

**POSITIONAL LIMITS TO COMPETITIVE ALLOCATION:  
EVIDENCE FROM CORPORATE TAKEOVERS\***

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**ABSTRACT**

I propose a model of competitive allocation of actors to positions when positions comprise of two or more assets. The model shows that when these assets are costly to separate, a decline in incumbent's performance results in much smaller increase in the number of contestants who can replace the incumbent. Thus, under these conditions, a decline in incumbent's performance has a small effect on the likelihood of her replacement. I test this hypothesis by examining the allocation of top level managers to firms in the American market for corporate control in the 1980s. Using a measure of separation costs derived from Burt's constraint theory, I find support for the hypothesis. The theory and results provided here suggest that competitive allocation as a means of eliciting actor effort will be ineffective for positions that comprise two or more assets that are costly to separate from each other. In these circumstances, social mechanisms of eliciting effort are much more useful.

## **Introduction**

Social scientists have long recognized that competition for positions is a powerful means of eliciting effort and performance. A simple process of allocating a contesting actor to a position if she performs better than incumbent will motivate the incumbent to exert effort to avoid such replacement. This process will be particularly powerful when the contestants are fully compensated for their higher performance and can always initiate the replacement of the poorly performing incumbent. Although many sociologists and economists have pointed that numerous conditions have to be met for this process to operate well in practice, in theory, the threat of replacement remains a simple and yet extremely effective means of eliciting effort.

Though powerful, competitive allocation will only elicit effort if a decline in incumbent's performance increases the number of feasible contestants for the position. If this is not true, the incumbent can easily lower her performance without having to worry about replacement. At first sight, it may seem that there should be no reason why properly functioning markets should be subject to this limitation. As long as contestants can easily enter the market, a decline in incumbent's performance should be met with a concomitant increase in the number of alternative actors whose skills and performances equal those of the incumbent. However, in this paper, I question this claim and show that for certain types of positions a decline in incumbent's performance will not increase the probability of finding better replacements. Specifically, I argue that this effect will be pronounced when positions comprise two or more assets and these assets are costly to separate. Incumbents of such positions will be able to exert significantly less effort and perform poorly without fearing replacement.

The intuition behind this claim can be most easily understood by considering that when positions comprise two or more assets, the likelihood that the incumbent will be replaced is given by a joint probability of finding replacements for each of the assets. Thus, if incumbent's performance with one of the assets declines, the effect on the likelihood of replacing the incumbent will depend on how difficult it is to find a replacement for other assets in the position. In the extreme case when it is impossible to find replacements for the other assets in the position, the decline in incumbent's performance will have no effect on the likelihood of her replacement. In contrast, if it is always possible to find replacements for the other asset, the decline in incumbent's performance leads to the same increase in likelihood of replacement as it would for a single asset position.

Within this framework, it is easy to understand the role of separation costs of the assets. When separation costs are high, then it will be necessary to find a more skilled specialist who can perform not only better than the incumbent with one asset, but also cover the cost of separation. It will be more difficult to find such a replacement. Thus, when cost of separation is high, and it is difficult to find a specialist for the other asset, the effect of performance decline on the likelihood of replacement will be small. This stands in contrast to a situation, when the cost of separation is low, and it is easier to find a specialist for the other asset. In these circumstances, the effect of performance decline on the likelihood will be large. Thus, separation cost essentially allows actor to reduce his performance with an asset without having to worry about replacement.

I test for this prediction by examining the allocation of top level managers to firms in the American market for corporate control in the 1980s. As extensively documented in prior work, numerous legal and financial changes during this period resulted in a very competitive market for corporate control (Hirsch 1986; Palmer et al. 1995). The competitiveness of this market implied that managers who did not maximize the firm's shareholder value during this period were subject to a takeover bid regardless of their size, social or political connections (Davis, Diekmann and Tinsley 1994). Consistent with previous results, I find that poor stock market performance does indeed increase the likelihood that the incumbent managers will be replaced through a takeover. However, this finding applies only to firms composed of assets that are easily separated. In contrast, I find that when the firm is composed of assets that are costly to separate, the probability of replacement does not vary with performance: poorly performing managers were equally unlikely to be replaced as well performing managers were. This implies that managers of these companies were largely free from the constraints of the market for corporate control and could engage in behaviors that essentially allowed them to pursue their own goals, possibly at the expense of firm performance.

The theory and the results presented here have three implications, which range from fairly specific to fairly abstract. First, the argument presented here questions the claim that competitive allocation uniformly provides the most effective mechanism of eliciting effort by threatening to punish poorly performing actors with replacement. Instead, it points to a contingent view of the efficacy of this process in eliciting effort. Whereas competitive allocation is effective at eliciting effort by punishing poorly performing actors in charge of one asset, they become less useful when actors occupy positions that comprise two or more assets that are costly to separate from each other. In those conditions, social mechanisms of

control become much more important in eliciting effort. In the context studied here, such control is provided by boards of directors or organized shareholder action. In other contexts, norms or status contests will be necessary to provide incentives to perform (Zuckerman and Sgourev, 2006).

The second main implication can be derived by recognizing the sources of separation costs. As I discuss in greater detail later, separation costs arise predominantly because these assets are more productive when owned together than when they are separated. This implication is particularly salient for the theories describing conditions under which two or more assets should be controlled together, such as the different theories of the firm. These theories prescribe integration of business units characterized by mutual dependencies, arguing that joint ownership of such business units will increase their performance. However, these theories ignore the observation that such integration insulates managers of the newly established entity from replacement should they perform poorly. This allows them to exert less effort and thereby lowers performance of the business units. To the extent that these costs of managerial slack outweigh the benefits of integration, the prescription that mutually dependent assets should be integrated will not hold true. This suggests that theories of the firm cannot provide correct prescriptions without considering the impact of integration on the likelihood of managerial replacement in case of poor performance.

Finally, the theory and results presented here also have more general implications for our understanding of sociological explanations of inequality. Sociologists have traditionally focused on positional sources of inequality, which arise purely out of actors occupying particular positions and independently of their skills or performances. These positional advantages become salient when incumbents can occupy privileged positions even though

their performance declines. In contrast, when actors lose their positions as soon as their performance declines, the distinction between positions and actor performance becomes irrelevant. Since competitive markets punish poor performance with replacement, sociologists have usually assumed that there is little scope for positional rewards in competitive markets. However, as suggested here, even in competitive markets it is possible for incumbents of certain types of positions to continue to occupy them, despite performance decline. This suggests that it is possible for positional inequality to exist in competitive markets and begs for further inquiry into the subject.

### **Allocation of actors to positions**

The objective of this section is to formulate a model of competitive allocation of actors to positions, when positions entail control over more than one asset. For simplicity of exposition, I focus on allocation to a position consisting of two assets,  $a$  and  $b$ , but the insights gleaned from this model apply to positions with more assets. The position is occupied by an incumbent, whose performance with asset  $a$  is given by  $\pi_a$  and performance with asset  $b$  is given by  $\pi_b$ . The incumbent is faced with a population of  $n$  contestants who seek to occupy the position. Every contestant could deliver a certain level of performance with assets  $a$  and  $b$ , if they replaced the incumbent. The exact level of each contestant's performance with asset  $a$  is determined by a random draw from an exogenously given distribution of performances. Contestant's performance with asset  $b$  is determined in the same manner. The draws are statistically independent across assets and contestants.

Given the level of incumbent's performance, the population of contestants can be divided into four categories. First, there are contestants whose performance with asset  $a$  exceeds the

incumbents' performance with that asset. I define  $p_a$  to be the probability that a randomly chosen contestant's performance fulfils this condition. Second, there are contestants whose performance with asset  $b$  exceeds the incumbents' performance with that asset. I define  $p_b$  to be the probability that a randomly chosen contestant's performance fulfils this condition. Both  $p_a$  and  $p_b$  increase as incumbent's performance with that asset decreases. I refer to these two categories of contestants as *specialists*, as they can only deliver high performance with one of the assets. Specialist contestants stand in contrast to the third category of contestants, *generalists*, whose performance simultaneously exceeds the incumbents' performance both for asset  $a$  and for asset  $b$ . As I assumed that contestant's performance with one asset is independent of the contestant's performance with the other asset, the likelihood that a randomly chosen contestant will be a generalist is a product of the two probabilities:  $p_a p_b$ . The fourth category comprises all contestants whose performance does not exceed that of the incumbent for asset  $a$  or asset  $b$ . These do not form a threat to the incumbent.

A generalist can replace the incumbent alone, as he or she can perform better than the incumbent with both assets. In contrast, a specialist cannot independently replace the incumbent, since such an actor can provide higher performance only with one of the assets. However, a set of two specialists can replace the incumbent as long as there is one contestant with higher performance than the incumbent with asset  $a$  and one for whom this is the case for asset  $b$ . For the purposes of exposition, I assume that the only way in which

specialists can replace the incumbent is by separating the position into distinct assets, with each of the specialists controlling one of the assets<sup>1</sup>.

Although specialists have to operate in tandem to replace the incumbent, they actually pose a greater threat to the incumbent than generalists do. To see why this is the case consider that in a market composed of  $n$  contestants, there will be  $np_a$  specialists who can perform better than the incumbent with asset  $a$ . Similarly, there will be  $np_b$  contestants who can achieve the same with asset  $b$ . To replace the incumbent, any one of the specialists who can perform better than the incumbent with asset  $a$  can form a team with any one of the specialists who can perform better than the incumbent with asset  $b$ . If the specialists contestants face no problems identifying each other in the market, the number of such specialist combinations is given by the product of the number of each type of specialist, which is  $np_a * np_b = n^2 p_a p_b$ . In contrast, the likelihood that a randomly chosen contestant is generalist is  $p_a p_b$ . Consequently, in a market composed of  $n$  contestants, there are only  $np_a p_b$  generalist contestants. Comparison of the two numbers reveals that the incumbent will face  $n$  times more specialist teams than generalists. To the extent that the number of feasible replacements is related to the likelihood of replacement, specialists pose a much bigger threat to the incumbent<sup>2</sup>.

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<sup>1</sup> This assumption excludes a number of different possibilities of replacement by specialists. First, the specialist contestants cannot pool their skills to replace the incumbent without separating the position. Second, specialists cannot pool their skills with the incumbent such that they only assume control over some of the assets. Finally, one specialist whose performance with one asset exceeds the sum of incumbent's performance with all assets cannot replace the incumbent. These exclusions form scope conditions for the theory.

<sup>2</sup> It could be argued that likelihood of replacement is not related to the *number* of generalist or specialist contestants who can perform better than incumbent, but to the probability that there is at least *one* generalist or at least *one* set of specialists in the population of contestants who can perform better than the incumbent. The latter assumption would imply that the presence of, say, two specialist teams leads to no greater likelihood of replacement than the presence of one. Although it is possible that this is true, it assumes that (i) the specialists always possess full information on their own performance vis-à-vis the incumbent, (ii) have no better options other than replacing the incumbent and (iii) face no coordination problems. These conditions are unlikely to be met in real market settings. Consequently, I assumed that the likelihood of replacement is related to the number of teams presuming that the greater the number of teams, the more likely it is that some of them will overcome the three issues described above. Also, it can be easily demonstrated that relating the likelihood of

I illustrate this relationship in Figure 1. The horizontal axis represents the likelihood that a randomly drawn contestant will provide higher performance than the incumbent with a particular asset. In order to avoid drawing a three dimensional graph, the horizontal axis represents this probability for assets  $a$  and  $b$ , assuming that  $p_a = p_b$ . The horizontal axis can be interpreted easily by remembering that 0.01 increase in probabilities  $p_a$  and  $p_b$  in a population of 100 leads to 1 additional specialist capable of performing better than the incumbent with asset  $a$  and 1 additional specialist for asset  $b$ . The vertical axis in the figure represents the number of generalists and specialists in a population of 100 actors. The figure clearly indicates that teams of specialists provide a much greater threat to the incumbent than the generalists do.

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Insert Figure 1 around here  
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However, the figure also points to another very important feature of the model – namely, that relationship between the number of specialist combinations and the probability that a randomly drawn contestant will provide higher performance than the incumbent is highly non-linear. As illustrated in the figure, equivalent increases in the probability of finding a better specialist contestant lead to much smaller increases in the number of specialist teams at low levels of probability than at high ones. Stated differently, a decline in performance of an incumbent will lead to a smaller increase in the likelihood of replacement at high levels of performance than at low levels of performance.

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replacement to the probability that there is at least one generalist or at least one specialist in the population of contestants yields similar predictions.

The non-linearity is a direct consequence of the fact that the position comprises more than one asset. When there is only one asset, an increase in the number of contestants capable of replacing the incumbent will have a linear effect on the likelihood of replacement. When there are two assets in the position, replacement occurs through any combination of a specialist for asset  $a$  and specialist for asset  $b$ . For example, consider an entry of one additional specialist for asset  $a$  and one additional specialist for asset  $b$  into the consideration set. The new specialist for asset  $a$  can pair up with the new specialist for asset  $b$ , thereby creating one more team capable of replacing the incumbent. However, every new specialist for asset  $a$  can pair up with an old specialists for asset  $b$ . Similarly, every new specialist for asset  $b$  can pair up with an old specialist for asset  $a$ . If the initial performance of the incumbent was high, such that there were originally very few specialists, the new specialists can only form a few new combinations. In contrast, when the initial performance of the incumbent was low, such that there already were a lot of specialists capable of replacing the incumbent, the new specialists can only form a lot of new combinations.<sup>3</sup>

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<sup>3</sup> Although this cannot be seen easily from the figure, the relationship between incumbent's performance and the likelihood of replacement by a generalist is also non-linear. This can be easily deduced by considering that the number of generalists is determined by the product of  $p_a$  and  $p_b$ . The reasoning behind the result has similar logic to the discussion regarding specialists. Consider a high performance incumbent whose performance declines. Let us assume that the decline in performance results in more actors who can perform better than the incumbent with asset  $a$ . However, to become a generalist these actors also have to be high performers with asset  $b$ . Since the probability of performing better than the incumbent with asset  $b$  is still very low, it is more likely that the new contestants who can perform better with asset  $a$  will not be able to perform better with asset  $b$ . Consequently, few of them will become generalists. However, if the incumbent was an average level performer, an equivalent decline in performance has much more dramatic effects. Since they no longer have to be excellent performers with asset  $b$ , the probability that they will outperform the incumbent with asset  $b$  is much higher now. Thus, the likelihood that the new contestants who can perform better with asset  $a$  will be able to perform better with asset  $b$  thereby making them generalists. I do not discuss this in the main text, because generalists are much less numerous than teams of generalists and hence unlikely to be the main threat to the incumbent.

### *Cost of separation*

Although specialists form a much greater threat to the incumbent than generalists do, the severity of their threat can be restricted if there are a significant costs to separating the assets associated with the position. When these costs are present, a group of specialists cannot replace the incumbent if each of them performs only at least as well as the incumbent with a particular asset. Each of the specialists has to perform significantly better than the incumbent in order to compensate for the separation cost. The sum of each specialist's performance advantage has to add up to the cost of separation. In contrast, since generalists replace the incumbent without separating the assets, separation costs do not affect them.

As specialists have to perform much better than the incumbent in order to cover the cost of separation, separation costs essentially increase incumbent's performance vis-à-vis specialists. This reduces the probability of finding appropriate specialists in the population, which in turn eliminates a number of specialist groups that could replace the incumbent. This reduction can be easily seen in the example given in Figure 1. For example, if we assume that the cost of separation reduces the probability of finding a specialist for each of the assets from .10 to .03, the number of specialist teams declines from 100 to 9.

Consistent with the logic outlined in the previous section, the shift in the probabilities of finding specialists caused by the separation cost will have a significant impact on the effect of decline in incumbent's performance on the likelihood of replacement. Consider the incumbent of high separation cost who currently faces 9 possible combinations of specialist replacement teams. If the performance of that incumbent declines such that the probability of finding a qualified specialist increases to 0.04, the number of specialist teams will increase

by 7 to the total of 16. An equivalent decline in incumbent's performance for the position with no separation costs will shift the probability of finding qualified specialist from .10 to .11. Consequently, the number of combinations will increase from 100 to 121 – an increase of 21. This implies that the effect of an equivalent decline in incumbent's performance on the likelihood of replacement will depend on the separation cost. When the separation cost is low, the decline in incumbent's performance will lead to substantial increase in the likelihood of replacement. However, when the separation cost is high, the decline in incumbent's performance will only lead to a small increase in the likelihood of replacement. This implies that the incumbent is likely to continue to occupy the position, even though an equivalent decline in performance in a different position would result in a replacement.<sup>4</sup>

**Proposition:** A given decline in incumbent's performance leads to a smaller increase in the likelihood of replacement when the incumbent occupies a position that is more costly to separate.

### **Application to market for corporate control**

I test the main hypothesis in the market for corporate control in the 1980s. In the market for corporate control, managers compete for the right to control organizations on behalf of

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<sup>4</sup> It is possible to make an argument that high costs of separation reduce the effect of performance on the likelihood of replacement through a slightly different mechanism. Specifically, it is possible to argue that incumbents of high separation cost positions will always be replaced by a generalist, while incumbents of positions with no separation costs will be replaced by specialists. Since the likelihood of finding a generalist increases more slowly with performance than the likelihood of finding an equivalent set of specialists, then the high separation costs will lead to less performance sensitivity. While this reasoning is correct, the assumption that incumbents of high separation cost positions will be replaced by generalists implies that generalists must outnumber specialist teams for this position. As discussed in the text, specialist teams outnumber generalists by a factor of  $n$ . For generalists to outnumber specialist teams, it must be the case that the separation costs are very large. Specifically, under the assumptions of the model presented here, the separation costs must be so high such that they reduce the likelihood of finding a specialist for each asset by a factor of square root of  $n$ . Thus, for example, in populations of 100 contestants, separation costs must reduce this likelihood by a factor of 10. Given that this mechanism becomes binding only at such high level of separation costs, I do not discuss it in the main text, but include it here for completeness.

shareholders. These managers look for profitable opportunities to assume the management of organizations. When stock price of a company is high, it is unlikely that contesting managers can profit from replacing the incumbent managers. In contrast, such an opportunity is present in poorly managed firms, whose market value is low. Once the opportunity is identified, the contesting managers launch a takeover bid by offering to buy, at a premium, the stock held by the firm's shareholders. Although the firm's board members and incumbent managers can resist the takeover, shareholders are the sole decision makers (Walking and Long 1984). The incumbents can only affect the outcome of a takeover bid by proposing a counter offer that would result in greater financial benefits for shareholders. Such an offer could in turn elicit a counter-offer from the hostile bidder. The whole process leads to a price contest between incumbents and contestants for the right to control the firm. As shareholders decide whether to change the control of the firm largely on the basis of the outcome of this contest, the whole process resembles an efficient market for corporate control in which control over assets is allocated to those who value them most (Manne 1965). Thus, the market for corporate control can be thought of as a mechanism for competitive allocation of managers to organizations.

The market for corporate control has not always been competitive. Prior to the 1980s, managerial social networks, reputations, and class interests played an important role in the incidence of takeovers (Zeitlin 1974), leading to unequal exposure of firms to the market for corporate control (Marris 1964). Firms managed by the members of the inner circle of the corporate elite were unlikely to receive a takeover bid, while other firms did not enjoy similar protection (Palmer et al. 1995). However, changes in corporate governance in the 1980s erased these differences. Developments in the financial industry allowed outsiders to secure

short-term debt financing through junk bonds or other financial vehicles to complete the takeover (Baker and Smith 1998). These changes removed financial constraints on these outsiders and allowed entrepreneurial firms and individuals to bid for the corporate control of firms (Jensen 1993). The Supreme Court also lessened state laws limiting takeovers (Edgar vs. MITE, 1982), allowing outsiders to undertake even the largest deals. The increase in the number of potential participants in the market for corporate control—groups that had little reverence for the existing corporate pecking order (Hirsch 1986)—eradicated the protective elements of the inter-corporate social structure. In fact, empirical research on the topic suggests that in the 1980s neither size (Morck, Shleifer and Vishny 1988) nor connections to other large corporations or to banks (Davis and Stout 1992) were likely to protect a firm from a hostile takeover bid. The foregoing discussion suggests that the market for corporate control in the 1980s presents itself as a competitive arena where actors are matched to positions on the basis of performance, and with little regard to the social processes surrounding executive succession.

Existing research suggests that the increased competition in this market had its most pronounced impact on multi-business firms. Previously sheltered from the market for corporate control, many firms often had diversified into a broad set of different industries without a compelling economic rationale for doing so. However, managers of these companies often did not possess generalist skills required to run these multi-business-unit firms. Consequently, a great majority of these companies performed worse than equivalent sets of stand alone firms, both in terms of accounting and stock market performance. Once the market for corporate control became competitive, this relative undervaluation was

quickly exploited through takeovers of multi-business-unit firms (Davis, Diekmann and Tinsley 1994; Davis and Stout 1992).

To exploit the advantages of specialist managers over the incumbents, many of these bids took the form of 'bust up' takeovers, whereby multi-business-unit firms were split into separate business units and managed by specialists management teams (Davis, Diekmann and Tinsley 1994; Davis and Stout 1992). Up to 80% of take over targets were subject to this type of take-over, with the remainder being taken over as a whole (Jensen 1989). These bids would often be initiated by an arbitrageur, such as Carl Icahn, who would launch a bid for a company without any intention of managing the firm after takeover (Lipton and Steinberger 1988). Once the bid was successful, the company was split apart into individual business units and sold to specialist management teams. In other cases, a specialist would launch a bid for the entire company, and then sell individual business units to pre-arranged individual buyers. Despite the differences in the mechanics of the actual takeover, the final effect was exactly the same – a multi-business unit firm was separated and managed by specialist management teams.

The existence of bust-up takeovers is premised on the assumption that poorly performing multi-business firms could be separated into constituent business units at little cost. However, presumably not all of these firms were easy to separate, in which case they would be immune from a takeover. This probably explains why so many multi-business firms survived intact, despite numerous takeovers of diversified firms during that period. More importantly, these costly-to-separate enterprises should be immune from takeovers even if their stock market performance declined significantly, as predicted by the theoretical model

above. Little work has addressed this topic – a void that I address in the empirical section. However, before I proceed, I first need to establish a method for establishing costs of separating two or more business units.

### **Cost of business unit separation**

To identify the long-term performance costs of separating two or more business units from each other, I start by examining whether joint ownership of two or more business units contributes to each business unit's performance. I presume that the sum of these performance advantages effectively amounts to a performance penalty that would have to be incurred if the business units were separated. These performance advantages are difficult to measure, particularly for many of the large and complex companies that inhabit the American economy. To solve this issue, I draw on the developments in resource dependence and transaction cost theories, both of which theorize about conditions under which joint ownership of two or more business units is likely to contribute to their performance. By measuring these conditions, I can develop proxies for the costs of separation of multi-business unit firms that can be used to test the model from the previous section.

Both resource dependence theory and transaction cost economics trace the benefits of joint ownership of two or more business units to the presence of mutual dependencies between them. Mutual dependencies between two business units exist when each of them derives much greater benefit from exchanging with the other than with the next best alternative partner. Consequently, if the exchange between the two business units does not take place, both of them incur substantial opportunity costs. The existence of this cost implies that

each business unit would be willing offer better exchange terms to its trading partner, until it is indifferent between staying in the current relationship and switching to another partner. This creates a potential for strategic action, as each business unit could strategically withhold exchange in order to attempt to extract a better terms, leading to a lengthy bargaining process. Since both trading partners depend on each other to provide valued goods, the bargaining has substantial cost to both of them significantly reducing their performance<sup>5</sup>.

However, these performance penalties can be avoided if the two business units integrate under a single corporate umbrella. By doing so, they will eliminate the incentive to repeatedly renegotiate the terms of the exchange and the concomitant cost of doing so and hence improve the performance of the two business units over and above what they would be able to achieve if they were separated. Stated differently, integration of two business units under conditions of high mutual dependence creates a performance benefit that would be lost if the company were separated into individual business units. This is exactly the cost that specialists contestants would have to incur if they were to separate a firm characterized by high mutual dependencies between its business units<sup>6</sup>.

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<sup>5</sup> The two theories differ, however, in what they consider to be the source of mutual dependence. Resource dependence theory focuses on ex-ante mutual dependence that arises due to structural restrictions on exchange. Transaction cost economics usually assumes that two parties are initially independent, but develop mutual dependence over the course of the relationship as they invest in relationship-specific assets. Despite this difference, they both predict that joint ownership of business units that are mutually dependent will aid their performance. Having said that, the different types of mutual dependence call for different types of data and these vary in the difficulty of their collection across multiple industries. I discuss issue in the empirical part of the paper.

<sup>6</sup> The embeddedness approach in sociology has argued that integration of business units under conditions of mutual dependence may be unnecessary if the main decision makers of the business units possess affective ties that allow them to avoid the cost associated with opportunistic renegotiations. In the context of this study, this logic implies that if specialist contestants have already developed these affective relations, they may be able to replace the incumbent without incurring the separation cost. If this were the case, the theoretical underpinnings of the main hypothesis tested in this paper will be weakened. However, it is unlikely that all of the specialist contestants possess these relationships with others and so not all specialist contestants will be unaffected by the separation costs. Consequently, while the embeddedness approach weakens the main prediction, it would only eradicate it here under an extreme set of circumstances.

Taken together, this discussion suggests that the presence of mutual dependencies between firm's business units is likely to significant performance costs if the business units were separated. Consistent with the logic of the theoretical model, this separation cost should buffer the incumbent managers from replacement even if their performance declines. This leads me to hypothesize that

**Hypothesis:** A decline in firm's performance will lead to a smaller increase in the likelihood of a takeover when there exist significant mutual dependencies between the firm's business units.

## **Methods**

To test the hypothesis, I collected data on the 1978 *Fortune 500* largest industrial firms from 1978 to 1992. I chose 1978 to be the start date as it captures the beginning of the radical changes in the institutional environment surrounding the takeover market. The ascent of the Reagan administration in 1981 accelerated the process even further. However, many of the institutional changes had been contested or repealed by 1992. These changes critically reduced the competitiveness of the market and so I decided to end the observation period then. For all firms in the sample, I gathered the data on the incidence of takeovers from Compact Disclosure and *SEC News Digest* – an electronic and a paper format dataset containing filings of tender offers for stock with the Securities and Exchange Commission upon the commencement of the offer.

For every observation period, I also collected data on the business units owned by the firms in my sample from the Federal Trade Commission Line of Business Database. Firms are

required by the Financial Accounting Standards Board (FASB) to report disaggregated information for segments that represent 10% or more of its consolidated sales, assets or profits<sup>7</sup>. Although segments represent a higher level of aggregation than individual business units, the database reports all SIC codes in which a particular segment operates. Consequently, I am able to identify all material businesses lines in which the firm is operates. Although these data have been used previously by students of diversification, they are not without a set of shortcomings particularly when used in a panel. Since managers have substantial amount of control over the precision with which they disclose the SIC codes in which segments operate, these data can register changes in corporate diversification, when in fact none occurred. In order to guard myself against this possibility, I verified all instances of a company initiating or ceasing to report a segment against a *Securities Data Corporation's* Mergers and Acquisition database of acquisitions and divestitures derived from to ensure that these changes did actually occur. Only the instances in which I could obtain a match were classified as changes in the extent of corporate diversification across years.

Having identified the businesses in which the firms operate, I next sought to identify the cost of their separation by using measures of mutual dependence. At this point I was faced with the choice of using *ex-ante* or *ex-post* mutual dependence. Measures of *ex-post* mutual dependence would provide more precise proxies for the separation costs. This is because two *ex-ante* mutually independent firms can choose to invest in the relationship as it progresses thereby making themselves *ex-post* mutually dependent. As a consequence, the measure of *ex-ante* dependence will not capture these situations. At the same time, *ex-ante*

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<sup>7</sup> The 10% materiality criterion may understate the true extent of corporate diversification. I do not expect this to be a large problem for the purposes of this study as business segments that provide less than 10% of corporate sales, assets or profits are unlikely to be important as a source of takeover attempt.

mutual dependence will always be reflected in *ex-post* mutual dependence, thereby allowing the *ex-post* measure to capture both types of dependencies.

However, the theoretical advantage of the *ex-post* measure over the *ex-ante* measure has to be weighed against the ease with which these measures can be consistently observed across a wide spectrum of industrial settings. Sociologists and organizational scholars have developed and extensively tested measures of *ex-ante* mutual dependence that can be easily captured on a consistent basis across a wide set of industrial transactions (Thompson, 1967; Jacobs, 1974; Pfeffer and Salancik, 1978; Burt, 1983). For example, Burt (1980) in his seminal formulation proposed that patterns of dependencies between firms can be derived from input-output transactions between economic sectors and concentration of firms in these sectors. In this specification, two firms in different industries will be mutually dependent if each is required to buy most of its inputs or sell most of its outputs to the other and high levels of concentration in both industries limit the alternatives to acquire these resources elsewhere. Numerous tests of this specification have confirmed its usefulness in studies involving numerous sectors of the economy.

In contrast, the use of the *ex-post* measures associated with transaction cost economics is difficult across a large set of industries and firms. Although scholars in this tradition broadly agree that *ex-post* mutual dependencies arise out of relationship specific investments, there is less agreement on how to identify this type of investments consistently across various industrial settings. As a consequence, many of the leading scholars in the transaction economics tradition have focused on a particular type of transaction. Only by restricting their attention to, say, firms in a particular industry and their buyers or suppliers, were these

scholars able to measure *ex-post* mutual dependence consistently. In principle, I could follow this approach here and measure *ex-post* dependencies and relate them to the incidence of takeovers. However, given the relative infrequency with which hostile takeovers occur, the selection of a single industry would yield only a few takeovers. The scarcity of these outcomes would undermine the statistical power of the tests and would make it more difficult to account for alternative explanations of takeover activity. Consequently, I adopt the *ex-ante* measure to capture the costs of separation<sup>8</sup>.

Given this choice, I collected data from the 1977, 1982, 1987 and 1992 two-digit Benchmark Input-Output accounts for the U.S. economy developed by the Bureau of Economic Analysis. To construct annual measures, I linearly extrapolated the measures over the four available accounts<sup>9</sup>. I also gathered data on industry concentration in manufacturing from the concentration ratios published by the Census Bureau of the U.S. Department of Commerce. With the BEA's *Survey of Current Business* mapping of SIC categories to input-output sectors, I identified the four largest firms in each sector, summed their sales, and divided the sum by the total volume of sales for the sector reported in the input-output table. Concentration ratios for agriculture, mining, construction, government enterprises, and special industries were not available in all time periods. To avoid a sizable loss of observations, I linearly extrapolated the available concentration ratios across the missing

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<sup>8</sup> It should also be noted that the use of *ex-ante* measure will make it more difficult to provide empirical evidence in support of the theory. By using the *ex-ante* measure, firms that are coded as easy to separate will comprise of a mix of firms that are cheap to separate with some firms that are costly to separate, instead of comprising solely of firms that are easy to separate. This will reduce the average effect of performance decline on the likelihood of takeover for the firms that I coded as easy to separate. This will, in turn, reduce the estimated difference between the firms that were coded as costly to separate and those that were coded as not costly to separate. As a consequence, the bias inherent in the *ex-ante* measure will make it more difficult to provide evidence that there exists a significant statistical difference in the effect of performance decline on the likelihood of takeover between these two sub-populations, even if such statistical difference exists in reality.

<sup>9</sup> Given that the input-output change very little over any five-year period (Burt, 1983) different assumptions about the extrapolation did not change the results.

time periods. The findings did not significantly change whether we included or excluded these extrapolated observations.

## **Measures**

*Dependent variable* The dependent variable is a dichotomous variable coded 1 if the company received a hostile takeover bid in year  $t$  and zero otherwise.

*Independent variables* To identify the cost of separation of business units, I used the data on firm's presence in different industries using SIC definitions. Because SIC definitions differ from IO industry definitions used by the input-output tables, I translated all SIC definitions into IO definitions using the conversion table provided by the Bureau of Economic Analysis. This conversion yielded a set of industries in which a firm owned a business unit. Subsequently, I identified all relationships between these business units. For firms with two business units, there was only one relationship; for firms with three business units, there were three relationships, and so on. For every identified relationship, I calculated how difficult it is to separate the constituent business units from each other by calculating mutual dependence between them.

The measures of dependence of business units in industry  $i$  on business units in industry  $j$  were constructed in a three-step process. I began with measures of inter-industry flows,  $z_{ij}$ , expressed as the total dollar value of goods and services sold by industry  $i$  to industry  $j$ . Subsequently, I derived dependence of industry  $i$  on industry  $j$ , which is high to the extent that industry  $i$  sells a significant proportion of its goods and services to industry  $j$ ,  $s_{ij}$ , or it buys a significant proportion of its goods and services from industry  $j$ ,  $p_{ij}$ . To convert the measure of dependence of industry  $i$  on industry  $j$  to dependence of business units in

industry  $i$  on business units in industry  $j$ , I multiplied the dependence measure by four-firm concentration ratios in industry  $j$ ,  $O_j$ . Following Burt (1983), I formally define this measure of dependence of business units in industry  $i$  on business units in industry  $j$ , as  $C_{j \rightarrow i}$ :<sup>10</sup>

$$C_{j \rightarrow i} = (p_{ij} + s_{ij}) O_j$$

$$\text{where } p_{ij} = \left( \frac{z_{ji}}{\sum_q z_{qi}} \right) \text{ and } s_{ij} = \left( \frac{z_{ij}}{\sum_q z_{iq}} \right)$$

The unit of analysis for this measure of dependence is individual business units in an industry. When the unit of analysis is shifted to a dyad of business units in industries  $i$  and  $j$ , the dyad can be characterized by two dependence measures  $C_{j \rightarrow i}$  and  $C_{i \rightarrow j}$ , defined as:

$$C_{j \rightarrow i} = (p_{ij} + s_{ij}) O_j$$

$$C_{i \rightarrow j} = (p_{ji} + s_{ji}) O_i$$

The two measures of constraint,  $C_{j \rightarrow i}$  and  $C_{i \rightarrow j}$ , can be used to capture mutual dependence between two business units in industries  $i$  and  $j$ . Business units in industry  $i$  and  $j$  are mutually dependent to the extent that the constraint of business units in industry  $i$  on business units in industry  $j$  is high and simultaneously the constraint of business units in

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<sup>10</sup> I also ran the analyses using the constraint measure defined as  $\mathbf{C}_{j \rightarrow i} = (\mathbf{p}_{ij}^2 + \mathbf{s}_{ij}^2) \mathbf{O}_j$ . Burt (1982) used this functional form in his analysis of the relationship between dependence and profit. The results are insensitive to the functional form employed.

industry  $j$  on business units in industry  $i$  is high. Formally, this mutual dependence is measured as:<sup>11</sup>

$$\text{Mutual Dependence}_{i \leftrightarrow j} = C_{j \rightarrow i} + C_{i \rightarrow j}$$

To illustrate such mutual dependence relation, I chose a relationship between business units producing paper pulp and business units producing paperboard out of the pulp. Paper pulp business unit sell most of their output to business units in the paperboard industry, as they are very few other users of paper pulp. There are also very few business units in the paperboard industry. Thus, if any one of them refuses to buy from a paper pulp business unit, the latter will experience significant problems locating an alternative exchange partner at the same prices. The paper pulp business will then have to reduce the price of its output significantly in order to be able to exchange with others. However, at the same time, the business unit in paperboard must buy most of their inputs from the paper pulp industry. There are also very few business units in the paper pulp industry. This effectively confines any business unit in the paperboard industry to exchanging with its current exchange partners or face significant costs of seeking other exchange options.

In the final step, I added up all of the individual level mutual dependencies for all relationships in the firm. This yielded the final measure of total mutual dependence between

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<sup>11</sup> The additive specification of mutual dependence may lead us to conclude that mutual dependence (MD) exists in a dyad, when in reality it does not. For example, if a dyad is characterized by  $C_{j \rightarrow i} = 0$  and  $C_{i \rightarrow j} = 0.2$ , the additive specification of mutual dependence yields  $MD = 0.2$ . Yet it may be argued that since one of the business units is not dependent on the other, such a dyad should be properly classified as featuring no mutual dependence. To account for this possibility, I also constructed  $MD_{i \leftrightarrow j} = C_{j \rightarrow i} * C_{i \rightarrow j}$ . According to this specification, mutual dependence is greater than zero only if both  $C_{j \rightarrow i}$  and  $C_{i \rightarrow j}$  are larger than zero. The empirical results were not affected by this change in functional form.

business units owned by the firm<sup>12</sup>. This measure essentially proxies for the costs of separation of the firm.

To show how firms vary on the measure of total mutual dependence, I choose two prototypical firms: high separation cost firm, Dow Chemical, and low separation cost firm, Beatrice Foods. The nature of exchanges between their business units is shown in the top panel of Figure 2. As before, the nodes represent industries. The width of the ties represents mutual dependence. Dashed circles indicate the scope of a firm. On the left hand side, I provide a schematic drawing of Berkshire Hathaway which has three business units in different industries: Publications, Candy and Insurance. Berkshire Hathaway is low separation cost firm because there are very few mutual dependencies between business units in which the firm operates. On the right hand side, I provide a schematic drawing of Dow Chemical which has three business units in different industries: Chemicals, Plastics and Biochemical Consumer Specialties. Dow Chemical is a high separation cost company, because there are significant mutual dependencies between each of the firm's business units. Each business unit sells a significant proportion of its output and buys a significant proportion of its inputs from others in the firm and there are few choices to go outside the firm as all industries in which Dow Chemical operates are oligopolized.

The measure of total mutual dependence is undefined for single-business unit firms. To deal with this problem I assigned the value of zero to total mutual dependence for these firms. To differentiate this value from the situation where mutual dependencies between business

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<sup>12</sup> I also tried a number of different specifications, such as the average of mutual dependencies in the firm, or the average of mutual dependence weighted by the share of sales of the two units. Although the parameter estimates differ for each of these specifications, the results are substantively the same.

units are in fact zero, I constructed a dummy that took the value of one for single business units and zero otherwise. To check the robustness of this approach, I also re-estimated the models using a sample of firms present in two or more industries. Since there are only very few single-business units in the dataset of Fortune 500 companies, the elimination of the single business unit firms (16% of firm-years) from the sample did not affect the results.

As a control, I also calculated the sum of mutual dependencies between all business units that the firm holds and business units in industries in which the firm does not operate. This control intends to capture the possibility that the firm has a number of mutual dependencies that are not integrated into the firm. For example, consider Beatrice Foods and International Paper illustrated in the lower panel of Figure 2. Beatrice Foods operated in Food, Chemical and Distribution industries. Since there are no mutual dependencies between these business units, the firm is easy to separate. However, there are significant mutual dependencies between Beatrice Foods and other business units that Beatrice Foods does not own implying that Beatrice Foods is enduring negotiation costs associated with mutual dependence that can be avoided if the exchange was integrated. International Paper also has three business units: Pulp Production, Paper and Cardboard products. These businesses are all mutually dependent suggesting that they will be costly to separate. However, these businesses also face a number of other mutually dependent relationships that still have not been integrated. As in the case of Beatrice Foods, the fact that these exchanges are not integrated into firms lowers International Paper's performance. Consequently, in both cases, the existence of these unintegrated exchanges should increase the likelihood of these companies' takeovers.

To capture the measure of firm's performance I calculated firm's Tobin's  $q$ , defined as

$$\text{Tobin's } q = \frac{\text{market value of financial claims on a corporation}}{\text{replacement value of the corporation's assets}}$$

where the market value of financial claims on a corporation is equal to the market value at year-end of common equity times the number of shares outstanding plus the book value of preferred stock and debt, and the replacement value of the corporation's assets is the sum of the book value of all assets except inventories and net plant, property, and equipment, plus the replacement value of inventory, plant, property, and equipment. Tobin's  $q$  is particularly relevant a measure of incumbent management's performance as it represents an assessment by financial claimants about whether or not the corporation will generate greater value from the assets under its control relative to the value that these assets would generate were they deployed outside the firm.<sup>13</sup>

Finally, I calculated a number of controls used in prior studies of takeovers: (i) firm's return on assets, (ii) free cash flow as a fraction of market value and (iii) debt to equity ratio. I also calculated the entropy index, defined as  $\sum p_i \ln(1/p_i)$ , where  $p_i$  is the proportion of the firm's sales made in segment  $i$ . The entropy index is a measure of total diversification and taps the extent to which a firm operates in a number of industries using a weighted average of the proportion of a firm's sales made in each of the segments in which it operates. Prior studies

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<sup>13</sup> The measure of Tobin's  $q$  is an overall measure of performance rather than a measure of performance with individual assets. This raises the possibility that a decline in Tobin's  $q$  implies that managers' performance with both assets declines, implying that both  $p_a$  and  $p_b$  increase at the same time. This is different from my explanation of the intuition behind the theoretical model where I focused on incumbent's decline in performance with one asset. However, it is no different from the mathematical model underlying the prediction. For example, an increase from  $p_a$  to  $2p_a$  and from  $p_b$  to  $2p_b$  results in the overall increase in joint probability from  $p_a p_b$  to  $4p_a p_b$ . However, when there are separation costs that amount to  $.5p_a$  and  $.5p_b$ , an equivalent decline in performance will increase the probabilities from  $.5p_a$  to  $1.5p_a$  and  $.5p_b$  to  $1.5p_b$ . Thus, the joint probability will increase from  $.25p_a p_b$  to  $2.25p_a p_b$ . Thus, even if both  $p_a$  and  $p_b$  increase simultaneously following decline in performance, the cost of separation still attenuates the relationship between performance and likelihood of replacement.

of takeovers, such as Davis *et al* (1994), found that this measure of diversification had a significantly positive effect on takeover activity. Descriptive statistics and a correlation matrix for all of the variables are presented in Table 1.

### **Statistical model**

I test the hypothesis using random-effects logit model, implemented in STATA as xtlogit procedure. As implemented here, the procedure yields maximum likelihood estimates of the effect of time varying independent variables on the likelihood of obtaining a takeover bid during the following year. The functional form of the estimated model is given by

$$\text{logit Pr}(Y_{it}=1 \mid X_{it-1}, u_i) = a + X_{it-1} b + u_i$$

where  $Y_{it}$  is equal to one if firm  $i$  receives a bid in year  $t$  and zero otherwise,  $X_{it-1}$  is a vector of independent variables lagged by one year,  $u_i$  is a firm specific random effect and  $a$  and  $b$  are parameters to be estimated. Since most firms receive at most one bid, the use of fixed effects is not possible and consequently  $u_i$  is assumed to be random and is not being estimated from the data. To check the robustness of the results with respect to different estimation procedure, I also estimated hazard rate models. The results are insensitive to the functional specification of the model.

### **Results**

In Model 1, I present the null model in which the only variables included are the financial ones. The results are consistent with previous findings (Davis, Diekmann and Tinsley 1994; Davis and Stout 1992). The measure of Tobin's  $q$  is negative and statistically significant

from zero, suggesting that firms whose performance declined faced a significant increase in the likelihood of takeover. The measure of return on assets is in the expected direction, but is not statistically significant. The effect of debt is in the expected direction and significant: firms with more debt were less likely to be taken over. Similarly, firms with more free cash flow experience takeover bids at a higher rate, but the effect is not statistically significant. In Model 2 I introduce the measure of total mutual dependence for the firm. The coefficient estimate is negative, suggesting that firms that are harder to separate are less likely to be separated. In Model 3, I introduce the interaction between the measure of total mutual dependence and Tobin's  $q$ . The coefficient estimate is positive and significantly different from zero. This suggests that the negative effect of Tobin's  $q$  on the likelihood of takeover is moderated by high total mutual dependence for the firm. This confirms the main hypothesis of the paper.

To determine the implications of this interaction effect, I solve the regression equation and draw it on a three dimensional graph for high, medium and low levels of separation costs (see Figure 3). The graph indicates that for low mutual dependence firms, a decline in Tobin's  $q$  leads to a significant increase in the likelihood of a takeover bid. In contrast, an equivalent decline in firm performance leads to a much smaller increase in that likelihood. In fact, as can be easily seen from the figure, for firms in the top quartile of mutual dependence measure, there is no relationship between Tobin's  $q$  and the likelihood that the firm will receive a takeover bid. This suggests that the managers of these companies were immune from a takeover regardless of the level of their performance.

In Models 4 and 5, I test for the stability of the coefficient estimates. In Model 4 I introduce the measure of sum of mutual dependencies that have not been integrated by the firm. As expected this estimate is positive and significantly different from zero. This suggests that firms that have not integrated their mutual dependencies are more likely to receive a takeover bid. The introduction of this control does not affect the other coefficients of interest. In Model 5, I control for the entropy variable – a measure of firm diversification used in previous studies and shown to have a significant positive effect on the rate of takeover incidence (Davis, Diekmann and Tinsley 1994). I include this variable because the two measures of mutual dependence are essentially measures of firm diversification, so the measures need to be included together to check the stability of parameters. The coefficient estimate on the measure of entropy is positive, however, it is not significantly different from zero. Also, the inclusion of the measure increases the fit of the model by 3, which is statistically insignificant. These findings mean that the addition of the existing measures of diversification to a model with measures of mutual dependence is not necessary and does not affect the main results of interest.

## **Discussion**

In this paper, I proposed a model of competitive allocation of actors to positions when positions require that the occupants work with two or more assets. I showed that as long as it is costly to separate these assets, the effect of incumbent's performance on the likelihood of replacement is significantly reduced allowing the incumbent to slack without suffering the punishment of the market. To test this model, I examined the incidence of takeovers in the American economy in the 1980s – a period widely held to feature a competitive market for allocation of managers to firms. Consistent with the predictions of the model, I found that

for firms comprising business units that were costly to separate were there was no relationship between performance and likelihood of takeover. This result suggests that the takeover wave did not effectively remove all poorly performing management teams. It was only restricted to companies that were easy to 'bust-up.' For other diversified firms, managers could easily continue to destroy shareholder value without worrying about market punishment. These results not only lend credence to the model, but they also question the prevailing view of this period according to which the competitive market forces eradicated all poorly performing managers.

Incidentally, the results presented here also suggest a revision of the corporate strategy view of the takeover wave in the 1980s. Prior studies have shown that diversified firms were on average more likely to be taken over than were single business unit firms (Davis, Diekmann and Tinsley 1994). This result has been interpreted to mean that firms should essentially be run by specialists in their quest to "return to core competence" (Prahalad and Hamel 1990). Though many firms did indeed reduce the number of industries in which they operated, many firms remained substantially diversified with some increasing in scope. This suggests that the strategic explanations of takeovers and implications for firms were at best incomplete. The results presented help to address the problem. Specifically, the results suggest that many multi-business unit firms that were easy to separate quickly became takeover targets, particularly when their management teams did not perform well. At the same time, many of the multi-business firms that internalized mutual dependencies remained diversified. Since prior analyses of diversification did not differentiate between

diversification that internalizes mutual dependencies and diversification that does not, they were unable to detect this critical difference.<sup>14</sup>

Finally, despite the empirical contributions of this study, it is important to recognize that the analysis employed here is subject to significant limitations. Perhaps the most important one is that I have to proxy for separation costs by using measures of mutual dependence derived from input output tables and concentration ratios. Although these measures have been previously used in investigations of firm dependence (Pfeffer, 1972; Burt, 1983; Finkelstein, 1997), they provide only very coarse measures separation costs by assuming that all dyads of business units in two industries will be subject to the same separation costs. Clearly, the use of these measures implies a significant measurement error, calling for future research to examine the key prediction of this paper with better measures.

## **Implications**

In addition to informing the debates regarding the wave of takeovers in the 1980s, the theory and the results presented here have three theoretical implications, which range from fairly specific to fairly abstract. First, they question the claim that markets uniformly provide the most effective mechanism of eliciting effort by threatening to punish poorly performing actors with replacement. This positive view of markets pervades significant amount of economic literature on corporate governance, where markets for corporate control are seen

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<sup>14</sup> Since prior research has found that diversified companies were more likely to be taken over than single business firms, it could have been the case that most of the firms in the sample were easily separated. Alternatively, it could have been the case that the positive effect for easy to separate firms was so much bigger than the negative effect for costly to separate firms such that the average effect still yielded a positive result according to which more diversified firms were more likely to be taken over.

as the most efficient means of controlling managerial agency (Jensen and Ruback 1983; Manne 1965). Kaufman and Zacharis (1992) summarize this view:

*In unfettered markets, corporate managers would be disciplined by a simple rule: a decline in a market value below the replacement cost of the firm would induce outsiders to bid for control with the intention of enhancing their wealth by the liquidation or reorganization of the acquired business [...] A perfectly fluid system would allow discipline to be imposed on inefficient managers and firms in a perfectly competitive environment with recontracting for all managerial talent with short-term contracts*

In contrast, sociologically informed accounts underscore the critical role of social instruments of control, such as boards of directors (Khurana 1998) and organized shareholder action (Kang 1996). Instead of proposing that the markets for corporate control provide a better method of managerial oversight than the social instruments of control, the arguments put forward here propose an important contingency. Whereas markets are effective at eliciting effort by punishing poorly performing actors in charge of one asset, they become less useful when actors occupy positions that comprise two or more assets that are costly to separate from each other. Consequently, managers can pursue their own interests, at the expense of shareholders, without the threat of being replaced by market forces. Under these conditions, markets for corporate control no longer seem to be able to control managerial agency. Instead, active control by boards of directors and shareholders are important to ensuring that managers do not engage in behaviors which fulfill their goals at the expense of those of the owners' of the firm.

Second, the theory and findings provided offer a set of interesting implications for theories that seek to describe conditions under which two or more assets should be controlled together, such as the different theories of the firm developed in the last twenty five years. In

advancing these theories, sociologists and economists alike have theorized that integration of two distinct businesses under a single corporate umbrella is likely to be beneficial when exchanges between them are subject to market failures (Granovetter 1985; Pfeffer and Salancik 1978; Williamson 1985). The failures are, in turn, most likely to arise in the presence of significant mutual dependencies between the two businesses (Casciaro and Piskorski 2005; Williamson 1981). These theoretical developments have been accompanied by increasingly sophisticated research designs and measurement strategies that allowed empirical studies to provide credible support for this causal link.

The model put forward in this paper suggests that these theories ignore the observation that integration of mutually dependent exchanges insulates managers of the newly established entity from replacement should they perform poorly. As a consequence, such managers should be no more likely to face replacement than if they performed well. This allows them to exert less effort without punishment and thus presumably lowers performance of the business units. To the extent that these costs of managerial slack outweigh the benefits of integration, the prescription that mutually dependent assets should be integrated will not hold true. This suggests that theories of the firm cannot provide correct prescriptions without considering the impact of integration on the likelihood of managerial replacement in case of poor performance. More generally, any theory describing conditions under which assets should be controlled together cannot be complete without considering the impact of integration on the likelihood of incumbent replacement in case of poor performance. Clearly, more effort should be put into developing theories that recognize both that

integration will affect potential firm performance as well as the effects of integration on managerial incentives to perform.<sup>15</sup>

Finally, the model presented here has interesting implications for sociological explanations of inequality between actors. Sociologists frequently claim that what distinguishes sociology from other social sciences is the differentiation between an actor and an actor's position in the social structure (Simmel 1950). Central to this distinction is the claim that rewards are attached to positions rather than to actors' performances and inequality between actors is generated by occupation of different positions. This line of reasoning forms the cornerstone of structural explanations of inequality and stands in a marked contrast to individualistic theories, which postulate that actors are rewarded mainly on the basis of their individual performances (Coleman 1990; Parsons 1953).

The usefulness of structural explanations of inequality, however, critically depends on the process of allocation of actors to positions. If actors are accorded a privileged position as soon as their performance increases, or lose it as soon as their performance falters, positions reflect nothing more than the performance of the incumbent. The fact that rewards are attached to positions gives us little theoretical insight into the sources of inequality (Granovetter 1994). In contrast, when actors retain their privileged positions despite their

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<sup>15</sup> It should be noted that Grossman and Hart (1986) and the literature that the article spawned did recognize that integration decisions will affect managerial incentives to perform. If these incentives are undermined so much that they generate performance loss that outweighs other benefits of integration, the assets should not be integrated. Despite the similarity in the nature of the argument, the papers in the Grossman and Hart tradition and the current paper make different assumptions about the source of performance losses. Papers in the Grossman and Hart tradition assume that integration changes actor's incentives because it changes the actor's ownership relationship with the asset. In the present article, I argue that actor's incentives to perform change because of the number of contestants that can replace the actor if the latter performs badly. Future research should address how the two perspectives can be fruitfully integrated.

poor performance, or they are unable to attain them even if their performance merits that, structural advantages or disadvantages can occur.

Given the critical role of allocation processes to the emergence of structural inequality, social scientists have long sought to define conditions under which such processes can emerge. The overarching conclusion of these efforts is that the allocation processes that generate structural inequality are essentially departures from competitive market allocation. The selection of the benchmark is not coincidental – it was based on the assumption that it is impossible for structural inequality to emerge in competitive markets (Sørensen 1996). This is because in a competitive market, if the incumbent's performance falls below what the next best contestant can deliver, the incumbent is replaced with the contestant. Thus, the best performing actor is always allocated to the position. As a consequence, it should be impossible for structural inequality to emerge in competitive markets. In contrast, departures from competitive markets were said to allow for the emergence of structural inequality. This is the case, for example, in collusive closure whereby a group of actors restricts the supply of contestants or the supply of available positions (Smith 1776; Weber 1947). These restrictions allow the group to secure positional advantages for itself at the expense of those who are excluded from occupying the positions (Weeden 2002).

The theory and results provided here question this conclusion by showing that it is possible for actors to avoid replacement even in competitive markets as long as they occupy positions composed of assets that are difficult to separate. This setting in which I identify this result also presents an opportunity for straightforward reconciliation of the predictions of the traditional conception of structural inequality, which presumed that there can be no

structural inequality in competitive markets, with the opposite view advocated here. The two views differ in their identification of the privileged and the exploited actors. In traditional accounts of structural inequality, the advantage of those who occupy privileged positions comes at the expense of those who were prevented from occupying that position, despite better qualifications. As previously argued in the literature, competitive markets eliminate this type of structural inequality. However, the observation that under certain conditions managers can benefit at the expense of shareholders in competitive markets suggests that not all structural inequality is eliminated. This time, however, it is the occupants of the position (managers) who benefit at the expense of the owners of the assets associated with the position (shareholders). Thus, while competitive markets do eradicate structural inequality between incumbents and contestants, they do not necessarily eradicate it between incumbents and those who control access to the position.

Figure 1  
Specialists and generalists (n=100)

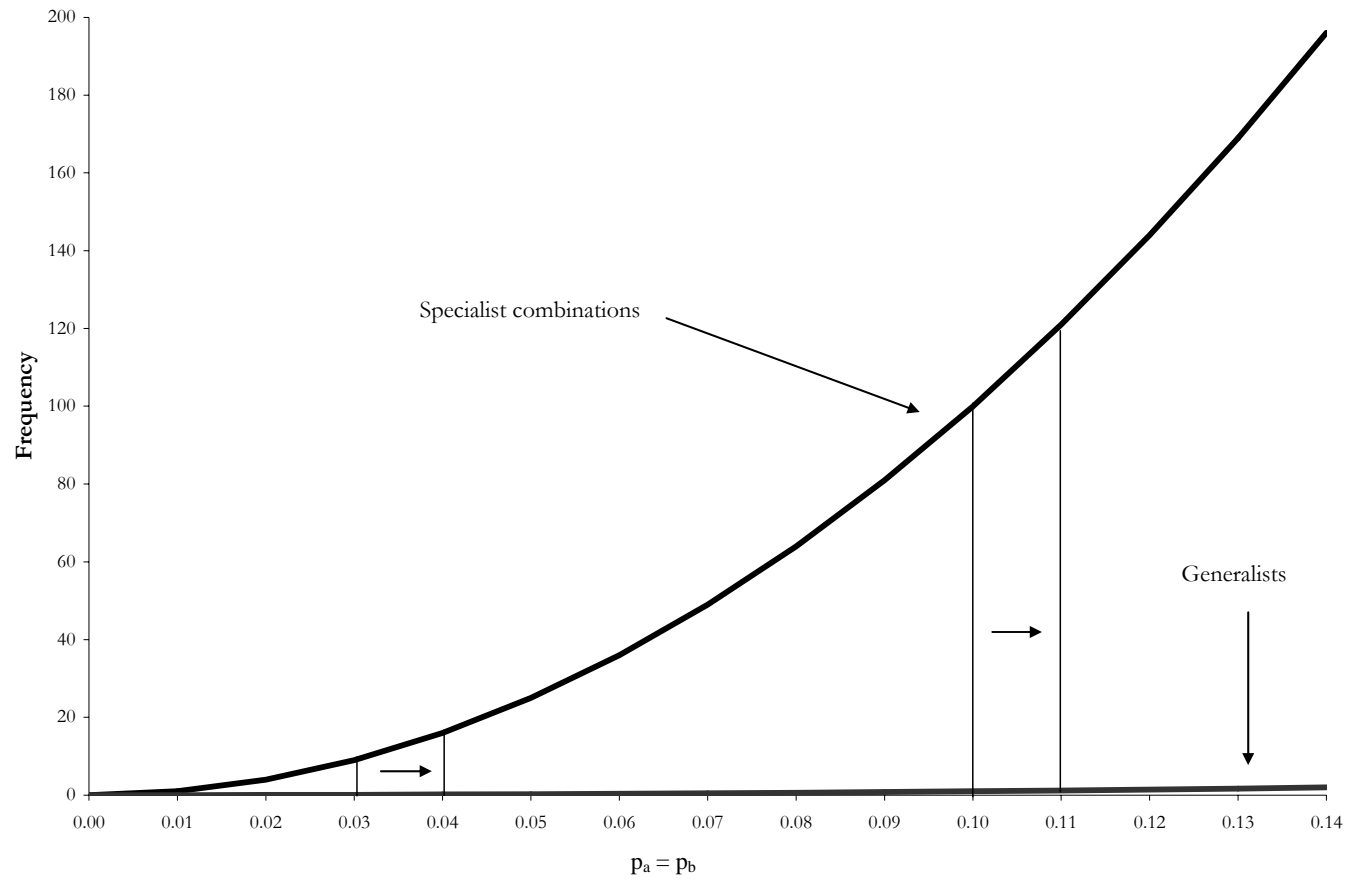
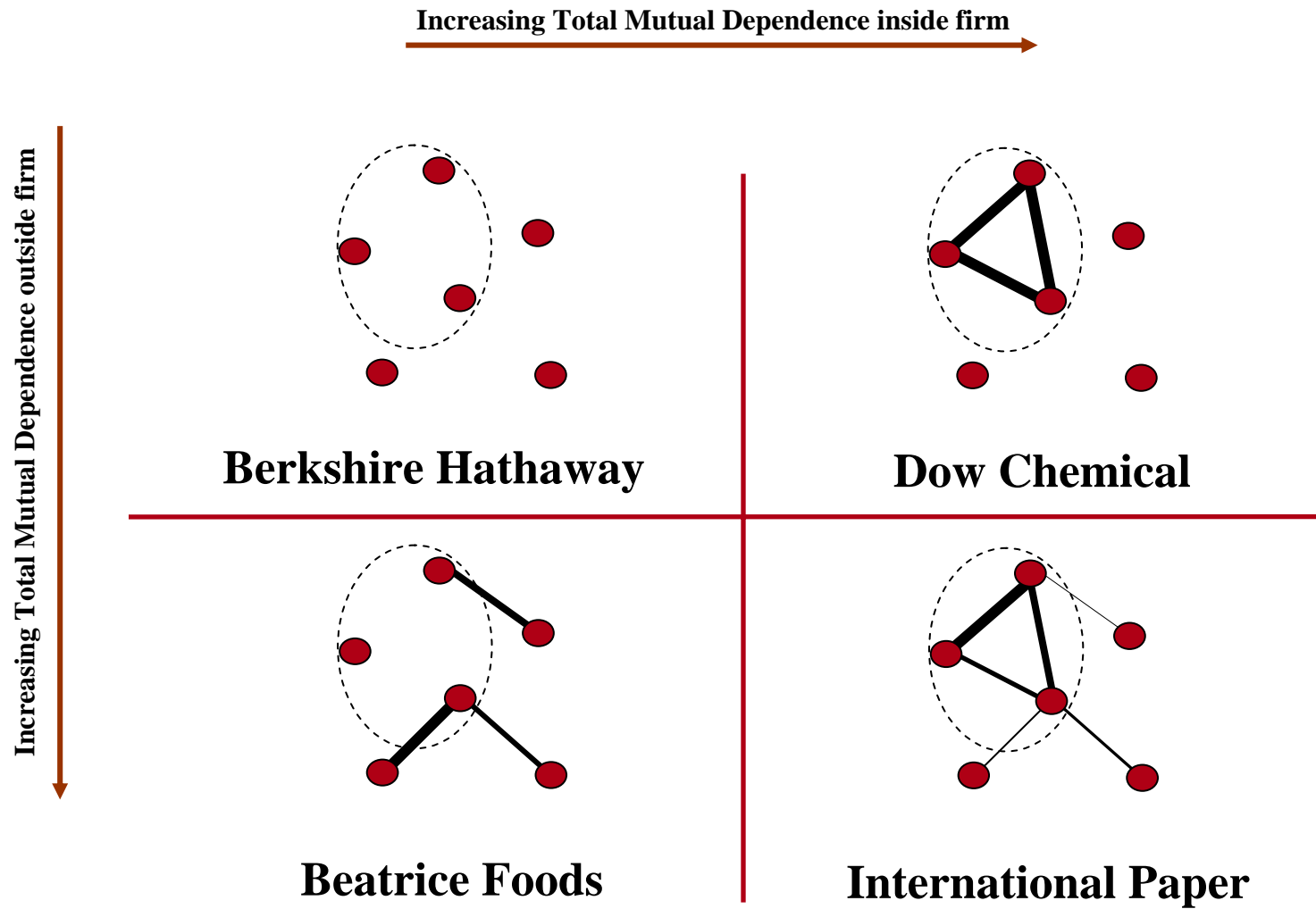
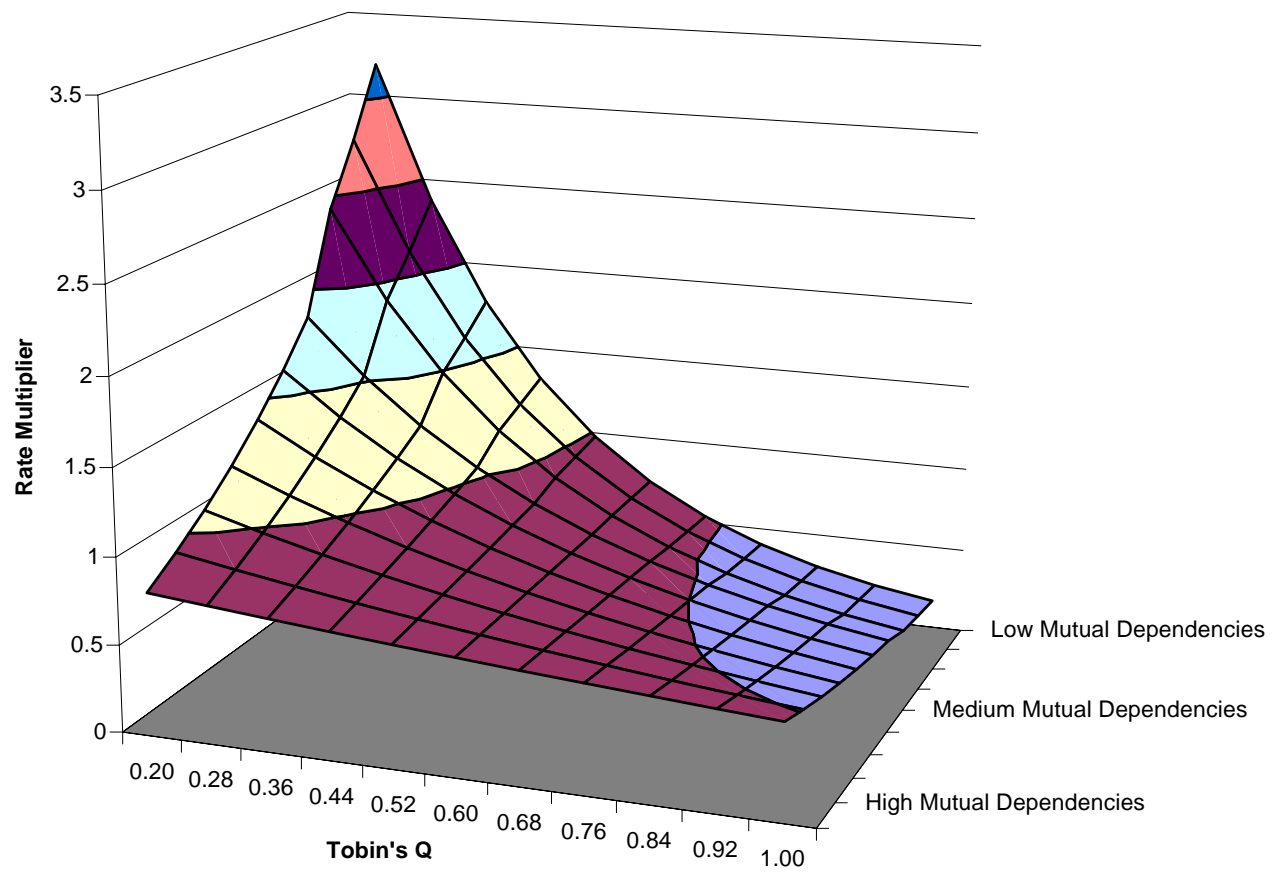


Figure 2

Prototypical Firms



**Figure 3**  
**Mutual Dependencies inside a Firm and the Likelihood of a Takeover**



**Table 1**  
**Summary Statistics and Correlation Table**

	<b>Mean</b>	<b>St. Dev</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
1. Takeover bid	.04	.19										
2. Tobin's q	.60	.42	-.08									
3. Return on Assets	.05	.06	-.11	.49								
4. Log(Sales)	5.97	9.11	-.01	-.08	.10							
5. Free Cash Flow/Market Value	0.01	.13	-.00	.00	.28	-.10						
6. Debt to Equity/Market Value	1.12	1.55	.05	-.51	-.64	-.08	-.10					
7. Entropy Index	1.04	.49	.03	.13	.10	-.34	.13	-.13				
8. Mutual Dependence Inside Firm	5.17	10.4	.08	-.09	.02	.06	.00	.04	.20			
9. Mutual Dependence * Tobin's q	-.46	2.94	.03	-.36	-.18	.07	-.04	.15	-.24	-.20		
10. Mutual Dependence Outside Firm	5.12	4.11	.14	-.14	.00	.13	.01	.06	.23	.12	-.16	
11. Single business unit	.16	.37	.02	.02	0.05	-.06	0.02	-.02	.44	-.25	.15	-.15

**Table 2****Maximum Likelihood Estimation: Firm  $i$  receives a takeover bid in year  $t$  \***

<b>Variable</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
Intercept	-3.11**	-3.12**	-3.33***	-3.52***	-5.10***
Tobin's $q$	-1.55**	-2.30***	-3.45***	-3.37***	-3.41*
Return on Assets	-3.13	-2.88	-2.55	-2.12	-2.49
Debt to Equity	-.10***	-.18***	-.19***	-.19***	-.17***
Free Cash Flow	.85	.90	.88	.96	.91
Sales	-.01	-.02	-.01	.002	-.04
Entropy					.72
Single business unit		.09**	.08**	.06**	.03**
Total Mutual Dependence inside		-.04**	-.07***	-.08***	-.12**
Total Mutual Dependence inside * Tobin's $q$			.18**	.17***	.25**
Total Mutual Dependence outside				.42**	.14**
Model Log Likelihood	-288	-218	-199	-174	-171

\* Year dummies not reported.

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