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FORMS OF GOVERNANCE AND THE SIZE OF RENT-SEEKING^(*)

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Abstract

In this paper we present a model of an organization where agents can choose between productive and rent-seeking activities. We consider two governance institutions, single ownership and corporate governance or parliament rule. Applications include models of internal organization of a firm, of a kingdom ruled either by an absolute monarch or by the parliament, and location where agents can locate either in the court and become rent-seekers, or in an industrial city and become entrepreneurs. Our main goal is to study the size of rent-seeking activities under the two governance regimes. Under single ownership, rent-seeking reflects the taste of the owner for such activities and the possibilities of extracting rents from productive agents (who finance rent-seeking). The main conclusion of the paper is that, under corporate governance, the size of the rent-seeking sector may be larger than under single ownership despite the fact that in the former nobody has an intrinsic taste for rent-seeking activities. \pagebreak

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1. Introduction

In this paper we present a model of an economy where productive and unproductive (rent-seeking) activities coexist. The paper studies how different forms of governance affect the relative size of productive and rent-seeking activities. We assume two forms of governance, single ownership, where decisions are taken by a single agent and corporate governance or parliament rule, where decisions are taken by majority voting. There are several motivations for our work.

1: **History.** In Europe from the XVII century on, some countries developed a strong productive structure and were ruled by a parliament (e.g. Netherlands and Great Britain) while others (e.g. Spain and other southern countries) concentrate efforts in rent-seeking activities devoted to obtain monopoly rights, noble titles etc. from the absolute monarch. According to some, "Absolutist states.....such as early modern Spain, created economic conditions that retarded long-run economic growth" (North and Weingast [1989]) and conversely, strong economic performance was the effect of the rule of parliament. The question here is the explanation of the connection between forms of governance and economic performance.

2: **Location.** In some countries there is a stark contrast between industrial re-

gions/cities (e.g. Milan, Barcelona) and the capital of the nation (Roma, Madrid). The folklore attaches to the former the role of an industrious, exploited people and to the latter the role of exploitative, tax-setters and rent-seekers. The question here is how governance institutions affect the relative size of the industrial region with respect to the capital.

3: Governance of a firm. In this case there are two types of regimes: Single ownership and corporate firms in which owners are reduced to the role of powerless suppliers of an input (Berle and Means [1932]). In the latter, decisions are taken by majority voting by managers in the Board of Directors. Managers can hide profits from shareholders and divert them to finance the activities of rent-seekers.¹

In this paper we provide a model that, hopefully, encompasses all these situations. Our basic idea is that rent-seeking inside an organization is an equilibrium phenomenon whose size is determined by the relative profitability of rent-seeking and alternative activities. Thus, on top of the welfare loss created by taxes, we have an extra welfare loss caused by the diversion of potentially useful talent into the unproductive sector. The latter idea was explored by Murphy, Shleifer and Vishny (1991) and Acemoglu (1995). However, they do not focus on the role of

¹In our model, asymmetric information between shareholders and managers does not shape the organization (as happens in other models of corporate finance, see e.g. Tirole [2001]). It just allows rent-seekers managers to divert profits from the shareholders.

different kinds of governance, which is the center of our analysis. We also assume imperfect competition. This creates an extra welfare loss not contemplated by these papers, namely that an increase in the rent-seeking sector increases the degree of monopoly in the productive sector (see our comments below equation (2.1')).

We first model single ownership. Here there are three classes of agents: the owner, who collects taxes and provides the prize (which is the good sought by rent-seekers), workers who provide labor, and active agents, who might either do rent-seeking or organize production. Free entry in rent-seeking and productive activities determines the number of active agents in each activity. In the case of a kingdom this means that the noble may be either courtier or entrepreneur. In the case of a firm this means that managers can either direct a division of the firm or devote their time to unproductive activities at the top, i.e. being members of a (fictitious) council of advisors. Given an allocation of active agents, the owner chooses a tax rate that maximizes his income. These taxes finance the consumption of the owner and the prize. Given a tax rate, entrepreneurs maximize profits and rent-seekers choose efforts to maximize payoffs (in an attempt to obtain the prize). An equilibrium is a situation where all agents maximize.² We prove

²The game is played sequentially. Hence, our concept of equilibrium is subgame perfection,

that such an equilibrium exists, it is unique and stable (Propositions 1 and 2). We also study the determinants of the relative importance of the rent-seeking sector. We find that under certain conditions on the form of demand functions, an exogenous technological progress can decrease the relative size of the rent-seeking sector (Remark 1). Thus, the rent-seeking sector may decrease for reasons independent of governance.

Next, we move to an organization in which the decision about the tax rate is taken by majority voting in a parliament composed of all active agents. Thus, the owner disappears and with him the taste for rent-seeking and his consumption (i.e. all taxes are devoted to financing the prize). We will call this organization corporate governance or parliament rule. In the case of a kingdom, the interpretation is that, in the beginning, parliaments were mainly populated by owners and nobility. In the case of a firm, the parliament is the Board of Directors (BOD). The BOD is composed of representatives of the production side, whom we will call entrepreneurs, and other members that are potential rent-seekers. The suppliers of the input can be interpreted as shareholders supplying capital. Rent-seeking possibilities still exist under parliamentary rule. We assume that a prize might be awarded, provided the necessary taxes are voted on the parliament. We find

i.e. in each stage agents assume that all agents will behave rationally in the rest of the game.

that there are, at least, two equilibria. In one of those, rent-seeking activities disappear because the parliament is composed entirely of entrepreneurs and their most preferred tax rate is zero (Remark 2). But in another equilibrium the parliament is dominated by rent-seekers that vote on a tax rate that maximizes total revenue. This tax coincides with the tax set by a single owner. We provide several conditions under which the latter equilibrium exists (Propositions 3 and 4). In this equilibrium, the number of rent-seekers is larger than under single ownership because taxes are now entirely devoted to producing the prize. Consequently, in this equilibrium, the number of entrepreneurs falls, the price of the production rises and the welfare of workers/shareholders falls with respect to the equilibrium level under single ownership (Proposition 5).

Finally we deal with equilibrium selection, i.e. with the question of which particular equilibrium actually occurs. With the historical interpretation in mind, we assume that when the single owner is deposed, the existing active agents vote in a provisional parliament about taxes and, thus, they select a particular equilibrium. We see that under not unreasonable conditions they select the tax that maximizes income (Proposition 6). All these results point out that the existence of a parliament is not a sufficient condition for promoting the relative size of the productive sector.

Summing up, in our model, the existence of a parliament is neither a necessary, nor a sufficient condition for rent-seeking to vanish. Moreover the size of rent-seeking might be larger under corporate governance, where nobody has intrinsic taste for rent-seeking, than under single ownership where the owner likes rent-seeking per se. Of course, our results are based on a particular model. We do not know if a change in our assumptions on the nature of taxes or rent seeking activities, etc., would produce similar results. Thus, the best way of looking at our result is that it is a robust counterexample to the theory that parliament and productive activities go hand by hand.

Finally, in our paper, neither external competition, nor incentives play any role. Without denying the importance of these two forces in shaping the nature of organizations the paper is written in the belief that internal conflict is also an important determinant of the shape of organizations. Of course all our conclusions are provisional, until a model with all the necessary ingredients is developed.

The paper is organized as follows. Sections 2 and 3 deal with the model and the results that are derived from it. The paper ends with a section of conclusions which comments on our assumptions and offers some suggestions for future research.

2. The Model

The organization produces two kind of goods: The good that is subject to rent-seeking, that we will call the prize (a position in the board of directors/a duchy) and the differentiated good produced by the organization. There is a sole input (labor/money) whose price is normalized to one.

The owner (absolute king) collects revenues from the productive units by means of a tax on output. In the case of a firm we might think of this tax as a royalty fee for the transfer of technology to the divisions. See the final section for a discussion of this assumption. Let t be the tax rate. The owner transforms part of taxes in the prize.³

There are N active agents who either organize the production inside the organization, call them entrepreneurs, or become rent-seekers.⁴ Suppose that there are m entrepreneurs (later on we will explain how m is determined). Each entrepreneur produces a differentiated good and faces an inverse demand function of the following form,

³The single owner can be thought of an aggregate of many shareholders with identical tastes.

⁴In our model only the owner can set taxes. For a model where active agents can set taxes too see Rosenthal (Bates et alia, [1998]).

$$p_i = a - b(x_i + \theta \sum_{j \neq i} x_j)^\alpha - t, \text{ with } a \geq 0, \alpha > -1, b\alpha > 0, \text{ and } 0 \leq \theta \leq 1.$$

θ measures the degree of product differentiation. The slope of the demand function is determined by the sign of $-ab$ and thus, it is negative. The parameter α is a measure of the curvature of demand function (inverse demand function is concave iff $\alpha \geq 1$). b is an inverse measure of the size of the market since the maximum consumption of the good obtains when $x_i = ((a - t)/b)^{\frac{1}{\alpha}}$. Notice that if $\alpha = 1$ and $b > 0$, the inverse demand function is linear and if $a = 0, b < 0, \alpha < 0$, the demand function is isoelastic with elasticity $-\alpha$.

There are two interpretations of the model. Under partial equilibrium, these demand functions are exogenously determined. This interpretation fits into the firm model. Under general equilibrium, these demand functions are derived from the maximization of utility of a representative worker who supplies labor, pays taxes and consumes the goods produced.⁵ This interpretation fits better in the model of a kingdom.

⁵If, for simplicity, we assume that the product is homogeneous, the preferences of the worker are representable by the following utility function:

$$u = ax - \frac{bx^{\alpha+1}}{\alpha+1} - l, \text{ where } x \equiv \sum x_i \text{ and } l \text{ is leisure.}$$

The budget constraint is $px + tx = l$. The first order condition of utility maximization yields the function in the main text (second order condition holds since $-bw\alpha x^{\alpha-1} < 0$).

Each entrepreneur has access to assets (i.e. technology) that allow him to convert one unit of the input in $1/g$ units of product. Thus, $1/g$ is the productivity of the input in the productive sector. We will assume that $(a - g)/b > 0$. In the linear case it means that the marginal cost is below the maximum price that the worker is willing to pay. In the isoelastic case, it means that the marginal cost is positive.

If entrepreneur i produces x_i and competitors produce $\sum_{j \neq i} x_j$, profits for i , denoted by B_i , are:⁶

$$B_i \equiv (a - b(x_i + \theta \sum_{j \neq i} x_j)^\alpha - t - g)x_i$$

We assume that collusion possibilities are exogenous. Firm i maximizes $B_i + \gamma \sum_{j \neq i} B_j$, $0 \leq \gamma \leq 1$. If $\gamma = 0$ the entrepreneurs act independently (i.e. the firm is divisionalized). If $\gamma = 1$ aggregate profit equals individual profit and the production sector is a team. Notice that the tax can also be interpreted as the revenue raised by the headquarters of the organization as a percentage of direct costs, a standard practice among diversified corporations.

⁶If this model is interpreted as a general equilibrium model, profits are spent in the market for the numeraire good, i.e., labor is used either as domestic services or to produce domestically a good consumed by entrepreneurs.

We assume that firms are quantity-setters. First order conditions (FOC) of profit maximization for $i = 1, 2, \dots, m$ are

$$a-t-g-b(x_i+\theta \sum_{j \neq i} x_j)^\alpha - \alpha b(x_i+\theta \sum_{j \neq i} x_j)^{\alpha-1} x_i - \gamma \alpha b \theta \sum_{j \neq i} x_j (x_j + \theta \sum_{r \neq j} x_r)^{\alpha-1} = 0,$$

It can be shown that second order conditions hold and the system of FOC has only symmetric solutions. At the unique equilibrium, output and prices are

$$x_i = \left(\frac{(a-g-t)(1+\theta(m-1))^{1-\alpha}}{b(1+\theta(m-1)+\alpha(1+\gamma\theta(m-1)))} \right)^{\frac{1}{\alpha}}. \quad (2.1)$$

$$p_i = \frac{\alpha(a-t-g)(1+\gamma\theta(m-1))}{1+\theta(m-1)+\alpha(1+\gamma\theta(m-1))} + g. \quad (2.1')$$

We see that $a-g$ is a measure of the profitability of production. Since equilibrium is symmetric, let us denote the market price by p . Tedious calculations show that the degree of monopoly $(p-g)/p$ is decreasing with m . Thus an increase in the number of rent-seekers ($= N-m$) increases the degree of monopoly.

Let $n (= N-m)$ be the number of rent-seekers. Let V be the value that they attribute to the prize. Rent-seekers must exert effort in order to attract the attention of the owner. Let G_i be the effort (time spent nearby the owner, cost of

banquets, etc.) made by the rent seeker i . The probability that i gets the prize is

$$\sigma_i = \frac{G_i^\epsilon}{\sum_{j=1}^n G_j^\epsilon}, \quad \epsilon \in [0, 1].$$

The parameter ϵ is a measure of the responsiveness of σ_i to efforts.⁷ If $\epsilon = 0$, $\sigma_i = 1/n$. If $\epsilon = 1$ we have the function proposed by Tullock (1980). σ_i can also be interpreted as the fraction of the prize obtained by i .

We assume that effort has a cost $C_i = cG_i$, $c > 0$. Thus, payoffs for i are

$$\Pi_i = \frac{G_i^\epsilon}{\sum_{j=1}^n G_j^\epsilon} V - cG_i.$$

Given V and n each rent-seeker chooses effort in order to maximize payoffs taken as given the effort of other rent-seekers. FOC of payoff maximization are

$$\frac{\epsilon G_i^{\epsilon-1} \sum_{j=1}^n G_j^\epsilon - \epsilon G_i^{\epsilon-1} G_i^\epsilon}{(\sum_{j=1}^n G_j^\epsilon)^2} V = c, \quad i = 1, 2, \dots, n.$$

It is easy to see that the second order condition holds and that the system above

⁷See Pérez-Castrillo and Verdier (1992).

only includes symmetrical solutions.⁸ This yields,

$$G_i = \frac{\epsilon(n-1)V}{n^2c}. \quad (2.2)$$

$$\Pi_i = \frac{V(n - \epsilon(n-1))}{n^2}. \quad (2.2')$$

The owner is the producer of the prize. His utility function is $U = (\sum_{i=1}^n G_i)^\beta C^{1-\beta}$, $0 < \beta \leq 1$ where C is his consumption of the numeraire.⁹ We assume that the prize is produced from the input under constant returns to scale. Let $e (> 0)$ the marginal (and average) productivity of the input in the production of the prize. An interpretation is that the prize consists of the value of the input plus the prestige given by the status achieved with the prize. In this case, $e > 1$ reflects the value added by the status.¹⁰ Also e reflects the degree of law enforcement of the laws that provide a legal cover for the prize owner.

Taxes can be spent either on C or in the production of the prize. Hence $C + V/e = T$. Taxes are set by the owner. The maximization of his utility can be

⁸The introduction of collusion among rent-seekers does not change the results significantly. For instance if each rent-seeker maximizes $\Pi_i + \eta \sum_{j \neq i} \Pi_j$, $0 \leq \eta \leq 1$, we have that the equations in the main text hold with ϵ substituted by $\epsilon(1 - \eta)$.

⁹In the case of an absolute king, labor consumption can be interpreted as domestic services and/or domestic production performed by the worker.

¹⁰Thus, in the case of a kingdom the prize may be a duchy that is just an amount of labor allocated to the Duke plus the prestige given by this title. For the sale of titles against revenue in England in the early XVII century see North and Weingast (1989), p. 811.

made in two steps. First the owner maximizes T and, later on he decides how to divide his income between C and V .

Let us first analyze the maximization of T . We assume that when the owner maximizes T he assumes that the number of rent seekers is given. In the kingdom model, this may be interpreted as saying that agents can not change occupation, only the descendents -perhaps involving an adequate marriage. Under this interpretation agents are families. In the location interpretation, this assumption can be motivated by the fact that entrepreneurs and rent-seekers live in different parts of the country and that relocation is costly. In the model of a firm, the assumption means that changing profession involves a high transaction cost. In any case, the decision to enter one of the two activities is a long run decision that is not influenced by changes in the tax rate. Given that $T = t \sum_{i=1}^m x_i$, we get

$$T = t \left(\frac{(a - g - t)(1 + \theta(m - 1))^{1-\alpha}}{b(1 + \theta(m - 1)) + \alpha(1 + \gamma\theta(m - 1))} \right)^{\frac{1}{\alpha}} m.$$

The above equation is the Laffer curve of our economy. Maximization of T amounts to choose a $t \in [0, a - g]$ in order to maximize $t \left(\frac{a - g - t}{b} \right)^{\frac{1}{\alpha}}$ ($t \leq a - g$ because production must be non-negative, see (2.1)). Given that the objective function is continuous and t belongs to a compact set, the maximum exists. Clearly, this

maximum can not be located at the extremes, where $T = 0$. So the maximum must be located at FOC, i.e.

$$(a - g - t)^{\frac{1}{\alpha}} \left(1 - \frac{tb}{\alpha b(a - g - t)}\right) = 0.$$

There is only one value of t that solves the previous equation and yields positive revenue, namely

$$t^* = \frac{\alpha(a - g)}{1 + \alpha}. \quad (2.3)$$

Notice that t^* belongs to $[0, a - g]$ because $t^* > 0$ since $\alpha b > 0$ and $\frac{a-g}{b} > 0$ and $t^* < a - g$ because $\alpha/(1 + \alpha) < 1$. Denote by \bar{T} the taxes levied.¹¹ Now let us turn to the distribution of \bar{T} between consumption of the numeraire and the prize. We assume that the owner correctly anticipates the efforts made by rent-seekers as a function of V and hence $U = (\sum_{i=1}^n G_i)^\beta C^{1-\beta} = (\frac{\epsilon(n-1)V}{nc})^\beta (C)^{1-\beta}$. Thus, the utility function can be re-written as $U = V^\beta C^{1-\beta}$. The maximization of utility given \bar{T} yields $C = \bar{T}(1 - \beta)$ and $V = e\beta\bar{T}$.

Finally, we assume that active agents can freely enter into rent-seeking or

¹¹It can be shown that

$$\bar{T} = \frac{\alpha(a - g)}{1 + \alpha} \left(\frac{(a - g - t)(1 + \theta(m - 1))^{1-\alpha}}{b(1 + \alpha)(1 + \theta(m - 1)) + \alpha(1 + \gamma\theta(m - 1))} \right)^{\frac{1}{\alpha}} m.$$

production activities. However, once they have entered in an activity, this choice can not be reversed. Assuming for simplicity that n and m are real numbers, free entry implies that

$$B_i = \Pi_i. \tag{2.4}$$

Now we can write the definition of an equilibrium:

Definition 1: *A single ownership organization is in equilibrium if:*

1. *No active agent wants to switch occupation, i.e., (2.4) holds for $n+m = N$.*
2. *Given n and m , the owner maximize tax revenues, i.e. (2.3) holds.*
3. *Given n and V , rent-seekers maximize payoffs, i.e. (2.2) holds.*
4. *Given t and m , the product market is in equilibrium, i.e. (2.1) holds.*

The game is played in three stages. In the first, active agents decide if they produce or become rent-seekers. In the second, the owner maximizes revenues and builds the prize. In the last stage, the prize is allocated and production takes place. The equilibrium of the single ownership is a subgame perfect equilibrium where, in each moment agents assume that other agents will act optimally in the rest of the game.¹²

Consider now corporate governance. Here there is a parliament (board of

¹²If the model is interpreted as a general equilibrium model, since Walras law holds, the market for the numeraire good is in equilibrium as well.

directors) that is composed of all active agents that decide the tax rate by majority voting. The owner is now a constitutional king (a CEO). He receives an stipend that for simplicity we assume is zero. As before, there is a prize, which is produced by the input and this prize is awarded by means of a lottery.¹³ In this set up, rent-seeking is organized by the rent-seekers and efforts are wasted.¹⁴

The new equilibrium is defined as follows:

Definition 2: *A corporate governance organization is in equilibrium if:*

1. *No active agent wants to switch occupation, i.e., (2.4) holds for $n+m = N$.*
2. *Given n and m , the parliament decides about t by majority voting.*
3. *Given n and V , rent-seekers maximize payoffs, i.e. (2.2) holds.*
4. *Given t and m , the product market is in equilibrium, i.e. (2.1) holds.*

This new equilibrium is identical to that of a single ownership except that taxes are voted by the parliament.

¹³Another interpretation is that taxes are devoted to producing a good that is exported and the mechanism by which the production is assigned is regarded as random by rent-seekers.

¹⁴Another interpretation is that the owner is still able to receive efforts of rent-seekers and to assign the prize provided the parliament has voted on the necessary taxes. Under this interpretation, the owner is still as an organizer of rent-seeking but his consumption is severely limited with respect to what he enjoyed under single ownership.

3. Results

Our first result is the following:

Proposition 1: *There is a unique equilibrium for the single ownership.*

Proof: Since $B_i = (p - g)x_i$, equations (2.2') and (2.4) imply that

$$(p - g)x_i = \frac{e\beta t x(n - \epsilon(n - 1))}{n^2} \text{ or } n^2(p - g) = e\beta t(n - \epsilon(n - 1))m.$$

Since $t^* = \frac{\alpha(a-g)}{1+\alpha}$, from (2.1') we obtain that

$$\frac{t^*}{p - g} = \frac{1 + \theta(m - 1)}{1 + \gamma\theta(m - 1)} + \alpha.$$

Simplifying and taking into account that $m = N - n$,

$$\frac{n^2}{e\beta(n(1 - \epsilon) + \epsilon)} - \frac{(N - n)(1 + \theta(N - n - 1))}{1 + \gamma\theta(N - n - 1)} - \alpha(N - n) = 0. \quad (3.1)$$

The left hand side of (3.1) is positive for $n = N$ and negative for $n = 0$. Hence, there is a value of n such that (3.1) holds. Such value is unique since the left hand side of (3.1) is strictly increasing in n . Given this value of n , the equilibrium values of x_i and G_j are determined by equations (2.1) and (2.2). ■

The previous equilibrium, can be regarded as a fixed point of a dynamic process in which the rate of change in the number of entrepreneurs is an increasing function of the difference between B_i and Π_i . Let

$$\frac{dm}{dt} = h(B_i - \Pi_i)$$

where $h()$ is sign-preserving. Now, we have the following:

Proposition 2: *The equilibrium of the single ownership is globally stable.*

Proof: In the proof of Proposition 1 it was shown that $B_i - \Pi_i$ was increasing in n , and so it is decreasing on m . Since $h()$ is sign preserving it follows that $\frac{dm}{dt}$ is a decreasing function of m and this proves the result. ■

Once we know that equilibrium is unique and stable we can embark upon the job of analyzing the determinants of the relative size between rent-seeking and productive activities. A measure of this size is the ratio between V and aggregate production denoted by $x \equiv \sum_{i=1}^m x_i$. This ratio will be denoted by u .

$$u \equiv \frac{V}{x} = \frac{e\beta t^* x}{x} = e\beta t^* = e\beta \frac{\alpha(a-g)}{1+\alpha} = \frac{e\beta\alpha b}{1+\alpha} \frac{a-g}{b}. \quad (3.2)$$

Notice that the determinants of u (the relative size of rent-seeking) and n (the

number of rent-seekers) are different. The latter is determined in (3.1) above. By plotting the values of the equation (3.1) against n and shifting the curve according to the changes in the parameters we see that n depends positively on e , β , α , θ and N and negatively on γ and ϵ . Notice that n is independent of a , b , c and g . But u depends on $e\beta$, α and $(a - g)$ and is independent of ϵ , γ , θ , b , N and c , see (3.2) above. The effects of e and β are what we expect: For instance a decrease in e (i.e. a decrease in the enforcement of the law that provides a legal cover to rent-seeking), decreases the relative size of it. However the effects of α and $(a - g)$ on u are not that intuitive:

$$\frac{du}{d\alpha} = \frac{\alpha b e \beta}{(1 + \alpha)^2} \frac{a - g}{\alpha b} > 0 \Leftrightarrow \alpha > 0 \Leftrightarrow b > 0.$$

$$\frac{du}{d(a - g)} = \frac{e \beta \alpha}{1 + \alpha} > 0 \Leftrightarrow \alpha > 0 \Leftrightarrow b > 0.$$

The effect of α on u depends on the impact of α on t^* since $u = e\beta t^*$. Under isoelastic demand ($\alpha < 0$) an increase of α reduces u because this change makes the demand curve more elastic and this makes it more difficult to extract taxes: If $b > 0$ an increase in α makes demand less elastic and this increases the possibilities for levying taxes and the possibilities to finance rent-seeking. The explanation of the effect of $(a - g)$ on u follows the previous lines because the effect of $(a - g)$ over

u takes the same sign as the effect of $(a-g)$ on t^* since $u = e\beta t^*$. The bottom line is that the effect of technological progress on u can not be forecasted unless we have a good estimate of the form of demand functions.¹⁵ It is perfectly possible that technical progress reduces or increases rent-seeking. The latter effect is similar to what is called the "Dutch disease" in which an increase in endowments lowers income because it increases rent-seeking (Baland and Francois (2000) and Torvik (2002)). All these findings are recorded in the following remark:

Remark 1: *In the equilibrium of the single ownership:*

a) n depends positively on $e, \beta, \alpha, \theta,$ and N , negatively on γ and ϵ and is independent of a, b, c and g .

b) u depends positively on e and β , is independent of $\epsilon, \gamma, \theta, b, c$ and N and

$$\text{sign } \frac{du}{d\alpha} = \text{sign } \frac{du}{d(a-g)} = \text{sign } \alpha = \text{sign } b$$

Let us now turn our attention to corporate governance. Under this regime active agents vote the tax rate. Rent-seekers have single peaked preferences with a maximum at $t = t^*$. Entrepreneurs have also single-peaked preferences with the maximum at $t = 0$. Hence the largest group will impose its most preferred policy.

¹⁵According to North (1981, p. 166), productivity increased steadily in the 150 years that preceded industrial revolution.

Remark 2: *If $N > 2$, $m = N$ and $t = 0$ is an equilibrium of corporate governance.*

The proof is obvious: If only entrepreneurs exist, the parliament votes on a tax rate of zero and no entrepreneur would like to switch to rent-seeking because he would not affect the decision on the tax rate and the prize does not exist.

Let us now study the possibility that rent-seeking exists under corporate governance. If it does, rent-seekers must be a majority in the parliament in order to impose a positive tax. And if they are such a majority, t^* will result. In this case, the number of rent-seekers is determined by (3.1) with $\beta = 1$. This equation is difficult to solve in general, so we will consider two extreme cases: no collusion ($\gamma = 0$) and full collusion ($\gamma = 1$).

Firstly, let us assume that entrepreneurs do not collude. This is appropriate for the example of a kingdom or for a divisionalized firm.

Proposition 3: *Suppose $\gamma = 0$. Under the following conditions there is an equilibrium in which $t = t^*$.*

$$\mathbf{a)} \quad e\theta > 1 \text{ and } N > \frac{2e(\theta - \alpha + 1)}{e\theta - 1}.$$

$$\mathbf{b)} \quad e\theta < 1 \text{ and } N < \frac{2e(\alpha - \theta - 1)}{1 - e\theta}.$$

c) $e\theta = 1$ and $1 + \alpha > \theta$.

Proof: For the time being take $\epsilon = 1$. Write (3.1) with $\beta = 1$, and $\gamma = 0$ as $n^2 = e(N - n)(1 + \theta(N - n - 1) + \alpha)$. Rearranging this equation we obtain that, $n^2(1 - \theta e) + e(2N\theta + 1 - \theta + \alpha)n - (\theta N^2 + N - \theta N + \alpha N)e = 0$. If $e\theta \neq 1$,

$$n = \frac{-e(2N\theta + 1 - \theta + \alpha) + \sqrt{e^2(2N\theta + 1 - \theta + \alpha)^2 + 4(1 - \theta e)(\theta N^2 + N - \theta N + \alpha N)e}}{2(1 - e\theta)}$$

Tedious algebra shows that $2n > N$ iff $2e(\alpha - \theta + 1) > N(1 - \theta e)$. Parts a) and b) follow from that. If $e\theta = 1$ (3.1) reads $(2N\theta + 1 - \theta + \alpha)n = \theta N^2 + N - \theta N + \alpha N$. In this case, $2n > N$ iff $1 + \alpha > \theta$. In all these cases the parliament is dominated by rent-seekers and voting yields a tax rate that maximizes T , i.e. $t = t^*$.

Finally, let $\epsilon < 1$. As we noticed in Remark 1 part a) n is a decreasing function of ϵ . Thus if $\epsilon < 1$ the number of rent-seekers increases in relationship with those in the case $\epsilon = 1$ and the previous result holds a fortiori. ■

Proposition 3 states three sufficient conditions for the parliament to be dominated for rent-seekers.¹⁶ The most interesting case is a). This case holds if the marginal productivity of the input in the production of the prize times the pa-

¹⁶These conditions are only necessary when $\epsilon = 1$. For instance, if $\epsilon = 0$, it is easily calculated from (3.1) that when N is large the parliament is almost exclusively populated by rent-seekers.

parameter that measures product differentiation is larger than one and N is large.

The case in which agents collude in the production sector is different from the previous case. In the latter, profits of entrepreneurs and rent-seekers go to zero at similar rates. In the former, market price does not tend to marginal costs, see equation (2.1'), and the gains of rent-seeking are exhausted at a faster rate than those of producing. Therefore, the relative profitability of production attracts many active agents and, for large values of N , the parliament is composed almost exclusively by entrepreneurs. For instance if $\gamma = \epsilon = 1$ it is easily calculated from (3.1) with $\beta = 1$ that rent-seekers are a majority iff $N < 2e(1 + \alpha)$. If we think of N as the number of seats in the board of directors -between 15 and 25 in most countries- that inequality requires quite high values of e and α . However if $\gamma = 1$ but $\epsilon = 0$, similar calculations show that rent-seekers are a majority iff $e(1 + \alpha) > 1$ which looks reasonable. Our next proposition studies the case of $\gamma = 1$ in general. This scenario is appropriate for a non-divisionalized firm.

Proposition 4: *Suppose that $\gamma = 1$. The following conditions are necessary and sufficient for the existence of an equilibrium in which $t = t^*$*

$$\mathbf{a)} \quad e(1 + \alpha)(1 - \epsilon) \geq 1 \text{ and } \epsilon > 0.$$

$$\mathbf{b)} \quad e(1 + \alpha)(1 - \epsilon) < 1 \text{ and } N < \frac{2e\epsilon(1 + \alpha)}{1 - e(1 + \alpha)(1 - \epsilon)}$$

Proof: Write (3.1) with $\beta = \gamma = 1$ as $n^2 = (1 + \alpha)(N - n)e(n(1 - \epsilon) + \epsilon)$, or $(1 + (1 + \alpha)e(1 - \epsilon))n^2 - e(1 + \alpha)(N(1 - \epsilon) - \epsilon)n = eN(1 + \alpha)\epsilon$.

Solving this equation we obtain that

$$n = \frac{e(1 + \alpha)(N(1 - \epsilon) - \epsilon) \pm \sqrt{(e(1 + \alpha)(N(1 - \epsilon) - \epsilon))^2 + 4(1 + (1 + \alpha)e(1 - \epsilon))eN(1 + \alpha)\epsilon}}{2(1 + (1 + \alpha)e(1 - \epsilon))}$$

Tedious algebra shows that $n > N/2$ if and only if $N(1 - e(1 + \alpha)(1 - \epsilon)) < 2e\epsilon(1 + \alpha)$. ■

Summing up, the conditions under which rent-seekers dominate the parliament depend on the degree of collusion but the general principle is clear: When e and N are large such an equilibrium exists. If e is small, N should be small too.

We now study other properties of this kind of equilibrium.

Proposition 5: *When the parliament is dominated by rent-seekers:*

a) *The number of rent-seekers is never smaller and the price of output never lower than under absolute monarchy.*

b) *If $\beta < 1$ the number of rent-seekers is larger and the price of output higher than under absolute monarchy.*

Proof: Consider again equation (3.1). By Remark 1 part a), n is an increasing function of β . Since the only difference between single ownership and corporate governance when the parliament is dominated by rent-seekers is that in the latter $\beta = 1$, the result about n follows. The result about the price of output follows from the fact that the price of output is decreasing in m and increasing in n . ■

The logic behind Proposition 5 is clear: when a parliament is dominated by rent-seekers, all taxes are spent in building the prize, so the size of it increases and this attracts more rent-seekers. This implies a decline in productive activities and hence the price of the output increases. An important consequence of this is that the welfare of workers under a parliamentary monarchy dominated by rent-seekers *is never larger* than what they enjoyed under absolute monarchy.¹⁷ It may be argued that this result is an artifact of our assumption that under corporate governance all taxes are spent in the prize. However, this assumption can be interpreted more broadly. For instance, if a king is deposed and his property sold in auction, there is an extra incentive to be a rent-seeker.¹⁸

¹⁷This is in tune with the Marxist belief that workers had very little to gain with a burgeoise regime.

¹⁸This may shed some light on the fact that in XIX century Spain, too much effort and attention was spent on the court. The explanation may be that at this time the property of the church and town halls was auctioned and this provided an extra incentive to become a rent-seeker. The role of rent-seeking activities in the slow development of Spain in the XIX and beginning of the XX century is studied in Fraile (1991).

With respect to relative size of rent-seeking activities under parliament rule, denoted by u' we see that it is determined by equation (3.2) with $\beta = 1$, or

$$u' \equiv \frac{V}{x} = \frac{et^*x}{x} = et^* = e \frac{\alpha(a-g)}{1+\alpha} = \frac{eab}{1+\alpha} \frac{a-g}{b}. \quad (3.3)$$

We see that the elasticity of u' with respect to e , $\alpha/(1+\alpha)$, and $(a-g)$ is identical to the elasticity of u with respect to the same variables.

We end this section by studying the problem of which equilibrium is more likely to occur, i.e. the equilibrium selection. We will assume that when the single owner is deposed, a provisional parliament forms. This parliament is composed by the entrepreneurs and rent-seekers under the previous regime. They vote on taxes.¹⁹ Our result is:

Proposition 6: *Under the following conditions the provisional parliament selects the equilibrium in which $t = t^*$.*

$$\text{i) } \gamma = 0, \beta e\theta > 1 \text{ and } N > \frac{2\beta e(\theta - \alpha + 1)}{\beta e\theta - 1}.$$

¹⁹Another possibility is that the parliament is dominated by workers. For instance, assuming for simplicity that $\theta = \gamma = 1$, that those working in the production of the prize will support rent-seeking activities and those working in the production of the output will support no taxes, and that votes are proportional to the number of hours spent in each sector, the first group obtains majority iff $2\alpha\beta(a-g) > (1+\alpha)g$. In the linear case this amounts to $a\beta > g(1+\beta)$ and in the isoelastic case to $-\alpha(2\beta+1) > 1$. In any case, it seems that the chances for the equilibrium in which rent-seekers dominate are not slim.

$$\text{ii) } \gamma = 0, \beta e\theta < 1 \text{ and } N < \frac{2\beta e(\alpha - \theta - 1)}{1 - \beta e\theta}.$$

$$\text{iii) } \gamma = 0, \beta e\theta = 1 \text{ and } 1 + \alpha > \theta.$$

$$\text{iv) } \gamma = 1, e\beta(1 + \alpha)(1 - \epsilon) \geq 1 \text{ and } \epsilon > 0$$

$$\text{v) } \gamma = 1, e\beta(1 + \alpha)(1 - \epsilon) < 1 \text{ and } N < \frac{2e\epsilon(1 + \alpha)}{1 - e\beta(1 + \alpha)(1 - \epsilon)}$$

Proof: Notice that e and β enter as a product in (3.1). Thus, all the reasonings made in Propositions 3 and 4 can be made with e substituted by βe . Then, under the above conditions, the number of rent-seekers under single ownership is larger than $N/2$ and voting will lead to a tax rate of t^* . ■

Notice that the number of rent-seekers in the parliament will change in the following periods. Remember that

$$\frac{dm}{dt} = h(B_i - \Pi_i)$$

where $h(\cdot)$ is sign-preserving. If the parliament selects zero taxes, $\frac{dm}{dt} > 0$ and the number of rent-seekers decreases steadily. In this case we approach asymptotically the equilibrium in which rent-seeking does not exist. However, if the parliament chooses a tax rate of t^* , by Proposition 5, the equilibrium number of rent-seekers

(determined by equation (3.1) with $\beta = 1$) exceeds the actual number (determined by equation (3.1)). Given that $B_i - \Pi_i$ is decreasing on m , and that in equilibrium $B_i = \Pi_i$ this implies that $\frac{dm}{dt} < 0$, so we approach asymptotically the equilibrium studied in Propositions 3 and 4.²⁰

4. Conclusion

The main conclusion of this paper is that the existence of a parliament is neither a necessary nor sufficient condition for the decline of rent-seeking; It is perfectly possible that technical progress makes the levy of taxes more difficult, making the finance of rent-seeking activities increasingly difficult (Remark 1, part b)), and that the parliament might be dominated by rent-seekers (Propositions 3 and 4). In this case, the number of rent-seekers increases under corporative governance (Proposition 5). Finally, the provisional parliament, may select the equilibrium in which rent-seekers dominate (Proposition 6). Our paper also clarifies that the determinants of the number of rent-seekers (n) and the relative size of the rent-seeking sector (u) are different. For instance parameters like ϵ or c affect the number of rent-seekers under a single owner but do not affect the relative size of

²⁰”Organizational types generally originate rapidly in a relatively short historical period, to grow and change slowly after this period” (Stinchcombe [1965]).

rent-seeking.

From the historical point of view our conclusions cast doubts on the belief that the parliament ”..controls over the exercise of arbitrary and confiscatory power by the Crown”, North and Weingast (1989), p. 804. As these authors recognize, ”the triumph of Parliament raises the issue of why it would not then proceed to act just like the king” (ibid. p. 817). In the case of the parliament subsequent to the Glorious Revolution of 1688 some answers are: 1) That ”Parliament represented wealth holders” i.e. it was not dominated by those living on taxes (ibid, p. 804). 2) The relative cost of rent-seeking under Parliament is substantially larger than under absolute monarchy (Ekelund and Tollinson [1981], p. 149. 3) The increasing difficulty of providing enforcements of the laws that protected rent-seekers (Tullock [1992]).

All these factors can be seen in our model: The importance of the number of rent-seekers in the provisional parliament (Proposition 6) and the role of ϵ (the effectiveness of efforts in rent-seeking) and e (the productivity in the production of rent-seeking) in the conditions for the existence of a parliament dominated by rent-seekers (Propositions 3 and 4).²¹

From the point of view of the theory of the firm, our main conclusion is that

²¹Stasavage (2000) adds to the list the composition and the rules of parliaments.

we can model corporate governance without any role for mechanism design and explain the compensations obtained by executives as the surplus obtained either in the production sector or in the rent-seeking business. In our approach, there is an internal balance between rent-seekers managers and entrepreneur managers. Even if those in the first category dominate the board of administration, a situation in which "top management may decide that collusion and expropriation of the security holder wealth are better than competition among themselves" (Fama [1980]) is unlikely as long as there are productive opportunities inside the firm.

A key assumption in our model is that the single owner or the parliament can only extract surplus of productive activities by means of a tax on output. However, very often, corporations extract a large part of the profits made by divisions (out of payments to the shareholders). In this case total revenues are $tx + \delta(p - g)x$, where δ is the fraction of profits that are transferred to the center. It can be shown that in this case the optimal tax is

$$t^* = \frac{(a - g)(\alpha(1 - \delta K) - \delta K)}{(1 - \delta K)(1 + \alpha)}, \text{ where } K \equiv \frac{\alpha(1 + \gamma\theta(m - 1))}{1 + \theta(m - 1) + \alpha(1 + \gamma\theta(m - 1))}$$

Also, it is easily calculated that

$$\frac{t^*}{p-g} = \frac{\alpha - \delta K(1 + \alpha)}{K}$$

which, like the corresponding expression in the proof of Proposition 1, it is decreasing on K . Therefore the qualitative features of equation (3.1) are preserved and Propositions 1 and 2 hold in this framework. Moreover, u remains as in the main text because

$$u \equiv \beta e(t^* + \delta(p-g)) = \beta e(t^* + \delta K(a-g) - \delta K t^*),$$

$$\text{and since } t^*(1 - \delta K) = \frac{(a-g)(\alpha(1 - \delta K) - \delta K)}{1 + \alpha}, \quad u \equiv \frac{\beta e(a-g)\alpha}{1 + \alpha}.$$

Thus, the findings in Remark 1 still hold in this framework. Unfortunately, the conditions under which Propositions 3, 4 and 6 hold become too complicated to shed light on the problem. All we can say is that the analysis made in the main text is a good approximation when δ is close to zero because in this case the key ratio $t^*/(p-g)$ is approximately α/K , and equation (3.1) holds approximately. Of course, Remark 2 and Proposition 5 still hold.

We end the paper by suggesting some avenues of research.

1: We have assumed that the degree of collusion is independent of the number of agents. However, the literature on supergames suggests that both variables are related (see, e.g. Shapiro (1989) for a survey). It would be interesting to have a model where collusion is an endogenous variable, determined simultaneously with the other variables of the model. The same can be said about the degree of divisionalization.

2: The introduction of risk in the model would allow for cases in which, because events turn out to be unfavorable, bankruptcy occurs. In the case of a corporation, this may lead to the discovery of the unpleasant fact that part of the corporation was living on money that, in principle, belonged to the shareholders, with the corresponding legal consequences.

3. In a dynamic context, it is not clear how the single owner can sustain his standard of living if, in each period, he has to cede part of his property. This suggest that this kind of regime might be not sustainable in the long run, unless a continuous inflow of new resources are poured into the system.²²

4: In our model rent-seekers do not perform any productive activity. However, it would be interesting to model rent-seeking as done by actual entrepreneurs to stop competition.

²²I owe this point to Juan Carmona.

5: About 300 years ago, most organizations in Europe were run by single owners, i.e. firms, families, university departments and countries. Many of these organizations in our present time use voting to some degree. It would be very interesting to investigate if the emergence and eventual dominance of voting procedures in many organizations in our present day societies have a common explanation.

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