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THE TYRANNY OF THE INEFFICIENT: AN ENQUIRY INTO THE ADVERSE CONSEQUENCES OF POWER STRUGGLES

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ABSTRACT

Life is replete with instances where two closely related parties forego mutually advantageous opportunities: peace treaties are not signed, inefficient regulations are not altered, and possibilities for investment are frittered away. Since the parties are in close contact, asymmetric information cannot be an explanation for the failure to agree. The explanation this paper offers is based on the assumption that when two parties interact repeatedly, not all aspects of the relationship are contractible. Each party's property rights in the relationship then become endogenous. Efficiency and distribution are not separable in such a world, leading the parties to forego perfectly contractible opportunities. The inability to cooperate is especially severe when one of the parties has relatively poor production opportunities which may explain why the inefficient have undue sway. We explore a number of applications.

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We observe many instances where two parties fail to reach a mutually beneficial agreement even when there are simple contracts and side transfers that would implement it. Consider, for instance, a dispute over territory between different ethnic or national groups. A simple auction for the contested territories with accompanying side payments should be able to achieve the first best. So why do so many wars occur, devastating the territory being fought over, and making the victor and vanquished both worse off? Similarly, there are many examples of inefficient regulations that are not repealed, or efficient legislation that is not enacted. For instance, oil field unitization (see later for details) increases oil recovery by two to five times compared to unconstrained production, in addition to saving the costs of unnecessary wells.[1] Nevertheless, according to Libecap and Wiggins (1985), Texas had no law mandating unitization because of the opposition of small drillers. Why did the small and inefficient drillers prevail even though it seemed quite possible for the larger drillers to buy them off?

Of course, it is possible to attribute some inefficiency to emotions such as fear, hatred, and jealousy. But these are usually momentary individual feelings. Many inefficiencies, however, survive both aggregation and time. And they extend beyond the obvious realms of stupidity and passions, into the cerebral cloisters of academia. For example, in March 1995, Yale University returned a $20 million gift from a wealthy alumnus rather than honor his request that the money be used for a course of studies in Western civilization. The apparent motive for this surprising decision was Yale's desire to limit the size of the Western civilization department. Even accepting the stated objective at face value, the outcome appears to be inconsistent with the Coase theorem. Possible contracting costs appear trivial relative to the size of the gift, and it should have been easy to design side transfers that would implement a Pareto-superior outcome. Why could the various departments of the university not negotiate a mutually beneficial agreement that would allow them to take advantage of the donation?

One could argue (though less and less convincingly nowadays) that universities are non-profit institutions, isolated from the market for corporate control and, thus, not forced to be efficient. But similar examples are quite common also among large business organizations.

[1] These figures are from Libecap and Wiggins (1985), who report an Oil Weekly estimate. They also cite the example of an oil field where 427 unnecessary wells were drilled at a cost of at least $156 million because unitization was not agreed to.

According to Carroll (1993), for instance, IBM failed to develop PCs profitably after having invented them, because of the active resistance that the "mainframe people" within IBM posed to the growth of the personal computer group, which they saw as a potential threat to their internal power (see Carroll, 1993).[2] Why was a mutually beneficial agreement not reached between the PC division and the mainframe division?

Such violations of the Coase theorem are so common in a variety of institutional settings, that case-by-case explanations seem grossly inadequate. There are three common features in all these examples. First, there seems to be an obvious Pareto-superior outcome, which is well known to all the parties involved and which theoretically can be reached with simple contracts. Nevertheless, such an outcome it is not attained. Second, these failures occur among parties with repeated interactions; academic departments in the same university, divisions in the same firm, firms in an industry with a common regulator, or neighboring countries. This is especially surprising, because it is generally believed that informational frictions are absent in situations of repeated interaction, therefore reducing contracting costs. The third common feature is more subtle; often the parties who lose by a proposed efficient agreement (e.g., the small drillers in Texas) do not have very productive uses for resources. The inefficient appear to have disproportionate power to block or distort agreements. What explains the tyranny of the inefficient?

To outline our explanation, we have to return to Coase (1960). For the Coase theorem to apply it is necessary that contracts be easily written and enforced. When two unrelated parties bargain over an issue, the contractibility of the specific issue itself is sufficient to guarantee efficient agreements. However, in situations where the parties involved in a transaction have repeated interactions or interactions on other dimensions, the contractibility of the specific issue may not be sufficient for the Coase theorem to apply. Not only will the parties involved be concerned about the direct effects of the deal they are discussing, but also about

[2]For instance, Carroll (1993, p76) documents that the Mainframe division at IBM crippled the personal computer division's Displaywrite word processing software by requiring that it have only a limited ability to handle electronic mail. The mainframe division ostensibly wanted to protect its mainframe based electronic mail system , called PROFS, by keeping electronic mail off personal computers. But other personal computer manufacturers were already building this capability in their programs. While one cannot rule out the explanation that the mainframe division was stupidly trying to prevent cannibalization when competition was the greater threat, the primary motive may have been internal, i.e., to stop or slow down the growth in importance (and power) of the PC division.

its consequences on the rest of their relationship.

Consider for instance a peace treaty trading off money for land. Assume that the specifics of the deal are very simple and so contracting costs for this specific transaction are zero. Then, for two non-neighboring countries, all gains from trade can be exploited.

If the two countries are neighboring, however, they will not just be concerned about the swap of money for land. They will also want to be assured about the possible use the other party will make of the money and the land being exchanged. They might fear that money will be spent to buy better weapons or land be used to launch more deadly attacks. The less the productive uses the recipient of the resources has, the more likely that the compensating transfer of resources will be used in unproductive and mutually destructive ways.

In turn, this will engender matching unproductive behavior, which could wipe out any potential gains from the agreement. As a result, an agreement requires the feasibility and enforceability of a more expanded set of contracts, encompassing all the possible effects of the deal now and over time. If some of these aspects are non-contractible, then a deal which was possible between two non-neighboring states becomes impossible between two neighboring states.

Let us explore the point in greater detail. The reason the above examples may seem anomalous to economists is because economic models have typically focused on productive agents in a world where all property rights are clearly spelled out and all possible contracts can be easily written and enforced. Yet in practice, property rights are not clearly defined, even in the best policed economies. This is especially true when laws cannot govern every aspect of the repeated transactions between parties, either because the laws do not exist (e.g., between countries), because they can be changed (e.g., between competing political groups), or because courts cannot become sufficiently informed to apply them (e.g., within organizations such as families and firms). Because property rights are not clearly defined resources can be, and are, deployed to alter them.

So subunits in an organization (divisions in a firm, factions in a political party, or countries in a geographic area) typically face the choice between deploying resources in productive activities or in altering property rights (attempting to grab the fruits of the other subunit's productive activities). We term the latter "power seeking" activities. Open warfare is just the most extreme, but not necessarily the most common manifestation of this phenomenon.

Consider the following examples of power-seeking within firms: One of the authors once worked in a commercial bank with three subunits. One subunit had leased dedicated long distance telephone lines to connect its representatives in each of the bank's branches. The lines were barely used and since the subunits shared space in the branches, it would have been a simple matter for the other subunits to share access to the lines and connect their representatives also. However, the other subunits decided to lease their own lines because they felt their dependence on the first subunit would compromise their ability to bargain over other issues such as transfer prices for funds. Thus resources were wastefully deployed so that the subunits could maintain their bargaining power vis a vis the first subunit.

Power seeking within firms, however, does not only take the form of overinvestment. For instance, Shleifer and Vishny (1989) describe how managers can enhance their own bargaining power by distorting the choice of investments towards those they are the best at managing. The production process can also be altered to enhance bargaining power. Crozier (1964) describes the strategy adopted by the maintenance engineers of a French cigarette manufacturer. They destroyed all the manuals and drawings of the highly specialized manufacturing equipment they were required to maintain. While this made training new engineers much more difficult, the old engineers became irreplaceable and immensely powerful.

Finally, our notion of power seeking encompasses as special cases activities such as rent-seeking (see Tullock (1980) and the references within) or Bhagwati's directly unproductive activities. Within organizations, these activities have been studied under the rubric of influence activities (Milgrom (1988)). But our notion of power-seeking is broader than simple influence activities. Rather than simply trying to influence the powers that be, power-seeking can also be an attempt to gain, or maintain, power. In other words, power seeking is to influence activities as a revolutionary is to a courtier.

Power seeking is obviously inefficient, and by the nature of the activity, hard to contract away. But the important new point we make is that power-seeking may prevent a fully contractible profitable opportunity from being jointly exploited. We identify three reasons for this. First, the transfers required to get co-operation may generate so much additional inefficiency so as to more than offset the benefits of the transaction. Second, the action itself may bring more surplus within the sphere of power-seeking, and thus increase inefficient power-seeking. Third, the action being sought may alter the balance of power in such a way that it does not make sense for one party to help regardless of the transfers it obtains. This is because transfers can be "recaptured" by the more powerful party. We identify circumstances under which otherwise efficient agreements will be passed up because of the inefficiencies from the above three sources.

First, agreements that require large side payments relative to the size of the net benefits of the transaction are more likely to be foregone. This may explain why internal subunits cooperate much better in fast growing companies or countries (see Olson, 1982), where the efficiency consequences of every decision are much larger, than in mature organizations where the redistributional aspect dominates. It may also explain the pervasive failure of internal control systems (Jensen, 1993) in dealing with declining organizations.

Second, agreements are more difficult if the unit whose consent has to be obtained through a transfer has relatively few production opportunities. Since it has few productive outlets for resources, the transfer is used less productively. Moreover, most of the compensating payment will be spent on gaining power, forcing the other party to try to counterbalance it at a great opportunity cost. This problem is especially severe when the agreement sought adversely affects the potential productive use of resources of one subunit; for example, when the subunit is required to divest or close down a production facility.[3] Since many legislative bargains attempt to deprive protected but inefficient producers of their productive opportunities, it is small wonder that the costs of misuse of the compensating transfers may exceed the efficiency gains, and the bargains do not take place.

Our result may seem somewhat strange because a one-off deal achieves first-best while inefficiencies arise in situations of repeated interaction. Typically, one thinks that repeated interaction enhances the opportunities for cooperation (see, for example, the Folk theorem in Fudenberg and Maskin (1986)). However, most of the literature on the effects of repeated interaction in full information settings simply shows that a variety of outcomes, not just harmonious cooperation, can be supported. The focus on cooperation rather than conflict is

[3] Also see Bagwell and Fulghieri (1995) who use influence cost models to study mergers and divestment of subsidiaries.

then simply an act of faith rather than a necessary implications. As Jack Hirshleifer (1993) so succinctly puts it:

> "According to Coase's Theorem, people will never pass up an opportunity to co-operate by means of mutually beneficial exchange. What might be called Machiavelli's Theorem says that no one will ever pass up an opportunity to gain a one-sided advantage by exploiting another party. Machiavelli's Theorem standing alone is only a partial truth. But so is Coase's Theorem standing alone. Our textbooks... should be saying that decision-makers will strike an optimal balance between the way of Coase and the way of Machiavelli – between the way of production combined with mutually advantageous exchange, and the dark-side way of confiscation, exploitation, and conflict."

Our framework, thus, is designed to analyze the interaction between the way of Coase and the way of Machiavelli. We discuss the implications of our results for political economy, the theory of organizations, and competitive strategy.

In the arena of political economy, our results modify Becker's (1983 and 1985) conclusions that the political process will favor the choice of more efficient policies to redistribute wealth. The costs we identify in the process of transferring wealth may prevent the implementation of efficient policies or favor the choice of suboptimal policies, which instead have the advantage of minimizing these costs.

That difficulties in reaching an agreement are enhanced when two parties interact closely identifies a cost of integration. This cost provides a potential explanation for the existence of limits to the size of a firm. It also provides a rationale for why organizational structure can be used to enhance a firm's efficiency.

We finally present an example of how the inefficiencies we have identified can be strategically exploited by outside rivals. History is replete with examples where a small band of men (or a small firm) conquer a much larger potential rival. The British conquest of India was accomplished with a force that rarely exceeded a few thousand British soldiers. They used the well-known tactic of divide and conquer by exploiting the conflicts between the various Indian religious and ethnic groups. As we will argue, if properly applied, this tactic requires little force: the external agent judiciously attacks a specific subunit in the country (or firm) in such a way that it magnifies the threat one internal subunit faces from another. Internal subunits then do not co-operate with each other. We also show that too much force can be counter-productive because it can convince internal subunits that the external enemy is the greater threat.[4] Thus paying attention to the way of Machiavelli can explain why Machiavellian tactics are successful.

The rest of the paper is as follows. We start by outlining the framework for our simple model and describe the equilibrium allocation within an organization. In section 2, we study the conditions that prevent efficient renegotiation and provide an example of it. We then study some simple extensions of the model in section 3, and applications to the theory of organizations (section 4), and competitive strategy (section 5). Section 6 concludes.

1 Equilibrium Allocation within an Organization

Consider an organization with two subunits. Examples of the organization are a country, a parliament, a political party, or a firm. Correspondingly, the subunits could be states, political parties, state units of political parties, or divisions. Subunits would like to maximize their share of the total surplus generated by the organization.[5] The commonality of interest among subunits, as well as the source of conflict between them, arises because the surplus generated by each subunit is channeled into a common pool and then re-allocated back to the subunits. We assume that this surplus cannot be re-allocated via an ex ante agreement, but has to be bargained over ex post. This assumption is meant to capture – in the simplest possible way – the idea that some aspects of a long-term relationship are not contractible and therefore unproductive power seeking might be individually profitable.

1.1 Framework

Let us call the subunits A and B. At date 1, each subunit i allocates its resources, λ^i, between two activities: productive investment (f^i) which generates future resources and non-productive power-seeking (g^i) which gives the subunit a larger share of the future common pool. For example, in the case of the state unit of a political party, productive investment

[4] Our argument does not require the internal subunits to have short horizons and not foresee the danger of internal conflict. The feasible set of agreements between internal subunits may be so constrained by power-seeking that the only response to an external threat may be to succumb to it. In a sense, internal conflict creates interstitial spaces that an outsider can occupy.

[5] Implicit in all our subsequent analysis is that each subunit is a cohesive whole. Therefore, we assume a strong form of what organizational theorists term "subunit identification" (see Pfeffer (1981)).

could refer to efforts to spur growth in the state, while non-productive power-seeking could be the building up of political clout over the center. Of course, each of these activities requires the attention of party workers and money, both of which may be in limited supply.

Subunit i generates a total surplus at date 2 of $F^i(f^i)$ from production where F^i is increasing and concave in f^i. This return, however, does not accrue to subunit i itself, but to a common pool. The allocation of this common pool is decided ex post on the basis of the relative power acquired by each division. So subunit A's share of the common pool – its power – is given by the relative amount it has invested in power-seeking, i.e., by

$$p^A(g^A, g^B). \tag{1}$$

where $p_1^A > 0$, $p_2^A < 0$ (subscript j denotes the partial with respect to the j^{th} argument), and B's share is given by $(1 - p^A)$. A's share is increasing in the amount of resources that it invests in power-seeking and decreasing in the amount B devotes to power-seeking.

Skaperdas (1995) shows that the only power function that satisfies a number of reasonable axioms has the form

$$p^i(g) = \frac{h(g^i)}{h(g^i) + h(g^j)} \tag{2}$$

where $h(\cdot)$ is a positive increasing function of its arguments.[6] This is the form we will adopt through the rest of the paper, though for tractability, some examples will specialize the power function further. For instance, in the rent-seeking and conflict literature (see Tullock (1980), Hirshleifer (1991, 1995)) $h(g) = g^m$ or $h(g) = e^{mg}$ where m is a positive constant. Figure 1 illustrates the shape of the power function for the case $h(g) = g^m$.

We assume that each subunit's objective is to maximize the amount of resources obtained at date 2. Therefore, for a given allocation (f^B, g^B) by subunit B, subunit A maximizes

$$U^A = p(g^A, g^B)[F^A(f^A) + F^B(f^B)]. \tag{3}$$

[6]The axioms are that (i) power sums up to 1 (ii) a subunit's power is increasing in its own power-seeking and decreasing in the other's power-seeking (iii) power does not depend on the identity of the player but only on power-seeking. In addition, there are two axioms that apply to multi-player contests.

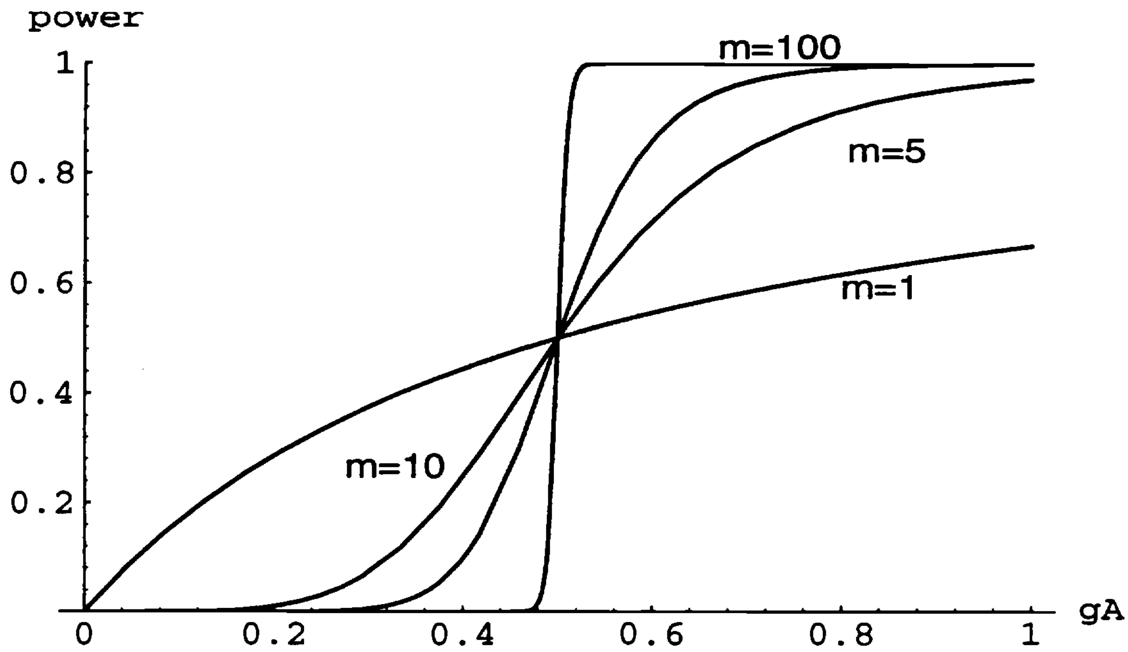

Figure 1: Shape of the power function for different values of m

subject to the budget constraint:

$$f^A + g^A = \lambda^A.$$

Substituting the budget constraints for each subunit in (3) we obtain

$$U^A(g^A, g^B) = p(g^A, g^B)[F^A(\lambda^A - g^A) + F^B(\lambda^B - g^B)]. \tag{4}$$

Similarly, we can derive the objective function for B.

1.2 Existence and Uniqueness of Equilibrium

Applying the lemmas in Skaperdas (1992) and Skaperdas and Syropoulous (1995) we can show that

Lemma 1 *If* $(p_1^A)^2 > p_{11}^A p^A$, *there is a unique pure-strategy Nash equilibrium.*

Proof: See appendix.

Note that the condition in the lemma is satisfied if p^A is concave. But it is also satisfied under the weaker condition that p^A increases sharply whenever it is convex. For instance, Skaperdas (1992) shows that (2) with $h(g) = e^{mg}$ satisfies lemma 1. Also, $h(g) = g^m$ satisfies lemma 1 so long as m is not too much greater than 1.

1.2.1 An example

Despite the apparent simplicity of the problem, the analytics soon become intractable. It is useful to illustrate the comparative statics with a simple power function. Let $p^i(g) = \frac{g^i}{g^i+g^j}$ and let the production function be linear, producing a surplus of R^i per dollar invested. A's reaction function is easily obtained

$$g^A = -g^B + \sqrt{g^B}\,\sqrt{g^B + \lambda^A + r(\lambda^B - g^B)}, \tag{5}$$

where r equals R^B/R^A. Ceteris paribus, A's power-seeking increases both in its own date-1 resources and in those of its rival. Intuitively, more resources today make the overall future pie bigger, increasing the return to power-seeking. Subunit A's power-seeking also increases in B's productivity and decreases in its own productivity; the more productive is subunit B, the greater the size of the pie, and hence the greater the incentive for subunit A to invest in power. While an increase in subunit A's own productivity also increases the size of the pie and hence its incentive to invest in power, this is outweighed by the cost of substituting away from the now more lucrative productive investments. Finally, the effect of an increase in the rival's power-seeking is ambiguous. For low values of subunit B's investment in power-seeking, an increase in its power-seeking triggers a corresponding increase in subunit A's power-seeking (strategic complementarity). However, this is reversed when B invests substantially in power-seeking. There are two reasons for this. First, the more subunit B invests in power, the smaller the common pool, and the lower A's incentive to gather power. Also, the marginal gain in subunit A's power from a unit investment in power-seeking eventually falls with subunit B's investment in power-seeking as subunit B's investment in such activities becomes large. Thus subunit A's investment in power-seeking can be crowded out.

In principle, A and B's reaction functions can be solved to obtain the equilibrium level of productive activity and power-seeking by each subunit. Unfortunately, there is no convenient analytical solution for the case when r is different from 1. If we restrict our attention to the symmetric case in which both divisions have the same return from productive effort (so that $r = 1$), the unique equilibrium is

$$g^{A,B\star} = \frac{\lambda^A + \lambda^B}{4}, \tag{6}$$

Note that independent of the size of their endowments, both divisions invest the same amount in power-seeking and consequently receive the same share of the common pool (i.e., $p_A = p_B = 1/2$). This is obviously an artifact of the linearity of the production function. If the production functions are identical but concave, it can be easily shown that the better endowed division invests more in power-seeking.[7]

2 The inefficiencies in transfers and the impossibility of agreement

In the environment we have described, power, and consequently, each subunit's share of the surplus is endogenous. In such a world, distribution (who starts out with what endowment) and efficiency (how much is produced) are inextricably linked. So the compensation principle – whereby the most efficient action is undertaken and losers compensated with side-payments from the larger surplus – need not hold. In this section, we show that transfers may themselves be a considerable source of inefficiency, and may inhibit agreement. In the next section, we examine two extensions of the basic model where power-seeking again inhibits agreement, but for different reasons.

2.1 The effects of the transfer on efficiency

Let the total resources possessed by the organization at date 1 be a constant λ. Now let us assume B wants A to take an action at date 1 that privately benefits B at date 2 but hurts A

[7] We can also explore the effects of different power functions, for instance, $p^A(g^A, g^B) = \frac{(g^A)^m}{(g^A)^m + (g^B)^m}$. Note that m=1 corresponds to the power function previously used, and $m = \infty$ corresponds to a scenario where the winner takes it all. So long as the condition in lemma 1 is satisfied, $g^{A,B\star} = \frac{\lambda^A + \lambda^B}{\frac{4}{m} + 2}$.

at date 2.

Ignore for the moment the effects of the action being contemplated, and simply consider the consequences of a transfer to A, i.e., an increase in λ^A with a corresponding decrease in λ^B. The total output $U = U^A + U^B$ can be written as

$$U(\lambda, \lambda^A, g^A, g^B) = F^A(\lambda^A - g^A) + F^B(\lambda - \lambda^A - g^B). \tag{7}$$

Differentiating the total output with respect to λ^A yields

$$\frac{dU}{d\lambda^A} = (1 - \frac{\partial g^{A*}}{\partial \lambda^A})F_1^A - (1 + \frac{\partial g^{B*}}{\partial \lambda^A})F_1^B, \tag{8}$$

where F_1^j is the first derivative of division j's production function.

When a dollar is transferred to A, only the amount net of any incremental power-seeking is redeployed in production. The first term on the right hand side of (8) is the direct gain in production when this net amount is put to work by A. Similarly, when B transfers the dollar, the total reduction in the resources it devotes to production is the amount transferred plus the incremental amount devoted to power-seeking. The loss in production due to this is the second term in (8).[8]

In a world where property rights are fully contractible, all wealth enhancing actions will be undertaken, that is, the necessary and sufficient condition for an agreement to be reached is that

$$\text{Net private benefit of action} > 0, \tag{9}$$

independent of the size of the transfer required. In our (more realistic) framework the necessary condition for agreement is that total surplus increases after the effect of the necessary transfer is accounted for, that is,

$$[\text{Net private benefit of action}] + (1 - \frac{\partial g^{A*}}{\partial \lambda^A})F_1^A - (1 + \frac{\partial g^{B*}}{\partial \lambda^A})F_1^B > 0 \tag{10}$$

[8]Note that in a world where property rights are endogenous, the marginal productivities of the different subunits need not be equal in equilibrium.

So if (8) is negative, not all welfare enhancing agreements will go through because of the inefficiencies generated by the transfer. For instance, if A is inefficient at the margin compared to B so that $F_1^B > F_1^A$, and power-seeking does not fall considerably with the transfer, then a number of efficient agreements will become impossible.

To see the effect of the transfer (a change in λ^A) on each subunit's power seeking, we totally differentiate the two first order conditions and solve simultaneously. Then

Lemma 2 *(i)* $\frac{\partial q^{A*}}{\partial \lambda^A} > 0$ *iff* $U_{1\lambda^A}^A > 0$
(ii) $\frac{\partial q^{B*}}{\partial \lambda^A} > 0$ *iff* $U_{2\lambda^A}^B > 0$
where $U_{1\lambda^A}^A = \frac{\partial U_1^A}{\partial \lambda^A}$ *and* $U_{2\lambda^A}^B = \frac{\partial U_2^B}{\partial \lambda^A}$.

Proof: See appendix.

The lemma states that the effect of a change in λ^A on each division's equilibrium power seeking depends on how λ^A changes the divisions' first order conditions.

Let us first consider the impact of a change in λ^A on A's first order condition:

$$U_{1\lambda^A}^A = -p^A F_{11}^A + p_1^A(F_1^A - F_1^B) \tag{11}$$

The transfer increases A's resources, λ^A, and therefore decreases A's marginal productivity (because F^A is concave). Since A bears only fraction p of any loss in productivity, the net effect is that A's opportunity cost of power seeking is lower by p times the change in marginal productivity. So the first term on the right hand side of equation (11) is clearly positive and increases A's power-seeking. If A has more productive use for the transferred resources, the size of the date-2 surplus also increases. This increases its incentive to spend resources in power seeking. Therefore, the second term in equation (11) is positive if $F_1^A - F_1^B > 0$, and overall, the transfer will increase A's power-seeking. If A is less productive at the margin than B, the effect of the transfer on A's power-seeking is ambiguous.

The effect of the transfer on B's first order condition is

$$U_{2\lambda^A}^B = (1 - p^A)F_{11}^B - p_2^A(F_1^A - F_1^B). \tag{12}$$

For a given level of resources λ, an increase in λ^A corresponds to a decrease in λ^B, an increase in B's marginal productivity, and hence an increase in its opportunity cost of power-seeking.

Thus the first term of equation (12) is clearly negative. The second term has the same interpretation and sign as the second term in equation (11) because $p_2^A < 0$. Therefore, if A is less productive at the margin than B, the transfer reduces B's power-seeking. But if A is more productive than B at the margin, the effect of the transfer on B's power-seeking is ambiguous. The effect is positive if one of the three following conditions is satisfied: i) B is not very powerful ($p^B = (1 - p^A)$ small) so that it does not bear much of the opportunity cost of power-seeking; ii) B' s production function is not very concave (F_{11}^B close to zero), iii) B's gain from power seeking is high (p_2^A very large in absolute value).

Using (10) and lemma 2, we can determine conditions where the transfer reduces welfare. We will focus on two specific cases now. We will show that when the subunit receiving the transfer either has exhausted its investment opportunities or has so few resources relative to the other subunit that it is resource-constrained in its power-seeking, the loss in efficiency as a result of the transfer is more than just the loss in productivity for the transferred resources, and increases in the size of the transfer. Therefore, all but the most welfare enhancing actions are blocked if the actions have large distributional consequences. We call this phenomenon the tyranny of the inefficient and the weak.

2.2 The tyranny of the inefficient

The inefficiencies associated with distribution are highest when the subunit that has to be compensated through transfers has exhausted its profitable investment opportunities. One example might be a mature subunit of a conglomerate that the rest of the conglomerate wants to close down, another may be an inefficient producer protected by laws that hamper the more efficient units in the industry.

Since A has no productive use left for resources, it is obvious that all the resources transferred to A will be wasted in power seeking. What is more interesting, is that the inefficiency can be even larger. By imposing $F_1^A = 0$ in equation (8) we obtain

$$\frac{dU}{d\lambda^A} = -(1 + \frac{\partial g^{B*}}{\partial \lambda^A})F_1^B. \tag{13}$$

The inefficiency will be more than simply the direct loss in productivity from the transfer if B reacts to A's increased power seeking by increasing its own level of power seeking. Therefore, we have the following result:

Proposition 1 *If $F_1^A = 0$ and $\frac{\partial g^{B*}}{\partial \lambda^A} > 0$, an increase in the required transfer increases inefficiency.*

Here is where the distributional consequences of the proposed agreement increases the hurdle rate in terms of efficiency that is required for all parties to consent to it. The larger the loss in private benefits to A as a result of the proposed agreement, the larger the transfer necessary for A's consent, and the greater has to be the overall gain in net private benefits for agreement to take place. In other words, most agreements that entail large distributional consequences are unlikely to take place. We call this extraordinary ability of the inefficient to block agreement *the tyranny of the inefficient.*

To analyze when the condition of Proposition 1 is likely to be satisfied (i.e., when B's power seeking increases with the transfer) we can simply apply the implicit function theorem to B's first order condition after substituting $dg^{A*} = d\lambda^A$ (because all A's additional resources will be used in power seeking). We, then, have

$$\frac{\partial g^{B*}}{\partial \lambda^A} = \frac{+p_{12}(F^A + F^B) - (p_1 + p_2)F_1^B - (1-p)F_{11}^B}{SOC^B}, \tag{14}$$

where SOC^B is the second order condition in B's maximization problem, which is negative in equilibrium. It follows that

$$sign[\frac{\partial g^{B*}}{\partial \lambda^A}] = sign[-p_{12}(F^A + F^B) + (p_1 + p_2)F_1^B + (1-p)F_{11}^B]. \tag{15}$$

The first term captures the strategic complementarity/substitutability of power-seeking by the two subunits. Recall that B's share is given by $(1-p)$. So if the marginal change in B's share with power seeking increases with A's power-seeking (power seeking is complementary for B), this is positive. The second term indicates how the change in power seeking affects the stake subunit B has in productive output, and hence its perceived cost of power seeking. The more the transfer increases A's power (p_1) relative to B's ($-p_2$), the less B bears of the loss in productive output, and the greater its incentive to seek power. Finally, since the production function is concave and the transfer reduces B's resources, B's opportunity cost of power-seeking (its marginal productivity) increases with the transfer.

From the form of the power function in (2), the first term is always positive if B is more powerful than A.[9] The second term is also positive under the additional condition that the function $h(\cdot)$ in (2) is not too convex (i.e., it is strictly positive if it is linear or concave).[10] The third term is negative but small if the production function is not too concave. So if B is large while A is small, A has exhausted its productive opportunities, and B's marginal productivity is not much changed by the transfer, the direct consequence of the transfer will be a loss of efficiency greater than the transfer. Consistent with our claim, thus, the inefficiencies from the transfer are more likely overcome the benefits of a transaction when the agreement requires the consent of a weak and inefficient A.

2.3 The tyranny of the weak

A closely related situation is one where subunit B is much larger (and potentially, though not necessarily, more productive) than subunit A. A would optimally like to invest more than its resources in power seeking. This case can be simply analyzed in the context of the example developed in section 1.2.1, though the result is more general. If $\lambda^A << \frac{\lambda^B}{3}$ then $\lambda^A < g^{A^*}$, and A invests everything it has in power-seeking. This implies that a transfer from B to A, if not large enough to make A unconstrained, will also be entirely used up in power seeking. Furthermore, B's best response is $g^B = -\lambda^A + \sqrt{\lambda^A(\lambda^A + \lambda^B)}$ which implies that B's power seeking increases with A's power seeking and, therefore, increases in the transfer.

To summarize, when A is inefficient or weak, the action sought of A may have to increase efficiency by more than the transfer, otherwise it will not be possible to obtain agreement on it. So actions that have large distributional consequences (and hence necessitate large transfers) will not be agreed upon unless they enhance efficiency tremendously. To illustrate the practical relevance of our result, in what follows we present two applications to political economy. The

[9] By differentiating (2) it is easy to see that $p_{12} < 0$ if and only if $p^A < \frac{1}{2}$.

[10] By differentiating (2) one gets that $p_1 + p_2 = h'(g^A)h(g^B) - h'(g^B)h(g^A)$, which is positive if $h(\cdot)$ is not too convex.

result, though, is general and can, as well, be applied to corporate or academic situations.

2.4 Application to Theory of Regulation

Becker (1983 and 1985) argues that the political process will favor the choice of more efficient policies to redistribute wealth. The greater the deadweight loss generated by a tax, the argument goes, the greater the incentives of taxpayers to lobby against it, while the greater the deadweight loss generated by a subsidy, the weaker the incentives of the beneficiaries to lobby for it. So long as taxpayers and beneficiaries have equal ability to buy political influence (as in a democratic society), the political process will move inexorably towards efficient policies. Becker (1985) concludes that "the potential to compensate is an important determinant of *actual* political behavior" and not only of normative behavior, as economists before him have suggested.

Becker's argument, though, does not consider two aspects that are crucial to our analysis. First, he does not consider the different production possibilities faced by the various groups, implicitly assuming that the opportunity costs of the resources spent in influencing legislation are equal for everyone. Second, he does not consider a dynamic situation where compensation can itself be used to buy further influence.

Once these two aspects are considered, it is possible that the political process prevents the implementation of efficient policies, or favors suboptimal policies which have the advantage of minimizing the costs of redistribution. We have argued that agreements are particularly difficult when one of the two parties has exhausted its investment opportunities, or when the desired agreement seeks to deprive a party of its opportunities. A second-best solution is to compensate the side that bears the adverse consequences of the agreement through future investment opportunities, rather than through money. In this way, transferred resources are allocated to productive (though perhaps not the most productive) uses rather than to politics.

An example of this phenomenon is provided by the regulation of oil fields, as described in Libecap and Wiggins (1985) and Libecap (1993). Oil fields are subject to the classic free-rider problem. If multiple drillers draw oil from the same field, it is privately optimal for a driller to extract at the highest rate possible. There is positive feedback in drilling because the high rate of extraction decreases the pressure at the driller's well-head, and thus draws even more oil towards it. But the total amount that can be extracted from the field by all the drillers is significantly reduced. Regulation mandating field-wide unitization can clearly improve efficiency; under unitization production rights are delegated to one firm which optimizes the extraction rate and then apportions the (larger) revenues to the other would-be producers.

Becker (1983) would suggest that competition among various interest groups should lead to efficient regulation (i.e., to unitization). This is, in fact, what occurred in states like Wyoming and Oklahoma. But these were also states where drillers were relatively homogeneous and had congruent interests. However, as Libecap and Wiggins show, Texas did not pass legislation mandating unitization. They attribute the suppression of such legislation to the larger numbers (and political clout) of small drillers and oil field suppliers in Texas who felt they would be made worse off by unitization. The little regulation that was passed to increase the efficiency of oil field exploitation was obtained by large drillers (the major beneficiaries) at the cost of expensive and highly inefficient production quotas. "Compensating lump sum payments were not made to win their [the small drillers'] support; instead, preferential production quotas and exemptions to spacing and drilling restrictions were given to small firms. This resulted in excessive high density drilling... All firms, large and small, benefitted from overall limits on rapid common-pool extraction. The aggregate costs of the regulatory process, however, were high and reservoir rents dissipated." Libecap (1993, p 33).

Why were the small drillers not bought off by a compensating side payment? Since the large drillers bore much of the cost of the preferences given to the small drillers, they apparently had the incentive to make these payments. And since they were large and low cost producers, they presumably were not liquidity constrained.[11] Our theory suggests an explanation. Given that the small drillers were high cost producers, their survival was largely due to the protection afforded them by the regulatory authorities. Had they received a lump sum transfer, they would have used it to buy more legislative protection rather than in improving productive efficiency.

By contrast, preferences would have increased the attractiveness of production for the

[11]Libecap suggests that the possibility that lump sum monetary payments may have been frowned upon for ethical reasons or that the transactions costs of determining and implementing them may have been too high. The latter explanation is more consistent with our views, though our model suggests the ethical norm may have developed for efficiency reasons.

small drillers and may have diverted future resources from politics to production. Moreover, additional revenues would flow in to the small drillers over time rather than immediately. So long as they faced some capital market frictions, or even some future threat of legislative reversal, they would not have been able to borrow against these flows, replicate the lump sum payment and buy increased protection.[12] For both reasons, the large drillers may have found this to be the least inefficient means of buying the support of small drillers.

2.5 Application to International Trade Agreements

Krugman and Obstfeld (1991) point out that trade agreements between similarly developed countries are more common because they find broad political support within each country, while agreements that involve countries at very different levels of economic development draw forth such strong political opposition to become unfeasible. The only empirical difference in the nature of these agreements is that most of the trade between homogeneous countries is intra-industry trade, while trade between countries at very different levels of development is mostly inter-industry.

Our model suggests an explanation for the difference in outcomes. Given that trade agreements between homogeneous countries change investment opportunities mainly within each industry – rather than across industries – even those producers who are hurt by the agreement are partially compensated through new production opportunities. As a result, the compensating transfers made to them will not entirely be wasted in power seeking, but can be invested in profitable ventures.

By contrast, agreements between heterogeneous countries will have the effect of destroying entire industrial sectors. Producers in these losing sectors, thus, will find themselves in the situation we described in section 2.2: requiring large compensation for their losses, but with no profitable ventures (but power seeking) to invest those resources. In these cases, the prospect of the waste the transfer would generate can block a trade agreement beneficial to the country as a whole. More generally, we would see only partial agreement as those affected use the

[12] We are not arguing that the small drillers would immediately invest the lump sum payment in the Political Action Committees of supporters. All that we need is that there be some positive correlation between the liquid wealth or "free cash flow" of an interest group and its political influence.

initial compensation or preferences to lobby to block further progress.

Thus far, we have focused on the inefficiency created by transfers. The transfer is not always a substantial source of inefficiency; for instance when it flows from the less efficient to more efficient subunit and does not raise power-seeking. However, power-seeking may still vitiate agreement. Showing this requires simple extensions of the model which we now discuss.

3 Extensions

3.1 Actions that increase the scope of power-seeking

We have assumed that all surplus flows into the common pool. More generally, it could be thought that some fraction of the surplus generated by a subunit is naturally protected from the other subunit. To the extent that some property rights are exogenously enforced, or are implicitly enforced by proprietary technology or by custom, they will be part of a subunit's turf and not subject to power-seeking. We have termed this turf "private benefits", though we postponed an explanation of this term till now.

Co-operation typically requires the transfer of private benefits from one party to another. To the extent that this transfer takes place without bringing more surplus into the common pool, it will not affect power-seeking. But it is possible that some actions transferring private benefits bring a lot of surplus into the common pool. Consider division A and division B in a conglomerate who each produce using technologies that do not require the other division's help. The surplus generated by the private technologies could be considered part of each division's private benefits. Now let A have access to a different technology, which has positive spillover effects on division B's private technology. It may be more efficient (from the conglomerate's point of view) for division A to choose the co-operative technology which transfers private benefits from A to B through the spillover. But in addition to the transfer of benefits, the co-operative technology may require A to seek B's help and may bring more of A's private surplus into the common pool. This increases potential power-seeking. The problem is that the co-operative technology increases the pie but also reduces the portion that is protected from power-seeking. The latter effect may dissipate the potential gains from the more efficient technology even if compensating transfers are frictionless.

Consider one last example of this phenomenon. Technology is only one of the potential determinants of a subunit's turf. Tradition (possibly supported by myth) is another. For example, some state universities have very small classes. Size limits are set by professors who have total discretion in setting class limits on the basis of pedagogic considerations. The tradition (or myth) is that the professor knows what is in the best interests of the students and this must be respected. So setting class size is part of the professor's turf. The state would like professors to increase class size to a more economic level. Professors would be happy to do so, provided they are compensated with higher salary. A bargain seems quite feasible: bigger classes for higher wages. The problem, however, is that once the offer of larger classes is on the table, it destroys the tradition (or myth) that there is a technological, professor-determined limit on class size. Professors not only lose their "turf" over class size, but since the set of issues bargained over is larger, more resources are wasted in power seeking. Thus the issue is never raised.[13]

3.2 Actions that affect critical resources.

Thus far we have assumed that all resources are perfectly fungible and can be used interchangeably to acquire power or to increase production. This assumption makes reaching an agreement easier, because the effect of any action on power can be sterilized through the appropriate transfer of resources (modulo the inefficiencies stemming from the transfer that we discussed in the earlier section).

In practice, though, there are many instances where certain resources are more valuable in generating power or, even, swamp other ways of generating power. Furthermore, these resources may be indivisible or non-transferable.[14] For example, the control of a strategic location can provide a strong advantage in controlling a territory, or the loyalty of the army can be a unparalleled source of political power in certain environments. In the jargon of the military, some resources may be force multipliers.

[13]Another example is the transition of an economy from one system of property rights to another. As soon as the old property rights are unfrozen, everything is up for grabs. Power seeking increases tremendously if new rights are not put quickly in place. That property rights be defined and held may become more important in restoring efficiency than determining the best holder.

[14]For an explanation of why control over a group of people might not be transferable see Rajan and Zingales (1995).

Now suppose that the action to be taken involves the allocation of the powerful resource to B. One way of incorporating this in the model is to have the action change A's power function to $p^A = \frac{h(g^A)}{h(g^A)+(h(g^B+c))}$ where $c > 0$. The action thus reduces A's power at any level of power-seeking, and because B possesses the critical resource, it can never transfer all power to A even if it transfers all other resources. If c is high so that the action reduces A's power considerably, then it is possible that no amount of transfer to A may be sufficient to compensate it or that so many resources should be wasted by A in seeking to counterbalance B's power to wipe out the benefits of the action itself. In both cases, an otherwise value-enhancing agreement will not be reached.

The point, though obvious, is important. An example may help fix ideas. Consider a department in a University where two main streams of research, A and B are represented. Those who subscribe to A have diametrically opposite views on a number of issues to those who subscribe to B. The As have as many devotees as the Bs, all decisions are put to vote, and majority rule prevails. Now consider a decision to hire new faculty into the department. Assume for simplicity that there is only one slot to fill and that teaching needs are such that a faculty member who does research in either area can fulfill them.

While a quality hire in either area will add prestige to the entire department, the As have a strong incentive to veto all new hires subscribing to B. The reason, quite simply, is that a new hire specializing in B will side with the existing Bs in all future decisions. This may unduly increase the group's power. For instance, the hire this year makes it more likely that the Bs will be able to force their choice on the department next year also. A cascade of hires of Bs will follow the initial hire, resulting in a collapse of the power of the As. For identical reasons, the Bs have an incentive to oppose hiring a new A.

The Bs could transfer resources like money or perks to the As in compensation. But the As know that unless these resources are immediately consumed – and the utility from such large momentary consumption will be small – the Bs will vote to revoke these privileges in the future. So an action such as a new hire which upsets the balance of power has consequences that cannot be compensated by a transfer, and will not take place. The problem here is that only certain indivisible resources (i.e., people) are a source of power, while money or perks are not (or matter less). Actions that affect power will thus be hard to agree upon.[15]

To summarize; agreements typically require a transfer of resources in exchange for a net transfer of private benefits. Agreements that are efficient in all other respects will not take place if the inefficiencies engendered by either transfer overcomes the gains from agreement. The inefficiencies are likely to be high if the recipient of the resource transfer does not have productive opportunities or if the process of transferring private benefits brings more surplus into the public domain. Finally, agreements are also likely to be blocked if the resources that can be transferred do not add to the power of the recipient while actions sought significantly reduce its power. We now explore applications of these ideas.

4 Application to the Theory of Organizations

4.1 Costs of integration

While a vast body of work starting from Coase investigates the benefits of integrating two subunits in the same firm, much less is known about what the limits to this are. Typically, the costs of expanding the firm are thought to be co-ordination costs (though see Grossman and Hart (1986) for an exception). Our paper argues for a different cost; since, integration leads to repeated interactions, the set of enforceable contracts any deal requires increases disproportionately. If some of these aspects are non-contractible, an efficient agreement which is possible between two independent companies becomes impossible between two subunits of the same company. Note that integration does not change the cost of writing down a particular contractual provision. Rather, integration changes the set of contingencies that become relevant to an agreement.

Our model provides some insights on when the costs of integration are more relevant.

[15] One way to overcome this is for both areas to grow at the same rate. Because of the indivisibility of new hires, this will typically imply overhiring. In the above example, the number of hires has to be a multiple of two. This is not very inefficient if the demand for the department's offerings is growing. For instance, if the department needs one new faculty member every year, it can hire two faculty, one from each area of research, every two years. This implies the department will be overstaffed (understaffed) by one faculty member every two years. The situation is worse when there are limited resources to be allocated – typical of most economic situations – for example, when the department needs only one more faculty member. In this situation, hiring two new ones (or none) will lead to a permanent excess (deficiency) of one faculty member. Again this example suggests why efficiency can be more easily achieved in growing organizations.

For instance, section 2.2 indicates that fewer agreements are possible if one subunit lacks opportunities to profitably invest its resources. But the Boston Consulting Group model, the dominant managerial paradigm of the value of conglomerates, insists that because internal financing reduces the need to rely on costly external capital markets, 'cash cows' (cash rich but dying subunits) should be paired with 'rising stars' (units that do not generate a lot of surplus but have wonderful investment opportunities). To the extent that a central authority in the firm can mediate such transfers and crowd out power struggles (see Rajan and Zingales (1995) on this issue), such pairing may be very beneficial. But if central authority is weak, such pairing may lead to enormous wastage in power seeking and foregone opportunities because the subunit that has to be compensated (the mature cash cow) has few investment avenues. This may also explain why successful conglomerates such as General Electric typically divest all subunits that do not hold strong positions in their own market segment.

4.2 Number of subunits and firm's size

In the basic model we assumed the existence of only two subunits. When the number of subunits increases, however, the equilibrium level of power-seeking increases in the number of subunits. In the context of our example (section 1.2.1) it is easy to show that with n subunits, the equilibrium level of power-seeking is

$$g^{i\star} = (n-1)\frac{\sum_j^n \lambda^j}{n^2}, \tag{16}$$

Thus, the total amount of resources wasted in power-seeking in the whole organization is

$$n\, g^{i\star} = (1 - \frac{1}{n})\sum_j^n \lambda^j, \tag{17}$$

This suggests that as the number of subunits grow large, an increasing amount of the common pie is dissipated in power-seeking.

What determines the number of subunits in a company? The smallest indivisible unit is an employee. Keeping the size of surplus (net of opportunity costs) constant, (17) suggests more populous firms are more inefficient. For a given number of employees, however, what determines the number of subunits is the congruence of employee objectives. Congruence may arise because some employees have similar skills and so benefit from the same decisions, or because they are assigned to a joint task and, thus, their destinies are tied together. In a sense, the former suggests that technology determines the number of units while the latter suggests that organizational design can also play a part. To the extent that the number of natural subunits are large in diversified firms, these firms are likely to be more "political" and less efficient.[16]

4.3 Implications for organizational design

Apart from influencing the number of subunits that form, organizational design may influence the costs of integration in other ways. Of course, in the absence of a theory of why organizations are formed, the discussion here is only suggestive. We postpone a full treatment of this topic to future work.

First, an organization's hierarchy can be viewed as a way to restrict the interaction among various subunits. For instance, to the extent that some individuals club together naturally in a subunit (e.g., because they perform the same function or contribute to the same product), it may be better to make a division out of them and reduce the points of contact with other subunits to the bare minimum. This makes it easier to contractually regulate the remaining dealings, eliminating unallocated rents and thus power-seeking.[17]

Along similar lines, an organization has some latitude in molding where power struggles take place, and hence, the strength and weakness of various subunits. Consider, for example, a university. The natural subunits are the various disciplines. If resource allocation took place at the discipline level, a large number of subunits would compete for resources, with substantial losses from power seeking. By clubbing different disciplines in the same department, and elevating the primary allocation of resources to the departmental level, the University produces a number of effects. It generates two levels of conflict: at the inter-departmental level and

[16] It is worth mentioning that a number of recent papers find that conglomerates sell at a discount relative to similar non diversified companies (e.g., Lang and Stulz (1994), Berger and Ofek (1995)).

[17] Baker and Montgomery (1995) argue that successful LBO organizations typically do not encourage business dealings between different subsidiary firms. In fact, their role seems to be confined to setting up the initial capital structure for the firms and appointing the CEO.

at the intra-departmental level. But it diminishes the amount of power-seeking at the inter-departmental level because, first, there are fewer competing departments and, second, there is a free-rider problem when disciplines allocate resources to power-seeking at the departmental level. Whether overall power-seeking diminishes when the university creates departments depends on the parameters of the problem, but is an interesting issue for further study.

Finally, we cannot ignore the possibility that the organization develops routines or norms (also called "corporate culture") to reduce the amount of resources devoted to extract rents in unforeseen contingencies. For example, in children's soccer matches there is a common norm that disputed balls should be attributed to the team that is defending at that moment. This norm clearly developed as a way to avoid painful verbal (and often physical) disputes that arise in the absence of an objective referee. Note that these organizational norms – although ex ante efficient – may sometimes generate ex post inefficient outcomes. Again, detailed study of which organizations develop strong cultures, and when these cultures break down is left for further work.

5 Application to Military or Competitive Strategy

Another area where our basic framework may provide useful insights is that of strategy (be it military or business). We have shown that internal fights within organizations can block efficient agreements. The obvious question, then, is whether an external rival can strategically exploit this dissension to its own advantage. History is clearly replete with instances where the internal subunits in an organization are so busy fighting each other that they apparently ignore the potentially greater threat from an external rival. Examples range from the repeated inability of warring Indian chieftains to unite against the British (or for that matter, against a long series of conquerors), to IBM's inability to compete in the PC business with (formerly) much smaller rivals such as Microsoft, Compaq, and Dell. Our interest here is to analyze how the external rival can exploit potential dissension by strategically choosing the strength and direction of his attack.

As has long been postulated by political strategists such as Kautilya, Machiavelli, and Sun Tzu, the external rival's aim is to accentuate internal imbalances. This analysis delivers interesting and sometimes counter-intuitive predictions – for example, a weak attack can be much more effective than a strong attack.

To see this let us extend the basic model a little. Assume that at date 0, an external agent attacks subunit B. The immediate effect of the attack is to reduce B's date 1 resources from their original value to λ_B. It also reduces B's productivity; if B's production function is $b_0(f)^a$ before the attack, it is $b_1(f)^a$ after the attack where $b_0 > b_1$. Subunit A is not directly affected by the attack. But if A helps B, the attacker is driven off, and B's productivity is restored to $b_0(f)^a$. A and B can contract on A's action of helping. Furthermore, B can transfer money to A for A's help. But there are some other costs and benefits of helping. First, A has to sacrifice $\Delta\lambda_A$ of its date-1 resources to help. These could be the direct costs of fighting the rival. Second, when A helps B, A suffers a private future loss (i.e., at date 2) of $-\Delta U_A$ while B has a private future gain of ΔU_B. In a multi-period model, A's loss may be thought of as future power (or opportunities) that is sacrificed by A when it diverts resources to aid B. Similarly, B's gain is the extra future power it gets from defeating an external rival.[18]

We define an attack to be stronger if the size of resources B is left with after the attack, λ_B, is smaller. If there were complete co-operation between A and B, a stronger attack would reduce the incentive to fight off the attacker. This is because for the organization as a whole, the costs of fighting off the attack are fixed while the benefits increase in the size of resources that will benefit from the increased productivity. But this intuition does not always hold in our model. Since the analytics are complicated, it is best to see why in a numerical example.

Let the power function be as in (2) with $h(g) = e^{5g}$. Let $b_0 = 3, b_1 = 2, a = 0.3, \lambda_A = 1, \Delta\lambda_A = 0.25, \Delta U_A = 0.45$ and $\Delta U_B = 0.45$. The form of the power function ensures that a unique interior equilibrium solution always exists. We determine the allocation of resources by the two subunits for a range of values of λ_B, both when A helps and when A does not. In figure 2, we plot the gain in A's utility from helping B on the Y axis and λ_B, which may also be thought of as the inverse of the strength of the attack, on the X axis. For the moment, we

[18] A's private costs are incurred even if B compensates A fully for the resources it invests in helping B. This would be much clearer in a more realistic multi- period model where not all the surplus B generates flows into a common pool. To the extent that B retains some of the additional future surplus it generates, by helping B today A ensures that B has more resources in the future, and hence a greater power base. So helping B has consequences not only for today's resources but also future power.

ignore the private cost ΔU_A (this would simply shift the whole curve down by 0.45) and any transfers B might offer to make.

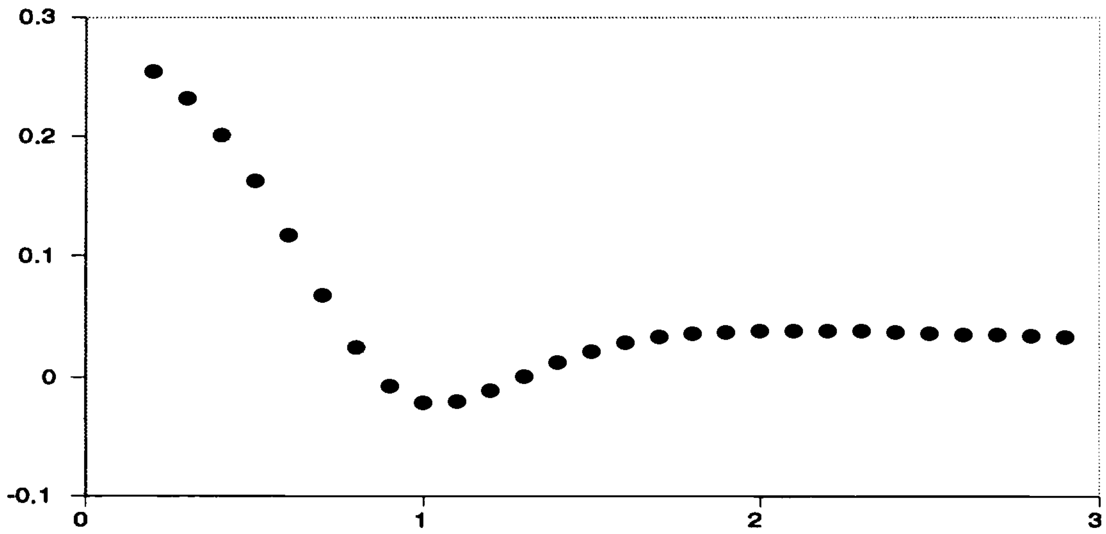

Figure 2: Change in A's utility as a function of the strength of the attack (which decreases from left to right).

Note that A's incentive to help is non monotonic in the strength of the attack. In fact, it is weakest and negative when the attack is of intermediate strength. This is despite the fact that over the range of λ_B examined, it is always efficient for A to help B if B's resources were optimally allocated.

There are three reasons why A's incentive to help is less than optimal. First, A internalizes the increase in productivity only through its own power over the common pool. So there is the classic Olson (1965) free-rider problem. Second, since B dissipates some resources in power-seeking, only a fraction of the resources benefit from the increased productivity.[19] Third, and most important, A's power is adversely affected by the help it gives B (because A's resource

[19]While this effect reduces A's incentive relative to the optimum, B actually reduces its power-seeking when A helps it. This is because the opportunity costs of power seeking for B increase when its productivity increases.

base is diminished). But the extent to which A's power is diminished depends on the size of B's resources after the attack (see figure 3).

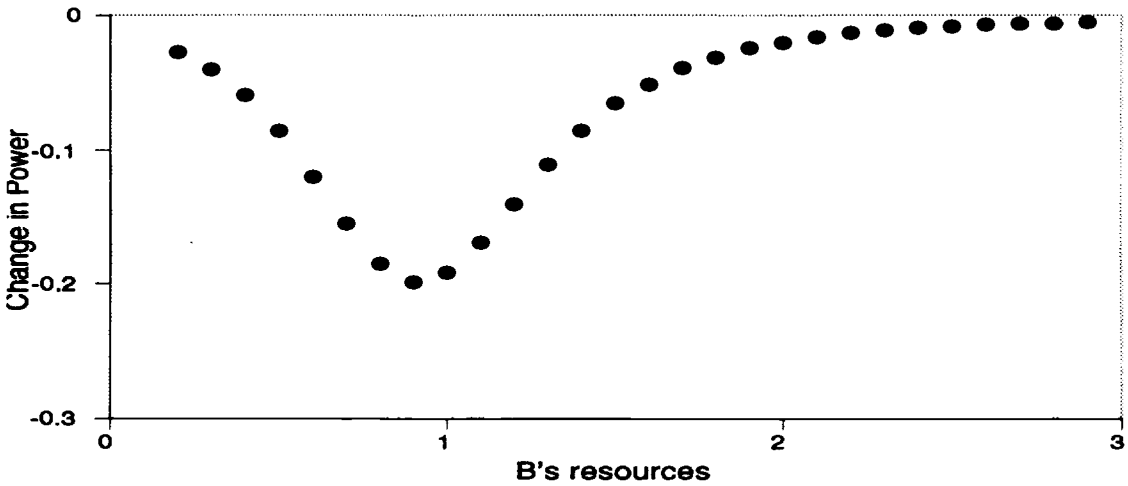

Figure 3: The change in A's power between when it helps and when it does not as a function of the strength of the attack (which decreases from left to right).

If B's resources are small (fierce external attack) then B will invest only a small amount in power-seeking whether it is helped or not. A's resources, even after helping B, are large enough for it to maintain its level of power. So A's power is not much diminished by helping B, and because A is powerful, it internalizes to a large extent the benefit of helping B. So A has an incentive to co-operate when B is fiercely attacked.

A also has an incentive to cooperate when the attack is so weak that B is left with a lot of resources even after the attack. The rationale here is that A has very little power whether it helps or not since the much better endowed B invests an overwhelming amount in power-seeking. Given that A's power and, hence, share of surplus, does not fall much on its helping B, its incentive to help increases as B's resources increase (for the obvious reason that the resources benefiting from increased productivity increase).

An attack of intermediate strength is most interesting. Here A and B are closely matched in terms of resources and A suffers considerable loss in power from helping B (see figure 3). In other words, given the steepness of the power function when internal subunits invest approximately equal amounts in power-seeking, jockeying for power is most extreme when internal rivals have similar resource bases.

Therefore, with an attack of moderate strength, an external rival increases the size of the internal dissensions to the point that the internal subunits may not co-operate with each other in fighting the external threat off.

The non-monotonicity of A's incentive to help raises a number of other interesting possibilities. Since A has an incentive to help when B's resource base is small relative to A's, the external agent may adopt a different tactic if B's resource base is small even before the attack; it may attack A rather than B to accentuate the internal conflicts. Similarly, since A has strong incentives to help when it is small relative to B, the external agent may create greater dissension by *helping* A rather than attacking anyone. This is reminiscent of the age-old policy of *divide and rule* where the ruling power in a country retains its supremacy by elevating an insignificant opposing subgroup in a country into a potential threat to other opposing subgroups in the country.[20]

Of course, the previous discussion is predicated on B's not being able to transfer resources to A in exchange for A's support in fighting the external threat. This is relevant if B's resources and A's resources are specialized enough that A cannot use B's resources and, hence, no transfer is possible. For instance, the resources can be loyal workers, whose loyalty cannot easily be committed to someone else. It may also not be possible to buy A's help if A's action is not contractible. What is more interesting is that cooperation may not ensue even when a transfer is possible and A's help is contractible. The breakdown of co-operation is a

[20]A classic example is the strategy adopted by the British in India in the 1930s. The British wanted to create a counter to the secular Congress and therefore attempted to build up fears of the Hindu majority among the Muslims. In addition, they extended overt and covert support to the Muslim League, a religious party, effectively raising a minor party to equal stature with the Congress. One might ask why the Congress did not alleviate Muslim fears of being swamped in case the British left India by offering them some protection (in terms of our model, if B is too strong for A to co-operate, why can't it weaken itself by destroying resources). The obvious problem is that such protections may not have been credible (since the use of resources is not easily observed or verified, it may be hard to prove that they have been destroyed and not simply hidden away.) A second possibility is that curbing the Muslim League became a much more pressing problem for the Congress than getting rid of the British. So destroying resources was just not an option.

possibility so long as the transaction between A and B is not one-off, but has some long term consequences such as the private costs and benefits described earlier.

If we take into account the private costs and benefits of A's action, A does not have an incentive to co-operate in the absence of transfers. Now assume that B can make a take it or leave it offer of date 1 resources worth t to A in exchange for A's help. The transfer is meant to compensate A both for the resources used in helping, and the future private loss to A. Of course, A can use part, or all, of t in power seeking. It turns out now (see figure 4) that A's cooperation cannot be bought when λ_B is very low or very high, i.e., when the attack is very strong or very weak.

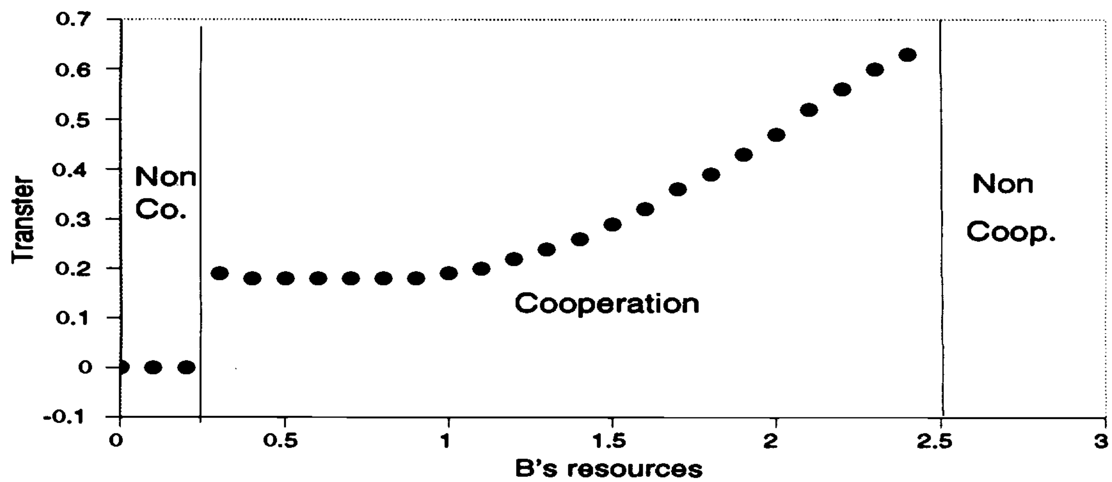

Figure 4: Transfer and regions of cooperation as a function of the strength of the attack (which decreases from left to right).

When the attack is strong, B's remaining resources are very productive. The opportunity cost of transferring them to A is very high, but A will not help without being compensated for its private loss. The inability to reach agreement here is, in a sense, due to liquidity constraints even though, strictly speaking, B has enough resources to compensate A.

Co-operation also breaks down when the attack is very weak. The intuition is as follows; as B's resources increase, the size of the date-2 pie and B's desire to protect it increase while B's opportunity cost of doing so decreases. Hence, B invests an increasing amount in power-seeking. The transfer should let A increase its power enough to recapture private loss it bears. But as B's power-seeking increases, A requires more and more investment in power-seeking to do this. Hence the size of the required transfer increases with λ_B even though the pie has grown (see figure 4). Furthermore, even as A invests an increasing fraction of the transfer in power- seeking, B has to counteract it. Ultimately, combined power seeking increases by more than the transfer and wipes out any gain from fighting the external rival off (see figure 5). Co-operation breaks down.

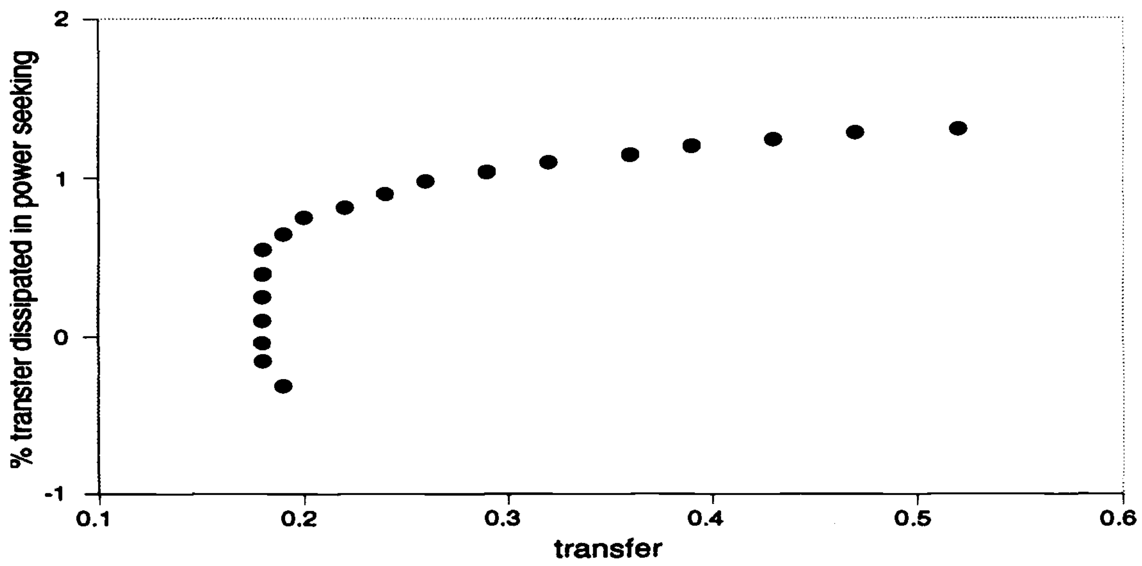

Figure 5: Total increase in power seeking as a function of the size of the necessary transfer

While the possibility of transfers changes the regions where co-operation breaks down, it does not change the fundamental point in this section that the attacker should choose the strength and direction of its attack judiciously. A strong attack can reinforce co-operation in certain situations, while it can break it down in other situations. An intimate study of the power structure within the organization targeted for attack is of essence in developing a successful strategy.[21] This is, after all, what Kautilya and Sun Tzu said thousands of years ago. But for it to make sense, we had to pay attention to the adverse consequences of power struggles.

6 Conclusions

This paper analyzes the adverse consequences of power struggles. Power struggles, though costly in their own right, can be worse because subunits may not co-operate in anticipation of the collateral consequences of an agreement.

Power struggles arise whenever property rights are not fully specified and can be altered by agents' actions. This endogeneity of property rights may be the unfortunate outcome of an unanticipated event (like the collapse of the Soviet Empire) or a device intended to draw forth specific investments (Rajan and Zingales, 1995).

No matter what their source is, we have argued that the way of Machiavelli (internecine conflict) can block the way of Coase (co-operation) when the efficiency gains from co-operation are small compared to the distributional consequences. Since much of politics (and academia) is about re-distribution, there is much conflict and substantial evidence of persistent and obvious inefficiencies.

To return to an example that started this paper, a donation to a department that does not have much in terms of growth opportunities simply makes it a stronger political force to contend with in the future (especially if the intention is to reduce its size then). The university may be better off returning the donation than contending with the ensuing power struggle. By contrast, a donation to a growing department in a growing university can be put to better use and opposition can be silenced through side payments. Our theory also suggests that agreements in such situations may be better achieved by enhancing the productivity of the inefficient hold-out, rather than transferring resources. Again reverting to an earlier example, peace among warring neighbors can be sustained better by enhancing their trading opportunities with the outside world rather than funneling huge amounts of money to their

[21] See also the work by Garfinkel (1994) on why democracies may be more peaceful.

governments.

By contrast, in situations with substantial growth opportunities, the efficiency gains from co-operation are likely to be large. It is only when the opportunities for at least some parts of the organization diminish substantially that conflict rears its ugly head. This may be why firms such as General Electric attempt to maintain a stable of high performing subunits only, getting rid of below-par ones even though there is no reason to believe that GE will manage them worse than a potential buyer. Since growing firms and stagnant firms are likely to have very different political environments, our model also suggests that they should have very different organizational structures. Developing these implications further is a task for future research.

Finally, it is useful to reiterate a methodological point our paper makes. Since Grossman and Hart (1986), researchers have focused on the inefficiencies that might arise in an incomplete contract world where two parties can perfectly contract ex post, but cannot perfectly contract ex ante. Holmstrom and Milgrom (1991) argue that optimal contracts where an agent has to be given the incentive to perform multiple tasks can look very different from contracts where the agent has to be given the incentive to perform a single task, especially if only a subset of relevant measures can be contracted upon. We make a related, but distinct, point. We point out why two parties might be inside the Pareto frontier even in the presence of perfect current contractibility, because of the non contractability of future interactions. In some situations, assuming the non-contractability of future interactions may be more relevant than assuming the non-contractability of current interactions.

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Proof of lemma 1:

(i) Existence Let A's share of the surplus be $U^A(g^A, g^B; \lambda^A)$ Skaperdas (1992) shows that U^A is quasiconcave in g^A if

Condition 1: $U_1^A <= 0$ implies $U_{11}^A < 0$. Intuitively, strict quasi-concavity requires that a function be strictly monotonic, or first strictly increasing then decreasing over the interval on which it is defined. If $U_1^A <= 0$ when $g^A = 0$, then by condition 1, U^A is decreasing throughout. If $U_1^A > 0$ when $g^A = 0$ then either it is always positive, or it touches zero for some $g^A > 0$. In the former case, the function is strictly monotonic as desired, in the latter case, it is first strictly increasing, then applying the argument above, it is strictly decreasing. Thus condition 1 ensures that U^A is strictly quasi-concave. Since it is also continuous in g^A, and similar results can be proven for U^B and g^B, the existence of a pure strategy equilibrium is guaranteed if condition 1 holds.

All that remains to show existence is then to prove that condition 1 holds.

Let

$$U_1^A = p_1^A(F^A + F^B) - p^A F_1^A <= 0 \tag{18}$$

Also,

$$U_{11}^A = p_{11}^A(F^A + F^B) - 2p_1^A F_1^A + p^A F_{11}^A. \tag{19}$$

Substituting for $F^A + F^B$ from (18) in (19), we get

$$U_{11}^A <= p^A F_{11}^A + [\frac{p_{11}^A}{p_1^A} p^A - 2p_1^A] F_1^A. \tag{20}$$

Substituting the condition in the lemma into (20), we prove condition 1.

Thus an equilibrium exists.

(ii) Uniqueness:

Let r^A and r^B be reaction functions for A and B respectively. It is sufficient to prove that $\frac{d}{df^A} r^A(r^B(f^A)) = r^{A\prime}(f^{B*}) \cdot r^{B\prime}(f^{A*}) < 1$ for any equilibrium point (f^{A*}, f^{B*}) to show that the equilibrium is unique. Again, the intuition is simple. Let f^{A*1} and f^{A*2} be two adjacent albeit isolated equilibrium values (see Skaperadas (1992) for a discussion of why equilibria have to be isolated). Because $\frac{d}{df^A} r^A(r^B(f^{A*1})) < 1$, and because no equilibrium exists between f^{A*1} and f^{A*2}, it must be that $r^A(r^B(f^A)) < f^A$ between f^{A*1} and f^{A*2}. But if we consider equilibrium f^{A*2} and knowing $\frac{d}{df^A} r^A(r^B(f^{A*2})) < 1$, it must be that $r^A(r^B(f^A)) > f^A$ between f^{A*1} and f^{A*2}. This is a contradiction and the equilibrium is unique if $r^{A\prime}(f^{B*}) \cdot r^{B\prime}(f^{A*}) < 1$.

What remains to be shown is that $r^{A\prime}(f^{B*}) \cdot r^{B\prime}(f^{A*}) < 1$. This is equivalent to showing that

$$\frac{U_{12}^A \cdot U_{21}^B}{U_{11}^A \cdot U_{22}^B} < 1 \tag{21}$$

Recognizing that with the form of the power function in (2), $p_{12}^A p = \frac{(1-2p^A)p_1^A p_2^A}{(1-p)}$, and substituting for p_{12}^A, F_1^A, and F_1^B (the values of the latter two terms are from the first order conditions) in U_{12}^A, we can show that $U_{12}^A = -U_{21}^B = 0$ Also, the negativity of second order conditions in equilibrium ensures that $U_{11}^A \cdot U_{22}^B > 0$. Hence (21) holds.

Proof of lemma 2: Totally differentiating the first order conditions, $U_1^A(g^A, g^B, \lambda^A) = 0, U_2^B(g^A, g^B, \lambda^A) = 0$, we get

$$U_{11}^A \cdot \frac{\partial g^{A*}}{\partial \lambda^A} + U_{12}^A \cdot \frac{\partial g^{B*}}{\partial \lambda^A} = -U_{1\lambda^A}^A \tag{22}$$

$$U_{21}^B \cdot \frac{\partial g^{A*}}{\partial \lambda^A} + U_{22}^B \cdot \frac{\partial g^{B*}}{\partial \lambda^A} = -U_{2\lambda^A}^B \tag{23}$$

Solving simultaneously, and recognizing that $U_{21}^B = -U_{12}^A = 0$ and from the proof of lemma 1 that $U_{11}^A \cdot U_{22}^B - U_{12}^A \cdot U_{21}^B > 0$, we obtain the lemma.

□.