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The Political Economy of Fiscal Policy

Abstract

We describe a theory of the collective choice of fiscal policy in dynamic economies that are subject to aggregate shocks. The theory incorporates realistically complex policy spaces, rational forward looking agents, and a rich political decision process. We argue that it provides a tractable framework to study a variety of important questions in macroeconomics and public finance.

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1 Introduction

With its emphasis on intertemporal decisions and rational forward looking agents, modern macroeconomics has generated many new insights and identified important issues of study. At the core of this research there is a fundamental question: how do individuals react to shocks? This question has two sides. On the one hand, it can be studied at the individual level, focusing on private decisions concerning labor supply, saving and investment. On the other, it can be studied at the societal level. How do individuals, through their political institutions, collectively decide to adjust fiscal policies in response to aggregate shocks such as wars or recessions? Though the first side can be addressed with the tools of basic microeconomics, the second requires a deeper understanding of how collective choices are made in complex dynamic environments.

In the last two decades, political economy has made important progress, both theoretically and empirically, in understanding how governments function and the type of distortions that the political process generates in an economy. This *first generation* of research, however, has largely focused on static or two period models that are not well suited to study the issues identified by modern macroeconomics. When longer time horizons are considered, other important elements of the environment (such as shocks, rational forward looking agents, etc) are muted. Thus, basic questions as to how governments smooth taxation in the face of wars, accumulate public infrastructure, or react to business cycles, have not been studied. More generally, there are only a few examples of political economy models general enough to be calibrated on the US economy, or used for practical policy evaluations. Because of this, empirical analysis on the behavior of fiscal policy remains guided by normative models of policy making that clearly square very poorly with political reality.

Motivated by these issues, we have been developing a theory of the collective choice of fiscal policy in dynamic economies that are subject to aggregate shocks. The economic model underlying our theory is similar to that used in the tax smoothing literature. To incorporate political decision making, we assume that the population is divided into distinct political districts or constituencies. Policy decisions are taken by a legislature consisting of representatives from each of these districts. We incorporate the friction that legislators can distribute revenues back to their constituents via pork-barrel spending. The legislature makes decisions in each period and legislative decision-making is modelled as non-cooperative bargaining. Periods are dynamically linked by the level of government debt.

We see our work as part of a *second generation* of research in political economy which attempts to develop political economy models in more general dynamic environments of interest to macroeconomists.[1] In this context, we believe that our theory has a number of appealing features. First, it focuses precisely on how individuals collectively decide to adjust policies in response to shocks. Second, it incorporates realistically complex policy spaces which include taxes, public goods, public debt, and pork-barrel spending. Third, it provides a tractable framework which generates unique predictions. Finally, the theory is sufficiently rich to permit calibration and the numerical analysis of policy issues.

Our pupose in this paper is to briefly outline the theory, describe its main predictions and discuss some of its applications. In the next section, we outline a general version of our model that incorporates both shocks in the value of public goods and persistent shocks in private sector productivity. In Section 3, we review the main results of Battaglini and Coate (2007b) which studies this model with just shocks in the value of the public good. We also discuss our research in progress with Azzimonti in which we compute and calibrate the model with the aim of assessing

[1] See, for example, Acemoglu, Golosov and Tsyvinski (2006), Azzimonti (2007), Battaglini and Coate (2007a), Hassler, Rodriguez Mora, Storesletten and Zilibotti (2003), Krussel and Rios-Rull (1999), Sleet and Yelketin (2007), Song, Storesletten and Zilibotti (2007) and Yared (2007).

the optimal fiscal constitution for the U.S. federal government. Section 4 reviews the results of Battaglini and Coate (2007c) which studies the model with business cycle shocks. We also discuss the consistency of the model's predictions with what is known empirically about the cyclical behavior of fiscal policy. Section 5 concludes.

2 The model

The economic environment A continuum of infinitely-lived citizens live in n identical districts indexed by $i = 1, ..., n$. The size of the population in each district is normalized to be one. There is a single (nonstorable) consumption good, denoted by z, that is produced using a single factor, labor, denoted by l, with the linear technology $z = wl$. There is also a public good, denoted by g, that can be produced from the consumption good according to the linear technology $g = z/p$.

Citizens consume the consumption good, benefit from the public good, and supply labor. Each citizen's per period utility function is $z + Ag^{\alpha} - \frac{l^{(1+1/\varepsilon)}}{\varepsilon+1}$, where $\alpha \in (0,1)$ and $\varepsilon > 0$. The parameter A measures the value of the public good to the citizens. Citizens discount future per period utilities at rate δ.

The value of the public good varies across periods in a random way, reflecting shocks to the society such as wars and natural disasters. Specifically, in each period, A is the realization of a random variable with range $[\underline{A}, \overline{A}]$ and cumulative distribution function $G(A)$.

The productivity of labor w also varies across periods, reflecting the business cycle. Specifically, 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. Conditional on being in a recession, the probability of remaining in a recession is α_{LL} and the probability of transitioning to a boom is α_{LH}. Similarly, conditional on being in a boom, the probability of remaining in a boom is α_{HH} and the probability of transitioning to a recession is α_{HL}. We assume that α_{HH} exceeds α_{LH}.

There is a competitive labor market and competitive production of the public good. Thus, the wage rate is equal to w_H in a boom and w_L in a recession and the price of the public good is p. There is also a market in risk-free, one period bonds. The assumption of a constant marginal utility of consumption implies that the equilibrium interest rate on these bonds must be $\rho = 1/\delta - 1$.

Government policies The public good is provided by the government. The government can raise revenue by levying a proportional tax on labor income. It can also borrow and lend by selling and buying bonds. Revenues can also be diverted to finance targeted district-specific monetary transfers which are interpreted as (non-distortionary) pork-barrel spending.

Government policy in any period is described by an $n+3$-tuple $\{r, g, x, s_1, ..., s_n\}$, where r is the income tax rate; g is the amount of public good provided; x is the amount of bonds sold; and s_i is the transfer to district i's residents. When x is negative, the government is buying bonds. In each period, the government must also repay any bonds that it sold in the previous period. The government's initial debt level in period 1 is b_0.

In a period in which government policy is $\{r, g, x, s_1, ..., s_n\}$ and the state of the economy (i.e., boom or recession) is $\theta \in \{L, H\}$, each citizen will supply $l^*_\theta(r) = (\varepsilon w_\theta (1-r))^{\varepsilon}$ units of labor. A citizen in district i who simply consumes his net of tax earnings and his transfer will obtain a per period utility of $u_\theta(r, g; A) + s_i$, where $u_\theta(r, g; A) = \frac{\varepsilon^{\varepsilon}(w_\theta(1-r))^{\varepsilon+1}}{\varepsilon+1} + Ag^{\alpha}$. Since citizens are indifferent as to their allocation of consumption across time, their lifetime expected utility will equal the value of their initial bond holdings plus the payoff they would obtain if they simply consumed their net earnings and transfers in each period.

Government policies must satisfy three feasibility constraints. First, revenues must be sufficient to cover expenditures. To see what this implies, consider a period in which the initial level of

government debt is b, the policy choice is $\{r, g, x, s_1, ..., s_n\}$ and the state of the economy is θ. Expenditure on public goods and debt repayment is $pg+(1+\rho)b$, tax revenue is $R_\theta(r) = nrw_\theta l^*_\theta(r)$ and revenue from bond sales is x. Letting the *net of transfer surplus* be denoted by $B_\theta(r, g, x; b) = R_\theta(r)-pg+x-(1+\rho)b$, the constraint requires that $B_\theta(r, g, x; b) \geq \sum_i s_i$. Second, district-specific transfers must be non-negative (i.e., $s_i \geq 0$ for all i). Third, the government cannot borrow more than it can repay which requires that x is less than $\overline{x} = \max_r R_L(r)/\rho$.

The political process Government policy 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. Since all citizens have the same policy preferences, the identity of the representative is immaterial and hence the selection process can be ignored.[2] The legislature meets at the beginning of each period. These meetings take only an insignificant amount of time, and representatives undertake private sector work in the rest of the period just like everybody else. The affirmative votes of $q < n$ representatives are required to enact any legislation.

To describe how legislative decision-making works, suppose the legislature is meeting at the beginning of a period in which the current level of public debt is b, the value of the public good is A, and the state of the economy is θ. One of the legislators is randomly selected to make the first proposal, with each representative having an equal chance of being recognized. A proposal is a policy $\{r, g, x, s_1, ..., s_n\}$ that satisfies the feasibility constraints. If the first proposal is accepted by q legislators, then it is implemented and the legislature adjourns until the beginning of the next period. At that time, the legislature meets again with the difference being that the initial level of public debt is x and there are new realizations of A and θ. If, on the other hand, the first proposal is not accepted, another legislator is chosen to make a proposal. There are $T \geq 2$ such proposal rounds, each of which takes a negligible amount of time. If the process continues until proposal round T, and the proposal made at that stage is rejected, then a legislator is appointed to choose a default policy. The only restrictions on the choice of a default policy are that it be feasible and that it treats districts uniformly (i.e., $s_i = s_j$ for all i, j).

Political equilibrium We look for a symmetric Markov-perfect equilibrium. In this type of equilibrium, any representative selected to propose at round $\tau \in \{1, ..., T\}$ of the meeting at some time t makes the same proposal and this depends only on the current level of public debt (b), the value of the public good (A), the state of the economy (θ), and the bargaining round (τ). We assume that legislators vote for a proposal if they prefer it (weakly) to continuing on to the next proposal round. We focus, without loss of generality, on equilibria in which at each round τ, proposals are immediately accepted by at least q legislators, so that on the equilibrium path, no meeting lasts more than one proposal round. Accordingly, the policies that are actually implemented in equilibrium are those proposed in the first round.

3 Fiscal policy with public spending shocks

Following Battaglini and Coate (2007b), first consider the above model with just shocks to the value of the public good; i.e., under the assumption that $w_L = w_H = w$. To understand equilibrium behavior note that to get support for his proposal, the proposer must obtain the votes of $q-1$ other representatives. Accordingly, given that utility is transferable, he is effectively making decisions to maximize the utility of q legislators. It is therefore *as if* a randomly chosen minimum winning

[2] While citizens may differ in their bond holdings, this has no impact on their policy preferences.

coalition (mwc) of q representatives is selected in each period and this coalition chooses a policy choice to maximize its aggregate utility.

In any given state (b, A), there are two possibilities: either the mwc will provide pork to the districts of its members or it will not. Providing pork requires reducing public good spending or increasing taxation in the present or the future (if financed by issuing additional debt). When b and/or A are sufficiently high, the marginal benefit of spending on the public good and the marginal cost of increasing taxation may be too high to make this attractive. In this case, the mwc will not provide pork and the outcome will be *as if* it is maximizing the utility of the legislature as a whole.

If the mwc does provide pork, it will choose a tax rate-public good-public debt triple that maximizes coalition aggregate utility under the assumption that they share the net of transfer surplus. Thus, (r, g, x) solves the problem:[3]

$$\begin{aligned} &\max u(r, g; A) + \tfrac{B(r,g,x;b)}{q} + \delta E v(x, A') \\ &s.t. \quad x \in [\underline{x}, \overline{x}]\,. \end{aligned} \tag{1}$$

where v is the continuation value function. The optimal policy is $(r^*, g^*(A), x^*)$ where the tax rate r^* satisfies the condition that

$$\frac{1}{q} = \frac{[\frac{1-r^*}{1-r^*(1+\varepsilon)}]}{n}, \tag{2}$$

the public good level $g^*(A)$ satisfies the condition that

$$\alpha A g^*(A)^{\alpha-1} = \frac{p}{q}, \tag{3}$$

and the public debt level x^* satisfies

$$\frac{1}{q} = -\delta E[\frac{\partial v(x^*, A')}{\partial x}]. \tag{4}$$

Condition (2) says that the benefit of raising taxes in terms of increasing the per-coalition member transfer $(1/q)$ must equal the per-capita cost of the increase in the tax rate. Condition (3) says that the per-capita benefit of increasing the public good must equal the per-coalition member reduction in transfers it necessitates. Condition (4) says that the benefit of increasing debt in terms of increasing the per-coalition member transfer must equal the per-capita cost of an increase in the debt level.

The mwc will choose pork if the net of transfer surplus at the optimal policy $B(r^*, g^*(A), x^*; b)$ is positive. Otherwise the coalition will provide no pork and its policy choice will then maximize aggregate legislator (and hence citizen) utility. The following result characterizes the effect of the temptation to distribute pork on the political equilibrium:

Proposition 1. *The equilibrium value function $v(b, A)$ solves the functional equation*

$$v(b, A) = \max_{(r,g,x)} \left\{ \begin{array}{c} u(r, g; A) + \frac{B(r,g,x;b)}{n} + \delta E v(x, A') : \\ \\ B(r, g, x; b) \geq 0,\, r \geq r^*,\, g \leq g^*(A),\, \&\, x \in [x^*, \overline{x}] \end{array} \right\} \tag{5}$$

[3] Since there is no variation in the state of the economy, in what follows we omit the θ subscript from the indirect utility function and net of transfer budget surplus.

and the equilibrium policies $\{r(b,A),g(b,A),x(b,A)\}$ *are the optimal policy functions for this program.*

The objective function in problem (5) is average citizen utility. A social planner would thus maximize this objective function without the constraints on the tax rate, public good level and debt. Thus, *political determination simply amounts to imposing three additional constraints on the planning problem.*

Given Proposition 1, it is straightforward to characterize the equilibrium policies. Define the function $A^*(b,x)$ from the equation $B(r^*,g^*(A),x;b)=0$. Then, if the state (b,A) is such that $A \leq A^*(b,x^*)$ the tax-public good-debt triple is $(r^*,g^*(A),x^*)$ and the mwc shares the net of transfer surplus $B(r^*,g^*(A),x^*;b)$. If $A > A^*(b,x^*)$ the budget constraint binds and no transfers are given. The tax-debt pair exceeds (r^*,x^*) and the level of public good is less than $g^*(A)$. In this case, the solution can be characterized by obtaining the first order conditions for problem (5) with only the budget constraint binding. It is easy to show that the tax rate and debt level are increasing in b and A, while the public good level is increasing in A and decreasing in b.

The characterization in Proposition 1 takes as fixed the lower bound on debt x^*. However, as is clear from (4), x^* depends on the expected derivative of the value function. Using Proposition 1, we can show that:

$$-\delta E[\frac{\partial v(x^*,A)}{\partial x}] = [G(A^*(x^*,x^*)) + \int_{A^*(x^*,x^*)}^{\overline{A}} (\frac{1-r(x^*,A)}{1-r(x^*,A)(1+\varepsilon)}) dG(A)]/n. \tag{6}$$

The intuition is this: in the event that $A \leq A^*(x^*,x^*)$ in the next period, increasing debt will reduce pork by an equal amount since that is the marginal use of resources. By contrast, in the event that $A > A^*(b,x^*)$, there is no pork, so reducing debt means increasing taxes and $\frac{1-r}{1-r(1+\varepsilon)}$ is the marginal cost of taxation when the tax rate is r.

Substituting (6) into (4), observe that since $1/q > 1/n$, for (4) to be satisfied, $A^*(x^*,x^*)$ must lie strictly between $\underline{A}$ and $\overline{A}$. Intuitively, this means that the debt level x^* must be such that next period's mwc will provide pork with a probability between zero and one.

Equilibrium dynamics In the social planner's solution for this economy, the government gradually acquires sufficient bond holdings so as to eventually be able to finance the first best level of public good provision with the interest earnings from these holdings. This permits the financing of government spending without distortionary taxation. In each period, interest earnings in excess of spending needs are rebated back to citizens via lump-sum transfers. As attractive as this solution might seem from a normative perspective, a long run steady state with massive government asset holding and zero taxation is not a satisfactory positive prediction.

The long run behavior of fiscal policies in the political equilibrium is summarized in the following proposition:

Proposition 2. *The equilibrium debt distribution converges to a unique, non-degenerate invariant distribution whose support is a subset of* $[x^*,\overline{x}]$. *When the debt level is* x^*, *the tax rate is* r^*, *the public good level is* $g^*(A)$, *and a minimum winning coalition of districts receive pork. When the debt level exceeds* x^*, *the tax rate exceeds* r^*, *the public good level is less than* $g^*(A)$, *and no districts receive pork.*

In contrast to the planner's solution, equilibrium fiscal policies fluctuate in the long run in response to shocks in the value of the public good. Legislative policy-making oscillates between periods of pork-barrel spending and periods of fiscal responsibility. Periods of pork are brought to an end by high realizations in the value of the public good. These trigger an increase in debt and taxes to finance higher public good spending and a cessation of pork. Once in the regime of fiscal

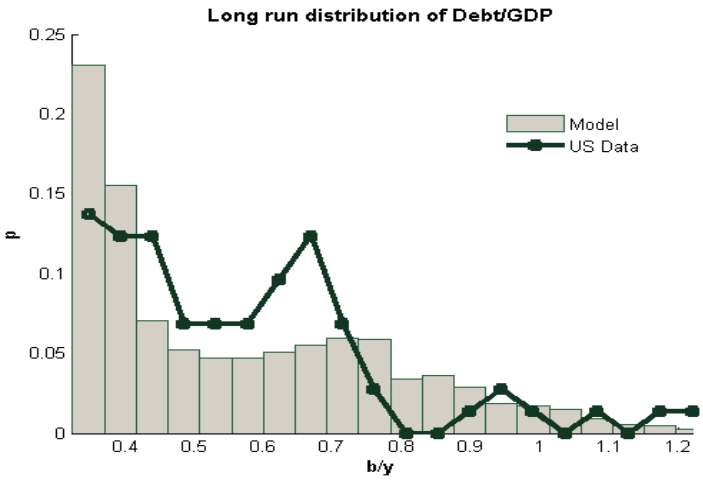

Figure 1: Comparison of the theoretical and empirical long run distributions of debt/GDP.

responsibility, further high realizations of A trigger further increases in debt and higher taxes. Pork returns only after a suitable sequence of low realizations of A. The larger the amount of debt that has been built up, the greater the expected time before pork re-emerges.

The debt level x^* plays a key role in equilibrating the system. If it is positive, the economy is in perpetual debt, with the extent of debt spiking up after a sequence of high values of the public good. When it is negative, the government will have positive asset holdings at least some of the time. A key question is therefore what determines the magnitude of x^*. In Battaglini and Coate (2007b), we show that the key determinant is the size of the tax base as measured by $R(r^*)$ relative to the economy's desired public good spending as measured by $pg^*(A)$. *The greater the relative size of the tax base, the larger is the debt level chosen when the mwc engages in pork-barrel spending.*

Applying the model Can this model explain the pattern of debt in a real economy? The thin line in Figure 1 represents the frequencies of debt/GDP in the United States in the period 1933-2005. The histogram in Figure 1 represents the long run distribution that is generated by the model based on a preliminary calibration for the same period taken from Azzimonti, Battaglini and Coate (2007). This figure makes clear that the model can generate a distribution of debt that looks natural. Note that the truncation of the distribution at the lower bar is endogenous and it corresponds to the minimal level x^*.

Optimal fiscal constitutions There is a considerable empirical literature on the benefits of fiscal constitutions, i.e. on provisions that limit the ability of legislators to tax, spend or issue debt. There is, however, a scarcity of frameworks in which to evaluate their effects on citizen welfare. The model presented above can be used as a *laboratory* to study the cost and benefits of these self imposed fiscal constraints. As an example, Figure 2 shows the equilibrium effect on the long run distribution of an upperbound on debt (in this example, set at the long term average in the unconstrained equilibrium), comparing the constrained with the unconstrained equilibrium. As can be seen, the upperbound induces a reduction in the volatility of debt and a shift to the left of its distribution. In this particular example, these changes induce an improvement in expected utility

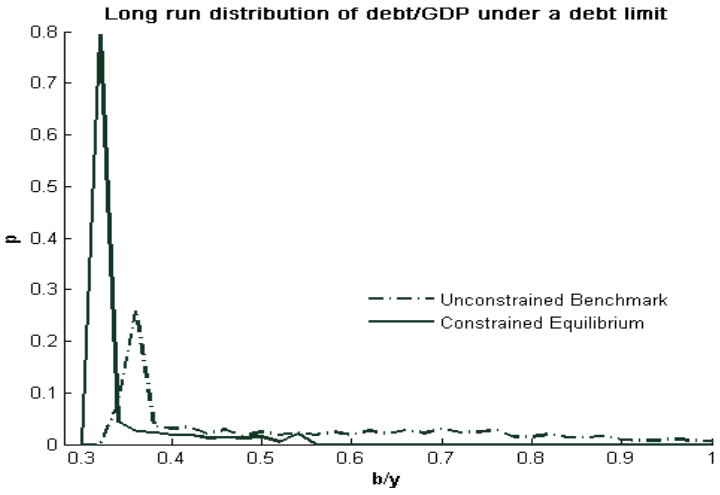

Figure 2: The effect of an upperbound on debt on the stationary distribution of debt/GDP

of 1.53% (in dollar terms). Azzimonti, Battaglini and Coate (2007) systematically investigate how the cost and benefits of this type of fiscal constraint depend on the economic fundamentals and the political system.

4 Fiscal policy over the business cycle

Following Battaglini and Coate (2007c), now consider the model with shocks to productivity, but a constant value of the public good; i.e., under the assumption that $\underline{A} = \overline{A} = A$. The new feature arising here is that the productivity shocks are *persistent.* Thus, they not only change current resources, but also change the expectation for the future.

If the mwc provides pork when the state is (b, θ), it chooses a tax rate r^*, a public good level $g^* = g^*(A)$, and a public debt level x^*_θ satisfying:[4]

$$\frac{1}{q} = -\delta[\alpha_{\theta H} v'_H(x^*_\theta) + \alpha_{\theta L} v'_L(x^*_\theta)] \qquad \theta \in \{L, H\}, \tag{7}$$

where v_θ is the continuation value function in state θ. This equation is analogous to (4). The left hand side of (7) is the per-coalition member benefit of an additional unit of debt and the right hand side is the per-capita expected marginal cost of debt. The key difference with the analysis in the previous section is that now, thanks to the persistence of shocks, the expected cost depends on the present state of the economy, and so the debt level chosen is state dependent. In this case the relationship between the equilibrium and the planner's problem becomes more sophisticated, because the lower bound on debt must be *state dependent.* We have:

Proposition 3. *The equilibrium value functions in booms and recessions $v_H(b)$ and $v_L(b)$ solve*

[4] Since the value of the public good is constant, in what follows we omit A from the utility function.

the system of functional equations

$$v_\theta(b) = \max_{(r,g,x)} \left\{ \begin{array}{c} u_\theta(r,g) + \frac{B_\theta(r,g,x;b)}{n} + \delta[\alpha_{\theta L} v_L(x) + \alpha_{\theta H} v_H(x)] \\ \\ B_\theta(r,g,x;b) \geq 0,\ r \geq r^*,\ g \leq g^*\ \&\ x \in [x^*_\theta, \overline{x}] \end{array} \right\} \quad \theta \in \{L, H\}$$

and the equilibrium policies $\{r_\theta(b), g_\theta(b), x_\theta(b)\}$ *are the optimal policy functions for this program.*

Define the function $b^*_\theta(x)$ from the equation $B_\theta(r^*, g^*, x; b) = 0$. Then, in state θ, if the debt level b is such that $b \leq b^*_\theta(x^*_\theta)$ the tax-public good-debt triple is (r^*, g^*, x^*_θ) and the mwc shares the net of transfer surplus $B_\theta(r^*, g^*, x^*_\theta; b)$. If $b > b^*_\theta(x^*_\theta)$ the budget constraint binds so that no transfers are given. The tax rate and public debt level exceed (r^*, x^*_θ) and are increasing in b. The public good level is less than g^* and is decreasing in b.

Comparing policies across booms and recessions, note that if the mwc provides pork, it chooses the same tax rate and level of public goods in either state. However, it chooses a higher debt level in a boom; i.e., x^*_H is larger than x^*_L. This reflects the more optimistic expectations legislators have concerning future tax revenues in a boom. If the mwc does not provide pork, tax rates and public debt levels are higher in a recession than a boom for any given b, while public good levels are lower.

Equilibrium dynamics The social planner's solution for this economy is similar to that discussed above: the government gradually acquires sufficient bond holdings so as to eventually be able to finance the first best level of public good provision with the interest earnings from these holdings. In the long run, whether the economy is in a boom or a recession, the tax rate is zero and the public good level is constant.

Consider now the political equilibrium. The key to understanding the dynamic pattern of fiscal policy is to understand how debt behaves. Two results pin down the dynamics of debt. First, debt always increases in a recession. Intuitively, if we are in a recession today, the economic environment can only improve in the future. This makes it worthwhile for the legislature to increase debt. Second, by similar logic, the debt level decreases in a boom if the initial debt level exceeds x^*_H and immediately jumps to x^*_H otherwise.

We can now infer the cyclical behavior of debt. In the short run, it is possible for debt to behave pro-cyclically - jumping up when the economy enters a boom. To see this, suppose that the economy's initial level of debt (b_0) were less than x^*_H and the economy starts out in a recession. Then, once the first boom arrives, if the level of accumulated debt remains less than x^*_H, debt will increase to x^*_H upon entering the boom. The boom increases both current and expected future productivity, which makes debt-financed pork more attractive for the mwc.

In the long run, however, debt must behave counter-cyclically. For once debt has jumped to x^*_H, it can never return to a lower level. This is because the debt level is bounded below by x^*_H in a boom and is increasing in a recession. This motivates:

Proposition 4. *The equilibrium debt distribution converges to a unique nondegenerate invariant distribution with support on* $[x^*_H, \overline{x}]$. *The dynamic pattern of debt 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.

Using this result, we can now predict the long run cyclical behavior of all the remaining fiscal variables. Upon entering a recession, the tax rate increases and public good provision decreases. Moreover, the tax rate will continue to increase and public good provision will continue

to decrease as long as the recession persists. When the economy enters a boom, the tax rate decreases and public good provision increases. During the boom, the tax rate continues to decline and public good provision continues to increase until they reach, respectively, r^* and g^*. *In long-run equilibrium, pork-barrel spending will not occur in recessions.* Moreover, it will only occur in booms once the debt accumulated during prior recessions has been paid off and debt has reached x_H^*. Finally, the primary surplus (the difference between tax revenues and public spending other than interest payments) will be countercyclical: when the economy enters a recession, it jumps down and then starts gradually increasing; when the economy enters a boom, it jumps up and then starts gradually declining until it reaches a minimal level of ρx_H^*.

Empirical implications The empirical literature on the cyclical behaviour of fiscal policy focuses on two main components of policy: government spending and the primary surplus. It finds that government spending tends to be pro-cyclical - increasing during booms and falling during recessions. In addition, it finds that the primary surplus increases in booms and decreases during recessions. The predictions of our theory are consistent with these findings.

Some of the literature assesses the overall fiscal stance of policy by looking at the cyclical behavior of government spending or primary surplus as a proportion of GDP. Fiscal policy is defined to counter-cyclical if government spending as a proportion of GDP declines in a boom and/or if the primary surplus as a proportion of GDP increases in a boom. Our theory suggests that this criterion is not a good measure for assessing the dynamic properties of a fiscal policy. In particular, in Battaglini and Coate (2007c), we show that despite the fact that fiscal policy in our model is clearly counter-cyclical, its pattern can be judged as either pro or counter-cyclical by this definition.

5 Conclusion

In this paper we have described a theory of the collective choice of fiscal policy in dynamic economies that are subject to aggregate shocks. We have outlined this theory's qualitative predictions for how fiscal policy should respond to shocks in public spending needs and also for how policy should vary over the business cycle. We have shown that the model with public spending shocks can be calibrated to mimic some important features of the U.S. economy and can be used to address important issues of constitutional design. We have also argued that the theory's predictions concerning the cyclical behaviour of fiscal policy are bourne out empirically.

The theory suggests many intriguing questions for future research. On the empirical front, the theory generates a number of new predictions that would be interesting to test: especially on the relationship of economic variables (like debt and public good expenditures) and political variables (as the size of winning coalitions, and pork transfers). On the theoretical front, the models we have developed so far ignore many important factors (endogenous growth, default, productive capital investment, etc) that should be incorporated in future research.

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