Corporate Diversification: Good for Some Bad for Others

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Abstract

In this paper a model based on conflicts of interest between shareholders, the CEO and divisional managers is developed to explain why corporate diversification is good for some firms and bad for others.

It is shown that when the decision to diversify is endogenous, whether diversification destroys value depends on the severity of conflicts of interests and the complementarities across divisions and not, as usual in the literature that explains value-decreasing diversification, on the efficiency of internal capital markets.
1 Introduction

Corporate diversification is a pervasive phenomenon despite the fact that is widely believed to be inefficient. The empirical evidence documents the existence of a diversification discount; i.e., the empirical observation that on average diversified firms trade at a discount relative to a portfolio of stand-alone firms in the same business segments,\(^1\) yet around 40% of them trade at a premium.\(^2\) The reason why diversification is good for some firms and bad for others is still an open question. There is a recent and large body of literature that provides an answer to this question based on the efficiency of internal capital markets. In particular, this literature argues, contrary to Williamson (1975), that there are circumstances under which internal capital markets allocate funds across divisions in an inefficient way thereby reducing firms’ overall value.\(^3\)

The goal of this paper is to provide an explanation for why diversification is good for some firms and bad for others that does not rely on the efficiency of an internal capital market. I consider two units (divisions) that can be operated either as stand-alone firms or as an integrated firm. It is shown that agency problems between the CEO, shareholders and divisional managers induce the CEO, under certain parameter configuration, to choose to integrate two units when the value-maximizing strategy for them is to stay focused and for others to choose the value-maximizing strategy. Thus, diversification is sometimes value-reducing and others value-increasing.

The model in this paper is based on agency problems arising from the existence of managerial private benefits and conflicts of interest between the CEO, shareholders and divisional managers. The CEO’s private benefits are a fraction of the firm’s total return when his preferred projects are implemented, while a divisional manager’s private benefit represents a fraction of his division’s return only when his preferred projects is implemented, where the total return is the sum of divisional


\(^2\)The event study evidence also reports a positive returns to diversification announcements through the mid-1970s (Matsusaka, 1993; Hubbard and Palia, 1998). The evidence, however, for the 1980s and 1990s is mixed (Kaplan and Weisbach, 1992; Morck et al., 1990; Hyland, 1999; and Chevalier, 2000)

\(^3\)See, e.g., Rajan, Servaes and Zingales (2000), Sharfstein and Stein (2000) Wolf (1999), and Matsusaka and Nanda (2000) and section 6 for a more detailed discussion of this literature.
returns plus the synergies arising from interdivisional coordination on project choice. Shareholders hire a CEO to choose and implement projects, allocate resources, and choose an organizational structure (centralization vs decentralization) and a diversification strategy (diversification versus focus). Centralization in this paper is understood as an structure under which the CEO chooses the projects to be implemented in each division, while decentralization as an structure under which each divisional manager chooses the project to be implemented in his own division.

In this environment, the consequences of decentralization are that divisional managers exert more effort, the CEO’s productivity is larger and divisional managers’ productivity is lower. Divisional managers exert more effort because they work always in their preferred projects, while under centralization they, sometimes, work in their preferred projects. The CEO’s productivity is larger because he does not devote time and effort to project implementation while divisional managers’ productivity is lower because they devote time and effort to project implementation. For instance, time to gather information about project characteristics or effort spent to learn the realized state. Thus, decentralization, understood as delegation of real authority, induces divisional managers to exert more effort and increases the CEO’s productivity, but it decreases divisional managers’ productivity.

The consequences of diversification are that divisional managers exert less effort and the CEO’s productivity is lower. The CEO’s productivity is lower because he has to manage two divisions instead of one and divisional managers exert less effort because their expected private benefits are lower as a consequence of the CEO’s lower productivity.

Given that in this paper interdivisional coordination on project choices across divisions is achieved only under an integrated firm and it is ensure under centralization, it is shown that the CEO prefers a diversified strategy and a centralized structure when the synergies are large, a diversified strategy and a decentralized structure when the synergies are neither too large nor too small and a decentralized focused firm when synergies are small. For large synergies, both the CEO and shareholders greatly benefit from interdivisional coordination while for small synergies, both the CEO and shareholders benefit more from being focused and decentralized since synergies cannot outweigh the CEO’s lower productivity and divisional managers’ lower effort. When synergies are neither too large nor too

\[4\] See, Aghion and Tirole (1997) for the seminal paper on the positive incentive effects of delegation.
small, then the CEO chooses a decentralized multidivisional firm because synergies are large enough to outweigh divisional managers’ lower efforts and the CEO’s lower productivity due to overload, but not large enough to compensate for the CEO’s lower productivity due to that he has to spend time and effort implementing projects.

In addition, it is shown that when synergies are not large enough, the CEO benefits more from diversification than shareholders do and thereby, the CEO chooses to diversify when the value-maximizing strategy is to remain focused. Thus, conditional on diversification taking place, when synergies are not large enough diversification destroys value. This result is driven by three forces: the wrong organizational structure effect, the pure disaligned preference effect, and the empire-building effect. The wrong organizational structure effect arises when the CEO chooses a centralized multidivisional firm despite that a decentralized one is value-maximizing. The intuition being that under decentralization the CEO works with positive probability in a project that does not yield any private benefits to him, while this is not true for shareholders. This implies that the CEO’s benefits from decentralization are lower than shareholders’ benefits. Thus, from shareholders’ point of view synergies are not large enough to outweigh divisional managers’ lower effort and the CEO’s lower productivity, yet they are large enough from the CEO’s point of view. The pure disaligned preference effect is also the outcome of disaligned preferences on project choices, but in this case the value-maximizing structure is adopted. This effect arises because under a decentralized focused firm, shareholders benefit from any project implemented by divisional managers, while the CEO benefits only when certain type of projects are implemented. The empire building effect arises because the CEO’s decision to diversify depends on the private benefits yielded by a diversified firm relative to the private benefits yielded by a focused firm, while the optimality of diversification depends on the returns yielded by diversified firm relative to the return of a pool of focused firms. This implies that even if the incentives are perfectly aligned, the CEO’s prefers diversification more often than it is optimal. This effect while trivial it has been ignored by the agency literature because the decision to diversify is usually assumed to be exogenous or made by shareholders.

Agency theory as developed by Jensen and Meckling (1976) suggests that managers make decisions that increase their utility while potentially decreasing the firm’s value because they are not full
residual claimants. In this context, there are two different types of agency problems that provide explanations for why a conglomerate strategy is adopted or why managers diversify their firms. The first is based on the idea that managers diversify their idiosyncratic risk resulting from having undiversified positions in their own firms. The evidence on this is, however, mixed; some authors find that managers with more stock ownership acquire divisions in business that allow to lower the risk, while others find evidence of less diversification in firms with more managerial stock ownership. But, more importantly, nothing prevents a manager from diversifying using the stock market. Thus, this is not a good explanation for why managers diversify their firms. The second type of explanation is based on the idea that managers derive private benefits of control from managing more diversified firms (Jensen, 1986; Stulz, 1990). Reasons for this range from prestige from managing larger firms, entrenchment through specific human capital investments to the idea that larger firms provide larger pay. These theories, although based also on agency problems, fail to explain when diversification takes place and why diversification is good for some firms and bad others. In fact, they can only explain why diversification can be value-reducing in the case that a diversified strategy is adopted.

In addition, the model produces a number of predictions concerning the interaction between diversification strategy, organizational structure and firm’s value that are more subtle. The model predicts that; (i) firms that pursue diversification that is not sufficiently related are traded at a discount (See, e.g., Ravenscraft and Scherer (1987), Kaplan and Weisbach (1992), and Fang and Lang (2000)); (ii) the more the CEO understands his firm’s opportunities, the smaller the set of parameters under which diversification destroys value; (iii) there are both, a causal link between diversification and value and measurement problems (See, e.g., Berger and Ofek (1995), Lang and Stultz (1994), Whited (2000)); (iv) when cash-flows under a multidivisional firm are abundant relative to a focused firm, diversification is less likely to reduce value, while when cash-flows are scarce, the opposite occurs; and (v) the more unequal are units’ opportunities ex-post, the larger the set of parameters under which diversification destroys value (See, e.g., Rajan, Servaes and Zingales, (2000)); (vi) value-reducing diversification occurs more often when firms are centralized.

The next section, section 2 presents the model. Section 3 derives the CEO and divisional managers’ project choices and optimal effort choices under each organizational structure and diversi-
fication strategy. In the next section, section 4, the CEO’s preferred diversification strategy and organizational structure is derived. In section 5, I discuss the empirical evidence on the existence of a diversification discount and show how the model can explain why diversification is good for some firms, but bad for others. In section 6, I study how an efficient internal capital market can destroy value, the empirical evidence and alternative models. In the next section, section 7, the related literature is briefly discussed. Finally, in section 8, concluding remarks are presented.

## 2 The Basic Model

I consider a firm composed of shareholders, a risk-neutral CEO and two risk-neutral agents or divisional managers. Shareholders hire a CEO to implement and work on projects, choose an organizational structure and a diversification strategy, and allocate resources across divisions. Whereas divisional managers are hired to implement and work on projects.\(^5\)

The CEO must jointly choose the organizational structure (centralization vs decentralization) and diversification strategy (multidivisional firm vs focused firm). In a centralized organizational structure the CEO chooses the projects to be implemented, while in a decentralized one this decision is fully delegated to divisional managers.\(^6\)

Each division faces 2 projects, called \(\alpha\) and \(\beta\) in what follows. A project’s return depends on divisional manager’s effort, the CEO and divisional manager’s productivity and, in a multidivisional firm, the project combination across divisions. A unit’s return when operated as a focused firm is \(H h_i \pi_i e_i, i = 1,2\), where \(\pi_i\) is the return for which unit \(i\) by itself can be accountable for, \(e_i\) is divisional manager \(i\)'s effort, \(H\) is a parameter that captures the CEO’s productivity and \(h_i\) is a parameter that captures divisional manager \(i\)'s productivity. When both divisions units are operated as an integrated firm total return when project combination \((n_i, n_j)\) is \(\{(\alpha, \alpha), (\alpha, \beta), (\beta, \alpha), (\beta, \beta)\}\) is implemented is \((h_1 \pi_1 e_1 + h_2 \pi_2 e_1 + s (n_i, n_j) (h_1 e_1 + h_2 e_2)) H\), where \(s (n_i, n_j)\) is the synergy arising

\(^5\)I assume that there is no conflict of interest within a division; that is, a divisional manager’s preference fully captures the preferences of the members belonging to his division.

\(^6\)Notice that in the terminology of Aghion and Tirole (1997), here, real and formal authority are the always the same.
when project combination \((n_i, n_j)\).

To capture in a simple form the benefits from interdivisional coordination, I assume that \(s(\alpha, \alpha) = s\) and \(s(\alpha, \beta) = s(\beta, \alpha) = s(\beta, \beta) = 0\). This assumption captures well the idea that interdivisional coordination in a given set of projects is a necessary condition to get a positive return from synergies and that coordination could be more beneficial when is in one type of project, project \(\alpha\), than in other type, project \(\beta\).\(^7\)

The CEO’s productivity parameter \(H\) is equal to \(\frac{1}{\gamma}\) in a decentralized multidivisional firm and \(\frac{M}{\gamma}\) in centralized multidivisional firm, while it is 1 in a decentralized focused firm and \(M\) in a centralized focused firm, with \(M \in [0, 1]\) and \(\gamma \geq 2\). This is meant to capture two things: (i) the CEO’s cost from overseeing two instead of one division—this explains why within a given organizational structure the CEO’s productivity parameter is smaller in a diversified firm; and (ii) the idea, in a reduced form, that implementing projects diverts personal productive resources away from other tasks. For instance, project implementation requires to gather some information in order to distinguish projects. This explains why the CEO’s productivity parameter within a diversification strategy is smaller in a centralized firm. Divisional manager \(i\)’s productivity parameter \(h_i\) is equal to 1 in a centralized organization and \(m \in [0, 1]\) in a decentralized one for \(i = 1, 2\). This is meant to capture, in a reduced form again, the idea that the task of implementing projects diverts personal productive resources away from other tasks. Furthermore, a divisional manager’s disutility of effort \(e_i\) is \(\frac{1}{2}e_i^2\).

Furthermore, it is assumed that \(m \geq M\); that is, it is more costly in terms of productivity for the CEO to investigate projects than for divisional managers. This captures the idea that the manager closest to the project (division) is more likely to know more about its prospects and thereby it has to use less personal resources to implement a project.

Implemented projects yield different private benefits to the CEO and divisional managers. They yield to divisional manager \(i\) a fraction \(\varphi_i\) of the return that accrues only to division \(i\) when his preferred project is implemented and 0 otherwise, while they yield to the CEO a fraction \(\phi\) of the return that each division by itself is accountable for plus a fraction \(\phi\) of the synergies when his

\(^7\)It can be shown that if \(s(\beta, \beta) = s\), most of our results holds, but the algebra gets unnecessarily complicated. In the last section, I discuss how our results change when \(s(\beta, \beta) = s\) is assumed.
preferred project is implemented and 0 otherwise. This implies that divisional managers do not get any private benefits from synergies. This is meant to capture the idea that $s$ influences the overall firm’s performance, but cannot be traced back to any particular division and thereby cannot benefit divisional managers, and that divisional managers have less incentives to coordinate project choices than the CEO. This is consistent with the evidence that coordination is harder to achieve under a decentralized structure.

The table below shows in the first entry the fraction of the return, $H h_i \pi_i e_i$, that accrues to divisional manager $i$ as a private benefit for each project combination and each state, while the first element in the second entry is the fraction of division $i$’s return that accrues to the CEO as a private benefit and the second one is the fraction of return from division $j$’s return that accrues to the CEO as a private benefit.

<table>
<thead>
<tr>
<th>State</th>
<th>$(\alpha, \alpha)$</th>
<th>$(\alpha, \beta)$</th>
<th>$(\beta, \alpha)$</th>
<th>$(\beta, \beta)$</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$\varphi_{i1}(\phi, \phi)$</td>
<td>$\varphi_{i1}(\phi, 0)$</td>
<td>0, (0, $\phi$)</td>
<td>0, (0, 0)</td>
<td>$p$</td>
</tr>
<tr>
<td>2</td>
<td>0, ($\phi, \phi$)</td>
<td>0, ($\phi, 0$)</td>
<td>$\varphi_{i2}(0, \phi)$</td>
<td>$\varphi_{i2}(0, 0)$</td>
<td>$1 - p$</td>
</tr>
</tbody>
</table>

This shows that in state 1 divisional manager $i$ prefers project $\alpha$ and in state 2 project $\beta$, while the CEO prefers always project $\alpha$ and thereby $(\alpha, \alpha)$ over $(\alpha, \beta)$, $(\beta, \alpha)$ and $(\beta, \beta)$. Notice also that the CEO prefers combination $(\alpha, \alpha)$ over $(\alpha, \beta)$ and $(\beta, \alpha)$ and these two over combination $(\beta, \beta)$ while shareholders prefer $(\alpha, \alpha)$ over $(\alpha, \beta)$, $(\beta, \alpha)$ and $(\beta, \beta)$, but they are indifferent between combinations $(\alpha, \beta)$, $(\beta, \alpha)$ and $(\beta, \beta)$. This is meant to capture the existence of conflict of interests between the CEO and shareholders. Furthermore, the severity of the conflict between shareholders, the CEO and divisional managers is captured by $p$; for as $p$ goes to 1, shareholders, the CEO and divisional managers’ conflict become less severe since divisional managers choose the CEO and shareholders’ preferred project combination more often and the CEO’s preferred combination is more likely to be divisional managers preferred combination.

- Assumption 1: $\varphi_i \in [0, 1]$, $\phi \in [0, 1]$ for $i = 1, 2$.

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8 It could be assumed that divisional managers also get private benefits from synergies, yet this does not change the results and over complicates the algebra.

9 See, e.g., the discussion in Argyres (1995) on a common technology adoption at IBM (centralized) versus GM (decentralized) and the management of strategy literature (Hill and Hoskisson, 1987 and the references therein).
Finally, it is assumed that the CEO and divisional managers’ reservation utility is zero and both have limited liability that it is also normalized to zero.

The timing of decision is as follows: At stage 1, shareholders hire the CEO to undertake the tasks mentioned above. At stage 2, the CEO hires divisional managers and chooses the organizational structure and diversification strategy. At stage 3, divisional managers choose effort. At stage 4, states are realized and learned by divisional managers and the CEO. At next stage, stage 5, under centralization the CEO chooses the projects to be implemented, while under decentralization divisional managers choose the projects to be implemented. At the final stage, returns are realized and compensation, if any, takes place.10

3 Project Choice and Divisional Managers Effort Allocations.

Suppose first that the CEO chooses a centralized multidivisional firm and thereby he chooses the projects to be implemented. Given the CEO’s preferences over projects, he implements project $\alpha$ in both division independent of the realized state since the implementation of project $\beta$ yields no private benefits to him. Thus, the CEO’s expected payoff in a centralized multidivisional firm, denoted by $U_c^2$ in what follows, is given by

$$U_c^2 = \phi \frac{M}{\gamma} (\pi_1 e_1 + \pi_2 e_1 + s (e_1 + e_2)), $$

while divisional manager $i$’s expected payoff, denoted by $u_{c2}^i$ in what follows, is

$$u_{c2}^i = \varphi_i p \frac{M}{\gamma} \pi_i e_i - \frac{1}{2} e_i^2. $$

Note that $\varphi_i \frac{M}{\gamma} \pi_i$ is multiplied by $p$ because only in state 1 the CEO chooses divisional manager $i$’s preferred project and $m$ has been suppressed since divisional manager $i$ does not spend any resources on project implementation.

10 The timing in which divisional managers choose effort after seeing the projects implemented yields the same results.
It readily follows from this that divisional manager \( i \)'s effort under a centralized multidivisional structure, denoted by \( e_{i2}^c \), is given by \( \frac{\phi M_2 p \pi_i}{\gamma} \). Thus, the CEO's expected payoff when a centralized multidivisional is adopted becomes

\[
U_c^2 = \frac{\phi M_2^2 p}{\gamma} (\varphi_1 \pi_1^2 + \varphi_2 \pi_2^2 + s (\varphi_1 \pi_1 + \varphi_2 \pi_2)).
\]

(1)

When a centralized focused firm is adopted, the CEO's preferred project continues being project \( \alpha \) and divisional manager \( i \)'s effort is \( e_{i1}^c = \varphi_i p M \pi_i \). Thus, the CEO's expected payoff when a centralized focused firm, denoted by \( U_1^c \), is

\[
U_1^c = \phi \varphi_i p M_1^2 \pi_i^2.
\]

(2)

The parameter \( \gamma \) has been suppressed since there is only one division and thereby there is no overload.

Consider next the case in which the CEO chooses a decentralized multidivisional firm. In this case divisional managers choose to implement their preferred projects always; that is, project \( \alpha \) in state 1 and project \( \beta \) in state 2 because the implementation of project \( \beta \) in state 1 and project \( \alpha \) in state 2 yields 0 private benefits. Thus, the CEO’s expected payoff in a decentralized multidivisional firm, denoted by \( U_2^d \) in what follows, is given by

\[
U_2^d = \frac{\phi m p}{\gamma} (\pi_1 e_1 + \pi_2 e_1 + ps (e_1 + e_2)),
\]

while divisional manager \( i \)'s expected payoff, denoted by \( u_{i1}^d \) in what follows, is

\[
u_{i1}^d = \varphi_i m \pi_i e_i - \frac{1}{2} e_i^2.
\]

Note that in this case \( \varphi_i \frac{\phi m}{\gamma} \pi_i \) is not multiplied by \( p \) because independent of the realized state divisional managers always implement their preferred project and \( m \) has been added to capture the decrease in productivity from the use of personal resources in the process of project implementation. Notice also that \( M \) has been suppressed from \( U_2^d \) because under decentralization the CEO does not
implement projects and thereby does not need to take time or resources away from other productive
tasks to be able to implement projects.

It readily follows from this that divisional manager \(i\)'s effort under a decentralized structure, denoted by \(e_{i2}^d\), is given by \(e_{i2}^d = \frac{\varphi_i m \pi_i}{\gamma^2}\). Thus, the CEO’s expected payoff when a decentralized multidivisional firm is adopted becomes

\[
U_i^d = \frac{\phi m^2 \pi_i}{\gamma^2} (\varphi_1 \pi_1^2 + \varphi_2 \pi_2^2 + ps (\varphi_1 \pi_1 + \varphi_2 \pi_2)) .
\]  

(3)

Lastly, when a decentralized focused firm is adopted, divisional manager \(i\) also implements his preferred project always, thereby his effort is \(e_{i1}^d = \varphi_i m \pi_i\). Thus, the CEO’s expected payoff when a decentralized focused firm is adopted, denoted by \(U_{1i}^d\), is

\[
U_{1i}^d = \phi pm^2 \pi_i^2 .
\]  

(4)

In this case the parameter \(\frac{M}{\gamma}\) has been suppressed since the CEO focuses only on one division and specializes on the productive task only.

It readily follows from the analyzes above that the consequences of decentralization are that divisional managers exert more effort, the CEO’s productivity is larger and divisional managers’ productivity is lower. Divisional managers exert more effort because they work always in their preferred projects, while under centralization they work in their preferred projects only when state 1 is realized. The CEO’s productivity is larger because he does not devote time and effort to project implementation while divisional managers’ productivity is lower because they devote time and effort to project implementation. For instance, time to gather information about project characteristics or effort spent to learn the realized state. Thus, decentralization, understood as delegation of real authority, induces divisional managers to exert more effort and increases the CEO’s productivity, but it decreases divisional managers’ productivity. In what follows, I call the decrease in divisional managers’ effort from centralization, divisional managers’ negative incentive effect of centralization.

The consequences of diversification are that divisional managers exert less effort and the CEO’s productivity is lower. The CEO’s productivity is lower because he has to manage two divisions instead of one and divisional managers exert less effort because their expected private benefits
are lower as a consequence of the CEO’s lower productivity. In what follows, I call the decrease in divisional managers’ effort from diversification, divisional managers’ negative incentive effect of diversification.

4 Organizational Structure and Diversification Strategy

In this section, I solve the CEO’s joint determination problem consisting on choosing the organizational structure and diversification strategy.

First, I derive conditions under which centralization is the CEO’s chosen structure. To simplify the analysis and focus on the main trade-offs, it is assumed from now on that divisions are symmetric; that is, \( \pi_1 = \pi_2 = \pi \) and \( \varphi_1 = \varphi_2 = \varphi \). It readily follows from equations 1 and 3 that the difference between the CEO’s expected private benefits in a centralized multidivisional firm and a decentralized one, denoted by \( \Delta U_2 \), is

\[
\Delta U_2 = 2\phi \left[ \pi \left( e_2^2 - e_1^2 \right) + e_2^2 (M - mp) \right] + s \left( e_2^2 - e_1^2 \right) + e_2^2 (M - mp^2)) \right] \\
= \frac{2\phi \pi p}{2} \left[ \pi \left( M^2 - m^2 \right) + s \left( M^2 - m^2 p \right) \right] 
\]

(5)

Notice that \( \Delta U_2 \) has two terms: the first one corresponds to the difference in private benefits from divisional returns and the second one captures the difference in private benefits from synergies. The first term is negative because of divisional managers’ negative incentive effect of centralization and because the CEO’s productivity is lower under centralization. Given the assumptions made so far, the second term may be either positive or negative. To make the problem interesting in what follows, I assume that this term is positive;\(^{11}\) i.e., \( M^2 - m^2 p \geq 0 \). That is, the lower divisional managers’ effort is outweighed by the fact that under centralization coordination is ensure while under decentralization interdivisional coordination takes place only when state 1 is realized in both divisions, which occurs with probability \( p^2 \). Thus, as the synergy parameter \( s \) increases

\(^{11}\)Notice that if \( M^2 - m^2 p \geq 0 \) and \( M \geq m \), centralization is always the preferred structure, while if \( M^2 - m^2 p \leq 0 \) and \( M \leq m \), decentralization is always optimal. Thus, these two cases are ruled out because they are less interesting to analyze than the one pursued in the text. The other possible case is the one in which \( M^2 - m^2 p \leq 0 \) and \( M \geq m \), yet this parameter configuration can never occur.
centralization is the preferred structure since the private benefits from interdivisional coordination outweigh divisional managers’ negative incentive effect of centralization and the CEO’s lower productivity. It readily follows from this that centralization is the preferred organizational structure when a diversified strategy is adopted if and only if \( s \geq s_c(p) \), where

\[
s_c(p) = \frac{\pi (m^2 - M^2)}{(M^2 - m^2 p)}.
\]  

**Proposition 1** \( \frac{\partial s_c(p)}{\partial m} > 0, \frac{\partial s_c(p)}{\partial p} > 0, \frac{\partial s_c(p)}{\partial s} \geq 0 \) and \( \frac{\partial s_c(p)}{\partial M} < 0 \).

In a diversified firm centralization is more likely to be the CEO’s preferred organizational structure as the CEO’s productivity increases, divisional managers’ productivity decreases, project return and the congruence of interest parameter decrease.

That both, a decrease in \( m \) and in increase in \( M \), make centralization more likely is due to that the former results in a lower divisional managers’ productivity under decentralization and the latter in an increase in the CEO’s productivity under centralization. That centralization is less likely to be the CEO’s preferred structure as \( p \) increases follows from that divisional managers are more likely to implement the CEO’s preferred project and interdivisional coordination on project \( \alpha \) without CEO’s command takes place more often. Lastly, that an increase in \( \pi \) makes centralization less likely to be the preferred structure is due to that divisional returns are larger in a decentralized structure.

Consider next the case in which a focused strategy is adopted. Then, the difference between the CEO’s expected private benefits in a centralized focused firm and in a decentralized one, denoted by \( \Delta U_1 \), is given by

\[
\phi \varphi p M^2 \pi^2 - \phi \varphi m^2 \pi^2.
\]

Because \( m \geq M \), under a focused strategy decentralization maximizes the CEO’s payoff. The intuition being straightforward.

These results up to here are summarized in the next proposition.

**Proposition 2** (i) Under a diversified strategy centralization is the chosen structure for all \( s \geq s_c(p) \); and (iii) under a focused strategy decentralization is always the chosen structure.
Next I derive conditions under which the CEO prefers a diversified strategy over a focused one given that he is choosing his preferred organizational structure.

Because under a focused strategy decentralization is always the preferred organizational structure, the CEO chooses to diversify when
\[ \Delta U_{21} \equiv 2 \max \{ U_2^c, U_2^d \} - U_1^d > 0. \]
It readily follows from equations 1, 3 and 4, that
\[
\Delta U_{21} = \begin{cases} 
\frac{\phi}{\gamma} [\pi M (2 (e_2^d - e_1^d) + e_1^d (2M - \gamma mp)) + 2M e_2^d s] & \text{if } s \geq s_c (p), \\
\frac{\phi m p}{\gamma} [\pi (2 (e_2^d - e_1^d) + e_1^d (2 - \gamma)) + 2p e_2^d s] & \text{otherwise.} 
\end{cases}
\]

Thus, if the optimal values \( e_2^d, e_2^d \) and \( e_1^d \) are plugged in 7, \( \Delta U_{21} > 0 \) if and only if \( s > s_c (p, \gamma) \), while \( \Delta U_{21} \leq 0 \) if and only if \( s \leq s_c (p, \gamma) \), where
\[
s_c (p, \gamma) = \begin{cases} 
\frac{\pi (\gamma^2 - 2)}{2p} & \text{if } p > p_c, \\
\frac{\pi ((m\gamma)^2 - 2M^2)}{2M} & \text{otherwise,}
\end{cases}
\]
and \( p_c = \frac{M^2 (\gamma^2 - 2)}{(m\gamma)^2 - 2M^2} \).

The intuition being straightforward. The second term in \( \Delta U_{21} \) is positive because it corresponds to the private benefits from synergies that take place only under integration. Whereas the first term is negative due to divisional managers' negative incentive effect of diversification and the CEO's lower productivity from being overloaded. Thus, as \( s \) increases, diversification is more likely to be the CEO's preferred diversification strategy.

This leads to the following result.

**Proposition 3** A multidivisional firm is adopted for all \( s > s_c (p, \gamma) \) while a focused one is adopted for all \( s \leq s_c (p, \gamma) \).

As expected \( s_c (p, \gamma) \) increases with the overload parameter \( \gamma \), the CEO’s productivity parameter \( M \) and the congruence of interest parameter \( p \). Furthermore, it decreases with \( m \) when centralization is the preferred structure. The reason being that an increase in \( m \) increases the CEO’s private benefit from a decentralized focused firm, while it does not increase the CEO’s private benefit from a centralized multidivisional firm.
So far I have derived the CEO’s preferred organizational structure within each diversification strategy and conditional on that the preferred diversification strategy. In the next proposition I combine these two results together to get the following.

**Proposition 4** (i) A centralized multidivisional firm is adopted for all \( s > \max \{ s_c(p, \gamma), s_c(p) \} \); (ii) a decentralized multidivisional firm is adopted for all \( s_c(p, \gamma) < s \leq \max \{ s_c(p, \gamma), s_c(p) \} \); and (iii) a decentralized focused firm is adopted for all \( s \leq s_c(p, \gamma) \).

These results can be seen in figure 1 where \( s_c(p, \gamma) \) and \( s_c(p) \) are depicted in a picture that has in the \( x \)-axis the synergy level \( s \) and in the \( y \)-axis the CEO’s expected payoff in each of the relevant cases.

Notice that the upper envelope (dark line) represents the CEO’s private benefits when he chooses the strategy and structure combination that maximizes his private benefits.
5 The Value Consequences of Diversification

There is a large empirical literature asking the following question: what are the consequences of diversification for shareholders’ value? For the most part, the evidence is one that is unfavorable to diversification, especially if one focuses on unrelated diversification and data after around, say, 1980s. The evidence shows that conglomerates are traded at a discount relative to a portfolio of stand-alone firms and during the 1980s a trend toward value increasing refocus has been highly documented.12

The most common measure to study the value effect of diversification in recent work is the well-known diversification discount. As developed by Lang and Stulz (1994) and Berger and Ofek (1995), the diversification discount compares the stock price of a diversified firm to the imputed values for its individual segments, where these imputed values are obtained from comparable focused firms that operate in the same industries as the diversified firms segments. These authors find substantial mean discounts, on the order of 15%, which they interpret as evidence of value destruction by diversified firms. This work has been extended to a variety of other sample periods and countries by Servaes (1996), Lins and Servaes (1999, 2000), and Rajan et. al., (1999).

However, a number of other papers have questioned further the idea that the diversification discount is the result of value destruction. Campa and Kedia (1999), Hyland (1999), Whited (2001) and Chevalier (2000) all argue in one way or another that the discount is the result of uncontrolled endogeneity; for firms with poor returns are the ones most likely to diversify. Thus, despite the fact that the evidence suggests, after taking into account the endogeneity problems, that the mean discount is not as large as the first wave of papers found, one cannot be completely sure that there is no causal link from diversification to value.13


13 The evidence in Chevalier 2000, however, reinforces the view that there is no causal link between diversification and value. She finds that although the stocks of acquirors tend to drop upon announcement of a diversifying transaction, looking at the combined return to acquirors and targets in such deals generally find it to be either close to zero or slightly positive. See, also, Matsusaka, (1993); Hubbard and Palia, (1998); Kaplan and Weisbach, (1992); Morck et
In this section I use the results derived above to show that: (i) there exist a causal link between diversification and value; that is, diversification may destroy value for some firms; and (ii) that the failure to control for endogeneity problems favors the existence of a diversification discount.

To show that there is causal link between value and diversification, the value-maximizing organizational structure and diversification strategy must be derived. Given the optimal effort and the chosen projects, shareholders’ value from a centralized focused firm is \( \pi^c = M^2 \varphi \pi^2 \) while under a decentralized focused firm is \( \pi^d = \varphi m^2 \pi^2 \). Thus, under a focused strategy decentralization is value-maximizing since \( m^2 > M^2p \).

Firm’s value under a centralized multidivisional firm is

\[
\pi_2^c = \frac{2 \varphi M^2 \pi}{\gamma^2} p (\pi + s),
\]

while under a decentralized one is

\[
\pi_2^d = \frac{2 \varphi m^2 \pi}{\gamma^2} (\pi + p^2 s).
\]

It readily follows from equations 8 and 9 that the difference between firm’s value in a centralized multidivisional firm and a decentralized one, denoted by \( \Delta \pi_2 \), is given by

\[
\Delta \pi_2 = \frac{2}{\gamma^2} \left[ \pi \left( M (e_2^c - e_2^d) + e_2^d (M - m) \right) + s \left( M (e_2^c - e_2^d) + e_2^d (M - mp^2) \right) \right]
= \frac{2 \varphi \pi}{\gamma^2} \left[ \pi \left( M^2 p - m^2 \right) + sp (M^2 - m^2 p) \right]
\]

Notice that, as \( \Delta U_2 \), \( \Delta \pi_2 \) has two terms: the first one that corresponds to the difference in divisional returns and the second one that captures the difference in the returns from synergies. The first one is negative because divisional managers’ negative incentive effect of centralization and because the CEO’s productivity is lower than divisional managers’ productivity. The second term is positive because divisional managers’ negative incentive effect of centralization is outweighed by the fact that under centralization interdivisional coordination is ensure while under decentralization that takes place only when state 1 is realized in both divisions, which occurs with probability \( p^2 \). Thus, centralization is the value-maximizing structure when a diversified strategy is adopted if and

only if \( s \geq s_f(p) \), where

\[
s_f(p) \equiv \frac{\pi (m^2 - M^2p)}{p(M^2 - m^2p)}.
\]

The following comparative statics can be easily derived.

**Proposition 5**

\[
\frac{\partial s_f(p)}{\partial m} > 0, \quad \frac{\partial s_f(p)}{\partial \pi} > 0, \quad \frac{\partial s_f(p)}{\partial M} < 0 \quad \text{and} \quad \frac{\partial s_f(p)}{\partial p} > 0 \quad \text{for} \quad p > \tilde{p}. \tag{11}
\]

The intuition for \( m, M \) and \( \pi \) is the same as for \( s_c(p) \). Notice that in contrast to the case for \( s_c(p) \), the threshold \( s_f(p) \) is not monotonically increasing in \( p \). This difference arises because the difference in private benefits from divisional returns \( p\pi (M^2 - m^2) \) decreases as \( p \) increases, while the difference in divisional returns \( \pi (M^2 - m^2p) \) increases as \( p \) increases. This difference arises because under decentralization the CEO gets private benefits that are proportional to divisional returns only when project \( \alpha \) is implemented, while shareholders benefit from the implementation of both, project \( \alpha \) and \( \beta \). This explains why divisional returns in a decentralized firm are \( m^2\pi \) and the CEO’s private benefits are \( pm^2\pi \).

Given that under a focused strategy decentralization is always the value-maximizing organizational structure, it is value-maximizing to diversify when

\[
\Delta \pi_{21} \equiv 2 \max \{ \pi_{21}, \pi_{12} \} - 2\pi_{11} > 0.
\]

It readily follows from equations 8, 9 and \( \pi_{11} \) that

\[
\Delta \pi_{21} = \begin{cases} \frac{2}{\pi} [\pi M ((e_{12}^\pi - e_{11}^\pi) + e_{11}^\pi (M - \gamma m)) + Me_{21}^\pi] & \text{if } s \geq s_f(p), \\ \frac{2m}{\pi} [\pi ((e_{12}^\pi - e_{11}^\pi) + e_{11}^\pi (1 - \gamma)) + p^2 e_{21}^\pi] & \text{otherwise}. \end{cases}
\]

Thus, if the optimal values \( e_{12}^\pi, e_{11}^\pi \) and \( e_{11}^\pi \) are plugged in 12, \( \Delta \pi_{21} > 0 \) if and only if \( s > s_f(p, \gamma) \), while \( \Delta \pi_{21} \leq 0 \) if and only if \( s \leq s_f(p, \gamma) \), where

\[
s_f(p, \gamma) \equiv \begin{cases} \frac{\pi (\gamma^2 - 1)}{p^2} & \text{if } p > p_f, \\ \frac{\pi (\gamma^2 - 1)}{M^2p} & \text{otherwise}, \end{cases}
\]

and

\[
p_f \equiv \frac{(\gamma m)^2}{2M^2} - \frac{1}{2M^2} \left( (\gamma m)^4 - 4M^4 (\gamma^2 - 1) \right)^{\frac{1}{2}}.
\]

The intuition being straightforward. The second term in \( \Delta \pi_{21} \) is positive because it corresponds to the private benefits from synergies that take place only under integration. Whereas the first term

\[14 \tilde{p} = \frac{2m}{M^2} - \frac{1}{4M} (m^2 - M^2)^{\frac{1}{2}}.\]
is negative due to divisional managers’ negative incentive effect of diversification and the CEO’s lower productivity from being overloaded. Thus, as \( s \) increases diversification is more likely to be the CEO’s preferred diversification strategy.

The discussion so far is summarized in the next proposition, which parallels the results in proposition 4.

**Proposition 6** (i) A centralized multidivisional firm is value-maximizing for all \( s > \max \{s_f(p, \gamma), s_f(p)\} \); (ii) a decentralized multidivisional firm is value-maximizing for all \( s_f(p, \gamma) < s \leq \max \{s_f(p, \gamma), s_f(p)\} \); and (iii) a decentralized focused firm is value-maximizing for all \( s \leq s_f(p, \gamma) \).

These results can be easily seen in figure 2 where \( s_f(p, \gamma) \) and \( s_f(p) \) are depicted in a picture that has in the \( x \)-axis the synergy level \( s \) and in the \( y \)-axis \( \Delta \pi_{21} \).

Notice that the upper envelope (dark line) represents shareholders’ value when the value-maximizing strategy and structure combination is chosen.

Diversification destroys value when the CEO chooses to diversify and diversification yields a
lower firms’ value than a pool of focused firms in the same business segments.\textsuperscript{15} Thus in what follows I derive conditions under which the CEO chooses to diversify when being focused is the value-maximizing diversification strategy.

According to propositions 4 and 6, the CEO chooses to diversify if and only if $s > s_c(p, \gamma)$ while diversification is value-maximizing if and only if $s > s_f(p, \gamma)$. This, implies that if $s_c(p, \gamma) < s_f(p, \gamma)$, there is a range of values of $s$ for which diversification destroys value because the CEO chooses to diversify for synergy levels that are lower than the minimum synergy level that makes diversification value-maximizing. Thus, in the next lemma conditions under which $s_c(p, \gamma) < s_f(p, \gamma)$ are obtained.

\textbf{Lemma 7} $s_c(p, \gamma) < s_f(p, \gamma)$ for all $p$.

\textbf{Proof.} Suppose that $(m\gamma)^2 - 2M^2 > 0$. Then, the first to notice is that $p_c < p_f$. It is easy to show that

$$p_c - p_f = \frac{M(\gamma^2 - 2)}{(m\gamma)^2 - 2M^2} - \frac{(\gamma m)^2}{2M^2} + \frac{1}{2M^2}\left((\gamma m)^4 - 4M^4(\gamma^2 - 1)\right)^{\frac{1}{2}} \leq 0$$

if and only if $(m\gamma)^2 - M^4\gamma^2 \geq 0$. This holds always because $m \geq M$.

Given this, it readily follows after some simple algebra that $\triangle s(p, \gamma)$ defined as $s_f(p, \gamma) - s_c(p, \gamma)$ is equal to

$$\triangle s(p, \gamma) = \begin{cases} \frac{\pi(\gamma^2(2-p)-2(1-p))}{2M^2p} & \text{if } p > p_f, \\ \frac{\pi(\gamma^2(2m^2-M^2)+2M^2(1-p))}{2M^2p} & \text{if } p_c < p \leq p_f, \\ \frac{\pi(m\gamma)^2(2-p)}{2M^2p} & \text{if } p \leq p_c. \end{cases}$$

Because $p \leq \left(\frac{M}{m}\right)^2 \leq 1$ and $m \geq M$, it readily follows from this that $\triangle s(p, \gamma) > 0$ for all $p$. Thus, $s_c(p, \gamma) < s_f(p, \gamma)$ for all $p$. \hfill \blacksquare

\textsuperscript{15} Most papers that deal with the diversification discount at a theoretical level argue that a diversification discount exists when firm’s value is lower than the sum of focused firm’s value in the same business segments. This, however, is not true unless when that holds a firm chooses to diversify. If the shareholders choose the strategy this will never be the case since, diversification will not take place when it is not value-maximizing and the diversification discount will be only due to a measurement problem.
Given that \( s_c(p, \gamma) < s_f(p, \gamma) \) for all \( p \), the next proposition follows from the definition of \( \Delta \pi_{21} \), propositions 4 and 6 and lemma 7.

**Proposition 8** Diversification destroys value for all \( s \in (s_c(p, \gamma), s_f(p, \gamma)) \).

This proposition establishes that if diversification takes place; that is, if \( s > s_c(p, \gamma) \), then it is value-reducing for small values of the synergy parameter \( s \), \( s \leq s_f(p, \gamma) \) and value-increasing for larger values of \( s \), \( s > s_f(p, \gamma) \). This explains why firms that diversify into sectors that are not related are much more likely to be traded at a discount. In fact, the American corporate world witnessed during the 1990s a movement from unrelated diversification to related diversification and away from conglomerates. For instance, Fan and Lang (2000) documents that both vertical relatedness as well as complementarity of firm’s segments have increased over time and that multi-segment firms have decreased in number. In 1979, the proportion of multi-segment firms was 46 %, while this was only 20 % in 1996, which is consistent with the refocus trend that occurred during the 1990s.\(^{16}\)

To understand the intuition behind this proposition it is useful to analyze different ranges for the synergy level \( s \).

Consider first the case in which \( s \leq s_c(p, \gamma) \), then the CEO chooses a decentralized focused firm which is the value-maximizing organizational structure and diversification strategy (region C plus F in figure 3). This occurs because synergies are not large enough to compensate for the CEO’s lower productivity from overseeing two divisions instead of one and divisional managers’ negative incentive effect of diversification.

Consider next the case in which \( s > s_f(p, \gamma) \). In this case the CEO chooses a diversified strategy which is the value-maximizing strategy (region A plus B in figure 3). The reason being that synergies are large enough to compensate for the CEO’s lower productivity and divisional managers’ negative incentive effect of diversification. This is not to say that the CEO’s choices are value-maximizing since he may be choosing a value-reducing structure.

To see this notice that \( s_f(p) > s_c(p) \) for all \( p \);\(^{17}\) that is, there is a region given by \( (s_c(p), s_f(p)) \)

---

16 See, for instance, Ravenscraft and Scherer (1987) and Kaplan and Weisbach (1992), who find that many unrelated acquisitions are later divested.
17 This follows from that \( m^2 - M^2p > M^2 - M^2 \) and \( p (M^2 - m^2p) < M^2 - m^2p \).
on which the CEO, when a diversified strategy is adopted, chooses a centralized structure despite that a decentralized one is value-maximizing. Thus, if $s_f(p) > s > s_c(p) \geq s_f(p, \gamma)$, the CEO chooses a centralized multidivisional firm despite that a decentralized multidivisional firm is value-maximizing (region B in figure 3). Thus, diversification does not destroy value in the sense that when units are integrated under one firm are valued less than when they are operated as focused firms, yet the CEO’s chosen structure is not value-maximizing since firms’ value when a diversified strategy is adopted is larger under a decentralized multidivisional firm.

Lastly, consider the case in which $s \in (s_c(p, \gamma), s_f(p, \gamma))$ (region D plus E plus G in figure 3). In this case it follows from proposition 4 that the CEO chooses to diversify while it follows from proposition 6 that the value-maximizing diversification strategy is to remain focused. Thus, diversification destroys value for those firms that have $s \in (s_c(p, \gamma), s_f(p, \gamma))$.

To better understand why diversification destroys value when $s \in (s_c(p, \gamma), s_f(p, \gamma))$, it is useful to re-write $\Delta \pi_{21}$ as a function of $\Delta U_{21}$. It follows from equations 7 and 12 that

$$
\Delta \pi_{21} = \begin{cases} 
\frac{1}{\phi} \left[ \Delta U_{21} - \phi(2 - p) \pi me_1^2 \right] & \text{if } s > s_f(p), \\
\frac{1}{\phi} \left[ \Delta U_{21} - \phi \Delta \pi_2 - \phi(2 - p) \pi me_1^2 \right] & \text{if } s_c(p) < s \leq s_f(p), \\
\frac{1}{\phi} \left[ \Delta U_{21} - \phi(2 - p) \pi me_1^2 \right] & \text{if } s \leq s_c(p).
\end{cases}
$$

(13)

Notice that the value of $\Delta \pi_{21}$ depends on which organizational structure is in place. When $s > s_f(p)$ and $s \leq s_c(p)$, the CEO’s choice of structure is value-maximizing, while when $s_c(p) < s \leq s_f(p)$, the CEO chooses a centralized structure despite that a decentralized one is value-maximizing; that is $\Delta \pi_2 < 0$ for $s_c(p) < s \leq s_f(p)$. This implies that when the CEO’s chooses to diversify and $s_c(p) < s \leq s_f(p)$, there is gain that is not realized equal to $\phi \Delta \pi_2$.

The intuition is as follows. Centralization is the CEO’s preferred organizational structure because the private benefits from synergies outweigh divisional managers’ negative incentive effect of centralization and the CEO’s lower productivity. Yet, centralization is not value-maximizing because the return from synergies are not large enough to outweigh the negative effects of centralization. The reason being that the CEO does not get any private benefits when project $\beta$ is implemented, while shareholders benefit from the implementation of both projects, $\alpha$ and $\beta$. I call this effect wrong organizational structure effect of diversification.
Furthermore, it follows from equation 13 that $\Delta U_{21}$ may be positive while $\Delta \pi_{21}$ is negative even when the value-maximizing structure is adopted. To understand why this occurs, it is useful to analyze the term $(2 - p)\pi me^d_1$. This term can be split in two terms $\pi me^d_1$ and $(1 - p)\pi me^d_1$, where the first one captures what I call the empire-building effect and the second one captures what I call the pure disaligned preferences effect. The empire building effect arises because the CEO’s decision to diversify depends on the private benefits yielded by a diversified firm relative to the private benefits yielded by a focused firm, while the optimality of diversification depends on the returns yielded by diversified firm relative to the return of a pool of focused firms. This implies that even if the incentives are perfectly aligned; i.e., $p = 1$, the CEO’s prefers diversification more often than it is optimal. This effect while trivial it has been ignored by the agency literature because the decision to diversify is usually assumed to be exogenous or made by shareholders.\footnote{It could be argued that this effect is fully driven by the assumption that the CEO is not allow to own shares on a firm other than the one he works on. This argument, though correct, does not change this result since the second effect is immune to this critique. If the CEO is allowed to own shares in a focused firm other than the one he is the CEO, the term $(2 - p)\pi me^d_1$ becomes $(1 - p)\pi me^d_1$.} The second effect results from disaligned preferences on project choices between the CEO and shareholders and the CEO and divisional managers. For the CEO does not derive any private benefits from project $\beta$, while shareholders and divisional managers do. Thus, shareholders’ value in a focused firm is positive when either project $\alpha$ or $\beta$ is implemented, while the CEO’s private benefit is positive if and only if state 1 is realized; i.e., if and only project $\alpha$ is implemented. Given that project $\alpha$ is implemented with probability $p$, the CEO’s private benefit from a focused firm is a fraction $\phi$ of $\pi me^d_1$, while shareholders’ value is $\pi me^d_1$.

It is interesting to know how the range of values of $s$ under which a diversification destroys value changes with the main parameters of the model.

**Proposition 9** $\Delta s(p, \gamma)$ is strictly increasing in $\pi$ and $\gamma$, strictly decreasing in $p$, non-decreasing in $m$ and non-increasing in $M$.

That $\Delta s(p, \gamma)$ is strictly decreasing in $p$ follows immediately from the fact that as $p$ increases shareholders, the CEO and divisional managers’ preferences get more aligned and therefore, the
CEO is more likely to choose the organizational structure that maximizes firm’s value and less likely to diversify when that strategy is not value-maximizing. That $\Delta s(p, \gamma)$ is strictly increasing in $\pi$ follows from that this makes the return from the implementation of project $\beta$ more attractive relative to the implementation of project $\alpha$ for shareholders, but not for the CEO since he gets no private benefits from project $\beta$. That $\Delta s(p, \gamma)$ does not decrease with $m$ and does not increase with $M$ follows from that an decrease in $m$ and an increase in $M$ decrease the range of values of $s$ on which the CEO chooses a value-decreasing organizational structure; that is, $s_f(p) - s_c(p)$ decreases.

The discussion around the diversification discount also revolves around the question of whether diversification destroys value or is just a measurement problem. As I already showed diversification destroys value for those firms that have a synergy level $s \in (s_c(p, \gamma), s_f(p, \gamma))$, but it also true that even when diversification does not destroy value a diversification discount, as measured empirically,
may arise. Thus, there are both a causal link between diversification and value and a measurement problem.

It is easy to see that when one treats diversification as an exogenous decision, some firms that are optimally diversified may show-up empirically as being traded at a discount. To see this suppose that there is no firms that have \( s \in (s_c (p, \gamma), s_f (p, \gamma)) \) and thereby diversification does not destroy value; that is, all firms for which \( s \leq s_c (p, \gamma) \) remain focused while all firms for which \( s > s_f (p, \gamma) \) diversify. This implies that one observes focused firms only when it is value-maximizing; that is, \( \hat{\pi}_2 - 2\hat{\pi}^d < 0 \) and diversified firms when is also value-maximizing; that is, \( \hat{\pi}_2 - 2\hat{\pi}^d > 0 \). If one compares the stock price of a diversified firm, \( \hat{\pi}_2 \), to the imputed values for its individual segments, where these imputed values are obtained from comparable observed focused firms that operate in the same industries as the diversified firms segments, \( 2\hat{\pi}^d \), then in many cases \( \hat{\pi}_2 < 2\hat{\pi}^d \). That is, diversification will show-up as value-reducing, specially for those that diversification is slightly better than focused.

As an example suppose that \( \pi_i = \pi_f = \pi, \ p_i = p_f = p, \) and \( s_i > s_f (p, \gamma) \) and \( s_f < s_f (p, \gamma) \). The first assumption captures that both firms are in the same business segment, the second controls for the severity of the agency problem, and the third one implies that firm \( i \) diversifies while firm \( j \) does not. Now suppose that \( s_i \leq s_f (p) \); that is, firm \( i \) is a decentralized multidivisional firm. Then, \( \pi_{2i}^d = \frac{2m_i^2 \pi}{\gamma} (\pi + p^2 s_i) \) while the pool of type \( j \) focused firm is \( 2m_j^2 \phi^2 \). In this case \( \pi_{2i}^d - 2\pi_{1i}^d \leq 0 \) if and only if \( s_i \leq \frac{\gamma m_i^2 \pi - m_j^2 \pi}{m_i^2 p^2} \). Then, in order to show that this case may occur \( s_f (p, \gamma) \) must be lower than \( \frac{\gamma m_i^2 \pi - m_j^2 \pi}{m_i^2 p^2} \). That is,

\[
\frac{\pi (\gamma - 1)}{p^2} \leq \frac{\gamma m_i^2 \pi - m_j^2 \pi}{m_i^2 p^2}.
\]

Thus, if \( m_j^2 \geq m_i^2 \) then firm \( i \) will show-up as traded at a discount when compared with a pool of focused firms that have managers with a productivity parameter \( m_j \).
6 Internal Capital Markets and The Value Consequences of Diversification

The literature has identified several mechanisms by which the allocation of investment funds in an internal capital market can either increase or decrease firm’s value; that is, there is a bright- and a dark-side to internal capital markets.

Basically, the way that value can be created by diversification is through the creation of an efficient internal capital markets. This effect that was first discussed at length by Williamson (1975) and Donaldson (1984) is based on idea that the CEO, in an internal capital market, has better incentives to become well-informed about divisions’ prospects and therefore he will engage in winner-picking. This has been formally shown by Stein (1997) and Matsusaka and Nanda (2000) by explicitly linking the performance of monitoring and winner-picking to the strong control rights held by the CEO in an internal capital market.19

The dark side, basically, comes from the literature on influence activities initiated by Milgrom (1988), Milgrom and Roberts (1988), and Meyer, Milgrom and Roberts (1992), where division managers are portrayed as rent-seeking agents who try to persuade the CEO to provide them with extra benefits. Following this literature, Rajan, Servaes and Zingales (2000), Scharfstein and Stein (2000), and Wulf (1999) show that an internal capital market can do a worse job of allocating funds to individual divisions as a result of influence or rent-seeking activities.

On the one hand, Rajan, Servaes and Zingales (2000) and Wulf (1999) address the issue of inefficient capital allocation in models in which the CEO acts on behalf of shareholders; i.e., where the only agency conflict is between the CEO and divisional managers. They argue that when divisions have different investment opportunities, the CEO will want to tilt the capital budget away from the efficient point, and towards a socialist outcome in which the weaker division gets relatively more than it would under the first-best. Thus, the CEO uses the capital budget process as a device to control division-manager rent-seeking activities or succumbs to the influence activities given more

19Stein (1997) also suggests that the CEO will be more likely to do a good job at picking winners when units operate in related lines of business.
capital to those divisions that invest more on these activities. On the other hand, Scharfstein and Stein (2000) assume, as I do, that there are two levels of agency conflicts, between the CEO and shareholders and the CEO and divisional managers. In their model, managers of divisions with worse prospects spend more time building up their outside options to extract a larger pay from the CEO in order to be retained. The CEO views as less costly for him to retain division managers of the divisions with worse prospects with a larger than the efficient capital allocation; for this allows him to save the firm’s cash to be used for other uses that provide him with larger private benefits.

The evidence shows that there is an internal capital market at work (e.g., Lamont (1997) and Shin and Stulz (1998)), though not necessarily an efficient one. For instance, Shin and Stulz (1998), Scharfstein (1998), Rajan, Servaes and Zingales (2000), and Billett and Mauer (1998) come to the conclusion that the internal capital market in the typical diversified firm engages in cross-subsidization allocating too much to divisions with poor prospects and too little to divisions with high prospects. Thus, according to these authors an internal capital market contributes to create a diversification discount. However, as in the case of the diversification discount, this on-average conclusion of socialism has been challenged on methodological grounds. Again the issue has to do with the endogeneity of the diversification decision and the resulting possibility that divisions in multidivisional firms are systematically different from their stand-alone counterparts in the same industry.

Whited (2001) and Chevalier (2000) argue that industry q s may be better measures of investment opportunities of stand-alone firms than those of conglomerate divisions. Chevalier (2000) investigates the importance of these effects by looking at the investment behavior of conglomerate divisions in the years before they merged. In this pre-merger phase, when the divisions were still focused firms and by definition there could have been no reallocation, she finds some of the same results as Rajan, Servaes and Zingales (2000) and Scharfstein (1998), albeit in a weaker form. This suggests that correcting for various econometric biases weakens, though does not necessarily contradict, the

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26 Chevalier (2000) raises a methodological caveat about some of this work. She point that if a single firm owns two divisions in apparently unrelated SIC codes, they may still be related because of a common factor at the firm level. In this case, it would be unsurprising if one division’s investment is related to the other division’s cashflow, as the latter may contain information about the common component of investment opportunities.
evidence of on-average socialism in these papers. Thus, as was the case with the diversification
discount, the evidence on the efficiency of internal capital markets is non-conclusive.\footnote{Maksimovic and Phillips (2000), using plant-level data from manufacturing firms, find that when a division that has high productivity relative to its industry experiences a positive demand shock, this reduces the growth of the other divisions in the same firm. Thus the internal capital market seems to take money away from other divisions to feed the strong ones when they most need it.}

In this section, I attempt to clarify how an efficient internal capital market can contribute to value destroying diversification when issues of rent-seeking are leaved aside.

I assume, as is commonly done in this literature, that the internal capital allocation is non-contractible and that is the CEO, not shareholders, who chooses the capital allocation across divisions.\footnote{This is perhaps, as argued by Sharfstein and Stein (1998), one of the most defining characteristic of an integrated firm and it is this authority or decision right that distinguishes a CEO from, for instance, a well-informed banker.} Thus, the CEO’s control rights allow him to reallocate resources across divisions as he sees fit.\footnote{See, e.g., Matsusaka and Nanda (1999), Rajan, Servaes and Zingales (1999), Stein (1997) and Scharfstein and Stein (2000).} Notice that in this paper as in Scharfstein and Stein (2000) the party making the cash-flow allocation decision (the CEO) is himself an agent of shareholders, so that one cannot simply assume that he will choose the capital allocation that maximizes shareholders’ value.

I assume that each firm starts with an initial endowment of resources or cash-flow, denoted by $k$, that comes from either an external financier or from past years cash-flows or both and that a project’s return depends on the amount of capital allocated to it.

The timing is as follows. After the CEO has chosen the organizational structure and diversification strategy, but before divisional managers have chosen effort, the CEO observes which division is more productive and decides the capital allocation.\footnote{The timing in which the CEO learns which division is more productive right after projects are implemented yields qualitatively the same predictions but the analysis gains in complexity with no new insights.} After that, the timing follows as in the basic model. It is assumed that with probability $q$ division $i$ is in the high-productivity state and division $j$ in the low-productivity state; that is, $\pi_i (k_i) = \pi k_i + \Delta k_i$ and $\pi_j (k_j) = \pi k_j$, while with probability $1 - q$ the opposite occurs; that is, $\pi_i (k_i) = \pi k_i$ and $\pi_j (k_j) = \pi k_j + \Delta k_j$, with $\pi \geq \Delta$ and that $s (k_1, k_2) = s (k_1 + k_2)$.

Consider first the case of a focused firm. Because the CEO’s private benefits are proportional to a
project’s return his investment decision is to invest all cash-flow available, denoted by $k^*$, independent of the realized productivity. Given this investment policy, a divisional manager’s expected payoff under a centralized focused firm when the high-productivity state is realized is $\varphi p M (\pi + \triangle) k^* e_i - \frac{1}{2} e_i^2$, while when the low-productivity state is realized is $\varphi p M \pi k^* e_i - \frac{1}{2} e_i^2$. Thus, his effort under centralization, denoted by $e^c_i (k^*)$, is

$$e^c_i (k^*) \equiv \begin{cases} 
\varphi M p (\pi + \triangle) k^* & \text{in the high-productivity state,} \\
\varphi M p \pi k^* & \text{in the low-productivity state.}
\end{cases}$$

A divisional manager’s expected payoff under centralized focused firm when the good state is realized is $\varphi m (\pi + \triangle) k^* e_i - \frac{1}{2} e_i^2$, while when the bad state is realized is $\varphi m \pi k^* e_i - \frac{1}{2} e_i^2$. Thus, his effort under decentralization, denoted by $e^d_i (k^*)$, is

$$e^d_i (k^*) \equiv \begin{cases} 
\varphi m (\pi + \triangle) k^* & \text{in the high-productivity state,} \\
\varphi m \pi k^* & \text{in the low-productivity state.}
\end{cases}$$

The CEO’s expected payoff under centralization is $U^c_i (k^*) \equiv r_i \varphi M^2 p [(\pi + \triangle) k^*]^2 + (1 - r_i) \varphi M^2 p (\pi k^*)^2$, while his payoff under decentralization is $U^d_i (k^*) \equiv r_i \varphi M^2 p [(\pi + \triangle) k^*]^2 + (1 - r_i) \varphi m^2 p (\pi k^*)^2$, where $r_1 = q$ and $r_2 = 1 - q$. The firm’s expected profit under centralization is $\pi^c_i (k^*) \equiv r_i \varphi M^2 p [(\pi + \triangle) k^*]^2 + (1 - r_i) \varphi M^2 p (\pi k^*)^2$ while the expected profit under decentralization is $\pi^d_i (k^*) \equiv r_i \varphi m^2 [(\pi + \triangle) k^*]^2 + (1 - r_i) \varphi m^2 (\pi k^*)^2$. Because $m \geq M$, decentralization is the CEO’s preferred structure and also the value-maximizing structure when a focused strategy is adopted. Thus, the CEO’s private benefits from a pool of decentralized focused firms, denoted by $U^d (k^*)$, is $\varphi \varphi p m^2 (2 \pi^2 + 2 \pi \triangle + \triangle^2) k^* e_i^2$ while the value of a pool of decentralized focused firms, denoted by $\pi^d (k^*)$, is $\varphi m^2 (2 \pi^2 + 2 \pi \triangle + \triangle^2) k^* e_i^2$.

Consider next the case of a diversified firm. The investment policy in a diversified firm is different because the CEO will choose to invest all cash-flow available to the division that yields the larger expected private benefits.\(^{25}\)

Suppose that the CEO’s allocates $k_i$ to division $i$ when the high-productivity state is realized for division $i$ and $k^m - k_i$ to division $j$ when the low-productivity state is realized in division $j$, $i, j = 1, 2$.

\(^{25}\)The results in this section do not hinge on the assumption that returns are linear on investment, but the algebra is greatly simplified by this assumption.
where $k^m$ is total cash-flow available. It readily follows from this that divisional manager $i$’s expected utility under centralized multidivisional firm when the high-productivity state is realized is 
$$
\varphi p \frac{M}{\gamma} (\pi + \triangle) k_i e_i - \frac{1}{2} e_i^2 ,
$$
while when the low-productivity state is realized is 
$$
\varphi p \frac{M}{\gamma} (k^m - k_j) e_i - \frac{1}{2} e_i^2 .
$$
Whereas his expected utility under a decentralized multidivisional firm when the high-productivity state is realized is 
$$
\varphi m ^M (\pi + \triangle) k_i e_i - \frac{1}{2} e_i^2,
$$
while when the low-productivity state is realized is 
$$
\varphi m ^M (k^m - k_j) e_i - \frac{1}{2} e_i^2 .
$$
Thus, his effort under a centralized structure, denoted by $e_i^c (k^m)$, is 
$$
e_i^c (k^m) \equiv \begin{cases}
\varphi \frac{M}{\gamma} p (\pi + \triangle) k_i & \text{in the high-productivity state}, \\
\varphi \frac{M}{\gamma} p (k^m - k_j) & \text{in the low-productivity state},
\end{cases}
$$
while his effort under a decentralized structure, denoted by $e_i^d (k^m)$, is 
$$
e_i^d (k^m) \equiv \begin{cases}
\varphi m^M p (\pi + \triangle) k_i & \text{in the high-productivity state}, \\
\varphi m^M p (k^m - k_j) & \text{in the low-productivity state}.
\end{cases}
$$

The CEO’s problem when a centralized multidivisional firm is adopted when the high-productivity state is realized in division $i$ is to choose $k_i$ to maximize 
$$
U_2^c (k^m) = \varphi \varphi p \left( \frac{M}{\gamma} \right)^2 \left[ (\pi + \triangle)^2 k_i^2 + \pi^2 (k^m - k_i)^2 + s ((\pi + \triangle) k_i + \pi (k^m - k_i)) k^m \right].
$$

Notice that this is a strictly convex function and that $U_2^c (k^m)$ at $k_i = k^m$ is larger than $U_2^c (k^m)$ at $k_i = 0$. Thus, the capital allocation that maximizes the CEO’s private benefits is to allocate all the cash-flow available to the more productive division; that is, $k_i = k^m$.

The CEO’s problem when a centralized multidivisional firm is adopted when the high-productivity state is realized in division $i$ is to choose $k_i$ to maximize 
$$
U_2^d (k^m) = \varphi \varphi p \left( \frac{M}{\gamma} \right)^2 \left[ (\pi + \triangle)^2 k_i^2 + \pi^2 (k^m - k_i)^2 + ps ((\pi + \triangle) k_i + \pi (k^m - k_i)) k^m \right].
$$

Notice that this is also a strictly convex function and that $U_2^d (k^m)$ at $k_i = k^m$ is larger than $U_2^d (k^m)$ at $k_i = 0$. Thus, the capital allocation that maximizes the CEO’s private benefits is to allocate all the cash-flow available to the more productive division; that is, $k_i = k^m$.

In order to simplify the analysis in what follows I assume that $k^m = k$ and $k^s = \mu k$ with $\mu \in [0, 1]$; i.e., the cash-flow available in a multidivisional firm is larger than in a focused firm.
Furthermore, it is assumed that $\gamma \mu > 1$.

Notice that the difference between divisional manager $i$’s effort in a centralized multidivisional firm and his effort in a decentralized focused firm, $e^c_i (k) - e^d_i (\mu k)$, is

$$
\begin{align*}
\left\{ \begin{array}{ll}
\varphi (\pi + \triangle) k \left( \left( \frac{M}{p} - m \right) + m (1 - \mu) \right) & \text{in the high-productivity state}, \\
0 - \varphi m \pi \mu k & \text{in the low-productivity state},
\end{array} \right.
\end{align*}
$$

while $e^d_i (k) - e^d_i (\mu k)$ is given by

$$
\begin{align*}
\left\{ \begin{array}{ll}
\varphi m (\pi + \triangle) k \left( \left( \frac{1}{\gamma} - 1 \right) + (1 - \mu) \right) & \text{in the high-productivity state}, \\
0 - \varphi m \pi \mu k & \text{in the low-productivity state}.
\end{array} \right.
\end{align*}
$$

Notice that when the high-productivity state is realized the first term on 20 and 21 is negative while the second one is positive. The negative term arises because the CEO’s productivity is lower. Whereas the positive term arises because the reallocation of resources implies that when a division gets funds, it gets more funds in a multidivisional firm than in a focused one. Whereas when the low-productivity state is realized, effort is always larger in a focused firm because in a multidivisional firm the divisional manager of the less productive division gets no funding ex-post. Thus, the reallocation of funds across divisions generates a negative incentive effect in the low-productivity state and a positive one in the high-productivity state.

It is also worthwhile to note that in the high-productivity state $e^c_i (k) - e^d_i (\mu k)$ could be either increasing or decreasing in the productivity gain $\triangle$. When $\gamma$ and $\mu$ are small is increasing while when these are large is decreasing. The reason being that for $\gamma$ and $\mu$ small, a divisional manager productivity of one extra dollar allocated to its division is large and when his divisions gets funds it gets much more than when it is operated as a focused firm.

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26 Berger and Ofek (1995) and Comment and Jarrel (1995) document, empirically, that conglomerates borrow only a trivial amount more than their counter-parts. Thus, if most funding comes from debt, it is more likely that $1 > \mu > \frac{1}{2}$.

27 It follows from 20 and 21, that there exists a $\mu$, denoted by $\tilde{\mu}$, such that divisional managers exert more effort under a focused firm than a diversified firm for all $\mu > \tilde{\mu}$ and less effort for $\mu \leq \tilde{\mu}$. This follows from that at $\mu = 1$, $e^c_i (k) - e^d_i (\mu k) < 0$, while at $\mu = 0$, $e^c_i (k) - e^d_i (\mu k) > 0$. Thus, by continuity of $e^c_i (k) - e^d_i (\mu k)$ there exists $\tilde{\mu}$ such that $e^c_i (k) - e^d_i (\mu k) = 0$. The same holds for $e^d_i (k) - e^d_i (\mu k)$.

28 A similar result is found in Brusco and Panuzzi (2001) and Inderst and Laux (2000). Yet, in Brusco and Panuzzi (2001) the incentive effect is always negative.
Given the optimal efforts, the CEO’s expected payoff when he adopts a centralized structure, denoted by $U_c^2(k)$, is given by

$$U_c^2(k) = \frac{\phi_2 M^2 \rho (\pi + \triangle) k^2}{\gamma^2} (\pi + \triangle + s),$$

while when he adopts a decentralized structure, denoted by $U_d^2(k)$, is given by

$$U_d^2(k) = \frac{\phi_2 m^2 \rho (\pi + \triangle) k^2}{\gamma^2} (\pi + \triangle + ps).$$

It follows from this that centralization is the preferred organizational structure when a diversified strategy is adopted if and only if $s \geq s_c(k)$, where

$$s_c(k) = \frac{(\pi + \triangle) (m^2 - M^2)}{(M^2 - m^2 p)}.$$  \hfill (24)

Notice that as the ex-post productivity difference between divisions increases, centralization is less likely to be the CEO’s preferred organizational structure. The reason being that an increase in project returns from $\pi$ to $\pi + \triangle$ increases the CEO’s private benefit more in a decentralized firm because the CEO’s productivity is lower than divisional managers’ productivity; that is, $m > M$.

It follows from equations 22, 23 and $U_1^d(\mu k)$ that the difference between the CEO’s private benefits under a multidivisional firm and a decentralized focused firm, denoted by $\triangle U_{21}(k)$, is

$$\triangle U_{21}(k) = \begin{cases} 
\frac{\phi_2 M^2 \rho (\pi + \triangle) k^2}{\gamma^2} (\pi + \triangle + s) - \frac{\phi_2 m^2 \rho (\pi + \triangle + ps)}{\gamma^2} (\mu k)^2 & \text{if } s \geq s_c(k), \\
\frac{\phi_2 m^2 \rho (\pi + \triangle) k^2}{\gamma^2} (\pi + \triangle + ps) - \frac{\phi_2 m^2 \rho (\pi + \triangle + ps)}{\gamma^2} (\mu k)^2 & \text{otherwise}. 
\end{cases}$$

It readily follows from this that diversification is the CEO’s preferred diversification strategy if and only if $s > s_c(k, p)$, where

$$s_c(k, p) = \begin{cases} 
0 & \text{if } \gamma^2 \leq \frac{2(\pi + \triangle)^2}{(M^2 - p)(\pi + \triangle + s)^2}, \\
\frac{\gamma^2 \mu^2 ((\pi + \triangle)^2 + \pi^2) - 2(\pi + \triangle)^2}{2p(\pi + \triangle)} & \text{if } p > p_c(k) \\
\frac{\gamma^2 \mu^2 ((\pi + \triangle)^2 + \pi^2) - 2(\pi + \triangle)^2}{2M^2(\pi + \triangle)} & \text{otherwise},
\end{cases}$$

where

$$p_c(k) = \frac{M^2(\gamma^2((\pi + \triangle)^2 + \pi^2) - 2(\pi + \triangle)^2)}{m(\gamma^2((\pi + \triangle)^2 + \pi^2))}.$$
It is straightforward to show that $s_c(k,p)$ increases with $\Delta$ for $\gamma$ sufficiently large and decreases for $\gamma$ sufficiently small. The reason being that for $\gamma$ large an increase $\Delta$ decreases $e^d_i(k) - e^d_i(\mu k)$ and $e^d_i(k) - e^d_i(\mu k)$, while the opposite occurs for $\gamma$ sufficiently small. The intuition being that the increase in divisional manager’s expected private benefits when $\Delta$ increases depends on the productivity of each unit and the amount of cash-flow available. When the productivity under a diversified firm is much smaller than the productivity in a focused firm; i.e., $\gamma$ is large, and the cash-flow available in a focused firm is large; i.e., $\mu$ is large, an increase in a project’s returns increases private benefits more in a focused firm. The opposite occurs when $\gamma$ and $\mu$ are small.

Given the optimal efforts, shareholders’ value when a centralized structure is adopted, denoted by $\pi^c_2(k)$, is given by

$$\pi^c_2(k) = \frac{\varphi M^2 p(\pi + \Delta)k^2}{\gamma^2} (\pi + \Delta + s),$$  \hspace{1cm} (26)$$

while under a decentralized structure, denoted by $\pi^d_2(k)$, is given by

$$\pi^d_2(k) = \frac{\varphi m^2 (\pi + \Delta)k^2}{\gamma^2} (\pi + \Delta + p^2 s).$$  \hspace{1cm} (27)$$

It follows from this that centralization is the value-maximizing organizational structure when a diversified strategy is adopted if and only if $s \geq s_f(k)$, where

$$s_f(k) = \frac{(\pi + \Delta)(m^2 - M^2p)}{p(M^2 - m^2p)}. \hspace{1cm} (28)$$

Notice that as the productivity difference between divisions ex-post increases, centralization is less likely to be the CEO’s preferred organizational structure. The reason again being that the CEO’s productivity is lower than divisional managers’ productivity.

It follows from equations 27 and 28 and $\pi^d_1(\mu k)$ that the difference between firm’s value under a multidivisional firm and a pool of decentralized focused firms, denoted by $\Delta \pi_{21}(k)$, is

$$\Delta \pi_{21}(k) = \left\{ \begin{array}{ll}
\frac{\varphi M^2 p(\pi + \Delta)k^2}{\gamma^2} (\pi + \Delta + s) - \varphi m^2 \left( \left( \frac{\pi + \Delta}{\gamma} \right)^2 + p^2 \right) (\mu k)^2 & \text{if } s \geq s_f(k), \\
\frac{\varphi m^2 (\pi + \Delta)k^2}{\gamma^2} (\pi + \Delta + p^2 s) - \varphi m^2 \left( \left( \frac{\pi + \Delta}{\gamma} \right)^2 + p^2 \right) (\mu k)^2 & \text{otherwise.} \end{array} \right. \hspace{1cm} (29)$$
It readily follows from this that diversification is the value-maximizing strategy if and only if
\[ s > s_c(k,p), \]
where
\[ s_f(k,p) \equiv \begin{cases} \gamma^2 \mu^2 ((\pi + \Delta)^2 + \pi^2) - (\pi + \Delta)^2 & \text{if } p > p_f(k), \\ \frac{\gamma^2 \mu^2 ((\pi + \Delta)^2 + \pi^2) - p M^2 (\pi + \Delta)^2}{p M^2 (\pi + \Delta)} & \text{otherwise}, \end{cases} \]
and
\[ p_f(k) \equiv \frac{(\gamma m)^2 ((\pi + \Delta)^2 + \pi^2) - (\gamma m)^2 ((\pi + \Delta)^2 + \pi^2) (1 - p)}{2 M^2 (\pi + \Delta)^2}. \]

Let define \( \Delta s(k) \) as \( s_f(k,p) - s_c(k,p) \) when \( s_c(k,p) > 0 \), then
\[ \Delta s(k) = \begin{cases} \frac{\gamma^2 \mu^2 ((\pi + \Delta)^2 + \pi^2) (1 - p) - 2 (\pi + \Delta)^2 (1 - p)}{p M^2 (\pi + \Delta)} & \text{if } p > p_f(k), \\ \frac{\gamma^2 \mu^2 ((\pi + \Delta)^2 + \pi^2) (2 - p) - 2 (\pi + \Delta)^2 (1 - p)}{p M^2 (\pi + \Delta)} & \text{if } p_c(k) < p \leq p_f(k), \\ \frac{(m \gamma)^2 ((\pi + \Delta)^2 + \pi^2) (2 - p)}{2 M^2 (\pi + \Delta)} & \text{if } p \leq p_c(k). \end{cases} \]

It is easy to see from this equation and the definition of \( s_f(k,p) \) and \( s_c(k,p) \) that \( \Delta s(k) > 0 \).

Then, a result equivalent to the one in proposition 8 and comparative statics concerning \( \mu \) and \( \Delta \)
are stated in the following proposition.

**Proposition 10**

(i) Diversification destroys value for all \( s \in (s_c(k,p), s_f(k,p)) \); and (ii) if \( p \leq p_f(k) \), then \( \Delta s(k,p) \) is strictly increasing in \( \mu \) and \( \Delta \); and (iii) if \( p > p_f(k) \), then \( \Delta s(k,p) \) is strictly increasing in \( \mu \) and \( \Delta \) for \( \Delta > \Delta \) and \( \Delta \) for \( \Delta \leq \Delta \).

Thus, a result equivalent to the one in which internal capital markets are ignored is obtained.
The interesting part is how the presence of an efficient internal capital markets can contribute value destruction when a diversified strategy is pursued.

The model predicts that: (i) when the relative abundance of cash-flow between a multidivisional firm and a focused firm increases; that is, \( \mu \) decreases, diversification is less likely to reduce value, while when cash-flow becomes relatively more scarce, the opposite occurs. The intuition being that an increase in \( \mu \) makes the winner-picking benefit lower and decreases divisional managers’ benefit from getting more funds in multidivisional firm when

The last part states that if \( p \leq p_f(k) \), then the more unequal are divisions in an ex-post sense; that is, the larger is \( \Delta \), the larger the range of \( s \) under which diversification destroys value while
when \( p > p_f(k) \), this holds only for large values of \( \triangle \). The intuition is as follows. As \( \triangle \) the winner-picking effect increases firm’s value increases more than the CEO’s private benefits because the CEO’s benefit from the winner-picking effect only when project \( \alpha \) is implemented while shareholders when either project \( \alpha \) or \( \beta \) is implemented. Thus, as the productivity differences across divisions ex-post increases, the region for \( s \) under which diversification destroys value is larger.

### 7 Related Work

There are several papers related to the issue studied here, yet there are few that relates closely to the model in this paper.

The idea that decentralization or delegation of decision rights increases divisional managers incentives closely resembles the argument in Aghion and Tirole (1997). They notice that when project choice is non-contractible, centralization discourages an agent to investigate projects. The reason being that under centralization the decision right on project choice is in the hands of the principal, who imposes his preferred project whenever informed, while under decentralization the agent imposes his preferred project whenever informed. Similarly, Rotemberg and Saloner (1994) argue that firms may wish to avoid being too broad in scope. For if there are credit constraints at the firm level that allow to implement one project at the time, being focused helps the CEO to keep the promise to implement any good ideas that they may have, thereby increasing their ex-ante research incentives.\(^{30}\)

The model in this paper differs from this idea in that there is a multitasking problem embedded in the model. Delegating decision rights to divisional managers encourage them to exert more effort, yet it decreases their productivity because project implementation demands personal resources. Thus, delegation creates incentives for some tasks, but it decreases them on others.

The paper by Matsusaka (2001) is also related to the model here. Matsusaka develops a model that revolves around the notion of organizational capabilities and that diversification is a matching/search process. He shows that diversified firms may trade at a discount despite that diversification is value-maximizing. The reason being that a poor match between organizational capabilities

\(^{30}\text{See, Stein (2001) for how corporate focus can affect divisional managers’ incentives.}\)
and units generates a discount at the same time that induces firms to diversify in search of better matches. This suggests that the diversification discount may cause diversification and not the other way around. Clearly, this paper is complementary to the model in this paper because it predicts the causality in the other direction; that is, diversification destroys value for some firms creating a diversification discount. The model also predicts that firms that are optimally diversified may be traded at a discount because the decision to diversify is endogenous.

Another important difference is that Matsusaka’s model ignores agency problems and argues that agency theory fails to explain some of the findings that the model here explains and that the model here makes predictions not only concerning the diversification strategy, but also the organizational structure.

As was mentioned in section ?? there are models that explain why diversification destroys value based on inefficient internal capital markets (see, e.g., Matsusaka and Nanda, 2000; and Scharfstein and Stein, 2000; Brusco and Pannunzi, 2002). The main difference with this papers is that my results do no hinge upon the efficiency of internal capital markets and more importantly, in my model the decision to diversify is endogenous. This is important because the fact that a diversified firm is valued less than a pool of focused firms is not a sufficient condition for diversification to destroy value. It must be true that diversification takes place when diversified firms are valued less than their units separately.

Lastly, the model here also relates to the literature on corporate strategy where it is argued informally that realizing synergies requires interdivisional coordination and/or resource sharing (centralization); for the CEO must acquire detailed knowledge of divisional opportunities if it is to identify possibilities for exchange or joint action. (see, e.g., Hill and Hoskisson, 1987; Hill, 1998, and Argyres, 1995). In addition, they argued that this requirement is incompatible with the organizational structure needed to realize the benefits of internal capital markets. My paper is complementary to this literature since it develops a formal model that captures some of the insights from this literature.
8 Conclusions and Remarks

An important conclusion of the papers is that diversification is good for some firms and bad for others and even for those for which it is good, they may show-up in the data as traded at a discount. Thus, the answer to the question Does diversification destroys value or is measurement problem? is yes to both, it destroys values and there is also a measurement problem. This finding is driven by agency problems between shareholders, the CEO and divisional managers and does not depend on the efficiency or inefficiency of internal capital markets.

The driving forces behind the model are: the existence of con‡ict of interest between shareholders, the CEO and divisional managers; the CEO’s empowerment with decision rights and the existence of potential synergies that are materialized if and only if interdivisional coordination on project choice takes place. The first two capture the ideas in Bearle and Means that a large portion of assets or decisions are controlled by managers with minimal ownership stakes in their firms and thereby they do not act always on the interest of owners. This captures well the separation of ownership and control. This combined with the third force leads to some of the questions raised by the literature on the boundaries of the firm. In particular, to the issue of why coordination can be easily achieved within a firm than through the market. In this paper the idea behind is that the CEO’s authority combined with private benefits provide him with better incentives than the market to gather information and make project implementation possible. Furthermore, the benefits of interdivisional coordination not only depend on that coordination is achieved, but also on the organizational structure chosen. If coordination can be achieved through the market at some positive cost, the CEO of an integrated firm faces different incentives at the time to choose an organizational structure than the CEO of a focused firm. This difference in incentives may lead to the adoption of the wrong organizational structure more often under separation than integration reducing firm’s value.

There are several assumption that might seam stronger than they actually are. The assumptions that $M^2 > m^2 p$ and $m > M$ can easily be modified at the cost of missing the richest case. For if $M^2 - m^2 p \geq 0$ and $M \geq m$, centralization is always the preferred structure, while if $M^2 - m^2 p \leq 0$ and $M \leq m$, decentralization is always optimal. Yet, the result that diversification destroys value
for small values of $s$ is robust to the change in assumptions because of the three forces that explain why diversification destroys value only the wrong organizational structure effect is lost.

I have also assumed that only coordination in project $\alpha$ yields a positive return. If it is assumed that coordination on project $\beta$ also yields a positive return, then the results holds, but a region under which failure to diversify destroys value arises. For instance, if \( s(\beta, \beta) = s \), the return from interdivisional coordination in a decentralized firm becomes \( p^2 + (1-p)^2 \) instead of \( p^2 s (\phi_1 \pi_1 + \phi_2 \pi_2) \), while the CEO’s private benefits remain a fraction $\phi$ of \( p^2 s (\phi_1 \pi_1 + \phi_2 \pi_2) \) since project $\beta$ yields 0 private benefits to the CEO. Thus, the CEO fails to internalize the benefits from interdivisional coordination on project $\beta$ and thereby he fails to diversify in circumstances that diversification is value-maximizing.

I have ignored incentive contracts. In the environment here incentive contracts can increase divisional managers efforts, but can never change divisional managers’ project choices since project choice is non-contractible and project $\alpha$ and $\beta$ are indistinguishable in terms of return. So, even if returns are contractible, this does not change divisional managers’ project choices. Incentive contracts may help to align the CEO’s choice with shareholders’, yet they cannot perfectly aligned the CEO’s interest with shareholders because the CEO will always get more benefits (private benefits plus the share of profits agreed on the incentive contract) from the implementation of project $\alpha$ than project $\beta$.

References


9 Appendix: Proofs of Main Results