

Government Purchases Over the Business Cycle: the Role of Heterogeneity and Wealth Bias in Political Decision Making

Discussion by Marina Azzimonti
U Texas Austin and U Penn

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Introduction

- ▶ **Objective:** to develop a quantitative model that can deliver RBC properties of Government Spending (g)
 1. Autocorrelation: $\rho_g = 0.74$
 2. Volatility: $Var(g) \sim Var(y) = 1.9$
 3. Procyclicality: $Corr(g, y) = 0.47$
- ▶ Representative agent model + benevolent gov't:
 - ▶ Successful on (1): $\rho_g = 0.62$
 - ▶ Too little volatility: $Var(g) = 1.1$
 - ▶ Too much comovement: $Corr(g, y) = 0.96!!$

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- ▶ Let's focus on the last two points.

My discussion

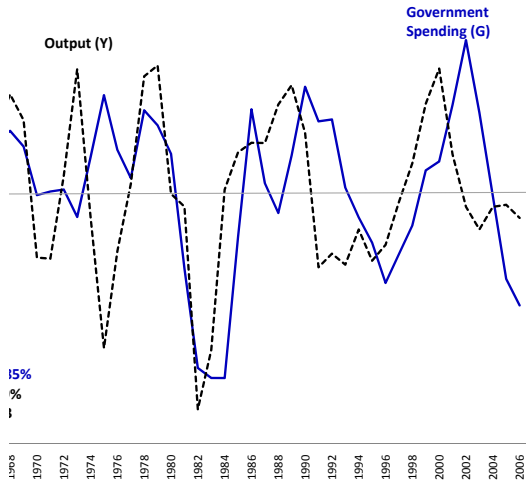
1. The facts
2. The modeling assumptions

⇒ Centered around the GBC

$$g = \tau y$$

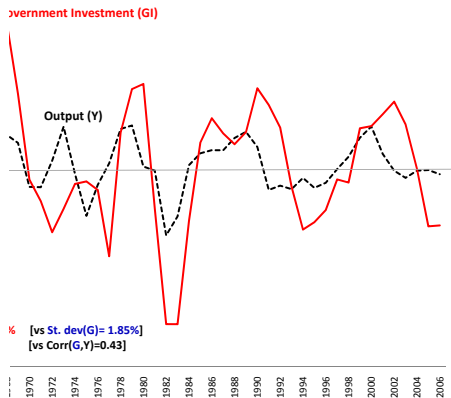
The facts

- ▶ Output and Public Spending (g) over the cycle



The facts

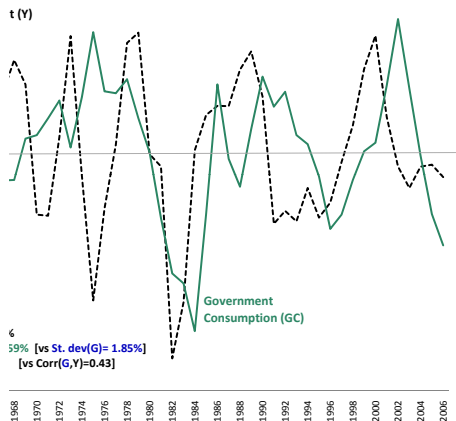
- ▶ but $G = \text{consumption spending} + \text{investment}$, and...



- ▶ investment on public capital: productive + durable

The facts

- ▶ The model is about *consumable g...*



- ▶ note that here the co-movement between g and y is even smaller!!

The GBC - Simple Accounting

- ▶ The GBC is

$$g = \tau y$$

- ▶ Taking logs, and denoting $\ln x \equiv \tilde{x}$

$$\tilde{g} = \tilde{\tau} + \tilde{y}.$$

- ▶ The variance is

$$\text{Var}(\tilde{g}) = \text{Var}(\tilde{\tau}) + \text{Var}(\tilde{y}) + 2\text{Cov}(\tilde{\tau}, \tilde{y}),$$

- ▶ and the correlation

$$\text{Corr}(\tilde{g}) = \text{Corr}(\tilde{\tau}, \tilde{y}) + 1.$$

- ▶ **KEY:** how *responsive* taxes are to shocks!

Why does the Representative Agent Model fail?

- ▶ Dinky 2x2 model

- ▶ Production: $y^i = z^i l^\alpha l^{1-\alpha}$, $\delta = 1$, $l = 1$.
- ▶ TFP shocks: $z^i \in \{z^H, z^L\}$ with transition q^{ij} .
- ▶ Utility: $u(c, g) = \theta \ln c + (1 - \theta) \ln g$.
- ▶ CBC: $c_t = (1 - \tau_t)[w_t + r_t k_t] - k_{t+1}$

- ▶ Competitive Equilibrium

- ▶ Competitive firms: $w^i = (1 - \alpha)y^i$ and $r^i = \alpha \frac{y^i}{k}$.
- ▶ Agents: only choose k_2

$$u_c^i = \beta E_i u_c^{ij}$$

CE in the 2-p model

- ▶ Optimal choice

$$k_2^i = s(1 - \tau_1^i)z^i k^\alpha,$$

where $s = \frac{\alpha\beta}{1+\alpha\beta}$ is the propensity to save (a constant).

- ▶ Consumption will be

$$c_1^i = (1 - s)(1 - \tau_1^i)z^i k^\alpha$$

$$c_2^{jj} = (1 - \tau_2^j)z^j k_2^{i\alpha}$$

- ▶ The government chooses τ at each point in time taking capital as given.
- ▶ Note: in this example there is no time-inconsistency problem, since k_2 is independent of future taxes.

MPE in the 2-p model

- ▶ To find the MPE, we can just solve the sequential problem of a benevolent government,

$$\max_{\tau_1, \tau_2} \theta \ln[(1-s)(1-\tau_1^i)z^i k^\alpha] + (1-\theta) \ln[\tau_1^i z^i k^\alpha] +$$

$$\beta E_i \left\{ \theta \ln[(1-\tau_2^j)z^j k_2^{i\alpha}] + (1-\theta) \ln[\tau_2^j z^j k_2^{i\alpha}] \right\}$$

- ▶ But because of logs, this is equivalent to

$$\max_{\tau_1, \tau_2} (\theta + \alpha\beta) \ln(1-\tau_1^i) + (1-\theta) \ln \tau_1^i +$$

$$\beta \{ \theta \ln(1-\tau_2^j) + (1-\theta) \ln \tau_2^j \}$$

$\Rightarrow \tau_1$ and τ_2 are **independent of the shocks!!!**

Simple Accounting - Model

- ▶ This can be shown even in an infinite horizon economy using the same argument: τ_t is constant over time.
- ▶ The variance is

$$\text{Var}(\tilde{g}) = \underbrace{\text{Var}(\tilde{\tau})}_{=0} + \text{Var}(\tilde{y}) + \underbrace{2\text{Cov}(\tilde{\tau}, \tilde{y})}_{=0}$$
$$\Rightarrow \text{Var}(\tilde{g}) = \text{Var}(\tilde{y}).$$

- ▶ and the correlation

$$\text{Corr}(\tilde{g}, \tilde{y}) = \underbrace{\text{Corr}(\tilde{\tau}, \tilde{y})}_{=0} + 1$$
$$\Rightarrow \text{Corr}(\tilde{g}) = 1.$$

- ▶ KEY: taxes are *not responsive* to shocks!
- ▶ To fix the co-movement, we would need $\text{Corr}(\tilde{\tau}, \tilde{y}) < 0$.

This paper

- ▶ To fix the co-movement, we would need $Corr(\tilde{\tau}, \tilde{y}) < 0$.
- ▶ **Strategy**: introduce heterogeneity + political power
 1. Idiosyncratic shocks (on productivity and impatience)
 - ▶ similar to RAM (aggregation!),
 - ▶ $Corr(G, Y) = 0.98$
 2. Heterogeneity + Wealth bias chosen to match $Corr(G, Y)$
 - ▶ Halves $Var(G)$!
- ▶ Problem: counter-factual implication since taxes are **procyclical** in the data

$$Corr(\tilde{\tau}, \tilde{y}) = 0.26$$

...and now?

- ▶ There is another way to break this...
- ▶ **Suggestion 1:** Allow the government to borrow!

$$g = \tau y + rb - b'$$

where b is the stock of one-period bonds, and b' new debt.

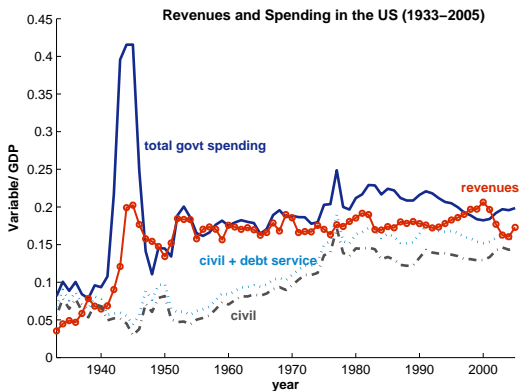
- ▶ Then

$$\text{Corr}(g, y) = \text{Corr}(\tau y + rb - b', y)$$

- ▶ The government will use debt counter-cyclically to smooth tax distortions, so taxes will be less volatile.

Response to shocks - Revenues and Spending

- ▶ Clear evidence of 'tax smoothing' in the US.



- ▶ Natural experiment: large shock to government expenditures during WWII (mostly defense).

...and now?

- ▶ Potential problems
 - ▶ Will g be less volatile too?
 - ▶ You might have to consider other items in g that might affect debt, like defense spending.
- ▶ **Suggestion 2:** Consider shocks to the demand of public goods

$$u(c, g) = v(c) + Av(g)$$

- ▶ A large value of A denotes periods when public spending are highly valued (i.e. a war, a natural disaster, Democrats in power!).

What we found

- ▶ In Azzimonti, Battagilni, Coate (2009) we analyzed that environment
 - ▶ but without capital (taxes distorted labor supply only);
 - ▶ depending on the magnitude of shocks, it is possible to obtain a small $Corr(\tilde{g}, \tilde{y})$;
 - ▶ intuition: when A is large, the government $\uparrow b'$ and $\uparrow \tau \Rightarrow \downarrow$ labor supply $\Rightarrow \downarrow y$.
- ▶ A combination of z shocks and A shocks might get the right co-movement!
- ▶ Under a benevolent planner, gov't wants to accumulate assets in the long run. Would this happen with wealth bias political power?

Conclusions

- ▶ Very interesting question: we do not know much about the cyclicity of many of the items in the government budget.
- ▶ Super ambitious project!
- ▶ Novel channel via weighted political power. More intuition?
- ▶ However...not there yet. My final reading would be
 - ▶ Balanced budget assumption OK if trying to understand the effects on wealth biased political power on the economy (normative).
 - ▶ If you want to explain RBC properties of government spending, you *cannot escape* debt!