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ELECTORAL UNCERTAINTY AND ECONOMIC GROWTH

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Electoral Uncertainty and Economic Growth

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Abstract: This paper formalizes the link among electoral uncertainty, fiscal policy and economic growth. The setup is a dynamic general equilibrium model of optimal growth and fiscal policy, in which fiscal policy is endogenized through a game between two political parties that can alternate in power. The elected party uses income taxes to finance the provision of public consumption services. We solve for a Markov-perfect general equilibrium in Nash strategies between the political parties, and study how electoral uncertainty (in the form of ex ante reelection probabilities) affects the conduct of fiscal policy, and in turn how fiscal policy affects private investment and economic growth. Low reelection probabilities induce rational policymakers to follow shortsighted, inefficient policies; the inefficiency here takes the form of a relatively large public sector with short-term benefits and low economic growth. We also review the empirical literature on the link between political uncertainty and the macro-economy.

Keywords: Optimal fiscal policy, Economic growth, Electoral uncertainty.
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1. INTRODUCTION

It is widely believed that political factors (e.g. elections, partisan motives, bureaucracy) are crucial in determining economic policies and in turn economic outcomes.[1] The early literature focused on the link between elections and fiscal policy. For instance, Rogoff and Sibert [1988] showed how the incumbent political party manipulates policy instruments in an attempt to increase its reelection probability. Persson and Svensson [1989] and Alesina and Tabellini [1990] developed two-party models to show how fiscal and public debt policy can be used strategically by the incumbent party to influence the choices of its successor. In Lockwood, Philippopoulos and Snell [1996], electoral uncertainty reduces the marginal cost of public debt and this leads to relatively loose fiscal policy before elections, in the form of over-spending, under-taxing and over-borrowing.

More recently, the emphasis has been on economic growth. There is robust empirical evidence that sociopolitical instability affects economic growth. This is a rich literature that includes Barro [1991], Easterly and Rebelo [1993], Barro [1996], Levine and Zervos [1996], Alesina and Perotti [1996], Alesina, Roubini and Cohen [1997], Rodrik [1997], Devereux and Wen [1998], Darby, Li and Muscatelli [1998] and many others (for a recent survey, see Drazen [2000, chapter 11]). These papers use various sociopolitical indices (e.g. measures of democracy, political violence, government duration, income inequality) in ad hoc growth regressions to see how sociopolitical factors affect economic growth.

However, most of the above empirical papers do not study the formal link among political uncertainty, economic policy instruments and economic growth. This is important in order to understand how politics affects the macro-economy. Therefore, the present paper introduces a simple model to formalize the link among electoral uncertainty (in the form of reelection probabilities), fiscal policy and economic growth. To do so, it builds upon previous work by Devereux and Wen [1998], Darby, Li and Muscatelli [1998], Persson and Tabellini [1999a] and Asteriou, Economides, Philippopoulos and Price [2000].[2] The setup is a two-party, general equilibrium model of optimal growth and fiscal policy, in which the elected party

[1] For a recent survey, see Drazen [2000].

chooses distorting taxes to finance government consumption expenditures. We use an infinite-time horizon model, so that we do not ignore any important dynamic implications. Within this politico-economic setup, we study how reelection probabilities (interpreted as a measure of political instability) affect the conduct of fiscal policy, and in turn how fiscal policy affects private investment and economic growth.

The model is as follows. We consider a closed economy with a private sector (households and firms) and two political parties that can alternate in power according to an exogenous reelection probability.[3] Households consume, work and save in the form of capital. Firms use capital and labor to produce a single good. The elected party forms a government that finances its public consumption services by taxing households' income.[4] The dynamic way we model the electoral system is similar to that in Lockwood et al. [1996]. That is, the elected political party chooses its policy to maximize the utility of the representative household. In doing so, the elected party plays Stackelberg vis-à-vis private agents, and Nash vis-à-vis the other party, which may regain power in the next election with a non-zero probability. Since optimal tax policies are inherently time-inconsistent, we solve for Markov strategies, and hence a Markov-perfect general equilibrium in which optimal policies are time-consistent.[5] We work as follows: We first solve for a competitive equilibrium, given any (Markov) fiscal policy; we next endogenize fiscal policy by solving for Markov strategies.

There are two main results for economic policy. The first one is basically technical. The optimal income tax rate is flat over time. This is a version of Barro's [1979] tax smoothing result; namely, it is optimal to smooth out tax distortions over time. In other words, it is optimal for policymakers to keep the tax rate (and the associated government expenditures-to-output ratio) constant over time, even if the underlying general equilibrium model is non-linear and economic policy is the

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[2] See Asteriou et al [2000] for a comparison of these models. See Persson and Tabellini [1999a] for a survey of the literature on political uncertainty, economic policy and economic growth. Verdier [1994] emphasizes the importance of multiple equilibria in politico-economy models of growth.

[3] Endogenizing the re-election probability does not change our main results (see Economides and Philippopoulos [1999]).

[4] That is, we do not include public debt. This does not affect our main results (see Economides and Philippopoulos [1999]). Also, we do not include government production services, like public investment. Again, this does not affect our main results (see Asteriou et al. [2000]).

[5] Thus, optimal policies depend on the current value of the relevant state variables. For the properties of Markov strategies and Markov-perfect equilibria in macroeconomic setups, see e.g. Obstfeld [1991].

outcome of a game between two political parties that alternate in power, rather than the choice of a benevolent government. Second, the optimal income tax rate (and the associated government expenditures-to-output ratio) decreases with the probability of remaining in power. In other words, when reelection becomes less certain, rational forward-looking policymakers find it optimal to go for a larger public sector. In turn, the higher tax rates – required to finance the higher government expenditures - reduce private capital accumulation and economic growth. This is consistent with empirical evidence of a negative effect of "too large" government sizes upon economic growth in OECD economies (see e.g. Tanzi and Schuknecht [1997]).

Our theoretical results are similar to those in Devereux and Wen [1998], Persson and Tabellini [1999a] and Asteriou et al [2000]. Asteriou et al [2000] also provide empirical support. Specifically, by using UK data, they confirm that lower ex ante reelection probabilities (calculated by using opinion polls) lead to lower economic growth. Note that since they use the incumbent's popularity as a measure of ex ante reelection probabilities, they provide evidence different from that of the literature that has mostly used ad hoc indices of sociopolitical instability.

The mechanism that drives our results is as in Lockwood et al [1996]. When there is electoral uncertainty (in the sense that there is a non-zero probability of being out of power in the next election) and the parties do not care enough about economic outcomes when out of power (specifically, we assume that the parties care about economic outcomes less when out of power than when in power),[6] they effectively face a *quasi finite time-horizon.* As a result, the lower the probability of getting reelected, the smaller the effective discount rate, the less the incumbent party values capital accumulation, and the more it spends on current unproductive activities. In other words, electoral uncertainty induces policymakers to follow shortsighted, inefficient policies; the inefficiency here takes the form of a relatively large government sector with short-term benefits, high tax burden and eventually low economic growth. Our model can therefore offer an explanation why the size of government can be inefficiently large.[7]

[6] Laver and Hunt [1992] provide evidence from the political science literature that this is indeed the case in most democratic countries.

[7] Alesina [1999] discusses a number of other possible explanations, e.g. politically influential lobbies, bureaucracy etc. Note that, in general, one needs an imperfection to generate a "too large" size. Here, the imperfection is electoral uncertainty in combination with the assumption that political parties care relatively little about economic outcomes when out of power.

The rest of the paper is organized as follows. Section 2 presents the theoretical model. Section 3 reviews the relevant empirical literature. Section 4 closes the paper with a general discussion. Proofs are gathered in an Appendix.

2. A POLITICO-ECONOMIC MODEL OF OPTIMAL GROWTH

Consider a closed economy with a private sector and two political parties. The private sector consists of a representative household and a representative firm. The household consumes, works and saves in the form of capital. The firm produces a single good by using labor and capital. The political party, which has just won the election, forms a government that finances public consumption services by taxing the household's income. All economic policy instruments are endogenous, i.e. optimally chosen. We assume discrete time and infinite time-horizons.

2.1. Households

The representative household maximizes intertemporal utility:

$$\sum_{t=0}^{\infty} \beta^{t} u(c_t, g_t) \tag{1a}$$

where c_t and g_t are respectively private consumption and government consumption at time t, and the parameter $0 < \beta < 1$ is the discount rate. The utility function is increasing and concave in its two arguments, and also satisfies the Inada conditions. For algebraic simplicity, we assume that $u(.)$ is additively separable and logarithmic. Thus,

$$u(c_t, g_t) = \log c_t + \delta \log g_t \tag{1b}$$

where the parameter $\delta \geq 0$ is the weight given to government consumption relative to private consumption.

The household rents its beginning-of period capital, k_t, to the firm and receives $r_t k_t$, where r_t denotes the return to capital at t. It also supplies inelastically

one unit of labor services per unit of time and receives labor income, w_t.[8] Further, it receives profits, π_t. Thus, the budget constraint of the household is:

$$c_t + k_{t+1} = (1 - \tau_t)(r_t k_t + w_t + \pi_t) \tag{2}$$

where $0 < \tau_t < 1$ is the income tax rate. The initial capital stock, k_0, is given.[9]

The household acts competitively by taking prices, tax policy and public consumption services as given. From the household's viewpoint, the state at any time can be summarized by the predetermined capital stock, k_t, and the current tax rate, τ_t. We will solve this problem by using dynamic programming. Then, let $V(k_t;\tau_t)$ denote the value function of the household at time t. This value function must satisfy the Bellman equation:

$$V(k_t;\tau_t) \equiv \max_{c_t,\, k_{t+1}} [\log c_t + \delta \log g_t + \beta V(k_{t+1};\tau_{t+1})] \tag{3}$$

Using (2) into (3) for c_t, the optimality condition for k_{t+1} is:

$$\frac{1}{c_t} = \beta V_k(k_{t+1};\tau_{t+1}) \tag{4a}$$

while the envelope condition for k_t is:[10]

$$V_k(k_t;\tau_t) = \frac{(1 - \tau_t) r_t}{c_t} \tag{4b}$$

2.2. Firms

Technology takes a Cobb-Douglas form. The production function is:[11]

[8] Assuming inelastic labor supply does not affect our main results.

[9] For simplicity, we assume full capital depreciation.

[10] (4a) and (4b) combined give the standard Euler equation, $\frac{c_{t+1}}{c_t} = \beta(1-\tau_{t+1}) r_{t+1}$.

[11] The firm's problem is written in labor intensive form. Then, in equilibrium, there is one unit of labor services. See e.g. Barro and Sala-i-Martin [1995, chapter 2].

$$y_t = Ak_t^{\alpha} \tag{5}$$

where $A > 0$ and $0 < \alpha < 1$ are parameters.

At any point of time, the representative firm maximizes profits, π_t:

$$\pi_t \equiv y_t - r_t k_t - w_t \tag{6}$$

The firm acts competitively by taking prices as given. This is a static problem. The standard first-order conditions, that also imply zero profits, are:

$$r_t = \alpha A k_t^{\alpha - 1} \tag{7a}$$

$$w_t = (1 - \alpha) A k_t^{\alpha} \tag{7b}$$

2.3. Government Budget Constraint

We assume that at each time t, the government runs a balanced budget. Thus, it finances public consumption services, g_t, by taxing the household's income at a rate τ_t. Then, the government budget constraint is:

$$g_t = \tau_t (r_t k_t + w_t + \pi_t) \tag{8}$$

2.4. Competitive Equilibrium (given economic policy)

Given tax policy, $\{\tau_t\}_{t=0}^{\infty}$, a Competitive Equilibrium (CE) is defined to be a sequence of allocations $\{c_t, k_{t+1}, g_t\}_{t=0}^{\infty}$, and prices $\{r_t, w_t\}_{t=0}^{\infty}$, such that:[12] (i) Households maximize utility and firms maximize profits, given prices and economic policy. (ii) The government's budget constraint is satisfied. (iii) All markets clear via price flexibility. This CE is described by equations (1)-(8) above. In this subsection, we will take advantage of the specific functional forms used to get a closed-form analytical solution for the CE.

We start with economy-wide output. Equations (5), (6) and (7a)-(7b) imply:

$$r_t k_t + w_t + \pi_t = y_t = A k_t^{\alpha} \tag{9}$$

By making use of the Cobb-Douglas constraint in (9), equations (1)-(8) imply the following result (see Appendix A):

Result 1: *In a Competitive Equilibrium (given any Markov economic policy), optimal private consumption and end-of-period capital follow:*

$$c_t = A(1 - \alpha\beta)(1 - \tau_t)k_t^{\alpha} \tag{10a}$$

$$k_{t+1} = A\alpha\beta(1 - \tau_t)k_t^{\alpha} \tag{10b}$$

Note two things in (10a)-(10b). First, these are closed-form analytical solutions. This is thanks to the special structure of the model. In particular, this is due to log-linear utility functions, Cobb-Douglas production functions and full capital depreciation.[13] Second, the sign of $\frac{\partial c_t}{\partial \tau_t}$ and $\frac{\partial k_{t+1}}{\partial \tau_t}$ is always negative. Thus, private consumption and capital accumulation decrease with the current tax rate, τ_t (see Asteriou et al [2000] for a richer model).

It will be useful for what follows, to present the government's budget constraint in a CE. Using (9) into (8), government expenditures are simply:

$$g_t = \tau_t A k_t^{\alpha} \tag{10c}$$

so that the expenditures-to-output ratio will be constant, if the tax rate is constant (see below).

We summarize the findings so far. Equations (10a), (10b) and (10c) give c_t, k_{t+1} and g_t respectively in a Competitive Equilibrium (CE). This is for any Markov fiscal policy, where the latter is summarized by the current tax rate, τ_t. Note that c_t, k_{t+1} and g_t are functions of the predetermined capital stock, k_t, and the current tax

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[12] We choose to solve for a CE in terms of tax rates $\{\tau_t\}_{t=0}^{\infty}$. Alternatively, we could solve in terms of $\{g_t\}_{t=0}^{\infty}$. The next section will endogenize the choice of $\{\tau_t\}_{t=0}^{\infty}$.

[13] See Stokey and Lucas [1989, chapter 4], and for macroeconomic applications see e.g. Sargent [1987] and Obstfeld and Rogoff [1996].

rate, θ_t, only. This will make the political parties' optimization problem recursive and hence policies will be time consistent.[14] The next subsection will endogenize the choice of θ_t.

2.5. Optimal Economic Policy and Political Equilibrium

To endogenize economic policy, we form a Nash game between two political parties, denoted by i and j, which can alternate in power according to an exogenous reelection probability, $0 \le q \le 1$. For simplicity, elections take place in each time-period.[15] Thus, the party in power at time t has a probability q of winning the next election and remaining in power in the next time-period $t+1$, and a probability $1-q$ of losing the election and remaining out of power at $t+1$. The elected party chooses the current tax rate, θ_t, to maximize the utility of the representative household. In doing so, it plays Stackelberg *vis-a-vis* private agents (households and firms). It also plays Nash *vis-a-vis* the other political party, which may be in power in the next time-period.

Specifically, the Political Equilibrium (PE) is defined as follows: (i) Each time-period t, the elected party i chooses its tax policy to maximize (1a)-(1b) subject to the Competitive Equilibrium (summarized by (10a)-(10c) above) and by taking as given the policy of the other party, $j \neq i$, which may be in power at $t+1$. (ii) We solve for symmetric Nash strategies. That is, since the two parties are assumed to be alike, their (Nash) strategies are symmetric ex post.[16] (iii) The parties do not care about economic outcomes when out of power.[17] (iv) We solve for Markov policy strategies. That is, θ_t will be a function of the current value of the economy-wide state variables only. Note that this also confirms the solution to the private agents' optimization problem in the previous subsection (see Result 1 above). (v) Finally, the solution for θ_t, in combination with the CE above, will give a Markov-perfect general equilibrium, which we call Political Equilibrium.

[14] See Kollintzas et al. [2000] for methodological details.
[15] See also Alesina and Tabellini [1990]. However, see Lockwood et al [1996] for a richer model in which the electoral cycle lasts two time-periods so that the elected party can remain in power for two periods. Our main results do not depend on this.
[16] See e.g. Lockwood et al [1996] for partisan differences in a public finance model.

Problem Formulation

We solve the above defined policy problem by using dynamic programming. From the political parties' viewpoint, the state variable at any time t is the economy's inherited stock of capital, k_t. Let $V^{P_i}(k_t)$ and $V^{N_i}(k_t)$ be respectively the value functions of party i when in power, and when out of power, at time t. Then, $V^{P_i}(k_t)$ and $V^{N_i}(k_t)$ must satisfy the following pair of Bellman equations:[18]

$$V^{P_i}(k_t) = \max_{q_t}\left[\log c_t + \delta \log g_t + \beta q V^{P_i}(k_{t+1}) + \beta(1-q)V^{N_i}(k_{t+1})\right] \qquad (11a)$$

$$V^{N_i}(k_t) = 0 + \beta(1-q)V^{P_i}(k_{t+1}) + \beta q V^{N_i}(k_{t+1}) \qquad (11b)$$

where c_t, k_{t+1} and g_t follow (10a), (10b) and (10c) respectively. Notice that in (11a), the incumbent has a probability q of remaining in power and a probability $1-q$ of losing the coming election. In (11b), when the party is out of power, it knows that there is a probability q of continuing to be out of power and a probability $1-q$ of coming back to power in the next election. Also notice that when out of power, the parties do not care about policy outcomes; hence the zero in (11b).

Inspection of the above problem reveals that we have to solve a dynamic programming problem with a log-linear payoff function and Cobb-Douglas constraints. Thus, the functional formulation of the policymakers' problem is similar to that of the private agents'. This means that the value functions in (11a)-(11b) are expected to be of the log-linear form $V^P(k_t) = u_0^P + u_1^P \log k_t$ and $V^N(k_t) = u_0^N + u_1^N \log k_t$, where $u_0^P, u_1^P, u_0^N, u_1^N$ are undetermined coefficients.

Optimal Policy and General Equilibrium

Using the above guess functions into (11a)-(11b), differentiating the right-hand side of (11a) with respect to θ_t, imposing the *ex post* symmetricity conditions $\theta_t^i = \theta_t^j \equiv \theta_t$, $u^{P_i} = u^{P_j} \equiv u^P$ and $u^{N_i} = u^{N_j} \equiv u^N$, the first-order condition for θ_t in a Markov-perfect equilibrium in symmetric Nash strategies is:

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[17] This is for simplicity. The crucial assumption is that the political parties care less about economic outcomes when out of power than when in power.

[18] See also Lockwood et al [1996] for a similar modeling.

$$\frac{\delta}{\theta_t} - \frac{1}{1-\theta_t}\left[1 + \beta\left(q u_1^{P} + (1-q) u_1^{N}\right)\right] = 0 \qquad (12)$$

In turn Appendix B shows:

Result 2: *In a Political Equilibrium, the income tax rate,* θ_t*, is constant over time and equal to:*

$$0 < \theta = \frac{\delta}{\delta + \Omega} < 1 \qquad (13)$$

where,

$$\Omega = 1 + \beta\left(q u_1^{P} + (1-q) u_1^{N}\right) = \frac{(1-\alpha\beta)(1+\alpha\beta(1-2q)) + \alpha\beta(1+\delta)(q+\alpha\beta(1-2q))}{(1-\alpha\beta)(1+\alpha\beta(1-2q))}$$

Notice two things in (13). Firstly, it is optimal to keep the policy instrument flat over time. This is a tax smoothing result. Obviously, this type of policy introduces fewer intertemporal distortions. Secondly, the "effective" discount rate, Ω, increases with the probability of being reelected, q; that is, $\frac{\partial \Omega}{\partial q} > 0$. In other words, as the probability of getting reelected increases, policymakers care effectively more about the future. In turn, $\frac{\partial \theta}{\partial q} < 0$. In other words, as the probability of being reelected increases, the total government expenditures-to-output ratio (and the associated required tax rate) decreases. In turn, since the end-of-period capital stock, k_{t+1}, is decreasing in the tax rate, θ_t,[19] it follows that as the probability of remaining in power increases, capital increases.

When there is electoral uncertainty and the parties care relatively little about economic outcomes when out of power, they effectively face a quasi finite time-horizon. As the reelection probability gets smaller (i.e. q falls), the party in power cares less about the future and spends more now. Since higher spending requires higher tax revenues, the tax rate is higher than without electoral uncertainty.[20] This leads to lower private capital accumulation and economic growth.

[19] See equation (10b) above.
[20] When $q = 1$, we get the benevolent government case.

We summarize the above results in the following proposition:

Proposition 1: *There is a unique Markov-perfect general equilibrium in Nash strategies among political parties. In this political equilibrium, when the probability of getting reelected decreases, it is optimal for policymakers to follow short-sighted fiscal policies (in the form of a higher total expenditure-to-output ratio) and this is bad for private capital accumulation and economic growth.*

3. EMPIRICAL EVIDENCE: A REVIEW OF THE LITERATURE

In this section, we will briefly review the relevant empirical literature and summarize its methodology, main findings and problems. As in the theoretical analysis above, we will focus on the link among political uncertainty, fiscal policy and economic growth.

The connection between fiscal policy and economic growth has long been a central area of empirical research. Recently, thanks to the theory of endogenous (long-term) growth, interest has focused on the implications of the different tax structures and the different types of government expenditures for economic growth. For instance, Mendoza et al. [1997] provide evidence that distortionary taxation harms investment and economic growth, while non-distortionary taxation does not. Kneller et al. [1998, 1999] provide similar evidence for taxes and also find that productive government expenditures enhance growth, while non-productive expenditures harm growth (see e.g. Asteriou et al [2000] for a survey).

Also, since the early 1960s in most OECD countries, there is evidence that: (i) the size of the public sector (measured by total government expenditures as a share of GDP) has increased substantially and (ii) government consumption (e.g. transfers and government wages) as a share of GDP shows a sharply upward movement relative to government investment (see Alesina [1999] and the references cited therein). As a result, there is a negative relationship between large-sized governments and economic performance (see e.g. Tanzi and Schuknecht [1997]). These trends in the data can by understood by theories of political distortions. In other words, political distortions (e.g. electoral uncertainty in our paper) induce policymakers to go for too large public sectors and spend more on unproductive activities.

One is then led to investigate the empirical link among political distortions, policy instruments and economic growth. To do so, the literature has used several indices of political distortions. For instance, inequality in the distribution of income; or, socio-political instability in the form of frequent government turnovers, political violence and unrest; or, political corruption, bureaucracy and lack of property rights; or, pre-electoral fiscal euphoria. Although there are differences across different papers, two results seem to be rather robust: (a) there is a correlation between political distortions and the conduct/manipulation of economic policy; (b) there is a negative effect from political distortions to economic growth (see Alesina et al. [1997], Alesina [1999], Persson and Tabellini [1999a] and Drazen [2000]). Note that the literature has emphasized not only how policies affect the macro-economy but also how variability (i.e. lack of persistence) in policies affects the macro-economy.

However, we believe that one empirical issue is still open. As Drazen [2000, chapter 11] points out, if we follow the theory, one should divide the reduced-form effect from political distortions to economic outcomes into two sub-effects: from distortions to policy instruments, and in turn from policy instruments to economic outcomes. Unfortunately, it is rather rare to find significant support for both sub-effects simultaneously, especially if one tests formally the cross-equation restrictions implied by the theory. This is why most empirical studies rely exclusively on unrestricted reduced-form regressions. Asteriou et al [2000] is a recent example of this methodology in a model similar to the one presented in Section 2 above. When they use government's popularity as a measure of ex ante re-election probabilities, they find a strong negative effect from low popularity to economic growth in the UK. However, the data cannot distinguish the two sub-effects (i.e. from popularity to fiscal policy instruments, and from fiscal policy instruments to economic growth).

4. CONCLUSIONS AND RELATED POLITICO-ECONOMY ISSUES

In this paper, we used a simple general equilibrium politico-economy model to formalize the link among electoral uncertainty, fiscal policy and economic growth. We showed that, even with fully rational behavior, lower reelection probabilities create pressure for short-sighted fiscal policies and this is bad for private capital accumulation and economic growth. These predictions are consistent with evidence provided by the relevant empirical literature.

As Lockwood et al. [1996] have emphasized, although this model generates electoral cycles similar to those generated by other well-known models, it is for different reasons. In this model, it is the "quasi finite time-horizon effect" that leads to electoral cycles. The algebra shows that this effect follows from a combination of electoral uncertainty and the assumption that the parties care relatively little about economic outcomes when out of power.[21] This combination leads to the quasi finite time-horizon effect, which in turn generates an electoral cycle similar to the one generated by Rogoff-type manipulation of the endogenous reelection probability (see e.g. Rogoff and Sibert [1988] and Rogoff [1990]). It also allows us to get predictions consistent with the empirical literature (i.e. under all administrations, the size of the public sector becomes bigger before elections) which is not always the prediction of the literature on the strategic use of public debt (see e.g. Persson and Svensson [1989] and Alesina and Tabellini [1990]).[22]

So far we have been rather formal. We will close the paper with a loose discussion of two closely related politico-economy issues.

Market failures versus policy failures

Although electoral uncertainty can induce short-sighted fiscal policies, this is not a message against elections or multi-party political systems. It is well known that elections and political parties have a multiple role to play within a society. For instance, as Persson and Tabellini [1994] point out, elections make officeholders accountable to the electorate, in the sense that voters have the chance to select either the most competent policymaker or the policymaker whose ideology is closer to the majority of the voters. Elections can control the moral hazard of the policymakers, who have to limit their opportunism to reduce the threat of replacement.

[21] That is, our algebra shows that if there is electoral uncertainty (i.e. $q < 1$) but the parties care the same about economic outcomes all the time irrespectively of whether they are in power or not, then the solution is equivalent to that of a benevolent (one party) government.

[22] There is a view that political business cycles like the above are possible to disappear in the near future. As Alesina et al. [1997] point out, this is based on two arguments: (a) The EU integration process will make national policies much less independent, and (b) many countries will soon face problems of oversized public sectors. Although both (a) and (b) are true, they are not enough to eliminate political business cycles. Even within the EU, member-countries will not completely lose their fiscal autonomy. Also, globalization may worsen some of the existing political distortions. For instance, within the new integrated environment, national governments have a stronger incentive to free ride on other economies (an example is EU redistributive transfers). Also, when unpopular measures of fiscal stabilization are taken, this can increase political distortions in the short run (e.g. rent seeking activities). See Alesina et al. [1997] for these issues.

Instead, the way to interpret our results is as another application of the tradeoff between "market failures" and "policy failures". The general idea is that when there are market failures (e.g. public goods, externalities, monopolistic situations, influential lobbies), policy intervention is needed to correct these failures, and fiscal policy is an obvious candidate for this role. It is, then, the tradeoff between market and policy failures that determines the optimal policy. What we have shown in this paper is how the effectiveness of fiscal policy is reduced because of electoral uncertainty; the latter pushes rational policymakers to follow short-sighted policies. Therefore, while economic policy is needed to correct the existing market failures, it also generates its own distortions.[23]

Need for enforcement mechanisms

Given the above, a natural question to ask is the following: can we design mechanisms that reduce political distortions? In the context of our multi-party democratic model, the task is to design mechanisms that give policymakers the incentive to care about economic outcomes all the time, and not just when they happen to be in power. In Rogoff [1990] type models, the task is to design mechanisms that discourage policymakers from manipulating pre-election probabilities. In Alesina and Drazen [1991] type models, the task is to design mechanisms that force policymakers to stop the war of attrition and break the vicious cycle of the status quo.

Therefore, in most politico-economy models, the main task is to design mechanisms that can extend the effective time horizon of policymakers, without harming the function of multi-party democracies. Note that this is consistent with the general game theoretic result that many properties, concerning the comparison between non-cooperative and cooperative outcomes, may change once the model allows for dynamics (recall that the one-shot equilibrium of the prisoner's dilemma game is not necessarily the equilibrium of the same game repeated a sufficiently large number of times). It is also consistent with the literature on public goods. For instance, Glomm and Lagunoff [1999] show that, concerning the provision of public goods, whether voluntary (i.e. decentralized) or coercive (i.e. centralized) mechanisms

[23] In addition to short-sighted policies due to electoral uncertainty, other popular policy distortions are manipulation of asymmetric information, transfers to powerful groups of voters, rent-seeking bureaucracies, political corruption, etc.

prevail, depends crucially on whether the game is static or dynamic. This is because, in a dynamic setup, the accumulation process mitigates the problem of conflicting interests occurring in coercive communities and hence such communities become more attractive.

The basic question still remains: how can we force policymakers to care about the future? The ideal scenario would be a kind of endogenous enforcement. However, this is too good to be true in a world that typically exhibits political distortions, and where elections have usually the features of a one-shot noncooperative game. In this case, the task is to establish a constitutional and political system (through e.g. monitoring, provision of information to the public, fines/subsidies, credible punishment of political corruption, etc) that increases political competition between selfish politicians and gives them incentives for more far-sighted policies. There is a big and rapidly developing literature on these issues that are beyond the scope of this discussion (see e.g. Laffont [1999], Myerson [1999] and Persson and Tabellini [1999b]).

All this means that we do not only need game theory but also implementation theory. As Moore [1992, pp. 188-9] points out, the former is concerned with how a given game is played, while the latter is concerned with the design of the game. The choice of mechanism will be driven by the choice of the equilibrium concept. Our preference should be for a cooperative equilibrium concept in general, or (in the context of our model) a mechanism in which the political parties care about economic outcomes all the time even when they are out of power. In other words, a complete theory on the link between politics and economics requires an analysis of both the "electoral" and the "governmental" level (see e.g. Myerson [1999, pp. 672-3]). As Myerson says, the electoral level defines the procedures by which candidates are elected, while the governmental level defines the channels through which the constitutional structure of the political system affects the way economic policy is formed. In the present paper, as in most of the literature, we focused only on one of these levels; specifically, we focused on the governmental level, taking as given the electoral system.

To sum up, the two-way link between politics and economics is expected to remain one of the main determinants of the way economic policy is conducted. The need for setting up the right incentives for policymakers is a big challenge in democratic societies.

APPENDICES

Appendix A: Proof of Result 1.

Inspection of the log-linear objective function [see equation (1b)] and the Cobb-Douglas constraint [see equation (9)], and given that economic policy is Markov, implies that the conjecture:

$V(k_t;\boldsymbol{q}_t) = u_0 + u_1 \log k_t + u_2 \log \boldsymbol{q}_t$

where u_0, u_1, u_2 are undetermined coefficients, can be a solution of the dynamic programming problem in (3).

Using this conjecture, the optimality conditions (4a) and (4b), together with (7a)-(7b), give (10b) in the text. In turn, (10b) and (2) give (10a). Then, plugging (10a) and (10b) back into (3), using the above conjecture for the value function, and equating coefficients on both sides of the Bellman equation, we can solve for u_0, u_1, u_2. For instance, we get $u_1 = \dfrac{\alpha}{1-\alpha\beta}$. Note that the above conjecture for the value function can solve the dynamic programming problem because fiscal policies are assumed to be Markov (as indeed is the case when we solve the policymakers' optimization problem in Appendix B below). Also, note that the values of u_0, u_2 cannot be determined before we solve for optimal policy. This is as it should be, since this is a general equilibrium model in which the policy instrument is chosen endogenously (see Kollintzas et al. [2000]). By contrast, when policy is exogenous, we only need to assume a statistical process that drives policy instruments over time (see Sargent [1987, chapters 1 and 3]).

Appendix B: Proof of Result 2

Equation (12) directly implies equation (13). So, the problem is to solve for $\Omega \equiv 1 + \beta[q u_1^P + (1-q)u_1^N]$. Inspection of the first-order condition (12) reveals that, if the conjectures $V^P(k_t) = u_0^P + u_1^P \log k_t$ and $V^N(k_t) = u_0^N + u_1^N \log k_t$ can solve the dynamic programming problem in (11a)-(11b), then $\boldsymbol{q}_t$ has to be constant along the optimal path. Plugging (12) into (11a)-(11b) and equating coefficients on both sides, we get the two Riccati equations, $u_1^P = \alpha\left(1 + \delta + \beta[q u_1^P + (1-q)u_1^N]\right)$ and $u_1^N = \alpha\beta[q u_1^N + (1-q)u_1^P]$, which can be solved for u_1^P and u_1^N. Thus,

$u_1^P = \frac{a(1+\delta)(1-ab\gamma q)}{(1-ab)[1+ab(1-2q)]} > 0$ and $u_1^N = \frac{a^2 b(1+\delta)(1-q)}{(1-ab)[1+ab(1-2q)]} > 0$. Then, the value of Ω follows as in equation (13) in the text. This also completes the solution for the CE in Appendix A above.

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