Fiscal policy over the RBC: A positive theory

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• How do governments adjust fiscal policies in response to productivity shocks?

• This paper presents a political economy theory of the behavior of fiscal policy over the business cycle.

• The theory has two ingredients:
  – A neoclassical real business cycle framework with serially correlated shocks on productivity (boom and recessions.)
  – A legislature that chooses fiscal policy by non cooperative bargaining.

• The state of the business cycle and debt are the state variables, creating a dynamic linkage across policy-making periods.
Contributions

• Though in the short term we can have episodes of procyclical fiscal policy (the voracity effect), in the long run policies are counter-cyclical.

• Empirical predictions are supported by existing evidence and a new set of predictions is generated: for example, that pork is procyclical.

• The model provides a framework to interpret empirical work.
Plan for the talk

I. Outline the model.

II. How are policies chosen?

III. Implications for empirical research.
I. The model

II. 1 The economy

- A continuum of infinitely-lived citizens live in $n$ identical districts. The size of the population in each district is normalized to be one.

- There are three goods - a public good $g$, private consumption $z$, and leisure $1-l$.

- Each citizen's per period utility function is $z + Ag^\alpha - \frac{l^{(1+\frac{1}{\varepsilon})}}{\varepsilon + 1}$.

- Discount factor: $\delta$.

- Technology: $z = wl$ and $g = z/p$. 
• The economy can either be in a "boom" or a "recession".

• Labor productivity is $w_H$ in a boom and $w_L$ in a recession where $w_H > w_L$.

• The state of the economy follows a first order Markov process, with transition matrix:

$$
\begin{bmatrix}
\alpha_{LL} & \alpha_{LH} \\
\alpha_{HL} & \alpha_{HH}
\end{bmatrix}
$$

*The economy is more likely to be in a boom if it was in a boom the previous period.*

• These assumptions imply that the competitive equilibrium price of the public good is $p$, the wage rate is $w_H$ in a boom and $w_L$ in a recession, and the interest rate is $\rho = 1/\delta - 1$. 


I.2 Politics and policies

• Public decisions are made by a legislature consisting of representatives from each of the $n$ districts.

• One citizen from each district is selected to be that district's representative.

• The legislature meets at the beginning of each period.

• The affirmative votes of $q < n$ representatives are required to pass legislation.
• The legislature can raise revenues in two ways: via a proportional tax on labor income and via borrowing in the capital market.

• Borrowing takes the form of issuing one period bonds with interest rate $\rho$: $b$ in period $t \rightarrow (1 + \rho)b$ in period $t+1$.

The legislature can also hold bonds if it so chooses, so that $b$ can be negative.

• Public revenues can be used to finance public goods or targeted district-specific transfers, (non-distortionary pork).

• A policy choice is described by an $n+3$-tuple $\{r, g, x, s_1, ..., s_n\}$. 
• Define:

\[ B_\theta(r, g, x; b) = R_\theta(r) + x - pg - (1 + \rho)b \]

where \( R_\theta(r) \) is the tax revenue function and \( \theta=H,L \) is the state of the economy.

• The proposal must satisfy the budget constraint

\[ B_\theta(r, g, x; b) \geq \sum_i s_i \]

• There is also an upper bound \( \bar{x} \) on the amount the government can borrow determined by the requirement that it must be able to repay the debt.
I.3 Legislative policy-making

- Following Baron & Ferejohn, one of the legislators is randomly selected to make the first policy proposal, with each representative having an equal chance of being recognized.

- If the proposal is accepted by \( q \) legislators, then the plan is implemented and the legislature adjourns until the beginning of the next period.

- At that time, the legislature meets again with the only difference being that \( b \) and (maybe) \( \theta \) are different.

- If, on the other hand, the first proposal is not accepted, another legislator is chosen to make a proposal.
• There are $T$ such proposal rounds.

• If the process continues until proposal round $T$, and the proposal made at that stage is rejected, then a legislator is required to choose a default policy that treats districts uniformly.

• If we assume that each round takes a negligible time, than we may assume $T \rightarrow \infty$, but it is not necessary.
I.4 Equilibrium

• We look for a symmetric Markov equilibrium in which legislators use weakly stage undominated strategies.

• The problem has a recursive structure with the state variables being the current debt level $b$ and the current state of the economy $\theta$.

• We show that such an equilibrium exists.
II. How are policies chosen?

• The Planner’s problem can be written in the recursive form:

\[ v_\theta(b) = \max \left\{ u_\theta(r, g) + \frac{B_\theta(r, g, x; b)}{n} \right\} \]

\[ + \delta [\alpha_{\theta H} v_H(\theta) + \alpha_{\theta L} v_L(\theta)] \]

\[ B_\theta(r, g, x; b) \geq 0 \quad \& \quad x \leq x, \]

Where \( v^\theta_\theta(b) \) is the continuation value in state \( \theta \).

• Intuitively we would expect the equilibrium to generate too high \( r \), too little \( g \) and too much debt. But how exactly?
Proposition. There are bounds \( \{r^*, g^*, x_{\theta}^*\} \), such that the equilibrium value functions \( v_H(b) \) and \( v_L(b) \) solve the system of functional equations:

\[
V_{\theta}(b) = \max_{(r,g,x)} \left\{ u_{\theta}(r, g) + \frac{B_{\theta}(r,g,x;b)}{n} + \delta[\alpha_{\theta L}v_L(x) + \alpha_{\theta H}v_H(x)] \right\}
\]

\[
B_{\theta}(r,g,x;b) \geq 0, \quad r \geq r^*, \quad g \leq g^* \quad \& \quad x \in [x_{\theta}^*, \bar{x}]
\]

• So the equilibrium can be interpreted as a constrained planner’s problem.

• The debt constraint is state contingent
• What policies are chosen in boom and recessions?

\[ x_{\theta}^*(b) \]

\[ x_H^* \]

\[ x_L^* \]

\[ x_{H}^*(b) \]

\[ x_{L}^*(b) \]
Proposition.

• In the **short term**, fiscal policy may be **pro-cyclical**;

• In the **long term** fiscal policy is **counter-cyclical**.

  – Upon entering a recession, debt will increase and will continue to increase as long as the recession persists.

  – When the economy enters a boom, debt decreases and, during the boom, continues to decline until it reaches $x^*_H$.

• So a **voracity effect** is possible, but it will not persist.

• This could not be seen in previous literature, where stable distributions are not characterized.
– **In the short run**: suppose we are in a recession with low debt \( x < x^*_H \) and the economy enters a boom.

![Graph showing x^*_\theta(b), x^*_H(b), and x^*_L(b).]

We have a Pork-fest.
– **In the long run**: debt is going to be locked in \([x^*_H, \bar{x}]\)
III. Empirical implications

• Model predicts:
  – debt, r and primary surplus are countercyclical
  – g and R(r) are procyclical (i.e., they increase in booms and decrease in recessions).

• These predictions are supported by existing evidence

• Other predictions have not been empirically studied yet:
  Example: Pork is procyclical

• Some of the literature defines counter-cyclicality in terms of g/y and ps/y. We don’t find a theoretical basis for this definition.