

Barriers to Investment in Polarized Societies[†]

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Private investment is one of the main driving forces of growth and development. We see large distortions, however, in the returns to private investment across countries, capturing *barriers to investment* (examples are capital income taxes, investment taxes, permits, and bribes, to name a few). These barriers, by distorting investment decisions, slow down growth and result in lower levels of consumption and income per capita. This hypothesis is supported in Diego Restuccia and Carlos Urrutia (2001) who document that the relative price of investment to consumption is negatively correlated with investment rates.

A key observation is that these barriers to investment are also correlated with sociopolitical variables reflecting frictions in the government's decision-making process, such as the *degree of polarization* and the level of *political instability*. Consider, for example, the case of investment taxes, which distort the relative price of investment to consumption. Figure 1 shows that for a cross section of countries—excluding nondemocracies—greater polarization results in a higher relative price of investment (panel B), while this is mitigated by the degree of political stability (panel A).¹ Moreover, these sociopolitical variables are also found to be related to the size of governments, growth, and investment rates. In this paper I present a tractable dynamic model of political economy embedded in a neoclassical economy that explains these relationships.

The analysis herein assumes that the role of the government is to provide public goods, which are financed via distortionary taxation. There are two groups or regions in the economy, and while agents agree on the size of governments, they disagree over the composition of expenditure. The intensity of such disagreements is captured by the *degree of polarization*. Groups are represented by parties that alternate in power via a democratic process, and election outcomes are uncertain. The *degree of political stability* (i.e., frequency of turnover) is determined in a voting equilibrium. Agents are forward looking and vote for the party that yields them higher expected utility.

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¹ Price of investment (1980s average) from Restuccia and Urrutia (2001). Political stability (1980s average) from the PRS dataset; the variable name is “Government Stability.” Polarization is obtained from Erik Lindqvist and Robert Ostling (2010) who define a measure of polarization from survey responses about the role of the government. Dictatorships are excluded from the datasets using the Gastil scale, taken from William Easterly and Ross Levine (1997). Both variables have been normalized to belong to the interval [0, 1].

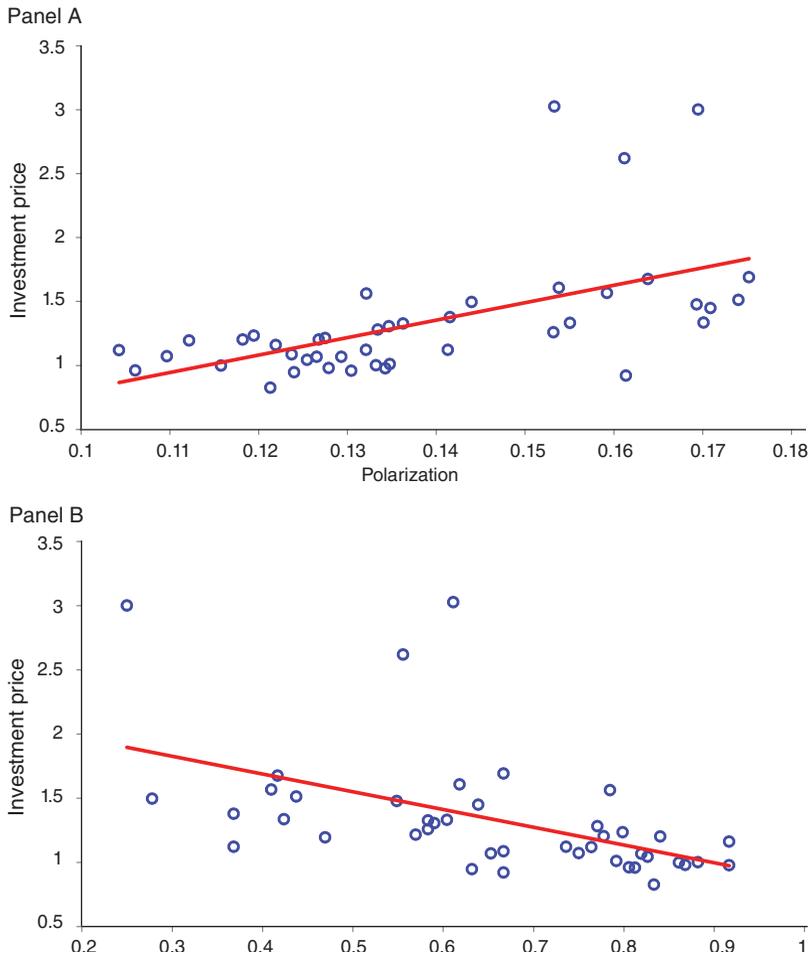


FIGURE 1. PRICE OF INVESTMENT AND SOCIOPOLITICAL VARIABLES

There is no commitment technology, so promises made during the campaign are not credible unless they are optimal *ex post* (i.e., when the party takes power). I characterize time-consistent outcomes as symmetric Markov-perfect equilibria (MPE).² I first derive the incumbent's optimality condition for a general case and characterize the determinants of political turnover in the equilibrium of a voting model. I then solve a closed form equilibrium for a special case with investment taxes to derive testable implications from the theory.

I find that highly polarized societies tend to grow at a lower rate and converge to lower levels of income per capita in the long run. The model hence provides a rationality-based explanation of the empirical relationship found by Easterly

² Thus, the equilibrium described herein is a "fundamental" equilibrium capturing the effects that are inherent in the dynamic game itself, whether of finite, or infinite, horizon. The equilibrium here is thus the limit of finite-horizon equilibria: its characteristics do not significantly depend on the time horizon, as long as the time horizon is long enough. See Avinash Dixit, Gene M. Grossman, and Faruk Gul (2000) for efficient allocation rules that are not Markov in a political game.

and Levine (1997) between polarization and growth. Due to political uncertainty, governments are endogenously *shortsighted*—at least more so than the groups they represent. As a consequence, they tend to overspend. Since public spending is financed through distortionary taxation, there is underinvestment and lower levels of income per capita in the long run. Moreover, the speed of convergence decreases, which implies that measured growth rates are lower along the transition path. This dynamic inefficiency is mitigated by the degree of incumbency advantage, which increases political stability. This result is consistent with the negative correlation between political instability and private investment found in Robert J. Barro (1991). The stronger is the advantage of the incumbent over the opposition, the higher the investment rate, and the faster the growth to a better steady state. This stability, however, comes at a cost: the persistence of one government leads to persistent underspending on public goods of the type preferred by the group out of power. The degree of inefficiencies caused by political disagreement is characterized in the analytical example, where the solution is shown to be Pareto-inferior to that in the second best (for any arbitrary set of Pareto-weights), as long as the outcome of elections is uncertain.

The main intuition behind these results is best understood from the Euler equation faced by the incumbent in power, which consists in four terms, each involving a source of inefficiency arising from sociopolitical frictions. The first term captures the trade-offs faced by a government that lacks commitment and has access only to distortionary taxation in a homogeneous society. It contains a weighted sum of wedges to private investment and public goods' provision decisions, and is analogous to the optimality condition derived in previous literature (see, for example, Paul Klein, Per Krusell, and José-Víctor Ríos-Rull 2008, KKRR hereafter). The second term captures the extra distortion generated by heterogeneity in society: the party in power does not internalize the effects of its policy on the group out of power, which introduces an extra wedge relative to the optimality condition of a benevolent planner. This term is usually present in environments with a common pool problem, and generally results in overspending and overtaxation. The third term summarizes the effect of political instability: the government wants to decrease the level of resources available to next period's policymaker (increasing taxes today) so as to restrict spending on local public goods that his group does not value. This distortion appears in models with political uncertainty, such as Alberto Alesina and Guido Tabellini's (1990) model of government indebtedness. This last effect might be counterbalanced by a fourth term, as long as the current incumbent expects to regain power some time in the future. Larger taxes today have a negative effect in the opposition's policy that will deter future investment—thus lowering the tax base forever after—and this must be taken into account by the current policymaker. This effect appears only in infinite-horizon economies with incumbency advantage and has not been derived in other papers in the literature.

The model is described in Section I. The political game and the MPE are defined in Section II, where the incumbent's Euler equation is characterized. The application to investment taxes is discussed in Section III, where qualitative testable implications are derived. Section IV discusses the contribution of this paper over existing literature, and Section V concludes.

I. The Basic Model

A. Economic Environment

Consider an infinite-horizon neoclassical economy populated by agents who live in one of two regions, the north N and the south S , of measure $\mu^J = 1/2, J = \{N, S\}$. Agents work in the production sector for a competitive wage, rent capital to firms, and enjoy the consumption of private and public goods. While they have identical income and identical preferences over private consumption, there is disagreement on the composition of public expenditures due to the fact that the government can provide *local* public goods (e.g., parks, museums, local infrastructure and schooling). Agents are assumed to differ, not only in their preferences over the composition of expenditures, but also in another dimension that is completely unrelated to economic policy (religious views, charisma of the politician, etc.). Preferences over this *political dimension* imply derived preferences over policymakers. Instantaneous utility is assumed to be separable in consumption of public and private goods, and political shocks are assumed to be additive. For agent j in region J we have

$$(1) \quad \underbrace{(1 - \rho)u(c_{jt}^J) + \rho v(g_t^J)}_{\text{economic}} + \underbrace{\xi_{jt}}_{\text{political}}$$

where u and v are increasing and concave, with $v(0) \equiv \bar{v}$, c_{jt} denotes the consumption of private goods, and g_t^J is the level of discretionary spending on local goods in region J . The variable ξ_{jt} summarizes the utility derived by agent j from political factors (to be described later in more detail). Notice that an agent living in the north derives no utility from the provision of a good in the south (and vice versa), so in principle there will be disagreement in the population over the desired composition of public expenditures, but not on its size, since both types have the same marginal rate of substitution between private and public goods.

The parameter $\rho \in [0, 1]$ can be interpreted as the degree of *polarization* in society. If ρ was equal to zero, agents would derive utility only from private consumption (no disagreement). As ρ increases, agents put more weight on the provision of public goods. Since public goods can be partly targeted to different regions, this implies agents' views will be farther away from each other, and thus society is more polarized. The parameter ρ will be the key variable governing the size of government distortions in cross-country comparisons.

Agents finance private consumption and investment with their capital and labor income. The government raises revenues by levying a proportional tax τ_t on "taxable funds" y_{jt} . Thus, agent j 's budget constraint is

$$c_{jt} = w_t l_{jt} + r_t k_{jt} - l_{jt} - \tau_t y_{jt},$$

where capital evolves according to $k_{j,t+1} = l_t + (1 - \delta)k_{jt}$, and δ denotes the depreciation rate. Every agent is endowed with k_0 units of initial capital and one unit of time.

This representation allows for a wide range of commonly used tax instruments. Examples include capital income taxes, where $y_{jt} = r_t k_{jt}$; investment taxes, where $y_{jt} = \iota_{jt}$; or total income taxes, where $y_{jt} = w_t l_{jt} + r_t k_{jt}$. The constitution allows parties to choose different spending levels on public goods across regions, but restricts tax rates to be the same across agents.

The cost of producing $g > 0$ units of a local public goods is given by $x(g)$, with $x(0) = 0$. Assuming that there is no debt, the government must balance its budget every period,

$$\sum_J x(g_t^J) = \tau_t y_t,$$

where y_t denotes total taxable income. The proceeds from taxation are displayed in the right-hand side of the equation, while the left-hand side contains the sum of expenditures in local public goods.

Private goods are produced by competitive firms that have access to a constant returns to scale technology: $F(K_t, L_t)$, where K_t is the stock of capital and L_t is aggregate labor.

DEFINITION 1: A competitive equilibrium (CE) given public spending $\{g_t^N, g_t^S\}_{t=0}^\infty$ is a sequence of allocations, $\{c_{jt}, l_{jt}, k_{j,t+1}, \iota_{jt}, K_{t+1}, L_t\}_{t=0}^\infty$, tax rates $\tau = \{\tau_t\}_{t=0}^\infty$, and prices $\{w_t, r_t\}_{t=0}^\infty$ such that: (i) agents maximize utility subject to their budget constraint, (ii) firms maximize profits, so $w_t = F_2(K_t, L_t)$ and $r_t = F_1(K_t, L_t)$, (iii) markets clear $\sum_J \mu^J k_{J,t+1} = K_{t+1}$, $\sum_J \mu^J l_{jt} = L_t$, and (iv) the government budget constraint is satisfied.

Aggregate consumption and investment will be denoted by c_t and ι_t . In this economy, prices and aggregates determined in a competitive equilibrium are independent of region-specific characteristics and voting outcomes.

EQUIVALENCE: Consider two CE with a different composition of local public goods s.t. their per-period aggregate cost $x(g_t^N) + x(g_t^S)$ is unchanged \Rightarrow the sequences of $\{c_t, K_{t+1}, \iota_t, \tau_t\}_{t=0}^\infty$ in the two equilibria are identical to each other.

To see this, notice first that since leisure is not valued, the supply for labor is inelastic ($l_{jt} = 1$). Because of the separability between private and public consumption assumed in the utility function, and the fact that political shocks are additive, investment is affected only by the tax rate (and is independent on the type of public good being provided). Since the government taxes both regions at the same rate, their citizens face identical after-tax returns to capital investment, and hence save the same amount.

Agents' saving decisions are therefore characterized by a standard Euler equation:³

$$u_c(c_{jt}) = \beta R_{t+1}(\tau) u_c(c_{j,t+1}).$$

³ Under capital or total income taxes $R_{t+1}(\tau) = [r_{t+1} + 1 - \delta](1 - \tau_{t+1})$. Under investment taxes $R_{t+1}(\tau) = (1/(1 + \tau_t))[r_{t+1} + (1 - \delta)(1 - \tau_{t+1})]$.

This implies that individual and average capital holdings coincide, $k_{j,t+1} = K_{t+1}$. The level of consumption is, as a result, also identical across regions. Prices and aggregate allocations are independent of the distribution of types, and we can think of the outcomes of the competitive equilibrium as resulting from a representative agent.

B. A Planning Problem

Before describing the outcome under political competition (where different parties alternate in power), it is useful to characterize the optimal allocations chosen by a benevolent social planner. Taking the initial level of capital K_0 as given, the planner chooses the sequence $\{c_t, K_t, g_t^N, g_t^S\}_{t=0}^\infty$ that maximizes a weighted sum of utilities,

$$(2) \quad \max \sum_J \lambda^J \sum_{t=0}^\infty \beta^t [(1 - \rho)u(c_t) + \rho v(g_t^J)],$$

subject to the resource constraint

$$\sum_J x(g_t^J) + c_t + K_{t+1} = F(K_t, 1) + (1 - \delta)K_t,$$

where the weight on type J agents is given by λ^J (with $\lambda^N + \lambda^S = 1$). There are two key optimality conditions. The first one determines the optimal provision of public goods. As long as the planner gives a positive weight to each agent, the optimal allocation of public good J will be such that its marginal utility is proportional to the marginal utility of private consumption.⁴ Departures from this condition represent a *gap* or *wedge* Δ_{gt} in the optimal provision of g_t^J ,

$$(3) \quad \Delta_{gt} \equiv -(1 - \rho)u_c(c_t)x_g(g_t^J) + \lambda^J \rho v_g(g_t^J).$$

The second condition determines optimal investment. The planner chooses K_{t+1} to equate the marginal costs in terms of foregone consumption to the discounted marginal benefits of investment. Departures from this condition define an *investment gap*,

$$(4) \quad \Delta_{kt} \equiv (1 - \rho)[-u_c(c_t) + \beta u_c(c_{t+1})[F_k(K_{t+1}, 1) + 1 - \delta]].$$

The political equilibrium will be characterized in terms of these two gaps.

II. The Political Game

The role of the government in this economy is to provide public goods. There are two parties (N and S) representing each region, which compete for office every period.

⁴ The planner is constrained to offer all households the same consumption allocation (that is, $c_t^N = c_t^S, \forall t$). This is imposed in order to capture the constraint faced by the government in the political equilibrium (where parties cannot tax agents at different rates).

There are two key features that distinguish political parties from a benevolent social planner. The first one is that parties care only about the well-being of their constituency, rather than the welfare of the whole population.⁵ The second one is that politicians lack a commitment technology. This has implications in two dimensions. First, taxes introduce a source of time-inconsistency in the government's problem, even in the absence of political uncertainty, so the second best cannot be achieved (see KKRR for a discussion). Second, because promises made over the campaign are nonbinding, political competition does not induce politicians to maximize a utilitarian welfare function (as in the traditional Lindbeck-Weibull probabilistic voting model), but rather the utility of the party in power.

We can divide each period t into two stages: the Taxation Stage and the Election Stage. At the Taxation Stage, an incumbent from group i chooses τ , g^N , and g^S knowing the state of the economy (K) and the distribution of the political shocks but not their realized values. Hence, policy is chosen under uncertainty: with some probability the incumbent will be replaced by a candidate from a different party. After production, consumption, and investment take place, ξ_{it+1} is realized. The probability of reelection can be calculated by forecasting how agents make their voting decisions given different realizations of the shock. At the Election Stage, agents vote for the party that gives them higher expected lifetime utility. They need to forecast how the winner of the election chooses policy. The assumptions of rationality and perfect foresight imply that their predictions are correct in equilibrium.

A. Markov-Perfect Equilibrium (MPE)

There is no commitment technology, so promises made by any party before elections are not credible. The party in power plays a game against the opposition taking their policy as given. Alternative realizations of history (defined by the sequence of policies up to time t) may result in different current policies. In principle, this dynamic game allows for multiple subgame-perfect equilibria that can be constructed using reputation mechanisms. I will rule out such mechanisms and focus instead on MPE, defined as a set of strategies that depend only on the current—payoff-relevant—state of the economy. The equilibrium characterized here corresponds to the limit of the finite horizon game.

Given the sequence of events, and the separability between the economic and political dimensions, the only payoff-relevant state variable for the government is the stock of capital, K . The equilibrium objects we are interested in are: the spending rule in good J followed by incumbent i , $\mathcal{G}_i^J(K)$, its probability of reelection, $p_i = p_i(K)$, and the rule governing the evolution of aggregate capital under i 's policies, $K' = \mathcal{H}_i(K)$, where primes denote next-period variables.

⁵ This is a *partisan model*: a politician from party J is just like any other agent in that group. Alternative models in the literature assume that politicians extract rents from being in power, so their objective is to maximize the probability of winning the next election. See Torsten Persson and Guido Tabellini (2000) for a discussion on *opportunistic models*.

Election Stage.—The utility derived from political factors, ξ , has three components: an individual ideology bias (denoted by φ^j), an overall popularity bias (ψ) and an incumbency advantage term (χ),

$$\xi_j = (\psi + \varphi^j)I_i + \chi\tilde{I}_{i,i^-},$$

where I and \tilde{I} are indicator functions such that $I_N = 1$ and $I_S = 0$, $I_{i,i} = 1$ and $I_{i,i^-} = 0$, if $i \neq i^-$. The subindex i denotes the identity of the party in power, and i^- represents last period’s value of i .

The individual specific parameter φ^j measures voter j ’s ideological bias toward the candidate from party N . Its distribution is assumed to be uniform, $\varphi_N^j[-\frac{1}{2}\phi, \frac{1}{2}\phi]$. These shocks are i.i.d. over time, hence “candidate specific.” Each period, voters form opinions about the candidate’s position on certain moral, ethnic, or religious issues, orthogonal to the provision of public goods (i.e., capital punishment, prolife versus prochoice views, same-sex marriage, etc.). A value of zero indicates neutrality in terms of the ideological bias, while a positive value indicates that agent j prefers the candidate belonging to party N over his opponent. Thus, individuals belonging to the same group may vote differently.

The parameter ψ represents a general bias toward party N at each point in time, measuring the average relative popularity of candidates from that party relative to those from party S . It captures candidates’ personal characteristics such as honesty, leadership, integrity, charisma, and trustworthiness. Candidates with higher values of ψ are preferable. The popularity shock is i.i.d. over time and distributed according to $\psi_N[-\frac{1}{2}\Psi, \frac{1}{2}\Psi]$.

As noted in the empirical literature, the party in power is more likely to win an election. This creates an incumbency advantage, which in the model is captured by the parameter χ . Everything else equal, voters prefer an incumbent over a challenger when $\chi > 0$.

At the election stage, voters compare their lifetime utility under the alternative parties. The maximization problem of voter j in group S is given by

$$\max\{V_S(K', i), W_S(K', i) + \psi' + \varphi^{j'}\},$$

where $V_S(K', i) = V_S(K'_g) + \chi\tilde{I}_{S,i}$ and $W_S(K', i) = W_S(K') + \chi\tilde{I}_{N,i}$. If the incumbent today belongs to the same party (so $I_{NN} = 1$ and $I_{NS} = 0$) then there is some extra utility associated with the incumbency advantage effect.

Determination of Probabilities.—Let us turn now to the intermediate stage between taxation and elections. The political shocks have not yet been realized. We will determine the probability of reelection faced by each party. Individual $j \in S$ votes for N whenever the shock realizations are such that $V_S(K', i) < W_S(K'_g, i) + \psi' + \varphi^{j'}$. We can identify the *swing voter* in group S as the voter whose value of $\varphi^{j'}$ makes him indifferent between the two parties:

$$\varphi_i^S(K') = V_S(K', i) - W_S(K', i) - \psi'.$$

All voters in group S with $\varphi^{j'} > \varphi_i^j(K')$ also prefer party N . There is also a swing voter in group N analogously defined. The value of φ_i^j depends on the difference in utilities of having party S versus party N in office, on the realization of the popularity shock, and on the identity of the party in power at the time of elections. Party N 's share of votes is

$$\pi_{iN} = \sum_j \mu^j P(\varphi^{j'} > \varphi_i^j(K')) = \frac{1}{2} [1 - \phi \sum_j \varphi_i^j(K')].$$

Under majority voting, N wins if it can obtain more than half of the electorate, $\pi_{iN} > 1/2$. This occurs whenever its relative popularity is high enough. There exists a threshold level $\psi_i^*(K')$ such that N wins for any $\psi > \psi_i^*(K')$, where

$$(5) \quad \psi_i^*(K') = V_S(K', i) - W_S(K', i) + W_N(K', i) - V_N(K', i).$$

The threshold is given by a weighted sum of the differences in the utility of the swing voter under each party, and hence depends on the capital stock. Since $\varphi_i^j(K')$ depends on the realized value of ψ , π_{iN} is a random variable. If N was currently in power, its probability of reelection would be given by $p_N(K') = \Pr(\psi' > \psi_N^*(K'))$, and analogously with S . This implies

$$(6) \quad p_N(K') = \frac{1}{2} - \psi_N^*(K')\Psi \quad \text{and} \quad p_S(K') = \frac{1}{2} + \psi_S^*(K')\Psi.$$

Note that the current level of consumption in public goods does not affect the voting decision (i.e., no retrospective voting). Voters do not “punish” parties for their past behavior but decide instead in terms of future policy choices.

Taxation Stage.—At this stage, the incumbent must decide on the optimal spending level g , knowing that it will be replaced by a different policymaker with some probability $p_i(K')$. As standard in the literature, current governments choose their policy taking into account that future governments will play according to the MPE rule. Consider the problem faced by the incumbent of type N :⁶

$$(7) \quad \max_{g^N, g^S \geq 0} (1 - \rho)u(c) + \rho v(g^N) + \beta \{p_N(K')V_N(K') + [1 - p_N(K')]W_N(K')\},$$

where V_N denotes the utility of an agent residing in region N when his party is in power and W_N the utility when his party is out of power (to be described later). Consumption follows

$$c = f(K) + (1 - \delta)K - \sum_j x(g^j) - K' \equiv C(K, K', g),$$

⁶ In this formulation, I follow Persson and Tabellini (2000) and assume that parties maximize utility net of shocks. The qualitative nature of results does not change if shocks are included.

where $g = \{g^N, g^S\}$ and K' is the level of tomorrow's capital that satisfies the agents' first-order condition,

$$(8) \quad u_c(c) = \beta E_{iN} [R(g, \mathcal{G}_i(K')) u_c(c'_i)].$$

After-tax returns depend on current and future spending (through the government budget constraint) and $c'_i = \mathcal{C}(K', \mathcal{H}_i(K'), \mathcal{G}_i(K'))$. E_{iN} denotes the expectation over policies followed by tomorrow's incumbent, given that party N is currently in power. Equation (8) defines a functional equation that determines future capital as a function of current capital and government spending, $K' = H_N(K, g)$. This equation determines agents' optimal reactions to a one-period deviation of g from the equilibrium rule that the incumbent would follow, $\mathcal{G}_N(K)$. Agents know that a future government of type i plays according to the equilibrium strategy, so $g' = \mathcal{G}_i(K')$, where capital follows $K'' = \mathcal{H}_i(K')$. Consistency implies that $\mathcal{H}_i(K) = H_i(K, \mathcal{G}_i(K))$. It is clear that party i sets $g^j = 0, j \neq i$. Slightly abusing notation, we use $\mathcal{G}_i(K)$ to denote the equilibrium amount spent by incumbent i on the local public good i . The description of the problem is completed by defining the functions $V_N(K)$ and $W_N(K)$:

$$(9) \quad V_N(K) = (1 - \rho)u(\mathcal{C}_N(K)) + \rho v(\mathcal{G}_N(K)) \\ + \beta \{ p_N(\mathcal{H}_N(K))V_N(\mathcal{H}_N(K)) \\ + [1 - p_N(\mathcal{H}_N(K))]W_N(\mathcal{H}_N(K)) \}, \text{ and}$$

$$(10) \quad W_N(K) = (1 - \rho)u(\mathcal{C}_S(K)) + \rho \bar{v} \\ + \beta \{ p_S(\mathcal{H}_S(K))W_N(\mathcal{H}_S(K)) \\ + [1 - p_S(\mathcal{H}_S(K))]V_N(\mathcal{H}_S(K)) \},$$

where $\mathcal{C}_i(K) \equiv \mathcal{C}(K, \mathcal{H}_i(K), \mathcal{G}_i(K))$. Equation (9) represents the value function of type N when currently in power, while equation (10) is the utility when out of power (given the opposition S 's policy decisions). There are two differences between these functions. The first one is that when the incumbent's party is out of power, $g = 0$. The second one is that the expected utility is different, because p_N represents the probability of reelection of incumbent type N (so if the group is currently out of power, it regains power with probability $1 - p_S$).

The political uncertainty, combined with the conflict over the provision of public goods, creates incentives to act strategically. Even though parties represent their constituencies and have no derived value of being in office, they will try to manipulate the probability of being reelected (which allows them to implement the desired policy in the future). Moreover, by controlling the level of investment via changes in the tax system, they can indirectly affect policy decisions of future policymakers by changing the amount of capital available to

them. This can be seen in the last term of the first-order condition with respect to g , for incumbent N :

$$(11) \quad \begin{aligned} & -(1 - \rho)u_c(c)x_g(g) + \rho v_g(g) \\ & + H_{Ng}(K, g)[-(1 - \rho)u_c(c) \\ & + \beta \{p_N(K')V_{NK}(K') + [1 - p_N(K')]W_{NK}(K') \\ & + p_{NK}(K')[V_N(K') - W_N(K')]\}] = 0, \end{aligned}$$

where $p_{NK}(K') = \partial p_N(K')/\partial K'$ and $K' = H_N(K, g)$.

An increase in g has a direct effect on current utility, since it diverts resources from private to public consumption (first term in equation (11)). The marginal benefit is given by the increase in the marginal utility of public goods v_g (second term). The benefit received by the current group is generally larger than that of a benevolent planner due to the fact that incumbents have a higher weight on their own group when $\lambda^N < 1$. There is an indirect effect, as an increase in g is financed with distortionary taxes: facing larger taxes, agents reduce investment. This is captured by the change in K' since $H_{Ng} < 0$. The reduction in K' has a contemporaneous effect that raises the marginal utility of current consumption, but at the expense of affecting future utility. When K' decreases, expected future utility goes down from contraction of resources. Agents living in region N suffer a decrease in utility of $V_{NK}(K') = \partial V_N(K')/\partial K'$ if they win the next election (which occurs with probability p_N) and a decrease of $W_{NK}(K') = \partial W_N(K')/\partial K'$ otherwise (which occurs with probability $1 - p_N$). Given that the identity of the decision maker changes over time, the envelope theorem doesn't hold in this environment, so the traditional Euler equation will not be satisfied.

Finally, a change in investment today modifies the problem faced by voters, which in turn affects the probability of reelection. A rational incumbent realizes this fact and thus takes into account the effect of the reduction of K' on its likelihood of winning. It is reasonable to expect that $V_N(K') > W_N(K')$, i.e., the group is better off when its party is in power. However, the sign of $p_{NK}(K')$ is, in principle, ambiguous.

Politico-economic Equilibrium.—We can now define a political equilibrium that takes into account voting decisions.

DEFINITION 2: A MPE with endogenous political turnover is a set of value and policy functions such that:

- (i) Given reelection probabilities and government policy, agents maximize utility and firms maximize profits: the functions $\mathcal{H}_i(K)$, $V_i(K)$, and $W_i(K)$ solve equations (8), (9) and (10) respectively.

- (ii) Given reelection probabilities and firms' and agents' optimal decisions, the function $\mathcal{G}_i(K)$ solves incumbent i 's maximization problem, given by equation (7).
- (iii) Given the optimal rules of government, agents, and firms, $p_i(K)$ solves equation (6).

We consider a symmetric MPE, where the incumbent chooses the same aggregate level of spending in public goods regardless of its type, $g_N^N = g_S^S \equiv \mathcal{G}(K)$, and faces the same reelection probability, $p_N(K') = p_S(K') \equiv p(K)$. This is a natural selection due to the fact that political shocks are symmetric and the economy satisfies the "equivalence" property.⁷

It is straightforward to show that if both parties face the same probability of reelection it is best for them to choose symmetric policy functions. Inspection of equations (7), (9), and (10) reveals that they face exactly the same maximization problem when in power. The value functions when out of power are also identical. Therefore, they will choose the same taxation levels, which implies $\mathcal{H}_N(K) = \mathcal{H}_S(K) \equiv \mathcal{H}(K)$ and $\mathcal{C}(K) = f(K) + (1 - \delta)K - x(\mathcal{G}(K)) - \mathcal{H}(K)$. Hence, the path of taxes and consumption is deterministic.

In general, $p(K)$ is a nontrivial function of the state variable and requires the use of numerical methods for its characterization. However, in a symmetric MPE it is possible to show that the probability of reelection takes a very simple form: it is a constant. To see this, assume that both parties follow the same policy rules while in power and guess a constant probability of reelection: $p_S(K) = p_N(K) \equiv p$. Since policy rules are symmetric, $V_S(K', S) - V_N(K', S) = \chi$ and $W_N(K', S) - W_S(K', S) = \chi$. This implies that $\psi_S^*(K') = \chi$ and $\psi_N^*(K') = -\chi$. Replacing these into equation (6),

$$(12) \quad p_N(K') = p_S(K') = \frac{1}{2} + \Psi\chi.$$

It is worth noting that while the probabilities are endogenously determined, they do not depend on the state variable K . The intuition is as follows: an increase in g today implies an increase in current taxes, which reduces K' . This results in a loss of $\varphi_{iK}^S = V'_{SK} - W'_{SK}$ swing voters in group S and an increase of $\varphi_{iK}^N = W'_{NK} - V'_{NK}$ swing voters in group N , assuming that V is steeper than W (the argument is analogous if W was steeper). By symmetry, and the fact that incumbency advantage is additive, $\varphi_{iK}^S = \varphi_{iK}^N$, so the threshold $\psi_i^*(K')$ does not change. No candidate is able to change policy today and obtain a net gain in the number of votes; hence, they set policy so that the marginal effect of the last unit invested on the probability of reelection is actually zero. This would not hold if groups had a different size or the distribution of φ was region-dependent.

⁷ The composition of expenditures will be different, since $g_S^N =$ and $g_N^S = 0$.

B. Differentiable Markov-Perfect Equilibrium (DMPE)

In order to further characterize the trade-offs faced by an incumbent when choosing investment, I will restrict attention to *differentiable* policy functions.⁸ This allows us to derive the generalized Euler equation (GEE) since the envelope theorem does not hold, and delivers a solution that is the limit to the finite horizon problem.

The politico-economic equilibrium studied here implies several distortions relative to the first best derived in Section IB. The incumbent's first-order condition with respect to local public goods displayed in equation (11) can be rewritten as an Euler equation and decomposed into a weighted sum of wedges.

PROPOSITION 1: *Define*

$$\begin{aligned}\Delta^{Hmg} &= \Delta_g + H_g \Delta_k + \beta \Delta'_g g'_g, \text{ where } g'_g = -H_g \frac{H'_k}{H'_g}, \\ \Delta^{Het} &= (1 - \lambda^J) \rho [v_g + \beta g'_g v'_g], \\ \Delta^{DE} &= (1 - p) \beta \rho v'_g \mathcal{G}'_k H_g, \text{ and} \\ \Delta^{IA} &= (2p - 1) \beta H_g \frac{\mathcal{H}'_k}{H'_g} \{\Delta^{Hmg'} + \Delta^{Het'}\}.\end{aligned}$$

Incumbent J's first-order condition can be written as a weighted sum of these terms:

$$(13) \quad \Delta^{Hmg} + \Delta^{Het} - \Delta^{DE} - \Delta^{IA} = 0.$$

PROOF:

See Appendix VI.

An increase in spending is financed by a rise in taxes. Because taxes are distortionary and parties have no commitment, the governments' Euler equation involves a trade-off between current and future gaps relative to the first best. The first term in the GEE, Δ^{Hmg} , would be equal to zero in a homogeneous society. The expression up to this point is analogous to that derived in KKRR, who study a similar environment under a benevolent planner without commitment and identical agents. The first term in Δ^{Hmg} is the gap between the marginal utility of private consumption and that of public consumption Δ_g (defined in equation (3)). Its second term is the distortion in private investment Δ_k (defined in equation (4)), weighted by the decrease in aggregate capital caused by higher taxes. Its last term captures tomorrow's wedge Δ'_g , weighted by the indirect effects of current taxes on future spending, where g'_g can be interpreted as the change in g' that keeps K'' unchanged.

The second term in the GEE, Δ^{Het} , incorporates the effect of heterogeneity on the incumbent's policy, abstracting from political instability. A heterogeneous society being ruled by a dictator belonging to one of the two groups would set g so as to

⁸ KKRR made this assumption (in a different context), arguing that there could, in principle, be an infinitely large number of Markov equilibria.

satisfy $\Delta^{Hmg} + \Delta^{Het} = 0$. The term Δ^{Het} thus incorporates the distortions arising from the *tragedy of commons*. The term $\Delta^{Het} \neq 0$ because incumbent J has a weight of one on region J while the planner places only weight λ^J on this group.

The effects of political uncertainty on public spending are apparent in the third term in the GEE, Δ^{DE} . When the incumbent is not reelected, a marginal increase in spending today changes the opposition's spending in public goods tomorrow, via the induced decrease in K' . This reports a cost in terms of foregone consumption next period with no utility benefit, since the incumbent derives no utility from that public good. Because the current incumbent does not internalize the full costs of raising taxes when $p < 1$, it tends to overspend in public goods. This can also be interpreted as the current incumbent wanting to "tie the hands" of its successor in order to restrict its spending. The disagreement over the composition of public goods together with the political uncertainty promote growth-retarding policies that deter investment, so policymakers act as being more shortsighted than the groups they represent.⁹

The last term in the GEE is the *incumbency advantage effect*, Δ^{IA} . The party in power knows that not only will future spending be altered when K' decreases, but also the future incumbent's distortions $\Delta^{Hmg'} + \Delta^{Het'}$. This term was absent in the previous literature involving political instability. Because most of the papers focused on two-period economies, there were no incentives to invest in the latter period, $\mathcal{H}_k(K') = 0$. Papers that did analyze infinite horizon economies assumed no persistence ($p = 1/2$), which also causes the term to disappear.¹⁰ Finally, notice that the government's Euler equation (13) depends on derivatives of an unknown equilibrium function: $H_k(K', g')$ and $H_g(K', g')$. In such an environment, the traditional methods to prove existence and uniqueness cannot be used. Even calculating the steady-state level of capital is nontrivial. Most studies have to rely on numerical methods to characterize equilibrium functions.¹¹

Under more specific assumptions over the production technology and the utility function, it is possible to find an analytical solution, as shown next.

III. An Application: Investment Taxes

The objective of this section is to show that the conflict arising in polarized societies results in governments choosing inefficient policies that slow growth and reduce long-run welfare. The hypothesis is that barriers to investment are positively related to the degree of polarization and political turnover, which reduces the incentives to invest. Restuccia and Urrutia (2001) provide support for the link between large investment distortions (measured by the relative price of investment to consumption) and low investment rates, which result in low growth rates. My contribution over their work is

⁹ This effect is similar to that observed in Torsten Persson and Lars E. O. Svensson (1989). Timothy Besley and Stephen Coate (1998) find that disagreements over redistribution policies can result in inefficient levels of investment. Gian Maria Milesi-Ferretti and Enrico Spolaore (1994) also obtain strategic manipulation, but for an alternative environment.

¹⁰ For two-period economy examples, see Persson and Svensson (1989) or Persson and Tabellini (2000). For an infinite horizon economy, see Manuel Amador (2003).

¹¹ Krusell and Ríos-Rull (1999) and Azzimonti, Pierre-Daniel Sarte, and Jorge Soares (2009) use linear quadratic approximations.

to introduce a theoretical link between sociopolitical variables and investment distortions consistent with the evidence presented in Figure 1.¹²

To do this, I restrict attention to investment taxes and characterize the political equilibrium, deriving qualitative implications from the theory under specific functional assumptions. Changes in two fundamental parameters capturing sociopolitical dimensions will be considered: the degree of polarization ρ and the degree of incumbency advantage, $\tilde{\Psi} \equiv \Psi\chi$, which directly affects political instability in the model.

ASSUMPTION 1: *Suppose that: (i) utility is logarithmic, $u(c) = \log c$, and $v(g) = \log(g + G)$, (ii) technology is Cobb-Douglas, $F(K, L) = AK^\alpha L^{1-\alpha}$, (iii) there is full depreciation $\delta = 1$, and (iv) the cost of public goods is linear: $x(g) = g + G$ when $g > 0$ and $x(0) = 0$.*

Note that $v(0) = \log(G) = \bar{v}$, so that utility is well defined when no public good is provided to this region (which occurs every time the group is out of power).¹³

Under these assumptions, aggregate investment is proportional to output, $y = AK^\alpha$, and decreasing in spending, $H(k, g) = \alpha\beta y - G - g$, while consumption is proportional to output, $c = (1 - \alpha\beta)y$. Because consumption and investment are linear in output, it is reasonable to guess that public goods spending satisfies $\mathcal{G}(K) = \eta y - G$, where η is the value that makes equation (13) hold. Proposition 2 shows that this guess is indeed correct in the MPE.

PROPOSITION 2: *Under Assumption 1, there exists a symmetric MPE that satisfies*

$$\mathcal{T} = \frac{\eta}{\alpha\beta - \eta}, \mathcal{G}(K) = \eta AK^\alpha - G, \text{ and } \mathcal{H}(K) = (\alpha\beta - \eta)AK^\alpha,$$

where η is given by

$$(14) \eta = \frac{\rho\alpha\beta(1 - \alpha\beta)[\alpha\beta(2p - 1) - 1]}{\rho[\alpha\beta(1 + \alpha\beta) - 1 + \alpha\beta p(1 - 2\alpha\beta)] - \alpha\beta(1 + \alpha\beta(1 - 2p))}.$$

PROOF: Replace the functional forms in Assumption 1, the solution for $H(K, g)$, and the guess $G + \mathcal{G}(K) = \eta y$ into equation (13) and verify that η satisfies equation (14).

In equilibrium, the government taxes investment at a time-invariant rate (i.e., \mathcal{T} is independent of the capital stock), which determines the relative *price of investment* across countries. A constant share η of GDP is spent on public goods. This share is known as the *size of a government*, the main endogenous variable affecting economic performance in our model.

¹² There are alternative formulations (such as income taxes and capital income taxes) which would lead to similar detrimental effects of polarization and political instability on investment and growth rates.

¹³ Assuming that the fixed cost of providing public goods is equal to G is a normalization that allows us to find closed-form solutions.

REMARK: *The price of investment is larger in countries where the government is large. As a result, investment rates are lower.*

An agent’s marginal propensity to invest is negatively related to the share of public spending on output. As the following corollary shows, this slows down growth during the transition and results in lower levels of output in the steady state.

COROLLARY 1: *The economy converges to a unique steady state where $\bar{K} = (\alpha\beta - \eta)^{1/(1-\alpha)}$, $\bar{y} = A\bar{K}^\alpha$, $\bar{c} = (1 - \alpha\beta)\bar{y}$ and $\bar{g} + G = \eta\bar{y}$. The speed of convergence is given by*

$$\gamma \equiv \frac{\partial K'}{\partial K} = (\alpha\beta - \eta)K^{\alpha-1},$$

so countries with similar initial conditions and technology but a larger government grow at lower rates toward their steady state. Moreover, they are permanently poorer in the long run. Long-run welfare, conditional on being in power, satisfies

$$\begin{aligned} \bar{V}(\eta) = & \kappa\{(1 - \rho)[1 + \beta(1 - 2p)]\log \bar{c} \\ & + \rho(1 - \beta p)\log(\bar{g} + G) + \rho\beta(1 - p)\bar{v}\}, \end{aligned}$$

where $\kappa = (1 - \beta p)/((1 - \beta p)^2 - (\beta(1 - p))^2)$, and when out of power,

$$\begin{aligned} \bar{W}(\eta) = & \frac{\kappa}{1 - \beta p}\{(1 - \rho)[1 + \beta(1 - 2p)]\log \bar{c} \\ & + \rho\beta(1 - p)\log(\bar{g} + G) + \rho(1 - \beta p)\bar{v}\}. \end{aligned}$$

Given that the share η is the driving force of convergence speed and long-run outcomes, it is interesting to analyze what parameters determine it. Government size is not only a function of economic variables—the discount factor β and the capital share α —but also depends on sociopolitical variables—the degree of polarization in society ρ and the degree of political instability p .¹⁴

The Effects of Polarization and Instability.—In the next two corollaries we focus on the effects of sociopolitical variables in economic outcomes, during both the transition and the long run.

COROLLARY 2: *Polarized societies (that share the same level of political stability) have larger governments, a higher price of investment, and lower investment rates, and they converge more slowly to lower levels of GDP than unpolarized societies. Moreover, their long-run welfare is smaller.*

¹⁴ Actually, the independent variable governing political instability is the incumbency advantage term $\tilde{\Psi}$. Since there is a one-to-one relationship between the two, and only p is directly observable in the data, we will phrase the results in terms of changes in p .

This can be seen from the fact that private investment, the speed of convergence, and the steady-state value of capital are negatively related to η . This results from $\mathcal{H}_\eta < 0$, $\gamma_\eta < 0$ and $\bar{K}_\eta < 0$, with η increasing in ρ , where

$$\frac{\partial \eta}{\partial \rho} = \frac{(\alpha\beta)^2(1 - \alpha\beta)(1 + \alpha\beta(1 - 2p))^2}{M^2} > 0,$$

where $M = \rho[\alpha\beta(1 + \alpha\beta) - 1 + \alpha\beta p(1 - 2\alpha\beta)] - \alpha\beta(1 + \alpha\beta(1 - 2p))$.

Thus, the model predicts that the *price of investment* is positively correlated with polarization, consistent with the evidence presented in Figure 1 (panel A). The corollary also provides a formal microfoundation for the empirical relationship between ethnic (and cultural) fractionalization and economic growth documented by Easterly and Levine (1997). Moreover, it also provides a rationale for the findings in Robert E. Hall and Charles I. Jones (1999), who show that polarization (measured as ethnolinguistic fractionalization or religious polarization) has a negative effect on output per worker. This is consistent with the model, since more polarized societies not only grow at a slower rate, but also exhibit lower *levels* of GDP per worker.

COROLLARY 3: *Stable societies (that share the same degree of polarization) have smaller governments, a lower price of investment, and higher investment rates, and they converge faster to larger levels of GDP than unstable societies. Moreover, their long-run welfare is larger.*

This results from the negative relationship between η and p ,

$$\frac{\partial \eta}{\partial p} = -\frac{1}{M^2}(\alpha\beta\rho)^2(1 - \alpha\beta)^2 < 0.$$

This experiment compares two countries with the same level of ρ but a different degree of incumbency advantage, $\tilde{\Psi}$, and hence different p .¹⁵

The negative correlation between the *price of investment* and political stability is consistent with the evidence presented in Figure 1 (panel B). It also provides a microfoundation for some of the findings relating political instability and growth, first pointed out by Barro (1991).¹⁶ He documents a strong negative correlation between the size of governments (measured by public consumption) and private investment, as predicted by the model. Michael B. Devereux and Jean-Francois Wen (1998) provide empirical support for the bias toward spending in economies with frequent turnover. They show that sociopolitical instability (using the Barro and Lee index) has a positive effect on the ratio of government spending to GDP.

The results of this section were derived under particular functional form assumptions. As a robustness check, I computed numerically the effects of political instability and polarization in a more general case where utility has a constant relative

¹⁵ In the model, we consider $\tilde{\Psi} > 0$, so the comparative statics refer to changes in p at the relevant interval $p \in [1/2, 1]$.

¹⁶ Barro finds that political instability, measured as assassinations per million population and coups/revolutions per year, has a significant negative effect on growth from 1960 to 1985 for a panel of countries.

risk aversion, $G = 0$, and $\delta < 1$. I found that for a reasonable set of parameters, the qualitative results remain unchanged (for details, see Azzimonti 2009).

The Dynamic Inefficiency of Governments.—The intuition behind Corollary 3 is simple. The current policymaker foresees that if he loses the next election, the opposition will spend part of the resources on a public good that reports no utility gains for his constituency. Hence, the benefits from an extra unit of investment, obtained by keeping the size of government small, are not fully internalized. This causes the incumbent to be *shortsighted* and overspend today on unproductive public goods. Investment is then too costly relative to consumption (since the price of investment is affected by taxation), so agents underinvest. The effect is stronger the lower the probability of remaining in power. As $p \rightarrow 1$ the economy has no political turnover, so we can think of the planner as a benevolent dictator. A dictator sets $\eta^D = \alpha\beta(1 - \alpha\beta)\rho/(\rho(1 - \alpha\beta) + \alpha\beta) > 0$.

It is interesting to note that while the size of governments is smaller under dictatorships $\eta \geq \eta^D$, so that the economy converges to a steady state with more output, welfare may not be larger since one of the groups never receives transfers. How costly this is for society depends on the stand we take on the welfare function, which ultimately depends on the Pareto weights of each group. Rather than presuming a particular set of weights, we will characterize the Utility Possibility Frontier in the first best (the Pareto Frontier, PF) and second best (SB), and compare them to the combinations of utilities that can be achieved in the political equilibrium.¹⁷

Figure 2 illustrates the PF, where group N 's weight λ^N decreases as we move from left to right in the plot. The intersection between PF and the 45° line represents the solution under a utilitarian planner. The steady-state level of capital is independent of λ^J , $\bar{K}_{FB} = (\alpha\beta)^{1/(1-\alpha)}$, so regardless of the welfare function we can immediately see that the PE is *Pareto inefficient*: capital converges to $\bar{K} = (\alpha\beta - \eta)^{1/(1-\alpha)}$, which is smaller than \bar{K}_{FB} as long as $\eta > 0$. The largest value of K in the PE is achieved when $p = 1$. Thus, while political stability improves welfare, a dictator will not achieve full efficiency.

Given that we are restricting the set of tax instruments by ruling out lump-sum taxation, a more useful comparison would be to the set of steady-state welfare pairs that characterize the SB under a *benevolent planner*. The planner chooses investment taxes in order to maximize equation (2) subject to allocations and prices being part of a competitive equilibrium (described in Definition 1). The distance between PF and SB along any ray from the origin reflects the degree of inefficiencies caused by distortionary taxes. Under this functional specification, the solution is *time consistent*, so SB also represents allocations under no commitment. In the political equilibrium, while capital converges to a steady-state value \bar{K} , utility is stochastic since the provision of g^J changes as parties alternate in power. The line PE^N in Figure 2 represents the welfare pairs $[\bar{V}^N, \bar{W}^S]$ —defined in Corollary 1—conditional on group N being in power. As we move from right to left, p increases. When $p = 1$, the benevolent dictator's solution coincides with that of a BP that assigns no

¹⁷ Any allocation in the Utility Possibility Frontier is a Pareto optimum, as it is just a representation of the contract curve in the utility space. The utility pairs in the PF and the SB have analytical solutions, which can be found in Azzimonti (2009).

argument in this literature is that governments may be inclined to overspend on public goods (which only benefit a specific group) to create excessive levels of debt or to underinvest in productive public capital.¹⁸ The contribution of this paper lies in the analysis of a dynamic infinite-horizon political economy model embedded in a neoclassical environment, where policy affects private investment and long-run outcomes. A forward-looking government must take into account how future policymakers will react to current changes in investment caused by taxes, and how this in turn will affect the availability of resources if power is regained. This dynamic strategic effect cannot be captured in two-period models. Daron Acemoglu, Michael Golosov, and Aleh Tsivynski (2008) and Devereux and Wen (1998) analyze infinite-horizon models where underinvestment and overspending arise, but mainly because policymakers are self-interested (i.e., have different preferences than private agents). This paper also contributes to a growing literature on political failures that result from a fundamental lack of commitment of the government. While existing models with repeated voting find strategic interactions, most of them have to rely on numerical methods to characterize the MPE (see Krusell and Ríos-Rull 1999). John Hassler, Kjetil Storesletten, and Fabrizio Zilibotti (2007) and Marco Battaglini and Stephen Coate (2008) present a theoretical characterization of voting equilibria that results in public good spending being inefficiently high, but abstract from capital accumulation and the dynamic distortions caused in private investment and growth by excessively large governments.

This paper also extends existing literature by endogenizing the probabilities of reelection in a dynamic setup. A key assumption in this paper is that politicians are citizen candidates who do not have commitment to platforms. As a result, voters expect the incumbent to maximize the utility of the group he represents (disregarding the welfare of other groups). This is opposite to standard results in probabilistic voting models with commitment to platforms, where the politician's maximization problem is equivalent to that of a benevolent planner (see Christopher Sleet and Sevin Yeltekin 2008; Emmanuel Farhi and Ivan Werning 2008). Because of the symmetry assumption, I find that the probability of reelection is independent of the stock of capital. See Robert Lagunoff and Jinhui Bai (2011) for an interesting reduced-form environment based on Battaglini and Coate's (2008) model, where the reelection probability depends on the aggregate state of the economy.

The model that is most closely related to this one is Amador (2003), which also analyzes the inefficiencies generated by the tragedy of commons in a dynamic infinite horizon model. His basic mechanism, like the one in this paper, is based on the trade-offs described in Alesina and Tabellini (1990). Amador finds that politicians are too impatient behaving as hyperbolic consumers, which results in inefficient overspending and excessive deficit creation. The contributions over his work are: the introduction of private investment and distortionary taxation, the endogenous determination of political turnover, and the link between sociopolitical variables

¹⁸ Persson and Svensson (1989) and Alesina and Tabellini (1990) study the interaction between changes in the identity of the policymaker and excessive debt creation in two-period models, while Ricardo J. Caballero and Pierre Yared (2010) extend these to an infinite horizon model of taxation smoothing. Besley and Coate (1998) and Persson and Tabellini (2000) present models where the government underinvests.

and economic outcomes. In a recent paper, Mark Aguiar and Amador (forthcoming) analyze the effects of these two sociopolitical variables on expropriation rates, which affect economic growth by deterring investment by multinational firms. Their focus is on the flow of capital across countries in open economies, while I analyze the effects of investment distortions on the domestic market. Methodologically, they characterize reputation equilibria, while I consider Markov-perfect equilibria.

The model that is closest in terms of the motivation is that of Gerard Padro i Miquel (2007), who analyzes the pervasive effects of ethnic differences in taxation, spending, and development in a dynamic economy. The main difference is that, in my paper, policymakers are partisan and alternate in power via a democratic process, while there is no institutionalized succession of autocrats (whose objective is to maximize rents from power) in Padro's paper.

V. Concluding Remarks

I presented a model where disagreements about the composition of spending in a polarized and politically unstable society result in implementation of shortsighted policies by the government. As a consequence, investment rates are too low, which slows down growth during the transition. In the long run, this results in output, consumption, and welfare being inefficiently low. The larger is the degree of polarization, the greater the inefficiency. Political stability mitigates the effects of polarization by making the incumbent internalize the dynamic inefficiencies introduced by the choice of growth-retarding policies. The model provides a formal microfoundation for the empirical findings of Easterly and Levine (1997) and Barro (1991) within a dynamic neoclassical framework with rational agents.

The mechanism driving our results is intuitive. Groups with conflicting interests try to gain power in order to implement their preferred fiscal plan. Since there is a chance of being replaced by the opposition, overspending is optimal. Because this is financed by distortionary taxes, choosing a large public sector reduces investment: the relative price of investment goes up as taxes increase, and this deters private savings. The greater the disagreement, captured by the degree of polarization, the larger are the losses of being replaced by the opposition. Hence, the stronger is the shortsightedness in policy choices.

The forces that drive shortsightedness are the disagreement of consecutive governments, the political uncertainty, and the induced lack of commitment. Therefore, a way to improve the performance of democratic institutions would be to try to reduce the effect of either of these factors. Consider, for example, an independent Congress where both groups had representation. Depending on each group's bargaining power, positive amounts of both public goods could be provided every period, thus reducing the "disagreement effect."

APPENDIX

The FOC with respect to g is

$$(15) \quad (1 - \rho)u_c[-x_g - H_g] + \rho v_g + \beta H_g \{pV'_K + (1 - p)W'_K\} = 0,$$

where $H_g = \partial H(K, g) / \partial g$. Denote by $\mathcal{G}(K)$ the function that solves this equation. We can obtain V_K by differentiating equation (9), and use the equation (15) to cancel terms involving changes in $\mathcal{G}(K)$. We obtain

$$V_K = (1 - \rho)u_c[f_K + (1 - \delta) - H_K] + \beta H_K \{pV'_K + (1 - \rho)W'_K\}.$$

Given the definition of Δ_g and using equation (15), we can write

$$(16) \quad V_K = (1 - \rho)u_c[f_K + 1 - \delta - H_K] - \frac{H_K}{H_g} [\Delta_g + \rho(1 - \mu)v_g].$$

Let $\bar{H}_K = H_K + H_g \mathcal{G}_K$. To find W_K , differentiate equation (10):

$$(17) \quad W_K = (1 - \rho)u_c[f_K + 1 - \delta - x_g \mathcal{G}_K - \bar{H}_K] + \beta \bar{H}_K \{(1 - p)V'_K + pW'_K\}.$$

We can use equation (15) to solve for W'_K :

$$(18) \quad W'_K = \frac{1}{1 - p} \left\{ \frac{(1 - \rho)u_c[x_g + H_g] - \rho v_g}{\beta H_g} - pV'_K \right\}.$$

Replacing this equation into equation (17), using the definition of Δ_g , and simplifying,

$$W_K = (1 - \rho)u_c[f_K + 1 - \delta - x_g \mathcal{G}_K - \bar{H}_K] + \beta \bar{H}_K \frac{1 - 2p}{1 - p} V'_K + \frac{p}{1 - p} \frac{\bar{H}_K}{H_g} [(1 - \rho)u_c H_g - \Delta_g - \rho(1 - \mu)v_g].$$

Replacing equation (16) in the expression above and updating one period, we obtain an expression for W'_K that is independent of the value functions and their derivatives. Finally, we can update equation (16) one period and replace it, together with W'_K , to obtain the GEE:

$$\begin{aligned} \tilde{\Delta}_g + H_g \left\{ \Delta_K - \beta \frac{H'_K}{H'_g} \tilde{\Delta}'_g + \beta \left[-(1 - p)\rho v'_g \mathcal{G}'_K \right. \right. \\ \left. \left. + (1 - 2p) \frac{\bar{H}_K}{H'_g} \left(\tilde{\Delta}'_g + \Delta'_K H'_g - \beta H'_g \frac{\bar{H}_K''}{H_g''} \tilde{\Delta}''_g \right) \right] \right\}, \end{aligned}$$

where $\tilde{\Delta}_g = \Delta_g + \rho(1 - \mu)v_g$. Rearranging this expression, we obtain equation (13).

REFERENCES

- Acemoglu, Daron, Michael Golosov, and Aleh Tsyvinski.** 2008. "Political Economy of Mechanisms." *Econometrica*, 76(3): 619–41.
- Aguiar, Mark, and Manuel Amador.** Forthcoming. "Growth in the Shadow of Expropriation." *Quarterly Journal of Economics*.
- Alesina, Alberto, and Guido Tabellini.** 1990. "A Positive Theory of Fiscal Deficits and Government Debt." *Review of Economic Studies*, 57(3): 403–14.
- Amador, Manuel.** 2003. "A Political Model of Sovereign Debt Repayment." Unpublished.
- Azzimonti, Marina.** 2009. "Barriers to Investment in Polarized Societies." Unpublished.
- Azzimonti, Marina, Pierre-Daniel Sarte, and Jorge Soares.** 2009. "Distortionary Taxes and Public Investment When Government Promises Are Not Enforceable." *Journal of Economic Dynamics and Control*, 33(9): 1662–81.
- Barro, Robert J.** 1991. "Economic Growth in a Cross Section of Countries." *Quarterly Journal of Economics*, 106(2): 407–33.
- Battaglini, Marco, and Stephen Coate.** 2008. "A Dynamic Theory of Public Spending, Taxation, and Debt." *American Economic Review*, 98(1): 201–36.
- Besley, Timothy, and Stephen Coate.** 1998. "Sources of Inefficiency in a Representative Democracy: A Dynamic Analysis." *American Economic Review*, 88(1): 139–56.
- Caballero, Ricardo J., and Pierre Yared.** 2010. "Future Rent-Seeking and Current Public Savings." *Journal of International Economics*, 82(2): 124–36.
- Devereux, Michael B., and Jean-Francois Wen.** 1998. "Political Instability, Capital Taxation, and Growth." *European Economic Review*, 42(9): 1635–51.
- Dixit, Avinash, Gene M. Grossman, and Faruk Gul.** 2000. "The Dynamics of Political Compromise." *Journal of Political Economy*, 108(3): 531–68.
- Easterly, William, and Ross Levine.** 1997. "Africa's Growth Tragedy: Policies and Ethnic Divisions." *Quarterly Journal of Economics*, 112(4): 1203–50.
- Farhi, Emmanuel, and Ivan Werning.** 2008. "The Political Economy of Nonlinear Capital Taxation." Unpublished.
- Hall, Robert E., and Charles I. Jones.** 1999. "Why Do Some Countries Produce So Much More Output Per Worker Than Others?" *Quarterly Journal of Economics*, 114(1): 83–116.
- Hassler, John, Kjetil Storesletten, and Fabrizio Zilibotti.** 2007. "Democratic Public Good Provision." *Journal of Economic Theory*, 133(1): 127–51.
- Klein, Paul, Per Krusell, and José-Víctor Ríos-Rull.** 2008. "Time-Consistent Public Policy." *Review of Economic Studies*, 75(3): 789–808.
- Krusell, Per, and José-Víctor Ríos-Rull.** 1999. "On the Size of US Government: Political Economy in the Neoclassical Growth Model." *American Economic Review*, 89(5): 1156–81.
- Lagunoff, Robert, and Jinhui Bai.** 2011. "On the Faustian Dynamics of Policy and Political Power." *Review of Economic Studies*, 78(1): 17–48.
- Lindqvist, Erik, and Robert Ostling.** "Political Polarization and the Size of Government." *American Political Science Review*, 104(3): 543–65.
- Milesi-Ferretti, Gian Maria, and Enrico Spolaore.** 1994. "How Cynical Can an Incumbent Be? Strategic Policy in a Model of Government Spending." *Journal of Public Economics*, 55(1): 121–40.
- Padró i Miquel, Gerard.** 2007. "The Control of Politicians in Divided Societies: The Politics of Fear." *Review of Economic Studies*, 74(4): 1259–74.
- Persson, Torsten, and Lars E. O. Svensson.** 1989. "Why a Stubborn Conservative Would Run a Deficit: Policy with Time-Inconsistent Preferences." *Quarterly Journal of Economics*, 104(2): 325–45.
- Persson, Torsten, and Guido Tabellini.** 2000. *Political Economics: Explaining Economic Policy*. Cambridge, MA: MIT Press.
- Restuccia, Diego, and Carlos Urrutia.** 2001. "Relative Prices and Investment Rates." *Journal of Monetary Economics*, 47(1): 93–121.
- Sleet, Christopher, and Sevin Yeltekin.** 2008. "Politically Credible Social Insurance." *Journal of Monetary Economics*, 55(1): 129–51.

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2. Florian Scheuer, Alexander Wolitzky. 2016. Capital Taxation under Political Constraints. *American Economic Review* **106**:8, 2304-2328. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
3. T. Renee Bowen, Ying Chen, Hülya Eraslan. 2014. Mandatory versus Discretionary Spending: The Status Quo Effect. *American Economic Review* **104**:10, 2941-2974. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
4. Timothy Besley, Ethan Ilzetzki, Torsten Persson. 2013. Weak States and Steady States: The Dynamics of Fiscal Capacity. *American Economic Journal: Macroeconomics* **5**:4, 205-235. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]