

**“Deadlock” Societies, The Allocation of Time
and Growth Performance**

by

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Growth is the consequence of deliberate efforts by entrepreneurs who try to increase their profits through innovation. We endogenize the choice of time devoted to this activity vis-a-vis other ways of increasing income, i.e., by obtaining government subsidies. We provide an explicit technology for the allocation of government subsidies. The characteristics of this political redistribution mechanism will affect time allocations and therefore, growth performance. For example, as groups have a more unequal access to the political system, fewer resources will be devoted to political fighting since the outcome of the process is more certain. On the other hand, societies in which the balance of power is more evenly distributed will find themselves in a "deadlock", where a considerable amount of resources are spent on trying to affect government decisions.

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1 Introduction

The endogenous growth literature has broken the link between growth and exogenous technological progress, allowing to study the implications for growth performance of a wealth of variables which were previously ignored. In particular, the fact that some economies grow while others stagnate is no longer a puzzle for the theory. Additionally, models like those of Becker, Murphy and Tamura (1990), Murphy, Shleifer and Vishny (1989), and Azariadis and Drazen (1990), allow for multiple equilibria, in which initial conditions may determine whether a country takes off into steady growth or stays at a low-level equilibrium. These results are a big step forward, in that they enable us to explain differential growth performance between rich and poor countries. Yet, there are some countries for which the observables (or variables usually included in growth regressions) would predict better growth than the observed. Latin American countries are a prime example of this. Continent dummies for Latin America (and for Subsaharan Africa) are found to be negative and significant by Barro (1991) and Alesina et al (1991), among others.

It is our contention that this poor growth performance can be explained by the misallocation of human resources to activities that do not foster growth, such as overgrown financial sectors in high inflation economies, information gathering, and influence activities. This misallocation can take place both at the extensive (bodies) and intensive (time) margins. The extensive margin, in which highly skilled people are engaged in nongrowth related activities, is studied in Murphy, Shleifer and Vishny, (1991) and Baumol (1990). This paper concentrates on the allocation of time, the intensive margin. We take as given the distribution of people across activities, assuming that the ablest people will be at the top of organizations (Rosen (1981)), and look at the allocation of their time between influence activities and growth-enhancing activities.

The importance of the misallocation of entrepreneurial time is described in De Pablo and Martinez (1989), who provide a stylized version of the typical day in the life of an Argentine CEO :

He wakes up at 6:30, ..., turns on the radio to listen to portions of three-hour news and interview programs. In these programs, the news of the newspaper he is about to read ... are updated with telephone calls to key officials, businessmen, analysts, etc.. While having breakfast, he reads two general papers and two papers specializing in economics.

As soon as he arrives at the office, ..., he will check with his managers to confirm that he correctly understood what he read or heard and start his office day. This typically will include a working luncheon to listen to a public official, or a political or economic analyst, plus meetings with ministers or high officials in charge of price, exchange rate, or wage controls, authorizations for entry in a market or tax incentives for investments, etc., plus meetings with "competitors" to unify positions in a petition to authorities...

Following Grossman and Helpman (1991), we envision growth as a process in which there is constant improvement in the quality of the technology for producing goods. This

¹De Pablo and Martinez, (1989).

improvement is the consequence of deliberate efforts of producers, who try to obtain a market niche over which to exert monopoly power. Our model endogenizes the producer's choice of the amount of time to devote to this activity vis-a-vis other ways of increasing income, i.e., through winning government subsidies. We provide an explicit technology for the allocation of government subsidies, a reduced form for the political system. When one sector has a comparative advantage in the access to the political game, this sector will tend to specialize in that activity. When the bias in the system is "ideological," or independent of lobbying intensities, the less-favored sector will spend more time trying to compensate for such bias. We show that societies that allocate more resources to the political system will have lower growth rates. Furthermore, the characteristics of the political redistribution mechanism will affect time allocation and therefore growth performance. For example the more unequal a group's access to the political system is, the fewer resources it will devote to political fight, since the outcome of the process is more certain. On the other hand, societies in which the balance of power is more evenly distributed will find themselves in a "deadlock" where a considerable amount of resources get spent on trying to affect government decisions.

The previous results are based on the case in which the political dispute takes place across sectors of the economy (for example, between the agricultural and industrial sector or between capital intensive and labor intensive firms). There are some historical experiences where the main dimension of conflicts have been within sectors, between incumbents and potential entrants. The building of barriers to entry and other restrictive practices have had a negative impact on growth. In this case, the asymmetry between the insider and the outsider works to decrease growth.

In our model, the political system and policy decisions have an important effect on growth performance. In this vein, we agree with the literature that emphasizes that "policy matters," as in Rebelo (1991) and Fischer (1991). Rebelo and Fischer emphasize the effects of taxation and of macroeconomic policy, respectively. Without disagreeing with them, we want to emphasize the complementary problems introduced by macroeconomic instability (you must devote time to figure out the value of relevant macroeconomic variables, such as inflation, to avoid suffering capital losses of an order of magnitude bigger than operating profits), policy uncertainty (you delay investment until you know the new set of relevant prices because you don't want to commit yourself to a production technique that may be nonoptimal at future relative prices), and "weakness of governments"² that are susceptible to being influenced by rent-seeking activities. The last problem is the one we model explicitly.

The next section describes the model. Sections 3 and 4 show the solution to the model for the case of symmetric access to the polity. Sections 5 and 6 analyze the asymmetric case. Section 7 discusses the case in which the political battle takes place among firms within the same sector. Finally, Section 8 concludes.

²Borrowing the terminology of Edwards and Tabellini (1991).

2 The Model

The economy produces two goods, x and y . While the product space is constrained in the dimension of the number of goods, we allow for improvements in the quality of both commodities.³ This corresponds to viewing the process of growth as a Schumpeterian model of technological progress in which technological breakthroughs increase the consumption possibilities of the economy. We denote quality as q_m^x and q_m^y , where m indicates the generation to which the product belongs. Goods belonging to superior generations can be interpreted as giving a higher level of utility or as being producible at a lower cost. An example is the market for PCs where more advanced models (a 486 vs. a 386) can be interpreted as either improving the quality of the good “personal computer” or as reducing the cost of providing a “level of computing power.”

At each point in time, there are two firms in each sector, which master different technological qualities. As we will see, only the more advanced or “state of the art” firm will produce at each time. The other, which we will call the “follower,” will be engaged in research activities aimed at obtaining the technological lead and dominating the market. In equilibrium, the successful innovator will take over production, and will reap the benefits of its temporary monopoly power (until he himself is outdated), which justifies the initial sunk cost of spending on technological development.

There are N workers. The utility of each worker is given by

$$U^w = \sum_{t=0}^{\infty} \beta^t \log[D_t + w(1 - h_t)], \quad (1)$$

where

$$\log D_t = \log\left(\sum_m q_m^x x_m\right) + \log\left(\sum_m q_m^y y_m\right) \quad (2)$$

and h_t is the fraction of time devoted to work. The formulation of D_t implies that all goods in the same product line are perfect substitutes; therefore, the consumer will choose the goods with the lowest quality-adjusted price. In addition, the elasticity of substitution between both commodities is equal to one, due to the additive log specification. Workers maximize (1) subject to an intertemporal budget constraint, where income is given by wage earnings.

Each industry is composed of two self-employed highly-skilled entrepreneurs. Each entrepreneur maximizes the utility function

$$U^e = \sum_{t=0}^{\infty} \beta^t \log D_t, \quad (3)$$

where $\log D_t$ is defined as in (2), subject to his wealth. His wealth equals the expected present value of the profit stream from his firms. The firm has two sources of income: product market profits and subsidies from the government (received if the firm is successful in its lobbying effort).

³The basic specification follows closely that of Grossman and Helpman (1991).

We show below that at each moment, there will only be one active producer (“the leader”) per sector. Each entrepreneur is endowed with one unit of skilled labor. When the firm is engaged in production, this unit is devoted to the monitoring of production workers. When the firm is a follower, this unit is allocated between activities directed toward technological advancement (R&D) and efforts to influence the allocation of funds (subsidies) through the political system.

There are three “technologies” in this economy. We describe each one in turn. First, goods are produced using only labor with unit labor requirements. Second, in order to obtain a probability ι of a technological breakthrough, $a\iota$ units of skilled labor have to be devoted to R&D. The input requirement a is assumed to be greater than one. Also, each new technological generation is superior to the previous one by the amount $\mu > 1$.

Finally, we describe the technology for the allocation of the government subsidy S . As stated in the introduction, we are thinking of two types of activities that use up entrepreneurial resources: rentseeking and information acquisition. In both cases, the relevant choice variable is a positional good; you need to “beat” others in the political arena or to be “more” informed than others.⁴ Given such a structure, a natural way of modelling the process is a rank order tournament (Lazear and Rosen (1981)).

The sector that receives the government subsidy, S ,⁵ is that which exerts the maximum amount of pressure in the political arena. The losing sector pays the bill. Each sector devotes resources (managerial time) to maximizing the probability of winning the bid. The effective amount of pressure by each sector j , L_j , equals

$$L_j = l_j + \epsilon_j, \quad (4)$$

where l_j is the output of lobbying time produced with bl_j units of skilled labor and ϵ_j is an error term that reflects shocks to the political system or instrument uncertainty and is unknown at the time of deciding l_j . The subsidy is allocated according to

$$S_x(l_x, l_y) = \begin{cases} -S & \text{if } L_x \leq L_y \\ S & \text{if } L_x \geq L_y \end{cases}$$

So, the probability that sector x obtains the subsidy is given by the probability that

$$\eta < l_x - l_y, \quad (5)$$

where $\eta = \epsilon_y - \epsilon_x$ has (symmetric) distribution Φ .

This battle is repeated every period by the two followers. The subsidy (positive or negative) is valid for the duration of the monopoly position if the technological improvement is obtained during the period immediately following each political battle. The government “rationalizes” the subsidy by arguing that it encourages R&D, since it is given to technological leaders. Although the government budget is balanced on average, it need not be balanced every period. We assume that the government borrows or lends to cover up for temporarily running budget deficits and surpluses.

⁴In what follows we word the discussion in terms of the former interpretation.

⁵ S has an upper bound. This stems from the fact that we require that the producer who has achieved a technological breakthrough and who will be *charged* the subsidy be willing to enter.

Notice that if we assume that S is a fixed sum in the context of a rank order tournament with an error term, then our game is equivalent to one in which the size of the transfer (S) is endogenously determined as a function of the players lobbying efforts. We interpret η , the random shock to the political process, as including all those factors that may influence the political allocation that are beyond the control of the parties involved and unknown at the time of making the effort decisions. Some examples are sudden changes in public opinion as a consequence of the arrivals of news about discoveries of the environmental and health consequences of certain products and changes in the international environment regarding intellectual property rights. The shock η can also be interpreted as a measure of the importance of other temporary players who also participate in the political process.

3 Equilibrium

From (1) and (2), the “intratemporal” demand for each commodity will equal

$$d_{jt} = \frac{I_t}{2p_{jt}}, \quad (6)$$

where I_t equals total nominal spending at time t and $j = x, y$. This demand applies to workers and entrepreneurs alike. Along with the fact that preferences are homothetic in x and y , this implies that (6) also represents aggregate demand.

This specification allows for an easy characterization of the intertemporal problem. The logarithmic utility function implies that the consumer will choose a pattern of expenditure such that

$$I_t = \beta(1 + r)I_{t+1}. \quad (7)$$

Producers of the same product engage in Bertrand competition. Different qualities of the same product are perfect substitutes by (2). The implication is that the leader, or the state-of-the-art producer, will charge a quality-adjusted price slightly below the reservation price of the competitor, which is the wage rate, w^* , i.e. the competitor’s marginal cost. In equilibrium, therefore, the follower will not engage in production. The demand function (omitting time subscripts) becomes completely elastic at price μw^* or up to quantity

$$d_j^* = \frac{I}{2\mu w^*}. \quad (8)$$

The equilibrium price in the product market will then be $w^* \mu$, and the Bertrand profits will equal

$$B = (p - w^*)d_j^* = (\mu - 1)w^* \frac{I}{2w^* \mu} = \left(1 - \frac{1}{\mu}\right) \frac{I}{2}. \quad (9)$$

Unskilled labor is hired for production purposes. The supply of labor is perfectly elastic at the constant marginal disutility of work, w . The derived demand for labor is flat at $\mu w^* = w$ up to the quantity $\frac{I}{2\mu w^*}$ and zero afterwards due to the unitary elasticity assumption. The equilibrium wage is $w^* = w$. Notice that only L units of labor get hired, while the remaining $(N - L)$ workers consume leisure and no commodities.

The interest rate, r , is determined in the capital market. The employed workers have a smooth path of income, and therefore only go to the capital market if the interest rate differs from the discount factor. Entrepreneurs' incomes fluctuate over time, as in some periods, they will be earning profits and in others, they will be doing research and lobbying. They will borrow during the nonproductive periods and will lend in the profit-making periods. In addition, the government demands (supplies) funds when its net subsidies are positive (negative). For society as a whole, expenditure equals income at each point in time. Since aggregate income is constant, we can determine the interest rate from substituting (7) into

$$\beta = \frac{1}{1+r}. \quad (10)$$

4 The Allocation of Time

The entrepreneur's problem consists of allocating his unit of skilled labor between research (or innovation-oriented thinking) activities, which increase the probability of a technological jump, and lobbying efforts, which increases the probability of receiving a government subsidy. He maximizes the value of the firm, or

$$V_j = \beta \iota_j \frac{B + ES_j(l_j, \bar{l}_{-j})}{1 - \beta(1 - \bar{\iota}_j)} \quad (11)$$

for a firm in sector j , where \bar{l}_{-j} indicates the lobbying effort of the other group, and where E denotes the expectation operator and a bar over a variable indicates that it is taken as given in the maximization. The value of the firm is the present discounted value of the stream of income. The firm receives Bertrand profits and (receives or pays) a government subsidy after achieving a technological breakthrough. This happens with probability ι_j in which case the producer becomes the leader, obtaining a per period profit of B (the Bertrand profit) plus the (positive or negative) subsidy until he is displaced. The discount factor includes the probability of being displaced as leader in the future, which equals $\bar{\iota}_j$, the research intensity of the other firm in the same industry. The value of the firm is maximized subject to

$$1 = bl_j + a\iota_j. \quad (12)$$

The parameter $b > 1$ is the inverse of the lobbying efficiency of the sector. We assume initially that this productivity is equal for both sectors, which generates a symmetric equilibrium. We will look at the Nash Equilibrium in the dual game across industries for the subsidy and within an industry for technological leadership.

The first-order conditions for the firm in sector j are

$$\beta \frac{B + ES_j(l_j, \bar{l}_{-j})}{1 - \beta(1 - \bar{\iota}_j)} = \lambda_j a, \quad (13)$$

$$\beta \frac{\iota_j}{1 - \beta(1 - \bar{\iota}_j)} \frac{\partial ES_j(\cdot)}{\partial l_j} = \lambda_j b, \quad (14)$$

plus the budget constraint (12). The expected subsidy for sector x is

$$ES_x = [2\text{Prob}(\eta < l_x - l_y) - 1]S = [2\Phi(l_x - l_y) - 1]S, \quad (15)$$

and

$$\frac{\partial ES_x}{\partial l_x} = 2S\phi(l_x - l_y), \quad (16)$$

where ϕ is the density of Φ , the distribution of η .

For the case in which Φ is a normal distribution with zero mean and variance σ^2 , we solve for the symmetric equilibrium -same ι and same $l \forall j$ - that involves evaluating the normal density at zero. We obtain

$$\iota = \frac{bB}{aS} \sqrt{\frac{\pi}{2}} \sigma. \quad (17)$$

Therefore, in equilibrium, the rate of technological improvement increases with research productivity, decreases with lobbying productivity, and increases with the size of Bertrand profits.

Equation (17) is valid only for an interior solution. From (12), the probability of a technological breakthrough, ι , is constrained to be smaller than $\frac{1}{a}$. This implies that if $\frac{S}{B}$ is smaller than $b\sqrt{\frac{\pi}{2}}\sigma$, all effort will be devoted to R&D. Increases in S will not affect this value until we fall again in the interior solution region. Further increases in S will decrease the amount of R&D and will therefore deteriorate the growth performance of the economy.

Additionally, in order to insure that the sector that lost the political bid will be willing to enter and pay the subsidy, we must impose an upper bound on $\frac{S}{B}$. This condition requires that the value of entering and receiving $B - S$ be larger than the value of waiting an additional period, in which case the expected subsidy is zero.⁶

The growth rate of the economy is measured by the growth of the consumption index D_t .⁷ This rate of growth is stochastic, so that we must compute its expectation, $g = E(\log D_{t+1} - \log D_t)$. Given that technological improvements in each period follow a Bernoulli distribution with success probability ι , the level of technology over time follows a binomial distribution in which the expected number of increments in t periods equals the probability of success times the number of periods. The logarithm of the consumption index is

$$\log D_t = \log xy + \log q_t^x + \log q_t^y. \quad (19)$$

Starting with a quality level of q_0 for both products, the expected value of quality in period t equals

⁶This participation constraint is

$$\frac{S}{B} - \left(\frac{S}{B}\right)^2 \geq \beta \frac{b}{a} \sqrt{\frac{\pi}{2}} \sigma \quad (18)$$

As long as a is sufficiently large (or β is not too large), this imposes an upper bound on $\frac{S}{B}$.

⁷Notice that our model refers to growth in a welfare quality-including sense, that is, not completely captured by standard growth accounting methods.

$$E \log q_t = \log q_0 + \iota t \log \mu; \quad (20)$$

so,

$$g = 2\iota \log \mu. \quad (21)$$

We are now in a position to state some of our main comparative static results. Equation (17) relates the rate of innovation to the parameters of the economy, and (21) relates ι to the growth rate. Both the rate of technological improvement and the growth rate of the economy increase with the productivity of R&D (lower a , the input requirement in the research technology) and decrease with improvements in the productivity of lobbying effort (lower b). The amount of research decreases with the fraction of resources allocated to the political system. Equation (17) also shows that an increase in the variance of the shocks to the political allocation process (σ) makes the outcome of influence activities less certain and therefore reduces the incentive to engage in lobbying. This increases the amount of resources devoted to research, increasing the probability of obtaining quality improvements and increasing growth.

In the extreme case of a very high σ , the political allocation process is so uncertain that it is not worth spending to try to influence the outcome. The political process is uncertain because of the actions and interactions of the many actors in political arena that are not modeled here. In societies in which many small groups can eventually have a say in the determination of the political allocation, the lobbying efforts of big groups will be less effective. Sudden changes in public opinion and the arrival of information, which are unknown at the moment of deciding on lobbying effort, increase the uncertainty of the process.

An alternative interpretation of high σ would be that, given the political outcome, the ability of the government to implement this redistribution may not be perfect. The policies required to implement this redistribution are not the simple subsidy-cum-tax scheme used above. In the real world, redistribution is achieved through complicated mechanisms such as regulatory policy, price controls, distortionary taxation and exchange rate policies. All of these measures are subject to a variety of shocks that make the implementation not completely certain.

5 Asymmetric Equilibria

We move now to the analysis of the case in which the access to the political system is asymmetric. There are two ways in which we could incorporate asymmetry. First, a group may have a comparative advantage at political activity. This captures the well-known results in the public choice literature (Buchanan and Tullock (1962), Olson (1965), Stigler (1971), and Peltzman (1976)) that state that some smaller, better-organized or more homogeneous groups have more political leverage than others. In our model, this could be introduced by having $b_x \neq b_y$, i.e., different productivity parameters in the lobbying production function, or $a_x \neq a_y$, since what matters is the comparative advantage. This is analogous to a change in the relative price of lobbying vs. R&D for both sectors.

The implications of the changes in the relative prices will depend on whether the substitution or income effect dominates. If the substitution effect prevails, it can be shown that the sector with the higher productivity in the political sector will devote more time to this activity and less time to growth-enhancing investments than the other. Consequently, it will receive the subsidy more often. For instance, if we interpret a change in relative prices as a consequence of one sector being more productive in R&D than the other, our model predicts that the less-efficient sector will receive the subsidy more frequently, which matches the intuition that unhealthy firms and sectors often receive government protection. If the income effect prevails, the outcome will be equivalent to a change in the relative “income” of the two groups, the case that we analyze next.

The previous paragraph referred to one sector having a comparative advantage in political activities. There may also be a systematic component in the subsidy allocation scheme independent of lobbying efforts. This may be thought of as capturing all permanent (or known) biases in the decision process for the government, known to the groups when deciding on their lobbying efforts, such as public opinion, efficiency considerations (Becker (1983)) and ideological positions, which make one sector a favorite. While η captured the transitory (or unknown) shocks to the political system, here we introduce a bias such that for equal lobbying efforts, one group has a higher probability of obtaining the subsidy. This is analogous to a change in relative expected income.

The methodology for this section is as follows. First, the first-order conditions for the entrepreneur’s problem are modified to incorporate this asymmetry. Each set of these conditions can then be simplified to one equation that implicitly defines the reaction functions $l_x(l_y)$ and $l_y(l_x)$. Combining the two reaction functions gives a sign for $l_x - l_y$.

The rule for allocating the subsidy is now

$$S_x(l_x, l_y) = \begin{cases} -S & \text{if } L_x + \Delta \leq L_y \\ S & \text{if } L_x + \Delta \geq L_y \end{cases}$$

which means that there is a permanent and known political bias in favor of sector x . The expected subsidy for sector x becomes

$$ES_x = [2\Phi(\eta < l_x - l_y + \Delta) - 1]S. \quad (22)$$

Making the appropriate substitutions in (13) and (14) and dividing them gives

$$\frac{\frac{B}{S} + 2\Phi(l_x - l_y + \Delta) - 1}{(1 - bl_x)2\phi(l_x - l_y + \Delta)} = \frac{1}{b} \quad (23)$$

and

$$\frac{\frac{B}{S} - 2\Phi(l_x - l_y + \Delta) + 1}{(1 - bl_y)2\phi(l_x - l_y + \Delta)} = \frac{1}{b}, \quad (24)$$

for x and y , respectively. Equations (23) and (24) implicitly define two reaction functions. These reaction functions are upward sloping, reflecting the strategic complementarity of lobbying efforts, and intersect only once, characterizing a stable equilibrium.

Dividing (23) by (24) we obtain

$$\frac{B + (2\Phi(l_x - l_y + \Delta) - 1)S}{B - (2\Phi(l_x - l_y + \Delta) - 1)S} = \frac{B + ES_x(l_x, l_y, \Delta)}{B - ES_x(l_x, l_y, \Delta)} = \frac{\iota_x}{\iota_y}. \quad (25)$$

Equation (25) implies that the sign of ES_x is the same as that of $\iota_x - \iota_y$, or equivalently, that of $l_y - l_x$. However, we know that the expected subsidy to sector x is positive if and only if $l_x - l_y + \Delta > 0$; but then, $ES_x < 0$ will contradict (25). From this, we know that $\Delta > 0$ implies $ES_x > 0$ and $l_x < l_y$. This result is summarized in the following lemma.

Lemma. The sector that is more favored by the political system, independently of the lobbying input, will exert less lobbying effort than the other but will still be more likely to receive the subsidy.

The lemma states that the income effect (you are more likely to win no matter how much effort you devote) induces the favorite group to spend part of this “income” in the other activity; therefore, it reduces the total amount it spends on pressure activities.

6 The “Deadlock” Society

The previous section showed that each group’s time allocation will be different in an asymmetric equilibrium. In the case in which the asymmetry is due to different “productivities” in the political process, the sector with a comparative advantage in lobbying will tend to specialize in that activity. In the case where the bias in the political system is independent of the time input, the favored sector will spend less time seeking political favors than the other.

In this setup the two sectors will grow at different rates. We can still compute the rate of growth of the economy, which is

$$g = (\iota_x + \iota_y) \log \mu. \quad (26)$$

So growth depends positively on the sum of research intensities (negatively on the sum of lobbying intensities). The crucial question for understanding the effect of asymmetries in the political process on growth is whether aggregate lobbying increases or decreases as the degree of symmetry changes. In this section, we answer this question.

Differentiating the system of two reaction functions, we obtain a comparative static result for $l_x + l_y$ as a function of the asymmetry parameter. We use equations (23) and (24) and apply the implicit function theorem to obtain

$$\frac{\partial l_x}{\partial \Delta} + \frac{\partial l_y}{\partial \Delta} = \frac{\phi'(\bar{\eta}) \frac{\alpha}{\beta} (\iota_x + \iota_y)}{3\phi(\bar{\eta}) + \phi'(\bar{\eta})(l_x - l_y)}, \quad (27)$$

where $\bar{\eta} = l_x - l_y + \Delta$. Equation (27) is valid for any distribution function Φ . It shows that if η is uniformly distributed, the total level of effort is invariant to the degree of asymmetry because $\phi' = 0$. If η is normally distributed, then the total level of effort is negatively related to Δ , which means that more asymmetry induces lower aggregate lobbying and therefore higher growth.

We are now in a position to state one of our main results, which we summarize in the following proposition.

Proposition. For all distributions such that $\phi'(u) < 0$ for $u > 0$, the rate of growth of the economy will be negatively related to the degree of symmetry in the political allocation process.

Proof.

From the lemma, we know that $\bar{\eta} > 0$ and that $l_x - l_y < 0$ when $\Delta > 0$. If $\phi'(u) < 0$ for $u > 0$, then from (27), $\frac{\partial l_x}{\partial \Delta} + \frac{\partial l_y}{\partial \Delta} < 0$. \square

The proposition shows that the higher is Δ , the smaller is the aggregate incentive to engage in rent-seeking activities. The marginal benefit of lobbying is equal to the increase in the probability of receiving the government subsidy (ϕ) times the gain in income ($2S$). This benefit is higher for larger values of the density function. In the case of distributions such as the standard normal, the value of the density falls as the absolute value of the random variable increases. In such a case, the marginal benefit of lobbying activities decreases as we move away from zero. In the symmetric equilibrium, the density was evaluated at zero, so, the incentive to lobby was at its maximum. We call this equilibrium the “deadlock” situation, where equally shared access to the political process induces an outcome with the highest use of entrepreneurial skill for activities not conducive to growth. The intuition of this result is similar to that in Lazear and Rosen (1981). In that paper, when workers within a firm are different from each other, a handicap system (giving higher prizes to lower ability workers) elicits the optimal amount of effort. If prizes were kept constant, there would be a disincentive to work, since the winner of the contest would be almost certain. Within the context of our model, a big Δ implies asymmetry without handicap, which lowers the aggregate incentive to devote resources to the political contest.

We interpret high- Δ economies as those in which the pattern of subsidies is fairly well established and in which society has clearly picked a winning sector. Alternatively, in low- Δ economies, it is not clear who are the winners, and every group sees a chance of obtaining government privileges. We have shown above that the latter economies would have a worse growth performance. Our result formalizes the intuition that as we make one of the two sectors a clear winner, the incentive for both sectors engage in lobbying decreases. Consider, for example, a case in which with almost certainty, sector x , receives the subsidy. In this case, there is little incentive for both x and y to lobby at all. It has been argued that some Latin American economies are in a situation in which many resources are spent on lobbying. We think this is not only because these are high S societies⁸ (meaning that an important fraction of resources get allocated through the political system), but also because the power structure is such that every group perceives that it has a chance of exacting a sizable amount of resources from the government. Concern about entrepreneurs that “work” not in their factories but in their corresponding ministries has been well known

⁸Remember that this comparative statics is performed for a given $\frac{S}{S+B}$, the fraction of resources distributed through the political system. What our result means is that for a given level of redistribution, the more biased the political system is in favor of particular groups, fewer resources will be spent in trying to influence the outcome of such a process.

for years. We think our model, captures this “deadlock” situation which the economy is spending much of its entrepreneurial resources in a useless fight for government protection.

So far, we have been talking about asymmetry among big pressure groups. In this case asymmetry induces less waste of resources. Nevertheless – as Dougan and Snyder (1990) show – asymmetries between these groups and the rest of the participants in the political process are necessary for the existence of this type of negative sum games. This type of asymmetry reduces growth performance. We believe that in more democratic societies, reduce the degree of asymmetry that may arise between the power groups and the rest of the public is lower; our parameter σ measures the relevance of “small players.” Accordingly Scully (1988) has shown that politically open societies grow faster.

There is another way in which asymmetry may be detrimental to growth. This is the case in which the game for political favors is a game between incumbents and potential entrants to a given industry. In this case asymmetry may lead to the erection of barriers to entry and other restrictive policies. We analyze this case in the following section.

7 Intraindustry Lobbying

As stated above, we have shown that bias in the political system is growth-enhancing in the context of the model developed. In this section, we consider another characterization of political markets in which biases in the system may be detrimental to growth. We have in mind the well known cases of slowdowns in technological improvement and growth in those societies in which the currently-producing firms have an advantage or have captured the political process in their favor and have managed to decrease the extent of competition that they face.⁹ This discourages potential entrants and compels them to also devote resources to lowering those barriers. This intraindustry political dispute may, in the extreme, lead to complete growth stagnation, as in Olson (1982).

We capture these ideas in a model similar to that used in previous sections, where now we have two firms/entrepreneurs and only one sector. At each point in time, there is a firm that is trying to achieve a technological breakthrough in order to displace the current producer and obtain a Bertrand profit, B . This entrepreneur allocates his time between investing in R&D, lobbying order to lower the barriers to entry, and a third activity that we call leisure which tries to capture all other opportunity costs of participating in this system.

There is one incumbent firm that produces and obtains Bertrand profits until displaced. This entrepreneur also chooses between the three possible uses for his unit of skilled labor. In this setup, the incumbent may also devote resources to R&D. This captures the fact that even when facing no competition, a firm may have the incentive to improve the quality or lower the production costs of production to increase profit margins. In the particular context of our model this incentive arises from the assumption that (keeping B constant) in the case in which both firms make a technological breakthrough, the incumbent retains the whole market.

⁹Examples of this are discussed for Mexico in Harber (1989), for Peru in De Soto (1987), for Argentina in Bustamante (1988), and for Pakistan in Asilis and Juan-Ramón (1992).

The political struggle results in a barrier to entry that we model as a fixed cost of entry, K . The stage payoffs can take three values. If the firm is an outsider, the entrepreneur only derives utility from leisure (wh^o), where h^o is the consumption of leisure while an outsider.¹⁰ If the firm enters in the production process in this period, it obtains a payoff in terms of leisure (wh^i) plus the Bertrand profit (B) minus the entry cost (K), where h^i is the consumption of leisure while an incumbent. After the entry period, if the entrepreneur remains the incumbent, he receives a per period payoff equal to $B + wh^i$.

Now, we can evaluate the appropriate value functions of being an outsider and an incumbent. The value of being an outsider equals

$$V^o = wh^o + \beta \left\{ (1 - \bar{\iota}_i)\iota_o[V^i - K(l_o, \bar{l}_i)] + (1 - (1 - \bar{\iota}_i)\iota_o)V^o \right\}. \quad (28)$$

The value of being an outsider equals the present leisure consumption plus the discounted value of future payoffs. With probability $(1 - \bar{\iota}_i)\iota_o$, the outsider will displace the incumbent¹¹ and after paying the cost of entry, become an incumbent with corresponding value V^i . Otherwise, the firm remains an outsider with value V^o .

Equivalently, for the incumbent we have that

$$V^i = wh^i + \beta \left\{ (1 - (1 - \iota_i)\bar{\iota}_o)V^i + (1 - \iota_i)\bar{\iota}_o V^o \right\}. \quad (29)$$

Again, the value of being an outsider equals the present leisure consumption plus the discounted value of future payoffs. With probability $1 - (1 - \iota_i)\bar{\iota}_o$, the incumbent remains as such with value V^i . Otherwise, the incumbent is displaced.

Upon solving (28) and (29), we obtain the value functions as functions of the underlying parameters and choice variables. Notice that l_i , the lobbying effort of the incumbent, does not appear in his value function. This is so because it only affects the size of the barriers to entry eventually incurred by the other player. Because l_i enters only in this strategic sense but not directly in the payoff of player i , we use a Stackelberg solution concept that allows for these strategic choices. The incumbent is the first mover and accounts for the reaction function of the potential entrant when making his choice.

The outsider maximizes his value function subject to the budget constraint

$$1 = ai_o + bl_o + h_o. \quad (30)$$

The first-order condition with respect to h_o is

$$\frac{\partial V^o}{\partial h_o} = w + \beta(1 - \bar{\iota}_i)\iota_o \frac{\partial K}{\partial l_o}. \quad (31)$$

Notice that the optimal choice of h_o will be either zero or one depending upon the value of $\bar{\iota}_i$. The derivative $\frac{\partial K}{\partial l_o}$ is negative, so nonparticipation ($h_o = 1$) will be more likely, the higher is ι_i . If $\iota_i \rightarrow 1$, then entry for the outsider almost never takes place, and the incentives to participate in the political-economic game decrease. Under some conditions the fact that the outsider is not participating will also induce a corner solution in which the

¹⁰Leisure is introduced additively to market payoffs, with constant marginal rate of substitution w .

¹¹Recall that if both firms achieve a technological breakthrough, only the incumbent remains in the market.

incumbent devotes all of his time to leisure. If $h_o = 0$, the entrepreneur chooses a nonzero R&D and lobbying intensities, a structure similar to that of our previous sections.

From the first-order conditions, we can solve for ι_o as a function of the parameters and of ι_i , giving us the outsider's reaction function, which we then incorporate into the maximization problem of the incumbent. The solution will depend on the specification of the barriers to entry function, $K(l_i, l_o, \Delta)$. In the spirit of the previous models, Δ captures the asymmetry between the two players. This asymmetry will be in favor of the incumbent. For sufficiently high Δ , the solution for the outsider will be at the corner solution, in which he exits from the political-economic game. As said before, this may also induce the incumbent to devote all of his time to leisure; since nobody invests in R&D, the growth rate collapses to zero.

8 Conclusions

This paper explores the implications of some characteristics of political redistribution processes on growth performance. Societies that allocate a higher fraction of resources through the political or nonmarket system will suffer from lower growth rates because much of their stock of entrepreneurial talent will be used to influence government decision and or to anticipate government policy. It is a "folk theorem" of Latin American economics that it is easier to get rich by influencing or anticipating government policy than by technological improvements, cost reductions or brand development.

The subsidy given by the government was justified as an incentive to R&D as it was only provided to the technological leader in each sector. What is striking is that the optimal subsidy to R&D in the context of the model is having this subsidy equal to zero, i.e., not to have any subsidy at all. If no transfers are given, then there is no incentive to engage in lobbying activities and consequently, all time gets devoted to the pursuit of technological improvements. The model teaches us that once we account for all the struggles induced by the redistributive effects of subsidies and taxes, the results may be very different than those arising from models which disregard this consideration.

An increase in the variance of the shocks to the political allocation process (σ) makes the outcome of influence activities less certain and therefore reduces the incentive to engage in lobbying. This increases the amount of resources devoted to research, increasing the probability of obtaining quality improvements and increasing growth. In the extreme case of a very high σ , the political allocation process is so uncertain or so independent of pressure groups that it is not worth spending effort to influence the outcome. The political process is uncertain because of the actions and interactions of the many actors in political arena not modeled here or alternatively due to instrument uncertainty in the implementation of redistributive policies. Political systems in which the number of independent decision makers in the political body is large may be characterized by more uncertain decisions or alternatively by more transparent decision making. Similarly, for a given size of the decision-making body, the higher the correlation across votes (for example, due to party discipline), the smaller this variance and hence, the growth rate.

In addition, we show that the **aggregate** level of resources spent on deciding the political redistribution will be directly related to the symmetry in the access to the political

game. This is to say that for a given level of redistribution, growth rates will be negatively related to the degree of symmetry between pressure groups. When policy makers are highly “ideologized,” they are more likely to favor one sector independently of influence activities. In that case, we expect to observe a lower aggregate effort to convince the government on the direction of policy.

The effect on the relative lobbying efforts depends on the nature of the asymmetry. If the asymmetry comes from differences in productivity in the political arena, then the sector that has a comparative advantage will tend to specialize in influencing the government, as predicted by the public choice literature. On the contrary, if the degree of asymmetry comes from an established bias in favor of one particular sector, then the losers will exert more effort than the winners in gaining government favor.

This is consistent with the characterization in Lal (1991), who distinguishes between two types of governments: “autonomous”, i.e., those who follow their own independent objectives (the case in which the government coincides with a social planner, he calls the “platonic” states; the others are “predatory” states), and “factional” states, i.e., those who serve the objectives of the groups that succeed in its capture. Table shows the relationship between output growth and type of polity for a sample of developing countries according to that classification. As it can be seen, factional governments have experienced lower growth rates. We interpret this result as a preliminary confirmation of our comparative static result for the intersector asymmetry model. In terms of our model, we interpret the platonic states as those for which $S = 0$, predatory states as those with $S > 0$ but a very high Δ , and factional states as having $S > 0$ and Δ close to zero. If the political game takes place between incumbents and outsiders within given sectors, asymmetry (size of the exogenous components of barriers to entry) can eventually lead to complete stagnation.

Even though we have framed our discussion in the context of the time allocated to influencing activities, we believe the results extend to a wealth of alternative interpretations. For example, economies with unstable macroeconomic policies will induce entrepreneurs to spend most of their time trying to keep informed on the relevant variables for decision making. The fact that being ahead of others is what matters in financial decision making, is what gives plausibility to our rank order setup, even for studying the extent of effort devoted to information acquisition. Many firms realize that they have much more to gain or to lose, by correctly anticipating economic policy than by increasing the efficiency of their operations.

The next steps to be taken in this research effort are in two (complementary) directions. First, the introduction of dynamic considerations in the framework should be developed. For the case of intersector conflicts we have analyzed the way in which some characteristics of the political process affect economic outcomes. It is well known that the causality can go both ways: changes in the economic environment can trigger changes in the political structure. For instance, Frieden has claimed (Frieden (1991)) that Latin American countries have suffered from hysteresis in the sense that they did not revert to free trade policies after World War II; this was due, he argues to the fact that the temporary lack of industrial products had allowed a new (industrial) class to prosper and to become a political actor capable of vetoing proposals to allow domestic relative prices to move together with international relative prices against their sector. Similarly, Olson has argued (Olson (1982))

Table 1: Growth and Type of Polity

Country	Growth 1960-85	Autonomous		Factional
		Platonic	Predatory	
Hong Kong	8.9	x		
Singapore	8.3	x		
Malaysia	6.9			x
Thailand	6.7		x	
Brazil	6.6		x	
Mexico	5.7		x	
Malta	5.6	x		
Turkey	5.6	x		
Egypt	5.4		x	
Indonesia	5.3		x	
Costa Rica	5.0			x
Colombia	4.7			x
Sri Lanka	4.7			x
Malawi	4.3	x		
Peru	4.1			x
Nigeria	3.7			x
Jamaica	3.3			x
Mauritius	2.9			x
Madagascar	2.0			x
Ghana	1.3		x	
Uruguay	1.1			x

Source: Lal (1991)

that the breaking up of entrenched economic interests in Japan and Germany after World War II has been instrumental in speeding up the growth of these economies.

In the case of intra-industry conflict, it is natural to expect that the incumbent will be able to build up a political capital stock that will affect the size of entry barriers. These dynamics may lead to a build up of barriers high enough to induce the stagnation result described before.

Second, there are always the more basic questions: Where do these allocation processes come from? What "fundamentals" of different societies induce some governments to be actively involved in redistribution schemes which represent an important fraction of income? What political institutions can be linked to our parameterization? These are fascinating questions. Further work is certainly required, but we have provided a start by linking several characteristics of the political technology and the growth rate of the economy.

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