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Three essays on ownership structure and firm focus: The impact of ownership structure on the corporate sell-off decision; The long term impact on the firm from large sell-offs; The relationship between ownership structure, firm focus, and Tobin's Q

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THREE ESSAYS ON OWNERSHIP STRUCTURE AND FIRM FOCUS: THE IMPACT OF OWNERSHIP STRUCTURE ON THE CORPORATE SELL-OFF DECISION; THE LONG TERM IMPACT ON THE FIRM FROM LARGE SELL-OFFS; THE RELATIONSHIP BETWEEN OWNERSHIP STRUCTURE, FIRM FOCUS, AND TOBIN'S Q

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Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copy of the dissertation to the Graduate College.

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Dissertation Director Willard T. Carleton — Date 12/17/93

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DEDICATION

This paper is dedicated with love to: Leonard M. Steiner, my father, who passed away in 1988 in his 69th year, I attribute to him my energy and intensity; Selma Steiner, my mother, for her consistent loving support; and Sallie Anna Steiner, my daughter, just for being herself.

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ABSTRACT

Three essays relating to ownership structure and firm focus are presented. The first study analyzes the relationship between ownership by officers and directors and the corporate sell-off decision. The relationship is formalized in a simple theoretical model; The analysis suggests a negative relationship between the sell-off decision and the extent of both director ownership and officer and director ownership, and it implies a positive relationship between the sell-off decision and both officer and institutional ownership. Empirical results show a significant negative relationship between the probability of a sell-off and the level of director and officer and director ownership. The second study investigates the long term impact on firms that sold-off large assets in 1986 and 1987. Previous research implies firm performance should improve for sell-off firms relative to nonsell-off firms and debt should fall for sell-off firms relative to nonsell-off firms. The empirical results are supportive of these expectations. The third study empirically models Tobin's Q. Previous research in finance argues value is dependent on ownership structure through an alignment effect and an entrenchment effect. The alignment effect means that as inside ownership increases, the interests of inside and outside owners are aligned which encourages decision making that maximizes the firm's value. The entrenchment effect argument reasons that insiders are monitored by the threat of

a takeover. As the ownership by insiders increases this threat diminishes and thus decision making may tend to be directed toward maximizing decision makers welfare. Economics and Strategic Management attribute value to the composition of assets and the level of firm focus. A firm may create value by diversifying for synergy reasons; however, an overdiversified firm may also be a function of managerial objectives. The two separate arguments are retested using inside ownership and a diversification index. Inside ownership is found to be significantly positively related to Q over the range 0% to 5%. The diversification index is found to be significantly negatively related to Q. When both effects are included in a model of Q, they are each statistically significant with appropriate signs on the estimated coeficients.

1. The Impact of Ownership Structure on the Corporate Sell-off Decision

1.1. Introduction

During the 1980's, American corporations made a new commitment to focus their operations. Lichtenberg (1991) notes that the extent of firm "diversification declined significantly during the second half of the decade. The mean number of industries in which firms operated declined 14%, and the fraction of single-industry firms increased 54%. Firms that were 'born' during the period were much less diversified than those that died, and 'continuing' firms reduced the number of industries in which they operated."[1]

A sell-off is a way for firms to restructure their assets to achieve a narrower focus (Lichtenberg terms it dediversification). The term sell-off covers three kinds of transactions: spin-offs, divestitures, and unit-management buyouts. In a spin-off, a new legal entity is created whose shares are distributed on a pro rata basis to existing shareholders of a parent company. A divestiture means the sale of a portion of the assets of a firm. A unit-management buyout is a divestiture where the sale is made to a group led by members of the selling firm's management team. This research investigates divestitures, yet the more general term sell-off will be used in this paper.

During the 1980's, the number of sell-offs increased both in absolute numbers and as a percentage of total (announced) merger and acquisition activity. The increase was more substantial for large sell-offs ($100 million or more). Additionally, unit-management buyouts became more popular during the 1980's. Aggregate yearly transactions for sell-offs, large sell-offs and management buyouts of divisions or segments are given in Table 1.1.

Table 1.1. Sell-Off activity over time [a].

Yr	Total Sell-offs [b]	% of M&A's [c]	Large Sell-offs	% of Sell-offs	Mgmt Buyouts	% of Sell-offs
68	557	12%	n/a	n/a	n/a	n/a
78	820	39%	n/a	n/a	49	6%
79	752	35%	n/a	n/a	59	8%
80	666	35%	n/a	n/a	47	7%
81	830	35%	37	10%	83	10%
82	875	37%	41	13%	115	13%
83	932	37%	53	14%	139	15%
84	900	36%	83	21%	122	14%
85	1218	41%	120	23%	132	11%
86	1259	38%	146	27%	144	11%
87	807	40%	137	35%	90	11%
88	894	40%	162	36%	89	10%

a. Data taken from Mergerstat Review, 1988. Reprinted with permission from Merrill Lynch.

b. Sell-offs reported in this table do not include spin-offs; Mergerstat Review does not track spin-offs.

c. The term M&A refers to publicly announced merger and acquisition activity not completed transactions, as defined by Mergerstat Review

After 1984, a noticable shift in the data is apparent. The difference is more dramatic for the large sell-offs. Why is this true? What motivates these restructurings? One cause may be external takeover pressures. Table 1.2 shows both contested and uncontested tender offers from 1978 to 1988.

Table 1.2. Tender offer activity over time[a]

yr	Contested	Uncontested
78	27	63
79	26	80
80	12	41
81	28	47
82	29	39
83	11	26
84	18	61
85	32	52
86	40	110
87	31	85
88	46	171

a. Data taken from Mergerstat Review, 1988. Reprinted with permission from Merrill Lynch.

It is evident that the environment after 1984 presented a greater takeover threat. This is consistent with the argument that takeover threats influence the sell-off decision. Yet, sell-offs are also a function of firm-specific factors. For example, a corporation's performance and its level of debt are reasonable explanations for

asset sell-offs. While these external and firm-specific factors are important, this paper argues that the firm's decision to sell off assets is also related to its ownership structure.

The firm's ownership structure has received substantial attention in recent academic literature. Analysis has focused on four principal measures of ownership structure: concentration, large shareholders, inside ownership, and institutional ownership. The present research investigates the relationship between the sell-off decision and both inside and institutional ownership. Inside ownership includes officers, directors, and beneficial owners. A reasonable introductory question is to ask: how substantial is inside ownership?

Researchers investigating inside ownership have calculated quite different mean levels. McConnell and Servaes (1990) use the Value Line Investment Survey to calculate a sample mean inside ownership of 13.9% in 1976 and 11.78% in 1986. Stulz, Walkling and Song (1990) also use the Value Line Investment Survey to generate insider data on a sample of 104 successful takeovers between 1968 and 1986. Their sample mean level of insider ownership is 4%. (In their paper, they note that the content of the Value Line Investment Survey data is generated from "proxy statements, corporate news releases, and Forms 3 and 4 filed with the SEC. Form 3 is an initial ownership statement filed by officers, directors, and 10% principal stockholders. Form 4 records any changes in ownership. Value Line treats as insiders those shareholders related to management or

board members."[2]). Mikkelson and Partch (1989) use firm proxy statements to calculate "the number of shares of common stock and voting preferred stock owned directly or indirectly by a firm's top three officers (chief executive, president, and chairman of the board) and by the board of directors."[3] Their sample pools the years 1973, 1978, and 1983. They "include voting shares held by members of an officer's or director's family, by trusts for any family member's benefit, and by corporations or foundations controlled by the family."[4] Using these definitions they report a mean officer and director ownership of 19.6% and a median figure of 13.9%.

These selected research papers indicate that the insider ownership data are ambiguous. Results are a function of the years chosen, the sample, and the source of the data. Additionally, it is a common practice to aggregate over many groups. In this paper, the insider ownership variable is dissected using the Spectrum 6 publication. This makes it possible to analyze individual insider groups (i.e., directors versus officers).

Institutional ownership is commonly defined to include mutual funds, pension funds, insurance companies, and banks (trusts). The SEC and other organizations have accumulated aggregated institutional ownership figures. Institutional ownership is intriguing due to the growing presence of these investors in the equity markets. Moreover, it is believed by some that institutions can function as effective monitors of management. Table 1.3 shows

percentage equity holdings for mutual funds and pension funds (both public and private).

Table 1.3. Institutional Ownership over time

Year	MF[a]	Pensions[b]	MF+Pensions
76	4.33	14.91	19.2
80	3.34	18.61	21.9
81	3.2	18.36	21.5
82	3.66	19.77	23.4
83	4.60	19.65	24.2
84	5.14	18.74	23.8
85	6.14	19.64	25.7
86	6.99	19.89	26.8
87	7.96	n/a	n/a
88	7.07	n/a	n/a

a. Percentages are calculated as the value of ownership by mutual funds divided by the total value of the market. The mutual fund data was taken from The Mutual FundFact Book. The market data is taken from the NYSE Fact Book.

b. Percentages are calculated as the value of ownership by pension funds divided by the total value of the market. The pension fund data was taken from the SEC Annual Reports. The market data is taken from the NYSE Fact Book.

It is evident that mutual funds and pension funds have grown in importance during the 1980's. If institutions function as effective monitors, this means that corporate managers were under increasing scrutiny to make value-maximizing decisions, such as when to sell-off assets.

In this paper, the relationship between ownership structure and the sell-off decision is formalized in a simple theoretical model. The results show a negative relationship between the sell-off decision and the extent of both director ownership and officer & director ownership. It also implies a positive relationship between the sell-off decision and both the extent of officer ownership and institutional ownership. Empirical results are developed that are consistent with the theory. They show a significant negative relationship between the probability of a sell-off and the level of director ownership, where director ownership includes those identified as "officers and directors". This relationship is robust to changes in the empirical models examined. A significant positive relationship is found between the level of officer ownership and the probability of sell-off in some empirical models. The substantially different results between the director and officer ownership variables suggest that these ownership units should not be treated as homogeneous, which is the assumption implied by aggregating the groups. Finally, a positive, but insignificant, relationship is found between the level of institutional ownership and the sell-off decision.

The remainder of this paper is structured as follows: in section 1.2, the sell-off literature is reviewed; in section 1.3, the conflict between inside managers and outside shareholders is introduced; section 1.4 contains a formal statement of the relationship between ownership and the sell-off decision; in

section 1.5, the testable hypotheses are stated; section 1.6 reviews the data sources and empirical methodology; in section 1.7, the empirical results are presented; finally, concluding remarks are made in section 1.8.

1.2. Sell-offs

The two basic questions asked in the sell-off literature are: 1. what are the wealth effects asssociated with a sell-off?; 2. what motivates a sell-off? Event studies measuring wealth effects have been completed by Alexander, Benson, and Kampmeyer (1984), Jain (1985), Hite, Owers, and Rogers (1987), Kim and Schatzberg (1987), Trifts, Sicherman, Roenfeldt, and Cossio (1990), and Lang, Poulsen, and Stulz (1992). These studies report positive cumulative abnormal returns for both the acquirer's and the sell-off firm's shareholders. Additionally, sell-offs usually follow a period of negative returns (Alexander, Benson and Kampmeyer and Jain).

Hite and Vetsuypens (1989) have explored the wealth effects surrounding management buyouts of divisions. The distinguishing feature of this transaction, relative to a third-party sell-off, is the possibility of "'arm's-length bargaining' between buyer and seller which raises the possibility of 'managerial self-dealing' at the expense of parent company shareholders."[5] Hite and Vetsuypens report results showing positive abnormal returns to shareholders during the two-day period surrounding the buyout announcement. For

this reason, they conclude the transaction is similar to a third-party sell-off.

Research also has focused upon the behavioral question: what motivates sell-offs? Certainly sell-offs can serve to generate cash to pay down current or noncurrent debt and, in turn, reduce the firm's debt/equity ratio. However, Linn and Rozeff (1989) argue that this would be a rather expensive method compared to, for example, an equity issue. They contend that this explanation confuses the results of the sale with its cause. The real cause may be simply that the seller is able to obtain a "good" price for the assets. An alternative motive may be that the unit has poor profitability. Yet, because profitability could be improved by altering the division's marketing, production and/or pricing, it is not obvious that an unprofitable division will always be sold-off. Evidence supporting the importance of profitability is given by Ravenscraft and Scherer (1987). In a rather unique study, the authors follow acquisitions in the 1960's and identify which of these acquisitions were eventually sold off during the 1974 to 1981 period. They empirically model, with a logistic regression, the sell-off decision as a function of both overall firm performance and the segment performance. They find both performance measures to be significantly negatively related to the sell-off decision.

A third possible motive for a sell-off may be that the assets are more valuable to another organization. In this case, even after optimizing with respect to production and pricing, the assets may be

sold. For this to be true there must be greater synergies for the purchasing organization, which would then be willing to bid an amount that exceeds the assets' value as contained in the existing firm. One approach to studying the synergy argument has been with event study methodology. Hite, Owers, and Rogers investigate the sources of the wealth gains associated with a sell-off. They show gains generated at the announcement are lost when the transaction is unsuccessful; this is interpreted to support a synergy (or efficiency hypothesis) over an information hypothesis. Kim and Schatzberg find that total liquidations generate larger excess returns than either partial sell-offs or mergers on average. This is consistent with the movement of individual assets to their most productive buyer.

Lang, Poulsen, and Stulz (1992) report evidence contrary to the synergy arguments. They find a significant positive reaction to a sell-off when the proceeds are targeted for repaying debt, but abnormal returns are insignificantly different from zero when the proceeds are retained in the firm. They conclude the results support Jensen's (1988) free cash flow arguments and cast doubt upon the operating efficiency view of asset sales. They state " the operating efficiency view of asset sales cannot explain the cross-sectional variation in the stock-price reaction to asset sales since that view predicts a positive stock-price reaction irrespective of the use of the proceeds."[6]

An interesting extension to the synergy research is expounded by Weston (1989). He asks the question: if the organization is not the most efficient operator of the assets, why were the assets ever acquired? He contends that an acquirer may sell a business it has improved or a business that once had synergies with the acquirers' core business but now no longer does. In this case, both the original acquisition and the sale could have increased shareholder value. In a similar vein, Shleifer and Vishny (1990) argue that relaxed antitrust enforcement and financial innovation in the 1980's made possible some business combinations that were not viable previously. Some acquisitions that led to a relatively efficient allocation of resources in the 1970's may no longer have been efficient in the 1980's when sales to related buyers or leveraged buyouts became feasible.

The profitability, debt, and synergy arguments are each appealing, yet what is often ignored is the possibility that the process may be contaminated by the decision makers. The sell-off decision is often viewed by management as an "admission of defeat" that the assets could not be operated in the most efficient manner (Lovejoy, 1971). Generally, the decision makers may have objectives inconsistent with the pure maximization of the firm's value. It would therefore seem that the sell-off may need additional motivation. The external threat of a takeover could serve as motivation for management "to do the right thing" (Lovejoy, 1971). Coffee (1988) discusses how takeover threats provide stimulus for

management to restructure the firm efficiently. Dann and DeAngelo (1988) look at sell-offs as a way to thwart a possible takeover by selling a key division of their firm which the hostile party was particularly interested in acquiring. They find that these types of sales generate negative but insignificant wealth effects.

An alternative factor which may play a role in the decision to sell-off assets is the internal ownership structure. This has not previously been explored, and it is the focus of this research study. As background, it is important to be acquainted with the relationship between inside managers and outside shareholders. In financial economics this has been commonly portrayed as a classic principal/agent relationship.

1.3. The Management/Shareholder Conflict and Ownership Structure

The firm can be viewed as a "nexus of contracts" involving not only managers and investors, but also, directors, employees, suppliers, and customers. The relationships that are formed "are" the corporation. In financial economics this is usually simplified down to a discussion focusing on the managers, who are the agents, and the shareholders, who are the principals. This separation of ownership and control allows for the specialization of risk bearing and managerial decision making. In this regard, Easterbrook and Fischel (1990) point out that "those who have wealth can employ it

productively even if they are not good managers; those who can manage but lack wealth can hire capital in the market."[7]

The problems generated by the separation of ownership and control have been discussed for more than 200 years beginning with Adam Smith (1776). In 1933, Berle and Means wrote about the breakdown in the profit maximization goal due to the conflicts between managers and shareholders. The conflict can be analyzed in terms of objective functions. Each of the participants will have a distinct objective function to maximize. Owners will have an objective function consistent with the classical view of the firm to maximize value. According to portfolio theory owners will choose stocks which yield the highest return for a given total risk. Moreover, through diversification into many stocks (and other assets) they can eliminate unsystematic risk and they are left with only systematic risk. However, investors' realized return will be maximized by the stock price being at a maximum level. This maximum stock price will be attained if corporate policies have an underlying objective to maximize stock price by making choices on projects according to their net present values. Management's objective function may be quite different. It is argued that management maximizes a utility function which depends on more than the firm's stock price (Williamson, 1964, 1970). Management may also have a desire to reduce its individual risk position by diversifying the firm (Amihud and Lev, 1981), to build a larger firm than is optimal to increase their power and prestige (Kaysen, 1960,

Gordon, 1961, Manne, 1962, 1965), and to consume excessive salaries and other perquisites (Baumol, 1959, 1962, 1967, Marris, 1964, Dyl, 1988).

Given these difficulties it seems one approach to relieving investors of the burden of overindulgent managers would be to regulate appropriate action. However, "corporate code in almost every state is an enabling statute. An enabling statute allows managers and investors to write their own tickets, to establish systems of governance without substantive scrutiny from a regulator and without effective restraint on the permissible methods of corporate governance."[8] Courts apply the "business judgement doctrine" which is effectively a hands-off approach in assessing corporate decisions. "The corporation is a complex set of explicit and implicit contracts, and corporate law enables the participants to select the optimal arrangement for the many different sets of risks and opportunities that are available in a large economy. No one set of terms will be best for all; hence the 'enabling' structure of corporate law."[9] An example of this hands-off approach is the allowance of various antitakeover charter amendments. This is not to say the legal environment is unimportant; however, the primary mechanism for controlling the conflict will be carried out through the interactions of the participants which produce market forces.

Academic financial economics concentrates on four areas which may reduce the conflict. These are: 1. the competitive labor

market; 2. external takeover threats; 3. internal monitoring by the board of directors; 4. the ownership structure of the firm. Fama (1980) offers the conjecture that managers are subject to ex-post settling up costs for their actions. These costs are generated by the competitive labor market. They argue that internal monitoring of management by managers above and below is ultimately supported by this labor market pressure. Furthermore, the board of directors can serve to monitor top management. He also argues for the importance of outside board members to mitigate collusion between management groups on the board since management could control the board and, therefore, expropriate wealth from shareholders. Little evidence exists to support the Fama labor market conjecture; Dyl (1988), in fact, provides results which cast doubt on the labor market's ability to resolve the management/shareholder conflict. He looks at the relationship between the degree to which a firm is closely held and the managerial compensation level. He argues that "the finding of a significant inverse relationship between the degree to which a firm is closely held and the level of management compensation would suggest the pressence of higher agency costs in widely held firms and would call into question the assumption of managerial labor market efficiency (at least with regard to its ability to discipline some aspect of manager's behavior)"[10]. His results do show a significant negative relationship after controlling for other factors which determine compensation.

Manne (1965, 1967) discusses the importance of takeover threats. He argues that the stock price will be lower for firms whose management does not make decisions consistent with stock price maximization. These firms will tend to be acquired by outside parties who will operate them more efficiently. Fama (1980) is primarily interested in resolving the issue through competitive labor markets; however, he notes, as a last resort, takeover pressure may have some value. Schleifer and Vishny (1988) contend that the takeover market in combination with large shareholders can serve as an effective monitor for these agency problems. Contrary to this reasoning, however, Jarrell and Bradley (1980) argue that the tender offer event has nontrivial costs that make this a less effective monitoring force than believed.

Internal mechanisms also exist for controlling the firm's management. The votes cast by shareholders are used to elect the board of directors who in turn are to oversee the managers. The American Law Institute identifies four substantial areas of responsibility for the directors: "1. Elect, evaluate and, where appropriate, dismiss the principal senior executives; 2. Oversee the conduct of the corporation's business, with a view to evaluation on an ongoing basis, whether the corporation's resources are being managed in a manner consistent with [enhancing shareholder gain, within the law, within ethical considerations, and while directing a reasonable amount of resources to public welfare and humanitarian purposes]. 3. Review and approve corporate plans and actions that

the board and principal senior executives consider major and changes in accounting principles that the board or principal senior executives consider material. 4. Perform such other functions as are prescribed by law, or assigned to the board under a standard of the corporation."[11] The opinion suggests that directors are accountable to shareholders. Consistent with this, states have ruled that directors are fiduciaries in relation to the shareholders (as a class) and the corporation. This seems to imply, with respect to the directors' responsibilities, potential conflicts between other stakeholders in the corporation such as customers, employees, governments, lenders, suppliers, and communities and the shareholders. However, "according to Delaware law, if directors look out for the long-term interests of shareholders they will also be deemed to have taken care of the corporations' other stakeholders."[12] In recent years, in an atmosphere of leveraged buyouts and unfriendly takeovers, the emphasis on the stakeholders' positions has increased. Seventeen states have laws empowering directors explicitly to consider stakeholders other than the shareholders (Lorsch, 1989). Thus, today the directors' primary accountability is to shareholders, but other stakeholders interests make that a dubious responsibility. They are legally responsible for the management of the corporation, but the objective of that management may not be unambiguous. In the end they are required to use "good business judgment" (Lorsch, 1989)

The reality of the power of the directors has often been questioned. Boards have been heavily critcized for the dominance held by inside management. In response, during the 1980's, the number of outside directors on corporate boards in the United States increased (Bacon, 1990). A number of recent academic papers have explored the importance of board composition. Are outside directors effective monitors of management? Studies by Rosenstein and Wyatt (1990) and Lee, Rosenstein, Rangan, and Davidson (1992) answer this question affirmatively. Rosenstein and Wyatt use event study methodology to find significant positive abnormal returns associated with outside director appointments. Lee, Rosenstein, Rangan, and Davidson study managerial buyouts. The nature of this type of a transaction has inherent conflicts of interest with the potential for expropriating wealth from shareholders. The organization of the board is hypothesized to be a monitor of the conflict. They find shareholder wealth gains are greater when the board is dominated, in a numerical sense, by outside directors. This would suggest that more outside directors serve as effective monitors in this type of decision.

Other researchers have viewed outside directors as pawns of senior management. It is argued that they have little influence due to a relative lack of information and to the difficulties in undertaking a united effort. While this united effort may be easier to attain during distressful periods, it suggests the firm's decisions more normally will be a function of managerial objectives. Singh

and Harianto (1989) find a significant positive relationship between the adoption of a golden parachute and the proportion of outside directors. This suggests that outside directors are not effective monitors in this type of a decision. However, in the same paper, Singh and Harianto find a significant negative relationship between the adoption of a golden parachute and the stock ownership by the management team. This suggests that ownership structure may be more important than board composition in controlling managerial perquisite consumption.

A final hope for resolving the conflict between managers and shareholders exists in the ownership structure of the firm. Numerous papers have been written to theoretically model and empirically test the influence of ownership structure. Jensen and Meckling (1976) present a model in which a larger management ownership serves to align the interests of managers and shareholders. However, they also discuss the difficulties arising from managers holding a large portion of a firm due to individual portfolio problems from being undiversified. Demsetz (1983) treats ownership structure in an equilibrium context. He notes the value of large shareholder and the importance of managerial ownership. Shleifer and Vishny (1986) present a model where large shareholders can serve as monitors of management and, in the absence of a direct monitoring function, can facilitate takeover movements in poorly managed firms. The issue of ownership structure resolving the manager/shareholder conflict must

ultimately rest upon our empirical findings that inside ownership changes the conflict or other ownership units (institutions) effectively "monitor" the conflict.

The impact of "managerial holdings" or "insider holdings" has generated a fair amount of empirical research relating to firm diversification, voting on antitakeover charter amendments, and firm performance. The terms have often been used in the literature in an imprecise way. They are used to capture the holdings of directors, officers, and/or other beneficial owners. To highlight the ambiguous nature of the term(s), in the following discussion, the researchers' definition of "managerial holdings" is noted. Amihud and Lev (1981) argue that management will tend to over-diversify the firm beyond what is optimal due to management interests of reducing risk. They present evidence which shows that manager-controlled firms tend to engage in more conglomerate acquisitions. Additionally, manager-controlled firms tend to be more diversified. The definition of a manager-controlled firm in the study is effectively a firm with a low ownership concentration. Agrawal and Mandelker (1987) show that a higher management stake in the firm is associated with investments that increase the variance of the firm's value, not decrease it; thus, they conclude that management ownership is beneficial toward resolving the conflict. They define various levels of managerial holding. One type measures the top executives' stockholdings, a second measures the top two

executives' stockholdings, and a third measures all officers' and directors' ownership.

Evidence is also supplied in studies on antitakeover charter amendments. Jarrell and Poulsen (1987) find that more harmful amendments are associated with larger insider holdings. They reason that large insider holdings can help management win a majority for approval of the amendment. This evidence suggests that insider ownership is not effective at controlling agency costs. Jarrell and Poulsen's definition of insider ownership is all directors and officers. Malatesta and Walkling (1988) find poison pill defenses are associated with less management ownership. Malatesta and Walkling argue that management is in more need of a poison pill if they own a small portion of the firm. Their definition of management is all officers and directors.

Firm performance and value is another area of study on management ownership. Stulz (1988) develops a model where value first increases with management ownership and then falls with management ownership. Morck, Schleifer, and Vishny (1988) use ownership by the board of directors to explain firm value (Tobin's Q). McConnell and Servaes (1991) find insider ownership, defined to be officers and directors, to be significant in cross sectionally explaining firm value.

Another area of ownership structure involves the presence of institutional owners (and concentration levels). The key issue is whether an institution can be an effective monitor. In order for this

to be true, institutions must hold some "power" which provides sufficient motivation for management to efficiently operate the firm. The power may come from the institutions' voting rights, from the consequences of their equity sales, and from assistance they might lend in a takeover process. Jarrell and Poulsen (1987) investigate institutional voting issues. They argue that institutions are more likely to vote in accordance with their economic interests. They empirically find that firms with more harmful antitakeover charter amendments have lower institutional ownership. Brickley, Lease, and Smith (1988) partition institutions into different categories. They find that those institutions which are less subject to management influence are most likely to vote against ATCA's. Brickley, Lease, and Smith also argue that some institutional investors, especially "pressure resistant" types, are more active in their approach through organizations such as the Council of Institutional Investors. (They note the California Public Employees' Retirement System as one active participant.) This type of organization encourages dialogue with management to voice concerns and apply pressure. Pound (1988), however, finds that large investors are passive in their voting and either vote with management or sell their shares (the Wall Street Rule). This raises the question about the possible signaling effects of large sales by institutions.

If the sale by institutions is a source of information (bad news) to the market, then this represents another form of power

held by institutions which make them effective "monitors". (Note, this is a broader use of the term monitor than usually employed.) Scholes (1972) studies secondary distributions and finds significantly stronger negative results when investment companies or management sell shares than when individuals or banks sell. The abnormal performance index for the days 0 to +10 is -1.4% for investment companies and mutual funds, 0.0% for banks and insurance companies, -0.7% for individuals, -2.1% for corporations and officers, and -0.5% for estates and trusts. A third reason institutions can be effective monitors is related to their ability to assist takeovers as discussed by Shleifer and Vishny and empirically supported by Ambrose and Megginson (1991).

1.4. A Formal Statement of the Relationship Between Ownership Structure and the Sell-off Decision

This formal presentation focuses on the true objective of the corporation. Classical microeconomics assumes that the firm is directed by the goal of value maximization. It is argued that value maximization is an appropriate assumption since if "firms did not maximize their stock market value, or deviated far from value maximization, someone would attempt to take them over, change the course of action of the firm, and make a pure capital gain."[13]. Alternatively, there is a "managerial" literature which identifies objectives such as "satisficing", "sales maximization", and the

maximization of the manager's welfare. In this formal presentation, the following is generally assumed:

1. The firm is comprised of two divisions with assets A_1 and A_2. One of these divisions represents the "core" activity (with assets=A_1) and the other the "non-core" activity (with assets=A_2);

2. Each asset has the same systematic risk. Additionally the correlation coefficent between the returns (or sales) on the two assets is less than 1. These two assumptions mean that adjustments in the level of assets do not influence the shareholders' risk position; however, the total risk of the firm will change through the diversification.

In choosing the level of A_1 and A_2, two cases are possible: 1. we can assume the firm's decision makers attempt to maximize the total firm value; 2. we can assume the firm's decision makers maximize their own welfare which only partially considers the firm's value.

Case 1: Decision Makers Maximize The Firm's Total Value

The following additional assumptions are made:

1. The divisions and the assets required to operate them, Ai, are each associated with four functions - $g_i(Q_i)$, R_i, C_i and S. "$g_i(Q_i)$" represents a probability distribution over the level of sales. Q_i represents the expected level of sales given a level of assets, A_i.

The var(Q_i) is assumed to be equal to var(Q) for all asset levels. R_i is the revenue function, a function of output and price. The firm cannot influence the price level. C_i is the cost function unique to each division while S is the costs shared between both divisions. These functions depend on the firm's management and production synergies between the two divisions.

2. The model is for a single period.
3. The corporate tax rate is positive.

The model analyzed in this section extends the classical microeconomic model by incorporating agency and bankruptcy considerations. In the classical microeconomic model, the quantity sold is obtained as a solution. In this model, the price of output from each division is given, and, for a chosen level of assets, the expected quantity (Q_i) is also given. The issue then becomes which organizations will hold the assets to produce the good. This is assumed to be a function of how the assets used to produce Q interact with the firm's other assets (i.e., the synergies that exist). By making synergies unique to each firm, the maximum value added to the firm by the assets becomes unique.

Define:

$Q_i(A_i)$ = the expected number of units sold in division i during the next period given the size of the assets.

A_i= the cost of assets needed to support division i.

VA_i = the value added to the firm by division i, over the cost of the assets in division i, Ai.

$V_i = A_i + VA_i$, the value contributed to the firm by division i, exclusive of value added through synergies (shared costs).

$V_{1,2}$ = The value contributed by the synergies (costs savings) between assets 1 and 2.

$V(A_1,A_2)$ = the total market value of the firm which is a function of the firm's size.

$C_i(Q_i(A_i))$ = the expected cost unique to division i.

$R_i(P_i,Q_i(A_i))$ = the expected revenue unique to division i.

$S(Q_1(A_1),Q_2(A_2))$ = the expected shared nonfinancial costs.

$E(A_1,A_2)$ = The market value of Equity, a function of the firm's size, $A_1 + A_2$.

$D(A_1,A_2)$ = The market value of Debt, a function of the firm's size, $A_1 + A_2$

M(D/D+E) = M(%D) = the benefit to debt in terms of the monitoring capacity of outside debt, an increasing concave function over the %D..

Z(D/D+E) = Z(%D) = the indirect costs of debt or the additional costs associated with a distressed firm. Increases with the percentage of debt and thus the probability of financial distress (bankruptcy).

r = the firm's discount rate

= kd(%D) + ke(%E) = kd(%D) + ke(1 - %D) = kd(%D) + ke - ke(%D)

kd = the after tax cost of debt

ke = the cost of equity

r_i= the divisional discount rate

t = the firms tax rate

Note, because the systematic risk of asset 1 and asset 2 are assumed to be the same, "r" and "r_i" will be equal and constants over changes in the level of A_1 and A_2. However, r does change with the percentage of debt in the firm. Also note that the expected revenue and cost functions are given based on managerial opinions and these opinions are shared by the market. No differential information is assumed. The firm value will be based on these shared expected revenue and cost functions.

The total value of the firm can be represented as the sum of three components. These may be identified intuitively as the direct profit from each asset group plus synergies and the net induced benefits of debt:

$$V = [1/1+r]\ [R_1(P_1,Q_1(A_1)) - C_1(Q_1(A_1))]\ [1 - t]$$

$$+ [1/1+r]\ [R_2(P_2,Q_2(A_2)) - C_2(Q_2(A_2))]\ [1 - t]$$

$$- [1/1+r]\ [S(Q_1(A_1),Q_2(A_2)]\ [1 - t]$$

$$+ [1/1+r]\ [M(\%D) - Z(\%D)].[1 - t]$$

Since price is given and associated with each level of assets, A_i, there is a quantity, Q_i, the notation on P and Q will be dropped. This allows us to focus upon the firm's size, A_1 and A_2. Therefore:

$$V = [1/1+r]\ [R_1(A_1) - C_1(A_1)]\ [1 - t]$$

$$+ [1/1+r]\ [R_2(A_2) - C_2(A_2)]\ [1 - t]$$

$$- [1/1+r]\ [S(A_1, A_2)]\ [1 - t]$$

$$+ [1/1+r]\ [M(\%D) - Z(\%D)].[1 - t]$$

This value can be further simplified and alternatively represented as comprising four elements, V_1, V_2, $V_{1,2}$ and $V_{\%D}$:

$$V = V_1 + V_2 + V_{1,2} + V_{\%D}$$

V_1 considers that value added to the firm which is uniquely attributable to asset 1. Identically, V_2 considers that value added to the firm which is uniquely attributable to asset 2. $V_{1,2}$ is the value added from the synergies created by combining assets 1 and 2. Finally, $V_{\%D}$ is the value added associated with the firm's financing choice. First, the analysis is presented using an all equity firm and then a leveraged firm is considered.

(I) The all-equity case

The following optimization problem must be solved:

$$\text{Max } V = [1/1+r]\ [R_1(A_1) - C_1(A_1)]\ [1 - t]$$

$$+ [1/1+r]\ [R_2(A_2) - C_2(A_2)]\ [1 - t]$$

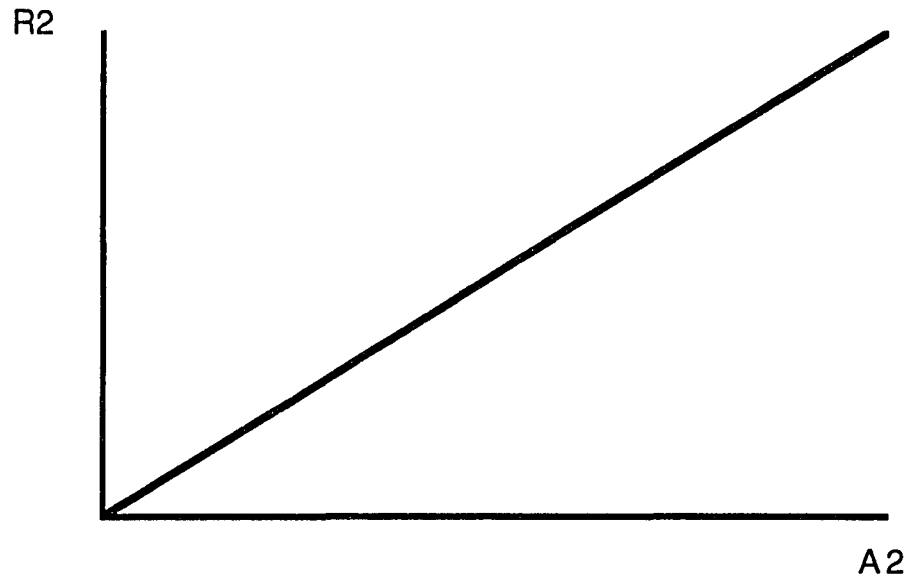
$$- [1/1+r]\ [S(A_1, A_2)]\ [1 - t]$$

Choosing A_1, A_2

The solution will generate some A_1^* (optimum level of assets in the "core" division) and A_2^* (optimum level of assets in the "non-core" division). By fixing the level of A_1 at A_1^*, the solution to the optimum level of A_2, A_2^*, can be graphically presented..

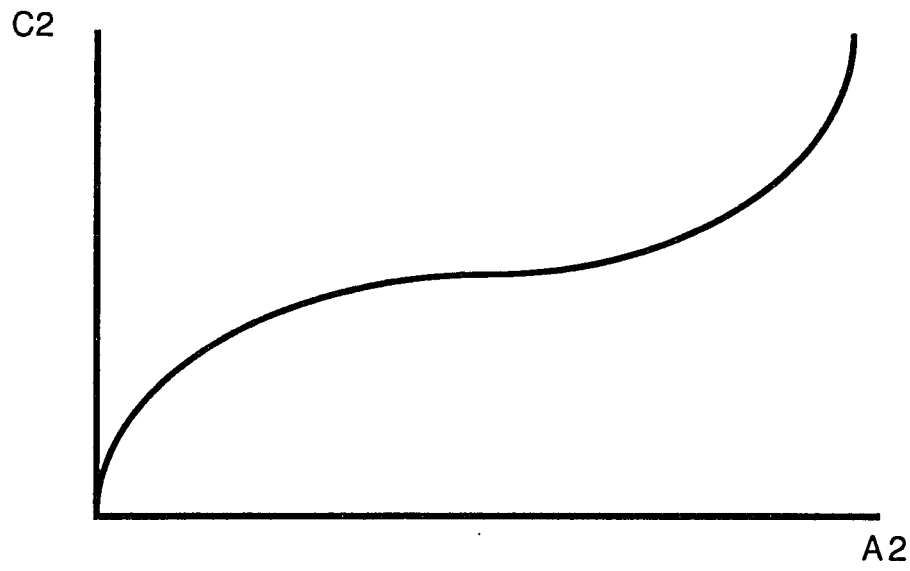
The revenue function will be monotonically increasing. The price will be a function of the change in the level of competition as the level of assets increases. For simplicity assume a linear relationship. Thus $dR(A_2)/dA_2$ = constant. This is represented in Figure 1.1.

Figure 1.1. Revenue Function



The cost function is assumed to be monotonically increasing over all A_2, $dC_2(.)/dA_2 > 0$. As previously stated, the function will exibit increasing returns over small firm sizes and decreasing returns over larger firm sizes. The cost curve is represented in Figure 1.2.

Figure 1.2. Cost Function

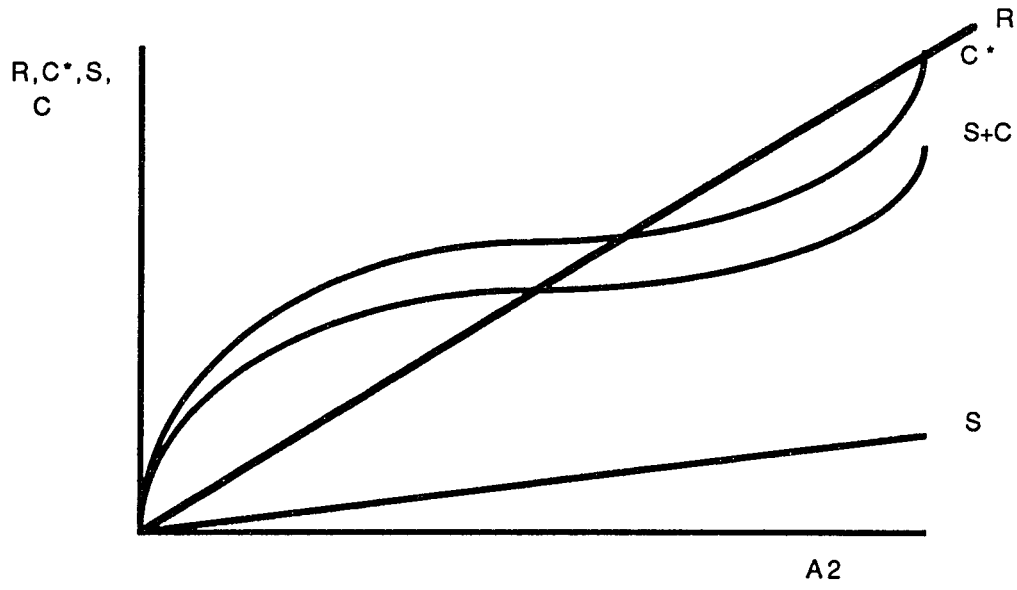


Now consider the shared costs. It is reasonable to assume that $dS(.)/dA_1 > 0$ and $dS(.)/dA_2 > 0$. Additionally, for synergies to exist, we would expect that:

$$C_2(A_2) + S(A_1,A_2) < C^*_2(A_2)$$

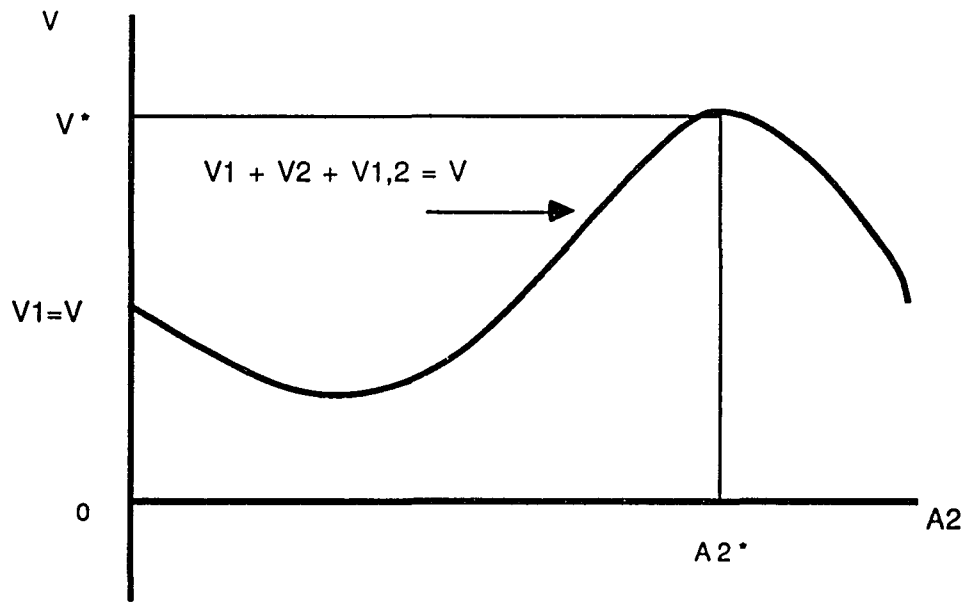
where $C^*_2(Q_2(A_2))$ represents the costs for the division's operations if it stood alone, without being a part of a diversified firm (i.e., a divisional management buyout), or it could represent the total costs for the next most efficient controller of the assets. The three cost curves along with the revenue function are given in Figure 1.3. (Baumol, Panzer, and Willig, 1982)

Figure 1.3. Revenue and Cost Functions



These cost curves, of course, assume the current firm is the best holder of the divisional assets since S+C < C*. (Note, if S+C > C*, this would suggest that there exists another organization which could more efficiently manage the assets. This would mean a sell-off should occur since this alternative firm should be able to bid a value for the assets which exceeds the value the assets could attain if they remained under the control of the current operator.) The value maximizing A_2 is represented graphically in Figure 1.4.

Figure 1.4. Valuation Function



When A_2=0, then the firm's value is equal to V_1. The optimum firm value is identified as V*. V* can be divided into a that which is contributed by asset 1, V_1, that which is contributed by asset 2, V_2, and that which exists because of the synergies between assets 1 and 2, $V_{1,2}$.

(II) A firm financed with equity and debt

With the introduction of debt, D, the firm's value depends upon the relative cost of debt, after tax, to the cost of equity along with agency and bankruptcy considerations. Since it is assumed that the after tax cost of debt is less than the cost of equity, the firm can employ more debt to increase its value. It is also assumed there is a

monitoring value to debt, captured by function M, as the firm must access the capital markets when debt is rolled over. However, with more debt, the probability increases for the firm becoming financially distressed and thus incurring indirect costs of debt. This is captured by function Z. The trade-off between the good news of debt, the lower cost and the monitoring value, and the bad news of debt, the indirect costs, defines the capital structure problem in the model. For simplicity, it is assumed that the second partial of r with respect to the percentage of debt is zero.

The maximization problem, therefore, is more complicated, and it can be represented as follows:

$$\text{Max } V=[1/1+r]\ [R_1(A_1) - C_1(A_1)]\ [1 - t]$$

$$+\ [1/1+r]\ [R_2(A_2) - C_2(A_2)]\ [1 - t]$$

$$-\ [1/1+r]\ [S(A_1, A_2)]\ [1 - t]$$

$$+\ [1/1+r]\ [M(\%D) - Z(\%D)]\ [1 - t]$$

Choosing A_1, A_2, %D

Note %D = [D/(D+E)] and r = kd(%D) + ke - ke(%D). The solution will generate an optimum level of A_1, A_2, and %D. As a consequence the

optimum firm size, $A_1 + A_2$, level of debt, D, and level of equity, E, all follow.

Three first order necessary conditions must be met for an optimum. The first is:

$$(1)\quad \frac{\partial V}{\partial A_1} = \left[\frac{1}{1+r}\right]\left[\frac{\partial R_1}{\partial A_1} - \frac{\partial C_1}{\partial A_1}\right][1-t] - \left[\frac{1}{1+r}\right]\left[\frac{\partial S}{\partial A_1}\right][1-t] = 0$$

The second is:

$$(2)\quad \frac{\partial V}{\partial A_2} = \left[\frac{1}{1+r}\right]\left[\frac{\partial R_2}{\partial A_2} - \frac{\partial C_2}{\partial A_2}\right][1-t] - \left[\frac{1}{1+r}\right]\left[\frac{\partial S}{\partial A_2}\right][1-t] = 0$$

The third is:

$$(3)\quad \frac{\partial V}{\partial \%D} = -\left[\frac{1}{(1+r)^2}\right]\left[\frac{\partial r}{\partial \%D}\right][R_1 - C_1 + R_2 - C_2 - S + M - Z][1-t] + \left[\frac{1}{1+r}\right]\left[\frac{\partial M(\%D)}{\partial \%D} - \frac{\partial Z(\%D)}{\partial \%D}\right][1-t] = 0$$

Since, $$r = k_d(\%D) + k_e(\%E) = k_d(\%D) + k_e - k_e(\%D)$$

then, $$\frac{\partial r}{\partial \%D} = k_d - k_e < 0 \quad \text{if } k_d < k_e$$

Define, $$B = -\left[\frac{1}{(1+r)^{-2}}\right]\left[\frac{\partial r}{\partial \%D}\right][R_1 - C_1 + R_2 - C_2 - S + M - Z][1-t]$$

and B > 0.

therefore, (3) can be rewritten as (3'),

$$(3') \quad \left[\frac{1}{1+r}\right]\left[\frac{\partial M(\%D)}{\partial \%D} - \frac{\partial Z(\%D)}{\partial \%D}\right] = -B$$

The necessary condition for a maximum is to choose A1, A2, and %D such that the first order conditions are met. This is summarized as follows:

$$\frac{\partial V}{\partial A_1} = \frac{\partial V}{\partial A_2} = \frac{\partial V}{\partial \%D} = 0$$

It is assumed that:

$$\frac{\partial M(\%D)}{\partial \%D} > 0, \quad \frac{\partial Z(\%D)}{\partial \%D} > 0, \quad \frac{\partial^2 M(\%D)}{\partial \%D \partial \%D} < 0, \quad \frac{\partial^2 Z(\%D)}{\partial \%D \partial \%D} > 0, \quad \frac{\partial^2 r(\%D)}{\partial \%D \partial \%D} = 0$$

In order to develop the second order sufficient conditions for a maximimum, the following are defined:

$$H = \begin{vmatrix} V_{1,1} & V_{1,2} & V_{1,3} \\ V_{2,1} & V_{2,2} & V_{2,3} \\ V_{3,1} & V_{3,2} & V_{3,3} \end{vmatrix}$$

Note: $V_{k,k} = \frac{\partial^2 V}{\partial k \partial k}$ for $k = A_1, A_2, \%D$

The second order sufficient conditions for a maximum are:

$$|H1| = |V_{1,1}| < 0$$

$$|H2| = \begin{vmatrix} V_{1,1} & V_{1,2} \\ V_{2,1} & V_{2,2} \end{vmatrix} > 0$$

$$|H3| = |H| < 0$$

Since,

$$V_{1,1} = \left[\frac{1}{1+r}\right]\left[-C_{1,1}\right]\left[1-t\right] < 0 \quad \text{if } C_{1,1} > 0$$

$$V_{1,2} = -\left[\frac{1}{1+r}\right]\left[S_{1,2}\right]\left[1-t\right] < 0$$

$$V_{1,3} = 0$$

$$V_{2,1} = -\left[\frac{1}{1+r}\right]\left[S_{2,1}\right]\left[1-t\right] < 0$$

$$V_{2,2} = \left[\frac{1}{1+r}\right]\left[-C_{2,2}\right]\left[1-t\right] < 0$$

$$V_{2,3} = 0$$

$$V_{3,1} = 0$$

$$V_{3,2} = 0$$

$$V_{3,3} = \left[\frac{1}{1+r}\right]\left[\frac{\partial^2 M}{\partial \%D \partial \%D} - \frac{\partial^2 Z}{\partial \%D \partial \%D}\right] < 0 \text{ assuming } \frac{\partial^2 r}{\partial \%D \partial \%D} = 0$$

then,

$$|H1| = \left[\frac{1}{1+r}\right]\left[-C_{1,1}\right]\left[1-t\right] < 0$$

$$|H2| = \left[\frac{1}{1+r}\right](-C_{1,1})\left[\frac{1}{1+r}\right](-C_{2,2})\left[1-t\right] + \left[\frac{1}{1+r}\right]^2(S_{2,1})^2\left[1-t\right] > 0$$

$$|H3| = \left[\frac{1}{1+r}\right]\left[M_{3,3}-Z_{3,3}\right]\left[\frac{1}{1+r}(-C_{1,1})\frac{1}{1+r}(-C_{2,2}) + \left(\frac{1}{1+r}\right)^2(S_{2,1})^2\right]\left[1-t\right] < 0$$

Therefore, by assuming $M_{33}<0$, $Z_{33}>0$, $C_{11} >$ and $C_{22} > 0$ around the optimum, we have established the conditions for a maximum solution to the optimization problem.

Now let's consider the decision to sell-off assets. Assuming the second-order conditions are met, the condition for a sell-off is an appropriate violation of any of the first order conditions. For convenience, let us examine some possible violations, one at a time:

A.

$$\left[\frac{1}{1+r}\right]\left[\frac{\partial R_2}{\partial A_2} - \frac{\partial C_2}{\partial A_2}\right]\left[1-t\right] < 0$$

This says that the last dollar contributed to asset 2 has resulted in negative operating profits before shared costs. At the margin, A_2 is reducing the value of the firm.

B.

$$\left[\frac{1}{1+r}\right]\left[\frac{\partial R_2}{\partial A_2}-\frac{\partial C_2}{\partial A_2}\right][1-t]-\left[\frac{1}{1+r}\right]\left[\frac{\partial S}{\partial A_2}\right][1-t]<0$$

This says that the last dollar contributed to A_2 has resulted in negative operating profits after shared costs. Again, this is reducing the value of the firm.

C. The allocation of assets between divisions 1 and 2 may be incorrect. To see this, we can set equation (1) = (2). This expression can be rewritten as equation (6).

$$(6)\quad \frac{\left[\frac{1}{1+r}\right]\left[\frac{\partial R_1}{\partial A_1}-\frac{\partial C_1}{\partial A_1}\right][1-t]-\left[\frac{1}{1+r}\right]\left[\frac{\partial S}{\partial A_1}\right][1-t]}{\left[\frac{1}{1+r}\right]\left[\frac{\partial R_2}{\partial A_2}-\frac{\partial C_2}{\partial A_2}\right][1-t]-\left[\frac{1}{1+r}\right]\left[\frac{\partial S}{\partial A_2}\right][1-t]}=1$$

If the ">" applies to (6), it says the last dollar contributed toward A_1 increased value more than the last dollar contributed toward A_2. In this case a sell-off of A_2 should take place with the proceeds used to purchase more A_1. This form of reorganization would effectively narrow the focus of the firm.

D. Problems with the level of debt. Relabel equation (3') as equation (7) below:

$$(7)\quad \left[\frac{1}{1+r}\right]\left[\frac{\partial M(\%D)}{\partial \%D} - \frac{\partial Z(\%D)}{\partial \%D}\right] = -B$$

If B=0 under the condition that dr/d%D = 0 (kd=ke), then the optimum amount of debt requires (7) to be equal to 0. if (7) is positive, this means value can be created by increasing debt, ceteris paribus. If (7) is negative, value can be created by reducing debt, ceteris paribus. How can we achieve this? If A_1 and A_2 are fixed at their optimum mix, a pure exchange of equity and debt would be an option. If (7) is negative, the firm should issue equity and use the proceeds to buy back debt. If (7) is positive, the firm should issue debt and use the proceeds to buy back equity. If equation (6) is greater than 1 (too much A_2) and (7) is negative (too much debt), the optimum mix of assets and the optimum level of debt might be achieved by selling off division 2 and using the proceeds to buy back debt. This would suggest a positive relationship between the firm's sell-off decision and the level of debt in the firm.

If B>0 under the more realistic condition that dr/d%D < 0 (kd < ke), then the optimum amount of debt will be higher than if B=0. The intuition is that the firm must not only trade off the monitoring value of debt with the indirect costs of debt, but also factor in the advantage of debt as a lower cost source of funds. For the case with

B>0, the same relationships obtain with respect to selling-off assets A2.

This section suggests that a sell-off can occur for three reasons: because of poor operating performance, because of a non-optimal mixture of assets, or because of a high level of debt. The analysis assumes the decision makers direct the firm to maximize the firm's total value. The next section removes this assumption, giving the decision makers' ownership a role in the sell-off decision.

Case 2: Maximization Of Decision-Maker (Officer and Director) Welfare

To simplify the analysis define $V_1 + V_2 + V_{1,2} + V_{\%D} = V^*$. Also assume the firm entertains bids for the assets. The analysis studies how decisions vary based upon differing assumptions about the value of the asset to officers and directors.

The claimants to the firm's value, V*, are equityholders and debtholders. Consider also one type of stakeholder in the firm, officers and directors (O/Ds). (Stakeholders have also been modeled by Cornell and Shapiro (1987) and Karpoff and Thorley (1991).) O/Ds extract value from the firm in terms of their compensation rents and their equityholder returns. Note, the use of the concept compensation rents highlights the uniqueness of the relationship of the officers and directors to their employing firm. These compensation rents are defined as excess compensation over their

next best alternative, and they are received as salary and bonus rents, referred to as nondiversifying rents, and as perquisite rents, such as firm diversification to reduce O/D risk, referred to as diversifying rents. Let the discounted value of their future compensation rents be represented as V_{crts} and be equal to the value of nondiversifying rents, V_{ndrts}, plus the value of diversifying rents, V_{drts}; Let the maximum value of the firm before the nondiversifying rents are extracted be V**. Then,

$$V^* + V_{ndrts} = V^{**}$$

and

$$V^* = V_e + V_d$$

Where V_e=the value of the equityholders' position and V_d=the value of the debtholders' position.

Thus,

$$(9) \quad V^{**} = Ve + Vd + V_{ndrts}$$

(9) simply states that the equityholders, debtholders, and the O/Ds each have a claim to V**. Alternatively, it defines a conflict. Holding V** fixed, as V_{ndrts} increases either V_e or V_d must fall. This

is effectively allocating more corporate resources to O/D salary and bonuses. However, ODs may also have equity positions in the firm.

Now consider the problems which confront Officers and directors:

1. To extract value from the firm;
2. To control their personal risk level.

O/Ds as stakeholders extract value from salaries, performance bonuses, and perquisites. O/Ds as equityholders extract value from dividends and the appreciation in the value of the stock. Their equityholder position may be a function of personal choices or it may be a function of a compensation contract. Therefore total O/D compensation may come from salaries, performance bonuses, perquisites, and stock ownership or options for stock ownership. If labor markets are efficient, they should price the officers' and directors' total compensation based upon their decision making. Because of information problems, it is not clear that labor markets will be efficient. Therefore, assuming labor markets are not efficient, compensation and compensation rents can create conflicts within the firm between O/Ds and other claimants. For example, the conflict between O/Ds and other claimants will arise with salary and perquisites while performance bonuses will serve to align the O/Ds with equityholders and debtholders. O/Ds' equity positions

will, also, serve to align their interests with outside claimants similar to bonuses; however, this equity solution magnifies the problem associated with O/Ds personal risk (problem (B)). Increasing their equity position makes their personal portfolios more undiversified.

Now define:

$Alpha_1 = V_{ndrts}/V^*$ = the officer/director "stakeholder rents" claim as a percentage of V*

and

$Alpha_2 = n(V_e/N)/V^*$ = the officer/director equityholder claim as a percentage of V*

where, n=number of shares owned,

N=total number of shares outstanding,

V_{crts} = the value of officer/director salary, bonus and perquisite rents

$= V_{ndrts} + V_{drts}$,

V_{ndrts} = the value of officer/director nondiversifying rents (i.e., Salary),

V_{drts} = the value of officer/director diversifying rents (i.e., the reduction in total risk associated with the firm owning the noncore asset).

Their personal wealth position may be stated as:

$$W = Alpha_1(V^*) + V_{od}'' + Alpha_2(V^*) + C$$

V_{od}'' is the discounted value of officer/director salary and bonus from the best deal they could gain from employment if they ceased their position with their current firm. C represents their level of liquid assets, cash . Assuming $Cov(V^*,C)=0$, $Cov(V^*,V_{od}'')=0$, $Var(V_{od}'')=0$, and $Var(C)=0$, the variance, total risk, of their wealth position is:

$$(10) \quad Var(W) = (Alpha_1 + Alpha_2)^2(VarV^*)$$

From (10), it is clear that the O/Ds have an interest in reducing the variance of the value of the firm to reduce their personal risk. In other words, pure firm diversification is valuable for the officers and directors. Moreover, it becomes increasingly valuable as their equity position, $Alpha_2$, increases. (Assume, for now, $Alpha_1$, their stakeholder position, is fixed.) It is assumed that A_1 and A_2 are imperfectly correlated and $Beta(A_1) = Beta(A_2)$. Therefore, the existence of A_2 in the firm reduces the firm's total risk without

changing the systematic risk. The decision to sell-off A_2 or not sell-off A_2 only affects the risk to the officers and directors. Yet, the sell-off decision may also increase the firm's total value.

Now focus on the noncore, firm diversifying asset, A_2. A_2 has potentially two distinct values for the O/Ds:

(1) V_2^* $(=V_2 + V_{1,2})$ is the value contributed by asset 2 in terms of discounted cash flows.

(2) V_{drts} is the value of asset 2 in terms of its firm diversifying capabilities. This value will only be of interest to O/Ds; it will not be valued by well diversified outside shareholders.

We can define this term as:

$$V_{drts} = f(VarW(Alpha_2, A_2=0) - VarW(Alpha_2, A_2>0))$$

Assume f is monitonically increasing in its arguments. The relationship can be explained as follows: V_{drts} captures how A_2 provides a reduction in the variance of the manager's wealth. A_2 does this by reducing the variance of the firm, (see equation (10)). Also from equation (10), we can see that $Alpha_2$ functions as a multiplier for how the variance of the firm impacts the variance of the manager's wealth. If $Alpha_2$ is high, the variance of the firm being greater due to the lack of A_2 being present will be magnified

into the variance of the manager's wealth. The result is that $Alpha_2$ will be positively related to V_{drts}. V_{drts} is effectively standardized to dollars. It can intutitively be taken to be the amount of money O/Ds have to be compensated to be indifferent between $VarW(Alpha_2, A_2=0)$ and $VarW(Alpha_2, A_2>0)$.

Now, suppose a bid of $\$K_2$ is made for Asset 2. A total firm value maximizing objective would require $K_2>V_2^*$ for the asset to be sold to the next best user. For clarity, assume for a moment we have an all-equity firm. To illustrate the impact on the firm's value, assume V_1=\$10, V_2=\$10, K_2=\$12, and the number of shares outstanding before the sell-off = 5. The value of the firm before the sell-off is $V_1 + V_2 = 20$. The per share value of equity is 20/5=\$4. After the sell-off, we can assume the proceeds are used to buy back equity. In this case, the \$12 generated from K_2 is used to repurchase 3 shares at \$4 each. Then the per share value is \$10/2=\$5. Equity values for the existing equityholders will have increased by \$1. We would expect, however, that the equity values would respond quickly to the news of the sell-off and that the equity would not be able to be purchased at \$4. Therefore, we would expect a return to the continuing equity holders to be something less than \$1.

Alternatively, the \$12 might be used to invest in V_1 assets. If the prices of these assets are efficient such that the NPV is zero or close to zero then the per share equity value is (10 + 12)/5=\$4.40. This is a gain of \$.40 for equityholders. If the V_1

assets have a positive NPV then the gain will be something greater than $.40.

Whichever choice is made as to the use of the K_2 funds, we can see that the value of equity would increase appropriately as the value-maximizing objective rule is satisfied. The question becomes: Are there situations where this value increasing decision will not be taken?

Consider two cases:

(Case I)

(A) Assuming $V_{drts}=0$ (i.e., O/Ds do not associate a value with firm diversification), what is the officers' and directors' claim to the cash bid of K_2? As equityholders, they have a proportionate right to $Alpha_2$ of K_2. Additionally, we might assume that they can maintain their existing nondiversifying rents, V_{ndrts}, even after the sell-off. In other words, these nondiversifying rents are not dependent upon the noncore asset. Now, what claim do O/Ds have to the value of asset 2 if it is held within the firm? The O/Ds as equity holders have rights to $Alpha_2(V_2^*)$. They also generate salary and bonus rents, V_{ndrts}. The sell-off will be acceptable to O/Ds if their welfare is greater after the sell-off than before the sell-off. This requires:

$$Alpha_2(K_2) + V_{ndrts} > Alpha_2(V_2^*) + V_{ndrts}$$

which trivially simplifies to:

$$(11)\ K_2 > V_2^*$$

But (11) is simply the same decision rule as if the objective were to maximize the firm's total value (as assumed in case 1).

(B) Next, suppose V_{drts} is positively valued by the O/Ds. In this case, the sell-off decision will be made if:

$$Alpha_2(k_2) + V_{ndrts} > Alpha_2(V_2^*) + V_{ndrts} + V_{drts}$$

which simplifies to:

$$(12)\ K_2 > V_2^* + V_{drts}^*$$

where $V_{drts}^* = V_{drts}/Alpha_2$. It is assumed that $\partial(V_{drts}^*)/\partial Alpha_2 > 0$ (see appendix A).

(12) says that the sell-off must compensate O/Ds both for the value of discounted cash flows and for the risk reduction provided by asset 2. Now the sell-off decision will depend upon $Alpha_2$. Moreover, a conflict can arise between the value maximizing objective and the O/D welfare maximizing objective. This is an

agency problem which exists because of a positive value attributed to V_{drts}^*. This can be viewed graphically in figure 1.5.

Figure 1.5. Sell-off Model

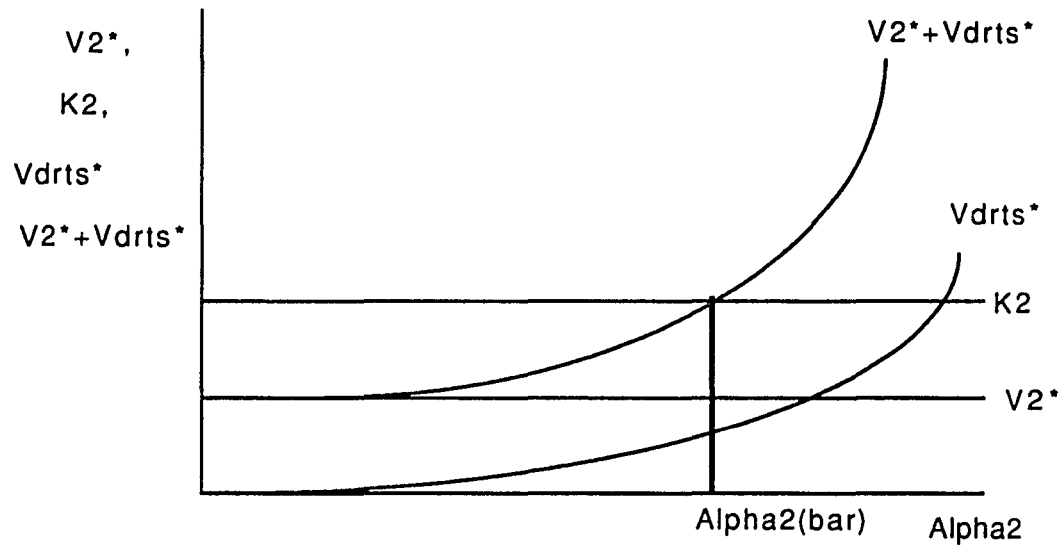


Figure 1.5 shows an inverse relationship between the level of equity ownership by O/D, Alpha2 and the sell-off decision. $Alpha_2$(bar) is the critical level of ownership. Above this level, no sell-off will occur, below this level, a sell-off will occur.

If V_{drts}^* is a value which causes conflicts with the value maximizing objective, the obvious question becomes how might V_{drts}^* be controlled? It is possible external monitors can function to move decision making toward value maximization. For example, institutional ownership can function to facilitate a takeover of non-value maximizing firms (Shliefer and Vishney, 1986). Define

f(takeover threat(institutional ownership)) as a discounting function.

Assume

$$\partial f(.)/\partial(\text{takeover threat}) > 0$$

and

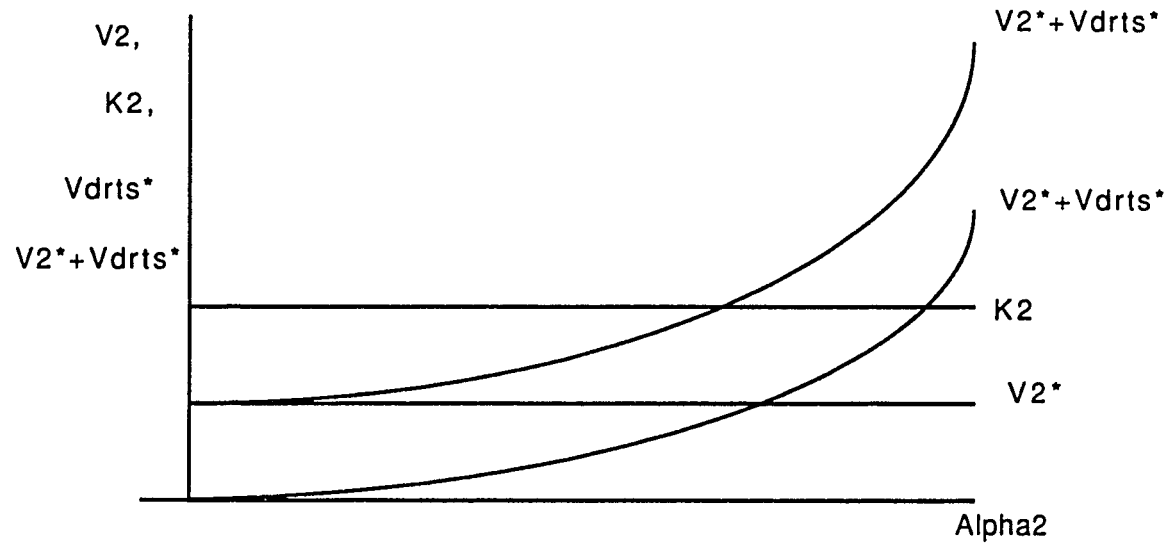
$$[\partial f(.)/\partial \text{takeover threat}][\partial \text{ takeover threat}/\partial \text{ institutional own}]>0$$

Therefore,

$$\partial V_{drts}^{*}/\partial f(.) < 0$$

This means that increasing takeover threats and/or increasing institutional ownership can reduce the value O/Ds attribute to V_{drts}^{*}, and thus the sell-off decision will be undertaken over more values of $Alpha_2$. This is represented in figure 1.6.

Figure 1.6. Sell-off Model



(Case II)

(A) Now consider the senario where O/Ds as stakeholders can not maintain the current value of nondiversifying rents, V_{ndrts}, after a sell-off of the non-core assets. This might include perquisite consumption that is uniquely tied to owning the noncore asset. For example, if IBM owned a chain of luxury hotels in exotic locations, this could obviously be valued by O/Ds. If the sell-off does not occur, the O/Ds have a claim as equityholders and as stakeholders, on the value of asset 2 when retained within the firm. Their equity claim is $Alpha_2(V_2^*)$; their stakeholder rent claim is $V_{ndrts} + V_{drts}$.

Assuming $V_{drts}=0$, the sell-off will occur if:

$$Alpha_2(K_2) > Alpha_2(V_2^*) + V_{ndrts}$$

This can be rewritten as:

$$Alpha_2(K_2) > Alpha_2(V_2^* + (1/Alpha_2)V_{drts})$$

Define $Alpha_1$ as V_{ndrts}/V_2^*. Then $V_2^*(Alpha_1) = V_{ndrts}$.

Therefore,

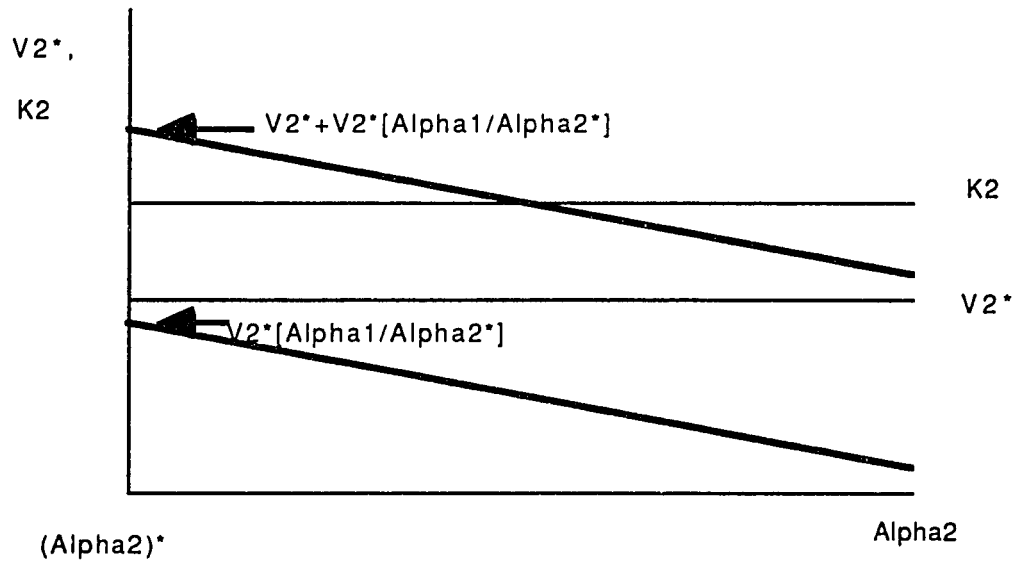
$$Alpha_2(K_2) > Alpha_2(V_2^* + (Alpha_1/Alpha_2)V_2^*)$$

or

$$(13) \quad K_2 > V_2^* + (Alpha_1/Alpha_2)\ V_2^*$$

(13) says that K_2 must be some multiple over V_2^*. This amount depends upon the O/Ds' positions as stakeholders and as equityholders. Given a fixed $Alpha_1$, their stakeholder position, the sell-off rule is represented graphically in figure 1.7.

Figure 1.7. Sell-off Model



The sell-off will occur when $V_2^* + (Alpha_1/Alpha_2)V_2^* > K_2$. For low values of $Alpha_2$, the sell-off will not occur. As $Alpha_2$ increases, O/Ds' welfare is maximized by the sell-off. Thus, in this case, increasing $Alpha_2$ reduces the conflict between the value maximizing objective and the O/Ds' welfare maximizing objective.

(B) Now reconsider $V_{drts}^*>0$. The sell-off will occur if:

$$K_2 > V_2^* + (Alpha_1/Alpha_2)\, V_2^* + V_{drts}^*$$

Now, the sell-off rule can be represented in figure 1.8.

Figure 1.8. Sell-off Model

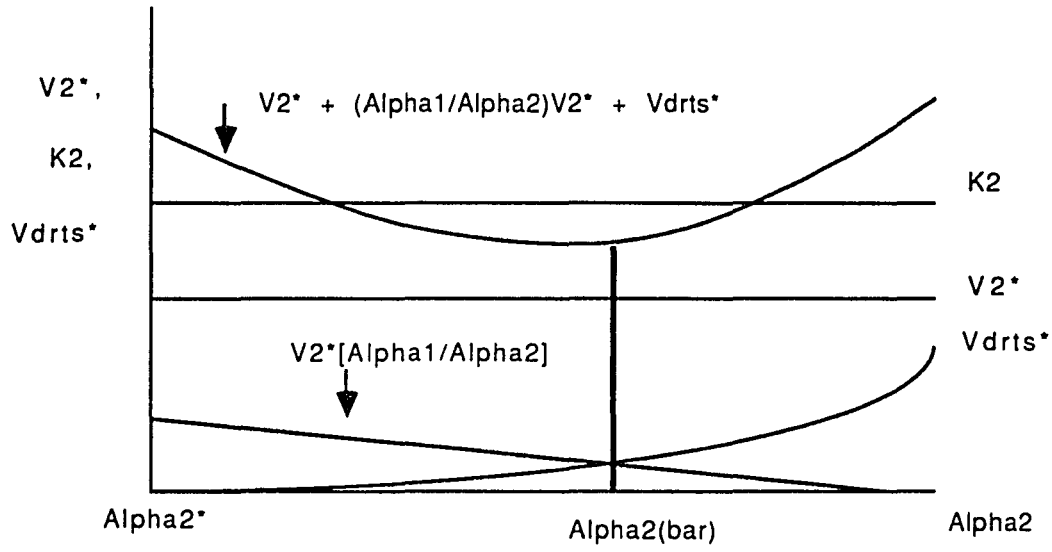


Figure 1.8 shows that the sell-off decision will initially be positively related to $Alpha_2$ up to $Alpha_2$(bar). After $Alpha_2$(bar), the level of $Alpha_2$ is negatively related to the sell-off decision.

Now consider three types of insiders: officers, officers & directors, and directors. If "Pure" officers tend to have a relatively small equityholder position, we may expect to see a positive relationship between their equity position and the sell-off decision.

If officers and directors and "pure" directors tend to have a high $Alpha_2$, we may expect a negative relationship between their equity position and the choice to sell-off A_2. These are empirical questions.

This analysis predicts that if O/Ds can maintain their stakeholder rent position after the sell-off, then a negative

relationship is expected. If O/Ds cannot maintain their stakeholder rent position after a sell-off, then the sell-off decison is negatively related to their equity ownership. Under this more reasonable assumption, a negative relationship between the sell-off decision and the equity position for directors and O/Ds is expected. Differences between directors and officers may exist in terms of how their equity positions influence the sell-off decision. Finally, a positive relationship between the sell-off and both takeover threat and the level of institutional ownership is suggested.

1.5. The Hypothesized Relationships

The main testable hypothesis is that ownership structure influences one type of corporate decision, whether or not to sell-off assets. Two groups have been identified which may serve as important components of the ownership structure - insiders and institutions. First, reconsider insider ownership. One type of insider is the director. (Those individuals identified as "officers and directors" are included in the term director for the purpose of stating the hypotheses and for the empirical testing.) Directors often have a substantial stake in the firm. Indeed, this is what may allow them to hold a director position. As large shareholders they may derive substantial prestige from the firm, its size, and its activities. Moreover, as the percentage of their ownership increases, a larger portion of the average director's wealth is

invested in the firm. This will motivate directors to undertake actions which will increase the firm's level of diversification. Their desire for firm diversification will increase with their equity position. Since the return on asset groups can be expected to be imperfectly correlated, a sell-off will tend to reduce the firm's diversification (especially a large sell-off). By this reasoning, firms with a higher concentration of director ownership would have a lower probability of selling-off assets. (Hypothesis #1). Alternatively, the directors' interest in the firm's value will be stronger if they hold a larger ownership position to the extent this aligns their interest with outside shareholders (Jensen and Meckling, 1976). If sell-offs are looked upon negatively by decision makers, those firms with a larger director equity position, more alignment with outside shareholders, will tend to sell-off more assets (Alternative Hypothesis #1).

A second type of insider group is the officers, who tend to have lower equity holdings relative to their stakeholder positions. If they can extract value from the sell-off bid in terms of higher compensation for the good decision then we could expect a positive relationship between the sell-off decision and their equity position. Alternatively, Jensen and Meckling predict that a high level of management ownership may serve to align outside ownership and management. If sell-offs are normally resisted by management, the alignment effect would cause a higher concentration of management ownership resulting in a higher probability of selling-off assets,

ceteris paribus (Hypothesis #2). Alternatively, as the percentage of managers' ownership increases, a larger portion of their wealth is invested in the firm. This combined with their human capital investment in the firm makes them undiversified. By a similar line of reasoning as used with the directors, firms with a higher concentration of management ownership would have a lower probability of selling-off assets (Alternative Hypothesis #2).

Now reconsider the institutional investor. Brickley, Lease, and Smith (1988) identify three important types based upon the institution's likelihood of being influenced by management. One group, called pressure-sensitive institutions, includes insurance companies and banks. A second group, called pressure-resistant institutions, includes public pensions and mutual funds. A third group, called pressure indeterminant institutions, includes corporate pension funds. In their research, Brickley, Lease and Smith find that these three groups have a differential effect on voting in antitakeover proposals. Specifically, the pressure-sensitive group has a significant positive relationship to the percentage of votes made for a proposal, while the pressure-resistant group has a significant negative relationship. It is reasonable to assume that the pressure-resistant group (mutual funds, public pensions) would serve as more effective monitors of management than the pressure-sensitive group (banks, insurance companies). Therefore, I would expect a higher probability of sell-off associated with more ownership by the pressure-resistant group

(Hypothesis #3) I would expect a nonpositive (and possibly insignificant) relationship between the probability of a sell-off and the equity positions for the other two institutional groups (Hypothesis #4).

There are expected to be a number of other firm specific influences on the sell-off decision - performance, debt, and size. A negative relationship between performance and the probability of sell-off (Hypothesis #5) is expected. A poor performing firm may have greater takeover pressures; one way to remove that pressure is to sell-off particular assets (Dann and DeAngelo 1988). A positive relationship between the level of debt and the probability of an asset sell-off (Hypothesis #6) is expected. One motivation for selling-off asets may be to lesson the burden of debt. Size is also expected to be an important variable in explaining sell-offs. I expect larger firms to be more likely to sell-off assets. (Hypothesis #7).

1.6. Empirical Methodology and Data Sources

Three basic tasks must be accomplished in order to test the relationship between the sell-off decision and the firm's ownership structure. They are: identify a sample of firms, generate the data on the firms, and choose an appropriate estimation method. There are three types of sampling: random sampling, stratified sampling, and choice-based sampling. The random sampling approach is to choose

firms randomly from a defined population. In a stratified sample, the population is divided into subpopulations based on some explanatory variable, for example firm size; a random sample is then drawn from each subpopulation. However, different groups are sampled at different rates. In a choice-based sample, the subpopulations are determined not by an explanatory variable but by the outcome of interest. For example, the population can be divided based on whether a firm sold-off assets over a given time period. Then a random sample is drawn from each subpopulation.

A number of financial economic studies have explored the differences between groups of firms. An example is the investigation of takeover targets. One problem in this type of study arises because the event of interest, in this case a takeover, will occur in only a small number of firms. If a random sample were chosen, the number of targets in the sample would be very small. Commonly, the response is to choose n1 targets and n2 nontargets where n1 and n2 are chosen to be approximately equal. Palepu (1986) notes that this type of a sampling biases the results. He reviews the choice based sampling approach under these conditions, and the appropriate estimator. He discusses the need for the logistic function to be weighted in a precise way to consider the fact that a relatively small number of nontarget firms are included in the sample.

In the present study, a random sampling approach is used, but the population is restricted such that a sufficient number of events

occur. (Actually, the sample ends up being equal to the population.) I use the years 1986 and 1987 because they represent a period when a substantial number of large sell-offs took place (see Table 1) and a period when it was believed (Lichtenberg, 1991) there existed a commitment to focus the firm's operations. In other words, I expected to find during this time period that the assets being sold would be considered to be "non-core" assets by the selling firm and "core" assets by the buying firm.

The first sampling restriction was for the firm to be large and segmented. Large segmented firms are more likely to sell-off assets to improve their focus. The Compustat Business Information tapes were used to identify companies who have at least three different operating segments. Two of these segments were required to have assets greater than $100 million dollars. This restriction was imposed since the list of sell-offs was taken from a list of transactions, in Grimm's Mergerstat Review, valued at $100 million dollars or more. The firms in the sample were also required to have complete financial information on the Compustat tapes and to have complete ownership information in the Spectrum publications. This resulted in a sample of 177 firms. The elimination of firms on the S&P financial index, because these firms are more heavily regulated, resulted in a sample of 152 firms.

Next, the dependent and independent variables were collected. The sell-off decision was identified for each firm by year. This was done by matching the sample of firms with a list of large sell-

offs from the "$100 million dollar club" in the Mergerstat Review. These transactions do not include spinoffs. Where a firm engaged in a sell-off, the percentage of the firm sold was calculated. Explanatory variables were collected from year end 1985 and year end 1986 data. Four different types of explanatory variables were collected: performance, debt, size, and ownership structure. Firm performance was measured by the net profit margin. Other measures were also tried - P/E, ROA, ROE. The measure of firm debt is the ratio of the book value of long term debt to the book value of total assets. Firm size was proxied by total assets. The variables on performance, debt, and size were generated from the Compustat Annual Data Tapes. Of particular interest in this study will be the ownership structure variables. The inside ownership variables were taken from Spectrum 6; the institutional ownership variables were taken from Spectrum 3. Both Spectrum publications are produced by Computer Directions Advisors, Inc. Based upon these publications, director ownership is defined as those individuals who are directors or officers and directors. Officer ownership is defined as those individuals who are officers or officers and directors.

Three different statistical models have been considered: Tobit, Logit, and Multinomial Logit. The Tobit regression model is a censored regression model. Originally Tobin (1958) worked with the normal distribution to develop the model; however, other distributions can also be used. The goal is to explain a dependent variable which is assumed to be continuous over a range of values

but this variable is also censored at some value, usually zero. In terms of this research, the percentage of a firm sold off, which is obviously censored at zero, would be the dependent variable. The tobit results, however, were never as strong as the logit model. The reason is that the percentage of a firm sold off is not truly continuous. It depends on how the firm is segmented. One firm may have three segments each of which could be sold-off while another has eight segments. The result is that the RHS explanatory variables may do a good job of explaining the decision to sell-off, but poorly explain the percentage sold-off.

A second empircal modeling approach is to make use of the logistic regression. In this maximum likelihood technique the dependent variable is binary, taking on the value of 1 if a firm sold-off assets and 0 otherwise. The results from this approach will be presented at the end of the paper. A third option for statistically modeling the sell-off decision is the multinomial logit. This approach allows for the dependent variable to be discrete and to have multiple values (greater than two). These discrete choice models offer techniques to address other related questions on corporate sell-offs. For example, an empirical model could be developed to explain the difference between firms which sold-off assets over both years (more of a program to sell-off assets) verses those firms which sold-off assets in only one year. The difference between substantial sell-offs, where the percentage sold-off is large, and smaller sell-offs could also be studied.

Finally, the importance of the buyer in the transaction (a third party rather than management) could be explored.

The logistic regressions take the following form:

$$\text{Prob(Sell-off}_t\text{)}=F(\text{Perform}_{t-1},\text{debt}_{t-1},\text{size}_{t-1},\text{inst}_{t-1},\text{officer}_{t-1},\text{director}_{t-1})$$

1.7. Empirical Results

Because I have two years of information on each firm, it was possible to generate the results in one of two ways:

1. The two years of information on the 152 firms can be treated as a panel data set. Using this approach, the number of observations is doubled to 304. Also, the number of sell-offs occurring is larger. Two considerations have to be made. One is the difference in the envirnoment between 1986 and 1987. This is modeled with a dummy variable to consider indivdual year effects. A second problem is that the sell-off decision in 1987 is influenced by the sell-off decision in 1986. It would be expected that this would be a positive relationship. I model this by defining a dummy variable which is one if the firm sold-off during the previous year and zero if no prior year sell-off occurred.

2. An alternative approach is the use of a two year window: With this method, a firm was classified as a sell-off firm if assets were sold in either 1986 or 1987. The number of observations in this approach was 152, but the percentage of sell-offs was higher.

One problem is that those firms who sold off in both years are effectively treated the same as those which sold off in only one of the years. A solution to this problem would be the use of the multinomial logit model. A second problem is the measurement of the explanatory variables. Which yearly data should be used? If the firm did not sell-off any assets or if sold off assets in both years an average of the two years was used. If the firm sold off assets in only one of the years, then the explanatory variables are the year end data from the year prior to the sell-off.

A final issue is the precise definition of the sell-off. Commonly, research studies restrict the definition of a sell-off to be assets sold which are greater than some percentage of the firm (i.e., 5% or 10%). Because, I am dealing with large absolute numbers ($100 million), it is possibly less important to identify percentages. Nevertheless, I generated my logistic models using two different definitions of a sell-off: 1. if more than 0% of the firm is sold-off; 2. if more than 4% of the firm is sold-off.

I make use of the following abbreviations:

NPM = Net Profit Margin

TA = Total Assets

DA = Long Term Debt/Total Assets

PCTINST = Percentage of institutional ownership

OFF = Officers ownership

DRT = Directors ownership (including "officers and directors")

Prv = 1 if the firm sold-off assets in the previous year, otherwise 0

Q= 1 if a sell-off occurred, otherwise 0

It is first interesting to look at some summary statistics on the data. These statistics assume a sell-off definition of greater than 0%. Table 1.4 reports sample means and standard deviations.

Table 1.4. Summary Statistics

Panel Data:

Variable	N	Mean	Std Dev
NPM	304	0.040	0.055
TA	304	5904.57	8139.520
DA	304	0.203	0.121
OFF	304	1.603	4.909
DRT	304	4.569	9,250
PCTINST	304	51.079	12.555
PCTSOLD	304	1.818	6.875
Q	304	0.151 (46 sell-offs)	n/a

Two Year Window Sample

Variable	N	Mean	Std Dev
NPM	152	0.039	0.050
TA	152	5931.98	8170.07
DA	152	0.205	0.115
OFF	152	1.625	4.619
DRT	152	4.387	8.671
PCTINST	152	50.829	12.129
PCTSOLD	152	3.174	9.151
Q	152	0.25 (38 sell-offs)	n/a

The statistics are fairly uniform across the two subsamples. The performance measure, net profit margin, is 4%. The size measure, total assets, is in $1 million dollar units. This suggests the average firm is about $5 billion. The amount of long term debt, as measure by the the ratio of long term debt to total assets is 20.3%. The officer ownership is approximately 1.6% across the samples while the director ownership is 4.6% and 4.4% in the two samples. This comparison suggests that officers and directors have quite different ownership positions. The magnitude of the ownership percentages could be driven by, for example, many insiders owning a few shares or a few insiders owning a large amount (concentrated). My results show that for the directors the average number of shares held per person is higher than the average number held by officers. This may suggest that the average director is substantially tied to the firm in the sense that a larger portion of his/her total wealth is sunk into the firm. Institutions own roughly 50-51% of the sample firms. PCTSOLD represents the mean percentage of assets sold off. In the "pooled" sample it was 1.8% and the "two year window" sample it was 3.2%. The abreviation Q represents the sell-off decision. The mean term of .151 in the "pooled" sample means 15.1% of the sample firms on average sold-off assets in each year. In other words 46 sell-offs occurred over the two years. In the two year window sample, the mean value of Q is .25. Thus 25% of the firms sold off assets during 1986 or 1987.

It is next useful to look at some comparisons of the sell-off groups relative to the nonsell-off group over the performance, size, debt, and ownership variables. This is presented in Table 1.5. The t statistics test the equality of the group means. (Note: Q=0 means no sell-off, Q=1 means sell-off.)

Table 1.5. Summary statistics by sell-off grouping

Panel Data

Variable	Q	N	Mean	T^a/T^b
NPM	0	258	0.042	1.15/1.19
	1	46	0.032	
TA	0	258	5625.22	1.36/1.42
	1	46	7471.35	
DA	0	258	0.195	2.50/2.75
	1	46	0.248	
OFF	0	258	1.670	0.61/0.56
	1	46	1.228	
DRT	0	258	5.033	4.29/2.08
	1	46	1.968	
PCTINST	0	258	50.934	0.55/0.48
	1	46	51.891	

Two Year Window

Variable	Q	N	Mean	T^a/T^b
NPM	0	114	0.042	1.11/1.29
	1	38	0.030	
TA	0	114	5541.06	1.02/1.02
	1	38	7104.74	
DA	0	114	0.193	2.23/2.30
	1	38	0.242	
OFF	0	114	1.716	0.40/0.42
	1	38	1.355	
DRT	0	114	5.225	3.40/2.09
	1	38	1.873	
PCTINST	0	114	50.325	0.96/0.89
	1	38	52.342	

Notes:

a. This T statistic tests the equality of the means assuming equal population variances.

b. This T statistic tests the equality of the means assuming unequal population variances. It is the Cochran and Cox approximation.

In table 1.5, means are reported for sell-off and nonsell-off groups. For example the average NPM for the sell-off group in the panel data is 3.0% while the non-sell-off group has an average NPM of 4.2%. As expected the performance is stronger for the non sell-off group. The t statistic, however, suggests that they are not significantly different. In terms of the total assets, the sell-off groups tend to be smaller. The difference is not significant. The debt position for the sell-off firms is higher than the nonsell-off firms (24.2% verses 19.3%). This is significantly different based on the t statistic. The results on the NPM, TA, and DA are similar for the two year window.

In both samples managerial ownership and director ownership is lower for the sell-off group. This is more pronounced for the director ownership. Both variables, however, represent rather noisy data. The t statistic on the officer variable is not significant. However, the group means are significantly different for the director variable in both samples. The results imply that the sell-off firms tend to have a significantly lower level of director ownership. This is statistical evidence that director ownership is important in the sell-off decision.

One problem with analyzing the relationships using the above simple approaches is that it ignores the interactions between variables. Thus, the results from the logistic regressions are next reviewed. I first present the results generated from the panel data. Table 1.6 presents the findings using the greater than 0% definition of a sell-off. Table 1.7 presents the findings using a greater than 4% definition of a sell-off. p values are reported below each estimate and a Chi square statistic measuring the overall fit is presented at the end of each table.

Table 1.6. Logit results with sell-offs defined as asset sales > 0%

Panel Data

MODEL:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Effect					
INTRCPT	-2.489	-2.383	-2.219	-2.129	-2.277
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.01)**
NPM	--	-1.861	--	-1.677	-3.286
		(0.51)		(0.56)	(0.27)
TA	0.00002	0.00002	0.00001	0.00001	0.00001
	(0.31)	(0.31)	(0.53)	(0.51)	(0.50)
DA	2.961	2.780	3.004	2.731	2.295
	(0.02)**	(0.04)**	(0.02)**	(0.04)**	(0.09)*
OFF	--	--	--	0.070	0.080
				(0.25)	(0.19)
DRT	--	--	-0.079	-0.107	-0.115
			(0.07)*	(0.05)**	(0.04)**
PCTINST	--	--	--	--	0.004
					(0.77)
Prv	1.183	1.194	1.225	1.240	1.260
	(0.03)**	(0.03)**	(0.02)**	(0.02)**	(0.02)**
D86	0.242	0.239	0.248	0.221	0.177
	(0.500)	(0.506)	(0.493)	(0.542)	(0.631)
-2*Log L	245.338	244.912	238.949	237.38	231.671
Chi-sq	13.052	13.478	19.442	21.010	26.72
	(0.01)**	(0.02)**	(0.00)**	(0.00)**	(0.00)**

Note: 1. The Chi-sq statistic tests the overall significance of the model.

2. ** denotes significance at the .05 level.

3. * denotes significance at the .10 level.

Table 1.7. Logit results with sell-offs defined for asset sales > 4%

Panel Data

MODEL:	(1)	(2)	(3)	(4)	(5)
Effect					
INTRCPT	-2.639	-2.463	-2.233	-2.090	-2.379
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.02)**
NPM	--	-3.152	--	-2.972	-3.000
		(0.29)		(0.33)	(0.32)
TA	-0.000131	-0.00013	-0.000153	-0.000152	-0.000153
	(0.04)**	(0.04)**	(0.02)**	(0.03)**	(0.03)**
DA	3.571	3.226	3.657	3.108	3.215
	(0.02)**	(0.04)**	(0.02)**	(0.05)*	(0.05)**
OFF	--	--	--	0.122	0.124
				(0.09)*	(0.09)*
DRT	--	--	-0.117	-0.174	-0.172
			(0.08)*	(0.03)**	(0.03)**
PCTINST	--	--	--	--	0.005
					(0.75)
Prv	0.930	0.943	0.976	1.018	1.002
	(0.14)	(0.13)	(0.13)	(0.12)	(0.13)
D86	0.347	0.358	0.348	0.434	0.428
	(0.40)	(0.39)	(0.41)	(0.31)	(0.32)
-2*Log L	188.807	187.725	181.279	177.522	177.417
Chi-sq	15.782	16.865	23.310	27.068	27.173
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**

Note: 1. The Chi-sq statistic tests the significance of the overall model.
2. ** denotes significance at the .05 level.
3. * denotes significance at the .10 level.

The results are generally favorable using the pooled sample. The most elaborate model in table 1.6 is number 5. In that model,

the signs on the estimates are as expected. The NPM is negative, TA is positive, and DA is positive. The estimates on the ownership variables reveal the importance of dissecting the director and officer ownership variable. While the coefficient estimate on officer ownership is positive, the estimate on the director variable is negative. The variables with significance include the level of debt, DA, and the director ownership, DRT. The negative coefficient on DRT suggests that holding other things constant a higher level of director ownership results in a lower probability of a sell-off. This is consistent with the arguments that directors receive prestige from the firm, they personally value firm diversification, or they may entrench themselves with equity ownership. The significance exists over a number of more simple models. Surprisingly, the performance measure, NPM, is not significant. In table 1.7, the asset sales are required to be at least 4% of the firm in order to be so identified. These results are similar for the debt and director ownership variable. The estimate for the asset variable is negative and signficant. This is reasonable since smaller firms will tend to divest larger amounts and thus meet the 4% requirement. Additionally, the officer ownership coefficient is positive and significant. This suggests that, holding other things constant, a higher level of officer ownership results in a higher probability of sell-off. This is consistent with reduced agency costs. In each of the models, the coefficient on the institutional variable is positive, as expected, but the estimate is not significant. In all of the models

reported, the overall significance of the model is good as measured by the Chi square statistic. (This is actually the likelihood ratio.) Next, the results from the two year window are presented.

Table 1.8.Logit results with sell-offs defined as asset sales > 0%

Two year window

MODEL:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Effect					
INTRCPT	-1.996	-1.830	-1.660	-1.557	-2.384
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.03)**
NPM	--	-2.686	--	-1.553	-1.818
		(0.48)		(0.69)	(0.64)
TA	0.00002	0.00002	0.00001	0.00001	0.00002
	(0.37)	(0.38)	(0.60)	(0.57)	(0.49)
DA	3.590	3.303	3.620	3.300	3.411
	(0.03)**	(0.05)*	(0.03)**	(0.06)*	(0.05)*
OFF	--	--	--	0.077	0.084
				(0.28)	(0.24)
DRT	--	--	-0.101	-0.132	-0.129
			(0.09)*	(0.06)*	(0.07)*
PCTINST	--	--	--	--	0.015
					(0.39)
-2*Log L	165.111	164.623	158.922	157.480	156.724
Chi-sq	5.839	6.327	12.028	13.470	14.226
	(0.05)*	(0.09)*	(0.01)**	(0.02)**	(0.03)**

Note: 1. The Chi-sq statistic tests the significance of the overall model.
2. ** denotes significance at the .05 level.
3. * denotes significance at the .10 level.

Table 1.9. Logit results with sell-offs defined as asset sales > 4%

Two year window

MODEL:	(1)	(2)	(3)	(4)	(5)
Effect					
INTRCPT	-1.928	-1.651	-1.410	-1.191	-1.756
	(0.00)**	(0.00)**	(0.01)**	(0.05)**	(0.04)**
NPM	--	-4.518	--	-3.210	-3.339
		(0.28)		(0.46)	(0.44)
TA	-0.000115	-0.000115	-0.000146	-0.000143	-0.000143
	(0.08)*	(0.08)*	(0.04)**	(0.04)**	(0.05)*
DA	4.391	3.869	4.625	4.004	4.105
	(0.02)**	(0.05)**	(0.02)**	(0.05)*	(0.05)*
OFF	--	--	--	0.117	0.123
				(0.18)	(0.17)
DRT	--	--	-0.166	-0.224	-0.221
			(0.07)*	(0.04)**	(0.04)**
PCTINST	--	--	--	--	0.010
					(0.59)
-2*Log L	135.851	134.660	127.918	125.024	124.724
Chi-sq	9.376	10.566	17.308	20.202	20.502
	(0.01)**	(0.01)**	(0.00)**	(0.00)**	(0.00)**

Note: 1. The Chi-sq statistic tests the significance of the overall model.
2. ** denotes significance at the .05 level.
3. * denotes significance at the .10 level.

The two year window sample generates significance in the debt level and the director ownership variables. The signs on the coefficents are as expected and consistent with the panel data approach. The director ownership is significantly negatively related

to the probability of a sell-off. The officer variable is positive but not significant in this sample (actually in table 1.9 it is significant at the .20 level of significance.). The NPM is again surprisingly insignificant although the sign is correct. The overall significance of each model is measured by the Chi square statistic. Based upon this statistic, each model significantly explains the probability of a sell-off.

1.8 Conclusion

This paper has explored the impact of the firm's ownership structure on the decision to sell-off assets. This decision can be motivated by a desire to attain a more focused operating strategy. However, a more focused operating strategy may not be in the best interests of the decision makers. The high level of sell-off activity in the second half of the 1980's provides an environment during which firm's tended to dediversify their operations (Lichtenberg, 1991). Therefore, that period provides a good opportunity to study how the firm's ownership structure might influence these asset restructurings. Two possible objective functions have been studied in this paper. One assumes decisions which maximize the firm's total value. A second assumes decision makers maximize their own welfare. If decision makers have an objective only to maximize the firm's total value then ownership structure should play no part in the sell-off decision. In this case decision makers would be

constantly reviewing bids on their assets and selling those assets if the bid price exceeds the value added to the firm by the expected discounted asset cash flows. However, if decision makers maximize their own welfare, they may only partly be concerned about the firm's value. Another consideration may be their level of personal risk and the firm's level of diversification.

A formal model was presented in the paper which suggests that if decision makers can extract value from the sell-off bid in terms of higher future compensation, then a nonlinear relationship between ownership by decision makers and the choice to sell-off assets obtains. If directors are presumed to have, on average, large equity positions (a result which was empirically found to be true), we would expect a negative relationship between their ownership and the sell-off decision. If officers are expected to have a relatively low equity position (also empirically supported), we would expect a positive relationship between their ownership and the sell-off decision. The empirical results suggest that ownership by directors is important in explaining the sell-off decision. The significant negative relationship between the level of director ownership and the probability of a sell-off possibly suggests that directors partly are influenced in their decision making by their level of personal risk. Moreover, corporate decision making is not simply directed by value maximization. Lastly, the substantially different results between the directors and the officers suggest that they are not a single homogeneous group.

2. The Long Term Impact on the Firm from large Sell-offs

2.1. Introduction

In this chapter, the impact on segmented (or diversified) firms that sold-off large assets during 1986 and 1987 is studied over time and compared with segmented firms that did not sell-off large assets. The questions of interest are: 1. does the performance of the sell-off firms change over time and relative to the nonsell-off sample of firms?; 2. do the sell-off firms change their financial structure over time and relative to the nonsell-off firms? Research on corporate events such as sell-offs tends to focus on the time period around the event. For example, the sell-off decision, theoretically modeled in the first chapter, is found to be a function of differences in performance, debt, and ownership structure. If firms are concerned about increasing value, then firms may restructure their real asset portfolios through sell-offs. A poor performing firm would be more likely to attempt to increase value by selling-off assets. In the empirical models, the estimated coefficent on the performance variable is negative, as expected; however, it is not statistically significant. To the extent the sell-off, asset restructuring, can be used to pay down debt due in the near term the sell-off may be a sensible activity. Moreover, from a valuation point of view a financial restructuring may increase the value of the firm given a certain monitoring value function for debt,

an indirect cost function for debt, and assuming debt capital is less costly. Empirically, the estimated coefficient on the debt measure was found to be positive and significant. This means that more debt in a firm increases the probability of a sell-off. The implications of that research for the present study are: 1. if the sell-offs are motivated by the objective to increase firm value, then the performance measures of the sell-off group are expected to increase and converge toward the nonsell-off group's performance measures; 2. if the sell-offs are motivated by the need to reduce firm debt, then it is expected that the sell-off group's debt measures will decrease and converge toward the nonsell-off groups ratios over time.

This study also builds upon the conclusions established by "event studies". That research concludes that firms which sell-off assets experience abnormal returns, an increase in value, relative to nonsell-off firms. This means that the stock market is rewarding the firm because the decision is expected to improve the firm's operational performance or because the proceeds will be used in a value increasing manner such as paying down an excessive amount of debt. The implications of the "event study" research for the present study are: 1. we should expect to see the firm's performance improve and converge toward the nonsell-off firm's performance; 2. the debt ratios of the sell-off firms may fall and converge toward the nonsell-off firms.

The results of this study show that sell-off firms do experience stronger performance results in the years following the sell-off. The sell-off firm's performance is weaker than the nonsell-off firms in the year prior to the sell-off; The sell-off firm's performance improves over time and relative to the nonsell-off group. In the year prior to the sell-off, the debt measures for the sell-off firms are higher than for the nonsell-off firms. Over time the debt measures for the sell-off group falls relative to the nonsell-off group. Overall, the results are supportive of the previous research on sell-offs.

This chapter is organized as follows: in section 2.2, a brief review of previous sell-off research is reported; in section 2.3, the data is described and the financial ratios used in the study are introduced; in section 2.4, the results are presented; concluding remarks are made in section 2.5.

2.2. Review of Related Research

Ravenscraft and Scherer (1987) model the decision to sell-off assets. The authors use a sample of firms which made acquisitions in the 1960's. They follow the firms through time and identify which of the acquisitions were eventually sold off during the 1974 to 1981 period. Using a logistic regression, they empirically model the sell-off decision as a function of both overall firm performance

and the segment performance. They find both performance measures to be significantly negatively related to the sell-off decision.

In the first chapter, the decision to sell-off assets is empirically modeled for a group of diversified or segmented firms during 1986 and 1987. The performance variable, net profit margin, is negatively related to the probability of a sell-off. For one of the empirical models, the estimated coeficient is -3.3 which means an increase in the NPM reduces the probability of a sell-off. The estimate is not significant with a p value of 0.27. The debt variable, debt to asset ratio, is positively related to the probability of a sell-off. Its estimated coeficient is 2.3 which means a decrease in the DA ratio decreases the probability of a sell-off. This estimate is significant at the 10% level with a p value of 0.09.

Using event study methodolgy, Hite, Owers, and Rogers (1987) find selling firms experience mean cumulative daily prediction errors of 4.05% between 4 days before and the event date and they experience mean cumulative daily prediction errors of 1.66% from one day before to the event date. Jain (1985) identifies significant negative returns for sell-off firms prior to the sell-off, which suggests that these firms are performing poorly before the sell-off, and significant positve excess returns between 5 days before and one day before of 0.7%. Lang, Poulsen, and Stulz (1992) confirm the positive excess returns but find the sample of firms differs depending upon whether the proceeds go toward paying down debt. This suggests the valuation impacts are a function of financial

restructuring and not necessarily operational cash flow issues. In their study they look at the net income for the firm just prior to the selloff and find those with positive abnormal returns have a lower net income.

The obvious questions to follow are: How do firms change following a sell-off? Are the firm objectives (i.e., to improve performance and to reduce debt) being met for those organizations which choose to sell-off assets? Are the abnormal returns generated at the time of the sell-off justified?

2.3. Data

The same 152 firms used in chapter 1 are analyzed. Each firm is defined as a sell-off firm or a nonsell-off firm based upon whether it sold assets valued at $100 million or more during either 1986 or 1987. Financial data on each of the firms from 1985 to 1991 was then collected. The following ratios were calculated:

NPM = NI/SALES

ATRN = SALES/TA

EMLT = TA/SE

OPM = OINC/SALES

EPS = (NI/SOUT)/(P)

DDA = DEBTDU/TA

DA = LTDEBT/TA

DIV = DIV/SOUT

The net profit margin (NPM) measures the percentage of sales dollars which become net income. Equityholders have a claim to the firm's net income. The higher the NPM, the better the performance. The asset turnover ratio (ATRN) is an activity measure to guage the demand for the products produced by the assets the firm has chosen. The higher the ATRN ratio the greater the activity. The equity multiplier (EMLT) is a measure of financial leverage. It is also used as a risk measure for how equityholder returns are impacted by the firms leverage choice. The higher the EMLT, the more financial leverage exists in the firm. The operating profit margin (OPM) is a performance measure which tells us the percentage of sales that become operating income. The higher the OPM, the higher is the firm's operational efficiency. Earnings per share is a performance measure directly of interest to the shareholders given shareholders have rights to the bottom line profit. The higher is EPS, the higher is the return for shareholders. The debt due (DDA) is the percentage of assets which are financed with debt that is due in the next year. The debt asset ratio (DA) is the percenatge of assets financed with long term debt. The higher the DA ratio, the more the firm employs long term debt as a financing alternative. The dividend yield (DIV) is the dollar return to shareholders per share per year from dividend payments.

For each ratio, the group mean was calculated, for the sell-off group and the nonsell-off group, as follows:

$$\text{Group Average} = \frac{\sum_{i=1}^{n} \{\text{FinRatio}_i\}}{n}$$

where n is the group size, 114 nonsell-off firms and 38 sell-off firms.

2.4. Results

The results are presented in two ways. First, for each year the sell-off and nonsell-off groups are compared. This is done in table 2.1 through table 2.7. Next, the sell-off firms are analyzed over time. In table 2.8, the sell-off firm ratios are reported as raw figures. In table 2.9, the difference between the nonsell-off and the sell-off group ratios are reported.

Table 2.1. 1985 Financial Ratios for Nonsell-off and Sell-off Firms

FINRATIO	NONSELL-OFF	SELL-OFF	Ta/Tb
NPM	0.043	0.030	1.4/1.3
	(0.01)	(0.01)	
ATRN	1.273	1.134	1.7/1.3
	(0.06)	(0.06)	
EMLT	2.542	2.677	-0.8/-0.7
	(0.11)	(0.13)	
OPM	0.142	0.135	0.6/0.5
	(0.01)	(0.01)	
EPS	1.728	0.915	1.5/1.6
	(0.23)	(0.51)	
DDA	0.011	0.152	-1.3/-1.4
	(0.00)	(0.00)	
DA	0.180	0.220	-2.0/-2.0
	(0.01)	(0.02)	
DIV	1.540	1.804	-1.6/-1.7
	(0.08)	(0.14)	

Notes:

a. This T statistic tests the equality of the means assuming the population variances of the two groups are equal.

b. This T statistic tests the equality of the means assuming the population variances of the two groups are unequal. It is the Cochran and Cox approximation.

c. Standard errors are reported in parentheses below each mean value.

Table 2.2. 1986 Financial Ratios for Nonsell-off and Sell-off Firms

FINRATIO	NON-SELL-OFF	SELL-OFF	Ta/Tb
NPM	0.043	0.033	0.9/0.9
	(0.01)	(0.01)	
ATRN	1.218	1.040	2.2/1.6
	(0.06)	(0.05)	
EMLT	2.592	2.849	-1.0/-1.0
	(0.13)	(0.21)	
OPM	0.150	0.142	0.8/0.7
	(0.01)	(0.01)	
EPS	1.422	1.250	0.4/0.4
	(0.20)	(0.41)	
DDA	0.014	0.024	-1.2/-1.7
	(0.00)	(0.01)	
DA	0.203	0.246	-1.8/-1.9
	(0.01)	(0.02)	
DIV	1.688	1.868	-0.4/-0.3
	(0.36)	(0.23)	

Notes:

a. This T statistic tests the equality of the means assuming the population variances of the two groups are equal.

b. This T statistic tests the equality of the means assuming the population variances of the two groups are unequal. It is the Cochran and Cox approximation.

c. Standard errors are reported in parentheses below each group mean.

In 1985, the year before any sell-off activity, the three performance measures of NPM, OPM, and EPS are all lower for the sell-off group. However, only the EPS achieves marginal statistical significance. The debt measures of EMLT, DDA, and DA are all higher for the sell-off firms as expected. The DA measure achieves

statistical significance. Interestingly, the dividends paid by the sell-off group exceeds the nonsell-off group.

In 1986, after the first year of the sell-off activity, the performance measures are still lower for the sell-off group. The statistical significance for the difference between EPS for the two groups has been removed. The debt measures remain stronger for the sell-off group with the difference in the DA ratio attaining marginal significance.

Table 2.3. 1987 Financial Ratios for Nonsell-off and Sell-off Firms

FINRATIO	NONSELL-OFF	SELL-OFF	Ta/Tb
NPM	0.059	.057	0.1/0.1
	(0.01)	(0.01)	
ATRN	1.213	1.032	2.4/1.8
	(0.06)	(0.05)	
EMLT	2.538	2.789	-1.0/-0.9
	(0.16)	(0.21)	
OPM	0.155	0.145	0.8/0.7
	(0.01)	(0.01)	
EPS	2.275	2.718	-1.0/-1.1
	(0.18)	(0.42)	
DDA	0.011	0.013	-0.8/-0.8
	(0.00)	(0.00)	
DA	0.199	0.237	-1.4/-1.5
	(0.01)	(0.02)	
DIV	1.457	1.560	-0.4/-0.3
	(0.23)	(0.13)	

Notes:

a. This T statistic tests the equality of the means assuming the population variances of the two groups are equal.

b. This T statistic tests the equality of the means assuming the population variances of the two groups are unequal. It is the Cochran and Cox approximation.
c. Standard errors are reported in parentheses below each group mean.

In 1987, the first year after the sell-off activity, the financial results exhibit some clear changes. The performance measure of NPM is almost identical which reveals the sell-off group has effectively caught up to the non-sell off group. The earnings per share figure is actually higher for the sell-off group. The operational efficiency measure of OPM is similar. Again, no statistical difference exists between the two group's EPS measures. The debt due measures have converged while the debt asset ratios still seem to exhibit some differences, although not statistically significant. The dividend payments have also converged.

Table 2.4. 1988 Financial Ratios for Nonsell-off and Sell-off Firms

FINRATIO	NONSELL-OFF	SELL-OFF	Ta/Tb
NPM	0.0613	0.058	0.4/0.3
	(0.01)	(0.01)	
ATRN	1.203	1.050	1.9/1.5
	(0.06)	(0.06)	
EMLT	2.092	3.530	-2.5/-2.1
	(0.39)	(0.41)	
OPM	.1615	.1576	0.3/0.3
	(0.01)	(0.01)	
EPS	2.795	3.385	-0.9/-1.1
	(0.23)	(0.60)	
DDA	0.013	0.014	-0.6/-0.5
	(0.00)	(0.00)	
DA	0.218	0.247	-1.0/-0.9
	(0.02)	(0.02)	
DIV	2.620	2.307	0.3/0.3
	(0.71)	(0.71)	

Notes:

a. This T statistic tests the equality of the means assuming the population variances of the two groups are equal.

b. This T statistic tests the equality of the means assuming the population variances of the two groups are unequal. It is the Cochran and Cox approximation.

c. Standard errors are reported in parentheses below each group mean.

Table 2.5. 1989 Financial Ratios for Nonsell-off and Sell-off Firms

FINRATIO	NON-SELL-OFF	SELL-OFF	Ta/Tb
NPM	0.060	0.054	0.7/0.7
	(0.00)	(0.01)	
ATRN	1.209	1.018	2.2/1.7
	(0.06)	(0.06)	
EMLT	2.077	3.377	-2.3/-1.7
	(0.45)	(0.37)	
OPM	0.159	0.160	-0.1/-0.04
	(0.01)	(0.01)	
EPS	2.735	3.264	-1.0/-1.2
	(0.18)	(0.52)	
DDA	0.014	0.016	-0.4/-0.4
	(0.002)	(0.003)	
DA	0.242	0.241	0.03/0.02
	(0.02)	(0.02)	
DIV	1.721	1.564	0.4/0.2
	(0.39)	(0.16)	

Notes:

a. This T statistic tests the equality of the means assuming the population variances of the two groups are equal.

b. This T statistic tests the equality of the means assuming the population variances of the two groups are unequal. It is the Cochran and Cox approximation.

c. Standard errors are reported in parentheses below each group mean.

Table 2.6. 1990 Financial Ratios for Nonsell-off and Sell-off Firms

FINRATIO	NONSELL-OFF	SELL-OFF	Ta/Tb
NPM	0.051	0.040	1.2/1.2
	(0.004)	(0.01)	
ATRN	1.193	1.034	1.9/1.5
	(0.06)	(0.06)	
EMLT	2.677	3.558	-1.5/-1.3
	(0.37)	(0.45)	
OPM	0.151	0.147	0.3/0.3
	(0.01)	(0.01)	
EPS	2.310	1.894	0.7/0.8
	(0.24)	(0.56)	
DDA	0.0158	0.017	-0.4/-0.3
	(0.002)	(0.003)	
DA	0.232	0.238	-0.3/-0.2
	(0.02)	(0.02)	
DIV	1.210	1.503	-1.9/-2.0
	(0.07)	(0.14)	

Notes:

a. This T statistic tests the equality of the means assuming the population variances of the two groups are equal.

b. This T statistic tests the equality of the means assuming the population variances of the two groups are unequal. It is the Cochran and Cox approximation.

c. Standard errors are reported in parentheses below each group mean.

Table 2.7. 1991 Financial Ratios for Nonsell-off and Sell-off Firms

FINRATIO	NONSELL-OFF	SELL-OFF	Ta/Tb
NPM	0.031	0.026	0.4/0.4
	(0.01)	(0.01)	
ATRN	1.164	1.035	1.5/1.2
	(0.06)	(0.06)	
EMLT	2.721	3.554	-2.2/-2.0
	(0.22)	(0.32)	
OPM	0.139	0.140	-0.1/-0.1
	(0.01)	(0.01)	
EPS	1.413	1.167	1.6/1.9
	(0.29)	(0.75)	
DDA	0.017	0.0187	-0.5/-0.4
	(0.003)	(0.003)	
DA	0.232	0.234	-0.1/-0.1
	(0.02)	(0.02)	
DIV	1.199	1.399	-1.2/-1.3
	(0.07)	(0.14)	

Notes:

a. This T statistic tests the equality of the means assuming the population variances of the two groups are equal.

b. This T statistic tests the equality of the means assuming the population variances of the two groups are unequal. It is the Cochran and Cox approximation.

c. Standard errors are reported in parentheses below each group mean.

In the years following the sell-off activity, performance measures remained quite close between the two groups. It appears the sell-off activity did allow the sell-off group to catch up in some sense to the non-sell-off group firms and to maintain that position. The results thus justify the market's reaction to the news of a sell-

off. Although the debt due measure remained slightly higher for the sell-off group during most of the years, the debt to asset ratio became almost identical. It would appear that debt does play a role in that the sell-off firm can restructure itself financially. Finally, it is interesting to observe that dividends per share became much closer between the groups.

In table 2.8, financial ratios are presented for the sell-off group to highlight the time trends that may exist in the ratios.

Table 2.8. Financial Ratios for Sell-off Firms over time

FINRATIO	85	86	87	88	89	90	91
NPM	0.030	0.033	0.057	0.058	0.055	0.040	0.030
ATRN	1.134	1.040	1.032	1.050	1.018	1.034	1.035
EMLT	2.677	2.849	2.789	3.530	3.377	3.558	3.554
OPM	0.135	0.141	0.145	0.158	0.160	0.147	0.140
EPS	0.915	1.250	2.718	3.385	3.264	1.894	1.672
DDA	0.015	0.024	0.013	0.014	0.016	0.017	0.019
DA	0.220	0.246	0.237	0.247	0.241	0.238	0.234
DIV	1.804	1.868	1.560	2.307	1.564	1.503	1.400

This table clearly shows that the sell-off firm's performance measures of NPM, EPS, and OPM all increased over time. The debt due measure went down considerably after the sell-off period and generally remained at a lower level. The debt to asset ratio remained fairly constant even though, if we recall, the gap between the nonsell-off and sell-off group's debt asset ratios narrowed. It

appears the sell-off firms at least partially used the sell-off to pay down maturing debt and then took a conservative approach by not increasing their overall debt even though the nonsell-off group took on more debt over the time period studied. The dividend fluctuated a bit however it seemed to reach a lower post sell-off value around 1.50 compared to the 1.8 figure just prior to the sell-off. Overall, these results indicate that the sell-off has an impact on the firm in the long term.

In an attempt to control for time tends which impact both sell-off and nonsell-off firms, table 2.9 reports the differences between the nonsell-off and the sell-off firms ratios over time. A positive value means the mean ratio of the nonsell-off group exceeds the mean ratio of the sell-off group. A negative value means the mean ratio of the nonsell-off group exceeds the mean ratio of the sell-off group. For example, the EPS in 1985 for the nonsell-off group is 1.728 and for the sell-off group it is 0.915. The difference is a positive 0.813. The EPS in 1988 for the nonsell-off group is 2.795 and for the sell-off group it is 3.385. The difference is -0.590. In parentheses below each value is the t ratio testing the significance of the difference between the two group means assuming the two groups variances are equal.

Table 2.9. The Difference Between Nonsell-off and Sell-off Firm's Financial Ratios Over Time

FINRATIO

	85	86	87	88	89	90	91
NPM	0.013	0.010	0.001	0.003	0.006	0.011	0.005
	(1.4)	(0.9)	(0.1)	(0.4)	(0.7)	(1.2)	(0.4)
ATRN	0.139	0.178	0.181	0.153	0.191	0.159	0.12964
	(1.7)	(2.3)	(2.4)	(1.9)	(2.2)	(1.9)	(1.4)
EMLT	-0.135	-0.257	-0.250	-1.438	-1.300	-0.880	-0.832
	(-0.8)	(-1.0)	(-1.0)	(-2.5)	(-2.3)	(-1.5)	(-2.2)
OPM	0.006	0.008	0.009	0.0039	-0.001	0.003	-0.001
	(0.6)	(0.8)	(0.8)	(0.3)	(-0.1)	(0.3)	(-0.1)
EPS	0.813	0.172	-0.443	-0.590	-0.529	0.416	0.246
	(1.5)	(0.4)	(-1.0)	(-0.9)	(-1.0)	(0.7)	(1.6)
DDA	-0.004	-0.010	-0.002	-0.002	-0.001	-0.001	-0.002
	(-1.4)	(-1.2)	(-0.8)	(-0.6)	(-0.4)	(-0.4)	(-0.5)
DA	-0.039	-0.043	-0.038	-0.029	0.001	-0.007	-0.003
	(-2.0)	(-1.8)	(-1.4)	(-1.0)	(0.03)	(-0.3)	(-0.1)
DIV	-0.265	-0.180	-0.103	0.314	0.158	-0.293	-0.200
	(-1.6)	(-0.4)	(-0.4)	(0.3)	(0.4)	(-1.9)	(-1.2)

Notes:

1. The numbers in parentheses below each difference is theT statistics testing the significance of the difference between the means. The statistic assumes the population variances of the two groups are equal.

The groups exhibit differences in NPM, EPS, and DA in the initial year before the sell-offs. Over time those differences are removed. In the 2 or 3 years following the sell-off, both NPM and EPS increase for the sell-off group relative to the nonsell-off group, in fact, the EPS ratio is actually greater for the sell-off group following the

sell-off. The impact of the sell-off decision is seen most clearly with the DA ratio. In 1985 just before the sell-off, the sell-off firms have significantly more debt. In the years following the sell-off activity, the ratios converge and the significance of the difference is removed.

2.5. Conclusion

In this study the same 152 firms used in the first chapter are analyzed over time from 1985 to 1991 to identify how they have changed. Each of the firms was categorized as a sell-off or a nonsell-off firm depending upon whether it sold-off assets in 1986 or 1987 valued at $100 million or more.

The implications of previous sell-off research suggest that we should expect the sell-off firms to have an improved level of performance and a lower level of debt in the years following the sell-off activity; the performance and debt measures for the sell-off firms are also expected to converge toward the measures for the nonsell-off group. The results of this study are supportive of previous research completed on sell-offs. Noticable differences in performance and debt exist between the sell-off and the nonsell-off firms in the year prior to the sell-off activity. Following the sell-off activity, the sell-off firms exhibit a higher level of performance and lower debt measures. Moreover, the two group's mean levels of performance and debt do converge as expected. It thus appears that

the sell-off activity does have an impact on the firm in the long term.

3. The Relationship Between Ownership Structure, Firm Focus, and Tobin's Q

3.1. Introduction

What is the source of firm value? The firm is a portfolio of real assets purchased by the issuance of debt and equity. In the finance literature, we focus on which financial instruments are created to purchase the real assets or, in other words, the proportion of the assets financed with debt versus equity. An extension to this financing issue is the impact on the firm from having different types of equity holders. This analysis is based on agency theory and the objective of the firm. Do firms always try to maximize their value? In economics and strategic management, academic research focuses to a greater extent on the assets comprising the firm. The corporate strategy of whether to operate a focused or diversified firm is usually founded upon synergy issues. Are average operating costs reduced (or is value created) when real assets are combined? Therefore, the market value of the firm depends upon corporate asset decisions, financing decisions, and who holds the equity in the firm. These are the issues over which the firm has control. The firm's market value, however, also depends upon growth prospects which investors forecast for the industry in which it operates. In this study, an empirical model of firm value will be constructed using Tobin's Q. Tobin's Q is the

market value of the firm divided by its replacement value. A set of 531 New York Stock Exchange firms is studied in an effort to explain firm value. Is ownership the important factor? Is strategic focus or diversification? Are industry effects important? Are all three important?

Two separate literatures have developed to explain firm value: ownership and firm focus. The ownership literature hypothesizes that an alignment effect may explain a positive relationship between inside ownership and Q. The alignment effect means that the managers of the firm will be increasingly interested in maximizing firm value as their ownership in the firm increases. An entrenchment effect is hypothesized to explain a negative relationship between inside ownership and Q. The entrenchment effect means that as inside ownership increases, the firm's exposure to the takeover threat is reduced and, to the extent this threat encourages the firm's management to maximize value, the lower the threat the lower the value of the firm. The firm focus literature attributes value creation to synergies. These synergies could be created through shared costs. Excessive diversification, thought to be motivated by managerial interests, retard market values. Empirically, research completed on the importance of ownership structure for firm valuation identifies the presence of both an alignment effect and an entrenchment effect. In the firm focus literature, the results show that more focused firm's tend to create or are rewarded with higher market values.

The objectives in this study are: 1. to verify the existence of a relationship between Q and ownership structure and a relationship between Q and a diversification index using recent 1992 data; 2. to determine if these relationships are obtained using the same sample of firms at the same point in time (In other words, are the previous results sample dependent?); 3. to see if both ownership and diversification variables enter significantly into the same empirical model of Q. If so, the ownership and diversification studies previously completed are misspecified.

The results of the empirical tests yield the following conclusions: First, the relationship betweeen Q and ownership is found to be significant. However, only the alignment effect is observed; the entrenchment effect is not observed. The relationship between Q and the firm's focus is significant and negative, meaning more focused firms are rewarded with higher market values. Second, since both results above are established using the same sample of firms, we can say that the relationships identified in the previous research are not sample dependent. Third, when the ownership variables and the diversification index are included in the same model they each enter significantly in a statistical sense.

This paper is organized as follows: in section 3.2, previous research is discussed on ownership and firm focus; in section 3.3, the objectives of this study are outlined; in section 3.4, the data are introduced; in section 3.5, the results are presented; concluding remarks are made in section 3.6.

3.2. Review of Previous Research

First, the ownership literature will be reviewed and then the firm focus literature.

The Ownership Literature. The empirical finance literature hypothesizes a relationship between ownership structure and firm value. Much of this work was motivated by the theoretical paper of Jensen and Meckling (1976) in which agency costs explain how ownership structure influences firm value. Morck, Shleifer, and Vishny (1988) empirically investigate the relationship between Tobin's Q and the ownership by the board of directors. They find a significant positive relationship between Tobin's Q and ownership by the board for ownership percentages between 0 and 5%. They find a significant negative relationship between Tobin's Q and board ownership for ownership percentages between 5 and 25%. Their relationship between Tobin's Q and board ownership is not stable for ownership percentages greater than 25%. The results are consistent when board ownership is dissected into officers and outside board members. Their results are always stronger when they include other explanatory variables: research and development, advertising, long term debt, a size variable, and controls for industry effects. The piece-wise linear relationship estimated is said to support both a convergence of interest hypothesis where increasing ownership aligns management with outside shareholders and the entrenchment

hypothesis where ownership by the board removes or reduces the threat of a takeover and therefore allows management a greater opportunity to shirk and make nonvalue maximizing decisions. Board ownership is taken from the CDE 1980 publication of 456 Fortune 500 firms. Due to data collection problems their final sample of firms is 371 for modeling Tobin's Q. The R^2 is 1.0196% when only ownership is included. The R^2 is 59.5% when ownership, industry, and other controls are added.

A closely related empirical study completed by McConnell and Servaes (1992) uses a sample of 1173 and 1093 firms from the years 1976 and 1986, respectively, to explain Tobin's Q as a function of insider ownership and institutional ownership. Their results are generally consistent with Mork Shliefer, and Vishny's conclusions. McConnell and Servaes find a significant nonlinear relationship between Tobin's Q and the level of insider ownership. They also find a significant positive relationship between the level of institutional ownership and Tobin's Q. They do not find a significant relationship between the level or existence of a blockholder and Tobin's Q. In the regressions where debt, research and development, advertising, and size are controlled the explanatory power of the regressions as measured by R^2 is improved. The authors control for industry effects by adjusting the Tobin's Q variable. Their R^2 is 2.7% and 6.0% for 1976 and 1986 when only insider ownership is included. Their R^2 is 18.3% and 15.3% for 1976 and 1986, respectively, when ownship and other controls are added. When they model the industry

adjusted Q's, the R^2's are 11% and 4.2% for the two samples. In this case only for the 1986 sample do the authors find a significant nonlinear relationship. For the 1976 sample, the p value on the ownership variables is significant but the nonlinear term of ownership squared is not significant.

Holderness and Sheehan (1988) explore the relationship between Tobin's Q and whether a firm is majority held or diffusely held. Using a sample of 114 firms with majority holders and a match pairing of firms which are diffusely held they find no significant difference in the mean level of Tobin's Q. Interestingly they partition the majority holders into individuals and corporations. They find that "firms with corporate majority shareholders have accounting returns and Q ratios that are neither systematically higher nor lower than their comparison firms'. In contrast, firms with individual majority shareholders have mean and median values for both measures that are systematically lower than the values for their comparison firms."[14] Holderness and Sheehan note, however, that these differences lack statistical significance. Nevertheless theirs represents an interesting hypothesis to explore in a more detailed study.

Smith (1990) examines the operating performance of firms after a management buyout. "Operating returns increase significantly from the year before to the year after buyouts as measured by operating cash flows (before interest and taxes) per employee and per dollar of operating assets."[15] This suggests that,

looking across time, increasing the concentration of ownership positively effects performance and value.

The Firm Focus Literature. An alternative explanation for firm value has evolved out of the disciplines of economics and strategic management in which returns and values are explained by industry effects and the level of focus in the firm. Rumelt (1982) categorizes firms four ways: (1) single businesses, where 95% of the sales are from a single business; (2) dominant businesses, where firms have between 70% and 95% of sales in a single business or a vertically integrated chain of businesses; (3) related businesses, where firms have less than 70% of sales in one business and are diversified into related businesses; (4) unrelated businesses, where firms have less than 70% of sales in one business but are diversified into areas not related to each other. His findings are that firms remaining in a single or related business perform better in terms of both ROI and ROE than firms diversifying into unrelated businesses. The sample in his study was 100 firms randomly selected from the largest 500 industrial corporations in the years 1949, 1959, 1969, and 50 of the largest in 1974.

Michael and Shaked (1984) use finance-based performance measures. They use the Sharpe, Treynor, and Jensen measures of performance. They calculate a ratio called the related ratio for a sample of 51 firms over the five year period 1976 to 1980. The results reveal that unrelated diversification generates superior

risk-return profiles compared to related diversification. These results, which conflict with Rumelt's work, motivated additional study.

De (1992) uses the related ratio and the Sharpe, Treynor, and Jensen measures of performance and finds a positive but insignificant relationship between related diversification and these performance measures. The sample consisted of 123 Fortune 250 firms.

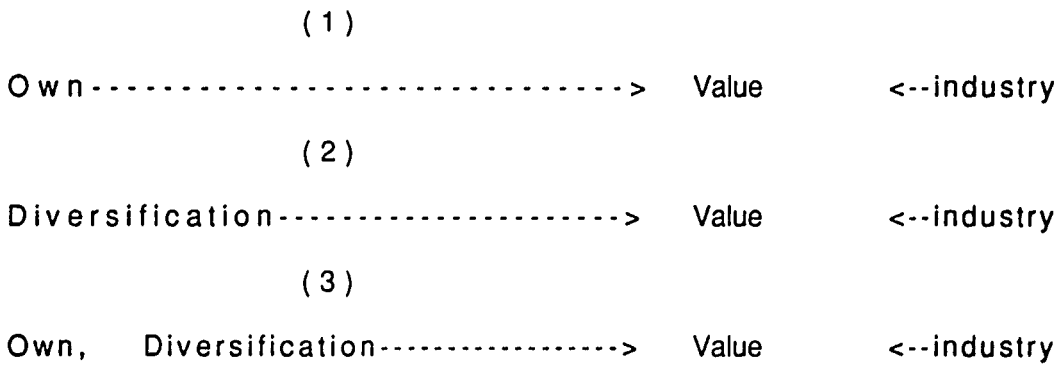
Other work on performance and valuation is motivated by Schmalensee (1985) who uses line of business data to study source of segment returns. He finds no support for the existence of firm effects nor share effects. However, he does find evidence for industry effects. He postulates that firm effects may exist in the form of focus effects (or contrarily diversification effects). Schmalensee uses accounting rates of return as a business unit or segment performance measure.

Wernerfelt and Montgomery (1988) use Tobin's Q as a measure of overall firm value. They try to explain Tobin's Q as a function of industry effects, share effects, and focus effects. The focus effects come in the form of a diversification index. With controls for marketing and R&D the R^2 for the model including all effects is 46.66%. In a variance decomposition 19.48% of the variation in Q is captured by industry effects, 2.61% is captured by focus effects, and .94% is captured by share effects. Interestingly, the results show that firm effects exist in the form of positive focus effects. He

states "the fact that we find a positive focus effect contradicts the classical view of diversification as a vehicle for collusion."[16]

3.3. Research Objectives

The two separate literatures have explained firm value, as measured by Tobin's Q, with different explanatory variables. Grouped together, the answer to the question of firm value appears to be both industry effects and firm effects. Firm effects may be in the form of diversification effects and also in the form of ownership effects. How can we separate out these influences? Are the models without a diversification index misspecified? Are the models without ownership structure misspecified? What is being postulated can be viewed with a diagram as follows:



An unbiased approach to resolving the differences is to use the same sample of firms at the same point in time to analyze the two lines of research. Therefore, first, as represented by (1), the relationships previously studied by Morck, Schliefer, and Vishney

and McConnell and Servaes, in which ownership structure is thought to influence firm value, are reexamined; second, as represented in relationship (2), the relationships studied in Wernfelt and Montgomery, in which firm focus is argued to influence firm value, are retested; third, as represented in relationship (3), both ownership and firm focus are both included in an empirical model of firm value.

3.4. Data

A sample representing all possible firm's on the 1992 Compustat tapes for which Tobin's Q can be calculated is first generated. This is the same approach taken by McConnell and Servaes. It is then required that the firms have inside ownership data available. The source for the inside ownership variable is Compact Disclosure's Spectrum data. It is further required that they have complete financial information on both the Business Information Compustat and the Compustat data tapes. A variable to measure firm diversification is computed using data from the Business Information Compustat tape. After these filters, the final sample of firms numbers 531, all are traded on the New York Stock Exchange. The measure of firm focus or diversification is identical to that used by Wernerfelt and Montgomery. It is the concentric index of Caves, Porter, and Spence (1980), and it is defined as follows:

$$\text{Divindex}_i = \Sigma_j w_{i,j} \Sigma_l w_{i,l} d_{j,l}$$

Note, i represents the firm, j and l represent industries within the firm, $w_{i,j}$ represents the fraction of firm i's assets that are in industry j, and $d_{j,l}$ is a weight whose value depends on the relations between j and l in the standard industrial classification (SIC) system. d=0, if j and l have the same 3-digit SIC code; d=1, if j and l have a different 3-digit code but identical 2-digit codes; d=2, if j and l have different 2-digit codes. the index captures the relatedness between industries in a firm. It will equal 0 for a perfectly focused firm. It will equal .5 if the firm has 50% of its assets in one industry and 50% of its assets in a second industry with different 3-digit SIC codes but identical 2-digit SIC codes. It will equal 1, if the firm has 50% of its assets in one industry and 50% of its assets in a second industry which have unique 2-digit SIC codes. Therefore, the more divisions and the more those divisions differ, the larger the index.

The calculation of Q is based on an outline provided by the McConnell and Servaes working paper for calculating Q using Compustat data. This is followed with the exception that for the calculation of the market value of debt the formulas presented in Lindberg and Ross (1981) are used.

Other financial data on the book value of long term debt and the book value of total assets are taken from the compustat tapes.

DA is equal to the ratio of the book value of long term debt to the book value of total assets. TA is the book value of total assets.

3.5. Results

First, sample statistics are calculated. Following the presentation of Morck, Shlieffer and Vishney (1988), the relationship between Q and inside ownership is presented in table 3.1. The results are similar to theirs at the lower ownership values. There is an initial jump in Q as inside ownership moves from zero up through 5%. The value of Q then falls rather steadily through 20% ownership. Thereafter, the sample data are quite noisy.

Table 3.1. Tobin's Q over Ownership Groups

Ownership %	Obs	MNQ	25th%	75th%
0	46	1.332	0.926	1.411
0 - 5	191	1.518	0.921	1.791
5 - 10	57	1.503	0.992	1.727
10 - 15	47	1.472	0.959	1.587
15 - 20	36	1.290	0.917	1.291
20 - 25	28	1.480	1.010	1.917
25 - 30	20	1.360	0.906	1.547
30 - 35	15	1.707	0.880	3.131
35 - 40	12	1.430	0.980	1.578
40 - 45	14	1.992	1.226	2.964
45 - 50	18	1.853	0.932	2.163
50 - 55	9	1.480	0.939	1.734
55 - 60	8	1.914	1.334	2.532

60 - 65	3	2.340	1.493	3.562
65 - 70	5	2.064	1.645	2.669
70 - 75	8	1.252	0.988	1.445
75 - 80	3	0.961	0.808	1.118
80 - 85	7	1.662	1.230	2.256
85 - 90	2	1.048	0.801	1.295
90 - 95	3	1.242	0.928	1.611

In table 3.2, the relationship between Q and the level of firm diversification can be observed. Except for the range of .6 to .7 for the diversification index, a rather clear inverse relationship between Q and the level of firm diversification can be seen.

Table 3.2. Tobin's Q over Diversification Index Groups

Divindex	obs	MNQ	25th%	75th%
0	277	1.654	0.992	2.145
0.1 - 0.2	2	0.868	0.660	1.077
0.2 - 0.3	10	1.448	0.894	1.841
0.3 - 0.4	7	1.220	0.796	1.448
0.4 - 0.5	14	1.503	1.046	1.744
0.5 - 0.6	21	1.577	0.928	2.090
0.6 - 0.7	18	1.811	1.038	2.151
0.7 - 0.8	15	1.210	0.894	1.450
0.8 - 0.9	19	1.353	0.927	1.676
0.9 - 1.0	24	1.297	0.844	1.793
1.0 - 1.1	42	1.260	0.956	1.407
1.1 - 1.2	20	1.295	0.950	1.625
1.2 - 1.3	23	1.307	0.962	1.396
1.3 - 1.4	18	1.125	0.848	1.352
1.4 - 1.5	11	1.477	0.938	1.269
1.5 - 1.6	11	1.062	0.921	1.212

Table 3.3 presents the mean value of Q over the industries represented in the data. The industries are defined by two digit SIC codes. The variability in Q across industries is evident which highlights the importance of controlling for industry effects. The range of mean Q over the different industries is from 0.85387 to 3.39234

Table 3.3. Tobin's Q across Industries

Industry	Obs	MNQ
Agricultural Prod. - Crops	2	1.051
Metal Mining	13	1.568
Coal Mining	2	0.888
Oil & Gas Extraction	11	1.446
Mng. Quarry Nonmtl Minerals	2	0.719
Heavy Construction - Not Bldg Constr	1	0.958
Food & Kindred Products	22	2.191
Tobacco Products	2	1.921
Textile Mill Products	14	1.318
Apparel & Other Finished Pds	10	1.809
Furniture & Fixtures	3	1.740
Paper & Allied Products	15	0.994
Printing, Publishing & Allied	24	2.089
Chemicals & Allied Products	48	2.051
Pete Refining & Related Inds	18	1.083
Rubber & Misc Plastics Prods	9	1.874
Leather and Leather Products	4	1.625
Stone, Clay, Glass, Concrete Pd	9	0.943
Primary Metal Industries	28	1.010
Fabr Metal, Ex Machy, Trans Eq	23	1.340
Indl, Comml, Machy, Computer Eq	50	1.193

Electr, Oth Elec Eq, Ex Comp	27	1.242
Transportation Equipment	28	1.583
Meas Instr - Photo Gds - Watches	22	1.463
Misc Manufacturing Industries	7	1.946
Railroad Transportation	7	0.960
Transit & Passenger Trans	1	3.392
Motor Freight Trans, Warehouse	1	0.854
Water Transportation	1	2.127
Transportation by Air	7	0.956
Communications	7	1.264
Electric, Gas, Sanitary Serv	16	1.072
Durable Goods - Wholesale	17	1.366
Nondurable Goods - Wholesale	16	1.476
Bldg Matl - Hardware - Garden - Retl	2	1.262
General Merchandise Stores	16	1.671
Food Stores	6	1.834
Auto Dealers, Gas Stations	2	1.335
Apparel & Accessory Stores	12	1.850
Home Furniture & Equipment Store	5	1.837
Eating & Drinking Places	8	1.679
Miscellaneous Retail	14	1.975

In table 3.4, the mean value of Q over different firm sizes is calculated. No obvious relationship is observed.

Table 3.4. Tobin's Q over Assets Groups

Assets	Obs	MNQ
< 100	57	1.621
100-500	186	1.512
500-1000	68	1.541
1000-1500	47	1.480
1500-2000	34	1.646

2000-2500	18	1.378
2500-3000	11	1.408
3000-3500	17	1.289
3500-4000	5	1.224
4000-4500	11	1.936
4500-5000	8	1.076
5000-5500	8	1.388
5500-6000	3	1.165
6000-6500	6	1.216
6500-7000	6	1.592
7000-7500	1	2.254
7500-8000	3	1.027
8500-9000	4	1.457
9000-9500	2	1.032
10000-10500	6	1.013
10500-11000	5	1.814
11000-11500	4	2.931
11500-12000	1	3.113
13000-13500	1	0.882
13500-14000	1	0.954
> 15000	19	1.213

In modeling Q, a piecewise linear regression technique is employed. There are two versions of this which yield slightly different results, but both offer insight and therefore both are presented - in part A and part B respectively.

(Part A)

Define a dummy variable and an ownership variable as follows:

Own = the percentage of inside ownership.

d1 = 1 if ownership is greater than 5%

0 if ownership is less than 5%.

Then, equation (1) is estimated:

(1) $Q = bo + b1 * Own + b2 (Own - 5) * d1 + other\ variables$

If Own < 5%, equation (1) becomes:

$Q = bo + b1 * Own + other\ variables$

If 5% <= Own < 100%, equation (1) becomes:

$Q = bo + b1 * Own + b2 (Own -5) = bo - 5 * b2 + (b1 + b2) * Own + other\ variables$

b1 represents the first linear portion and b1 + b2 represents the slope of the second linear portion. Effectively, if b2 is significant, it says the slope changes at 5%. The actual value of the slope is found by adding the coefficients.

The regression results are presented in Table 3.5. Note, ownx is equal to (own - 5) * d1 (see equation (1)).

Table 3.5. Empirical Models of Tobin's Q

Models	(1)	(2)	(3)	(4)	(5)
Variables					
Intercept	1.528	2.111	2.277	1.957	2.125
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Own				0.089	0.086
				(0.02)	(0.02)
Ownx				-0.087	-0.084
				(0.02)	(0.02)
DIVINDEX			-0.296		-0.292
			(0.00)		(0.00)
DA		-0.721	-0.679	-0.739	-0.700
		(0.00)	(0.00)	(0.00)	(0.00)
TA	-.0000024	-.0000027	-.0000003	-.0000012	-0.000001
	(0.51)	(0.44)	(0.93)	(0.73)	(0.76)
Ind Dums	yes	yes	yes	yes	yes
R^2	21.77%	23.60%	25.81%	24.64%	36.8%
F	3.241	3.505	3.851	3.532	3.856
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ESS	298.23	291.27	282.84	287.29	279.14

Note:

a. R^2 is the coefficient of determination.

b. F is the F statistic.

c. ESS is the error sum of squares.

d. p values are reported in parentheses below each estimated coefficient.

Model (1) is a base case where size and industry effects are used to explain the variablity in Q. The R^2 equals 21.77% which means that 21.77% of the variability in Q is captured by the variables in model

(1). This model supports the importance of industry effects. The F statistic of 3.241 is significant for the regression. In model (2), debt is included into the model with a significant p value. The negative sign on the coeficient was also obtained in the Morck, Schliefer, and Vishney paper. In Model (3) the results of Wernfelt and Montgomery are supported as the diversification index enters significantly with a p value on the estimated coefficient of zero. The R^2 equals 25.81% which means that 25.81% of the variablity in Q is caputured by the variables contained in that model. The F statistic is 3.851 which means that the model significantly explains Q. In model (4), the conclusions of McConnell and Servaes (1992) and Morck, Schlieffer, and Vishney (1988) are reexamined. The "best" piecewise linear regression model turned out to have only one turning point at 5%. The significance of both coefficients individually supports their inclusion in the model. The F statistic equals 3.532 for the model, and this is significant; the R^2 means that 24.64% of the variablity in Q is captured by the model. An F statistic for the inclusion of both ownership variables can be calculated by using the formula (2) below. (Note, ESS_r = the error sum of squares for the restricted model, (2), ESS_u = the error sum of squares for the unrestricted model, (4), d=the difference between the number of parameters estimated by the restricted and the unrestricted model, and n=the number of observations. k=number of regressors including the intercept in the unrestricted model.)

(2) $F = \{(ESS_r - ESS_u)/d\}/(ESS_u/n-k)$

$= \{(291.27 - 287.29)/2\}/(287.29/531 - 46)$

$= 1.99/0.5923$

$= 3.36$

$> F(5\%) = 2.99$

This result means the two ownership variables enter model (4) significantly.

Models (3) and (4) each being significant provides support that the conclusions of the ownership studies and the conclusions of the diversification studies are not sample dependent. Model (5) tests for the inclusion of both diversification and ownership effects into the model. This is the extension to the existing literature. The ownership studies have not included diversification effects and the diversification studies have not included ownership effects. The R^2 for model (5) is 26.78%, which means that 26.78% of the variablity in Q is captured by the model. The F statistic is 3.856 which means that the overall equation significantly explains Q. In comparing Model (5) with model (4), we can see the inclusion of the diversification index enters signiciantly based upon the p value of 0.00 on the estimated coeficient. In comparing model (5) with model

(3), we can calulate an F statistic to see if ownership enters this equation significantly. That calculation is done in equation (3) below.

$$(3) \quad F = \{(ESSr - ESSu)/d\}/(ESSu/n-k)$$

$$= \{(282.84 - 279.14)/2\}/(279.14/531-47)$$

$$= 1.85/0.5767$$

$$= 3.208$$

$$> F(5\%) = 2.99$$

Since 3.208 > F(5%), this calculation means that the addition of the ownership variables into model (3) is significant.

(Part B)

In this part, the ownership variables are defined in the same fashion as Morck, Shliefer, and Vishney (1988):

Own	=	Ownership by insiders.
Ownx	=	Own, if Own < 5%
	=	5%, if Own >= 5%
Owny	=	0, if Own < 5%
	=	Own - 5, if 5% <= Own < 100%

The estimated equation is:

(4) $Q = bo + b1 * ownx + b2 * owny + other\ variables.$

For Own < 5% equation (4) can be rewritten as:

$$Q = bo + b1*Ownx = bo + b1*Own$$

For ownership between 5% and100% equation (4) is rewritten as:

$$Q = bo + b1*Ownx + b2*Owny = bo + b1*5\% - b2*5\% + b2*Own + other\ var$$

The coefficent for Ownx, b1, will be the slope of the first linear portion, the coefficient on Owny, b2, will be the slope on the second linear portion.

Using these definitions, Table 3.6 reports the regression results.

Table 3.6. Empirical Models of Tobin's Q

Models	(1)	(2)	(3)	(4)	(5)
Variables					
Intercept	1.528	2.111	2.277	1.957	2.125
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ownx				0.089	0.086
				(0.02)	(0.02)
Owny				0.002	0.002
				(0.32)	(0.33)
DIVINDEX			-0.296		-0.29
			(0.00)		(0.00)
DA		-0.722	-0.679	-0.739	-0.70
		(0.00)	(0.00)	(0.00)	(0.00)
TA	-0.000002	-0.0000027	-0.0000003	-0.0000012	0.0000012
	(0.51)	(0.44)	(0.93)	(0.73)	(0.76)
Ind Dums	yes	yes	yes	yes	yes
R^2	21.77%	23.60%	25.81%	24.64%	26.78
F	3.241	3.505	3.851	3.532	3.856
ESS	298.230	291.275	282.845	287.296	279.14

Note:

a. R^2 is the coefficient of determination.

b. F is the F statistic.

c. ESS is the error sum of squares.

d. p values are reported in parentheses below each estimated coeffiecient.

Models (1), (2), and (3) are replicated from Table 3.5. Model (4) shows that ownership is positively related to Q over the range 0 to

5% inside ownership. Over the range 5% to 100% the ownership variable is positively related to Q to a lower degree, but the estimated coefficient is not significant. This result is different from that reported in Morck, Schlieffer, and Vishney (1988) and from that reported in McConnell and Servaes (1992). The entrenchment effect which predicts an negative relationship between ownership and Tobin's Q is not observed. The alignment effect which predicts a positive relationship between ownership and Tobin's Q is observed. The R^2 is equal to 24.64% which means that 24.64% of the variability in Q is captured by the model. The F statistic of 3.532 is significant, which means the model's independent variables significantly explain Q. We can jointly test the significance of the two ownership variables with an F test by comparing model (2), the restricted model with model (4), the unrestricted model.

$$(5) \quad F = \{(ESSr - ESSu)/d\}/\{ESSu/(n-k)\}$$

$$= \{(291.27 - 287.29)/2\}/\{287.29/(531-46)\}$$

$$= \{1.99\}/\{0.5923\}$$

$$= 3.36$$

$$> F(5\%) = 2.99$$

Because 3.36 > F(5%), this means the ownership variables jointly are significant entering model (4). In Model (5), both the diversification index and the ownership variables are included. Comparing model (4) with model (5) we find the diversification index enters significantly with a p value of 0.00. The R^2 on model (5) is 26.78% and the F statistic is equal to 3.856. Comparing model (3) with model (5), we can determine if the ownership variables enter significantly with an F test using equation (6).

$$(6) \quad F = \{(ESSr - ESSu)/d\}/\{ESSu/(n-k)\}$$

$$= \{(282.84 - 279.14)/2\}/\{279.14/(531-47)\}$$

$$= \{1.85\}/\{0.5767\}$$

$$= 3.208$$

$$> F(5\%) = 2.99$$

Since 3.208 > F(5%), this result shows that the ownership variables jointly enter model (5) significantly.

3.6. Conclusion

This empirical study has completed three objectives: 1. to retest the relationship between ownership and Q and the relationship between the diversification index and Q using recent data from 1992; 2. to establish that the two previous empirical results, one explaining Q with ownership and the other explaining Q by firm diversification are not sample dependent results. This study has identified both relationships using the same sample; 3. to show that the empirical models are improved by the incorporation of both the ownership and the diversification measures. Because they both enter significantly, this implies a misspecification in the previous independently generated research on ownership and firm diversification.

4. Appendix A: $\partial(V_{drts})/\partial(Alpha_2)$

$$V_{drts}^* = V_{drts} / Alpha_2 = [VarW(A_2=0) - VarW(A_2>0)]/Alpha_2$$

Let $VarW(A_2=0) = (Alpha_1 + Alpha_2)^2 \; Var(V^*)$

Let $VarW(A_2>0) = (Alpha_1 + Alpha_2)^2 \; Var(V^{*"})$

$$\partial(V_{drts})/\partial(Alpha_2) = 2(alpha_2 + Alpha_1)(VarV^* - VarV^{*"})/(Alpha_2)$$

$$- [(Alpha_1 + Alpha_2)^2(VarV^* - VarV^{*"})]/(Alpha_2)^2$$

$$= (2 + 2(Alpha_1/Alpha_2))(VarV^* - VarV^{*"})$$

$$- (1 + (Alpha_1)^2/(Alpha_2)^2 + 2(Alpha_1)/(Alpha_2))(VarV^*-VarV^{*"})$$

$$= (1 - (Alpha_1)^2/(Alpha_2)^2)(VarV^* - VarV^{*"})$$

This is positive assuming $Alpha_2$ dominates $Alpha_1$. This means the value of salary and bonus rents must be less than the value of the officers' and directors' equity positions.

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