Shotgun Wedding: Fiscal and Monetary Policy[1]

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[1]The views herein represent those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System

Main Themes of the Survey

- Monetary and Fiscal policy are intertwined in multiple ways
  - Common budget constraint
  - Multiple instruments that generate liquidity
  - Swaps of money for bonds
  - Enforcement of private vs. public loans
- Drawing a line on purely economic grounds is arbitrary
- But societies do it, the line shifts all the time, and it matters

What I Will Discuss Today

- Government budget arithmetics when $r < g$
  - There is a government budget constraint even if $r < g$

Should we Worry about Debt?

- Darby (1984): Some pleasant monetarist arithmetic
- Modern monetary theory: debt and money are the same thing
- Blanchard (2019): "Put (too) simply, the signal sent by low rates is not only that debt may not have a substantial fiscal cost, but also that it may have limited welfare costs."

Roadmap

- Set up an economy in which $r < g$
- Study the government budget
- Show that debt expansion may lead to winners and losers even with $r < g$
- Show that some people prefer $r < g$
- Change labels, turn fiscal policy into monetary policy

Setup

- Similar to Sargent and Wallace (1982, Real bills)
- Overlapping generations living two periods
- Two types of agents in each generation, with different endowment:
  - "Savers:" (α, ϵ)
  - "Borrowers:" (ϵ, γ)
- $\epsilon \approx 0$
- Pure exchange economy
- Preferences: $\log c^i_{yt} + \log c^i_{o\,t+1}$
- Borrowers are anonymous, repayment of private debt cannot be enforced

Government: Policy Instruments, Version 1

- Can issue bonds
- Can implement lump-sum taxes τ_t and transfers on everybody alive (but taxes are limited to ϵ)

Timing

- Government auctions bonds promising a payment of b_{t+1} units of good in $t + 1$
- Auction price: $1/\rho_{t+1}$
- Government implements lump-sum transfers/taxes to repay maturing debt, according to

$$b_t = \tau_t + b_{t+1}/\rho_{t+1}$$

- (May default if taxes are insufficient, but we do not consider this equilibrium)

Household budget constraints

- Young:

$$\frac{b^i_{t+1}}{\rho_{t+1}} = e^i_{yt} - c^i_{yt} - \tau_t,$$

- Old:

$$c^i_{o\,t+1} - e^i_{o\,t+1} = b^i_{t+1} - \tau_{t+1},$$

- Without government intervention, we get autarky: borrowers cannot borrow (anonymity), savers cannot lend to anyone
- In equilibrium, savers buy all of government debt, borrowers consume after-tax endowment
- Gov't borrowing substitutes for private borrowing (in addition to intertemporal redistribution)

Steady States

- Analyze welfare in steady state
- There are welfare effects on transition cohorts (e.g., extra debt is good for transition cohorts)
- For our purposes, enough to show that there are winners and losers from changes in debt
- Bond demand for each saver:

$$b^S_{SS} = \frac{1}{2}\left[\alpha - \tau_{SS}(\rho_{SS} - 1)\right]. \tag{36}$$

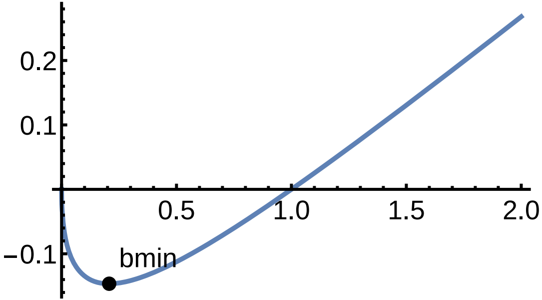
- Gov't budget constraint:

$$\tau_{SS} = b^S_{SS}\left(1 - \frac{1}{\rho_{SS}}\right)$$

- Equilibrium taxes/transfers per saver:

$$\tau_{SS} = b^S_{SS} - \frac{\sqrt{b^S_{SS}(\alpha + 2b^S_{SS})}}{2}. \tag{37}$$

Taxes as a Function of Debt in Steady State



Characterization of Taxes and Interest Rates

- Can compute τ_{SS}, ρ_{SS} as a function of b^S_{SS}.
- $\rho_{SS} < 1$ and $\tau_{SS} < 0$ iff $b^S_{SS} < \alpha/2$ (for $\epsilon \approx 0$)
- τ_{SS} convex in b^S_{SS}, with a unique minimum, at interior point $b_{\min} < \alpha/2$
- Note: gov't faces a budget constraint even when $\rho_{SS} < 1$ ($r < g$): more debt $\implies$ smaller transfers
- What matters is the marginal interest rate, not the average interest rate on government debt

Borrowers' Preferred SS Level of Debt

$$c^B_{y\,SS} = \epsilon - \tau_{SS},$$

$$c^B_{o\,SS} = \gamma - \tau_{SS}.$$

- Want to choose $b^S_{SS} = b_{\min}$

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- Want to choose $b^S_{SS} = b_{\min}$
- Do not want to push to $\rho_{SS} = 1$ $(r = g)$. True even if $\gamma > \alpha$
- Want some borrowing from gov't, but not full replacement of missing market (Yared, 2013, Azzimonti and Yared, 2017)

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- Want gov't to act as a cartel of the borrowers: restrict demand, get better price
- Do not want enforcement of private debt: Bhandari et al. (2017)

Savers' Preferred SS Level of Debt

- Mirror image: would like gov't borrowing over $\gamma/2$
- Here, limited by constraint $\tau_{SS} \leq \epsilon$

Changing Labels: From Fiscal to Monetary Policy

- Same economy as before
- Government issues "money," pieces of paper that are never redeemed
- Helicopter money injections, given to all households alive:
- Gov't budget constraint:

$$-T_t = M_t - M_{t-1}$$

- Household budget constraints:

$$M_t^i = P_t(e_{yt}^i - c_{yt}^i) - T_t,$$

$$P_{t+1}(c_{o\,t+1}^i - e_{o\,t+1}^i) = M_t^i - T_{t+1}$$

This Is just a Change in Variable

- $P_t / P_{t+1} \iff \rho_{t+1}$
- $\frac{M_t}{P_t} \iff b_{t+1}/\rho_{t+1}$
- $\frac{T_t}{P_t} \iff \tau_t$

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- debt is money in this economy
- helicopter money is fiscal policy

Monetary Policy Interpretation

- Borrowers like some inflation
- Savers would like deflation, limited by gov't ability to tax

Conclusion

- Fiscal policy and monetary policy are not distinct economically
- To draw a distinction, we need political economy...
- ... but they will always try to elope when push comes to shove

Surprise Inflation: A Simple Model

- Simple model
- Demand for money:

$$1 = \beta E_t \left[\frac{P_t}{P_{t+1}} v' \left(\frac{M_t}{P_{t+1}} \right) \right]$$

- Euler equation (linear utility in credit goods):

$$1 = \beta R_t E_t \left[\frac{P_t}{P_{t+1}} \right]$$

- PV budget balance:

$$\frac{B_t + M_{t-1}}{P_t} = E_t \sum_{s=t}^{\infty} \beta^{s-t} \left[\frac{T_s}{P_s} - g_s + \frac{M_s}{P_s} \left(1 - \frac{1}{R_s} \right) \right].$$

No uncertainty

Get an *equilibrium* seigniorage amount:

$$L(\pi_{s+1}) := \frac{M_s}{P_s}\left(1 - \frac{1}{R_s}\right) = v'^{-1}\left(\frac{\pi_{s+1}}{\beta}\right)\left(1 - \frac{\pi_{s+1}}{\beta}\right)$$

Together with PV budget balance:

$$\sum_{s=0}^{\infty} \beta^s L(\pi_{s+1}) = \frac{B_0 + M_{-1}}{P_0} - \sum_{s=0}^{\infty} \beta^s \left[\frac{T_s}{P_s} - g_s\right].$$

- Consider a class of equilibria in which RHS is fixed
- PV of seigniorage is pinned down, timing undetermined (Sargent and Wallace)
- Define $\bar{\pi}$ so that

$$\sum_{s=0}^{\infty} \beta^s L(\bar{\pi}) = \frac{B_0 + M_{-1}}{P_0} - \sum_{s=0}^{\infty} \beta^s \left[\frac{T_s}{P_s} - g_s\right]$$

- $\bar{\pi}$: inflation target (Chisini mean of inflation), fiscally determined

Unanticipated Inflation

$$(B_t + M_{t-1})\left(\frac{1}{P_t} - E_{t-1}\frac{1}{P_t}\right) = E_t\sum_{s=t}^{\infty}\beta^{s-t}\left[\frac{T_s}{P_s} - g_s + \frac{M_s}{P_s}\left(1 - \frac{1}{R_s}\right)\right]$$
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- True whether FTPL holds or not

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- Suppose that a shock moves one of the variables unexpectedly (say g_t)
- Could adjust $\{T_s\}$
- Could adjust $\{g_s\}, s > t$
- Could adjust future seigniorage

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- True whether FTPL holds or not
- Suppose that a shock moves one of the variables unexpectedly (say g_t)
- Could adjust $\{T_s\}$
- Could adjust $\{g_s\}, s > t$
- Could adjust future seigniorage
- If none of this adjusts, then price level adjusts (with long-term debt, innovation to current and future inflation)

A Hedging Theory of Government Debt, based on Bhandari et al. (2016)

- Suppose that using taxes and seigniorage to absorb shocks is costly
- Take inflation process as given
- What is the amount of nominal debt to issue?
- Answer: want to hedge optimally
-

$$\frac{B_t + M_{t-1}}{P_{t-1}} = \frac{\mathrm{Cov}_{t-1}(\pi_t^{-1}, \mathrm{PV}_t(\tau - g))}{\mathrm{Var}_{t-1}(\pi_t^{-1})}$$

$$= \mathrm{Corr}_{t-1}(\pi_t^{-1}, \mathrm{PV}_t(\tau - g))\sqrt{\frac{\mathrm{Var}_{t-1}(\mathrm{PV}_t(\tau - g))}{\mathrm{Var}_{t-1}(\pi_t^{-1})}},$$

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- Ramsey outcome will converge to this value

Currency/GDP ratio