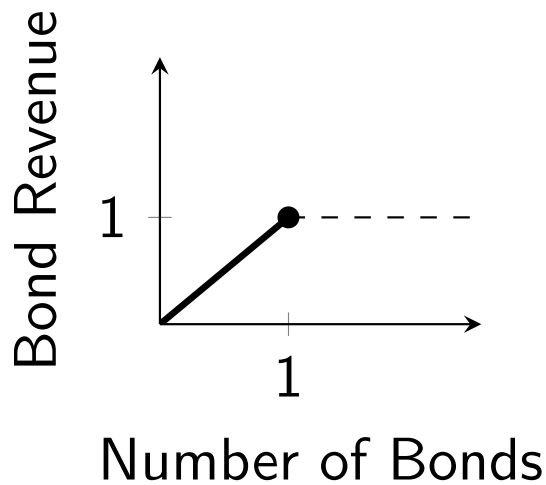
- Moves price level for strictly positive welfare gain
- Defaults to $P=1$ every period if no gains
- Function solely of bonds chosen in previous period and shock

Government chooses smallest B to produce level of bond revenue

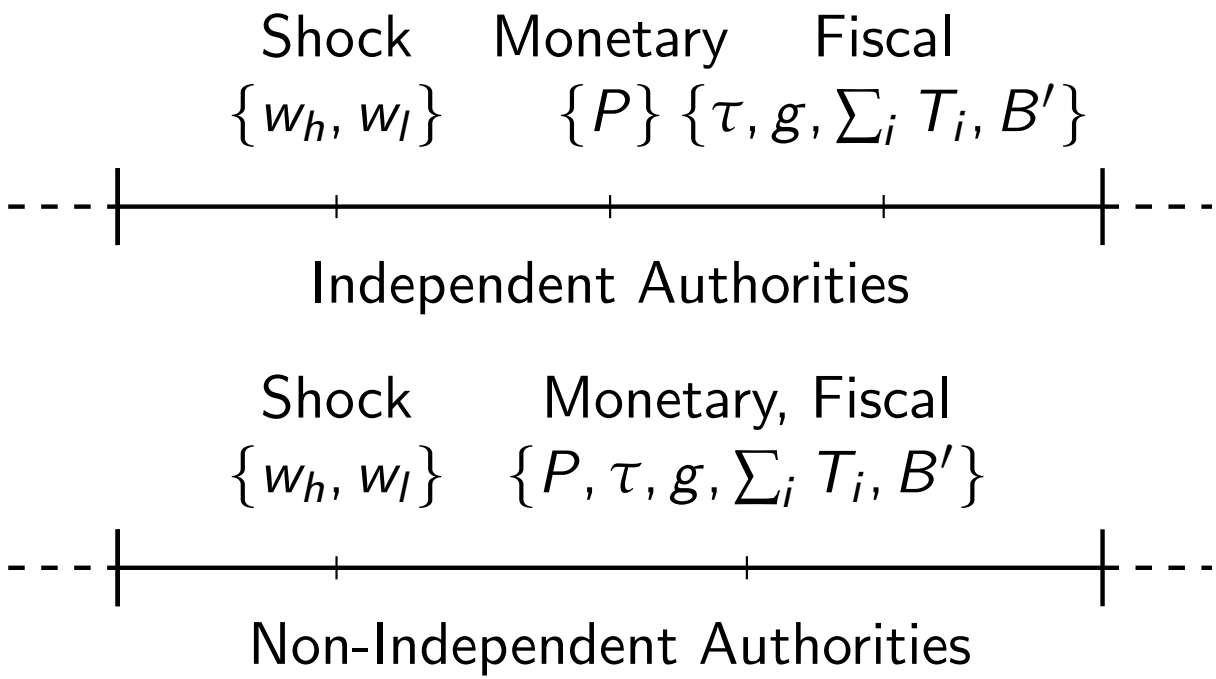
Example:

$$\text{Revenue} = qB = E\left[\frac{1}{P(B)}\right]B$$

$$P(B) = \begin{cases} B, & \text{if } B > 1 \\ 1, & \text{if } B \leq 1 \end{cases}$$



Plan



1. Benevolent Fiscal Authority Structures
   - Benevolent, Self-Interested Monetary Authority
     - $B = 0$
2. Self-Interested Fiscal Authority Structures
   - Benevolent Monetary Authority
     - $B > 0$
   - Self-Interested Monetary Authority
     - $B = 0$

Benevolent Fiscal Authority

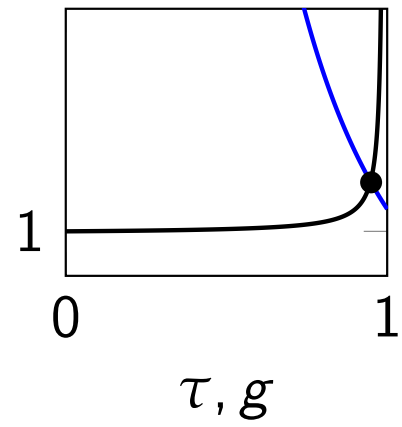
Benevolent Fiscal Planner maximizes total welfare

$$\max_{\tau,g,B',T_i} W_\theta(\tau,g) + \frac{\sum_i T_i}{n} + \beta\left[\pi v_H\left(B'\right) + (1-\pi)v_L\left(B'\right)\right]$$

FOC:

$$\frac{1-\tau}{1-\tau(1+\epsilon)} = \frac{nA}{g}$$

$$\frac{1-\tau}{1-\tau(1+\epsilon)} = \frac{-n\beta}{q(B')}\left[\pi v_H'\left(B'\right) + (1-\pi)v_L'\left(B'\right)\right]$$



$\frac{1-\tau}{1-\tau(1+\epsilon)} > 1$ hence $T_i = 0$

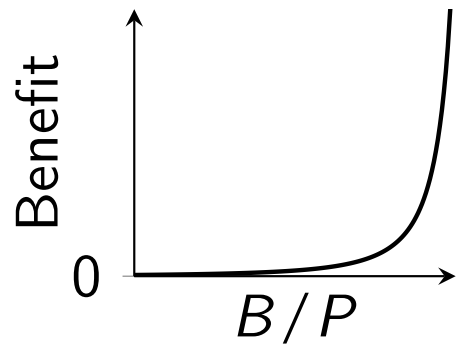
Monetary Policy with Benevolent Fiscal Policy

Monetary authority chooses P to maximize total or m welfare

$v_\theta(B) = \max_P [\text{(Fiscal Problem)}]$ or $v_\theta(B) = \max_{P,\tau,g,B',T_i} [\text{(Fiscal Problem)}]$

FOC for $B > 0$:

$$\frac{\partial v_\theta(B)}{\partial P} = \left[\frac{\epsilon\tau(\frac{B}{P})}{1-\tau(\frac{B}{P})(1+\epsilon)}\right]\frac{B}{(n,m)P^2}$$

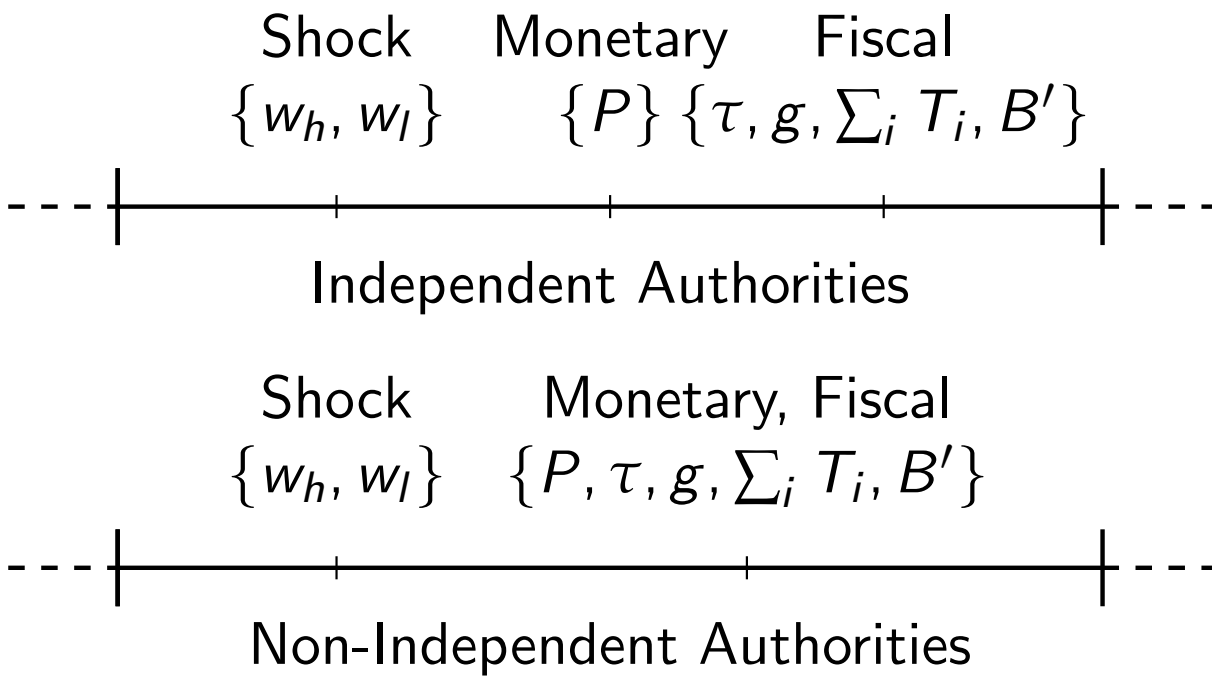


Thus

$$P(B) = \begin{cases} \infty, & \text{if } B > 0 \\ 1, & \text{if } B = 0 \end{cases}$$

Transfers always 0, so maximizing m welfare same as total

Plan



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Self-Interested Fiscal Authority

Fiscal Planner maximizes the utility of m consumers

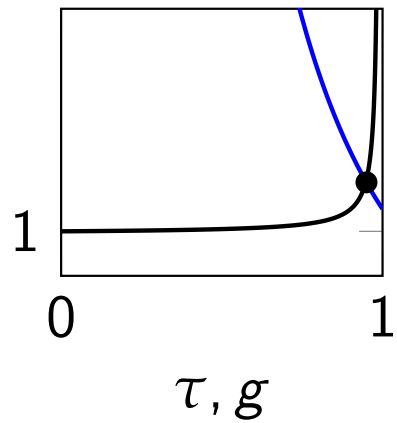
$$\max_{\tau,g,B',T_i} W_\theta(\tau,g) + \frac{\sum_i T_i}{m} + \beta\left[\pi v_H\left(B'\right) + (1-\pi)v_L\left(B'\right)\right]$$

$$\text{s.t. } g + \textstyle\sum_i T_i + \frac{B}{P} \leq \text{Rev}_\theta(\tau) + qB'$$

If no transfers:

$$\frac{1-\tau}{1-\tau(1+\epsilon)} = \frac{nA}{g}$$

$$\frac{1-\tau}{1-\tau(1+\epsilon)} = \frac{-n\beta}{q(B')}\left[\pi v_H'\left(B'\right) + (1-\pi)v_L'\left(B'\right)\right]$$

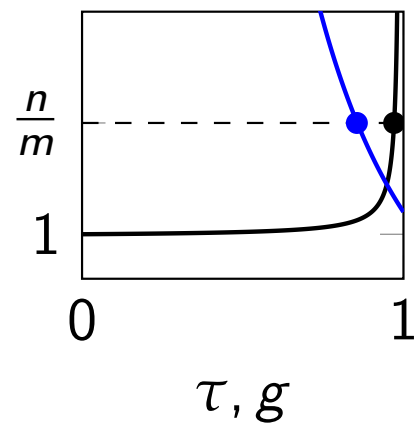


If transfers, τ^*, g^*, B'^* are constants:

$$\frac{n}{m} = \frac{nA}{g^*}$$

$$\frac{n}{m} = \frac{1-\tau^*}{1-\tau^*(1+\epsilon)}$$

$$B'^* = \arg\max_{B'}\left[\frac{qB'}{m} + \beta\left[\pi v_H\left(B'\right) + (1-\pi)v_L\left(B'\right)\right]\right]$$



Fiscal Policy Explanation

Will use revenue from taxes/bonds to

1. Repay bonds
2. After repaying, lower taxes/raise government spending
3. If taxes low enough, increase transfers

C_θ: Level of real bonds $\frac{B}{P}$ below which transfers are positive

- $\text{Rev}_\theta(\tau^*) + qB'^* - g^* - \frac{B}{P} > 0$

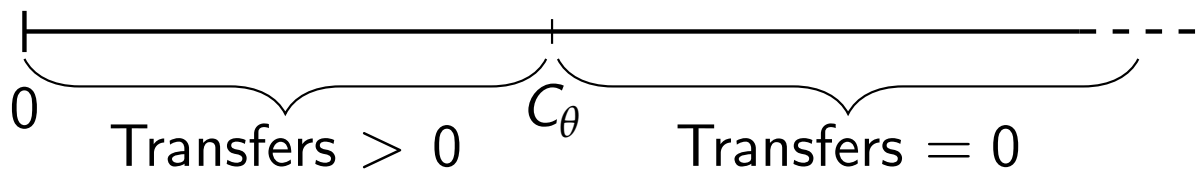


Figure: Transfers as function of level of real bonds

Monetary Authority with Self-Interested Fiscal Policy

Monetary authority chooses P to maximize total or m welfare

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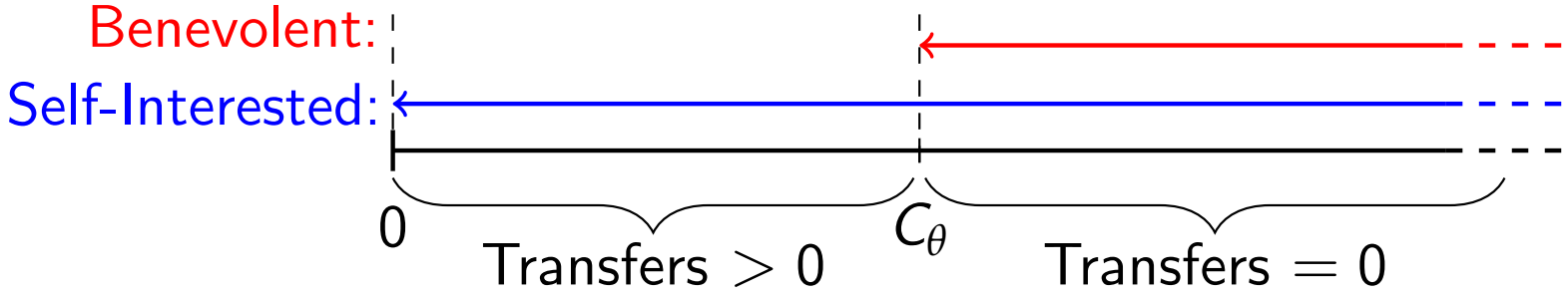
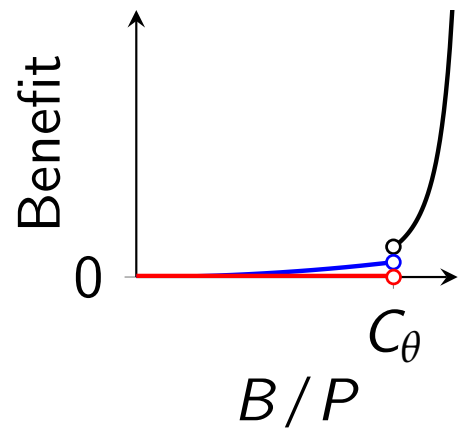


$$\frac{\partial v_\theta(B)}{\partial P} = \begin{cases} \left[\frac{\epsilon\tau(\frac{B}{P})}{1-\tau(\frac{B}{P})(1+\epsilon)}\right]\frac{B}{nP^2}, & \text{if } B > C_\theta \\ 0 \text{ or } \left[\frac{n}{m}-1\right]\frac{B}{nP^2}, & \text{if } B < C_\theta \end{cases}$$



Increasing the price level P

- If $\frac{B}{P} > C_\theta$: taxes down, public spending up; transfers $= 0$
- If $\frac{B}{P} < C_\theta$: taxes and public spending constant; transfers up

Fiscal Authority, Benevolent Monetary Authority

Fiscal Authority always issues C_h

In bad times $(w_\theta = w_l)$

$$P(B) = \begin{cases} \frac{B}{C_l}, & \text{if } B > C_l \\ 1, & \text{if } B \leq C_l \end{cases}$$

Monetary authority reduces real bond value to C_l

In good times $(w_\theta = w_h)$

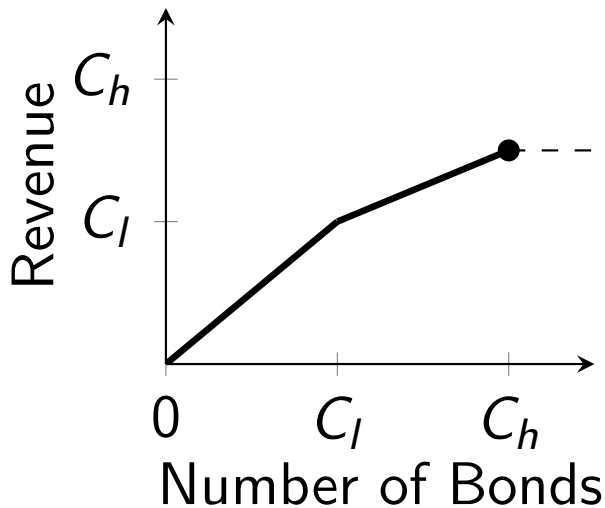
$$P(B) = \begin{cases} \frac{B}{C_h}, & \text{if } B > C_h \\ 1, & \text{if } B \leq C_h \end{cases}$$

Monetary authority reduces real bond value to C_h

Real bond value will always be C_θ

- Taxes always at lowest: $\tau = \tau^*$

Issue C_h bonds since no risk



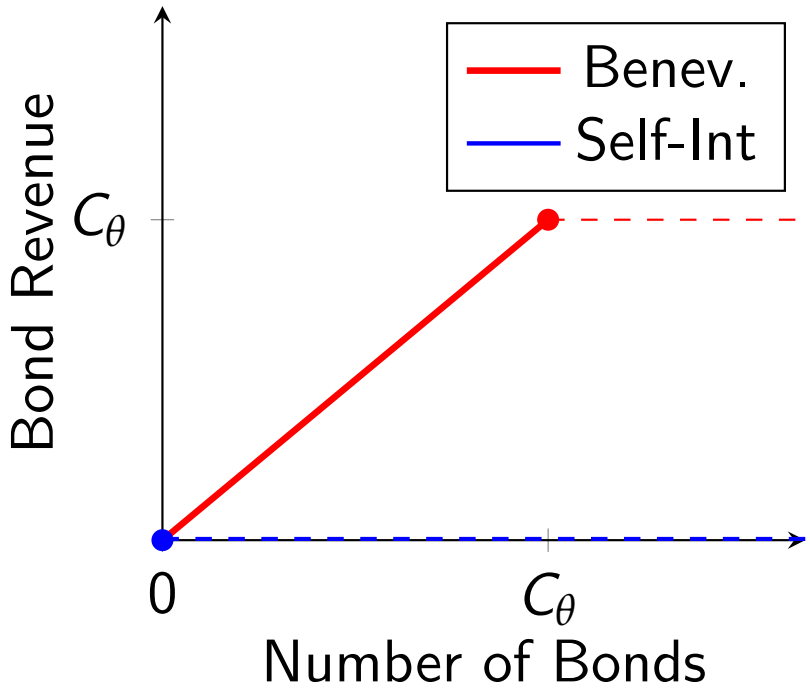
Self-Interested Fiscal Authority Results

Benevolent Monetary Authority

$$P(B) = \begin{cases} \frac{B}{C_\theta}, & \text{if } B > C_\theta \\ 1, & \text{if } B \leq C_\theta \end{cases}$$

Self-Interested Monetary Authority

$$P(B) = \begin{cases} \infty, & \text{if } B > 0 \\ 1, & \text{if } B = 0 \end{cases}$$



Benevolent: $B = C_h$, rely on inflation to repay in bad times

Self-Interested: $B = 0$, will always inflate everything away

Conclusions

Goal and instrument independence are necessary, not sufficient.

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Benevolent	Time inconsistency, Bonds $= 0$, Goal, instrument indep.	Time inconsistency, Bonds $= 0$, Instrument independence