E C O N O M I C S  B U L L E T I N

# Divisional power, intra−firm bargaining and rent−seeking behavior in multidivisional corporations

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## *Abstract*

Increasing divisional operational responsibilities and the dispersal of knowledge creating activities within the firm have loosened the traditional hierarchical structure of multi−divisional firms. In this paper we argue that a similar mixture of competition and cooperation that is found in inter−firm relationships now characterizes intra−firm relationships. Our model describes a situation in which divisional managers have their own objectives that may diverge from those of the firm as a whole.Thus, divisional managers are both profit−seekers in creating value that can be appropriated and rent−seekers in attempting to maximize their divisional share of the value created by the firm. The bargaining power of a division to maintain and increase its share of the profits generated by the operations of the firm as whole is crucially determined on its strategic independence.

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## 1. INTRODUCTION

Divisions in multi-divisional corporations differ in terms of productivity. Advocates of the resource-based view of business organizations suggest that division performance varies due to different strategic resources owned by each division (Wernerfelt, 1984). More specifically, they argue that different divisional strategic advantages in the form of valuable, rare and inimitable resources produce differences in the ability of divisions to generate returns for the firm as a whole (Barney, 1991; Peteraf, 1993).

In this paper we construct a theoretical model to describe how the profits generated by divisional resource-based advantages are distributed amongst divisions within the firm. However, the concept of resource distribution in the context of strategic competitive advantage is closely related to rent appropriation (Amit and Schoemaker, 1993). Therefore, our aim in this paper is to formulate a theory to illustrate the process whereby resources flow within multi-divisional firms. We show that divisional bargaining power is a crucial determinant of rent appropriation (Coff, 1999).

We construct a model in which divisions have their own goals that may diverge from those of the firm as a whole. We hypothesize that division managers are both profit seeking and rent-seeking since their actions take place with two different objectives in mind. The first objective, that can be termed 'external', is maximizing shareholders' value through market operations aimed at maximizing profits. The second objective is 'internal' and comes about when profits earned on the market become rents available for transfer within the firm. We argue that managers bargain with each other in the attempt to secure the highest amount of available rents for their divisions. Divisional power within the firm is the prime determinant of the distribution of these rents.

Scharfstein and Stein (2000) develop a similar model of inefficient allocation of resources due to intra-firm managerial behavior. In their model, divisional managers split their time between non-productive (lobbying for resources) and productive (using the resources to run their divisions) activities. They show that managers of less productive divisions spend a higher proportion of their time on lobbying for resources. Our model differs from theirs in a fundamental way. They assume an all-powerful headquarters that can allocate firm resources by fiat[1] and that a division's bargaining power is based simply on its lobbying efforts. In contrast, we assume that headquarters (and top management) may not exercise complete control over divisional management. In other words, we allow for the possibility that divisional managers may be so powerful as to be beyond the control of headquarters,[2] Such managers can act in a persistent manner, to further the interests of their divisions even at the expense of the prospects of the firm as a whole. Thus, *no matter what the level of lobbying effort undertaken by other divisions*, headquarters is unable to extract resources from powerful divisions. Further, powerful divisions are able to extract transfers from weaker divisions – they do not need to lobby headquarters to do so. This also contrasts with the assumption of Scharfstein and Stein (2000).

Profits generated by the firm are distributed between divisions through a process of negotiations. These profits become internal rents and are the payoff of the bargaining game. In a simple constant sum bargaining game all the gains of one player are the losses of another. In such a simplified model managers are only rent-seekers without taking into account any production and/or market considerations. Since the payoff is simply a share of a constant block of rents, each division aims at obtaining as large a share as possible. However, our aim in this study is to develop a more sophisticated model in which production considerations come into the picture. When we introduce production considerations, the activities to maximize the division's share of firm profits are

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[1] This assumption of a dictatorial headquarters is consistent in the internal capital markets literature. In one of the seminal papers in this area, Stein (1997) assumes that 'Headquarters' control rights also give it the authority to redistribute resources across projects' (p.117).

[2] For example, Bartlett (2002) provides a detailed description of Philips' corporate headquarters inability to control its huge North American subsidiary.

tempered by considerations about the potentially harmful effects of these activities on the overall level of these profits.

## 2. THE MODEL

We focus on the divisions in a given firm, and for notational simplicity restrict our attention to the case of two divisions, denoted by *A* and *B*. The results, however, extend directly to the case of an arbitrary number of divisions. Each division has a primary responsibility, e.g., a geographical territory, a product category, a business function, etc. However, both divisions, to greater or lesser extent, have secondary responsibilities to support the primary division. For pedagogical ease, let us focus on the case of geographical markets.

The payoff of a typical division '*i*' emanates from serving the firm (increasing firm sales) as well as from serving its own interests (increasing divisional power within the firm). These payoffs appear sequentially. Firstly, the division must generate sales and profits. These profits are the source of divisible rents. Secondly, the division must bargain with the other division to determine its share of the total rents. Thus, the game is organized in two stages where the two divisions are create profits in competition with other firms in the first stage and divide profits between themselves in the second stage. Before starting the analytical part of the section and therefore solving the game, it is important to make a note of two considerations.

First, from the perspective of the firm, divisional profit seeking is beneficial while rent seeking is detrimental. Profit seeking strengthens the firm's competitive position in the market. However, rent seeking merely involves pursuing transfers *from* other divisions and/or preventing transfers *to* other divisions. Such activities do not benefit the firm as a whole. As it is well known, rent seeking leads to a misallocation of resources and thus to inefficiency (Tullock, 1967). In this context, the question that arises is why headquarters, acting as the principal, cannot set up incentives to ensure that rent seeking activities by the divisions (the agents) are reduced to a minimum. The conditions under which it is possible to write an optimal contract that will induce an agent to desist from undertaking actions deleterious to the principal are well established in the literature (Laffont and Martimort, 2002). The lower the level of observability of the agent's actions, the higher the (expected) cost of the optimal contract to the principal. Since the tight monitoring of the multitude of details involved in running a division in a large multi-divisional corporation is virtually impossible, we posit that preventing divisional rent seeking cannot be done by contractual design.

Second, a unique aspect of the principal-agent game played by headquarters and divisional management relates to the nature of the latter's availability of outside options. While divisions can act in their own interests, sometimes at the expense of the firm as whole, the option of exiting the firm is generally unavailable to them. Paradoxically, even to achieve autarky within the firm, a division must have power. A weak division will be exploited and unable to prevent its resources being appropriated by more powerful divisions and/or by headquarters. Therefore autarky is not an outside option and divisions are *ipso facto*, engaged with headquarters and with each other. We can now move on and solve the game backward in the standard manner.

In the second stage of the game, the two divisions bargain over sharing the profits that have been generated in the first stage. Total firm profit is therefore a pre-determined variable in the second stage. We denote the total profits generated in the first stage by $\Pi$ and the payoff of the divisions *A* and *B* by $P_A$ and $P_B$. The 'adding up' constraint is $P_A+P_B = \Pi$. Then the Nash bargaining solution is obtained by maximizing $(P_A)^{\alpha}(\Pi-P_A)^{(1-\alpha)}$ with respect to $P_A$. In this formulation, $\alpha$ is the bargaining power of division *A* and $(1-\alpha)$ is the bargaining power of division *B*. The levels of these bargaining powers will be determined in the first stage and are also pre-determined in the second stage. This yields the standard Nash bargaining solution as

$$P_A / P_B = \alpha / (1-\alpha),$$

so that utilizing the 'adding up' constraint, we may write the Nash bargaining solution as:

(1a) $P_A^* = \alpha \Pi$
(1b) $P_B^* = (1-\alpha) \Pi$

In the first stage the divisions use their resources to generate profits. Again, for notational simplicity, we map the resource bundle of each division into scalar-valued indicator variables, $E_A^0$ and $E_B^0$. Total profits of the firm are the sum of the profits generated by division *A* and division *B*. (In general, divisional profits will be different from divisional pay-offs due to inter-divisional transfers.) Thus,

(2) $\Pi = \Pi^A + \Pi^B$

Each division can use its resource bundle in two ways – in its own operations or in the support of the activities of the other division. Incorporating the divisional resource constraints, the profits of the two divisions may be written as:

$\Pi^A = \Pi^A(E_A, E_B^0 - E_B)$; $\Pi^A_1 > 0$ ; $\Pi^A_2 > 0$
$\Pi^B = \Pi^B(E_B, E_A^0 - E_A)$; $\Pi^B_1 > 0$ ; $\Pi^B_2 > 0$

Finally, we assume that the bargaining power of each division is a function of its profit share. For example, the bargaining power of division *A* is $\alpha = f(\Pi^A / \Pi)$. Agglomerating this information and substituting it into the Nash bargaining solution to the second stage game, division *A* wishes to select its resource use to maximize:

(3) $P_A^* = \alpha \Pi = f(\Pi^A / \Pi) \{\Pi^A(E_A, E_B^0 - E_B) + \Pi^B(E_B, E_A^0 - E_A)\}$

The maximization problem of division B is symmetric. The first order condition for maximum may be written as

(4) $\partial P_A^* / \partial E_A = f(.) [\Pi^A_1 - \Pi^B_2] + (f' / \Pi) [\Pi^B \Pi^A_1 + \Pi^A \Pi^B_2] = 0$

It may be demonstrated that, for well-behaved profit functions, the second order conditions for maximum are satisfied. Examining equation (4), we can relate optimal behavior of the division to the nature of the bargaining power function *f*(.).

***Exogenously Determined Divisional Power***

This simplest case appears when $f' = 0$. This implies that (4) reduces to $\Pi^A_1 - \Pi^B_2 = 0$. Examining (2), it may be seen that this is precisely the condition required for division *A*'s actions to maximize overall firm profit, i.e., it uses its resources optimally from the perspective of the firm as a whole. In this case, divisional outcomes have no impact on divisional bargaining power. Bargaining power is then exogenous to the profit generation in stage 1.

Several situations are compatible with this case. First, it can represent the traditional hierarchical case where headquarters is extremely powerful and divisional power is extremely limited. Thus, divisions are unable to generate leverage through their actions. Second, it can represent the situation of an extremely weak division. For example, a division may be so small that increases in its results may have a negligible impact on the firm's bottom line and so yield very little leverage. The result is therefore quite intuitive – when headquarters is all-powerful *or* when a division is very weak, optimal divisional actions maximize the firm's prospects. In other words, the firm-focused objective pre-dominates and the division-focused objective disappears.

Thirdly, exogenously determined bargaining power can also be interpreted as the case where headquarters is able to design incentive contracts to motivate divisional managers to act in the

interests of the firm as a whole. An example would be payment schemes linked to firm-level performance.

***Endogenously Determined Divisional Power***

A natural expectation of the function $f(.)$ is that $f' > 0$. In this case, for (4) to hold, for reasonably similar marginal profit functions,[3]

(5) $\quad \Pi^A_1 - \Pi^B_2 < 0$

The marginal value of resource use in division *A*'s own activities is smaller than the marginal value in the other division's activities. In other words, from the perspective of the firm, division *A*'s resources are misallocated in favor of its own activities, away from supporting the activities of division *B*. This is because as division *A*'s share ($\Pi^A / \Pi$) rises its bargaining power increases. The misallocation of resources from the perspective of the firm fulfills the division-focused objective of increasing its rent-appropriation ability in stage 2 of the game.

Typically, we would expect (5) hold through division *A* using its resources in its own operations to the extent of driving its own marginal profit towards zero ($\Pi^A_1 \rightarrow 0$), while holding back resources from the operations of the other division ($\Pi^B_2 > 0$). Thus, the quest for power causes division *A* (and symmetrically, division *B*) to increase profits from its own operations *at the expense of* overall firm profits. It does this by withholding resources from the other division even though the marginal profit there is greater.

It is important to note that in such cases, headquarters is unable to design incentive contracts to motivate divisional managers to act in the interests of the firm as a whole. This would be the case in very large firms where the contribution of individual divisions to overall firm performance is difficult to quantify, i.e., computing the value of $\Pi^B_2$ may not be easy. More importantly, the computation of the returns to inter-divisional cooperation it is subject to problems of incentive compatibility, i.e., division A has an incentive to overstate and division B has an incentive to understate this value.

A measure of power with particularly good properties that falls in this category is the division's contribution to the Herfindahl index (Encaoua and Jacquemin, 1980). In this case, $\alpha = f(\Pi^A / \Pi) = (\Pi^A / \Pi)^2$. Note that the contribution to the Herfindahl index is quadratic and generates a convex power function. Inserting this contribution into (4) yields

$$\partial P_A^* / \partial E_A = (\Pi^A / \Pi^2) [\Pi^A_1 - \Pi^B_2] + (f' / \Pi) [\Pi^B \Pi^A_1 + \Pi^A \Pi^B_2] = 0$$

which can be simplified to

(6) $\quad \partial P_A^* / \partial E_A = (\Pi^A / \Pi^2) [\Pi^A_1 (\Pi^A + 2\Pi^B) + \Pi^B_2 \Pi^A] = 0$

It may be clearly seen that there exist values $\Pi^A_1 < 0$ and $\Pi^B_2 > 0$ that are sufficient for this to hold. In this case, power increases so rapidly in profit share, that division *A* actually accepts lower profits from its own operations if it can reduce division *B*'s profits by a greater amount through resource withholding. Thus, division *A* optimizes by attempting to gain a larger share of a smaller overall pie. It may also be seen that substituting the firm optimum ($\Pi^A_1 = \Pi^B_2 > 0$) into (6) ensures that $\partial P_A^* / \partial E_A > 0$. The firm's overall optimum resource involves division *A* using less of its resources on its own operations.

[3] We are implicitly assuming that the both divisions are profitable, i.e., $\Pi^A > 0$, $\Pi^B > 0$, so that $\Pi > 0$. However, this is merely a simplifying assumption. Since power is a function of relative profits, we could just as well shift the origin to the profits of the weakest division (the one with the lowest profits), so that *relatively* all other divisions would always have non-negative profits.

Another special case occurs where power is linearly dependent on profit share. This implies that $f' = k$, where '$k$' is a constant. In this case, (4) reduces to $\Pi^A_1 = 0$. Thus, the division maximizes its own profit, and the effects of its actions on the other division do not enter into its decisions at all. Since power and share are identical in this case, the two influences cancel out, ensuring that the division keeps whatever profit it generates from its own operations. Hence, it focuses on maximizing returns from its own operations and any resources provided in support of the other division are excess or 'leftover' resources that it cannot use. It may be seen that in this particular case the division is pursuing autarky. However, in order to implement this strategy of autarky, the division must create power and play the game against the other division. Therefore, as noted above, autarky is a strategic outcome within the game and not an outside option.

For completeness, we finally examine the case where the function $f(.)$ is such that $f' < 0$. In this case, again assuming reasonably similar marginal profit functions, $\Pi^A_1 - \Pi^B_2 > 0$. The marginal value of resource use in division $A$'s own activities is larger than the marginal value in the other division's activities. From the perspective of the firm, the division actually misallocates its resources in favor of the activities of the other division. This is because as division $A$'s share ($\Pi^A/\Pi$) rises its bargaining power falls. Thus, it acts to reduce its share of total firm profit. The situations in which this could arise are doubtless quite rare. An example of such a situation could be where headquarters is pre-disposed to equalizing contributions within the firm. Thus, it may always ally itself with weaker divisions and the strength of its support may be contingent on the weakness of the division. By reducing the disparity in divisional profits, a strong division could conceivably neutralize headquarters re-distributional efforts.[4]

## 3. DISCUSSION AND CONCLUDING REMARKS

In this paper we address an issue that has not received much attention in the classical theory of the firm, i.e., how does intra-firm bargaining affect the scope and organization of large multi-divisional firms? Coase (1937) suggested that transactions that are typically conducted within the firm are not governed by the price mechanism, but rather by power relationships. Questions about what has to be understood as power, its role and its sources have been investigated in the literature. Mechanisms such as ownership of physical assets (Grossman and Hart, 1986; Hart and Moore, 1990), the allocation of control rights over the acquisition of information (Aghion and Tirole, 1997), the provision of access to critical resources (Rajan and Zingales, 1998) and the investment in direct specialization over time (Rajan and Zingales, 2001) have all been elements defining alternative concepts of internal power within the firm. However, the role that power plays inside the business organization is poorly understood. A number of papers model intra-firm multilateral bargaining processes between the top management and employees to demonstrate that the way in which contractual negotiations are organized might affect the overall governance structure of the firm (Stole and Zwiebel, 1996). However, the focus in these studies has been concentrated on the employer-employee power relationship. The interaction between divisions or subsidiaries in large business organizations and its effects on the performance of the firm as a whole has been largely neglected.

In this paper we focus on the role played by divisional power in multi-divisional firms. We claim that the extent of rent seeking and the consequent resource misallocation depend on the bargaining power enjoyed by each division in negotiating resource transfers within the firm with both the other competing divisions and the firm's headquarters. In this framework, resources tend to be appropriated by the more powerful divisions. Divisional power is therefore merely a means to an end, which is represented by the ability to extract rents from the value created by the firm's activities. In our model we argued that the bargaining power enjoyed by the different divisions

[4] Note again, that unlike the approach commonly adopted in the internal capital markets literature, headquarters does not exercise dictatorial power.

drives resource flows within the firm (i.e., the direction and level of rent appropriation). However, we have not specified the nature and sources of divisional bargaining power in detail.

In traditional organization theory, multi-divisional firms are seen as hierarchical organizations in which headquarters delegates divisions' decision rights (Williamson, 1975). The transfer of decision-making authority to divisions creates opportunities for the implementation of activities involving moral hazard. In this context, headquarters must choose the optimal level of delegation such that misallocation of resources is reduced to a minimum (Jensen and Meckling, 1992; Gal-Or and Amit, 1998). In this approach to the theory of the firm divisions are seen as passive agents and headquarters have complete control over the amount decision rights to be delegated. In this framework, the notion of *discretion* is generally used to indicate the extent to which divisions can exercise decision-making autonomy (Simon, 1991; Baker *et al*., 2001).

In our model, the traditional view of the firm appears as a special case. The novelty of our approach consists in introducing another source of divisional autonomy, in addition to the discretion that is granted by headquarters. We refer to what has been defined in the previous section as divisional bargaining power (even vis' a vis' headquarters!). In our theoretical model the bargaining power of a given division is a function of its profit share. This power can be either exogenously or endogenously generated depending on the nature of the bargaining power function $f(.)$. It is straightforward to note that the case of exogenously determined divisional bargaining power ($f' = 0$) is analogous to the notion of discretion. In this case, the firm-focused objective dominates the division-focused objective because either headquarters is too powerful or the division is too weak. The traditional view of the firm as a hierarchical governance structure applies and the role played by the division in extracting rents from intra-firm resource transfers is negligible if it exists at all.

Divisional bargaining power is endogenously determined ($f' \neq 0$) when a set of divisional resources, actions and/or characteristics affect its productivity. We refer to those resources, actions and characteristics that create informational and other competitive advantages and affect the strategic independence of a given division with respect to other divisions and the firm as a whole (Aghion and Tirole, 1997; Rajan and Zingales, 1998). In particular, we allude a division's strategic position within the firm as evidenced by the extent of tasks performed in the firm's supply chain, the control exercised over the production process, the duration of the division's operations within the firm, its research and development (R&D) intensity and the extent of its knowledge creating capabilities (Mudambi and Navarra, 2002a and 2002b). The division's strategic position affects its competitive advantage in negotiating resource transfers within the firm.

Rajan, Servaes and Zingales (2000) point out that financial diversity amongst divisions reduces the incentive of the better performing divisions to cooperate with the poorer performing divisions, since the returns to cooperation are likely to fall between those of the two. They argue that headquarters reduces intra-firm financial diversity in order to strengthen the incentives for divisions to cooperate. We suggest that this only tells part of the story; Divisions that are powerful may be able to resist headquarters' attempts to re-distribute their profits.

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