THE DISTRIBUTION OF POLITICAL POWER, THE COSTS OF RENT-SEEKING, AND ECONOMIC GROWTH

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Poor economic growth in many countries can be explained by the misallocation of entrepreneurial resources to activities that do not foster growth This paper deals with the relation between the distribution of political power, the allocation of entrepreneurial resources and growth We model growth as deriving from Schumpeterian entrepreneurs who try to increase profits through innovation We endogenize the choice of time devoted to this activity vis-a-vis other ways of increasing income, such as obtaining government subsidies More unequal access to the political redistribution mechanism makes rent-seeking activities less profitable, and results in higher growth

The CFO of the Argentine firm is so busy he has no time to work [1]

1 INTRODUCTION

Most of the recent growth literature has developed in a representative agent-social planner framework, with little role for political institutions This development is paralleled by a lack of appreciation of the role of the entrepreneur in most of neoclassical economics We believe that the poor growth performance of many societies can only be understood by reinstating a central role to political institutions and entrepreneurs

In this paper we study the effect of some characteristics of political redistribution mechanisms (a reduced form for a series of institutions) on economic growth [2] We view and model the entrepreneur as the "mainspring of economic growth" (Schumpeter [1942], Powell [1990]) It is our contention that poor growth performance can be explained by the misallocation of entrepreneurial resources to activities that do not foster growth, such as overgrown financial sectors in high inflation economies, information gathering, and influence activities The allocation of entrepreneurial resources responds to the incentives present in the institutional framework In our model, we concentrate on the allocation of the entrepreneur's time between influence and growth enhancing activities [3] The importance of the misallocation of entrepreneurial time is described in De Pablo and

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1 De Pablo and Martinez [1989]

2 Douglass North [1990a, 1990b] develops a trans action-cost explanation of the existence and evolution of institutions Institutions emerge as a way of reducing uncertainty in human interaction in a world of imperfect knowledge and information North explains how path-dependence in institutional evolution can lock in inefficient institutional patterns The precursors of the idea of path dependence in modern economics are surveyed in Kuran [1988]

3 We take as given the distribution of people across activities, with the ablest people on top of organizations The "extensive margin" of occupational choice is studied in Murphy et al [1991]

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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 responsible for 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

The phenomenon we describe is not at all new, and its importance throughout history is well documented Baumol [1990] describes "political moneymaking" in Ancient Rome, corruption and confiscation of property in medieval China, warring in the Middle Ages, as well as rent-seeking in more recent times [4]

Within this view that politics and institutions matter, we concentrate on the effect on growth of the distribution of political power across pressure groups Does an equal distribution of power among contenders for redistribution help or hurt economic progress? The answer depends upon the nature of the redistributive conflict We find that *horizontal* inequality, in which access to political favors differs across sectors of economic activity, is beneficial for economic growth On the other hand, *vertical* inequality, in which bargaining power is unequal between insiders and outsiders of a particular economic sector, is harmful for growth An even distribution of political power at the horizontal level is harmful for growth because it induces a shift in entrepreneurial time towards the pursuit of redistribution It is when each agent (group) perceives himself as "having a chance" that the incentives to seek transfers are highest When winners and losers are clearly defined, the incentive to shift resources out of productive activities is much weaker

Argentina is a case in which the main redistributive conflict entails competition among sectors of economic activity [5] (Robinson [1985]) This situation has led to a deadlock in which valuable entrepreneurial resources have been directed away from Schumpeterian behavior In Chile the competition likewise took place mainly across sectors But there the conflict was resolved in favor of some sectors, with positive effects on growth performance (of course at a high cost in other terms such as political freedom and income distribution) On the other hand, there are historical experiences where the main conflicts have been those between incumbents and potential entrants, as in Mexico in the late nineteenth century and first half of the twentieth century (Haber [1989]) In such a setting, the asymmetry between insiders and outsiders worked against development [6]

Section II describes the model of horizontal (inter-industry) conflict Section III shows the solution for the case of symmet-

4 Our view owes a great deal to the literature on rent-seeking, starting from Tullock [1967] and Krueger [1974] Magee et al [1989] provide a comprehensive treatment of political economy in general equilibrium, a class to which our paper belongs

5 These sectors compete for tax exemption, subsidized credit, favorable exchange rates, protection from foreign trade, etc

6 Our findings about vertical asymmetries are consistent with the views in Olson [1982] and North [1990a] Differences in political power between pressure groups in general and the rest of the participants in the political process are necessary for the existence of redistributive institutions which are detrimental to growth

ric access to the polity Section IV analyzes the effects of asymmetry Section V discusses the vertical (intra-industry) case Section VI concludes

II THE MODEL[7]

There are two goods, x and y Each good potentially can be produced with different qualities We denote quality as q^x_m and q^y_m, where m indicates the generation to which the product belongs Goods of superior product 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 quality or as reducing the cost of providing a "level of computing power"

In each sector there are, at each point in time, two firms that 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 his temporary monopoly power, until he himself is outdated

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

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

where

$$(2) \quad \log D_t = \log \Big(\sum_m q^x_m x_m \Big) + \log \Big(\sum_m q^y_m y_m \Big)$$

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

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

subject to his wealth, which equals the expected present value of the profit stream from his firm The firm has two sources of income product market profits and subsidies from the government which are received if the firm is successful in its lobbying effort

We show below that at each moment there will only be one active producer ("the leader") per sector (This will be the outcome of Bertrand competition between the two firms within each 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, $\alpha\iota$ units of skilled labor have to be devoted to R&D The

7 The basic specification follows closely Grossman and Helpman [1991]

input requirement a is assumed to be greater than one. Also, each new technological generation is superior to the previous one by the amount $\mu > 1$. This technological jump is what allows for the existence of profits even when firms engage in Bertrand competition. The technological leader has the same marginal cost as the follower but produces a product with higher quality. He can capture the whole market by charging a price in excess of his marginal cost as long as it does not fully compensate for the quality differential.

Finally, we describe the technology for the allocation of government subsidies. As stated in the introduction, we are thinking of two types of activities that use up entrepreneurial resources: rent seeking 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.[8] In what follows we frame the discussion in terms of the former interpretation. Given such a structure, a natural way of modeling the process is a rank-order tournament (Lazear and Rosen [1981]). The sector that receives the government subsidy S, is the one that exerts the maximum amount of pressure in the political arena. The losing sector pays the bill. The subsidy (positive or negative) is valid for the duration of the monopoly position if a technological improvement is obtained during the period immediately following each political battle. Notice that the entrant may either be the recipient or payer of the subsidy, depending on the result of the political battle. 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

$$L_j = l_j + \varepsilon_j, \tag{3}$$

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

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

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

$$\eta < l_x - l_y, \tag{4}$$

where $\eta = \varepsilon_y - \varepsilon_x$ has (symmetric) distribution Φ, with density φ.

The random shock to the political process, η, includes all those factors that may influence the political allocation that are beyond the control of the parties involved and are unknown at the time the effort decisions are made. Some examples are sudden changes in public opinion due to discoveries of the environmental and health consequences of certain products and changes in the international environment regarding intellectual property rights. The shock η can be further interpreted as a measure of the importance of other temporary players who also participate in the political process.[9]

The battle is repeated every period by the two followers. We will look for a Nash equilibrium to this game. 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

8 A positional good is a good whose value depends on how it compares with similar goods consumed by others, also called a status good.

9 Notice that the assumption of a fixed S in the context of a rank-order tournament with an error term is equivalent (in terms of expected payoff) to a case in which the size of the transfer (S) is endogenously determined as a function of the players' lobbying efforts as in Hirshleifer [1991a].

assume that the government borrows or lends to cover temporary budget deficits and surpluses

III. 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 increase the probability of receiving a government subsidy. He maximizes the value of the firm, or

$$(5) \qquad V_x = \beta\iota_x [B + E S_x(l_x, \bar{l}_y)] / [1 - \beta(1 - \bar{\iota}_x)]$$

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_x 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 $\bar{\iota}_y$, the research intensity of the other firm in the same industry. The value of the firm is maximized subject to

$$(6) \qquad 1 = bl_x + a\iota_x$$

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, and we solve for a symmetric Nash equilibrium in the dual game across industries for the subsidy and within an industry for technological leadership. The fact that we use the Nash concept explains why we take l_y and ι_x of the other players as given in (5).

We show in the appendix that for the case in which Φ is a normal distribution with zero mean and variance σ^2, the expression for research intensity is

$$(7) \qquad \iota = (bB/a\beta)\sqrt{\pi/2}\ \sigma$$

Therefore, in equilibrium the rate of technological improvement increases with research productivity, decreases with lobbying productivity, and increases with the size of Bertrand profits.[10]

The growth rate of the economy is measured by the growth of the consumption index D_t.[11] This rate of growth is stochastic, so 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

$$(8) \qquad \log D_t = \log xy + \log q_t^x + \log q_t^y$$

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

$$(9) \qquad E \log q_t = \log q_0 + \iota t \log \mu,$$

so,

$$(10) \qquad g = 2\iota \log \mu$$

10 We consider the region of interior solutions for ι. This implies the need of imposing upper and lower bounds on the feasible values of S.

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

We are now in a position to state some comparative static results Equation (7) relates the rate of innovation to the parameters of the economy, and (10) 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 (7) 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 Sudden changes in public opinion and the arrival of information, unknown at the moment of deciding on lobbying effort, increase the uncertainty of the political allocation process An alternative interpretation of a high σ is 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 schemes 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 implementation not completely certain

IV HORIZONTAL INEQUALITY

The previous section analyzed the case in which the two pressure groups are identical, i e , have equal access to the polity In this section we investigate the effects of asymmetry Remember that η captured the transitory (or unknown at the time of deciding lobbying effort) shocks to the political system Here, we introduce a known bias ($\Delta > 0$) which is equivalent to a nonzero mean for the η process This could reflect public opinion or ideological positions that make one sector a (political) favorite This modification is analogous to having two parties with different endowments or "income" (see Hirshleifer [1991a]) [12]

The rule for allocating the subsidy is now

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

which means that there is a permanent and known political bias in favor of sector x

Before discussing the growth implications of asymmetry, we solve for the lobbying efforts of each group The appendix contains the proof to 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

12 There is another way in which we could incorporate asymmetry Groups could have different productivity parameters in the lobbying production, i e $b_x \neq b_y$, or $\alpha_x \neq \alpha_y$, since what matters is the comparative advantage This implies a different relative price of lobbying vs R&D across sectors The implications of this difference in relative prices will depend on whether a substitution or an income effect dominates If the substitution effect prevails, the sector with 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 one sector is 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 (this is analogous to the "paradox of power" in Hirshleifer [1991b]) If the income effect prevails, the outcome will be equivalent to the case discussed in the text

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

Although in the presence of asymmetry the two sectors will grow at different rates, we can still compute the rate of growth of the economy, which is

$$g = (\iota_x + \iota_y) \log \mu \tag{11}$$

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 We answer this question below

From the system of reaction functions for both groups, we can obtain a comparative static result for $l_x + l_y$ as a function of the asymmetry parameter In the appendix it is shown that

$$\partial l_x/\partial\Delta + \partial l_y/\partial\Delta = [\varphi'(\bar{\eta})\frac{a}{b}(\iota_x + \iota_y)] / [3\varphi(\bar{\eta}) + \varphi'(\bar{\eta})(l_x - l_y)], \tag{12}$$

where $\bar{\eta} = l_x - l_y + \Delta$ Equation (12) 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 $\varphi' = 0$ 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 More generally

PROPOSITION For all distributions such that $\varphi'(u)u < 0$, 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 $l_x - l_y < 0$ when $\Delta > 0$, and that $\bar{\eta} < 0$ and $l_x - l_y > 0$ when $\Delta < 0$ If $\varphi'(u)u < 0$, then from (12), $\partial l_x/\partial\Delta + \partial l_y/\partial\Delta < 0$

The proposition shows that the higher the value of 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, hence 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

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 societies where an important fraction of resources are 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 gov-

ernment [13] We think our model captures this "deadlock" situation in which the economy suffers as entrepreneurs spend valuable resources in fighting for government protection

This result—that greater equality of players implies more rent-seeking waste—will obtain as long as the marginal return to rent-seeking activities increases the closer the effective amount of resources spent by both players The same type of condition will deliver similar results in other conflict technologies (see, for instance, the contest success functions in Hirshleifer [1989] and an application to wars of attrition in Martinelli [1993])

Notice that tournaments like the one we model here are a special case of "winner-take-all" markets (Frank and Cook [1992]) Our result thus applies to other winner-take-all situations such as patent races one would expect that total R&D costs would be lower where there is a differential ability to innovate across firms

V VERTICAL INEQUALITY

In the previous section we considered the case of horizontal inequality and showed that asymmetry was growth enhancing But there is another way in which asymmetry may affect 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 that may have a detrimental effect on growth We have in mind the cases of slowdowns in technological improvement and growth in societies in which incumbent firms have captured the political process and have managed to decrease the extent of competition they face [14] Such vertical inequality discourages potential entrants and compels them to also devote resources to lowering those barriers This political dispute may, in the extreme, lead to complete growth stagnation, as in Olson [1982] This relates to results in the public choice literature (Buchanan and Tullock [1962], Olson [1965], Stigler [1971] and Peltzman [1976]) that state that smaller, better-organized or more homogeneous groups have more political leverage than others Olson [1982] points out that the existence of these "redistributional coalitions" induces political outcomes that are detrimental to growth

We capture these ideas in a model similar to the one of previous sections We now 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 in 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 among the same 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

13 Remember that this comparative statics is performed for a given $S/(S+B)$, 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, the fewer the resources that will be spent in trying to influence the outcome of such a process

14 Examples of this are discussed for Mexico in Haber [1989], for Peru in De Soto [1989], and for Pakistan in Asilis and Juan Ramón [1992]

make a technological breakthrough, the incumbent retains the whole market

The political struggle results in a barrier to entry that we model as a fixed cost K. 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.[15] 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

$$(13)\quad V^o = wh^o + \beta\{(1 - \bar{\tau}_i)\iota_o[V^i - K(l_o, \bar{l}_i)] + [1 - (1 - \bar{\tau}_i)\iota_o]V^o\}$$

The value of being an outsider equals the present leisure consumption plus the discounted value of future payoffs. With probability $(1 - \bar{\tau}_i)\iota_o$, the outsider will displace the incumbent and, after paying the cost of entry, become an incumbent with corresponding value V^i.[16] Otherwise, the firm remains an outsider with value V^o.

Equivalently, for the incumbent we have that

$$(14)\quad V^i = wh^i + \beta\{[1 - (1 - \iota_i)\bar{\tau}_o]V^i + (1 - \iota_i)\bar{\tau}_o V^o\}$$

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

Upon solving (13) and (14), 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

$$(15)\quad 1 = a\iota_o + bl_o + h_o$$

Differentiating V^o with respect to h_o and using (15) we obtain

$$(16)\quad \partial V^o/\partial h_o = w + \beta(1 - \bar{\tau}_i)\iota_o\partial K/\partial l_o$$

Notice that the optimal choice of h_o will be either zero or one depending upon the value of $\bar{\tau}_i$. The derivative $\partial K/\partial l_o$ is negative, so non-participation ($h_o = 1$) will be more likely, the higher the value of $\bar{\tau}_i$. If $\bar{\tau}_i \to 1$, 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 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.

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

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

From the first-order conditions we can solve for ι_0 as a function of the parameters and of ι_1, 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, $K(l_1, l_0, \Delta)$ 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 previously mentioned, 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

VI CONCLUSIONS

This paper explores the relation between the distribution of political power and economic growth We discuss how, for a given level of resources allocated through the political or non-market system, unequal access to the political power by different sectors affects growth We find that this asymmetry is beneficial for growth When policy makers are highly ideological, economic outcomes will not depend so strongly on influence activities and entrepreneurs will not deviate from Schumpeterian behavior[17]

This result is consistent with other findings Lal [1991], for instance, shows a relationship between output growth and type of polity based on his classification of different kinds of governments He distinguishes two main types "autonomous" and "factional" Autonomous states follow their own independent objectives (within this category there exist "platonic" states, in which the government coincides with a social planner, and "predatory" states) Factional states serve the objectives of the groups that succeed in its capture As can be seen in Table I (Table 4 in Lal [1991]) factional governments have experienced lower growth rates We interpret this result as a preliminary confirmation of our comparative static result In terms of our model the platonic states are those for which $S = 0$, predatory states are those with $S > 0$ but a very high Δ, and factional states have $S > 0$ and Δ close to zero

We then discuss the implications of asymmetry when the political game is one between incumbents and outsiders within given sectors Increased asymmetry will in this case lead to the erection of barriers to entry which can eventually lead to complete stagnation In every society both dimensions of asymmetry in the distribution of political power will matter Only an in-depth investigation of each particular case will reveal which dimension is more important Table I provides some impressionistic evidence, but more rigorous empirical testing of the model remains to be done

Although 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 about the variables relevant for decision making The fact that being ahead of others is what matters in financial decision making, gives plausibility to our rank-order setup, even for studying the amount 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

17 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

TABLE I
Growth and Type of Polity

Country	Growth	Autonomous		Factional
	1960–1985	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]

The subsidy given by the government was justified as an incentive to R&D It is striking that the optimal subsidy to R&D in this model is zero 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

The next step to be taken in this research is the introduction of dynamic considerations While it is undisputed that institutions affect the economy, it is as true that economic shocks affect institutions and that institutions evolve over time North [1990a] addresses the issue of institutional change stressing the possibilities of lock-in of different institutional setups Frieden [1991] has claimed 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 [1982] has argued 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 These dynamics, essential in explaining growth performance, may also be critically related to the distribution of political power through time

A final word on policy recommendations may be warranted Our model suggests that in order to induce economic growth, it is preferable to minimize the amount of resources that get transferred through the political system We, therefore, support institutional reforms that try to limit rent-seeking activities In addition, our model emphasizes that the benefits of such reforms are potentially larger in societies that are in a "deadlock" situation with a stalemate of power across interest groups

APPENDIX

Equilibrium

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

$$x_t = I_t/(2p_{xt}), \tag{17}$$

and similarly for good y, where I_t equals total nominal spending at time t Homotheticity implies that (17) also represents aggregate demand

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 $I/2\mu w^*$

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

$$B = I(p - w^*)/(2\mu w^*) = I(\mu - 1)w^*/(2w^*\mu) = I(1 - 1/\mu)/2 \tag{18}$$

Notice that prices are constant through time Nevertheless the quality of the goods bought at that constant price is increasing through time In a quality-adjusted sense, prices are falling through time

Solution to the Symmetric Model

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

$$\beta[B + ES_j(l_j, \bar{l}_{-j})]/[1 - \beta(1 - \bar{\iota}_j)] = \lambda_j a, \tag{19}$$

$$\beta\iota_j \partial ES_j(\cdot)/\partial l_j/[1 - \beta(1 - \bar{\iota}_j)] = \lambda_j b, \tag{20}$$

plus the budget constraint (6) The expected subsidy for sector x is

$$ES_x = [2\text{Prob}(\eta < l_x - l_y) - 1]S = [2\Phi(l_x - l_y) - 1]S, \tag{21}$$

and

$$\partial ES_x/\partial l_x = 2S\varphi(l_x - l_y), \tag{22}$$

where φ is the density of Φ, the distribution of η Now substitute back in the two first-order conditions evaluating φ at the origin and using the assumption of symmetry to obtain the solution for ι

Proof of Lemma and Proposition

The expected subsidy for sector x becomes

$$ES_x = [2\Phi(\eta < l_x - l_y + \Delta) - 1]S \tag{23}$$

Making the appropriate substitutions in (19) and (20) and dividing them gives

$$[B/S + 2\Phi(l_x - l_y + \Delta) - 1]/[(1 - bl_x)2\varphi(l_x - l_y + \Delta)] = 1/b \tag{24}$$

and

$$[B/S - 2\Phi(l_x - l_y + \Delta) + 1]/[(1 - bl_y)2\varphi(l_x - l_y + \Delta)] = 1/b, \tag{25}$$

for x and y, respectively Equations (24) and (25) 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 (24) by (25) we obtain

$$\{B + [2\Phi(l_x - l_y + \Delta) - 1]S\}/\{B - [2\Phi(l_x - l_y + \Delta) - 1]S\} = \iota_x/\iota_y, \tag{26}$$

or similarly,

$$[B + FS_x(l_x, l_y, \Delta)]$$

$$/[B - FS_\lambda(l_x, l_y, \Delta)] = \iota_x / \iota_y$$

Equation (26) 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 (26). From this, we know that $\Delta > 0$ implies $ES_x > 0$ and $l_x < l_y$. This is the result summarized in the lemma.

To obtain equation (12) differentiate (24) and (25), and use the implicit function theorem.

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