

Does CEO Duality Matter: An Integrative Approach

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(Abstract)

Some firms allow their CEO to hold the position of Chair of the Board of Directors while other firms choose to split those two positions between two different individuals. This dissertation first examines whether agency control mechanisms, agency problems, and other firm characteristics are related to the observed choice of one or two individuals in the two positions. The empirical research is based on the hypothesis that having the positions split between two individuals is a means of controlling agency problems when used in concert with (either as a substitute for or as a complement to) other mechanisms for controlling agency problems. Firms are thus viewed as evaluating the costs and benefits of split positions as well as of other agency control mechanisms. They choose the most cost effective means of addressing the problems they face. If split positions are more cost effective, then the firm should choose to split positions other things equal. The very high predictive power of the estimated logistic model confirms the hypothesis that the probability of choosing split positions is related to control mechanisms and agency problems as well as to size and other factors. Some agency control mechanisms perform as complementary agency control mechanisms and some as substitutes for split positions. The results suggest that firms with higher agency costs of debt and equity are more likely to have chosen to split positions. The results are thus consistent with the view of the choice of split positions as a means of managing agency problems in concert with other mechanisms in an integrative decision framework.

The second part of the dissertation examines the linkage between the CEO-Chair choice and the performance of the company (as measured by returns or operating efficiency). Shareholder activists argue that poor performance results when the CEO serves simultaneously as the Chair of the Board of Directors, so called "CEO duality." This dissertation examines whether firms that split these positions experience higher accounting performance than firms that do not split the positions. Several hypotheses are tested regarding the effects on firms with split positions. The empirical

model indicates that firms that have split positions exhibit, on average, no lower or higher performance than other firms after integrating into the model industry effects, the role of other agency control mechanisms, the size of agency problems, and other firm characteristics. This is consistent with an irrelevance hypothesis as well as with the possibility that firms choose their policies optimally once other factors are accounted for. However, the firms with split positions do exhibit a different relationship between information asymmetry and performance as well as between other agency control mechanisms and performance. The use of agency control mechanisms, for example as measured by the proportion of the firm held by institutional investors, have a greater effect on performance for non-split than for split firms.

Overall the results support the notion that firm and management characteristics (such as the level of agency problems, information asymmetry, ownership structure, and the existence of other agency control mechanisms) influence the choice to split positions and influence the role and effectiveness of split positions. The vast majority of firms' choice can be predicted by using such characteristics in an integrated model of the decision. The results imply that the benefits of split positions may be firm specific, that split positions are only appropriate for some firms, and that a net benefit will not be captured by all firms that simply enact a policy of split positions independent of their fundamental characteristics.

Dedicated to my husband, David

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Definitions of Variables

(In the Sequence of Appearance)

ROA1 = One year industry adjusted return on assets

ROA3 = Three year average of industry adjusted return on assets

SGASALE1 = One year industry adjusted Selling and Administrative Expenses (SGA) divided by sales

SGASALE3 = Three year average of industry adjusted SGA divided by sales

(CEO=CHAIR) = 1/0 Dummy; 1 for CEO = Chair / No Chair; 0= CEO≠Chair

CEOOWN = Percentage of CEO's ownership

NMGTDIR = Percentage of managers and directors' ownership excluding CEO ownership

BLOCKOWN = Percentage of ownership above 5%

INSTITOW = Percentage of institutional ownership

Q = market value/book value; When $Q > 1.06$ then $HQ = Q - 1.06$ and $LQ = 0$;
else $HQ = 0$ and $LQ = Q$;

PINDEPT = Proportion of independent directors

TOTAL = total number of board members

DR1 = debt ratio (with book value of equity as part of the denominator)

IND = 1/0 dummy; 1 for firms belong to high tech group, 0 otherwise.

LSALES = log of Sales

IFCFSALE = cash flows per dollar of sales in high cash flows and low q firms

SQRESVAR = variance of the residual squares

NFXASSET = the proportion of non-fixed assets

E = error

DBLOCKOWN = Split/joint Dummy * percentage of ownership above five percent

DNMGTDIR = Split/joint Dummy * managers and directors' (except CEO's) ownership

DINST = Split/joint Dummy * percentage of institutional ownership

DDR1 = Split/joint Dummy * debt ratio (with book value of equity as part of the denominator)

DHFCFLQ = Split/joint Dummy * IFCFSALE

DSQRESV = Split/joint Dummy * variance of the residual squares

DNFXAST = Split/joint Dummy * the proportion of non-fixed assets

RESIDUALS = observed probability of split - predicted probability from the logistic model where observed probability of split=1 when firms split positions and 0 otherwise.

ABSRES = absolute value of residuals

RESSQ = squares of the residuals

POGRESSQ = value of residual squares when the observed probability of the split minus the predicted probability from the logistic model is greater than zero, otherwise it is equal to zero.

NEGRESSQ = negative of the value of residual squares when the observed probability of the split minus the predicted probability from the logistic model is less than zero, otherwise it is equal to zero.

INCORDUM = 1 when prediction from the logistic model is different from the observed, otherwise, it is equal to zero.

LSHNUM = log of the number of shareholders

EXCHANGE = 1 when firms are traded in New York or American exchanges

CEOEQCH = 1 when CEO is also the chair, 0 for firms where CEO is not the chair. Firms without a chair will be treated as missing values.

Chapter 1

Introduction

1.1 Background of the Topic

The separation of ownership and control that characterizes the modern corporation creates conflicts of interest between managers and shareholders. The board of directors headed by its Chair is charged with resolving such conflicts and ensuring that management decisions enhance shareholder welfare. With a diffused base, shareholders cannot possibly oversee the managers themselves. Boards of directors are elected to represent owners, and as the representatives of shareholders, the board has a strict and absolute fiduciary duty to ensure that the firm is managed in the best interests of the shareholders. The board, therefore, is a crucial part of the corporate structure and of corporate governance.

Although legally the board has the responsibility for the company and presumably is the ultimate fountain of power, in practice, problems may arise. Management has the expertise, control and time to manage the company. Moreover, boards have limited time and information to exercise their responsibility. The objective is to allow both parties to have effective control without diminishing the motivation of the others. There are several ways to empower the board, but they all have their costs. Some suggest the creation of a nominating committee to select responsible directors. Kornand and Kerry found in 1991 that 82% of the board vacancies were filled via

recommendations from the Chairmen of the Board.¹ Given that nearly 80% of the Chairmen are also the CEO, the CEO ends up playing a dominant role in selection of directors.

Some suggest the use of independent directors to align the board with the interests of shareholders and reduce the domination of the CEO. Outside directors are perceived to be better monitors because they are not dependent on the CEOs for promotion or for legal or consulting business. In Michigan, boards that designate an independent director have more limited liability. Lorsch and Lipton's "A Modest Proposal for Improved Corporate Governance," suggests that boards chaired by the CEO should identify an independent "lead director". The rationale behind such a suggestion is to ensure that directors are organized to provide the checks and balances needed for a well functioning board. The changing role of the board of directors and its chairs are discussed in section 2.1.

A large body of literature has related board characteristics such as size, composition, and ownership structure to the efficacy of management decisions and their impact on firm performance and value (details of the literature review are provided in section 2.3.). The consensus view of this literature appears to be that smaller boards [Jensen (1993), Yermach (1996)], with a larger fraction of independent directors [Weisbach (1988), Byrd and Hickman (1992), and Brickley, Coles and Terry (1994) among others] and higher non- CEO ownership concentration [Brickley, Lease and Smith (1988, 1994), Agrawal and Mandelker (1990)] are more effective in reducing agency costs and increasing firm value. The relation between CEO ownership and firm value is reported to be non-linear [Morck, Shleifer and Vishny (1988) and McConnell and Servaes (1990)], with firm value increasing with CEO ownership at low levels of ownership (the alignment range), and decreasing with CEO ownership at high levels of ownership (the entrenchment range).

A characteristic of the board that has not received as much attention in the literature but is of growing interest to academics, practitioners, and shareholder groups is the board's leadership structure. The specified roles to be played by a separate board Chairman such as:

- chairing board and annual shareholder meetings,
- selecting members for board committees,
- deciding whether the information received by the directors is adequate, and

¹ Monks and Minow, *Corporate Governance*, Cambridge, Blackwell Business Publisher, 1995, p.193

- determining whether there is enough objectivity in the process of reviewing the performance of the CEO,

are not well understood.² The question of CEO duality, i.e., the CEO also performing those functions as Chairman of the Board, appears to be of growing concern to shareholder activists who argue that CEO duality increases agency problems and leads to poor firm performance.³ This position finds support among some academics, Jensen (1993)⁴, and law makers who propose splitting the position of CEO and Chairman as a way to control agency problems. Several large companies like Chrysler, Sears & Roebuck, Advanced Micro Devices, etc. have publicly resolved to separate the CEO-Chairman positions.

Congressman Edward Markey and SEC Commissioner Mary Shapiro also indicate their support of an independent board where positions of CEO and Chairman of the Board are separated.⁵ The President of National Association of Corporate Directors (NACD), John M. Nash, predicts that “when the next generation of CEOs comes to be, we’ll see the separation increase substantially.”⁶ The trend toward split positions is not limited to US firms. In the UK, Canada and Australia, there are research reports proposing separation of the titles (see Howard, Boyd and Carroll for further details). On the other hand, recently, Armco Steel, Becton Dickinson and Company, Connecticut General Insurance Company and Dow Chemical have all switched back to joint titles after earlier splitting the positions apart. Some of those firms claim that if the Chair and the CEO are held by two different individuals, more harm than good will be done to the

² Wangler, Lawrence, “The Real World of Separate Chairmen,” *Corporate Board*, September-October, 1994, v15, n88, p.21-25.

³ “Other Concerns are Likely to Follow GM in Splitting Posts of Chairman and CEO,” *The Wall Street Journal*, November 4, 1992, b1, b11.

⁴ Jensen, “Presidential Address: The Modern Industrial Revolution, Exit and the Failure of Internal Control Systems,” *Journal of Finance*, 1993, 48, 831-880.

⁵ “SEC Official Favors Shaking up Boardrooms,” *St. Louis Post Dispatch*, April 24, 1993. “Congress to Study Shareholders’ Right.” *Pension & Investments*, April 5, 1993. Also mentioned in Brickley, Coles and Jarrell’s 1996 working paper, “Corporate Leadership Structure: On the Separation of the Positions of CEO and Chairman of the Board.”

⁶ Miller, William, “Making it Chairman and CEO: panel urges firms to separate the two top officers and make an outsider Chairman,” *Industry Week*, January 6, 1997, v246 n1, p.50-51.

companies.⁷ Section 2.2, 3.2 and 4.2 provides details on the costs and benefits of splitting the CEO and Chairman of the board positions.

The extant empirical evidence on the relation between CEO duality and firm performance is decidedly mixed. Daily and Dalton (1992) report that firms that split the CEO-Chair positions perform comparably to firms with joint positions. However Pi and Timme (1993), Baliga, Moyer and Rao (1996) document superior performance for firms with split CEO-Chair positions. Brickley, Coles and Jarrell (1996) contradict previous reports, providing evidence of a performance advantage for those with joint positions in their sample of large firms. A problem with these studies is that they do not control for (1) firm characteristics that determine the potential for conflicts of interest between shareholders, bondholders and managers and (2) potential of other agency control mechanisms to act as a substitute for or to complement the agency cost reducing potential of splitting the CEO-Chair positions. This dissertation attempts a comprehensive empirical analysis of the CEO duality question in an integrated framework that controls for these factors.

1.2 The Split Versus Joint Decision

1.2.a. Approach

The splitting of CEO-Chair positions is one of several mechanisms for controlling agency costs arising from shareholder-bondholder-manager conflicts of interest. A firm optimally chooses a combination of mechanisms such that the marginal benefits per dollar are equalized across these mechanisms. The recognition of the split versus joint decision as an endogenous variable is discussed in section 3.1. We argue that the agency cost reducing benefits of split positions should therefore depend on the potential agency costs of debt, equity, and free-cash flow determined by the firm's characteristics. It should also depend on the existence of alternative control mechanisms determined by board characteristics, such as composition and ownership structure, and on firm characteristics such as growth opportunities which may induce capital market monitoring. The cost of the splitting mechanism is described by Brickley et al (1996) as the cost of (incomplete) transfer

⁶ The arrangement for split positions can do more harm than good if the CEO and the Chair are not compatible as in these cases (Booz Allen and Hamilton, *The Conference Board: Corporate Boards and Corporate Governance*, 1993, 18.)

of information between CEO and Chairman and should also depend on the nature of the firm. Thus, the efficacy of CEO duality cannot be analyzed without considering the characteristics of the firm and its board.

While other authors relate performance to board composition, financial leverage, institutional and insider ownership individually, this study puts into one framework various control mechanisms and firm characteristics. A single framework enables the examination of the tradeoffs involved with synergistic and alternative effects among the agency control mechanisms while accounting for the firm's existing level of agency problems.

The underlying hypothesis is that the various mechanisms for controlling agency problems interact with each other and with firm characteristics to determine, on the basis of costs and benefits, the optimal leadership structure. A structure with split positions may strengthen the checks and balances on the CEO and decrease the level of agency problems between the CEO and shareholders, but the marginal effectiveness of having split positions may be small and the costs high if other agency control mechanisms are in place or are cheaper to deploy.

Research question #1: **Is the policy on split positions an endogenous decision and what are the factors that affect such a decision** (please refer to section 3.3 for further details)?

1.2.b. *Empirical Methodology*

The first part of the dissertation is an analysis of the determinants of the firm's decision to split the CEO-Chair positions. A probabilistic empirical model of the choice of split versus joint positions is constructed. We hypothesize that the probability of split positions should be positively related to agency cost variables, inversely related to the costs of a split position and to alternative mechanisms that are substitutes for split positions, and positively related to alternative mechanisms that act as complements to leadership mechanisms. More details are provided in section 3.4.

1.2.c. Results

The very high predictive power of the estimated logistic model confirms the hypothesis that the probability of choosing split positions is related to control mechanisms and agency problems as well as to size and other factors. Most of the firms (close to 90%) have the same split versus joint policy as predicted by an integrative model with agency costs, agency control mechanisms, and other characteristics of the firms. Results of the probabilistic model are shown in section 3.6. Firms that have higher agency costs of equity and debt are more likely to have split positions because the need for splitting is higher in those firms. Firm with higher information asymmetry and a higher proportion of non-fixed assets (a measure of discretion and opportunity for redirecting resources) are also more likely to have split positions. Increases in the percent of the firm owned by institutional investors decrease the probability of split positions. Higher levels of growth induced monitoring, as measured by a proxy for Tobin's Q, are observed to be synergistic with split positions for firms with low Q based on the predictive model and (as seen later in chapter 4) the return models. Similarly, the ownership positions of blockholders are also found to be positively related to the probability of split positions; however, (as reported later in chapter 4 of the dissertation) higher blockholdings are associated with lower operating efficiency. So the evidence indicates that higher levels of blockholdings increase the need for split positions. There is some evidence that debt substitutes for split positions because of the negative relationship in the choice model and evidence of corresponding increases in operating efficiency noted in the second part of the dissertation. A higher proportion of the firm being owned by the CEO is found to be an alternative to split positions. The CEO's proportion of ownership of the firm is negatively related to the probability of split positions (suggesting perhaps that CEOs thwart the decision to split positions) yet higher CEO ownership lowers selling and administrative expenses per dollar of sales, a measure of operating efficiency used as a dependent variable in the second part (chapter 4) of the dissertation.

The results suggest that firms with higher agency costs of debt and equity are more likely to have chosen to split positions. The results are thus consistent with the view of the choice of split positions as a means of managing agency problems in concert with other mechanisms in an integrated decision framework.

1.3 Split versus Joint Positions: The Performance Effect

1.3 a. Approach

Following the probabilistic modeling of the split versus joint decision in chapter 3, this study examines whether there is an observable, material effect of the decision on accounting return performance and operating efficiency. Previous studies have reported an effect on returns, but those studies have not controlled for the role of agency costs and agency control mechanisms. In this study those factors enter the model to control for the effects of the demand for split positions and the extent to which the demand is already met by alternative control mechanisms. Some researchers hypothesize that one choice is the more cost effective mechanism (typically that split positions is more effective). They conclude, therefore, that the firm's returns or operating efficiency should suffer when the alternative (typically jointly held positions) is chosen.

This study views the issue as an empirical question regarding the relative costs and benefits of the choice made in the context of the existing conditions faced by the firm. The two types of firms may face different cost functions that attain the optimum at different levels of costs. There is no a priori reason to believe that firms making the optimal choice to split the positions will necessarily experience higher or lower returns than firms that optimally choose to have the positions combined. The adopted approach is discussed in section 4.1. Furthermore, the relationship between the decision and performance may be more complex than what is captured by a simple averaging of returns of firms in different subsamples (after holding other things equal). This study thus examines whether the relationship between performance and various independent variables differs for firms that choose to split versus choose jointly held positions. Although firms may not necessarily achieve better performance by adopting a particular policy, the observable differences between the two samples could be material.

Research questions #2 & 3:

- **Is the performance of firms that have split positions materially different from those that have not?**
- **Does the effect that the policy of splitting the CEO and Chair positions has on performance depend on firm conditions (particularly the level of**

agency costs), industry characteristics, and presence of other agency control mechanisms?

(For details of research question #1, please refer to section 3.3. Section 4.3 provides more detailed discussion on research questions #2 and #3.)

1.3.b. Methodology Issues

An additional complexity to undertaking this research is that individual firms that make the choice on split versus joint decisions are not guaranteed to have made the choice that is appropriate for their company. Although one expects most firms to choose what is optimal, others may deviate from the optimum by accident or because they are unaware or unable to take the most appropriate actions. This study recognizes that firms that do not split the positions of CEO and Chair include firms for which the costs of split positions exceeds the benefits as well as firms for which the benefits exceed the costs but that cannot effect a splitting of positions. In designing empirical tests on the relationship between performance and split position policies, this study incorporates a measure of the deviation from the predicted behavior regarding the split versus joint decision. Section 4.4 discuss the methodology issues involved in the empirical test.

One of the factors that can contribute to an observed policy that differs from the theoretical optimum is the power of the CEO. A powerful CEO can thwart efforts by the board, and the empirical tests in this study account for this consideration in the construction of the measure of deviations of actual from predicted policies. By incorporating a measure of the extent of "errors" in the split versus joint decision, confounding effects of combining firms that make the optimal decision with those that err are eliminated. A firm that chooses a sub-optimal policy should experience lower returns. Residuals from the predictive logistic model that does not include CEO ownership as an independent variable are used to measure the deviation from optimum.

1.3.c. Results

The results reported in section 4.6 on return performance do not support a direct agency control effect (accounting for other control mechanisms, firm characteristics, and industry effects) at the margin for firms employing a split positions policy. Except for the case of high tech firms,

companies that separate the CEO and Chair of the Board positions exhibit no difference in their industry adjusted returns nor in their operating efficiency. This could be the result of having made optimal decisions which at the margin produce no net effect, positive or negative, or the decision on split versus joint may not be material to accounting returns and operating efficiency. The exception to these results is firms with joint positions in industries believed to require strong and nimble management and effective coordination between management and the board. Such firms in high tech industries where the environment is perceived to be more dynamic exhibit lower rather than higher return on assets, contrary to the “leadership hypothesis.” In addition, the evidence does support the conclusion across the whole sample that firms with joint positions have a different relationship between a measure of information asymmetry (market model residual variance) and operating efficiency and a different relationship between returns and a measure of board effectiveness in monitoring (proxied by board size).

All decision errors (logistic residuals) are insignificant in return on assets models, although most of them (except one) have the right signs. So even if a firm deviates from the split or joint position predicted by the model, the firm’s returns do not appear to suffer. The observed insignificance of the errors can be attributed to the high predictive power of the logistic model that produces only a small number of firms that made decisions that deviate from the predictive model.

1.4. Conclusions

In this study, the three main research questions regarding the split versus joint positions decision are:

- Is the policy on split positions an endogenous decision and what are the factors that affect such a decision?
- Is the performance of firms that have split positions materially different from those that have not?
- Does the effect that the policy of splitting the CEO and Chair positions has on performance depend on firm conditions (particularly the level of agency costs), industry characteristics, and the existing level of monitoring?

The dissertation provides strong evidence that splitting versus combining the positions of the CEO and Chair of the board of directors is an endogenous decision. Based on a logistic estimation of the probability of a split position in a cross section of companies, the decision is a function of firm and board characteristics that proxy for the potential level of agency costs, the existence of alternative mechanisms to control them, and the (information) costs associated with a split position. The model proves highly accurate with only a small proportion of firms incorrectly classified.

The examination of the performance effects of the decision are less clear-cut. There is no evidence that there is a direct effect observable in the returns of firms that have split positions. There is weak evidence that a measure of operating efficiency reveals a differential and salutary benefit of split positions. Given the results that indicate there is no effect on performance of how large the “error” in the decision is, the majority of firms are choosing the policy appropriate for their situation, and thus as would be expected at the optimum policy, there is no marginal effect of the decision. However, there is evidence that there is a different relationship between performance and various agency cost and agency control mechanisms for firms with split positions versus joint positions. This more complex relationship does not provide simple answers to the question of whether a given firm would benefit from adopting split positions.

Overall the results indicate that a policy of split positions is not appropriate for all firms. For firms with fewer monitoring mechanisms and higher levels of agency problems, the benefits of split positions exceed the costs. The policy implication is that each firm has its unique conditions that influence the determination of the optimal policy. Shareholders should not adopt finance research results on the benefits of split positions as a common cure, and policymakers should not urge all firms to split titles.

Chapter 2

Background and Literature Review

The emerging trend of shareholder activism is shining a new light on the role of the board of directors, especially the role of its chair. The following sections will briefly describe how the image of the board as a control mechanism can vary from being solely a facade to being a realistic description of the active monitoring role played by the board representing shareholders. The next section also explains how the destruction of the traditional rubber-stamping boards has stimulated a hot debate on the separation of the CEO and Chairman of the board positions. The advantages and disadvantages of CEO duality will be discussed in 2.2. Section 2.3 provides a literature review.

2.1 The Changing Role of the Board of Directors and Its Chairs

According to Mace (1986) and Patton and Baker (1987), managers can dominate their boards by choosing the directors and filtering the information they analyze. When the Chairmen of the Board are chosen by the CEOs, the independence and power that the Chair is supposed to have will be diminished. Moreover, the board may meet only a few times a year, and it is often difficult for the directors to really understand the operations of the firms. Mace (1971) further argues that the motivation for serving as a director is the opportunity to earn prestige and monetary

compensation. Rarely do boards act contrary to the wishes of the chief executives.⁸ So the advice that they can give is limited, and the idea that the board acts in the interest of shareholders could become just a facade with no substantial role played by or for shareholders. Therefore, splitting positions/titles of the CEO and the Chair of the Board would not make much difference.

However, a new trend is emerging that differs from the phenomenon that Mace describes. We have entered into an era of shareholders' activism. In the past decade, shareholders have been more active in monitoring their investments. Many directors have been sued for negligence of their fiduciary responsibilities in courts. In cases like *Paramount v. Time*, *Smith v. Van Gorkom*, and *Hansen Trust PLC v. ML SCM Acquisition Inc.*, in the nineteen eighties, the courts made it clear that all directors, including the Chair, have to be "informed and diligent, and to act independently of management."⁹ The Executive Risk Management Associates' study in 1995 found that 42% of the Fortune 1000 company directors have been sued. In face of these lawsuits, directors have to take a new approach to their jobs on the Board. According to a survey by Booz, Allen and Hamilton in 1993, more outside directors are selected than a decade ago for the purpose of decreasing the CEO's influence. Companies have tried to eliminate directors that have had conflicts of interest. Under the leadership of the Chairs and the CEOs, more oversight committees such as nominating, audit, and compensation committees have been established.¹⁰ Thus, the responsibilities of the Chairs have been increased and have been moving away from the traditional "rubber stamping" functions.

Some corporate governance proponents like Leighton and Thain, Professors of Western Business School, have also re-specified the seldom recognized principles that guide the functions of the board. They maintain that the board is "responsible under law for the management of the company and answers to the shareholders. The board delegates to the CEO and officers of the firm the authority to run the company, but the board remains ultimately responsible for how well the company is managed."¹¹ Therefore, a separate position for the Chair is believed to be crucial for the success of the board.

⁸ Mace, Myles "*Directors: Myth and Reality*," Harvard University Press, Boston, 1971, p.186 and p. 195.

⁹ Millstein, Ira, "The State of Corporate Governance," 1993 reprinted in Monks, R. and Minow, N., *Corporate Governance*, Blackwell Publishers, 1995, 454.

¹⁰ According to Booz Allen and Hamilton Inc.'s *The Conference Board: Corporate Boards and Corporate Governance*, among their 546 questionnaires, 64% have nominating committees, 100% have an audit committee and 91% have compensation committees in 1993. In 1972, only 8% had nominating committees, 45% had audit committees and 69% had compensation committees.

Thus, the diminishing role of the board has been reversed by the emerging trend of active shareholder activism in the nineties. The legal responsibility of the board and its directors have been specified and tested by courts. Corporate governance and board reforms have brought forth a hot debate on the separation of the CEO and Chairman of the Board positions.

2.2 Costs and Benefits of Splitting the CEO and Chairman of the Board Positions

Splitting is a means of counterbalancing the CEO's power and self interests. According to Jensen and Meckling (1976), agency problems arise whenever there is separation of ownership and control. Since the CEO is managing other people's money rather than his/her own, agency costs of equity arise. This is clearly explained in a well-known quotation from Adam Smith:

“... it cannot well be expected, that they (directors/managers) should watch over it (joint-stock company) with the same anxious vigilance with which the partners in a private copartnery (partnership) frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, on the management of the affairs of such a company.”¹²

Without checks and balances, CEOs may act in their own interests rather than the shareholders' interests, resulting in misuses of funds, shirking, perquisite taking, and decisions based on personal preferences rather than maximizing shareholders' value. The tendency of managers to increase the firm beyond its optimal size has been discussed by Baumol (1959), Marris (1964) and Rhoades (1985). Such an empire-building ambition or executive pride is also reflected in Roll (1986) where profitability of takeovers to bidders is low. Though the greatest benefits from split positions/titles occur when CEOs are entrenched, entrenchment is not required

¹¹ “Improving Board Effectiveness,” Crawford, Dimma, Powis, MacDougall; et al, *Business Quarterly*, v57, n3, Spring 1993, p.11-1.

¹² Smith, Adam, *The Wealth of Nations*, Cannon Edition, New York: Modern Library 1937, 700, also quoted in Jensen and Meckling.

for split positions to be a useful monitoring mechanism. Keeping the two positions apart can avoid agency problems that may arise from combining power and control.

The Chairman is supposed to be the main architect of the board, i.e., of its composition, agendas, priorities and procedures. The job of a CEO is to lead a company, make strategic decisions and implement them. Combining the titles of the Chair and CEO is, according to Monks and Minow (1995), analogous to asking students to grade their homework. This will put the control of the board, in the hands of the CEO. When boards are too heavily influenced by CEOs, they may not be able to serve as an effective device for decision control (Jensen, 1993). So there will be no safety valve to guard against any misjudgment by the CEOs. The following summarizes the benefits of having separate CEO and Chair positions:

- “The role of board as an overseer and monitor of management will be clarified and its hand in dealing with management will be strengthened.”
- “By virtue of having its own leadership, the board will be better organized.” Split positions is a way to “enhance effectiveness and to restore the independent monitoring role” (Booz Allen and Hamilton Inc., 1993).

Thus, splitting the CEO and Chairman positions is considered as a way to make the board more effective which in turn enhances its check and balance function for the stockholders.

Nevertheless, there are also losses from split positions and benefits to combining the two positions. Some argue that a unitary leadership structure provides more effective leadership because it reduces possible confusion induced by divided authority. Since only one person is in control, the CEO would be able to respond more quickly to market conditions (Pfeffer and Salancik, 1978) without waiting for ratification of another person. The importance of this power is apparent in situations such as auctions (for example for radio spectrum licenses) where strategic and budget decisions have to be made within minutes. Having one leader can also minimize the potential for rivalry between heads (Arrow, 1963).

Brickley, et. al (1996) point out that CEOs may have specialized knowledge regarding the strategic challenges and opportunities facing the firm that is valuable to the Chairman’s job. Split positions would require costly and incomplete transfers of information between CEOs and the

Chairmen. Brickley, et. al (1996) and Pfeffer and Salancik's (1978) argument is most applicable in firms that are at an early growth stage of life or that involve high-technology. Single leadership in these firms may help to lower the costs of information transfer from the CEO to the Chair and enhance swift decision-making in such a dynamic environment.

Some costs of split positions are the potential costs of increased bureaucracy and over-monitoring. Some argue that since defining a role for the Chair that is meaningful and that does not overlap the CEO's role is difficult, joint titles will prevent the creation of a new layer of management, which adds additional information and reporting burdens on the existing management (Booz Allen and Hamilton, *The Conference Board: Corporate boards and Corporate Governance*, 1993, 18). Moreover, over-monitoring may result if firms split the CEO and Chair positions when other agency control mechanisms are in place and already successfully control the firms' agency problems.

In summary, the advantages of CEO duality include providing a check and balance to the CEO's self interests and enhancing the effectiveness and independence of the board. The disadvantages are divided authority, costs of potential rivalry between the heads, added bureaucracy and information transfer costs. But these costs and benefits of split positions are affected by other firm characteristics. These factors include:

- the existing level of monitoring and the general effectiveness of the board,
- the power of the CEO,
- the need for monitoring (degree of agency problems) and
- the cost of information transfer.

The presence of alternative agency control mechanisms, such as institutional owners and blockholders, would lower the need for split positions if these mechanisms act as substitutes for split positions. When the CEO's or managers' interests are not aligned with shareholders, the need for monitoring is higher, and split positions may provide the checks and balances that are needed to monitor the performance of the managers. To a company that has a strong board dominated by experienced outside or independent directors, the benefits for splitting would be low. On the other hand, split positions in weak boards that have been dominated by managers may not be enough to reverse the power of the CEOs and the management. In general, firms with a higher level of potential agency problems may find split positions very beneficial. For instance, low growth cash

cows that have a significant amount of free cash flows may benefit from split positions more than low growth firms where a smaller amount of resources would be available for potential abuses. The benefits of split positions would also be partially offset by the information transfer costs. Certain companies with heavy research and development (R&D) or in an early stage of development may have high information transfer costs, and split positions in these firms will incur higher costs. Since these firm characteristics interact with each other and with split positions, all of the above factors have to be taken into consideration when examining the effect of split versus joint positions.

2.3 Literature Review

The literature on the relationship between board characteristics, board composition, the effectiveness of management decisions and their impact on firm performance and value seems to have reached a consensus. A smaller board, larger fraction of independent directors, and higher non-CEO block or institutional ownership are more effective in reducing agency costs and increasing firm value. Jensen (1993) urges companies to have small boards. Large groups become less effective because the coordination and process problems overwhelm the advantages gained from having additional experts (Steiner, 1972 and Hackman, 1990). Yermack (1996) shows the advantages of smaller board. He finds an inverse relationship between board size and firm value for large corporations. He also documents that companies with small boards exhibit more favorable financial ratios, stronger CEO performance and stronger threat of dismissal.

Weisbach (1988), Byrd and Hickman (1992), and Brickley, Coles and Terry (1994), etc. have examined the role of independent directors. Weisbach (1988) finds the association between performance and resignations is stronger for companies that have outsider-dominated boards than those with insider-dominated boards. Further evidence on the role of independent directors is provided by Byrd and Hickman (1992). They report that bidding firms in tender offer bids have higher announcement returns than other bidders when more than 50% of their board members are independent directors. Brickley, Coles and Terry (1994) examine the stock market reaction to poison pill announcements. Their study indicates that the reaction is positive for an outsider dominated board and negative for insider dominated board. So the monitoring benefits of independent directors are well documented.

Recent papers on non-CEO block ownership are provided by Brickley, Lease and Smith (1988, 1994) and Agrawal and Mandelker (1990). Brickley, et al (1988) suggest block investors have more incentive to vote on corporate issues. They document that institutional investors and blockholders vote more actively on anti-takeover amendments than non-blockholders, and that the opposition by institutional investors is greater when the proposals appear to harm shareholders. In their 1994 paper, they report that managers in firms with large outside blockholders and low financial institutional ownership (with financial ties) are most likely to be constrained by voting. This constraint of voting is also stronger for managers in small firms with less dispersed ownership. Further evidence of the positive effect of institutional and block ownership is provided by Agrawal and Mandelker (1990) who relate institutional ownership with abnormal returns of anti-takeover amendment proposals. They find positive relations for various types of amendments even after controlling for the concentration of managerial equity ownership and firm size.

The relationship between CEO ownership and firm value is examined by Morck, Shleifer and Vishny (1988) and McConnell and Servaes (1990). For a cross sectional sample of Fortune 500 companies, they find Tobin's Q first increases, then declines, and finally rises slight as ownership by the board of directors rises. The same relationship also holds for CEO ownership. A similar non-monotone relationship is also found by McConnell and Servaes (1990) with a different range of ownership for alignment and entrenchment of managerial interests.

The empirical evidence regarding to the effect of split or joint decisions is also broad. Researchers have examined the effects of splitting position titles¹³ on CEO compensation (Boyd, 1994), adoption of poison pills (Mallette and Fowler, 1992), CEO turnover in poorly performing firms (Weisbach, 1988), price reaction to anti-takeover amendments, (McWilliams and Sen, 1997) and firm performance (Baliga, Moyer and Rao, 1996, Brickley et. al, 1996, Pi and Timme, 1993, Daily and Dalton, 1992 and Rechner and Dalton, 1991). Only one paper (Boyd, 1995), is similar to this one, in that it evaluates the environmental uncertainty on likelihood of split positions. The majority of the above papers (except some like Brickley et. al (1996) and Daily & Dalton (1992)'s paper) indicates that firms with separate titles have better performance than firms with combined titles.

Boyd (1994) uses CEO duality along with director's ownership, proportion of insider directors, director's pay and number of directors representing ownership groups to proxy for the independence board control. Consistent with his hypothesis, he finds that CEO also serving as the

¹³ Here combined titles means combining the title of CEO and Chairman of the Board into a person, so there is only a single leader. Some people refer this to CEO duality because one person holds two positions.

Chair lowers the independence of board control, and that CEO compensation increases as board control decreases. Thus, consistent with the agency theory, CEO compensation is positively related to CEO duality. The relation between the monitoring of CEO and board directors for firms listed on the New York Exchange is examined by Weisbach (1988). Evidence indicates that the relation between CEO replacement and poor firm performance is stronger when firms have split titles or are dominated by outsider board members. Another piece of evidence supporting the agency theory is by Mallette and Fowler (1992) who examine the relationship between board composition, board ownership stakes, and the passage of poison pills by manufacturing firms. They find a smaller number of poison pills are passed by firms with split titles, and equity holding of independent directors does not affect poison pill decision. They conclude that CEO serving as Chair is a stronger source of influence than are independent directors. More recently, McWilliams and Sen (1997) examine how board composition, leadership structure and board ownership affect the market's reaction to anti-takeover amendment. For firms having a CEO also serving as the Chair, the reaction becomes negative when insider and affiliated board membership increases their ownership percentages and representation on boards. For firms with split CEO and Chairman of the board titles, board and ownership structure do not help explain the stock price reaction. As a whole, the literature above has found evidence supporting the negative effect of joint leadership on CEO compensation, CEO resignations, price reaction to poison pill provision and anti-takeover amendments.

Most of the above literature concentrates on how separation affects the probability of occurrence of a certain event where crucial decisions have to be made by the boards and the CEOs. Only a few researchers examine the issue, as this paper does, linking the leadership structure with performance, the level of existing monitoring, the levels of agency problems, and other firm characteristics such as the stage of the firm within its life cycle. Pi and Timme (1993) look at whether CEO and the Chair being the same person has any impact on the efficiency and performance of banks. After controlling for size and CEO ownership, they find cost efficiency and return on assets decreases when the CEO is also the Chair. They also find that institutional and large blockholders' ownership and the proportion of insider and outsider directors are all unrelated to performance. Since banks are highly regulated, their results would imply that other non-regulated firms where CEO and the Chair is the same person should under-perform at least as much as the bank sample.

Baliga, Moyer and Rao (1996) have findings similar to Pi and Timme (1993). They investigate the long term performance of Fortune 500 firms that have joint CEO and Chair positions and the announcement effects on firms that change from CEO being the Chair to split

positions. They find that the market is indifferent to the change of status, but there is weak evidence that the persistence of CEOs also being the Chairs negatively affects long term performance. In their sample, they have mixed firms that have different characteristics and different needs for monitoring. Thus, finding indifference in the market reaction and finding a negative effect on the long term performance could reflect the need for a more careful dissection of the sample.

But Brickley, Coles and Jarrell's (1996) findings are just the opposite of Pi and Timme (1993) and Baliga, Moyer and Rao (1996). Brickley et. al (1996) investigate whether CEO and Chair being the same person has any impact on the performance on 661 large, publicly traded firms in 1989 that were in the Forbes Executive Compensation Survey. They argue that agency problems are more frequent for large firms, so they concentrate on large companies. They look into the various kinds of Chairmen: previous CEOs as Chairs, long-service executives as Chairs, and designated outsiders as Chairs, but they do not look at other agency control mechanisms that are in place. They find support for Vancil's hypothesis that firms with separate CEOs and Chairs are just in a transitional process when CEOs pass the baton to the next generation. They also find a positive difference in industry adjusted returns (over a three year period) between those that have combined titles and those that do not (i.e. firms with combined titles perform better than those with split titles). This finding is contrary to most of the findings in the literature which suggest the opposite (i.e., firms where the CEO and Chair are the same person usually operate sub-optimally).

In addition to these contradictory results, there is also evidence indicating split or joint titles will have no impact on performance. Daily and Dalton (1992) address CEO duality using a sample of S&P small companies. They, find no difference in performance across industry categories and firm sizes when CEOs are also the Chairs. Their findings could be observed either because the sample includes both firms that can be hurt as well as firms that benefit from combined titles, or because CEO and Chair being the same person really has no effect on performance or other mechanisms that are in place. But their emphasis is on the effect that founders have on board composition, and their performance measures, stock returns, are not risk adjusted. Rechner and Dalton (1991) find firms with combined CEO and Chair positions under-perform in terms of accounting based performance when compared with those with split positions. But they do not control for variables that may jointly correlate with firm performance and leadership structure.

Meanwhile, Howard, et. al (1996) also find no difference in beta adjusted investment returns between international firms that have combined and separate titles. But they do find a higher occurrence of CEOs being the Chairs in certain SICs (20-29, 30-39, 60-69: these are

manufacturing firms and financial institutions) among international firms. Thus so far, the literature on CEO also being the Chair is inconclusive with mixed results.

Boyd (1995) tries to resolve these conflicting results by integrating agency and stewardship perspectives of splitting titles. Based on Dess and Beard's (1984) environmental dimensions, Boyd uses 192 firms from twelve industries to find the direction and magnitude of split positions and performance relationship. He uses sales growth to proxy for abundance of resources and sales volatility to proxy for dynamism in the environment. He finds that there is a structural difference in the relationship between sales growth and return on investment, and the relationship between sales volatility and return on investment between split and non-split firms. Joint leadership in high sales growth firms will decrease returns, but it will increase returns in high sales volatility firms. But he has not considered how the existing monitoring level affects the costs and benefits of split positions and his returns are not industry adjusted. Yet, his contingency perspective, which recognizes split positions are not good for all firms, opens up new areas for research.

Overall, the empirical evidence on the relation between CEO duality and firm performance is mixed. Pi and Timme (1993), Baliga, Moyer and Rao (1996) report better performance for firms that have split titles than those that have joint titles. Brickley, Coles and Jarrell (1996) contradict previous reports. Among large firms, joint position firms outperform those with split positions. However, Daily and Dalton (1992) and Howard (1996) document firms with split positions have comparable performance to those with joint positions. The biggest problems with the existing lines of research are:

- the neglect of the connection between the use of split positions, other agency control mechanisms and special firm characteristics, and
- the neglect of the environmental factors that may force firms to deviate from the optimum.

When firms make a decision on split positions, they examine not only the costs and benefits of split positions, but also the need for split positions and the costs and benefits of alternative mechanisms. As mentioned previously in section 2.2, firm conditions such as high potential agency problems and existing level of monitoring, will alter the need for monitoring. The presence of other agency control mechanisms may lower the need for split positions if these agency

control mechanisms perform functions similar to split positions, i.e., if they are alternatives to split positions. On the other hand, the same conditions may increase the need for split positions if some of the alternative mechanisms provide the environment conducive to split positions.

There are different costs and benefits associated with different agency control mechanisms. Those costs include, but are not limited to, implementation costs, bonding, contracting and bankruptcy costs which are well specified in Smith and Warner (1979). Increasing the proportion of independent directors may be easier to implement than other exogenous mechanisms such as increases in institutional ownership. Easier implementation and a lower cost, however, do not guarantee the same effectiveness. Agency control mechanisms that have higher net benefits would be used more often than others. So because all these different conditions are not taken into consideration, most historical tests on effects of split positions/joint titles will be very misleading.

Previous studies also fail to recognize that firms that do not split positions include both firms that can benefit from as well as those that can be hurt by combined titles. When individual firms make the split versus joint decision, they try to maximize the utilities of the shareholders subject to the availability, feasibility and cost of agency control mechanisms and specific firm characteristics. But when the adjustment costs are greater than the benefits from altering split or joint positions, firms may choose not to change. When a powerful CEO can thwart efforts by the board, the board may not be able to carry out the split positions even when the benefits of splits are greater than the costs. Therefore, firms may deviate from optimal positions by choice, by accident, or by virtue of an inability to execute appropriate actions.

This dissertation attempts to put various control mechanisms and firm characteristics into one integrated framework to analyze the determinants of split positions and the effect of CEO duality on performance. It also incorporates a measure of the deviation from the predicted behavior regarding the split versus joint decision. This comprehensive framework enables the examination of the tradeoffs among a combination of agency control mechanisms that serve as substitutes or promoters for split positions while accounting for the level of agency problems and the confounding effects of including firms in the sample that make the optimal decision along with those that err.

Chapter 3

The Split Versus Joint Position Decision

3.1 Approach

This study recognizes, as Himmelberg, Hubbard and Palia (1997), Agrawal and Knoeber (1997) and Hermalin and Weisbach (1991) do, that firms optimally choose a combination of agency control mechanisms. Hermalin and Weisbach (1991) use Hausman's specification tests to show the endogeneity of managerial ownership. Agrawal and Knoeber (1997) also present direct evidence of the interdependence among these mechanisms. They find that the effect of some variables, such as debt and corporate control activity, disappear when estimates are made in a simultaneous system framework using two stage least squares. A similar endogeneity argument is put forth by Himmelberg, et al (1997) who demonstrate how unobserved heterogeneities can induce a spurious relationship between two variables. All those researchers agree that various mechanisms interact with each other and with firm characteristics and that firms form their optimal positions based on the cost and benefit analysis of each of these mechanisms.

The underlying mechanism for determining the deployment of various mechanisms for controlling agency problems (such as proportion of independent directors, CEO ownership, block ownership, managerial and director's ownership, and institutional ownership) is a cost and benefit analysis. Considering of the interaction between agency control mechanisms and other firm

characteristics, firms determine, the optimal combination of agency control mechanisms and the optimal level of agency problems on the basis of benefits and costs.

The goal of the firm is assumed here to be maximizing the shareholders' value¹⁴ of the corporation where the shareholders' value is the present value of all future positive and negative cash flows from growth opportunities and operations. Implicit in the costs of the operations are agency costs that are caused by the separation of ownership and control and the benefits of lower costs due to monitoring. The benefits and costs of deploying those agency control mechanisms are affected by many factors. The level of agency problems, the existence of monitoring mechanisms and other firm characteristics such as high growth and board effectiveness will affect the benefits of utilizing those mechanisms. For example, the higher the agency problems, the higher the benefits of split positions. Also, the marginal benefits of increasing the proportion of independent directors on an efficient board should be lower than on an inefficient one. In any case, at the optimum, all mechanisms will have the same marginal benefits.

Meanwhile, the costs of deploying these mechanisms will depend on the availability of agency control mechanisms, the ease of deployment, the impact on other mechanisms and the firm's characteristics. Some mechanisms may be more readily available than others. Availability and ease of deployment will affect the adjustment costs related to the modification of the quantity of those mechanisms. For example, the use of relationship investing by institutional holders in small firms may be limited. So it may have a higher adjustment cost than managerial ownership. Not only would the costs vary among mechanisms, they also vary with the level of usage. The cost function for managerial ownership and the proportion of independent directors are non-monotone¹⁵ and different from each other.

¹⁴ Margaret M. Blair argues it is wrong to accept "the premise that shareholders are the sole owners of corporation, that the measure of wealth creation counts only in terms of the share price of corporate stock, and that (corporate governance) focus(es) only on the power relationship between shareholders and managers.... In industries and firms where human capital is critical, (corporate governance systems) are likely to affect wealth-creating behavior substantially." (*Ownership and Control: Rethinking corporate governance for the twenty-first century*, 1995, The Brookings Institution, Washington D.C., 273-274.) She argues for the maximization of the intrinsic value of the firm. However, generally, in finance models, the goal of the managers should be maximizing the shareholders' wealth because shareholders are the residual claimants who own the assets and take the risks. In finance, it is assumed that the financial market is relatively efficient and that shareholders have taken all the relevant factors including the human capital and corporate governance systems into consideration when they price the securities. So under the efficient market condition, maximizing shareholders' value is maximizing the value of the firm and therefore, corporate governance concentrates on aligning the shareholders and managers' interests.

¹⁵ Tobin's Q increases and then decrease as managerial ownership and proportion of independent directors increases (McConnell and Servaes, 1990 and Byrd and Hickman, 1992).

In this study, split versus joint positions is hypothesized as one of the several endogenous mechanisms that firms use for controlling agency costs arising from shareholder-bondholder-manager conflicts of interests. As mentioned earlier, agency control mechanisms and firm characteristics are interdependent, therefore, the costs and benefits of splitting positions should depend on the existence and efficacy of alternative control mechanisms and on firm characteristics. For instance, the marginal benefits of split positions to strengthen the checks and balances on the CEO may be lowered if other agency control mechanisms are already in place. But the agency cost-reducing benefits of split positions should be higher when the potential agency costs of debt, equity and free cash flows are high. The cost of split positions may be more expensive relative to other agency control mechanisms that are cheaper to deploy. Unlike other agency mechanisms which have continuous or multi-level cost and benefit functions, split positions is a discrete 1 or 0 variable that has only two levels. So the incremental change (that is from split to joint or vice versa) is very large. Thus, the per increment adjustment cost of split positions is likely to be higher than that of the other mechanisms. This encourages firms to use other lower cost agency mechanisms or substitutes for split positions to control agency problems.

The effectiveness of CEO duality cannot be analyzed without considering the characteristics of the firms (such as the potential level of agency problems and growth opportunities which may induce capital market monitoring) and the presence of other agency control mechanisms as determined, in part, by board characteristics (such as composition and ownership structure of the board). While other authors relate performance to board composition, financial leverage, institutional and insider ownership individually, this study attempts to put into one framework various control mechanisms and firm characteristics. A single framework enables the examination of the tradeoff involved among the agency control mechanisms while accounting for the firm's existing level of agency problems.¹⁶ Details for costs and benefits of split positions and for their relationship between agency control mechanisms and firm characteristics are discussed in section 2.2 and 3.2. The following section will discuss how the presence of agency control mechanisms, industry and firm characteristics affect the benefits/costs of split positions.

¹⁶ Because few boundaries are imposed by the availability of various mechanisms, the optimization problem is likely to have a feasible solution set. Since the cost and benefit functions of each of these mechanisms are different, we can have multiple solutions. With the complexity of the relationship assumed here, closed form solution to the optimization problem are unlikely.

3.2. Benefits/Costs of Splitting Titles

3.2.a. Agency Control Mechanisms

In addition to split positions, there are other mechanisms that control agency problems through monitoring of the agents. In many cases, the higher the existing level of monitoring, the lower the benefits of split positions. However, agency control mechanisms can both increase and decrease the costs and benefits of split positions depending on the nature of these mechanisms. Some agency control mechanisms may provide an environment where splitting is more advantageous while others work on their own to enhance monitoring and lessen the need for additional mechanisms such as split positions. For the former case, the presence of these agency control mechanisms promotes the use of split positions by either decreasing the costs of split positions or by increasing the benefits of split positions or by enabling positions to be split. When the proportion of independent directors on the board increases, objectivity may increase and the votes for splitting positions may become a majority. So these mechanisms work in consonance with split positions and are positively related to split positions.

Some agency control mechanisms, however, may substitute for other agency control mechanisms. Their presence will lower the level of agency problems perhaps to the extent that they eliminate the need for more agency control mechanisms. Such substitutes for split positions lower the benefits of split positions. The use of substitutes is negatively correlated with the decision to split positions. Since firms make the split versus joint decision based on the tradeoff of the cost and benefits of split positions, split positions as an agency control mechanism will be used when:

- other agency control mechanisms cost more or provide less benefits than split positions
- the costs of split positions and its harmonizing agency control mechanisms are lower than the alternatives for split positions.

This viewpoint contrasts with the view of the proponents of splitting titles who encourage all firms to split position titles (and thus implicitly assume that at the margin this is the cheapest control mechanism regardless of the level and extent of use of alternatives).

No matter whether these agency control mechanisms have a positive or negative relationship with split positions and other agency control, omitting these mechanisms in any examination of the determinants of split positions will induce spurious relations between split positions and other firm and industry characteristics.

3.2.b. Firm and Industry Characteristics

Where the agency costs of debt or the agency costs of equity are high, the benefit to increased monitoring will be high at the margin. The net benefits of split positions should be high for firms or industries whose characteristics produce high potential levels of agency problems. The characteristics could include the degree of free cash flows, the level of growth, availability of investment opportunities, board composition and effectiveness, regulation of the firm's markets and prices, and the need to communicate complex information within the firm.

Free cash flows can be a source of agency problems because managers can abuse the use of funds. For firms with high free cash flows in low growth markets, the benefits of split positions can be relatively high because agency problems of free cash flow are unchecked, other things equal, for such firms. Low growth firms will have a higher demand for split positions because they have fewer opportunities to invest in positive net present value projects. Low growth also decreases the frequency with which firms go to the market. Meanwhile, the costs of split positions are relatively low in low growth firms where the business environment is relatively stable because the need to quickly convey information and coordinate action is very low. Therefore, the benefits of checks and balances (split positions) are relatively high and its costs relatively low when there are high free cash flows in low growth firms. So these firms are more likely to split positions.

Other firm characteristics that may indicate high agency costs of debt and agency costs of equity are the relative amount of non-fixed assets and the amount of information asymmetry respectively. It is more difficult for debtholders to monitor the transfer of non-fixed assets than the fixed assets to shareholders. So the potential agency cost of debt is higher when there is a higher amount of non-fixed assets. Managers will have more opportunities for shirking, perquisites taking and misuse of funds when the level of information asymmetry between shareholders and managers are high resulting in higher agency costs of equity. The higher the agency costs, the greater the demand for agency control mechanisms such as split positions.

The benefits of splitting can also be affected by board characteristics. For instance, board size is a characteristic that can be used to proxy for the effectiveness of the board. The larger the board, the more difficult it will be for the Chair to organize the board and make decisions in an efficient manner. An ineffective board would increase the need for split positions, but the marginal benefits of splitting will be lower as the size of the board increases. Even an entrenched CEO may make a concession to the board agreeing to split titles when he knows the Chair has to manage a large board. So the larger the board, the more likely the CEO and Chair titles will be split. One caveat is that it is easier for CEOs to appoint themselves as the Chair when the board is large or ineffective.

Firms within the same industry may share a similar business environment that affects both the benefits and the costs of split positions. One may expect the benefits of split positions lower in highly regulated industries than non-regulated ones. There may also be a sector effect among certain groups of industries. In “The Breakthrough Illusion,” Florida and Kenney (1990) suggest that high tech industries are a unique group that requires different leadership and organizational structure. High tech firms face enormous challenges in terms of the advancement of technology, the timing and the uncertainty of cash flows, and the development of personnel. Some of these factors increase the costs of split positions, but may not be captured by growth variables or an industry adjustment. So high tech firms should be more likely to have joint positions. At the individual firm level, companies with high levels of research and development or in an early stage of life may have high information transfer costs. A structure with split titles in these firms may incur higher costs than in other firms.

To summarize, both the benefits and the costs of split positions are affected by the existing level of monitoring, industry features, and firm characteristics. In general, the higher the existing level of monitoring, the lower the benefits of split positions. Some agency control mechanisms may lower the costs of splitting or increase the benefits of splitting by providing the appropriate environment. These mechanisms are in harmony with split positions. Alternative agency control mechanisms for split positions lower the benefits of split positions by providing monitoring of agency problems. The net benefits of split positions are high for firms with high free cash flows, equity agency, and debt agency problems. Other firm characteristics such as board size may also affect the benefits of splitting titles. The costs of split titles are higher for firms with higher information transfer costs and for firms that require stronger leadership to handle a dynamic and competitive business environment.

3.3 Research Question

The main questions are: Is the policy on split positions an endogenous decision and what are the factors that affect the decision? There are two aspects of this question that are addressed in this study:

- Are split positions used or not used in conjunction with other agency control mechanisms?
- Do firms with higher potential agency problems use split positions more often than an average firm?

To provide additional insight into the decision, this study investigates two other specific influences on the use of split positions:

- Does an effective board lower the demand for split positions?
- Is there an increased need for joint positions among firms in industries that requires more autonomous management, for example in high tech industries?

Here, split positions is hypothesized to be a firm decision, influenced by firm conditions and the other agency control mechanisms in place. Each of the following conditions constitutes a hypothesis. They are not competing hypotheses, e.g., the finding that debt agency costs are important in affecting the likelihood of split positions will have no effect on the likelihood of accepting or rejecting other hypotheses.

3.3.a. Existing Level of Monitoring

3.3.a.i *Agency Control Mechanisms*

Contrary to the common belief that split positions should always be used to control agency problems, this dissertation predicts that the need for splitting titles will depend on the existing level of monitoring, the relative benefits of splitting and the relative strength of the deployed agency

control mechanisms and other firm characteristics. The common belief implicitly assumes that split positions is the cheapest control mechanism at the margin regardless of the level and extent of use of alternatives.

If the costs of split positions are lower or the benefits of split positions are higher than other monitoring mechanisms, then firms will use split positions to control agency problems. But the benefits of split positions are lower when there are other monitoring mechanisms in place. Split positions will also be used if other agency control mechanisms enhance or promote the use of split positions to lower agency problems, but the benefits have to be higher than:

- the costs of split positions and its harmonizing agency control mechanisms, and
- the costs of any other agency control mechanisms.

3.3.a.ii Growth Induced Market Monitoring

A growing firm will have a lesser need for the separation of CEO and Chair positions because the crunch of demands on its financial resources induces market monitoring and forces firms to work more efficiently. Growth can be thought of as a disciplining condition because it uses up firms' cash flows, forces firms to get external funding, and increases the frequency with which firms go to the market. This forces firms to run more efficiently because they will be subjected to market and investment bankers' monitoring.

Growth can reduce possibilities of value-reducing diversification. When a firm is growing, it should have less free cash flows because there will be more investment opportunities. High growth will also provide opportunities to reinvest the cash flow profitably in the firms' current lines of business. As suggested by Lehn and Poulsen (1989), if the firm's management is specialized in its current line of business, then it may be unprofitable to invest the cash flows in diversification strategies. So growth firms have a lesser need to separate CEO and Chair positions to lower the agency problems related to the abuse of free cash flows suggested by Jensen (1996).

Moreover, in high growth firms, there is more demand for strong leadership. Growth introduces dynamism into the firm's business environment. Split positions in innovative and dynamic firms may hinder decision making and entrepreneurship. Single leadership (joint CEO and Chair positions) allows faster response time and more CEO accountability, which is expected to be

advantageous in a highly dynamic environment. So the costs of splitting are higher and the benefits of splitting are lower in high growth firms. These firms are less likely to split positions.

So, in growth firms, there are fewer opportunities for the CEO and managers to abuse the much needed resources and there is a higher need for joint leadership. All this decreases the need for splitting CEO and Chair titles and increases the need for joint leadership in high growth firms. Therefore, it is hypothesized that, because growth induces market monitoring mechanism, “growth” decreases the probability of split positions.

3.3.b. Potential Agency Problems

3.3.b.i Equity/Debt Agency Problems

It is predicted that the benefits of split positions are higher in firms with high equity and debt agency costs. So these firms are more likely to have split positions. Agency problems take place when the interests of the managers are not aligned with the interests of the shareholders or bondholders. Perquisites consumption, asset re-allocation, excessive risk taking and wealth transfer behavior are all forms of agency problems. While equity agency problems refer to agency problems between equity-holders and managers, debt agency problems refer to agency problems between debt-holders and managers. The higher the level of agency problems, the more benefits monitoring will provide. If split positions can provide the monitoring that such firms need, then the more the agency problems, the higher the likelihood that firms will split positions.

3.3.b.ii Cash Flows and Growth

It is predicted that more monitoring through split positions is needed when firms have higher amounts of free cash flows. The worst case scenario is having high cash flows in low growth firms. Everything else held constant, these firms should be more likely to have split positions. Cash flow here is viewed as being a characteristic of the firm or industry not within the discretion of management. Free cash flows are post-tax cash flows that are not distributed to security holders either as interest or dividend payments. A large amount of free cash flows provides opportunities for potential misuses of funds especially when there are few good investment opportunities. The question is: given the existence of free cash flows, how do firms organize their agency control mechanisms to counterbalance this potential source of abuse? How

likely would firms split positions under this circumstance? It is hypothesized here that the higher the amount of free cash flow in low growth firms, the higher the need for split positions and the higher the probability that positions are split.

3.3.c. Other Firm and Industry Characteristics

3.3.c.i. Board Effectiveness

An ineffective board would increase the need for split positions even though the realized benefits of splitting may be low. The more ineffective the board is, the more difficult it will be for the Chair to organize the board and make decisions in an efficient manner. Thus, decreased board effectiveness would increase the need and the likelihood of split positions. Meanwhile, even an entrenched CEO might agree to have split titles when he knows the Chair has to manage a large board. So the more ineffective the board is, the more likely the CEO and Chair titles will be split. The exception may be in cases where CEOs take advantage of an ineffective board by appointing themselves as the Chair.

3.3.c.ii Special High Tech Effects

It is predicted that high tech firms are more likely to have joint positions. High-Tech industries have special characteristics that distinguish them from other non-high-tech industries. According to the US Small Business Administration (1991) and Larry Swanson (1990), these include, but are not limited to, shorter product cycles, less reliance on scale economies, use of more flexible manufacturing systems, heavy dependence on research and development activities, a high percentage of scientists and engineers in the work force in addition to fast growth and high agency costs of debt and equity. High tech firms operate in a very dynamic, high growth environment. It has been argued that firms in high tech industries have a higher need for joint positions because visionary leadership, flexibility and efficient decision-making are important to a dynamic, fast growing, vibrant and volatile business environment. So the cost of splitting is high in these firms.

3.3.c.iii. *Information Transfer Costs*

There are costs involved when information is transferred from one person to another. The information transfer costs include, but are not limited to the managerial time for communicating the information, the costs of intended and unintended miscommunication, and the opportunity costs of delayed decision making or inappropriate decisions due to the need for the information transfers. The information transfer costs will increase when the CEO and the Chairman titles are split. The CEO has to communicate with the Chairman detailed company information that is needed for formulating and ratifying strategic decisions. The higher the information transfer costs, the more costly it is to have split positions.

All these hypotheses are used to answer only two main questions: Is split positions an endogenous decision? If so, what are the determinant for this decision? It is predicted that the probability of split positions should be inversely related to the costs of a split position, board effectiveness, information transfer costs, to alternative mechanisms that are substitutes for split positions, and the probability should be positively related to the levels of agency problems and mechanisms that promote the use of split positions to lower agency problems. But the effect of high tech industries on the probability of split positions is an empirical question.

3.4 Empirical Methodology

The first part of the dissertation is an analysis of the determinants of the firm's decision to split the CEO-Chair positions. The goal is to identify and investigate the effect that firm characteristics and other agency control mechanisms have on the decision to split positions which includes exploring the relationship between:

- split positions and other agency control mechanisms.
- split positions and levels of agency problems
- split positions and industry characteristics such as high tech industry effect and information transfer costs.

Logistic Regressions

To address the hypotheses in section 3.3 (whether firm characteristics and agency control mechanisms affect the costs and benefits and therefore the probability of splitting), a probabilistic empirical model of the choice of split versus joint positions is constructed¹⁷, that is,

Equation 1:
$$\text{Logit of } P_i (Y=0 \text{ or } \text{CEO} \neq \text{Chair}) = \beta_0 + \sum_{j=1}^p \beta_j x_{ij} + e_j$$

for $i=1$ to n observations, where X_{ij} = agency control mechanisms and firm characteristics (such as CEO's ownership, non-CEO managerial and director's ownership, block ownership, institutional ownership, residual variance proportion of non-fixed assets, free cash flows in high cash flows and low Q firms, board size, high tech dummy and controls), and e_i = error.

The test focuses on whether the probability of a firm being among those that choose to split positions is a function of measures of agency problems, of the existing level of monitoring, and of other firm and industry characteristics. This test treats the CEO \neq CHAIR variable as a decision made in response to the level of agency problems, the relative benefits of splitting, and the relative strength of other agency control mechanisms as reflected in the firms' choice of alternative mechanisms.

The alternative mechanisms hypothesis suggests one agency control mechanism can trade-off against another. This implies a negative relationship between the alternatives (other things equal). For instance, the presence of institutional ownership may obviate the need for split positions. This would mean the probability of split positions would be lower when this alternative is in place. So if there are alternatives for split positions, then not all the firms will split positions unless the costs of the alternatives are always higher than the costs of split positions. This is contrary to the arguments made by the proponents of splitting titles who encourage all firms to split position titles. This hypothesis would predict a negative relation between CEO \neq CHAIR and its alternatives.

¹⁷ As mentioned in Himmelberg, et al (1996), it is difficult to find instrumental variables that determine the optimal level of leadership ownership but not determine other agency control mechanisms. So two stage least squares is not adopted as the methodology to solve the endogeneity problem. Himmelberg et al (1997) use panel data to solve the unobserved sources of firm heterogeneity of firms. This method is not followed here because firm heterogeneity is the driving force of our results.

A harmonizing relationship implies that split positions goes hand-in-hand with other agency control mechanisms so as to control agency problems. That is, an increase of one agency control mechanism increases the benefits or lowers the costs of split positions, and therefore increases the likelihood of split positions. This implies a positive relationship between agency control mechanisms and split positions. This happens when:

- the benefits of splitting titles are increased or
- the costs of splitting titles are lowered or
- the probability of executing split positions are higher or
- their use induces other problems that need to be fixed by the alternatives

when other agency control mechanisms are in place. (For instance, high managerial ownership would, on one hand, align managers' interest with that of the shareholders', but, on the other hand, increase management's entrenchment.) So a combination of agency mechanisms is the most effective means for controlling agency problems. This hypothesis would predict a positive relation between CEO≠CHAIR and its alternatives.

However, positive (negative) signs of the coefficients from the logistic regression do not always imply complementary (alternate) agency control mechanisms. They are only evidence consistent with this interpretation. Positive (negative) signs indicate those are factors that increase (decrease) the likelihood of split positions. Mechanisms that have positive coefficients can be agency control mechanisms that enhance the separation of CEO and Chair titles or factors that increase the need for split positions. In the prior case, the existence of such a mechanisms may lower the costs of split positions which helps to promote the use of split positions. In the latter case, those mechanisms may create a situation (such as increasing the potential for agency problems) that increase the demand for split positions. Similarly, mechanisms that have negative coefficients can be substitutes for split positions or those that discourage the use of split positions.

High growth firms have a lesser demand for agency control mechanisms because of the market monitoring induced by the crunch of financial resources. So a negative relationship between split positions and growth are expected. Please refer to section 3.3.a.ii. for details.

High free cash flows become problematic especially when there are few investment opportunities. Keeping the level of monitoring constant, increasing the amount of free cash flows

would increase the probability of split positions. Other forms of agency problems such as agency costs of debt and equity would affect the probability of split in similar ways. The higher potential for agency problems, the higher the need for split positions. Please refer to section 3.3.b.i & ii. for details.

Board effectiveness can affect the split/joint positions in two ways. Ineffectiveness increases the need for split positions. But it is more difficult for the chair to organize an effective board. So CEOs would be able to enjoy the freedom with an ineffective board even when they are not the chair. So when the board is ineffective, CEOs would more likely allow the use of split positions. All this means that board effectiveness is negatively related to split positions. On the other hand, the CEO may also be able to appoint himself as the Chair when the board is ineffective. But all in all, the prior effect should dominate. Board effectiveness is likely to be negatively related to split positions.

A high tech dummy variable will reflect the effect of some common factors that are unique in high tech firms but that are not picked up by the variables that are described above. A positive coefficient of the high tech variable means split positions is beneficial even to high tech firms after controlling for the growth factor. This is consistent with the agency problem hypothesis. A negative coefficient supports the hypothesis that high tech firms need strong leadership which is better offered by a joint leadership structure. An insignificant coefficient is expected if there are no special high-tech effects among high tech firms other than those captured by the growth and agency cost proxies. The effect not captured by growth and agency costs of debt and equity will be captured in the high tech industry effect which is likely to decrease the probability of split positions. So a negative coefficient is expected.

Information transfer costs are costs induced when information is transferred from one party to the next. These include, but are not limited to, time spent on the communication, the potential costs of miscommunication, the opportunities costs of potential delay of decision due to the need for transfer of information. This cost will increase when the CEO and Chairman of the board titles are separated. The higher the information transfer costs, the higher the cost of splitting these positions. So a positive relation is expected.

In summary, to analyze the determinants of the firm's split versus joint decision, a probabilistic empirical model of the choice of split versus join titles is constructed. As a whole, it is hypothesized that increases in agency problems, increases in benefits of split positions, increases

in alternative mechanisms that promote the use of split positions, and decreases in board effectiveness are associated with increases in probability of splitting titles. The probability of splitting titles will be lowered when there are increases in alternative mechanisms that are substitutes for split positions, increases in information transfer costs, increases in the costs of split positions and among low tech firms.

3.5 Definition of Variables

3.5.a. Proxies for Agency Control Mechanisms and Market Induced Monitoring

The percentage of CEO ownership, non-CEO managerial and director ownership, block ownership, institutional ownership, proportion of independent directors, debt financing and Q represent measures of the extent to which agency problems are managed. The variables chosen are common agency control mechanisms recognized in the finance literature.

Morck, Shleifer and Vishny (1988) find a non-linear relation between board, CEO ownership and firm performance. Managerial ownership from 0-5% and above 25% helps to align the interests of the managers and shareholders. The 5-25% level is consistent with managers being entrenched. McConnell and Servaes (1990) find a similar non-linear relation. Hermalin and Weisbach (1991) also find such a non-linear effect when they analyze the effect of board composition on performance.

Demsetz (1983) and Shleifer and Vishny (1986) find support for the role of blockholders as an agency control mechanism. Both argue that large blockholders have a strong incentive to monitor managers because of their significant economic stakes. Watts and Wruck (1988) find that large blockholders influence departures by CEOs following poor performance. Shome and Singh (1995) find positive announcement returns from block formations. They also found some evidence of positive operating performance following block formations, suggesting monitoring reduces potentially opportunistic behavior.

The literature on institutional ownership indicates positive impacts of institutional holders. Moyer, Chatfield and Sisneros (1989) find institutional ownership is inversely related to the number of analysts who follow a company's stock. They argue security analysts perform an important monitoring function for the followed firms. Agrawal and Mandelker (1992) explore the relationship between institutional holders and the wealth effects of anti-takeover charter amendments. They find a positive relationship between institutional ownership and stock price reaction to announcement of anti-takeover amendment.

More recent papers on both block investors and institutional investors are provided by Brickley, Lease and Smith (1988, 1994). They find these investors are more likely to vote on anti-takeover amendments than non-blockholders, and their votes depend on the nature of the proposal. When the proposal appears to harm shareholders, the opposition by institutional investors is greater, suggesting an active monitoring role of institutional investors. In their 1994 paper, they report that managers in firms with large outside blockholders and low financially tied institutional ownership are most likely to be constrained by voting on anti-takeover amendments.

A high proportion of independent directors represents an agency control mechanism. Fama and Jensen (1983) argue that outside directors have the incentive to act as monitors of management because of the need to protect their reputation as effective, independent decision-makers. Weisbach(1988) shows that outsider dominated boards are more likely than insider dominated boards to respond to poor performance by replacing the CEO. Rosenstein and Watt (1990) find that the appointment of outside directors leads to significant, positive share price reactions. Byrd and Hickman (1992) find that firms where independent outside directors hold a higher percentage (up to 55%) of the seats have significantly higher announcement-date abnormal returns upon tender offers than those with a lower proportion of outsider directors. Brickley, Coles and Terry (1994) show that the price reaction to a poison pill is positive for an outsider dominated board and is negative for insider dominated boards.

Debt as an agency control mechanism is discussed in Jensen and Meckling(1976) who argued that the agency cost of external equity may be reduced by increasing the use of debt which reduces the need for external equity financing, thus reducing the scope of agency conflicts between managers and shareholders. Fixed payments associated with an increased level of debt, effectively bonds managers to disgorge the free cash flow of the firm (Jensen, 1986). Issuance of debt induces external scrutiny by investment bankers and creditors.

Traditionally, market to book value ratio (Q) and percentage change of sales are used to proxy firms' growth, but Morck, Shleifer and Vishny (1988) and McConnell and Servaes (1990) have used Q as a measure for the financial well-being of the firms. Here Q is used as a proxy for market induced monitoring. High Tobin's Q signifies firms that have valuable intangible assets such as good managers, goodwill, stock of patents and growth options. These firms have lower free cash flows and more frequent needs to go to the market for funds. Therefore high Q firms have less need for splitting the CEO and Chair positions. Firms with a very high Q may behave differently from those that have a lower Q because the marginal strength of monitoring may change at different levels of Q. To capture the potential non-linearity, Q is divided into two variables: high Q (HQ) and low Q (LQ).

The variables are defined as follows: (CEO=CHAIR)=1 when CEO is the Chair or there is no Chair. (CEO=CHAIR)=0 when titles are split between positions. This classification differs from those in the literature because the firms without a Chair are grouped with those firms where the CEO is the Chair. The lack of checks and balances in the case where there is no Chair leaves the CEO as the sole powerful individual. So those firms are grouped appropriately with the non-split firms. PINDEPT (proportion of independent directors) is defined in the same way as in Byrd and Hickman (1992).¹⁸ NMGTDIR (non-CEO, Managerial and directors' ownership) is defined as given in the proxy statement except the CEO's portion is deducted. Since non-CEO managerial ownership and proportion of independent directors are not the main variables, they will not be divided into different levels. INSTITOW (institutional ownership) and BLOCKOWN (5% ownership) are defined as in Compact Disclosure. DR(debt ratio)1 is defined as (total assets-total equity)/total asset while in DR2 market value of equity plus (TA-TE) is used in the denominator. CEOOWN is CEO's percent ownership of the outstanding common equity of the firm. Tobin's Q ratio is proxied by the firms' market to book ratio which is the sum of (the market value of equity and book value of long term debt and preferred stock) divided by the book value of total assets. As mentioned in Noronha, Shome and Morgan (1996), this simple approximation is justified because of a very high correlation (0.93) between this and Tobin's Q estimated using Lindberg and Ross's (1989) approach. The correlation is reported in Amit et. al (1989) and Perfect and Wiles (1994).

¹⁸ Independent directors are those that have no affiliation with the firm. Examples of this group are: private investors, business executives, academics and public sector decision makers. They are not corporate/retired officers, family members, investment bankers, lawyers that provide services to the firm, consultant, commercial bankers that have made loans to the firms, directors of suppliers and customers. Mean of PINDEPT in my sample is 47%. This proportion is a bit higher than Byrd and Hickman's sample (39%) which includes only NYSE and AMEX firms.

High Q (HQ) equals to Q and low Q (LQ) equals to 0 for firms with Q above 1.06 (the median of the sample). For Q below the median, HQ equals to 0 and Low Q equals to Q. So the coefficients of HQ represent the marginal effect of Q above the median Q.

3.5.b. Proxies for Agency Problems

The measures for debt and equity agency problems used here are: cash flows per dollar of sales in high cash flows, low Q firms (IFCFSALE), variance of the residual squares (SQRESVAR) and the proportion of non-fixed assets (NFXASSET).

Agency costs of free cash flows are discussed in Jensen (1986). A large amount of free cash flows creates the opportunities for the potential misuse of funds especially for firms that have low growth opportunities. Firms are divided into high/low cash flows and high/low Q firms. IFCFSALE is calculated as cash flows over sales in firms that have positive cash flows and Q above the median, i.e. cash flows over 0.000041 and Q above 1.06. Firms not belonging to this group will have a zero value for IFCFSALE. Free Cash Flows measure post-tax cash flows that are not distributed to security holders as either an interest or dividend payment. The proxy for free cash flows is defined in the same way as in Lehn and Poulsen (1989) where $CASH\ FLOWS = INC - TAX - INTEXP - PFDDIV - COMDIV$, where INC = operating income before depreciation (Compustat item #13). Tax = total income taxes, minus change in deferred taxes from the previous year to the current year (change in Compustat item 35). INTEXP = gross interest expenses on short and long term debt (Compustat item 15). PFDDIV = total amount of preferred dividend requirement on cumulative preferred stock and dividends paid on non-cumulative preferred stock (Compustat #19). COMDIV = total dollar amount of dividends declared on common stock (Compustat item #21).

The variance of the market model residuals (SQRESVAR) is used to measure the agency costs of equity because the fluctuation of the residuals is believed to represent the magnitude of additional adjustment that shareholders made on the value of the firm after accounting for changes in the market. This represents the firms' information asymmetry between shareholders and managers. Firms with low information asymmetry require small additional adjustment, inducing smaller residual variances. So as a proxy for agency costs of equity, residual squares should be positively related to split positions.

On the other hand, SQRESVAR can also be viewed as a proxy for the information transfer costs or the dynamism or environmental volatility that firms have to face. The information transfer costs should be higher the more dynamic the environment is, the higher the need for swift decision making. So under such circumstances, single leadership structure may have an advantage over a dual structure. So if residual as a proxy for information transfer costs, residual squares should be negatively related to split positions.

SQRESVAR is the variance of the square of the daily residuals from a market model. The beta estimation period is from -370 to -121 days from the starting date for calculating residuals. Returns are calculated on a 250 day period.

Proportion of non-fixed assets (NFXASSET) is another proxy for information asymmetry and agency problems. Prowse (1990) uses this to proxy for the agency costs of debt. As indicated by Prowse, non-fixed assets are the portion of assets not tied up in plant and equipment that are more difficult to monitor by debtholders. Agency costs of debt can easily arise when the sales of assets and transformation from one use to another cannot be monitored. NFXASSET is defined as one minus the ratio of gross fixed assets to total assets. So it is the proportion of non-fixed assets.

3.5.c. Proxies for Firm and Industry Characteristics

3.5.c.i. Board Effectiveness

Board size is used to proxy for board effectiveness. Board size is found to be negatively related to market valuation by Yermack (1996). For under-performing firms, Kini et. al (1995) find that boards shrink after successful tender offers. Monks and Minow (1995) also discuss that large boards can be an obstacle to change. Huther (1997) indicates that boards are inefficiently large for the rural electric cooperative industry. So board size does affect the effectiveness of the boards which in turn, affects firm performance. But there is no literature on how board size is linked to the probability of split positions. If a large board size is a signal of board ineffectiveness, then large board size should be positively related to the split/joint decision because separate chair can help to increase board efficiency and hence, large board size can increase the benefits of split

positions. Board size (TOTAL) is defined as the number of board members on the Board of Directors.

3.5.c.ii. *High-Tech Dummy*

According to Larry Swanson, Director of Economic Analysis, University of Montana (1990), high tech industries are “industries involved with computers, telecommunications, electronics, biotechnology and other emerging and rapidly evolving technologies.”¹⁹ With such a dynamic and vibrant environment, strong and visionary leadership is crucial to the running of these firms. So how these characteristics would affect the decision to split positions is an interesting empirical issue.

According to the Office of Technology Assessment and the National Science Foundation, high-tech industries are usually classified by the percentage of scientists and engineers and the direct research and development expenditures per dollar of sales. Research and development figures are not always reported, especially not for smaller companies. I combine the classification scheme from Chan, Kensinger and Keown (1997), which is based on Business week’s classification and included the industries that are benefited from NASA spin-offs of technologies. So the high-tech dummy will have a value of 1 for firms that belong to the Aerospace, Computers, information technology and software, medical, optics and scientific instruments and devices, pharmaceuticals, semiconductors and electrical equipment, telecommunications, communications equipment, space and guided missiles, research, computer and lab services. It will have a value of 0 for firms that belong to industries not listed above.

3.5.c.iii. *Information Transfer Costs*

The variance of the market model residuals (SQRESVAR) is used to measure the information transfer costs. Residual variance reflects the dynamism or environmental volatility that firms have to face. The more dynamic the environment is, the higher the information transfer costs, the higher the need for swift decision making which increases the costs of split positions. So as a proxy for information transfer costs, residual squares should be negatively related to split positions. For more details about residual variance as a proxy for agency cost of equity, please refer to section 3.5.b.

¹⁹ “High Tech Industry in Montana,” Larry Swanson, Montana Business Quarterly, Winter, 1990 P.2-8.

3.5.d. Control Variables

CEO tenure (CEOYR) and log of sales (LSALES) are included as control variables in the logistic and return regressions respectively. Vancil (1987) provides detailed studies of the succession processes used by a dozen firms. Former CEOs remain the Chairs while passing the baton (CEO titles) to their heirs. So the longer the CEOs' tenure, the higher the likelihood that the firms will split positions as part of the succession process. Size of firms may affect the probability of split. Large firms may have more active shareholders and are followed by more analysts which decreases the need for split positions. On the other hand, agency problems also seem to be more severe for large firms which seem to have more opportunities for misuse of resources.

To summarize, the proxies for agency control mechanisms are CEO ownership, non-CEO managerial and director's ownership, block ownership, institutional ownership, proportional of independent directors and Tobin's Q. The proxies for agency costs are free cash flows in high cash flow low Q firms, residual variance and proportion of non-fixed assets. Proxies for firm characteristics are size of the board and high tech dummy. The controls are CEO's tenure and log of sales.

3.6. Data and Simple Descriptive Statistics

To compile the sample, a pseudo random²⁰ sample is taken from the 1991 CRSP tape. The sample consists of 73 firms. The final sample includes firms that:

- were listed on CRSP tape through the end of 1991;
- are not in regulated banking and utility industries;
- are carried on Compustat in 1990 with the necessary data;

²⁰ All firms on 1991 Compustat are separated by exchanges and are arranged in alphabetical order. Firms from the regulated industries and those that went IPO in 1991 are excluded. My sample consists of firms taken from every thirty-two firms from the non-excluded set of firms.

- have proxy statements from June 1, 1990 to May, 31 1991 from Virginia Tech library or otherwise data are available from Compact Disclosure on CEO and Chairman.

Firms whose CEOs or Presidents serve as the Chairman of the Board as well as those that do not have a Board Chairman are classified as the group of firms where the authority is not split between two people (designated (CEO=CHAIR)=1) because CEO/Presidents will have complete power over the company when there is no Chair. These are also called the non-split firms. The other group contains those firms that have two different individuals holding the positions of CEO/President and Chairman of the Board. These firms are designated (CEO=CHAIR)=0 and are hypothesized to be attempting to control agency problems.

In this sample, there are 40 firms with combined/joint titles, 16 without a Chair and 17 firms with split positions. Table 3.1 shows the distribution of the sample. This sample has a much higher proportion of firms (five times higher) that have no Chair than Brickley, et. al's because 60% of this sample are OTC firms, and firms without Chairs appear more often in OTC firms. The percentage of OTC firms in this sample is representative of the percentage of OTC firms among all trading firms. In Brickley, et. al's Forbes sample, the median net sales for joint and split positions are \$2,250 million and \$1,940 million respectively. The median in this sample is \$54 million and \$168 million for joint and split positions firms respectively.²¹ Daily and Dalton (1993)'s firms' average sales are under \$20 million. So this sample has much smaller firms than Brickley, et. al's sample, but is larger on average than Daily and Dalton's firms.

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²¹ The mean and median of this sample are \$432.7 millions and \$52.75 millions respectively. The mean and median of the whole population (all non-regulated firms listed on 1991 CRSP and Computstat) are \$1111.98 million and \$58.36 millions respectively. So this sample has fewer extremely large firms that influence the mean but not the median. To draw a closer comparison to Brickley et al's sample which includes banks and utilities, a random sample (every 32th firms) of firms from all SICs is drawn. The mean and median of these firms are \$977.2 millions and \$67.29 millions. Brickley et. al's sample consists of only very large firms.

Table 3.1. Sample Distribution

Category	This Sample						Brickley et. al's Sample (1996)
	OTC		AMEX-NYSE		Total		
Missing Chair	11	25%	5	17%	16	22%	5%
CEO=CHAIR	22	50%	18	62%	40	55%	81%
CEO≠Chair	11	25%	6	21%	17	23%	14%
Total	44	59%	29	41%	73	100%	100%

TABLE 3.2. SIMPLE STATISTICS OF THE WHOLE SAMPLE

VARIABLES	Mean Median	Minimum Maximum
CEO AGE	53.64 54	30.00 72.00
CEO TENURE	17.06 14	5.00 51.00
CEO OWNERSHIP	0.10 0.05	0.0000 0.45
TOTAL ASSETS (Millions of \$)	318.81 53.11	2.20 5252.00
TOTAL EQUITY (Millions of \$)	100.68 21.04	0.42 896.12
TOTAL SALES (Millions of \$)	357.57 55.40	0.92 3722.24
DEBT RATIO 1 (Book value of E)	0.55 0.55	0.03 0.99
DEBT RATIO 2 (MKT. value of E)	0.52 0.54	0.02 0.98
BOARD SIZE	7.20 6.00	3.00 16.00

VARIABLES	Mean Median	Minimum Maximum
NUMBER OF SHAREHOLDERS	3046 1234	43 62,597
Q (MKT./BOOK)	1.24 1.06	0.44 5.00
PROP. of INDEPT. BOARD MEMBER	0.47 0.50	0.00 0.88
MGTDIROW	0.25 0.18	0.01 0.87
BLOCKOWN	0.37 0.34	0.00 1.00
INSTITOW	0.28 0.20	0.00 0.87
ONE YEAR INDUSTRY ADJUSTED RETURN ON ASSETS (ROA1)	-0.04 0.01	-1.15 0.27
INDUSTRY ADJUSTED SELLING & ADMINISTRATIVE EXPENSES (SGA)/ # of EMPLOYERS FOR ONE YEAR (SGAEMP1)	1.79 -2.21	-70.79 67.48
ONE YEAR INDUSTRY ADJUSTED SGA/SALES (SGASALE1)	0.05 -0.01	-0.29 0.70

Simple statistics describing the sample are in Table 3.2. The median CEO age for the whole sample is 54. On average, the CEOs have been around for 14 years. The median CEO ownership is 5%. The median for one year or three year averaged industry adjusted ROA is 1%. The median managerial, institutional and block ownership are 18%, 20% and 34% respectively. Half of the board members are independent directors. The median debt ratio is 55%.

Univariate t-test, Non-Parametric Tests

Generally, firms that have joint titles or no Chair ((CEO=CHAIR)=1) have the following characteristics (please refer to Table 3.3 for details on the comparison of CEO and performance characteristics of firms for (CEO=CHAIR)=0 versus (CEO=CHAIR)=1):

- Marginally older CEO;
- Marginally longer CEO tenure;
- Significantly higher CEO ownership;
- Marginally lower performance in terms of industry adjusted ROA;
- Marginally smaller board

than firms that have split titles.

From the simple statistics, the CEO entrenchment effect is clear. Non-split firms have CEOs that are older, with longer tenure, have higher CEO ownership, and lower industry adjusted return on assets. The two sub-samples on average have similar efficiency measures (such as selling and administrative expenses per employees or per dollar of sales (SGAEMP and SGASALE)), as well as similar size (total assets and total equity), debt ratio, percentage of institutional, managerial and block ownership.

3.7 Results

3.7.a. (CEO=CHAIR) as a Decision Variable and Factors Influencing this Decision

To investigate whether split versus joint positions is a decision variable and how agency control variables, level of agency problems, firm and industry characteristics affect this decision, agency control mechanisms and firm characteristics are used as explanatory variables in a Logit model for the probability that a firm has two persons in the two positions. Results are shown in Table 3.4. The very high predictive power (varies from 89% to 93%) of the estimated logistic model confirms the hypothesis that the probability of choosing split positions is related to control mechanisms and agency problems as well as to size and other factors.

The table is structured in the following ways. Equation 1 does not include PINDEPT (proportion of independent directors) as the dependent variable. The number of observations decreases by one fourth when PINDEPT is included in the model (see column 2). Equation three represents results from the same set of firms for equation 2. i.e. the same set of firms are used in equation two and equation three. Using the same set of firms provides a more valid comparison between models with the PINDEPT variable and without the PINDEPT variable. The significance and the sign of variables in the model 2 and 3 and model 1 and 2 are basically the same. As a whole, more variables become significant as the sample size increases. The coefficients of cash flows in high cash flow, low growth firms (IFCFSALE), residual variance (SQRESVAR) and log of sales (LSALES) become significant and the significance for institutional holdings is higher in the larger sample. Comparing models 2 and 3, IFCFSALE and SQRESVAR are insignificant in both models, which mean their significance in model one is not due to the omission of PINDEPT. For this study where the number of observations is small, PINDEPT will be dropped from the model.

TABLE 3.3. COMPARISON OF CEO CHARACTERISTICS & FIRM PERFORMANCE OF SPLIT AND NON-SPLIT FIRMS

*** 98 % significance ** 95% significance * 90% significance

VARIABLES	(CEO=CHAIR) or NO CHAIR JOINT FIRMS		(CEO≠CHAIR) Split firms		TEST FOR DIFFERENCE IN MEANS AND DISTRIBUTIONS	
	MEAN MEDIAN	Maximum Minimum	MEAN MEDIAN	Maximum Minimum	T TEST (PROB.>T)	WILSON 2 SAMPLE TEST (PROB.>Z)
CEO AGE	54.41 55.5	72 30	51.12 51	63 40	-1.64 (0.10) *	-1.62 (0.10) *
CEO TENURE	17.89 15	51 5	14.35 11	50 6	-1.25 (0.21)	-1.91 (0.06) *
CEO OWNERSHIP	0.12 0.07	0.45 0.0002	0.04 0.01	0.25 0.00	-3.38 (0.00) ***	-2.85 (0.00) ***
TOTAL ASSETS	314.63 52.33	5252 2.20	332.57 122.98	2137 13	0.11 (0.92)	0.70 (0.49)
TOTAL EQUITY	86.89 20.17	896.12 0.42	146.13 26.70	873.16 2.59	0.90 (0.38)	0.24 (0.81)
TOTAL SALES	296.33 54.12	3722.24 0.92	559.29 167.92	2409.73 3.30	1.44 (0.15)	1.09 (0.28)
Q (MKT./BOOK)	1.27 1.05	5 0.44	1.15 1.08	2.84 0.67	-0.73 (0.47)	0.21 (0.83)
INDUSTRY ADJUSTED (IND. ADJ.) RETURN ON ASSETS (ROA1)	-0.05 -0.01	0.19 -1.15	0.01 0.01	0.27 -0.13	-1.63 (0.10) *	0.79 (0.43)
SGASALE1 (IND. ADJ.)(millions/millions)	0.056 -0.0004	0.70 -0.29	0.04 -0.02	0.67 -0.11	-0.33 (0.74)	-0.38 0.70
SGAEMP1 (IND. ADJ.) (millions/thousand emp.)	2.57 -2.13	67.48 -70.79	-0.57 -3.44	41.01 -29.84	-0.47 (0.64)	-0.51 0.61

Continued...TABLE 3.3. COMPARISON OF CEO CHARACTERISTICS & FIRM PERFORMANCE OF JOINT AND SPLIT FIRMS

*** 98 % significance ** 95% significance * 90% significance

VARIABLES	(CEO=CHAIR) or NO CHAIR JOINT FIRMS		(CEO≠CHAIR) Split firms		TEST FOR DIFFERENCE IN MEANS AND DISTRIBUTIONS	
	MEAN MEDIAN	MAX. MIN.	MEAN MEDIAN	MAX. MIN.	T TEST (PROB.>T)	WILSON 2 SAMPLE TEST (PROB.>Z)
BOARD SIZE	7 6	16 3	7.88 8	12 5	1.21 (0.22)	1.98 0.05 **
Prop OF INDEPT. BOARD MEMBER	0.46 0.5	0.86 0	0.51 0.56	0.88 0.20	0.72 (0.47)	0.72 (0.47)
MGTDIROW	0.24 0.19	0.84 0.01	0.26 0.16	0.87 0.03	0.16 (0.87)	-0.22 (0.82)
INSTITOW	0.28 0.19	0.87 0	0.29 0.20	0.74 0.00	0.13 (0.89)	0.08 (0.93)
BLOCKOWN	0.35 0.29	1.00 0	0.45 0.37	1.00 0	1.18 (0.25)	0.95 (0.34)
DEBT RATIO (Mkt. value of equity) DR1	0.55 0.56	0.97 0.03	0.57 0.52	0.99 0.28	0.31 (0.76)	0.15 (0.88)
DEBT RATIO (Book value of Equity) DR2	0.52 0.55	0.94 0.02	0.53 0.54	0.98 0.10	0.15 (0.88)	-0.02 (0.98)
NUMBER OF SHAREHOLDERS	3120.41 1054	62597 43	2786 1556	12566 592	-0.24 (0.81)	1.41 0.16

TABLE 3.4. RESULTS OF LOGISTIC REGRESSIONS USING CEO=CHAIR/NO CHAIR AS THE DEPENDENT VARIABLE, AGENCY CONTROL MECHANISMS AND FIRM CHARACTERISTICS AS INDEPENDENT VARIABLES

$$\text{Logit of } P(Y=0 \text{ or } \text{CEO} \neq \text{CHAIR}) = a_0 + \beta X + E$$

*** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and Wald chi-square Statistics for Regression Models		
	NO PINDEPT	WITH PINDEPT	COMPARABLE SET WITH PINDEPT
Column Number	1	2	3
CEO TENURE	-0.03 0.23	-0.20 1.29	-0.19 1.42
CEOOWN	-17.90 6.45 ***	-31.13 5.06 ***	-30.70 5.44 ***
NMGTDIR	2.30 0.54	2.38 0.15	2.66 0.23
BLOCKOWN	3.87 3.32 *	6.58 3.73 *	6.48 3.93 **
INSTITOW	-7.44 4.09 **	-7.97 2.35	-7.91 2.34
PINDEPT		-0.34 0.01	
TOTAL	-0.05 0.07	-0.11 0.17	-0.10 0.16
HQ	-0.15 0.03	-6.67 1.24	-6.59 1.23
LQ	9.08 2.73 *	17.26 2.99 *	17.27 3.00 *
IND	-0.30 0.04	1.44 0.56	1.39 0.55
DR1	-5.11 3.25 *	-8.51 2.63 *	-8.44 2.63 *
LSALES	3.13 4.43 ***	2.69 2.08	2.67 2.06
IFCFSALE	1715.4 2.56 *	3301.2 1.74	3226.4 1.82
SQRESVAR	2638.4 3.29 *	2601.5 1.69	2689.6 2.13
NFXASSET	7.30 2.97 *	9.64 3.20 *	9.47 3.38 *
% Correct	89%	93%	91%
P -2 log L	0.0009	0.0017	0.001
# of OBS.	74	56	56

From here onwards, the discussion will concentrate on the first model. First an overview of the signs will be given, then the interpretation of the sign of each variable will follow. Coefficients of CEO ownership (CEOOWN), debt ratio (DR1) and institutional ownership (INSTITOW) are negative and significant. The presence of monitors/incentives such as institutional holders, debt holders and CEOOWN tends to decrease the probability of splitting position titles. They are either mechanisms that are alternatives²² to split positions for lowering agency problems or are factors that encourage/allow CEO entrenchment. If such increased use of other agency control mechanisms that is associated with a lower probability of split positions also increases return (an issue addressed here in later regressions), then the alternative mechanism hypothesis is supported. Low growth firms (LQ), blockholdings (BLOCKOWN), LSALES, IFCFSALE, SQRESVAR and proportion of non-fixed assets (NFXASSET) all have positive and significant coefficients. The first two variables signify agency control mechanisms. BLOCKOWN and LQ either represent conditions that increase the need for split positions or are mechanisms that promote split positions. The latter is supported if increased use of those agency control mechanisms which is associated with a higher probability of split positions also increases returns or operating efficiency. IFCFSALE, SQRESVAR and NFXASSET represent levels of agency problems. Increases in the level of agency problems increase the probability of split positions. The other variables such as CEO's tenure, board size, high-tech industry and HQ all have insignificant coefficients.

Empirical evidence indicates that CEO ownership and debt holdings are negatively related to the probability of split positions and operating expenses (later in part two of the dissertation), consistent with the notion that these agency control mechanisms are substitutes for split positions. This would mean the probability of split positions would be lower when these alternatives are in place. The existence of alternatives for split positions imply not all the firms will split positions unless the costs of the alternatives are always higher than the costs of splitting positions. This is contrary to the proponents' argument for split positions for all firms. Increasing CEO ownership can increase an alignment of interests; thus the need for splits decreases and returns would be expected to increase. So aligning CEOs' interests through ownership can be a substitute for split positions. On the other hand, increases in CEO's ownership may also enhance his/her entrenchment. If CEOs thwart the decision to split positions, it will also make the separation of CEO and Chairman of the board titles unlikely. Results from the second part of the dissertation indicate that the former explanation is more likely. Higher CEO ownership lowers selling and

²² Two mechanisms have an alternative relationship when the increase of one is associated with the decrease of the other. Since CEO=CHAIR is zero when the positions are split, agency control mechanisms that have a alternative relationship with split positions should have a negative coefficient in the logistic regressions in table 3.

administrative expenses per dollar of sales (a measure of operating efficiency) while it is negatively related to the probability of split positions.

Like CEO ownership, the coefficient for DR1 is also negative. DR1 is used to proxy for the monitoring provided by the bondholders.²³ In addition to the oversight of the transfers of assets from bondholders to shareholders, bondholders are also concerned with the general financial well-being of the firms. Thus, increases in debt holdings would decrease the probability of split positions. There is also some weak evidence that debt substitutes for split positions because higher debt holding is positively related to higher operating efficiency noted in the second part of the dissertation. But this does not explain the negative relationship between DR1 and returns (also in the second part of the dissertation).

Institutional owners may be more active in monitoring their portfolios due to their fiduciary responsibilities. Increases in the percent of firm owned by institutional investors decrease the probability of split. This finding is consistent with the existing literature on the positive monitoring role performed by institutional holders (see 2.3 and 3.5.a for details).

Higher levels of growth induced monitoring, proxied by Tobin's Q, is found to be positively related to split positions and returns (as seen in part two of the dissertation), consistent with the notion that it is complementary to split positions. Q represents growth induced monitoring. More growth induced monitoring in the low growth firms either promotes split positions or provides the condition for split positions. The latter may imply growth by itself is not enough to control agency problems even after controlling for existence of other agency control mechanisms.

Evidence seems to indicate that blockholding increases the need for split positions. The coefficient for block-holding is significant and positive. Again, there are two ways to interpret this. The first interpretation suggests that block ownership works in harmony with split positions to lower agency problems. Blockholdings, the pure size of the ownership effect, are less effective than CEO ownership in controlling agency problems. The second interpretation relates the

²³ On the other hand, even if debt ratios are a better proxy for the financial condition of the firm, then debt ratios' effect on the probability of split positions will be the same. Stronger leadership or joint positions may be needed when firms are in turmoil. Therefore, increases in debt ratios may also increase the probability of joint positions.

probability of split to the needs for split positions.²⁴ As reported later in the dissertation, higher levels of blockholdings are associated with lower operating efficiency, thus, the evidence indicates that higher level of blockholding increases the need for split positions.

IFCFSALE, SQRESVAR and NFXASSET, the proxies for agency problems, are significantly negative. Increases of cash flows in high cash flows-low Q firms, of residual variance and of the portion of non-fixed assets significantly increase the probability of split. Higher free cash flows in high cash flows, low growth firms can increase the agency problems of free cash flows when managers mis-allocate the extra funds. Residual variance represents information asymmetry between shareholders and the firms. Information asymmetry can cause two opposing effects. When the level of information asymmetry is high, then the information transfer costs will be high, too. According to Brickley et al (1997), the higher the information transfer costs, the higher the probability of joint. So SQRESVAR is expected to be negatively related to split positions. However, the higher the residual variance, the higher the equity agency problem caused by information asymmetry between shareholders and the firms. So SQRESVAR is expected to be positively related to split positions. Here, the Logit model indicates that SQRESVAR is positively related to split positions. So the second effect, the agency costs of equity, dominates. So higher information asymmetry results in higher probability of split. Higher proportion of non-fixed assets signifies more opportunities and discretion for the manager to redirect resources. So higher proportion of non-fixed asset represents higher level of agency cost of debt. The results on these three variables are as hypothesized: the higher the agency costs of free cash flows, of equity and of debt, the higher the need for an additional agency control mechanism such as split positions.

The Logit analysis also indicates that larger firms have a higher probability of split positions. The sign for the coefficient of CEO tenure is negative and insignificant. The result for CEO tenure does not support Vancil's "passing the baton" hypothesis where a young executive replaces an old CEO who becomes the Chair to facilitate the power transition process.

Overall, the results are consistent with the view of the choice of split positions as a means of managing agency problems in concert with other mechanisms in an integrated decision framework. The Logit regression has very high predictive power (close to 90%). Supported by higher operating efficiency, evidence to be shown in part two of the dissertation, CEO ownership are negatively related to split positions, and substitutes for split positions. Higher growth induced monitoring in low growth firms, related to higher returns (to be seen in return models in part two),

²⁴ It is quite surprising that increases in BLOCKOWN, supposed to be an agency control mechanism, increases the need to split. But BLOCKOWN also includes insider-blockholdings; it may be representing managerial ownership.

works in harmony with split positions. Blockholding, associated with lower operating efficiency (to be shown in part two), increases the need for split positions. Institutional ownership and debt ratio are negatively related to split positions. Firm characteristics, reflecting the degree of free cash flow, of equity, and debt agency problems, are positively correlated with the probability of split positions when other firm conditions such as the presence of agency control mechanisms are also considered. So firms with higher agency problems are more likely to chose split positions.

3.7.b. Specification Tests

To ensure the logistic regression is correctly specified, the effect of the addition of various possible factors that may possibly be related to split positions to the original logistic regression will be investigated. The classification of no chair firms as joint firms will also be examined to ensure that results in section 3.7 are not dependent on the definition.

3.7.b.i. *Addition of Factors*

One may be concerned that certain factors such as the breadth of ownership and degree of outside scrutiny by analysts and individual investors, which are not included in the Logit model, may have an impact on the split versus joint decision. The effect of the separation of titles for widely held firms may be different from that of the closely held firms. Joint titles may cause more problems for widely held companies than closely held ones because the free rider problem²⁵ is lower in closely held companies, and so shareholders are able and more likely to assert their influence through board governance. Another factor that may change the result is the monitoring by analysts and individual investors. Firms that are constantly being monitored by the analysts and investors may have a lesser need for split positions.

The log of the number of shareholders (LSHNUM) is used as a proxy for the breadth of ownership. The smaller the number of shareholders, the narrower the ownership will be. Narrow ownership would imply lower free rider problem and more effective board governance, and thus lessen the need for split positions. So LSHNUM is expected to be positively related to split positions. If firms listed on New York Security Exchange (NYSE) or American Exchange

²⁵ For details about how number of participants affect free rider problems, refer to Stigler's (1974) "Free Riders and Collective Action: An Appendix to Theories of Economic Regulation."

(AMEX) are followed more closely by security analysts and shareholders than those listed on the Over the Counter (OTC)²⁶, then being listed on big exchanges may correspond to increased outside scrutiny. So listing on the exchange is used as the proxy for the degree of outside scrutiny by analysts and investors. For firms that are listed on NYSE/AMEX, EXCHANGE will have a value of 1 and 0 otherwise. So EXCHANGE is expected to be negatively related to split positions.

To address the concern of misspecification, the log of the number of shareholders, denoted as LSHNUM, and an exchange dummy, EXCHANGE, are individually added to the original logistic regression to examine their effects on split positions and other variables. Results are shown in Table 3.5. The first two columns show results of the original model, the third and fourth column show results with LSHNUM added in the regressions. The fifth and the sixth columns show results when the exchange dummy is used. The seventh and the eighth columns contain results when both the LSHNUM and EXCHANGE are added to the logistic model.

Results indicate that the original model is not mis-specified. Coefficients for LSHNUM and EXCHANGE are insignificant in all six (column 3-8) logistic regressions. Addition of these variables does not alter the significance of variables in the original model. All models (the ones with LSHNUM, the ones with EXCHANGE and the ones with both variables, i.e. column 1-8) have around 90% correct classification. Firms that are mis-classified by one model are also mis-classified by the other model with only one/two exceptions. Therefore, all models are similar to the original model in terms of the significance of the variables and percentage of correct classifications.

²⁶ Kadlec and McConnell (1994) find that listing on the New York Stock Exchange is associated with an increase in the number of shareholders. Their cross section regression provide support for investor recognition as one of the sources of value from exchange listing.

TABLE 3.5. SPECIFICATION TESTS ON LOGISTIC REGRESSIONS USING CEO=CHAIR/NO CHAIR AS DEPENDENT VARIABLES, AGENCY CONTROL MECHANISMS & FIRM CHARACTERISTICS AS INDEPENDENT VARIABLES

Logit of P(Y=0 or CEO≠CHAIR) = $a_0 + \beta X + E$ *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and Wald Chi-Square Statistics for Regression Models								No-Chair firms excluded
	ORIGINAL MODEL	ORIGINAL MODEL	ADD LSHNUM	ADD LSHNUM	ADD EX-CHANGE	ADD EX-CHANGE	ADD ALL VAR.	ADD ALL VAR.	
Column #	1	2	3	4	5	6	7	8	9
CEO TENURE	-0.03 0.23	-0.20 1.29	-0.01 0.03	-0.16 0.73	-0.03 0.23	-0.26 1.21	-0.01 0.02	-0.26 0.97	-0.12 1.35
CEOOWN	-17.90 6.45 ***	-31.13 5.06 ***	-17.11 5.98 ***	-30.03 4.45 **	-17.68 6.24 ***	-38.47 3.95 **	-16.74 5.73 ***	-39.81 2.91	-34.79 7.08 ***
NMGTDIR	2.30 0.54	2.38 0.15	2.94 0.73	3.52 0.34	2.38 0.57	3.00 0.20	3.23 0.83	3.74 0.30	1.67 0.11
BLOCK OWN	3.87 3.32 *	6.58 3.73 *	4.45 3.99 **	8.73 3.98 **	3.68 2.98 *	8.51 3.43 *	4.22 3.62 **	12.43 2.49	10.62 4.77 **
INSTITOW	-7.44 4.09 **	-7.97 2.35	-6.90 3.04 *	-9.85 2.39	-7.35 3.95 **	-10.96 2.90 *	-6.92 3.14 *	-13.47 2.49	-14.31 4.65 **
PINDEPT		-0.34 0.01		-0.07 0.0003		0.18 0.00		-0.34 0.01	
TOTAL	-0.05 0.07	-0.11 0.17	-0.09 0.21	-0.22 0.51	-0.03 0.03	-0.15 0.26	-0.07 0.12	-0.28 0.61	-0.12 0.13
HQ	-0.15 0.03	-6.67 1.24	-0.39 0.14	-5.34 1.26	-0.30 0.06	-9.09 1.11	-0.52 0.13	-7.25 1.32	-1.55 0.81
LQ	9.08 2.73 *	17.26 2.99 *	9.48 3.02 *	18.27 3.01 *	9.43 2.80 *	19.89 2.65 *	9.90 3.02 *	22.26 2.49	16.01 3.55 *
IND	-0.30 0.04	1.44 0.56	-0.20 0.02	1.88 0.74	-0.57 0.13	2.98 1.29	-0.51 0.10	3.84 1.28	-0.96 0.25
DR1	-5.11 3.25 *	-8.51 2.63 *	-5.17 3.22 *	-10.88 3.11 *	-5.18 3.27 *	-9.36 2.59 *	-5.25 3.19 *	-12.99 2.46	-12.35 4.82**
LSALES	3.13 4.43 ***	2.69 2.08	2.66 3.01 *	2.43 1.53	3.23 4.39 **	2.39 1.57	2.78 3.05 *	2.01 1.00	3.57 3.42 *

**CONTINUED... TABLE 3.5. SPECIFICATION TESTS ON LOGISTIC REGRESSIONS USING
CEO=CHAIR/NO CHAIR AS DEPENDENT VARIABLES, AGENCY CONTROL MECHANISMS & FIRM
CHARACTERISTICS AS INDEPENDENT VARIABLES**

$$\text{Logit of } P(Y=0 \text{ or } CEO \neq \text{CHAIR}) = a_0 + \beta X + E$$

Independent Variables	Parameter Estimates and Wald Chi-Square Statistics for Regression Models								No-Chair firms are excluded from the sample
	ORIGINAL MODEL	ORIGINAL MODEL	ADD LSHNUM	ADD LSHNUM	ADD EX-CHANGE	ADD EX-CHANGE	ADD ALL VAR.	ADD ALL VAR.	
Column #	1	2	3	4	5	6	7	8	9
IFCFSALE	1715.4 2.56 *	3301.2 1.74	1549.2 2.12	2730.1 1.10	1760.0 2.57 *	3773.7 1.50	1552.0 2.00	3784.2 1.29	2962.8 2.55
SQRESVAR	2638.4 3.29 *	2601.5 1.69	2629.2 3.39 *	2596.1 1.34	2567.1 3.03 *	3137.0 2.09	2555.1 3.13 *	3429.4 1.75	2868.2 2.11
NFXASSET	7.30 2.97 *	9.64 3.20 *	8.25 3.22 *	12.46 2.89 *	7.22 2.92 *	12.29 3.03 *	8.33 3.30 *	17.25 2.06	18.91 4.50 **
LSHNUM			0.56 0.90	1.28 1.79			0.61 1.04	1.52 1.44	
EXCHANGE					-0.55 0.21	2.48 0.89	-0.67 0.27	3.01 0.73	
% Correct	89.2%	92.8%	90.4%	90.9%	90.5%	87.5%	93.2%	90.9%	82.5%
p values of -2 log L	0.0009	0.0017	0.0029	0.003	0.0015	0.0019	0.0042	0.0034	0.0001
SCORE	0.0314	0.0552	0.0551	0.1060	0.0864	0.0494	0.0709	0.1285	0.0457
# of OBS.	74	56	73	55	74	56	73	55	57

In terms of model fit measured by the p value of $-2 \log L$ and Score,²⁷ the models with LSHNUM (column 3 & 4), with EXCHANGE (column 5 & 6), and with both the LSHNUM and EXCHANGE (column 7 & 8) under-perform the original ones (column 1 & 2) The difference of the p value of Score between the model with PINDEPT and without PINDEPT is larger in these models than the original models. Models with both LSHNUM and EXCHANGE (column 7 & 8) have the highest percentage of correct classifications, but in terms of $-2 \log L$ and Score, they are not as good as the original models. SCORE from Model with PINDEPT, LSHNUM and EXCHANGE (column 8) is insignificant. So the addition of LSHNUM, EXCHANGE individually or both together do not help to improve the logistic model.

3.7.b.ii. Classification of Data

In addition to the concern of missing variables, there are concerns that results are driven by the classification of the split versus non-split firms (i.e. the definition of the CEO=CHAIR variable). Brickley, et al (1997) drop all firms without a chair from the sample and classify the rest of the firms by split and joint titles. This paper classifies firms that don't have any chairs or don't have chairs listed as non-split firms. For the prior case, CEO will have *de facto* power in these no-chair firms. For the latter case, data for the chair positions is actually missing. Results from the previous sections are based on a data set that includes firms with missing data on the chair positions. Firms should have the name of the chair reported if it is different from the CEO since the chair is an important position. The inclusion of these firms in the analysis is justified.

To investigate whether the results are driven by the definition of CEO=CHAIR variable, all firms that do not have chairs are deleted from the sample. A total of seventeen firms are deleted from the sample. To distinguish this set of firms that do not have the "no chair" firms, a new dependent variable CEOEQCH is used. For firms that have split titles, CEOEQCH=1. CEOEQCH=0 for firms with joint titles. Firms that don't have any chair, CEOEQCH=missing values. Results are shown in the last column in Table 4 where no-chair firms are excluded from the sample.

²⁷ The $-2 \log L$ is a test for the effects of the independent variables based on the $-2 \log$ Likelihood which is equal to -2 times the summation of the weight of the observation times the log of \hat{p} for each observation. The estimate \hat{p} is the probability obtained by replacing regression coefficients by their maximum likelihood estimates. The Score statistic gives a test for the joint significance of the explanatory variables in the model. Under the hypothesized $x=x_0$, it is defined as the vector of the second partial derivatives of the log likelihood with respect to parameter vector x times the inverse of the negative second partial derivatives of the log likelihood with respect to x times the vector of the partial derivatives of the log likelihood with respect to the parameter vector x . It has an asymptotic Chi-square distribution with r degree of freedom where r is the dimension of x (SAS User's Guide: Statistics, Cary, North Carolina, Version 5 Edition, 1985, p.1075 and p.1089).

Results of the logistic regression (column 9) are very similar to the original regression (column 1). Significant variables remain significant except for IFCFSALE and SQRESVAR which become insignificant in the CEOEQCH model. But their t values are close to 15% level of significance. Even the non-significant ones have the same sign. The percentage of correct classifications dropped from 89% to 83%. The CEOEQCH logistic model has mis-classified a total of ten firms compared to eight by the first model. Four out of the eight firms, which are not correctly classified by the first model, remain mis-classified in the second model. None of six firms that are mis-classified in CEOEQCH model are mis-classified in the other models (column 1-8). Two of the remaining four incorrectly classified firms by the original model (column 1) have no chairs. So more firms are mis-classified when no-chair firms are deleted from the sample. Given the small number of firms involved, the significance of the difference is unclear. Further analysis on the impact of this classification on returns is presented in part two of the dissertation.

As a whole, the logistic model in section 3.7 is able to withstand the mis-specification tests and the check on firm classification. The addition of variables (log of number of shareholders and exchange listing) and the deletion of no-chair firms do not seem to significantly alter the results. Most of the variables that are significant in the original model remain significant. Insignificant ones are also insignificant in those models. Most models (except the all variable and CEOEQCH model in column 8 & 9) have similar p values for $-2 \log L$ and SCORE and percentage of correct classifications. The predictive power for the original logistic model is higher when no-chair firms included in the sample than when those firms are deleted from the sample.

Chapter 4

Split Versus Joint Positions: The Performance Effect

4.1 Approach

The probabilistic modeling in the previous chapter shows that split versus joint positions is indeed a function of agency control mechanisms and agency problems. The next step is to examine whether the split versus joint decision has any observable, material effect on accounting return and operating performance. As mentioned in section 2.3, previous studies have reported the positive effects of splitting positions on CEO compensation (Boyd, 1994), adoption of poison pills (Mallette and Fowler, 1992), CEO turnover in poorly performing firms (Weisbach, 1988), and price reaction to anti-takeover amendments (McWilliams and Sen, 1997). However, the effects of split positions on returns are inconclusive. Pi and Timme (1993) report a more positive return on assets for banks with split positions; Daily and Dalton (1992) do not find any difference in performance between split and joint firms; Brickley, Coles and Jarrell (1996) document higher returns for joint firms than for split firms among large companies; Baliga, Moyer and Rao (1996) finds weak evidence that joint titles negatively affect long term performance. Based on the findings above, some researchers (e.g. (Weisbach, 1988), Daily and Dalton (1992) and Jensen (1993)) conclude that firms' returns or operating efficiency suffers when firms choose to have joint titles. As discussed in 3.1, firms optimally choose their leadership structure based on a choice of agency control mechanisms. The conclusion that split firms are better than joint firms implicitly implies that split positions is the more cost effective agency control mechanism when compared to others.

Yet, this conclusion may not be valid because these studies have not controlled for the role of agency costs and agency control mechanisms. The characteristics of the firms (level of agency problems), industry characteristics and the presence of other agency control mechanisms have to be put into one framework when evaluating of the effectiveness of CEO duality. In this study, the role of agency costs and agency control mechanisms enter into the model to control for the effects of the demand for controlling agency problems and for the extent to which the demand is already met by alternative control mechanisms.

This paper assumes that firms optimally choose a combination of agency control mechanisms based on firms characteristics (particularly, level of agency problems) and presence of agency control mechanisms. So there is no a priori reason to believe firms that optimally choose to have joint positions will necessarily experience higher or lower returns than firms that optimally choose to separate positions. This is applicable to the utilization of all agency control mechanisms, not just split positions. Since firms may face different cost functions that attain the optimum at different levels of costs, this study views the impact of split versus joint positions as an empirical question regarding the relative costs and benefits of the choice made in the context of the existing condition faced by the firm.

Although firms may not necessarily achieve better performance by adopting a particular policy such as splitting the CEO and Chair positions, the observable difference between the split and the non-split samples could be material. The relationship between the split versus joint decision and performance may be more complex than what is captured by a simple averaging of returns of firms in different subsamples (after holding other things equal). Therefore, this study also examines whether the split versus joint positions affect the relationship between performance and various independent variables.

As a whole, this study controls for the effects of the demand for split positions and the extent to which the demand is met by existing monitors. Putting these factors into a single framework, this study examines the relationship between performance and the split and non-split decision and evaluates whether the split/joint decision plays a direct role in firm performance after accounting for firm conditions, industry characteristics and the presence of monitors.

4.2. Relationship Between Split/joint Positions, CEO Ownership & Performance

4.2.a. Split/Joint Positions and Performance

As indicated in 2.2 and 3.2, there are costs and benefits associated with the use of split positions. The use of split positions and the effect on performance depends on the tradeoffs between its costs and its benefits.

The relative costs and benefits of split positions are likely to depend on firm characteristics. Split positions may positively affect performance for some firms and not for others. This study will identify and examine how firm characteristics and conditions that affect the cost-benefit analysis of split positions are reflected in firm performance.

4.2.b. CEOs' Ownership, Split/Joint Positions and Firm Performance

The CEO's ownership of the firm's stock will affect the cost/benefits and probability of split positions. On one hand, the CEO's interests can be more aligned with that of the shareholders when the CEOs own a large portion of the firm; on the other hand, CEOs can also become entrenched when they own a substantial portion of the firm. When the latter happens, split positions can be impossible to achieve or ineffective if implemented.

When the CEO is very entrenched either through his/her ownership or through his/her dominance of the board of directors, the need for monitoring will be high. However, the CEO and Chair positions may still be joint because the CEO may have so much power over the board that the board cannot even execute the split. In other words, the entrenched CEO may be able to thwart or eliminate the "supply" of split positions even though the demand for split positions is strong. In this case, the relationship between split positions and performance is altered by the CEO's ownership structure. So these non-split firms could exhibit lower performance.

On the other hand, splitting may occur, but the CEO is so entrenched that even split positions would have no impact on his power. This is the second way that ownership structure

affects the splitting and performance relationship. The shareholders believe that the benefits of splitting and the need for monitoring are high because of the CEO's entrenchment. But if the CEO already has power over the board, the amount of benefits that can actually be realized becomes an empirical question. The management can be so powerful that it can make split positions an ineffective mechanism for controlling agency problems. So even for firms that split, the realized benefits of split may not be greater than its costs and the positive effects on performance may never materialize.

4.2.c. CEO Ownership and its Impact on Empirical Testing

In designing the empirical tests for the relationship between splitting of positions and performance, one has to recognize that firm characteristics, especially CEO ownership, will have an impact on the methodology. In my sample of firms, the majority (close to 80%) of the firms are non-split firms. But non-split firms include not only those where costs of split positions are greater than the benefits of split positions. The observed non-split firms also include firms where benefits of split are greater than its costs but the boards cannot effect splits. There may also be firms where costs are equal to benefits and the board chooses to stay non-split. On the other hand, split firms are not only those where benefits of a split are higher than its costs, but also those where the ex-ante benefits of a split may seem to be greater than its costs. These are firms where CEOs have the power to thwart any agency control mechanisms, including the creation of a separate chair of the board.

Therefore, when testing for the difference of performance among split and non-split firms, one has to take into consideration this CEO ownership effect and separate firms that are under the influence of CEO ownership from the rest of the firms.

4.3. Research Questions

The main questions are:

- Is the performance of firms that have split positions materially different from those that have not?

- Is the relationship between splitting/combining CEO and Chairman of the Board positions and performance dependent on firm conditions, industry characteristics, and the existing level of monitoring?

4.3.a. Null and Alternative Hypotheses for the first question
(whether splitting CEO and Chairman of the Board positions affect performance)

The following three hypotheses address the magnitude and the direction of the impact of separating CEO and Chair positions. The Indifference Hypothesis suggests there is no difference in returns between split and non-split firms. There could be two reasons for this result:

- either CEO and Chair being the same person is immaterial (benefits and costs of split are immaterial) or
- the benefits of splitting are equal to its costs.

On the other hand, both the CEO Leadership and the agency problem hypothesis suggest split positions affects performance. But their prediction on the direction of the effect from split positions differs. According to the CEO Leadership Hypothesis, the costs of a split are greater than its benefits. Therefore, split positions would negatively affect returns. The argument behind this is that a single leader will improve responsiveness to the environment and enhance accountability of decision making. The Agency Problem Hypothesis suggests the opposite of the CEO Leadership Hypothesis. In this case, the benefits of splitting are greater than its costs, so split positions would positively affect returns. The lack of checks and balances on CEOs if the positions are not split would create an opportunity for CEO entrenchment, that enables and accentuates the development of agency problems.

Each of these hypotheses are discussed in more detail below.

4.3.a.i. *The Null Hypothesis:*

*The null hypothesis also known as **The Indifference Hypothesis** states that CEO and Chair being the same person does not affect performance.*

No matter how significant or insignificant the benefits and costs of splits are, as long as the benefits of splits equal to their costs, the split will not have any effect on performance. In other words, split positions can be an important decision that has the advantages and disadvantages mentioned in section 2.2 and 3.2., but the costs are more or less equal to benefits. So the net result is zero impact on performance.

Splitting can also be an insignificant decision, irrelevant to performance. This means that the advantages and disadvantages of splitting that we discussed in section 3.2 are immaterial and relatively unimportant. There are two possibilities. The market for CEOs and directors is always at work, and it will discipline inefficient managers and directors so separation does not make a difference. Alternatively, separating CEO and Chair positions simply may not be an agency control mechanism.

The direct opposite of this is that split positions does make a difference in performance, but it cannot be observed. Boards are supposed to react when there is poor performance. If firms are running fine, the role of the board will not be detected because in practice, the board will not be involved in the running of firms unless they are performing poorly.

Another case where no effect on performance may be observed is where the potential marginal benefits of control mechanisms may far exceed its costs; however, separating positions may not be an effective means or cost efficient for controlling agency costs especially when CEOs have sufficient power over the Board or are sufficiently entrenched to thwart any agency control efforts.

4.3.a.ii. *The Alternative Hypotheses:* The CEO Leadership and Agency Problem Hypotheses.

4.3.a.ii-1. *The CEO Leadership Hypothesis:*

The hypothesis states that firm value is positively affected by having the same person holding CEO and Chairman of the Board positions because benefits of joint positions are greater than their costs.

Contrary to the indifference hypothesis, the CEO Leadership Hypothesis argues that combining the CEO and Chair positions is better than splitting them. Brickley, Coles and Jarrell (1996) argue that the CEO may have specialized knowledge about the strategic challenges facing

the firms that the Chair may not have. Separating the Chair and CEO titles will induce costly transfers of critical information between the CEOs and the Chairs. Lorsch and Lipton (1993) argue that splitting titles will lead to confusion. It will also enhance the potential for rivalry between the CEO and the Chair. Pfeffer and Salancik (1987) argue that a single leader will improve responsiveness to the environment and enhance the accountability of decision making. Thus, split positions will dilute CEOs' power and ability to provide effective leadership.

The CEO Leadership Hypothesis attributes the source of value creation when CEO and Chair positions are combined to strong leadership, responsiveness to changes, more CEO accountability, reduction of confusion and information transfer costs between the CEO and the Chair. The hypothesis suggests these benefits outweigh the costs of combining positions (which are detailed in section 2.2 and 2.3); thus, joint positions should be positively related to returns and higher operating efficiency /lower overhead.

4.3.a.i-2. *The Agency Problem Hypothesis:*

The hypothesis states that firm value is negatively affected by when the same person holds the CEO and Chairman of the Board positions because the costs of joint are greater than their benefits.

Due to the separation of ownership and control, agency problems are created when the managers' and the shareholders' interests are not aligned. Managerial hegemony theory suggests that managerial dominance of a board renders it an ineffective governance mechanism (Mallette and Fowler, 1992). CEOs are more likely to protect their own jobs and so if the boards are dependent on their leadership to act in the shareholders' interests, directors will not be in a position to exercise their discretion in joint firms. As evidenced in Shivdasani and Yermack (1997), CEO involvement in the selection of new directors influences the quality of appointees to the board. Joint CEO and Chair positions would also enhance the power of the CEO over the board. CEO's pay is positively related to joint CEO and Chair positions, Sridharan (1996). The lack of checks and balances on CEOs would create an opportunity for CEO entrenchment that enables and accentuates the development of agency problems. Thus, if managerial dominance is critically determined by the structure of CEO Leadership, then managerial dominance will be greatly enhanced when a single individual serves as both the CEO and the Chair of the Board. These effects are believed to materially and negatively affect the performance of the firm when it uses joint positions. Firms with split positions will avoid these costs without incurring costs that are as high as the costs of joint positions.

To summarize, the above three hypotheses address the magnitude and the direction of the impact of separating CEO and Chair positions. The Indifference Hypothesis suggests there is no difference in returns between split and non-split firms. CEO Leadership Hypothesis suggests split positions would negatively affect returns. On the other hand, the Agency Problem Hypothesis suggests the opposite. It predicts split positions would positively affect returns.

4.3.b. *Hypotheses for the second question (whether the effect on performance of splitting CEO and Chairman of the Board positions depends on firm conditions, industry characteristics and the presence of other agency control mechanisms)*

In the literature review in section 2.3., agency control mechanisms and firm characteristics such as broad characteristics are related to firm performance. Results in Section 3 indicate that the decision to split positions is indeed a function of agency control mechanisms and agency problems. Since splitting positions is an endogenous agency control mechanism, the relationship between agency control mechanisms and performance, and firm characteristics and performance may be altered by splitting positions. For instance, the positive impact of institutional holders on firm value may be lower when the firm has split positions because the demand for agency control mechanisms is lower. Similarly, the potential threat of agency problems (such as agency problems of free cash flows and agency costs of debt and of equity) on firm value may be lower when there are monitors such as split positions in place.

Even though other firm and industry characteristics such as board effectiveness, special high tech industry effects and information transfer costs do not seem to be directly and significantly related to the decision to split positions (as shown in results in section 3.7. and Table 4), their relationship with performance may also be affected by split positions. The negative relationship between board ineffectiveness and performance could be heightened by joint positions. Similarly, it should not be difficult to concede that leadership structure may affect the impact of the high tech effect on performance. But the direction of the impact is unclear since high tech firms have high agency costs which increase the demand for split positions and high need for strong leadership which increases the costs of split positions. The negative effect of information transfer costs on performance may also be heightened when positions are split.

To conclude, the effect of split positions may not be observable through differences in performance. If the effect of split is dependent on level of agency problems, presence of other

monitors and firm characteristics, then the simple averaging of returns among difference groups (keeping other things constant) will not be able to capture the effect of split positions.

4.4. Methodology

The goal is to:

- test whether split positions has a separate effect on performance;
- examine how split positions affects the relationship between performance and characteristics of the firm and agency control mechanisms used by the firm.

Firms' characteristics affect the cost-benefits analysis of split positions. Therefore, empirical tests must be designed to account for and incorporate the role played by firm characteristics. The test procedure is as follows: first, a linear multiple regression is estimated to examine whether there is a difference in performance between splitting and non-splitting firms, with size as a control variable. Second, the relationship between split positions and performance will be re-examined, taking into consideration the effect of the split on the firm condition-performance relationship. Third, residuals from the predictive logistic regression in Chapter 3 are included in the return regression to incorporate the effects of errors in firm selection of the management structure. Because split (joint) firms include those that do need to split (to have joint positions) and those that erroneously split (or having joint positions), the division among split and non-split firms may not truly represent the effect of split positions. In order to separate firms that have not made a correct decision from those that do (which in some cases could be due to an entrenched CEO), residuals are calculated from a logistic regression that does not include the CEO effect. These residuals are used in the overall return regression as independent variables to avoid the CEO entrenchment effect on the decision to remain joint.

4.4.a. Multiple Regressions with Agency Control Mechanisms, Agency Problems, Firm and Industry Characteristics As Independent Variables.

To examine whether split positions affect performance (i.e. hypotheses 4.3.a.i, 4.3.a.ii-1. and 4.3.a.ii-2., the Indifference, CEO Leadership and Agency Problem Hypotheses respectively), firms are separated into split and non-split groups. Return and efficiency measures (such as return on assets, general, administrative and selling expenses over sales and over number of employees) for split and non-split firms are calculated. Accounting returns and efficiency measures are used because benefits and costs of splitting should affect operating activities which are supposed to be reflected in accounting measures. Since the split versus joint decision may have a long lasting effect, in addition to the one year performance and efficiency measure, simple average of three year (1990-1992) returns on assets and general, selling and administrative expenses over sales are also used as dependent variables in the regressions. Return and efficiency measures are regressed on split/joint variables, log of assets, agency control mechanisms and firm characteristics to see if split positions has a separate effect “holding constant” all these firm characteristics, that is,

Equation 1:
$$R_i = \beta_0 + \sum_{j=1}^p \beta_j x_{ij} + e_j, \text{ for } i=1 \text{ to } n \text{ observations}$$

where R_i = return measure, β_i = coefficients of the X_i and e_i = error term. X_{ij} = agency control mechanisms, firm characteristics and a control for firm size. The variables employed are: split/joint dummy, CEO’s ownership, managerial and director’s ownership (excluding CEO’s ownership), block ownership, institutional ownership, Q, proportion of independent directors, log of non-fixed asset, free cash flows in low Q firms, variance of the residual squares, board size, high tech dummy and log of assets.

Regressions are better than Univariate t-tests because regressions take the presence of existing agency control mechanisms, and other factors that may affect returns, into consideration when examining the impact of splitting the CEO and Chair positions on returns. A significant negative difference of returns (or positive difference in cost measures) between non-split firms and split firms will support the Agency Problem Hypothesis in the returns regressions, since CEO=CHAIR is 1 for non-split firms. The opposite will support the CEO Leadership hypothesis.

It is believed that the perquisite-taking behavior of the managers and other agency problems will at least be reflected in the overhead measures. When agency control mechanisms are in place, the overhead efficiency should, in general, be higher. Agency control mechanisms should be positively related to higher efficiency, resulting in negative coefficients for agency control mechanisms and a positive coefficient on the CEO=CHAIR dummy variable. When the coefficient on the CEO=CHAIR variable is not significantly different from zero, the empirical results will be consistent with the Indifference Hypothesis. Perfect substitutability among agency control mechanisms and the Firm Specific Hypothesis also would be consistent with insignificance of CEO=CHAIR. However, a coefficient of the CEO=CHAIR variable significantly different from the zero is evidence against the null indifference hypothesis.

To get a quick overview of the impact of split positions on performance, only log of sales is used as the control in the first set of regressions. Then other agency control mechanisms are added as controls in the second set of regressions because they may contribute positively to returns. These regressions allow us to examine whether firms with split positions have higher returns than firms that do not split, before and after controlling for other agency control mechanisms.

A firm's operating and efficiency performance is also affected by the level of agency problems. Firms that have high agency costs of equity and debt would have lower operating performance. The amount of free cash flows may also have an impact on efficiency. So the amount of cash flows in high cash flow and low Q firms, the fluctuation of stock prices, and the relative portion of non-fixed assets are used as proxies for levels of agency problems. Firms tend to be more efficient when the level of free cash flows is low. Also, for firms that have few investment opportunities, a large amount of cash flows will invite managers' abuses. Stock prices represent the present value of all future cash flows. Their fluctuation reflects the degree of information asymmetry between the firm and the stockholders. So the variance of the residual errors from the market model is used to proxy for agency cost of equity. Fixed assets can be used as collateral for debtholders, and it is easier for debtholders to monitor the wealth transfer. However, non-fixed assets such as account receivable, marketable securities, salable goods and prepayments are difficult to monitor. So the relative portion of non-fixed assets can reflect the level of agency costs of debt.

Other firm characteristics would also have an effect on returns and efficiency. High tech firms should have higher returns because of the risks that are involved. Board size which affects

the effectiveness of the board has been shown to be negatively related to performance measures (Q) in Yermack (1996).

To further investigate whether the effect of split positions is dependent on firm conditions, interactive terms using split/joint dummy times the variables of interest along with other agency control mechanisms and firm characteristics are used as independent variables in the return regression. Here only a subset of the agency control mechanisms and firm characteristic variables is included in the equation because certain variables (X_i 's) are highly correlated with the interactive terms (Split/joint Dummy * variable X_i) causing serious multi-collinearity between variables.

One means of combating the problem of multicollinearity is to reduce the number of independent variables. The decision as to which variables are to be dropped should not be arbitrary. Insignificance of the variable is not a reason for its exclusion. On the other hand, all variables that are dropped should be insignificant and should lower the explanatory power of the model when included. The final model should include as many relevant variables as possible while maintaining no more than an acceptable level of multi-collinearity.

The variable selection process for each regression model involves several steps. The details of the process are described in Appendix 1. To summarize, a base model is formulated with no cross term variables (i.e., no variables multiplied by the split/joint dummy). All non-cross terms, variables that are not included in the base model, will be re-entered into the base model one by one to recheck the significance of the variables. Not all variables are available for all firms, and thus we identify the largest set of firms for which the data are available and then estimate all versions of models with the same set of firms. Once the base model is fixed, cross term (or interactive) variables are added to the base model as long as they do not cause serious multi-collinearity among variables in the model. Upon the formation of the full model, all the variables dropped during the formation of the base model and the full model will be added back to the full model individually if they do not cause severe multi-collinearity.

At the culmination of this process, institutional ownership, the proportion of independent directors, CEO=CHAIR * debt ratio, CEO=CHAIR * High/low Q, CEO=CHAIR * proportion of non-fixed assets are excluded from both the ROA and SGASALE full models. Blockholdings, CEO ownership and board size are excluded from ROA full model; while CEO=CHAIR * CEO ownership, CEO=CHAIR * board size are excluded from the SGASALE model. These variables are not included in the full model because adding any of these variables to the full model causes multi-collinearity (increased VIFs of CEO=CHAIR and its related variables) and decreases adjusted

R². None of these variables are significant in the full model. As for the proportion of independent directors and CEO=CHAIR * the proportion of independent directors, both are insignificant by themselves, and when they are used in combination with others in the return regressions. Their inclusion would decrease the sample size by one third. So they are not included in the full model in this study.

So the full model is as follows:

$$\text{Equation 3: } R_i = \beta_0 + \sum_{j=1}^5 \beta_j X_{ij} + \sum_{j=1}^7 \beta_j DX_{ij} + e_j, \text{ for } i=1 \text{ to } n \text{ observations}$$

where X_j = CEO=CHAIR, High Q, Low Q, Log of SALES, proportion of non-fixed assets, debt ratio, cash flows in high cash flows low Q firms, residual variance, ownership percentage for managers and directors except for the CEOs, industry dummy for high tech firms, blockholdings, and DX_j = CEO=CHAIR * the following variables: debt ratio, institutional ownership, residual variance, proportion of non-fixed assets, blockholdings, cash flows in high cash flow, low q firms, percentage of ownership for managers and directors' ownership (except for the CEO's).

Table 1A in Appendix A shows that the adjusted R square of the base model is as good as the model with all agency control mechanisms and the model with agency control mechanisms and firm characteristics. The significance and signs of the variables are comparable. So the basic effects are captured by the base model.

4.4.b. Multiple Regressions with the Residual From the Logistic Regression (Chapter 3) As An Independent Variable

In reality, not all the firms make correct split/joint decisions. Firms that are observed to have split positions include firms that should, at the optimum, split as well as some that should have joint positions. If firms make a sub-optimal choice on the split/joint decision, returns and efficiency should be affected. So in order to fully evaluate the effect of the split/joint decision on the relationship between performance and firm characteristics, the extent of split/joint decision errors has to be taken into consideration. The farther away firms are from their optimal split/joint positions, the larger their errors, the lower their performance should be.

To capture the effect of mistakes on the split/joint choice, the predictive logistic regression's deviations from predicted choices can be used as an independent variable in the return and efficiency regressions. A negative coefficient on the deviation of actual from predicted probability would indicate that returns are lower for firms who stray too far from "optimal".

The effect of CEO ownership on split positions is complex. On one hand, CEO entrenchment is just another form of equity agency costs. The more a CEO is entrenched, the higher is the potential benefit for split positions. On the other hand, not only can CEO entrenchment lower the effectiveness of split positions, it can also make split positions impossible. That is, the board of directors may not be able to effect a split of positions if the board is dominated by the CEO. Even if the firm splits, no mechanism, including separation of positions, may matter at the margin because of the CEO's dominant control. So the performance of these firms suffers.

Also CEO ownership is different from other agency control mechanisms because CEOs can adjust their ownership to fit their interests. They can choose whether they would like to thwart or to co-operate with the board according to their interests. One may argue that as the wealth of the CEO is limited, the board can control CEO ownership through stock options and compensation. So CEOs don't have much choice. However, "executives' stock ownership fails to increase after compensation awards of stock options and restricted stocks, as managers reduce prior stock ownership to counteract boards' attempts to tie their wealth to firm value" (Ofek and Yermack, 1997).

To eliminate the adjustment effect of the CEO, the predictive logistic model without CEOOWN can provide residuals. These residuals can be used as an independent variable in the return regressions. The predicted probability of the split from this logistic model will represent the probability of split purely based on firm conditions other than the effect of CEOOWN.

4.5. Definitions and Choices of Variables

4.5.a. Return/Efficiency Measures

Industry adjusted ROA(return on asset)²⁸, industry adjusted SGASALE (Selling, general and Administrative Expenses divided by Total sales) and industry adjusted SGAEMP (Selling, general and Administrative Expenses divided by number of employees) are used as return and efficiency measures. They will be used as dependent variables in the regressions to investigate the link between agency control mechanisms and shareholder value. Even though Return on Equity (ROE) is used in both Brickley, et. al. (1996) and Balgia, et al (1996)'s papers as return measures, it will not be used here because ROE includes a leverage effect that could mask the efficiency effect. Accounting earnings which measure short term profitability are a better measure of managerial performance than stock price performance. Stock price is not used here because it is the present value of the expected future cash flows of the company. It includes the expectation of the ineffective monitoring by the Chairs when the titles are split. Selling, general and administration expenses divided by number of employers (SGAEMP) is used as a proxy for the operating efficiency. Some types of perquisites consumption or shirking will increase the overhead expenses such as general administrative expenses.

4.5.b. Agency Control Mechanisms:

The existing finance literature has documented that the proportion of independent directors, managerial ownership, blockholders, institutional holders, debt holders, CEO ownership and Q affect firm performance. Fama and Jensen (1983), Weisbach (1988), and Byrd and Hickman (1992) have reported evidence on how outside directors have acted as monitors of management replacing CEOs in poorly performing firms, lowering the negative impact of poison pills, etc. Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), and Hermalin and Weisbach (1991) find a non-linear relation between board ownership and firm performance. Demsetz (1983),

²⁸ Operating income before depreciation (Compustat item #13) is used for the computation of ROA and ROE. Ending value last year's assets and equity are used. ROAs are then adjusted for industry effect using firms with similar three digit SICs.

Shleifer and Vishny (1986), Watts and Wruck (1988) and Shome and Singh (1995) all find support for the role of blockholders as an agency control mechanism. Evidence includes blockholders' influences on departures by CEOs following poor performance, positive announcement effect on block formation, etc. Moyer, Chatfield and Sisneros (1989), and Agrawal and Mandelker (1992) report positive impacts of institutional holders by increasing the number of analysts following the stocks of the firms and their impact on anti-takeover amendments. Debt as an agency control mechanism is discussed in Jensen and Meckling(1976) who argued that the agency cost of external equity may be reduced by increasing the use of debt. Fixed payments associated with an increased level of debt, effectively bonds managers to disgorge the free cash flow of the firm (Jensen, 1986). Pi and Timme (1993) find CEO ownership positively affects performance in split firms but not for joint firms. Tobin's Q has been traditionally used as a proxy for growth, here Q is used as a proxy for market induced monitoring. Morck, Shleifer and Vishny (1988) and McConnell and Servaes(1990) use it as a measure for the financial well-being of the firms. Details for the literature review and definitions of these variables are explained in section 3.5.a.

4.5.c. Proxies for Agency Problems

Cash flows per dollar of sales in high cash flows, low Q firms (IFCFSALE), variance of the residual squares (SQRESVAR) and the proportion of non-fixed assets (NFXASSET) are used as measures for level of agency problems. Agency costs of free cash flows are discussed in Jensen (1986). The variance of the market model residuals (SQRESVAR) is used to measure the agency costs of equity because it represents the firms' information asymmetry between shareholders and managers. On the other hand, SQRESVAR can also be viewed as a proxy for information transfer costs. Prowse (1990) also uses non-fixed assets to proxy for the agency costs of debt. Details of the definitions and literature review of these variables are discussed in section 3.5.b.

4.5.d. Proxies for Firm and Industry Characteristics

Proxies for firm and industry characteristics include board size for board effectiveness, high-tech dummy for high-tech effect, residual variance for information transfer costs. Board size

is found to be negatively related to market valuation by Yermack (1996). Kini et. al (1995), Monks and Minow (1995) and Huther (1997) show that large boards negatively affect board effectiveness. Thus, it can be an obstacle to change or operating efficiency. Bregman, Fuss and Regev (1991) found that in Israel, high-tech firms appear to earn higher rates of return than low-tech firms. However, using advanced technologies does not guarantee huge profits. Only those that can manage the technological, financial and business risks in these high-tech firms will survive and excel. As mentioned in the section above, residual variance reflects the volatility of environment that firms have to face. The more dynamic the environment, the higher the need for swift decision, the higher the information transfer costs. Firms that don't manage the information transfer well will suffer. Details of the definitions and literature review of these variables are discussed in section 3.5.c.

4.5.e. Residuals

Residuals will be used as one of the dependent variables in the return regression (for the details related to the variables in the regression, please refer to the methodology in section 4.4) Residuals are defined as the difference between the observed probability of split and the predicted probability of split from a logistic regression (see 3.4). They represent the discrepancy between what firms should do and what they are doing with respect to split/joint positions. The value of the residuals ranges from 1 to -1 because the observed probability of split=1 when firms are split and 0 otherwise, and the probability of split ranges from 1 to 0. Firms are predicted to have split positions when they have a predicted probability of split ≥ 0.5 . So firms whose residuals range from:

- 0.0 to 0.5 are those that are supposed to have split positions and are observed to be split.
- -0.5 to 0.0 are those that are supposed to have joint positions and are observed to be joint.
- 0.5 to 1.0 are those that are supposed to have joint positions but are observed to be split.
- -0.5 to -1.0 are those that are supposed to have split positions but are observed to be joint.

So firms with residuals from -0.5 to 0.5 are doing what they are predicted to do. Firms with residuals outside the -0.5 to 0.5 range are not doing what they are predicted to do. Residuals may not be a significant variable in a regression on performance since both positive residuals ≥ 0.5 and negative residuals ≤ -0.5 represent firms that make incorrect split/joint decisions. These firms are

expected to perform worse than those that are correct in their decisions. To address this issue, residuals are used in the following ways:

- Take the absolute value of the residuals for the whole sample;
- Square the residuals for the whole sample.

Taking the absolute value of the residuals can maintain the original magnitude of the discrepancy while squaring the residuals can increase the relative penalty of making mistakes. Thus, significant results are more likely with the latter than the former. Both methods count residuals from the correct and incorrect firms. But since split/joint positions is a zero and one variable, i.e. firms can only choose to split/not to split but not in-between, a small discrepancy from the predicted value (residuals) should do little harm as long as firms are making the right decision. Realizing that, residuals are incorporated in a regression on performance in several ways. First, residuals for correct firms are set to 0, and then for the incorrect firms, the choices are:

- Making no adjustment to the residuals of the incorrect firms but splitting them into positive and negative residuals;
- Squaring the positive residuals. For the negative ones, residuals will equal to negative one times the square of the negative residuals;
- Setting the residuals of the misclassified firms to 1;
- Setting the residuals of the firms that are supposed to be joint but observed to be split to 1, and for firms that are supposed to be split but observed to be joint, setting the residuals to -1.

Splitting the residuals into positive and negative residuals allows us to separate the costs between over and under monitoring. The coefficient of the positive residuals represents the per unit cost of over-monitoring on returns while the coefficient of the negative residuals represents the per unit cost of under-monitoring on returns. The last two procedures of setting the residuals of the firms that make incorrect decisions, according to our predictive logistic model, to 1 neglects the magnitude of their mistakes.

4.5.f. Interactive Terms

The interaction between variables of interest (such as agency problem proxies and other agency control mechanisms) and the split and joint dummies are captured by the cross products or interactive terms in the regression. These interactive terms are used as independent variables in the return regressions to investigate if the effects of firm conditions on returns are affected by split/joint positions. These interactive terms equal to 0 when CEO and Chairman of the board positions are split, and they equal to the variables of interest when firms have joint positions.

These interactive variables include: DTOTAL (split/joint dummy times board size), DCEOOWN (split/joint dummy times CEO ownership), DBLOCKOWN (split/joint dummy times Block ownership), DNMGTDIR (split/joint dummy times managerial and director's ownership (except CEO's ownership)), DINST (split/joint dummy times institutional ownership), DIND (split/joint dummy times high tech dummy), DSQRESV (split/joint dummy times variance of the residual squares), DNFAXST (split/joint dummy times the ratio of the non-fixed asset) and DHFCFLQ (split/joint dummy times cash flows in high cash flows, low market to book ratio firms).

4.6 Results

The discussion of results will be divided into two parts. The first part are regression results taking into consideration the effect of agency control mechanism, agency problems, firm and industry characteristics, and interactive effects between split/joint variable and other independent variables. The second part presents regressions that account for the effect of the CEO power on the split versus joint decision.

4.6.a. Multiple Regressions with CEO=CHAIR, Other Agency Control Mechanisms, Agency Problems, Firm and Industry Characteristics and Interactive Terms as Independent Variables

In this section, results of multivariate analyses are reported. Multivariate regressions are used to control for additional factors that could influence returns or influence the choice of various

agency control mechanisms. To more carefully examine whether non-split firms have any separate effect on returns, and whether split positions improves performance, return and efficiency measures are regressed on (CEO=CHAIR) (Table 4.1) along with other agency control mechanisms (Table 4.2), other firm characteristics (Table 4.3) and interactive terms (Table 4.4).

As mentioned in 4.3, in general, an insignificant coefficient on (CEO=CHAIR) does not necessarily support the indifference hypothesis. Insignificance of (CEO=CHAIR) can happen when agency control mechanisms are perfect alternatives for each other. However, the significant coefficient on the CEO=CHAIR variable is direct evidence against the Indifference Hypothesis (assuming all the important factors are controlled for). A significant and negative (CEO=CHAIR) coefficient in return regressions would indicate that higher returns are associated with splitting rather than joining positions. This would support the agency problem hypothesis that joint titles cause problems that lower returns when other mechanisms are held constant (whether or not split positions produces monitoring advantages). This is consistent with the monitoring assumption, but it does not provide direct evidence of monitoring. A positive sign for the CEO=CHAIR coefficient in efficiency regressions would indicate non-split firms are less efficient than split firms.

First an overview of the results from Table 4.1-4.4 will be presented. (CEO=CHAIR) is insignificant with respect to all measures: ROA, a direct accounting measure on asset utilization, SGASALE and SGAEMP, the efficiency measures. This result is inconsistent with the hypothesis that there are some “separate” effects that split positions have beyond other agency control mechanisms. The insignificance is also consistent with the no difference hypothesis. Either CEOs serving as Chairs does not affect returns or the agency mechanisms are perfect substitutes for each other. But the split/joint decision does seem to make a difference in industries (proxied by high tech industries) believed to require strong management. Joint titles in these firms exhibit lower rather than higher return on assets (the coefficients for DIND are significant in Table 4.4). This result provides evidence that is contrary to the leadership hypothesis. The indirect effect of split positions is also presented. Across the whole sample, firms with joint positions have a different relationship between returns and a measure of board effectiveness in monitoring (proxied by board size).

Results from Tables 4.2-4.4 can help us to interpret the signs of the coefficients in the logistic regressions in Table 3.4. The three tables should be examined as a group. There is evidence that CEO ownership is an alternative mechanism for split positions: increases in CEO ownership lower the selling, general and administrative expenses per unit of sales (shown in Tables 4.2-4.4), and CEO ownership is negatively related to the probability of split positions in

Table 5. The significant, negative sign for BLOCKOWN in ROA regressions in Table 9 and the positive correlation between BLOCKOWN and the probability of split positions indicate that BLOCKOWN increases the need for split positions. IFCFSALE, SQRESVAR and NFXASSET all have positive, significant coefficients in the SGAEMP1 regression in Table 4.3. The coefficients of NFXASSET are significantly positive again in the SGASALE regressions in Table 4.3 and Table 4.4, and significantly negative in ROA1 regression in Table 4.4. So there is strong support for the notion that higher proportions of non-fixed assets increase the need for split positions. The results regarding DR1 seem to indicate that it is not an alternative mechanism for split titles. The increase in efficiency in Table 4.4 and the negative relation with the probability of split positions in Table 3.4 would suggest that debt is an alternative mechanism for split positions; however, the negative relation to returns is incorrect with this interpretation. An agency monitor should not be related to the lowering of returns.

4.6.a.i. Multiple Regression With Log of Sales As An Independent Variable

Very simple multiple regressions are used in Table 4.1 to get a quick feel on how split/joint decisions are related to return and efficiency measures. To control for size effects, return and efficiency measures are regressed on CEO=CHAIR and size. Various return and efficiency measures such as ROA, SGAEMP and SGASALE are used as the dependent variable. The models for SGAEMP are insignificant. So additional factors (CEO ownership (CEOOWN) and proportion of (NFXASSET)) are added to the model as controls. The coefficients of CEO=CHAIR in ROA and SGAEMP models are in the right direction (negative) but insignificant. However, the coefficient of CEO ownership is significant and is negatively related to SGAEMP. This latter evidence is consistent with the notion that increasing CEO ownership will better align their interests with firms, but the increased efficiency is not large enough to make a difference to measures such as ROA which exhibit large amounts of variability.

Overall, split versus joint decision does not seem to significantly affect return and efficiency performance. There is mixed evidence on the role of CEO ownership. On one hand, increases in CEO ownership decrease SGAEMP (see Table 4.1). On the other hand, lower performing non-split firms also have higher CEOs' ownership and older CEOs with longer tenure (see table 3.3). Other factors that affect returns, efficiency and the use of split positions have to be considered for a more valid and reliable result.

Table 4.1. Linear Regressions Using Returns/Efficiency Measures as Dependent Variables, CEO=CHAIR and Controls as Independent Variables

$$\text{Industry Adjusted Return/ efficiency measures} = a_0 + \beta X + \text{control}(s) + E$$

*** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models					
	Dependent Variables					
	ROA1	ROA3	SGA SALE1	SGA SALE3	SGA EMP1	SGA EMP3
CEO=CHAIR or NO CHAIR	-0.03 -0.77	-0.02 -0.50	-0.14 0.77	-0.02 0.71	7.27 1.07	7.89 1.14
CEOOWN					-61.96 -2.38 *	-72.67 -2.74 ***
NFXASSET					28.00 1.53	9.98 0.54
LSALES	0.08 3.38 ***	0.07 3.59 ***	-0.13 -5.00 ***	-0.12 -5.19 ***	-3.77 -1.05	-6.45 -1.77 *
F Values	6.51 ***	6.95 ***	13.13 ***	13.52 ***	1.94	2.23 *
# of OBS.	73	73	73	73	73	73

4.6.a.ii. Multiple Regressions with Agency Control Mechanisms as Independent Variables

Table 4.2 shows results of the linear regression on agency control mechanisms. (CEO=CHAIR) is insignificant in all of the five equations. The results do not support a direct agency control effect (after accounting for other agency control mechanisms) at the margin for firms employing a split policy. The insignificance of (CEO=CHAIR) is consistent with the no difference hypothesis and the perfect alternative mechanism hypothesis.

Some of the other agency control variables such as CEO ownership, lower Q firms, high-tech dummy and non-CEO managerial ownership do affect performance. Their coefficients are significant. CEOOWN is significantly negative in SGASALE regressions. More CEO ownership aligns CEO's interests with shareholders' interests resulting in higher efficiency in terms of lower selling and administrative expenses per dollar of sales. CEOOWN is also found to be negatively related to split positions in Chapter 3. Together, the evidence is consistent with the hypothesis that CEO ownership is an alternative mechanism for split positions. Increasing Q increases the return on assets, and Q is found to be positively related to split positions in Chapter 3. So this is consistent with the notion that increases in Q promote split positions. But the rate of increase is lower for higher Q. Increasing Q at very high Q also increases selling and administrative expenses. This may be a result of the expansion and growing activities in these firms. The high-tech dummy coefficient is positive and significant at 10% in the three year average ROA regression. Increases in managerial and director's (except CEO's) ownership will also increase efficiency. The control variable, LSALES, is significantly negative in SGASALE regressions. Increases in firm size enhance economies of scales, lower selling and administrative expenses per dollar of sales. The other variables in the regressions are insignificant.

TABLE 4.2. LINEAR REGRESSIONS OF RETURNS/EFFICIENCY MEASURES USING CEO=CHAIR AND OTHER AGENCY CONTROL MECHANISMS AS INDEPENDENT VARIABLES

$$\text{Return/ efficiency measures} = a_0 + \beta X + E$$

*** 98% significance ** 95% significance * 90 % significance

In- dependent/ Variables	Parameter Estimates and t Statistics for Regression Models					
	Dependent Variables					
	ROA1	ROA3	SGA SALE1	SGA SALE3	SGA EMP1	SGA EMP3
CEO=Chair/N O Chair	0.02 0.51	0.02 0.77	0.02 0.28	0.04 0.65	2.76 0.33	7.56 0.82
CEOOWN	-0.15 1.04	-0.01 -0.06	-0.51 -2.24 ***	-0.67 -2.91 ***	-5.38 -0.15	-37.70 -0.97
NMGTDIR	-0.002 -0.02	-0.05 -0.54	-0.46 -2.70 ***	-0.34 -2.01 **	11.92 0.45	34.69 1.20
BLOCK- OWN	-0.02 -0.25	0.04 0.71	0.14 1.31	0.12 1.16	-1.08 -0.07	-4.63 -0.26
INSTITOW	0.07 0.62	0.10 1.00	-0.01 -0.03	-0.08 -0.44	-0.05 -0.00	7.39 0.23
HQ	-0.14 -10.03 ***	-0.14 -10.31 ***	0.05 2.29 **	0.05 2.34 ***	6.14 1.73 *	2.32 0.60
LQ	0.50 4.30 ***	0.44 4.13 ***	-0.01 -0.04	0.03 0.17	-28.31 -1.00	-9.38 -0.31
PINDEPT	0.01 0.15	-0.01 -0.11	-0.09 -0.76	-0.07 -0.63	-9.05 -0.50	-8.90 -0.45
TOTAL	-0.01 -1.01	-0.002 -0.36	0.01 1.26	0.01 1.20	0.31 0.20	-0.20 -0.12
IND	0.03 0.90	0.06 1.80 *	-0.02 -0.27	-0.009 -0.16	0.84 0.09	0.47 0.05
DR1	-0.12 -1.38	-0.12 -1.41	-0.20 -1.42	-0.16 -1.17	-6.54 -0.30	8.50 0.36
LSALES	-0.01 -0.30	-0.01 -0.26	-0.15 -2.89 ***	-0.14 -2.62 ***	1.26 0.15	-6.11 -0.68
F Values	12.00 ***	12.89 ***	5.50 ***	5.42 ***	0.58	0.60
# of OBS.	56	56	54	54	54	54

4.6.a.iii. Multiple Regressions with Agency Problems, Firm Characteristics and Agency Control Mechanisms as Independent Variables

Results about CEO=CHAIR and other agency control mechanisms in Table 4.2 still hold in Table 4.3. Generally results are stronger in regressions with one year's measures as the dependent variables rather than the three year averages. The coefficients for split versus joint positions are insignificant in all except last equation (SGAEMP3) in Table 4.3. Again, the evidence does not support a direct agency control effect or a leadership effect for split positions. The insignificance of (CEO=CHAIR) is consistent with the no difference hypothesis and the perfect alternative mechanism hypothesis.

IFCFSALE, SQRESVAR and NFXASSET are conditions of the firms that may affect returns and efficiency. In table 4.3, these are used as proxies for agency costs of free cash flows, agency costs of equity and agency costs of debt. Coefficients of all three variables are negative in SGAEMP1 regression. Coefficients of the proportion of non-fixed assets are also significant in SGASALE regressions. The higher the agency costs of debt, the lower the operating efficiency. All this indicates the negative effect of agency problems on performance.

For other agency control mechanisms, the results are basically the same as those in table 4.2. CEOOWN, HQ, LQ, IND, LSALES and NMGTDIR are significant. Together with the results from Chapter 3, the evidence is consistent with the hypotheses that CEOOWN is an alternative agency control mechanisms for splitting positions, and increases in Q in low Q firms provides the condition conducive for split positions. The proportion of independent directors, block ownership, and institutional ownership are insignificant. The insignificance of the latter two variables is consistent with results found by Pi and Timme (1993). Their paper does not have the first variable. The insignificance of the signs of INSTITOW in return and efficiency model in Table 4.2 and 4.3 cannot help us to determine which interpretation (INSTITOW is a substitute for split positions, or is a condition that increase the need for split positions) would be more valid.

TABLE 4.3. LINEAR REGRESSIONS OF RETURNS/EFFICIENCY MEASURES USING CEO=CHAIR, OTHER AGENCY CONTROL MECHANISMS AND FIRM CHARACTERISTICS AS INDEPENDENT VARIABLES

$$\text{Return/ efficiency measures} = a_0 + \beta X + E$$

*** 98% significance ** 95% significance * 90 % significance

In- dependent/ Variables	Parameter Estimates and t Statistics for Regression Models					
	Dependent Variables					
	ROA1	ROA3	SGA SALE1	SGA SALE3	SGA EMP1	SGA EMP3
CEO=Chair/N O Chair	0.0005 0.012	0.01 0.38	0.07 1.21	0.08 1.32	13.61 1.60	16.244 1.67 *
CEOOWN	-0.10 -0.63	0.01 0.09	-0.63 -2.73 ***	-0.75 -3.19 ***	-17.93 -0.52	-47.97 -1.22
NMGTDIR	-0.01 -0.12	-0.04 -0.35	-0.36 -2.01 **	-0.26 -1.41	41.48 1.55	60.84 1.98 **
BLOCK- OWN	-0.04 -0.63	0.02 0.38	0.16 1.55	0.14 1.29	-3.92 -0.25	-7.64 -0.42
INSTITOW	0.04 0.38	0.09 0.82	0.07 0.38	-0.02 -0.12	13.52 0.49	18.47 0.58
HQ	-0.14 -9.04 ***	-0.14 -9.54 ***	0.05 1.95 *	0.05 2.00 **	6.23 1.79 *	2.37 0.59
LQ	0.43 3.42 ***	0.42 3.58 ***	0.15 0.80	0.16 0.81	-3.74 -0.13	11.05 0.34
PINDEPT	0.01 0.84	-0.003 -0.05	-0.06 -0.53	-0.05 -0.42	-2.19 -0.13	-2.91 -0.15
TOTAL	-0.01 -1.17	-0.002 -0.40	0.01 1.41	0.01 1.27	0.29 0.20	-0.19 -0.12
DRI	-0.10 -1.02	-0.13 -1.41	-0.28 -1.91 *	-0.23 -1.54	-24.18 -1.11	-7.56 -0.30
IND	0.06 1.46	0.08 2.12 **	-0.07 -1.13	-0.05 -0.82	-5.62 -0.63	4.37 -0.42
LSALES	-0.001 -0.02	-0.004 -0.12	-0.16 -2.99 ***	-0.14 -2.62 ***	3.09 0.38	-4.59- -0.50
IFCFSALE	-2.29 -0.61	-3.65 -1.05	7.67 1.36	5.73 1.00	1687.87 2.00 **	1222.82 1.26
SQRESVAR	-2.28 -0.05	24.96 0.59	72.95 1.06	62.34 0.89	24891 2.41 ***	22592 1.904 *
NFXASSET	-0.17 -1.50	-0.09 -0.89	0.37 2.22 **	0.29 1.74 *	50.37 2.03 **	40.04 1.41
F Values # of OBS.	9.75 *** 56	12.89 *** 56	5.20 *** 54	4.68 *** 54	1.25 54	0.87 54

4.6.a.iv. Full Model (Regressions with interactive terms, agency control mechanisms, agency problems, firm and industry characteristics as independent variables)

In the full model, interactive terms (split/joint Dummy * agency Control mechanisms/firm Characteristics) are added as independent variables to equations presented in Table 4.3 to examine whether the effect of split positions is dependent on firm characteristics. The formation of the base model is discussed in the Appendix A. The results of the full model, which is built on the base model and the interactive terms, are shown in Table 4.4. One has to recognize that this full model has not taken into consideration the mistakes firms make regarding split/joint decision. Except for the effect of split positions, overall, the other variables have the same results as in previous tables (Tables 4.2-4.3).

Results regarding the effect of split titles change in these set of equation. Most of the coefficients of CEO=CHAIR are still insignificant (except for SGASALE3). It seems that the effect of CEO=CHAIR is not very significant. However, split versus joint positions do make some difference under certain circumstances. For firms believed to require strong leadership and effective coordination, joint titles seem to lower returns when other firm characteristics are taken into consideration. High tech firms where the environment is perceived to be more dynamic are used to proxy for firms that require effective management and coordination. The coefficient for DIND is negative and significant in ROA1 regression at 10% level. The Leadership hypothesis, which argues that there is a higher need for non-split positions in industries with dynamic business environment, is not supported by the data.

The only other interactive term that is significant is DTOTAL. The coefficient for DTOTAL is negative in ROA1 regression at 10% level. So across the whole sample, firms with non-split titles have a different relationship between return on assets and board efficiency proxied by board size.

The coefficients of BLOCKOWN become significant in this table. They are positive in SGASALE regressions. BLOCKOWN is not in the ROA regressions because it causes serious multi-collinearity in those regressions. Along with the results from the logistic regression from Table 3.4, it seems that higher BLOCKOWN increases the need for split positions. Either BLOCKOWN is proxying for the percentage of insider ownership in these regressions or they do not tend to oppose the management.

TABLE 4.4. ROA AND SGASALE FULL MODELS WITH INTERACTIVE TERMS AS INDEPENDENT VARIABLES

$$\text{ROA or SGASALE} = a_0 + \beta X + \beta DX + E$$

Dependent Variables	ROA1	ROA3	SGASALE1	SGASALE3
Independent Variables	Coefficients & t statistics	Coefficients & t statistics	Coefficients & t statistics	Coefficients & t statistics
CEO=Chair or no chair	0.07 0.68	0.001 0.01	0.18 1.62	0.18 1.77 *
HQ	-0.11 -7.45 ***	-0.11 -7.93 ***	0.05 2.26 ***	0.06 2.61 ***
LQ	0.43 3.62 ***	0.40 3.72 ***	0.16 1.06	0.09 0.64
LSALES	0.01 0.26	0.02 0.57	-0.13 -3.01 ***	-0.12 -3.02 ***
NFXASSET	-0.18 -1.69 *	-0.10 -1.00	0.32 2.29 **	0.18 1.37
DR1	-0.21 -2.42 **	-0.22 -2.91 ***	-0.29 -2.46 ***	-0.19 -1.69 *
IFCFSALE	-5.03 -1.06	-5.09 -1.18	3.89 6.17	1.86 0.32
SQRESVAR	5.40 0.07	36.43 0.54	0.37 1.00	-27.27 -0.29
NMGTDIR	-0.09 -0.53	-0.10 -0.60	-0.06 -0.28	0.003 0.01
IND	0.08 1.11	0.07 1.10	0.01 0.10	0.05 0.52
BLOCKOWN			0.37 2.90 ***	0.31 2.56 ***
DTOTAL for ROA1/3	-0.01	-0.01	0.01	0.01
TOTAL for SGASALE1/3	-1.74 *	-1.04	1.18	1.07
DCEOOWN for ROA1/3	-0.02	0.08	-0.60	-0.65
CEOOWN for SGASALE1/3	-0.15	0.53	-2.94 **	-3.34 ***
DBLOCKOWN	-0.04 -0.47	0.01 0.18	-0.24 -1.35	-0.20 -1.22
DNMGTDIR	-0.06 -0.29	-0.02 -0.11	-0.10 -0.38	-0.17 -0.68
DIND	-0.14 -1.69 *	-0.10 -1.31	-0.04 -0.39	-0.08 -0.83
DHFCFLQ	54.90 1.22	8.24 0.20	-38.78 -0.68	-4.40 -0.08
DSQRESV	-64.51 -0.67	-27.03 -0.31	203.45 1.57	176.88 1.44
DINST	0.12 1.27	0.13 1.49	0.01 0.06	-0.04 -0.29
F value	6.14	6.44	4.86	4.79
# of OBS.	73	73	69	69

Coefficients of DR1 also become very significant. DR1 negatively affects returns and efficiency. DR1 can be thought as a measure for firms' financial condition or the amount of monitoring by debtholders. The former seems to be applicable in return regressions, while the latter is applicable in the efficiency regressions. So results does not fully support the interpretation of DR1 as an alternative agency control mechanism.

To conclude the results in section 4.6.a, except for a certain type of firm, there is no support for split positions improving returns. Almost all of the agency control variables are insignificant most of the time. This is consistent with both the alternative mechanisms and the indifference hypothesis that these mechanisms are good alternatives, and that firms do a pretty good job in balancing the mechanisms to reach their optimal level of monitoring which at the margin produce no net effect. But, this can also be the result of dependent variables being not very appropriate measures of operating performance and efficiency. The exception to the insignificance of split versus joint decision is the case where effective coordination and management is required. Firms in high tech industries, where the environment is more dynamic, exhibit lower return when titles are joint. There is also evidence that split positions affect the relationship between board effectiveness and returns. Together with results from chapter 3, the evidence is consistent with the hypotheses that CEO ownership is an alternative mechanism for split positions, and increased Q in low growth firms promotes split positions, and block ownership increases the need for split positions.

4.6.b. Return Regressions with the Residuals (from the Logistic Model That Does Not Include CEOOWN) as One of the Independent Variables

4.6.b.i. *CEO Ownership and Split/Joint Decisions*

The effect of CEO ownership is complex. At the lower level, CEO ownership probably has more alignment of interest effect, but higher levels of CEO ownership probably have more entrenchment effect. Does this mean high CEOOWN firms need to split positions more than low CEOOWN firms? Not necessarily. When CEOOWN is high and the CEO is entrenched, then the benefits of splitting the CEO and Chair positions should, of course, be high. On the other hand, when CEO ownership is low, there is not much alignment of interest, then the need for splitting should again be strong. Results from Tables 4.2-4.4 seem to indicate that an increase in CEO's

ownership lowers the selling, administrative expenses per dollar of sales, thus the alignment of interest effect dominates.

But CEO ownership is also different from other agency control mechanisms because CEOs can adjust their ownership in response to changes in split/joint decisions. Empirically, this CEO effect translates into some abnormalities among split and non-split firms. Among non-split firms, there are firms that are supposed to have split positions but the split is prevented by a powerful CEO. There are also firms that may have conditions that need splitting titles, but the alignment of CEO and shareholders' interests make non-split titles acceptable.

To eliminate the adjustment effect of the CEO, the predictive logistic model without CEOOWN can be used to provide residuals. These residuals can be used as an independent variable in the return regressions to reflect the deviation from predicted behavior. The predicted probability of the split from this logistic model will represent the probability of the split purely based on firm conditions other than the effect of CEOOWN. The CEOOWN in the performance regression will then capture the effects on returns.

4.6.b.ii. Regressions Results (Taking into account the CEO effect)

4.6.b.ii-1. ROA1 and ROA3 Regression results

Table 4.5 shows ROA regression models with residuals from the logistic model (Table 4) without CEO ownership as an independent variable. In part A, except for the INCORDUM column, residuals from all firms are considered. Residuals are incorporated into the equations in different ways. ABSRES represents the absolute value of the residuals. RESSQ represents residual squares. When residuals are squared, heavier weights are put on the large residuals. POSRES and NEGRES refer to positive and negative residuals. POSRES and NEGRES separate the observed split firms from non-split firms respectively. Observed split firms have positive residuals and non-split firms have negative residuals. INCORDUM is a dummy variable where INCORDUM =1 for firms that have split verbs joint positions different from the predictions from the logistic model, otherwise, INCORDUM will have a 0 value.

TABLE 4.5A. LINEAR REGRESSIONS OF ROA1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

ROA1 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	
ABSRES	-0.05 -0.50				SQRESVAR	14.08 0.19	5.90 0.08	43.48 0.50	-11.71 -0.15	
RESSQ		-0.06 -0.49			LSALES	0.01 0.21	0.001 0.03	0.02 0.55	-0.01 -0.22	
POSRES			-0.03 -0.23		IND	0.08 1.12	0.09 1.13	0.07 0.81	0.10 1.28	
NEGRES			0.29 0.97		DTOTAL	-0.01 -1.50	-0.01 -1.51	-0.01 -1.40	-0.01 -1.42	
INCORDUM				-0.06 -0.92	DIND	-0.13 -1.68 *	-0.14 -1.68 *	-0.11 -1.24	-0.16 -1.85 *	
CEO=CHAIR or no chair	0.04 0.34	0.04 0.27	0.10 0.66	0.004 0.03	DCEOOWN	-0.03 -0.19	-0.03 -0.17	-0.01 -0.08	-0.01 -0.08	
HQ	-0.12 -7.55***	-0.12 -7.57 ***	-0.12 -7.79 ***	-0.12 -7.68***	DNMGTDIR	-0.02 -0.11	-0.02 -0.07	-0.06 -0.26	-0.01 -0.03	
LQ	0.38 3.71 ***	0.37 3.59 ***	0.43 3.50 ***	0.37 3.58 ***	DBLOCK- OWN	-0.05 -0.56	-0.06 -0.61	-0.04 -0.41	-0.06 -0.67	
NMGTDIR	-0.11 -0.63	-0.13 -0.67	-0.03 -0.15	-0.14 -0.78	DINST	0.12 1.23	0.13 1.29	0.09 0.76	0.15 1.46	
IFCFSALE	-5.70 -1.07	-6.01 -1.05	-2.03 -0.28	-7.51 -1.31	DHFCFLQ	65.93 1.40	63.67 1.39	78.28 1.58	79.06 1.59	
DR1	-0.20 -2.37 **	-0.19 -2.19 **	-0.23 -2.33 **	-0.19 -2.15 **	DSQRESV	-79.03 -0.82	-74.77 -0.77	-88.78 -0.90	-54.54 -0.55	
NFXASSET	-0.16 -1.46	-0.17 -1.58	-0.12 -1.06	-0.17 -1.63 *	F value	5.96***	5.96***	5.67 ***	6.06***	
Adjusted R Squares	0.57	0.57	0.56	0.57	# of OBS.	73	73	73	73	

TABLE 4.5B. REGRESSIONS OF ROA1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

$$ROA1 = a_0 + \beta X + \beta DX + E \quad *** 98\% \text{ significance} \quad ** 95\% \text{ significance} \quad * 90\% \text{ significance}$$

All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.06 -0.61				SQRESVAR	-5.44 -0.07	5.03 0.06	8.21 0.10	-1.93 -0.02	
RESSQ		-0.03 -0.28			LSALES	-0.01 -0.13	0.002 0.04	0.002 0.06	-0.003 -0.09	
POSRES			-0.03 -0.24	-0.04 -0.55	IND	0.09 1.18	0.08 1.05	0.08 1.02	0.09 1.15	
NEGRES			0.19 0.84	0.02 0.84	DTOTAL	-0.01 -1.47	-0.01 -1.58	-0.01 -1.41	-0.01 -1.37	
INCORDUM					DIND	-0.15 -1.72 *	-0.14 -1.57	-0.14 -1.56	-0.15 -1.70*	
CEO=CHAIR or no chair	0.02 0.17	0.05 0.38	0.04 0.26	0.01 0.10	DCEOOWN	-0.02 -0.13	-0.03 -0.17	0.01 0.03	-0.004 -0.03	
HQ	-0.12 -7.61***	-0.12 -7.54***	-0.12 -7.33***	-0.12 -7.42***	DNMGTDIR	-0.02 -0.07	-0.04 -0.16	-0.02 -0.11	-0.01 -0.05	
LQ	0.37 3.49 ***	0.37 3.48 ***	0.38 3.53 ***	0.38 3.57 ***	DBLOCK-OWN	-0.06 -0.65	-0.06 -0.61	-0.06 -0.61	-0.06 -0.64	
NMGTDIR	-0.14 -0.72	-0.11 -0.58	-0.11 -0.55	-0.13 -0.67	DINST	0.15 1.34	0.13 1.18	0.14 1.30	0.15 1.38	
IFCFSALE	-6.74 -1.12	-5.51 -0.91	-5.40 -0.84	-6.53 -1.01	DHFCFLQ	71.32 1.44	63.56 1.32	88.20 1.57	90.48 1.61	
DR1	-0.19 -2.09 **	-0.19 -2.123**	-0.20 -2.17 **	-0.19 -2.18 **	DSQRESV	-63.72 -0.64	-73.92 -0.74	-60.69 -0.60	-52.97 -0.53	
NFXASSET	-0.17 -1.65 *	-0.18 -1.67 *	-0.17 -1.58	-0.17 -1.58	F value	5.98 ***	5.93 ***	5.64 ***	5.68***	
					# of OBS.	73	73	73	73	
					adj.R squares	0.57	0.57	0.56	0.56	

In part B, all firms that have split/joint decisions the same as those predicted from the logistic model will have zero values for the residuals. The rationale for this is that the split/joint decision is a discrete 1/0 variable. Firms can only have two choices. Firms that have residuals less than 0.5 and greater than -0.5 are basically making the right split/joint decisions even though it may not be the exact position they should be in. So these firms should not be counted as firms making mistakes. Results are stronger in Part B than Part A when residuals for the correct firms are set to zero because this better measures the actual situation as the split/joint decision is a 0/1 variable. Different formats of residuals from firms that made incorrect decisions are incorporated in various regressions: absolute value of the residuals, residual squares, positive and negative residuals, and squares of the POSRES and minus the square of the NEGRES.

Part C and Part D repeat part A and B but with a different dependent variable. The dependent variable for C and D is the average of three year industry adjusted returns on assets.

Results in Tables 4.5 A and B indicate that residuals are insignificant irrespective of the ways they are defined, but all of them except one have correct signs. In general, negative significant coefficients on the residuals variables (positive for NEGRES) will support the hypothesis that firms making incorrect split/joint positions will have lower returns. The insignificance of residuals means that incorrect split/joint decisions do not correspond to significantly lower performance, but they may be correlated with performance.

Why do firms making incorrect split/joint decisions not seem to suffer from under-performance even after controlling for the CEO effect? There are several explanations for this. First, the logistic predictive model in Table 3.5 may not be doing a good job. However, the high classification rates do not seem consistent with this explanation. Second, the under-performance of firms are not significant enough to be detected. Third, since most firms have made correct split/joint decisions, the sample size of the incorrect ones is too small to detect any significance. i.e., the logistic model seems to have very high predictive power. Model specificity (number of predicted and observed non-split firms /total number of observed non-split firms) is 95% and sensitivity (number of predicted and observed split firms/total number of observed split firms) is 71%. False negative (number of observed non-split but predicted to have split titles divided by the total of predictions of split titles) is 20%, and false positive (number of observed split but predicted to have non-split titles divided by the total of predictions of non-split titles) is 8.5%. Most of the firms (89%) are make the correct split/joint decisions, so only a small percentage of firms will have a non-zero value for the residual variables.

The rest of the results from Tables 4.5A and 4.5B are similar to Table 4.4. Irrespective of the ways residuals are incorporated into the model, CEO=CHAIR are all insignificant. CEO serving as Chairs, in general, does not seem to have a direct effect on industry adjusted ROA (when other things are held equal) except for firms that require nimble management. Results for DIND (high-tech dummy) are stronger in Tables 4.5 A and B than in Table 4.4. The coefficient for DIND is significantly negative half of the time at the 10% level. For the other half of the time, the coefficient is significant at 12%. Results imply for high-tech firms, having non-split positions also lowers ROAs.

NFXASSET, HQ, LQ and DR1 are significant in most of the regressions. Like DIND, NFXASSET are significantly negative half of the time at the 10% level. For the other half of the time, the coefficient is significant at 12%. Higher agency costs of debt (proxied by a higher proportion of non-fixed assets) lowers ROAs. The positive effect of growth induced market monitoring (increasing Q) in low Q firms increases at decreasing rate among high Q firms. The negative effect of DR1 on returns suggests that DR1 is proxying for the financial conditions of the firms rather than for agency monitoring.

Worth mentioning are the coefficients of DTOTAL, DINST and DHFCFLQ. Though coefficients of DTOTAL are not significant in any of the equations, they are all very close to significance and have negative signs which are consistent with the results in Table 4.4. Coefficients of DINST and DHFCFLQ are all positive and are close to 15% significance. The significance of these coefficients indicates that among firms in the whole sample, joint positions have a different relationship between: returns and measures of board effectiveness (DTOTAL), returns and measures of existing monitors (institutional ownership), returns and measures of agency problems of free cash flows (cash flows in high cash flows and low Q firms).

Tables 4.5C and 4.5D show results of regressions with three year average industry adjusted returns as the dependent variables. Similar to Tables 4.5A and 4.5B, DR1, HQ and LQ are still very significant. Coefficients of DIND and NFXASSET are negative. Coefficients of DIND are very close to 10% significance but those for NFXASSET are no longer significant.

TABLE 4.5C. LINEAR REGRESSIONS OF ROA3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND CONDITIONS AS INDEPENDENT VARIABLES

ROA3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	
ABSRES	-0.08 -0.98				SQRESVAR	44.58 0.67	31.60 0.46	72.78 0.92	15.14 0.21	
RESSQ		-0.09 -0.86			LSALES	0.01 0.48	0.005 0.15	0.03 0.76	-0.002 -0.01	
POSRES			0.01 0.08		IND	0.08 1.24	0.09 1.24	0.06 0.86	0.09 1.36	
NEGRES			0.35 1.29		DTOTAL	-0.004 -0.68	-0.005 -0.72	-0.004 -0.61	-0.004 -0.68	
INCORDUM				-0.07 -1.17	DIND	-0.10 -1.42	-0.11 -1.44	-0.08 -0.96	-0.12 -1.59	
CEO=CHAIR or no chair	0.05 0.48	-0.06 -0.48	0.02 0.11	-0.08 -0.65	DCEOOWN	0.07 0.51	0.08 0.54	0.09 0.64	0.09 0.64	
HQ	-0.12 -8.17***	-0.11 -8.15 ***	-0.11 -8.08 ***	-0.11 -8.24***	DNMGTDIR	0.04 0.21	0.05 0.23	-0.001 -0.01	0.04 0.21	
LQ	0.36 3.87 ***	0.34 3.66 ***	0.40 3.66 ***	0.34 3.67 ***	DBLOCK- OWN	0.01 0.11	0.002 0.02	0.02 0.25	-0.002 -0.03	
NMGTDIR	-0.13 -0.82	-0.15 -0.89	-0.05 -0.25	-0.15 -0.93	DINST	0.13 1.49	0.15 1.61	0.10 0.97	0.17 1.76	
IFCFSALE	-6.72 -1.40	-7.01 -1.36	-2.65 -0.40	-8.03 -1.55	DHFCFLQ	24.38 0.57	22.82 0.54	36.64 0.82	35.05 0.78	
DR1	-0.22 -2.83***	-0.20 -2.57 ***	-0.24 -2.77 ***	-0.20 -2.59 **	DSQRESV	-39.28 -0.45	-32.79 -0.38	-48.14 -0.54	-12.35 -0.14	
NFXASSET	-0.07 -0.66	-0.08 -0.84	-0.03 -0.31	-0.09 -0.92	F value	6.38***	6.35***	6.09 ***	6.45***	
Adjusted R squares	0.59	0.59	0.59	0.59	# of OBS.	73	73	73	73	

TABLE 4.5D. LINEAR REGRESSIONS OF ROA3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

$$ROA3 = a_0 + \beta X + \beta DX + E \quad *** 98\% \text{ significance} \quad ** 95\% \text{ significance} \quad * 90\% \text{ significance}$$

All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.07 -0.86				SQRESVAR	19.75 0.27	29.22 0.40	29.29 0.39	39.80 0.53	
RESSQ		-0.06 -0.52			LSALES	-0.0007 -0.02	0.005 0.14	0.004 0.12	0.01 0.29	
POSRES			-0.05 -0.53	-0.03 -0.24	IND	0.09 1.27	0.08 1.13	0.08 1.13	0.07 1.00	
NEGRES			0.16 0.81	0.27 0.81	DTOTAL	-0.005 -0.73	-0.005 -0.84	-0.004 -0.69	-0.005 -0.76	
CEO=CHAIR or no chair	-0.06 -0.50	0.03 0.28	-0.05 -0.41	-0.03 -0.22	DIND	-0.12 -1.48	-0.11 -1.33	-0.11 -1.34	-0.09 -1.21	
HQ	-0.11 -8.16***	-0.11 -8.07***	-0.11 -7.89 **	-0.11 -7.83***	DCEOOWN	0.09 0.59	0.08 0.54	0.10 0.68	0.10 0.69	
LQ	0.34 3.55 ***	0.34 3.52 ***	0.35 3.55 ***	0.35 3.56 ***	DNMGTDIR	0.04 0.18	0.02 0.09	0.03 0.15	0.01 0.07	
NMGTDIR	-0.15 -0.88	-0.13 -0.75	-0.13 -0.74	-0.11 -0.61	DBLOCK-OWN	-0.002 -0.03	0.0003 0.004	0.0001 0.001	-0.003 -0.04	
IFCFSALE	-7.46 -1.37	-6.34 -1.16	-6.52 -1.12	-5.34 -0.94	DINST	0.16 1.65 *	0.15 1.49	0.15 1.55	0.14 1.40	
DR1	-0.20 -2.48 **	-0.21 -2.49***	-0.21 -2.51***	-0.22 -2.56***	DHFCFLQ	27.84 0.62	20.00 0.46	39.63 0.78	37.27 0.73	
NFXASSET	-0.09 -0.95	-0.09 -0.97	-0.86 -0.89	-0.09 -0.89	DSQRESV	-20.62 -0.23	-30.67 -0.34	-18.50 -0.20	-25.80 -0.29	
adjusted R squares	0.59	0.58	0.58	0.59	F value # of OBS.	6.35*** 73	6.27 *** 73	5.96 *** 73	5.92*** 73	

Summarizing results in Tables 4.5A-D, all decision errors (logistic residuals) are insignificant although most of them have the correct signs. Even though split/joint decision does not directly affect industry adjusted returns on assets, it does marginally affect firms in the high tech industry. The effect of split versus joint positions is also found to be dependent on board effectiveness (proxied by board size) and presence of certain agency mechanisms (proxied by institutional ownership) with the one year data. Results are stronger in the one year return regressions than those with three year averages.

Problem with Multicollinearity

Most of the correlations between CEO=CHAIR and other interactive terms are significant at the 99% level.²⁹ With the introduction of residuals into the full model, variance inflation factors (VIFs) of the CEO=CHAIR variable have doubled when compared to that in the full model. Most of them are close to 20. This arouses some concerns because VIFs are indicators of the degree of correlation between variables when they are involved in a multiple regression framework. So high VIFs are evidence suggesting some multicollinearity between CEO=CHAIR and the other variables.

If the insignificance of the interactive terms such as DTOTAL, DINST and DHFCFLQ are caused by the collinearity between these variables and CEO=CHAIR, then when either one of the variables is dropped from the regression, the others should become significant. But the drop of any variable should satisfy the guidelines that we have established earlier in Appendix A. The t values of the CEO=CHAIR variables are not anywhere close to significance, but those of DTOTAL, DINST and DHFCFLQ are. VIFs of all variables (except CEO=CHAIR) are under 10 which is within the acceptable range. So CEO=CHAIR is probably the main source of the problem. So to investigate how the results would change when the problem of multi-collinearity is under control, CEO=CHAIR will be deleted from the regression model. Dropping CEO=CHAIR does not lower the adjusted R squares of the regression and VIFs of all the interactive terms are significantly lowered.

²⁹ The correlations between CEO=CHAIR and DTOTAL, DIND, DCEOOWN, DNMGTDIR, DBLOCKOWN, DINST DHFCFLQ and DSQRESV are 0.78, 0.32, 0.41, 0.38, 0.58, 0.48, 0.21 and 0.17 respectively. All except two are significant at 1% levels. For the correlation between CEO=CHAIR and DHFCFLQ, it is significant at the 10% level. The correlation between CEO=CHAIR and DSQRESV is insignificant.

TABLE 4.6A. LINEAR REGRESSIONS OF ROA1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS (WITHOUT CEO=CHAIR/NO CHAIR VARIABLE) AS INDEPENDENT VARIABLES

$$ROA1 = a_0 + \beta X + \beta DX + E \quad *** 98\% \text{ significance} \quad ** 95\% \text{ significance} \quad * 90\% \text{ significance}$$

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	
ABSRES	-0.07 -0.86				SQRESVAR	5.50 0.08	-3.30 -0.05	8.90 0.13	-13.03 -0.20	
RESSQ		-0.08 -0.88			LSALES	0.001 0.05	-0.01 -0.20	0.002 0.07	-0.01 -0.34	
POSRES			-0.04 -0.42		IND	0.08 1.11	0.09 1.14	0.07 0.92	0.10 1.30	
NEGRES			0.24 0.84		DTOTAL	-0.01 -1.79 *	-0.01 -1.85*	-0.008 -1.25	-0.10 -1.93 *	
INCORDUM				-0.06 -1.21	DIND	-0.13 -1.67 *	-0.14 -1.69*	-0.12 -1.39	-0.16 -1.86 *	
CEO=CHAIR or NO Chair					DCEOOWN	-0.02 -0.11	-0.02 -0.10	0.01 0.04	-0.01 -0.08	
HQ	-0.12 -7.77***	-0.12 -7.76 ***	-0.12 -7.73 ***	-0.12 -7.82***	DNMGTDIR	0.02 0.10	0.02 0.11	0.02 0.18	-0.003 -0.02	
LQ	0.38 3.73 ***	0.37 3.67 ***	0.39 3.60 ***	0.36 3.71 ***	DBLOCK-OWN	-0.05 -0.55	-0.06 -0.62	-0.05 -0.49	-0.06 -0.67	
NMGTDIR	-0.15 -1.08	-0.16 -1.19	-0.15 -1.04	-0.15 -1.06	DINST	0.14 1.56	0.15 1.76*	0.14 1.62	0.16 1.86 *	
IFCFSALE	-6.46 -1.35	-6.77 -1.38	-5.22 -0.94	-7.60 -1.54	DHFCFLQ	68.77 1.49	68.17 1.49	78.70 1.60	79.50 1.68 *	
DR1	-0.19 -2.40***	-0.18 -2.31 ***	-0.19 -2.37 ***	-0.18 -2.35***	DSQRESV	-72.11 -0.78	-68.06 -0.73	-68.82 -0.74	-53.42 -0.58	
NFXASSET	-0.15 -1.43	-0.16 -1.58	-0.13 -1.12	-0.17 -1.66 *	F value	6.39***	6.39***	6.01***	6.51 ***	
					# of OBS.	73	73	73	73	
					Adjusted R Squares	0.57	0.57	0.57	0.58	

TABLE 4.6B. LINEAR REGRESSIONS OF ROA1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS (WITHOUT CEO=CHAIR/NO CHAIR VARIABLE) AS INDEPENDENT VARIABLES

ROA1 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.07 -0.98				SQRESVAR	-12.93 -0.20	-12.19 -0.18	-4.30 -0.06	-2.05 -0.03	
RESSQ		-0.06 -0.73			LSALES	-0.01 -0.37	-0.01 -0.36	-0.01 -0.20	-0.004 -0.16	
POSRES			-0.04 -0.55	-0.03 -0.35	IND	0.09 1.20	0.08 1.08	0.08 1.05	0.07 0.94	
NEGRES			0.20 0.89	0.33 0.92	DTOTAL	-0.01 -1.88 *	-0.01 -1.82 *	-0.01 -1.67 *	-0.01 -1.61	
CEO=CHAIR or no Chair					DIND	-0.15 -1.75 *	-0.14 -1.62	-0.14 -1.60	-0.13 -1.49	
HQ	-0.12 -7.77***	-0.12 -7.73***	-0.12 -7.54***	-0.12 -7.51***	DCEOOWN	-0.01 -0.08	-0.01 -0.07	0.02 0.10	0.02 0.15	
LQ	0.36 3.64 ***	0.36 3.58 ***	0.37 3.67 ***	0.37 3.65 ***	DNMGTDIR	0.01 0.03	0.01 0.07	0.01 0.05	0.02 0.09	
NMGTDIR	-0.16 -1.14	-0.17 -1.20	-0.14 -1.02	-0.15 -1.04	DBLOCK-OWN	-0.06 -0.67	-0.06 -0.64	-0.06 -0.63	-0.06 -0.60	
IFCFSALE	-7.29 -1.45	-6.78 -1.34	-6.33 -1.20	-5.75 -1.10	DINST	0.16 1.89 *	0.16 1.88 *	0.15 1.83 *	0.15 1.82 *	
DR1	-0.18 -2.27 **	-0.18 -2.23 **	-0.18 -2.34***	-0.19 -2.33***	DHFCFLQ	73.65 1.57	68.07 1.47	90.77 1.65 *	90.15 1.65 *	
NFXASSET	-0.17 -1.66 *	-0.17 -1.66 *	-0.16 -1.58	-0.16 -1.56	DSQRESV	-57.75 -0.62	-61.13 -0.66	-51.58 -0.55	-52.95 -0.57	
Adjusted R squares	0.58	0.57	0.57	0.57	F value	6.43***	6.35 ***	6.04 ***	6.00***	
					# of OBS.	73	73	73	73	

TABLE 4.6C. LINEAR REGRESSIONS OF ROA3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS (WITHOUT CEO=CHAIR/NO CHAIR VARIABLE) AS INDEPENDENT VARIABLES

ROA3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES, - Square of NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES, - Square of NEGRES	INCOR-DUM	
ABSRES	-0.06 -0.86				SQRESVAR	55.72 0.90	46.73 0.78	67.58 1.08	39.55 0.66	
RESSQ		-0.06 -0.07			LSALES	0.02 0.85	0.02 0.64	0.03 1.05	0.01 0.52	
POSRES			-0.0001 -0.001		IND	0.09 1.30	0.09 1.25	0.06 0.89	0.09 1.38	
NEGRES			0.34 1.31		DTOTAL	-0.01 -1.44	-0.01 -1.47	-0.004 -0.65	-0.01 -1.53	
CEO=CHAIR or no chair					DIND	-0.11 -1.50	-0.11 -1.46	-0.08 -1.00	-0.12 -1.59	
INCORDUM				-0.05 -0.98	DCEOOWN	0.06 0.40	0.06 0.43	0.10 0.68	0.06 0.46	
HQ	-0.11 -8.26***	-0.11 -8.23 ***	-0.11 -8.28 ***	-0.11 -8.27***	DNMGTDIR	-0.01 -0.08	-0.01 -0.07	0.01 0.08	-0.03 -0.16	
LQ	0.37 4.00 ***	0.35 3.93 ***	0.40 4.08 ***	0.36 3.97 ***	DBLOCK-OWN	0.01 0.18	0.002 0.02	0.02 0.24	-0.002 -0.02	
NMGTDIR	-0.08 -0.66	-0.10 -0.77	-0.07 -0.53	-0.08 -0.67	DINST	0.11 1.44	0.12 1.64	0.11 1.42	0.13 1.72 *	
IFCFSALE	-5.74 -1.33	-5.78 -1.31	-3.13 -0.63	-6.37 -1.42	DHFCFLQ	20.70 0.50	18.70 0.45	36.70 0.83	26.92 0.63	
DR1	-0.23 -3.17***	-0.22 -3.08 ***	-0.24 -3.27 ***	-0.22 -3.12***	DSQRESV	-48.26 -0.58	-43.83 -0.52	-45.14 -0.54	-33.07 -0.40	
NFXASSET	-0.08 -0.81	-0.09 -0.09	-0.03 -0.32	-0.09 -1.01	F value	6.82***	6.35***	6.53 ***	6.87***	
Adjusted R squares	0.59	0.59	0.59	0.59	# of OBS.	73	73	73	73	

TABLE 4.6D. LINEAR REGRESSIONS OF ROA3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS (WITHOUT CEO=CHAIR/NO CHAIR VARIABLE) AS INDEPENDENT VARIABLES

ROA3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.05 -0.71				SQRESVAR	39.83 0.66	40.51 0.67	47.07 0.73	48.95 0.79	
RESSQ		-0.04 -0.46			LSALES	0.01 0.50	0.01 0.51	0.02 0.63	0.02 0.67	
POSRES			-0.03 -0.35	-0.01 -0.12	IND	0.09 1.26	0.08 1.13	0.08 1.11	0.07 1.00	
NEGRES			0.15 0.77	0.26 0.79	DTOTAL	-0.01 -1.48	-0.01 -1.42	-0.01 -1.29	-0.01 -1.23	
CEO=CHAIR or no chair					DIND	-0.11 -1.46	-0.10 -1.33	-0.11 -1.32	-0.10 -1.20	
HQ	-0.11 -8.22***	-0.11 -8.19***	-0.11 -7.99***	-0.11 -7.96***	DCEOOWN	0.06 0.46	0.07 0.48	0.09 0.61	0.10 0.66	
LQ	0.35 3.90 ***	0.35 3.86 ***	0.36 3.91 ***	0.36 3.91 ***	DNMGTDIR	-0.02 -0.12	-0.01 -0.08	-0.02 -0.10	-0.01 -0.07	
NMGTDIR	-0.09 -0.74	-0.10 -0.79	-0.08 -0.64	-0.08 -0.65	DBLOCK-OWN	-0.0007 -0.01	0.001 0.02	0.002 0.021	0.004 0.05	
IFCFSALE	-6.00 -1.32	-5.52 -1.21	-5.19 -1.08	-4.67 -0.99	DINST	0.13 1.73 *	0.13 1.73 *	0.13 1.69 *	0.13 1.67 *	
DR1	-0.22 -3.05 **	-0.22 -3.02***	-0.23 -3.09***	-0.23 -3.09***	DHFCFLQ	21.60 0.51	17.05 0.41	35.98 0.72	35.42 0.72	
NFXASSET	-0.09 -1.02	-0.09 -1.01	-0.86 -0.94	-0.09 -0.92	DSQRESV	-36.63 -0.44	-39.05 -0.47	-31.45 -0.37	-32.25 -0.38	
Adjusted R squares	0.59	0.59	0.59	0.58	F value # of OBS.	6.36*** 73	6.73 *** 73	6.36 *** 73	6.33*** 73	

Tables 4.6A-D show results of regressions without CEO=CHAIR. Results are very similar to those in Tables 4.6A-D with the exception that marginally insignificant interactive terms become significant when their VIFs are lowered by the removal of CEO=CHAIR in the regression. DTOTAL, DINST and DHFCFLQ become significant at 10% level in Tables 4.5A and B. When the source of multi-collinearity is removed, the significance of variables increases and results becomes stronger than those in previous tables. The significance of other variables such as HQ, LQ, DR1, NFXASSET and DIND are maintained. All the residuals in Tables 4.6 A and B have correct signs even though they are not significant. As mentioned earlier, the results for the three year average ROAs are not as strong as those in the one year ROAs.³⁰ DINST, DR1, HQ and LQ remain significant. Results in table 4.6C and D are similar to those in 4.6A and B except that DTOTAL, DHFCFLQ, DIND and NFXASSET have all lost their significance relative to the three year averages.

As a whole, results from Table 4.6B are more reasonable and reliable than those from other tables because residuals from the logistic model have residuals set to 0 when firms have split or joint positions the same as the prediction from the logistic model. Among the various format of residuals that are incorporated in the regressions in Table 4.6B, squaring the POSRES and negate the squaring of the NEGRES (column 4) theoretically can capture most accurately the relative costs of making incorrect split versus joint decision. However, due to the small number of misclassifications by the logistic model in each group of residuals (positive and negative residuals), residual results may not fully reflect characteristics of the population. Squaring the residual (column 2) becomes a good alternative here because it combines positive and negative residuals. In any case, despite the different ways residuals are incorporated in Table 4.6B, results are very similar.

Results in Tables 4.6A-D are consistent with those in Table 4.4 and Tables 4.5A-D. Residuals are insignificant. Firms do not appear to suffer even if their split/joint positions are deviated from the logistic prediction. The observed insignificance of the errors can be attributed to the high predictive power of the logistic model that produces only a small number of deviants. In general, CEO=CHAIR has no direct impact on ROA except for firms that are in industries believed to require strong and nimble management. Split versus joint positions also affects the relationship

³⁰ In general the switching of leadership structure among these firms may contribute to the weakening of the results for the three year period. However, in this data set, the majority (over 80%) of the firms maintain the same leadership structure and have the same chair and/ CEO during the three year time period. The smoothing in the three year returns but not the firm characteristics may have contributed to the weakening of results.

between performance and other variables such as institutional ownership and board size after controlling for presence of other agency control mechanisms and agency problems, industry and firm characteristics.

4.6.b.ii-2. SGASALE1 and SGASALE3 Regression Results

The structure of Tables 4.7A-D is similar to that in Table 4.5D except that the dependent variable has changed to an efficiency measure, SGASALE, a measure of overhead expenses. Again Tables 4.7A and 4.7B review results for SGASALE1 (overhead expenses in one year, 1991), Tables 4.7C and 4.7D show results for three year average SGASALE, SGASALE3. Consistent with Table 4.4, HQ, CEOOWN, BLOCKOWN, DR1, NFXASSET, LSALES are all very significant in Tables 4.7A&B. Increases in CEOOWN lower SGASALE1, and increases in BLOCKOWN raise SGASALE1. Together with results from Chapter 3 (CEOOWN is negatively related to split positions, and BLOCKOWN is positively related to split positions), this evidence is consistent with the notion that CEO ownership is an alternative for split positions, and block ownership increases the need for split positions.

Increases in NFXASSET and Q in high Q firms increase SGASALE. This result for the NFXASSET variable is evidence supporting a negative impact of the agency cost of debt on efficiency. The result for Q reflects the effect of growth and expansion on overhead expenses. Larger firms have lower SGASALE due to the economy of scale. DSQRESV, close to significance in Table 4.4, is significant at the 10% level in Tables 4.7A&B half of the time. That means that the split versus joint decision affects the relationship between residual variance and efficiency. Unlike the ROA case, most of the residuals do not have correct signs. Firms that make incorrect split versus joint decisions (firms that have positive residuals) surprisingly have lower SGASALE; however, residuals are all insignificant. Results for the three year averages are not as strong as those with one year data. DR1, NFXASSET and DSQRESV lose their significance in Tables 4.7C-D & D.

TABLE 4.7A. LINEAR REGRESSIONS OF SGASALE1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE1 = a₀ + βX + βDX + E *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	
ABSRES	-0.01				DR1	-0.28	-0.27	-0.16	-0.27	
	-0.06					-2.39 ***	-2.24**	-1.16	-2.25 **	
RESSQ		-0.04			NFXASSET	0.32	0.32	0.19	0.32	
		-0.26				2.17 **	2.24**	1.21	2.25 **	
POSRES			-0.30		SQRESVAR	-0.14	-3.45	-112.13	-13.29	
			-1.45			-0.001	-0.03	-0.96	-0.13	
NEGRES			-0.59		LSALES	-0.13	-0.13	-0.20	-0.14	
			-1.53			-2.97 ***	-2.85***	3.37 ***	-2.82***	
INCORDUM				-0.04	TOTAL	0.01	0.01	0.01	0.01	
				-0.45		1.14	1.18	0.80	1.24	
CEO=CHAIR or no chair	0.17	0.15	-0.07	0.13	DNMGTDIR	-0.09	-0.08	0.06	-0.07	
	1.32	1.05	-0.40	0.97		-0.33	-0.26	0.19	-0.25	
HQ	0.05	0.05	0.05	0.05	DBLOCK- OWN	-0.24	-0.24	-0.27	-0.24	
	2.23 **	2.22 **	2.31**	2.22 **		-1.35	-1.33	-1.53	-1.36	
LQ	0.14	0.13	-0.02	0.13	DINST	0.01	0.02	0.17	0.04	
	0.99	0.96	-0.14	0.93		0.07	0.15	1.03	0.24	
CEOOWN	-0.59	-0.59	-0.60	-0.58	DHFCFLQ	-38.06	-34.63	-68.25	-26.76	
	-2.87 ***	-2.85 ***	-2.98***	-2.75***		-0.63	-0.57	-1.10	-0.42	
NMGTDIR	-0.07	-0.09	-0.35	-0.09	DSQRESV	202.87	204.72	250.86	216.23	
	-0.29	-0.35	-1.23	-0.39		1.54	1.55	1.91*	1.61	
BLOCK-OWN	0.37	0.36	0.33	0.36	DIND	-0.04	-0.05	-0.12	-0.06	
	2.82 ***	2.73 ***	2.57 ***	2.78***		-0.37	-0.43	-1.06	-0.51	
IFCFSALE	3.79	3.00	-7.89	2.11	F value	4.52 ***	4.51***	4.70	4.53 ***	
	0.55	0.42	-0.84	0.28	# of OBS.	68	68	68	68	
IND	0.01	0.02	0.07	0.02	Adjusted R squares	0.50	0.51	0.52	0.51	
	0.10	0.17	0.69	0.24						

TABLE 4.7B. LINEAR REGRESSIONS OF SGASALE1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE1 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.08 -0.61				DR1	-0.26 -2.07**	-0.24 -1.92 *	-0.23 -1.79 *	-0.22 -1.67 *	
RESSQ		-0.11 -0.74			NFXASSET	0.32 2.24 **	0.32 2.23 **	0.31 2.18 **	0.30 2.16 **	
POSRES			-0.15 -1.08	-0.18 -1.09	SQRESVAR	-19.74 -0.19	-23.31 -0.22	-48.49 -0.45	-45.59 -0.43	
NEGRES			-0.22 -0.76	-0.35 -0.76	LSALES	-0.15 -2.82 ***	-0.15 -2.86 ***	-0.17 -3.04***	-0.17 -3.04***	
CEO=CHAIR	0.11	0.10	0.07	0.06	TOTAL	0.01	0.01	0.01	0.01	
NO CHAIR	0.76	0.62	0.43	0.39		1.28	1.30	1.21	1.19	
HQ	0.05 2.21 **	0.05 2.20 **	0.04 2.01 **	0.04 2.03 **	DNMGTDIR	-0.05 -0.19	-0.04 -0.14	-0.04 -0.14	-0.03 -0.11	
LQ	0.12 0.85	0.11 0.77	0.09 0.61	0.08 0.56	DBLOCK-OWN	-0.24 -1.34	-0.23 -1.30	-0.24 -1.34	-0.23 -1.29	
CEOOWN	-0.57 -2.73 ***	-0.57 -2.75 ***	-0.62 -2.92 ***	-0.62 -2.92 ***	DINST	0.05 0.35	0.07 0.43	0.08 0.54	0.09 0.57	
NMGTDIR	-0.11 -0.47	-0.13 -0.54	-0.17 -0.69	-0.18 -0.72	DHFCFLQ	-23.77 -0.38	-23.71 -0.39	-61.83 -0.87	-61.36 -0.87	
BLOCK-OWN	0.35 2.68 ***	0.34 2.56 ***	0.34 2.60 ***	0.33 2.48 ***	DSQRESV	219.49 1.64 *	218.84 1.65 *	210.16 1.57	206.47 1.55	
IFCFSALE	1.20 0.16	0.66 0.09	-1.95 -0.24	-1.68 -0.21	DIND	-0.07 -0.59	-0.07 -0.64	-0.09 -0.78	-0.09 -0.77	
IND	0.03 0.32	0.04 0.37	0.05 0.52	0.05 0.51	F value	4.56 ***	4.58 ***	4.58 ***	4.43 ***	
					# of OBS.	68	68	68	68	
					Adjusted R squares	0.51	0.51	0.51	0.51	

TABLE 4.7C. LINEAR REGRESSIONS OF SGASALE3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND OTHER FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE3 = a₀ + βX + βDX + E *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	
ABSRES	-0.03 -0.24				DR1	-0.18 -1.64 *	-0.17 -1.49	-0.09 -0.70	-0.17 -1.51	
RESSQ		-0.06 -0.41			NFXASSET	0.19 1.36	0.19 1.38	0.10 0.64	0.18 1.37	
POSRES			-0.23 -1.16		SQRESVAR	-26.04 -0.27	-32.07 -0.33	-108.76 -0.95	-41.95 -0.42	
NEGRES			-0.38 -0.99		LSALES	-0.12 -2.99 ***	-0.13 -2.92 ***	-0.17 -3.04 ***	-0.14 -2.87 ***	
INCORDUM				-0.04 -0.53	TOTAL	0.01 1.08	0.01 1.11	0.01 0.73	0.01 1.16	
CEO=CHAIR or no chair	0.16 1.37	0.15 1.08	-0.01 -0.06	0.14 1.05	DNMGTDIR	-0.16 -0.60	-0.14 -0.52	-0.05 -0.17	-0.15 -0.54	
HQ	0.06 2.81***	0.06 2.82 ***	0.06 2.91 ***	0.06 2.83 ***	DBLOCK-OWN	-0.20 -1.18	-0.20 -1.17	-0.23 -1.33	-0.20 -1.21	
LQ	0.08 0.65	0.08 0.58	-0.03 -0.21	0.07 0.57	DINST	-0.03 -0.26	-0.02 -0.15	0.09 0.54	-0.01 -0.06	
CEOOWN	-0.64 -3.29 ***	-0.64 -3.26 ***	-0.64 -3.30 ***	0.63 -3.15 ***	DHFCFLQ	-1.07 -0.02	1.64 0.03	-19.09 -0.32	8.78 0.15	
NMGTDIR	-0.01 -0.03	-0.03 -0.12	-0.21 -0.77	-0.03 -0.13	DSQRESV	176.64 1.42	179.74 1.45	209.79 1.66 *	191.94 1.51	
BLOCK-OWN	0.30 2.48 ***	0.30 2.40 ***	0.28 2.25 **	0.30 2.46 ***	DIND	-0.08 -0.85	-0.09 -0.90	-0.14 -1.31	-0.10 -0.96	
IFCFSALE	1.26 0.20	0.49 0.07	-6.98 -0.76	*-0.17 -0.03	F value	4.47 ***	4.48***	4.4	4.50 ***	
IND	0.05 0.56	0.06 0.62	0.09 0.96	0.06 0.67	# of OBS.	68	68	68	68	
					Adjusted R squares	0.50	0.51	0.51	0.51	

TABLE 4.7D. LINEAR REGRESSIONS OF SGASALE3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.03 -0.24				DR1	-0.18 -1.64*	-0.17 -1.49	-0.15 -1.31	-0.12 -1.02	
RESSQ		-0.06 -0.41			NFXASSET	0.19 1.36	0.19 1.38	0.18 1.32	0.17 1.28	
POSRES			-0.10 -0.98	-0.16 -1.05	SQRESVAR	-26.04 -0.27	-32.07 -0.33	-67.46 -0.66	-69.04 -0.68	
NEGRES			-0.10 -0.62	-0.28 -0.63	LSALES	-0.12 -2.99 ***	-0.13 -2.92 ***	-0.15 -3.04 ***	-0.16 -3.01 ***	
CEO=CHAIR	0.17	0.15	0.10	0.08	TOTAL	0.01	0.01	0.01	0.01	
NO CHAIR	1.37	1.08	0.72	0.51		1.08	1.11	1.10	1.07	
HQ	0.06 2.81 ***	0.06 2.82 ***	0.05 2.65***	0.05 2.68 ***	DNMGTDIR	-0.16 -0.60	-0.14 -0.52	-0.13 -0.50	-0.11 -0.41	
LQ	0.09 0.65	0.08 0.58	0.05 0.37	0.03 0.22	DBLOCK-OWN	-0.20 -1.18	-0.20 -1.17	-0.21 -1.24	-0.19 -1.15	
CEOOWN	-0.64 -3.29***	-0.64 -3.26 ***	-0.67 -3.29 ***	-0.66 -3.28 ***	DINST	-0.03 -0.26	-0.02 -1.05	0.02 0.12	0.04 0.26	
NMGTDIR	-0.01 -0.03	-0.03 -0.12	-0.07 -0.33	-0.10 -0.44	DHFCFLQ	-1.07 -0.02	1.64 0.03	-21.74 -0.32	-20.51 -0.31	
BLOCK-OWN	0.30 2.48***	0.29 2.40 ***	0.30 2.42 ***	0.27 2.17 **	DSQRESV	176.64 1.42	179.74 1.45	185.15 1.46	181.58 1.44	
IFCFSALE	1.26 0.20	0.49 0.07	-2.94 -0.39	-3.23 -0.43	DIND	-0.08 -0.85	-0.09 -0.90	-0.12 -1.13	-0.13 -1.16	
IND	0.05 0.56	0.06 0.62	0.08 0.85	0.08 0.88	F value	4.47 ***	4.48 ***	4.34 ***	4.35 ***	
					# of OBS.	68	68	68	68	
					Adjusted R squares	0.51	0.51	0.51	0.51	

Except for the cases of the squares of the POSRES and NEGRES, VIFs of CEO=CHAIR are usually under 15. Again, there is some, but not a serious amount of multi-collinearity between CEO=CHAIR and interactive terms. In this case, the elimination of the CEO=CHAIR is optional. Just to check whether the elimination makes a difference, Tables 4.8A-D show results of regression without a CEO=CHAIR variable. DSQRESV is significant in SGASALE1 and SGASALE3 regressions. Thus, split versus joint decision affects the relationship between SQRESVAR and SGASALE.

Results in Tables 4.8A-D are similar to those in Tables 4.6A-D except for the residuals. Coefficients of squares of POSRES are significant at the 10% level in Tables 4.7A to D. Firms that are supposed to have non-split positions, but observed to have split titles, have higher efficiency than firms that have non-split decisions. When CEO=CHAIR is not accounted for, it seems that there may be some marginal benefits of split positions in lowering SGASALE, even though the firm characteristics call for non-split titles.

To conclude, though the problem of multi-collinearity in Tables 4.7A-D (SGASALE regressions) is not as serious as those in Tables 4.5A-D (ROA regressions), results of Tables 4.8A-D are stronger than those of Tables 4.7A-D when multi-collinearity is under control. As with the ROA regressions, columns 2 and 4 in Table 4.7B provide more reliable results (refer to section 4.6.b.ii-2 and 4.5.e. for details). Results for one year data are stronger than those with three year averages. For the case of SGASALE, after controlling for multi-collinearity, some of the logistic residuals are significant. Split versus joint positions seems to have some direct effect on efficiency. It also affects the relationship between agency costs of equity and return performance.

TABLE 4.8A. LINEAR REGRESSIONS OF SGASALE1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND OTHER FIRM CONDITIONS (WITHOUT CEO=CHAIR/NO CHAIR VARIABLE) AS INDEPENDENT VARIABLES

$$SGASALE1 = a_0 + \beta X + \beta DX + E \quad *** 98\% \text{ significance} \quad ** 95\% \text{ significance} \quad * 90\% \text{ significance}$$

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	..Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	
ABSRES	-0.09 -0.87				DR1	-0.22 -2.02 **	-0.21 -1.98 **	-0.19 -1.85 *	-0.22 -2.03 **	
RESSQ		-0.14 -1.22			NFXASSET	0.33 2.21 **	0.32 2.23 **	0.21 1.43 **	0.31 2.19 **	
POSRES			-0.23 -1.96 *		SQRESVAR	-34.33 -0.35	-39.19 -0.41	-85.49 -0.89	-57.18 -0.60	
NEGRES			-0.52 -1.53		LSALES	-0.15 -3.74***	-0.16 -4.07***	-0.18 -4.58 ***	0.17 -4.22***	
INCORDUM				-0.09 -1.34	TOTAL	0.01 1.25	0.01 1.30	0.01 0.84	0.01 1.41	
CEO=CHAIR or no chair					DNMGTDIR	0.08 0.31	0.07 0.29	-0.01 -0.02	0.05 0.21	
HQ	0.05 2.11**	0.05 2.14 **	0.05 2.54 **	0.05 2.18 **	DBLOCK-OWN	-0.16 -0.96	-0.18 -1.06	-0.28 -1.63	-0.19 -1.15	
LQ	0.12 0.875	0.10 0.78	0.01 0.06	0.10 0.76	DINST	0.11 0.92	0.11 1.02	0.12 1.10	0.13 1.17	
CEOOWN	-0.53 -2.62***	-0.54 -2.67***	-0.62 -3.10 ***	-0.51 -2.58 ***	DHFCFLQ	-27.40 -0.46	-23.94 -0.40	-66.04 -1.08	-11.01 -0.18	
NMGTDIR	-0.23 -1.14	-0.23 -1.19	-0.26 -1.38	-0.22 -1.13	DSQRESV	237.67 1.83 *	235.13 1.83 *	235.33 1.89 *	258.50 2.03 **	
BLOCK-OWN	0.30 2.48 ***	0.30 2.53 ***	0.35 2.99 ***	0.31 2.61 ***	DIND	-0.02 -0.203	-0.05 -0.42	-0.11 -1.01	-0.06 -0.54	
IFCFSALE	1.23 0.19	0.11 0.02	-5.42 -0.77	-0.78 -0.11	F value	4.58 ***	4.69 ***	4.94 ***	4.73 ***	
IND	-0.004 -0.04	0.02 0.16	0.06 0.63	0.02 0.25	# of OBS.	68	68	68	68	
					Adjusted R squares	0.52	0.51	0.54	0.51	

TABLE 4.8B. LINEAR REGRESSIONS OF SGASALE1 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE1 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.14 -1.54				DR1	-0.21 -1.97***	-0.20 -1.90 *	-0.20 -1.87 *	-0.18 -1.78 *	
RESSQ		-0.18 -1.66 *			NFXASSET	0.31 2.02 **	0.31 2.20 *	0.30 2.17 **	0.30 2.15 **	
POSRES			-0.19 -1.96 *	-0.23 -1.97 *	SQRESVAR	-55.52 -0.59	-52.59 -0.56	-70.78 -0.75	-65.23 -0.69	
NEGRES			-0.20 -0.75	-0.34 -0.75	LSALES	-0.17 -4.30***	-0.18 -4.35***	-0.18 -4.49 ***	-0.18 -4.50***	
CEO=CHAIR or no chair					TOTAL	0.01 1.42	0.01 1.41	0.01 1.29	0.01 1.26	
HQ	0.05 2.18**	0.05 2.18 **	0.04 1.99 **	0.04 2.02 **	DNMGTDIR	0.05 0.19	0.05 0.18	0.02 0.07	0.02 0.08	
LQ	0.09 0.69	0.08 0.62	0.07 0.51	0.06 0.50	DBLOCK-OWN	-0.20 -1.18	-0.20 -1.17	-0.22 -1.28	-0.21 -1.24	
CEOOWN	-0.52 -2.64 ***	-0.53 -2.70 ***	-0.60 -2.92 ***	-0.60 -2.93 ***	DINST	0.13 1.20	0.13 1.22	0.13 1.18	0.13 1.21	
NMGTDIR	-0.22 -1.14	-0.23 -1.16	-0.24 -1.20	-0.24 -1.24	DHFCFLQ	-11.41 -0.19	-14.96 -0.25	-58.89 -0.84	-58.86 -0.84	
BLOCK-OWN	0.31 2.61 ***	0.30 2.58 ***	0.31 2.69 ***	0.31 2.61 ***	DSQRESV	251.34 1.99 **	242.69 1.92 *	226.54 1.78 *	220.15 1.73 *	
IFCFSALE	-1.42 -0.21	-1.54 -0.23	-3.68 -0.53	-3.20 -0.47	DIND	-0.08 -0.67	-0.08 -0.72	-0.09 -0.85	-0.09 -0.83	
IND	0.03 0.37	0.04 0.42	0.06 0.58	0.06 0.55	F value	4.81 ***	4.86 ***	4.72 ***	4.73 ***	
					# of OBS.	68	68	68	68	
					Adjusted R squares	0.52	0.52	0.52	0.52	

TABLE 4.8C. LINEAR REGRESSIONS OF SGASALE3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND OTHER FIRM CONDITIONS (WITHOUT CEO=CHAIR/NO CHAIR VARIABLE) AS INDEPENDENT VARIABLES

SGASALE3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	
ABSRES	-0.10 -1.09				DR1	-0.12 -1.18	-0.11 -1.11	-0.10 -0.98	-0.12 -1.16	
RESSQ		-0.15 -1.42			NFXASSET	0.19 1.40	0.18 1.37	0.10 0.71	0.17 1.31	
POSRES			-0.22 -1.97 *		SQRESVAR	-59.93 -0.64	-67.14 -0.74	-104.60 -1.14	-86.95 -0.97	
NEGRES			-0.37 -1.10		LSALES	-0.15 -3.78***	-0.16 -4.16***	-0.17 -4.50 ***	-0.17 -4.31***	
INCORDUM				-0.10 -1.49	TOTAL	0.01 1.16	0.01 1.21	0.01 0.75	0.01 1.31	
CEO=CHAIR or no chair					DNMGTDIR	0.01 0.04	0.004 0.02	-0.06 -0.25	-0.02 -0.07	
HQ	0.05 2.69***	0.06 2.75 ***	0.06 2.94 ***	0.06 2.79 ***	DBLOCK-OWN	-0.13 -0.79	-0.14 -0.89	-0.23 -1.36	-0.16 -0.98	
LQ	0.07 0.52	0.05 0.38	-0.03 -0.21	0.05 0.37	DINST	0.06 0.55	0.07 0.67	0.08 0.77	0.09 0.83	
CEOOWN	-0.58 -3.02 ***	-0.59 -3.09 ***	-0.65 -3.39 ***	-0.56 -2.97 ***	DHFCFLQ	9.84 0.17	12.43 0.22	-18.80 -0.32	25.18 0.43	
NMGTDIR	-0.16 -0.87	-0.17 -0.93	-0.20 -1.07	-0.16 -0.87	DSQRESV	210.12 1.71 *	208.93 1.72 *	207.52 1.74 *	234.60 1.95 *	
BLOCK-OWN	0.24 2.09 **	0.24 2.14 **	0.28 2.49 ***	0.25 2.22 **	DIND	-0.07 -0.68	-0.09 -0.89	-0.14 -1.35	-0.10 -1.0	
IFCFSALE	-1.23 -0.20	-2.32 -0.37	-6.60 -0.98	-3.11 -0.48	F value	4.52 ***	4.64 ***	4.70	4.67 ***	
IND	0.04 0.41	0.06 0.61	0.09 0.98	0.06 0.67	# of OBS.	68	68	68	68	
					Adjusted R squares	0.50	0.51	0.52	0.51	

TABLE 4.8D. LINEAR REGRESSIONS OF SGASALE3 USING RESIDUALS (FROM NON-CEOOWN LOGISTIC MODEL) AND OTHER FIRM CONDITIONS (WITHOUT CEO=CHAIR/NO CHAIR VARIABLE) AS INDEPENDENT VARIABLES

SGASALE3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.10 -1.09				DR1	-0.12 -1.18	-0.11 -1.11	-0.11 -1.10	-0.09 -0.89	
RESSQ		-0.15 -1.42			NFXASSET	0.19 1.40	0.18 1.37	0.17 1.28	0.16 1.24	
POSRES			-0.14 -1.92 *	-0.22 -2.03 **	SQRESVAR	-59.93 -0.64	-67.14 -0.74	-120.41 -1.14	-93.75 -1.05	
NEGRES			-0.09 -0.58	-0.27 -0.63	LSALES	-0.15 -3.78***	-0.16 -4.16***	-0.17 -4.49 ***	-0.18 -4.55***	
CEO=CHAIR or no chair					TOTAL	0.01 1.16	0.01 1.21	0.01 1.19	0.01 1.13	
HQ	0.05 2.69***	0.06 2.75 ***	0.05 2.61 ***	0.05 2.67 ***	DNMGTDIR	0.01 0.04	0.004 0.02	-0.05 -0.20	-0.04 -0.19	
LQ	0.07 0.52	0.05 0.38	0.03 0.21	0.01 0.06	DBLOCK-OWN	-0.13 -0.79	-0.14 -0.89	-0.18 -1.11	-0.17 -1.06	
CEOOWN	-0.58 -3.02 ***	-0.59 -3.09 ***	-0.63 -3.23 ***	-0.64 -3.28 ***	DINST	0.06 0.55	0.07 0.67	0.09 0.82	0.09 0.89	
NMGTDIR	-0.16 -0.87	-0.17 -0.93	-0.17 -0.93	-0.18 -0.97	DHFCFLQ	9.84 0.17	12.43 0.22	-16.79 -0.25	-17.19 -0.26	
BLOCK-OWN	0.24 2.09 **	0.24 2.14 **	0.26 2.33 ***	0.24 2.20 **	DSQRESV	210.12 1.71 *	208.93 1.72 *	212.11 1.76 *	198.17 1.64 *	
IFCFSALE	-1.23 -0.20	-2.32 -0.37	-5.43 -0.82	-5.13 -0.79	DIND	-0.07 -0.68	-0.09 -0.89	-0.13 -1.19	0.09 0.94	
IND	0.04 0.41	0.06 0.61	0.08 0.89	0.09 0.94	F value	4.52 ***	4.64 ***	4.57 ***	4.73 ***	
					# of OBS.	68	68	68	68	
					Adjusted R squares	0.50	0.51	0.52	0.52	

4.6.c. Specification test

Section 3.8 shows that the predictive power of the logistic model for the original data set is higher than that of the data set that excludes firms with missing data on Chair positions from the sample. To further investigate whether the deletion of those missing Chair firms affects the results, table 4.9A-D show results of linear regressions of ROA on firms that either have split positions or have combined positions.³¹ The coefficients for CEOEQCH are positive and significant indicating that joint firms actually perform better than split firms. This is consistent with the high costs of information transfer argument and results found by Brickley, Coles and Jarrell (1996). But this result is opposite to the results cited in this paper. Our results in previous sections show that when firms with missing Chairs are combined with firms with joint positions, split versus joint positions will have no impact on ROA. Results in this section show that firms with joint positions outperform split firms. So it seems that firms that have missing or no chairs have lower ROAs. Out of the sixteen firms that do not have any information on the Chair positions, only one firm has changed to have CEO and Chair titles combined the year after 1991. The rest of the firms still have no information on the Chair position the year after 1991. All of the fifteen firms have the same person as the CEO the year before and the year after 1991.

Comparing Tables 4.6A-B³² to Tables 4.9A-B, the significance of the coefficients of DTOTAL become stronger in this set of data than the original data set. In table 4.9A-B, coefficients of DBLOCKOWN become significant in ROA1 but disappear in ROA3 models. DBLOCKOWN is not significant in Tables 4.6A-B. DIND which is significant in Tables 4.6A&B is no longer significant in Tables 4.9A-B. Results of the three year averages (Tables 4.8C-D) are similar to those of the one year data (Tables 4.9A-B). The coefficients of CEOEQCH and DTOTAL remain very significant.

³¹ Firms with missing chair positions are deleted in Brickley, et al's (1996) paper.

³² Table 4.6A-D are results of linear regressions of ROA on residuals (from the logistic models) and firm conditions after controlling for the problem of multi-collinearity.

TABLE 4.9A. LINEAR REGRESSIONS OF ROA1 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

ROA1 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	
ABSRES	0.07 1.21				LSALES	0.04 1.75*	0.04 1.89 *	0.07 2.52 ***	0.04 1.94*	
RESSQ		0.07 0.98			IND	0.07 1.42	0.06 1.39	0.04 0.68	0.08 1.65*	
PORESSQ			0.21 1.89 *		DTOTAL	-0.02 -2.87***	-0.02 -2.78***	-0.02 -2.82 ***	-0.02 -2.82***	
NEGRESSQ			0.15 0.99		DIND	-0.08 -1.43	-0.08 -1.37	-0.04 -0.62	-0.09* -1.69	
INCORDUM				0.04 1.08	DCEOOWN	-0.06 -0.45	-0.06 -0.46	-0.04 -0.29	-0.06 -0.46	
CEOEQCH	0.21 2.47***	0.20 2.33 **	0.30 2.88 ***	0.20 2.40 ***	DNMGTDIR	0.11 0.74	0.11 0.73	0.02 0.12	0.14 0.89	
HQ	0.03 1.33	0.03 1.22	0.03 1.28	0.03 1.24	DBLOCK-OWN	-0.21 -2.49***	-0.20 -2.38***	-0.14 -1.58	-0.20 -2.40***	
LQ	0.26 3.03***	0.28 3.22 ***	0.37 3.64 ***	0.27 3.19 ***	DINST	0.04 0.59	0.03 0.44	-0.05 -0.53	0.03 0.42	
NMGTDIR	0.05 0.46	0.06 0.47	0.19 0.14	0.03 0.31	DHFCFLQ	16.64 0.50	18.37 0.55	28.88 0.86	19.21 0.58	
IFCFSALE	1.04 0.31	0.97 0.28	6.11 1.32	0.61 0.19	DSQRESV	-45.48 -0.72	-49.45 -0.78	-81.57 -1.24	-59.07 -0.92	
DR1	-0.09 -1.34	-0.10 -1.49	90.16 -2.15 **	-0.10 -1.56	F value	3.49 ***	3.41 ***	3.52 ***	3.52 ***	
NFXASSET	-0.17 -2.13**	-0.16 -1.99 **	-0.08 -0.90	-0.16 -2.01**	# of OBS.	57	57	57	57	
SQRESVAR	32.17 0.67	40.75 0.84	93.55 1.63	46.01 0.94	Adjusted R squares	0.46	0.45	0.47	0.47	

TABLE 4.9B. LINEAR REGRESSIONS OF ROA1 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

ROA1 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	0.07 1.21				LSALES	0.04 1.75*	0.04 1.89*	0.07 1.87*	0.07 2.66***	
RESSQ		0.07 0.98			IND	0.07 1.42	0.07 1.39	0.04 0.70	0.05 1.04	
POSRES			0.20 1.43	0.16 2.07**	DTOTAL	-0.02 -2.87***	-0.2 -2.78***	-0.02 -2.88***	-0.02 -2.96***	
NEGRES			0.03 0.29	0.12 0.90	DIND	-0.08 -1.43	-0.08 -1.37	-0.04 -0.65	-0.05 -0.89	
CEOEQCH	0.21 2.47***	0.20 2.33***	0.33 2.21**	0.26 2.93***	DCEOOWN	-0.06 -0.45	-0.06 -0.46	-0.05 -0.44	-0.03 -0.28	
HQ	0.04 1.33	0.03 1.22	0.04 1.27	0.03 1.24	DNMGTDIR	0.11 0.74	0.11 0.73	0.01 0.04	0.07 0.46	
LQ	0.26 3.03***	0.28 3.22***	0.34 2.90***	0.36 3.84***	DBLOCK-OWN	-0.21 -2.49***	-0.20 -2.38***	-0.16 -1.68*	-0.15 -1.76*	
NMGTDIR	0.05 0.46	0.06 0.47	0.19 1.07	0.13 1.09	DINST	0.04 0.59	0.03 0.44	-0.03 -0.26	-0.03 -0.42	
IFCFSALE	1.04 0.31	0.97 0.28	6.74 1.04	4.22 1.14	DHFCFLQ	16.64 0.50	18.37 0.55	20.15 0.60	28.18 0.84	
DR1	-0.09 -1.34	-0.10 -1.49	-0.14 -1.68*	-0.16 -2.23**	DSQRESV	-45.48 -0.72	-49.45 -0.77	-73.52 -1.06	-72.96 -1.16	
NFXASSET	-0.17 -2.13**	-0.16 -1.99**	-0.10 -0.96	-0.11 1.34	F value	3.49	3.41	3.37	3.64***	
SQRESVAR	32.17 0.70	40.75 0.84	79.07 1.19	86.86 1.66*	# of OBS.	57	57	57	57	
					Adjusted R squares	0.46	0.45	0.46	0.49	

TABLE 4.9C. LINEAR REGRESSIONS OF ROA3 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

ROA3 = a₀ + βX + βDX + E *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	
ABSRES	0.04 0.77				LSALES	0.04 2.25**	0.05 2.32**	0.08 2.99***	0.05 2.47***	
RESSQ		0.05 0.72			IND	0.07 1.67*	0.07 1.62	0.04 0.84	0.07 1.82*	
POSRES			0.18 1.87 *		DTOTAL	-0.01 -2.26**	-0.01 -2.24**	-0.01 -2.28**	-0.01 -2.38***	
NEGRES			0.17 1.27		DIND	0.10 -1.57	-0.08 -1.50	-0.04 -0.68	-0.09 -1.78*	
INCORDUM				0.03 1.11	DCEOOWN	-0.03 -0.28	-0.03 -0.29	-0.01 -0.10	-0.04 -0.33	
CEOEQCH	0.15 2.00**	0.15 1.95*	0.25 2.69***	0.16 2.18**	DNMGTDIR	0.07 0.48	0.06 0.45	-0.03 -0.22	0.07 0.52	
HQ	0.04 1.48	0.04 1.43	0.04 1.51	0.04 1.48	DBLOCK-OWN	-0.06 -0.84	-0.06 -0.77	-0.0004 -0.01	-0.06 -0.80	
LQ	0.28 3.59***	0.29 3.73***	0.37 4.21***	0.28 3.75***	DINST	-0.01 -0.09	-0.01 -0.19	-0.09 -1.17	-0.02 -0.27	
NMGTDIR	0.04 0.39	0.05 0.43	0.18 1.41	0.04 0.37	DHFCFLQ	-5.28 -0.18	-5.08 -0.17	5.28 0.18	-6.57 -0.22	
IFCFSALE	-0.07 -0.02	0.02 0.01	5.08 1.25	0.05 0.02	DSQRESV	-53.80 -0.94	-56.06 -0.98	-87.72 -1.51	-64.81 -1.14	
DR1	-0.13 -2.24**	-0.13 -2.34***	-0.20 -3.00***	-0.14 2.45***	F value	3.42***	3.40***	3.60***	3.50***	
NFXASSET	-0.10 -1.32	-0.09 -1.27	-0.01 -0.18	-0.09 -1.36	# of OBS.	57	57	57	57	
SQRESVAR	66.60 1.55	71.82 1.67*	123.85 2.44 ***	77.49 1.80*	Adjusted R Squares	0.45	0.45	0.48	0.46	

TABLE 4.9D. LINEAR REGRESSIONS OF ROA3 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

ROA3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	0.05 1.26				LSALES	0.05 2.55***	0.05 2.58***	0.07 3.13 ***	0.07 3.08***	
RESSQ		0.07 1.30			IND	0.07 1.69*	0.07 1.58	0.05 1.30	0.05 1.21	
POSRES			0.13 2.13 **	0.14 2.04**	DTOTAL	-0.01 -2.44***	-0.01 -2.46***	-0.01 -2.54 ***	-0.01 -2.50**	
NEGRES			0.06 0.74	0.10 0.83	DIND	-0.08 -1.64*	-0.07 -1.50	-0.05 -1.02	-0.05 -0.98	
CEOEQCH	0.17 2.27 **	0.17 2.29**	0.22 2.78 ***	0.20 2.69***	DCEOOWN	-0.04 -0.36	-0.04 -0.37	-0.02 -0.21	-0.02 -0.16	
HQ	0.04 1.46	0.03 1.43	0.03 1.49	0.03 1.48	DNMGTDIR	0.05 0.40	0.04 0.31	0.02 0.14	0.01 0.10	
LQ	0.29 3.86***	0.30 3.93***	0.36 4.30 ***	0.36 4.32***	DBLOCK-OWN	-0.05 -0.74	-0.05 -0.69	-0.01 -0.16	-0.01 -0.20	
NMGTDIR	0.05 0.51	0.06 0.61	0.11 1.08	0.12 1.13	DINST	-0.03 -0.38	-0.03 -0.44	-0.08 -1.09	-0.07 -1.03	
IFCFSALE	0.47 0.16	0.71 0.34	3.50 1.04	3.16 0.96	DHFCFLQ	-9.10 -0.31	-9.77 -0.33	-1.86 -0.06	1.01 0.03	
DR1	-0.15 -2.54***	-0.15 -2.57***	-0.19 -3.07 ***	-0.19 -3.04***	DSQRESV	-65.35 -1.15	-64.03 -1.14	-79.69 -1.43	-76.54 -1.37	
NFXASSET	-0.09 -1.34	-0.09 -1.29	-0.04 -0.67	-0.05 -0.70	F value	3.55***	3.57***	3.70***	3.67***	
SQRESVAR	81.10 1.87*	82.75 1.90*	117.90 2.49 ***	112.58 2.43***	# of OBS.	57	57	57	57	
					Adjusted R squares	0.46	0.47	0.49	0.49	

Tables 4.10A-D show results of SGASALE regressions. The coefficients of CEOEQCH and DSQRESV which are significant in Tables 4.8A-B³³ become insignificant in Tables 4.10A-B. The significance of other variables such as CEO ownership, block ownership and proportion of non-fixed asset is maintained. Coefficients of high Q and debt ratio lose their significance in Tables 4.10A-B. Tables 4.10C-D present results for three year averages. Results are comparable to those in Tables 4.10C-D. There is no major difference in results between these tables.

Overall, Brickley's sample may be biased because they have only taken the better performing firms when they delete firms with missing chairs from their sample. With these firms deleted, both his and our results show that joint firms seem to outperform split firms in terms of return on assets. However, when the sample includes those firms with missing Chairs, the results are different. When missing chair firms are classified as non-split firms, the split versus joint decision does not seem to affect performance. Given the results reported in section 3.7.b.ii. that the predictive decision model performs better when missing chair firms are included, it appears that missing chair firms do behave like firms with joint positions. Excluding the missing chair firms may not be appropriate and the different results in the performance regression may not be reliable. For the return on assets and efficiency regressions, the effect of split versus joint decision on the relationship between performance and other independent variables changes in opposite directions when missing chair firms are deleted. But since there is such a small number of firms in this category, the difference may not be significant. So further research on whether these and why these firms should be excluded from the sample is warranted.

³³ Table 4.8A-D are used to compare to Table 4.10A-D because an adjustment is made to lower the multicollinearity problem in Table 4.8A-D.

TABLE 4.10A. LINEAR REGRESSIONS OF SGASALE1 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE1 = a₀ + βX + βDX + E *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	Square of POSRES - Square of NEGRES	INCOR-DUM	
ABSRES	-0.12 -1.02				NFXASSET	0.30 1.81*	0.29 1.74*	0.22 1.10	0.28 1.69*	
RESSQ		-0.15 -1.03			SQRESVAR	-11.22 -0.11	-25.10 -0.24	-69.04 -0.55	-38.20 -0.36	
POSRES			-0.28 -1.14		LSALES	-0.13 -2.84 ***	-0.14 -3.02***	-0.17 -2.62***	-0.14 -2.97***	
NEGRES			-0.04 -0.14		TOTAL	0.01 1.3	0.02 1.40	0.01 1.34	0.02 1.39	
INCORDUM				-0.06 -0.86	IND	0.04 0.387	0.04 0.43	0.07 0.65	0.02 0.23	
CEOEQCH	0.12 0.92	0.11 0.77	-0.001 -0.00	0.13 1.04	DNMGTDIR	-0.10 -0.33	-0.09 -0.28	-0.004 -0.01	-0.13 -0.40	
HQ	0.11 1.34	0.11 1.42	0.12 1.46	0.12 1.47	DBLOCK-OWN	-0.19 -0.82	-0.20 -0.85	-0.23 -0.96	-0.23 -0.99	
LQ	-0.03 -0.17	-0.07 -0.35	-0.15 -0.66	-0.06 -0.34	DINST	-0.04 -0.24	-0.01 -0.08	0.07 0.34	-0.01 -0.07	
CEOOWN	-0.51 -2.07**	-0.50 -2.04**	-0.52 -2.08**	-0.49 -1.96*	DHFCFLQ	3.66 0.05	5.36 0.08	-2.99 -0.04	-2.07 -0.03	
NMGTDIR	-0.11 -0.48	-0.13 0.56	-0.25 -0.84	-0.09 -0.39	DSQRESV	151.24 1.09	154.098 1.12	179.04 1.25	178.21 1.29	
BLOCK-OWN	0.33 2.46***	0.32 2.36***	0.30 2.04**	0.35 2.63***	DIND	0.04 0.38	-1.0 -0.87	-0.13 -1.06	-0.07 -0.64	
IFCFSALE	2.31 0.34	1.88 0.27	-2.78 -0.28	2.84 0.43	F value	2.70 ***	2.70***	2.55***	2.67***	
DR1	-0.15 -1.11	-0.13 -0.91	-0.06 -0.35	-0.13 -0.90	# of OBS.	54	54	54	54	
					Adjusted R Squares	0.39	0.39	0.38	0.39	

TABLE 4.10B. LINEAR REGRESSIONS OF SGASALE1 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE1 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.11 -1.09				NFXASSET	0.28 1.69*	0.27 1.67*	0.25 1.43	0.22 1.10	
RESSQ		-0.16 -1.24			SQRESVAR	-43.23 0.41	-45.68 -0.43	-60.60 -0.51	-69.04 -0.55	
POSRES			-0.14 -0.99	-0.28 -1.14	LSALES	-0.15 -3.06***	-0.16 -3.12***	-0.16 -2.78***	-0.17 -2.62***	
NEGRES			0.05 0.30	-0.04 -0.14	TOTAL	0.02 1.45	0.02 1.48	0.02 1.43	0.01 1.34	
CEOEQCH	0.11 0.81	0.09 0.65	0.08 0.53	-0.001 -0.00	IND	0.03 0.34	0.04 0.43	0.04 0.41	0.07 0.65	
HQ	0.12 1.51	0.12 1.54	0.12 1.51	0.12 1.46	DNMGTDIR	-0.10 -0.31	-0.07 -0.24	-0.08 -0.26	-0.004 -0.01	
LQ	-0.08 -0.45	-0.10 -0.54	-0.12 -0.55	-0.15 -0.67	DBLOCK-OWN	-0.22 -0.98	-0.22 -0.96	-0.24 -1.01	-0.23 -0.96	
CEOOWN	-0.49 -1.95*	-0.49 -1.97*	-0.49 -1.93*	-0.52 -2.08**	DINST	0.01 0.05	0.02 0.14	0.04 0.21	0.07 0.34	
NMGTDIR	-0.12 -0.50	-0.14 -0.60	-0.14 -0.58	-0.25 -0.84	DHFCFLQ	4.87 0.07	9.31 0.14	1.39 0.02	-2.99 -0.04	
BLOCK-OWN	0.34 2.51***	0.32 2.36***	0.33 2.41***	0.30 2.04**	DSQRESV	177.00 1.29	171.64 1.26	183.11 1.31	179.04 1.25	
IFCFSALE	1.98 0.29	1.35 0.20	0.51 0.06	-2.78 -0.28	DIND	-0.08 -0.76	-0.10 -0.87	-0.10 -0.82	-0.13 -1.06	
DR1	-0.11 -0.76	-0.09 -0.64	-0.08 -0.53	-0.06 -0.35	F value	2.72 ***	2.76 ***	2.53 ***	2.55 ***	
					# of OBS.	54	54	54	54	
					Adjusted R Squares	0.39	0.40	0.38	0.52	

TABLE 4.10C. LINEAR REGRESSIONS OF SGASALE3 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	...Continued Independent Variables	Absolute value of the Residuals	Residual Squares	Square of POSRES - Square NEGRES	INCOR-DUM	
ABSRES	-0.11 -0.93				NFXASSET	0.23 1.38	0.21 1.32	0.18 0.90	0.21 1.31	
RESSQ		-0.14 -0.96			SQRESVAR	-20.10 -0.19	-32.15 -0.31	-54.88 -0.43	-44.65 -0.43	
POSRES			-0.20 -0.80		LSALES	-0.12 2.75***	-0.13 -2.91***	-0.15 2.24**	-0.14 -2.91***	
NEGRES			0.04 0.13		TOTAL	0.01 1.34	0.02 1.38	0.01 1.30	0.02 1.41	
INCORDUM				-0.06 -0.95	IND	0.06 0.68	0.07 0.73	0.08 0.78	0.05 0.58	
CEOEQCH	0.15 1.13	0.13 0.97	0.08 0.36	0.15 1.19	DNMGTDIR	-0.06 -0.19	-0.04 -0.14	-0.0003 -0.001	-0.07 -0.24	
HQ	0.13 1.63	0.14 1.71*	0.14 1.71*	0.14 1.75*	DBLOCK-OWN	-0.20 -0.86	-0.21 -0.89	-0.23 -0.92	-0.23 -0.99	
LQ	-0.05 -0.26	-0.08 -0.43	-0.12 -0.52	-0.08 -0.08	DINST	-0.10 -0.63	-0.08 -0.48	-0.03 -0.16	-0.07 -0.45	
CEOOWN	-0.62 2.56***	-0.62 -2.53***	-0.62 -2.51***	-0.60 -2.45***	DHFCFLQ	21.97 0.32	23.73 0.35	20.97 0.30	18.15 0.27	
NMGTDIR	-0.02 -0.11	-0.04 -0.19	-0.10 -0.34	-0.01 -0.03	DSQRESV	142.35 1.05	145.41 1.08	156.88 1.11	168.34 1.25	
BLOCK-OWN	0.28 2.12**	0.27 2.01**	0.26 1.81*	0.29 2.25**	DIND	-0.09 -0.77	-0.09 -0.83	-0.11 -0.87	-0.07 -0.62	
IFCFSALE	1.43 0.22	1.00 0.15	-1.28 -0.13	1.67 0.26	F value	2.51 ***	2.52***	2.34***	2.52***	
DR1	-0.06 -0.43	-0.03 -0.25	-0.001 -0.01	-0.03 -0.23	# of OBS.	54	54	54	54	
					Adjusted R Squares	0.37	0.37	0.35	0.37	

TABLE 4.10D. LINEAR REGRESSIONS OF SGASALE3 USING RESIDUALS, (FROM NON-CEOOWN LOGISTIC MODEL) CEOEQCH AND FIRM CONDITIONS AS INDEPENDENT VARIABLES

SGASALE3 = $a_0 + \beta X + \beta DX + E$ *** 98% significance ** 95% significance * 90 % significance
 All firms that have split/joint positions the same as the predictions from the logistic model have residuals set to 0.
 So only the incorrect ones have non-zero residuals.

Independent Variables	Parameter Estimates and t Statistics for Regression Models									
	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	...Continued Independent Variables	Absolute Value of the Residuals	Residual Squares	POSRES & NEGRES	Square of POSRES - Square NEGRES	
ABSRES	-0.11 -0.93				NFXASSET	0.23 1.38	0.21 1.32	0.23 1.30	0.19 1.11	
RESSQ		-0.14 -0.96			SQRESVAR	-20.10 -0.19	-32.15 -0.31	-27.42 -0.23	-56.22 -0.49	
POSRES			-0.04 -0.36	-0.16 -0.95	LSALES	-0.12 -2.75***	-0.13 -2.91***	-0.13 -2.31**	-0.15 -2.67***	
NEGRES			0.09 0.78	0.13 0.45	TOTAL	0.01 1.34	0.02 1.38	0.02 1.41	0.02 1.41	
CEOEQCH	0.15 1.13	0.13 0.66	0.17 0.15	0.11 0.29	IND	0.06 0.68	0.07 0.73	0.05 0.52	0.07 0.74	
HQ	0.13 1.63	0.14 1.71*	0.14 1.65*	0.15 1.80*	DNMGTDIR	-0.06 -0.19	-0.04 -0.14	-0.09 -0.28	-0.02 -0.07	
LQ	-0.05 -0.26	-0.08 -0.43	-0.04 -0.18	-0.12 -0.58	DBLOCK-OWN	-0.20 -0.86	-0.20 -0.89	-0.21 -0.83	-0.23 -0.96	
CEOOWN	-0.62 -2.56***	-0.62 -2.53***	-0.61 -2.42***	-6.00 -2.42***	DINST	-0.10 -0.63	-0.08 -0.48	-0.10 -0.53	-0.03 -0.17	
NMGTDIR	-0.02 -0.11	-0.04 -0.19	0.01 0.06	-0.06 -0.25	DHFCFLQ	21.97 0.32	23.73 0.35	18.85 0.28	27.06 0.39	
BLOCK-OWN	0.28 2.12	0.27 2.01**	0.29 2.22**	0.27 1.94*	DSQRESV	142.35 1.05	145.41 1.08	162.55 1.17	162.07 1.19	
IFCFSALE	1.43 0.22	1.00 0.15	2.99 0.37	0.06 0.01	DIND	-0.09 -0.77	-0.09 -0.83	-0.06 -0.48	-0.09 -0.81	
DR1	-0.06 -0.43	-0.03 -0.25	-0.05 -0.33	0.005 0.03	F value	2.51 ***	2.52 ***	2.34 ***	2.39 ***	
					# of OBS.	54	54	54	54	
					Adjusted R Squares	0.37	0.37	0.35	0.36	

Chapter 5

Conclusion and Proposed Future Work

The separation of ownership and control creates conflicts of interests between managers and shareholders. As the representative of shareholders, the board of directors has a fiduciary duty to ensure that the firm is managed in the best interests of the shareholders. However, boards have limited time and information to exercise their responsibilities. The empowerment of the board is a growing concern. Recently shareholder activists have suggested the separation of the CEO and chairman of the board titles as a way to improve board efficiency. They argue that CEO duality increases agency problems and leads to poor firm performance. While a large body of literature relates board size, board composition and ownership structure to the efficacy of management decisions and their impact on performance, the question of CEO duality has not received as much attention in the literature even though there is growing interest to practitioners, academics and shareholders in this area.

The extant empirical evidence on the relation between CEO duality and firm performance is decidedly mixed. While Daily and Dalton (1992) report no difference between firms that have split and joint titles in small firms, Pi and Timme (1993), Baliga, Moyer and Rao (1996) document superior performance for firms that have split titles. Brickley, Coles and Jarrell (1996) contradict previous reports, providing evidence of a performance advantage for firms with joint positions in large firms. A problem with these studies is the neglect of:

- firm characteristics that determine the potential conflicts of interest between various stakeholders (such as the shareholders, bondholders and the managers)
- the potential of other agency control mechanisms to alter the need and the costs of splitting positions (e.g. the presence of substitutes for split positions may lower the need for split positions).

This dissertation attempts a comprehensive empirical analysis of the CEO duality question in an integrated framework that controls for these factors.

The underlying hypothesis of this study is that splitting the positions between the CEO and the chairman of the board, when used in concert with other mechanisms, is a means of controlling agency problems. Firms evaluate the costs and benefits of split positions as well as of other agency control mechanisms. They choose the most cost effective means of addressing the problem they face. Other things equal, firms will choose split positions if it is more cost effective than other mechanisms.

The first part of the dissertation examines whether agency control mechanisms, agency problems, and other firm characteristics are related to the observed choice of employing one or two individuals in the two positions. A probabilistic empirical model of the choice of split versus joint positions is constructed.

Results indicate that splitting versus combining the CEO and Chair of the Board of directors is an endogenous decision. Based on the estimation of the probability of a split position in a cross section of companies, firms balance the split/joint decisions with other agency control mechanisms and use them according to their firm and board characteristics that proxy for the potential level of agency problems and the costs (e.g., information costs) of split positions. The logistic model has an extremely good fit with only a small (close to 10%) proportion of firms incorrectly classified.

Table 3.4 shows that variables that reflect the degree of free cash flow, of equity agency problems, and of debt agency problems, are positively correlated with the probability of split positions when other firm conditions such as the presence of agency control mechanisms are also considered. Firms that have higher agency costs of equity and debt are more likely to have split positions because the needs for split are higher in these firms. Ownership by CEOs and institutional holders and holdings by debtholders are

negatively related to split positions. Evidence on operating efficiency in part two (chapter 4) of the dissertation supports the interpretation that CEO and debt holdings are substitutes for split positions. Higher growth induced monitoring in low growth firms is positively related to higher returns (as shown in return models in part two) and thus works in harmony with split positions. Blockholdings, associated with lower operating efficiency (shown in part two), increase the need for split positions.

Therefore, the results suggest that firms with higher agency costs of debt and equity are more likely to have split positions. The empirical evidence is consistent with the hypothesis that split positions is a means of managing agency problems when used in concert with other agency control mechanisms.

The second part of the dissertation examines the linkage between the choice of split versus joint titles and the performance of the company. Previous studies have not controlled for the role of agency costs and agency control mechanisms. This study includes those factors because they affect the demand for split positions as do factors that affect the extent to which the demand is met by alternative control mechanisms.

The author believes that firms making the optimal choice to split the positions will not necessarily experience higher returns than firms that optimally choose to have the positions combined. The two types of firms may have different cost functions that attain the optimum at different levels of costs. This study views the issue of CEO duality as an empirical question regarding the relative costs and benefits of the choice made in the context of the existing conditions faced by the firms. This study also recognizes that the effect of CEO duality on performance may be dependent on firm conditions, industry characteristics and presence of the agency control mechanisms.

A complication that impacts the methodology is that firms are not guaranteed to have made the choice that is appropriate for their company. Non-split firms include firms for which the costs of split positions exceeds the benefits as well as firms for which the benefits exceeds the costs but that cannot effect a splitting of positions. One factor that can contribute to an observed policy different from the theoretical one is the power of the CEO. A powerful CEO can thwart the efforts of the board. By incorporating a measure of the extent of errors in the split versus joint decision, confounding effects of combining firms that make the optimal decision with those that err are reduced.

The results of examining of the performance of the split versus joint firms is less clear-cut than the probabilistic model. There is weak evidence reported in Table 4.8A-B that a measure of operating efficiency reflects a differential and salutary benefit of split positions. A few residuals in the overhead expense regressions are significantly negative at 10% level. These significant residuals are for firms for which the logistic model predicts joint positions but are observed to have split positions, and these firms seem to have higher efficiency than joint firms that make no mistakes on split/joint decisions. These are paradoxical results.

There is no evidence that there is a direct effect observable in the returns of firms that have split positions after integrating into the model industry effects, the role of other agency control mechanisms, the size of agency problems and other firm characteristics. This is consistent with an irrelevance hypothesis as well as with the possibility that firms choose their policies optimally once other factors are accounted for. But for firms that are in a dynamic and volatile environment (e.g., high-tech industries), joint leadership decreases returns on assets. In the return models, the residuals from the choice model (indicating the deviation from the predicted choice) are not significant. That is consistent with the view that firms typically make the “correct” choice of split versus jointly-held positions.

There is evidence reported in Table 4.6A-B and 4.7A-B that split versus joint positions affects the relationship between performance and various agency costs and agency control mechanisms (e.g., between performance and board size and that of efficiency and residual variance). This more complex relationship does not provide simple answers to the question of whether a given firm would benefit from adopting split positions.

Even firms that do not appear to have made the “correct” choice do not seem to be very far from the optimal. If they were far from the optimal choice, the residuals from the model of the choice that are used as independent variables in the return on assets regression would be significant, but they are not significant.

To conclude, the results support the notion that firm and management characteristics influence the choice to split positions and influence the role and effectiveness of split positions. The vast majority of firms’ choice on split versus joint positions can be predicted using such characteristics in an integrated model of decisions. The results imply that the benefits of split positions may be firm specific and a policy of split positions is not

appropriate for all firms. For firms with high block ownership, low CEO ownership, low debt holdings and high levels of agency problems, the benefits of splitting are high. The policy implication is that each firm has its unique conditions. So shareholders should not blindly take certain pieces of corporate finance research as a common cure and urge all firms to split titles.

Future work should focus on increasing the sample size to allow subgroup analysis of high-tech firms to understand why joint positions lowers performance in these firms. Since Q can also be used as a performance measure, the use of sales growth may help to ensure that the results reported here are related to Q and are not due to a spurious correlation between two performance measures. The examination of an announcement effect when firms switch policies may help to strengthen the present results. Last but not the least, investigation of the board and leadership structure of firms that have no explicit listing for chairman of the board could provide new insights.

Appendix A

The Formation of the Full Model

1. Formation of the Base Model

The base model will start with all the non-interactive variables for the interactive terms, split/joint times variables, are the main variables. Therefore, they should be the last to be considered in the drop list. In order to be included in the base model, the following criteria have to be satisfied:

- a) the variable should not cause multi-collinearity: evidenced by high variance inflation factor³⁴ and making the other significant variables significant;
- b) the variable should be significant in the basic return regression where there are only two independent variables, the variable itself and LSALES; and
- c) the variable will significantly increase the adjusted R^2 .

³⁴ Variance Inflation Factor (VIF) represents the inflation that each regression coefficient experiences above ideal. VIF for the i th regression coefficient is defined as 1 divided by (1-the coefficient of multiple determination of the regression produced by regressing the variable X_i against the other regressor variables, the X_j ($i \neq j$)). VIF will be large if the coefficient of determination is close to 1 i.e. the i th regressor has a strong linear association with the remaining of the regressors (Myers, Raymond, *Classical and Modern Regression with Applications*, PWS-KENT publishing, 1990, p. 127, 369).

For the ROA1 model, only HQ, LQ, DR1, LSALES and NFXASSET satisfy all of the three conditions. Since CEO=CHAIR is the main variable, it is included in the base model. So the base model for ROA1 is:

$$ROA1_i = \beta_0 + \sum_{j=1}^5 \beta_j x_{ij} + e_j, \text{ for } i=1 \text{ to } n \text{ observations}$$

where $X_j =$ CEO=CHAIR, HQ, LQ, NFXASSET and LSALES.

Similar procedures are also applied to the SGASALE1 model, only CEOOWN, BLOCKOWN, HQ, LQ, DR1, LSALES and IFCFSALE satisfy all of the three conditions. CEO=CHAIR is also included in the base model because it is the main variable. So the base model for SGASALE1 is:

$$SGASALE1_i = \beta_0 + \sum_{j=1}^5 \beta_j x_{ij} + e_j, \text{ for } i=1 \text{ to } n \text{ observations}$$

where $X_j =$ CEO=CHAIR, CEOOWN, BLOCKOWN, HQ, LQ, DR1, IFCFSALE and LSALES.

2. Rechecking the Significance of the Dropped and Non-Cross Variables

All the dropped variables are added to the base model one by one to see if any of them should be included in the base model. That is,

$$ROA1_i = \beta_0 + \sum_{j=1}^5 \beta_j x_{ij} + \text{one of the dropped variables} + e_j$$

for $i=1$ to n observations.

where $X_j =$ CEO=CHAIR, HQ, LQ, DR1, NFXASSET and LSALES.

$$SGASALE1_i = \beta_0 + \sum_{j=1}^5 \beta_j X_{ij} + \text{one of the dropped variables} + e_j$$

for $i=1$ to n observations.

where $X_j =$ CEO=CHAIR, CEOOWN, BLOCKOWN, HQ, LQ, DR1, IFCFSALE and LSALES.

Fewer firms may be included in the regression that has the dropped variable and the base model because the dropped variables may have missing values in some firms. So whenever two models are compared, regressions for both models are run on the smaller data set to ensure their comparability.

All of the following variables, except for NMGTDIR, DR1, IFCFSALE and SQRESVAR, decrease adjusted R^2 in ROA1 and have an insignificant coefficient when added to the ROA1 base model when each of them is added to the base model one at a time: CEOOWN, BLOCKOWN, INSTITOW, TOTAL and PINDEPT. The coefficients of NMGTDIR, DR1, IFCFSALE and SQRESVAR are insignificant, but the addition of these variables increase the adjusted R^2 by 1 to 2%. Since the base model should include only very significant variables, none of the dropped variables are added back to the base model at this stage.

Similarly, except for INSTITOW and PINDEPT, the other variables such as: NMGTDIR, TOTAL, DR1, IND, SQRESVAR and NFXASSET do not significantly lower the adjusted R^2 when they are added to the model. At this stage, none of the variables are added back to the base model so as to keep the base model simple.

3. Compare the Base Model with Other Models to Ensure its Explanatory Power

To ensure the dropped variables do not significantly affect the explanatory power of the model, the base model is compared to following two models on the same set of firms:

$$a) \quad ROA1_i = \beta_0 + \sum_{j=1}^p \beta_j X_{ij} + e_j, \quad \text{for } i=1 \text{ to } n \text{ observations,}$$

X_i = all non-cross term variables (Firm characteristics and agency control variables), $p=12$.

$$b) \quad SGASALE1_i = \beta_0 + \sum_{j=1}^9 \beta_j X_{ij} + e_j, \quad \text{for } i=1 \text{ to } n \text{ observations,}$$

X_i = all non-cross term agency control variables), $p=9$.

As indicated in Table A1, the base model of ROA1 has the highest adjusted R^2 (0.72). So the base model is as competitive as the other two models in column two and three. Even for the three year average ROA, the base model is as competitive as the other two models in column five and six. Table A2 shows similar results of SGASALE models. The SGASALE base models also have the highest adjusted R^2 (0.54).

4. Formation of the Full Model

With the base model, interactive terms are added to the base model one at a time. The priority of entry depends on their relative contribution to the explanatory power of the regression. Variables will be added to the base model if they do not cause severe multi-collinearity and do not decrease both the R^2 and adjusted R^2 substantially. The full models are as follows:

$$ROA1_i = \beta_0 + \sum_{j=1}^5 \beta_j X_{ij} + \sum_{j=1}^7 \beta_j DX_{ij} + e_j, \quad \text{for } i=1 \text{ to } n \text{ observations}$$

where X_j = CEO=CHAIR, Q, CEOOWN, IFCFSALE, LSALES, and
 DX_j = DTOTAL, DIND, DCEOOWN, DNMGTDIR, DBLOCKOWN, DINST,
 DSQRESV and DHFCFLQ

$$SGASALE1_i = \beta_0 + \sum_{j=1}^5 \beta_j X_{ij} + \sum_{j=1}^7 \beta_j DX_{ij} + e_j ,$$

for $i=1$ to n observations

where $X_j =$ CEO=CHAIR, HQ, LQ, CEOOWN, NMGTDIR, BLOCKOWN, IFCFSALE, DR1, NFXASSET, SQRESVAR, LSALES and TOTAL

$DX_j =$ DNMGTDIR, DBLOCKOWN, DINST, DHFCFLQ, DSQRESV and DIND

5. Finalizing the Full Model

All the variables that are not included in the full model are re-evaluated in the final stage. These include both the cross term variables and variables that were dropped from the base model. At this final stage, they would be included into the full model if they do not cause serious multi-collinearity among variables in the full model and their inclusion would not substantially reduce the sample size. CEOOWN, BLOCKOWN, PINDEPT, INSTITOW, TOTAL, DHQ, DLQ, DDR1, DNFFAST and DPINDEPT are excluded from the ROA1 full model. INSTITOW, PINDEPT, DCEOOWN, DHQ, DLQ, DDR1, DPINDEPT and DNFFAST are not included in the SGASALE1 model. These variables except PINDEPT and DPINDEPT have the following properties:

- Adding any of these variables to the full model causes multi-collinearity (increase the VIFs of CEO=CHAIR and its related variables) and decreases adjusted R^2 . None of these variables are significant in the full model.
- All of these variables are insignificant in the simple return regression where LSALES is the only other independent variable.
- All have a lower adjusted R^2 than the base model when added to the base model individually.
- The base model has a higher adjusted R^2 when compared to a model of all dropped variables added to the base model.

As for PINDEPT and DPINDEPT, both are insignificant by itself and when used in combinations with others in the return regressions, and their inclusion will decrease the sample size by one third. So they are not included in the full model in this preliminary study.

TABLE A1. COMPARISON OF ROA REGRESSION MODELS TO SHOW THE EXPLANATORY POWER OF THE BASE MODEL

$$ROA1/ROA3 = a_0 + \beta X + E$$

*** 98% significance ** 95% significance * 90 % significance

dependent var. Independent Variables	ROA1			ROA3		
	Base Model	Agency Control Mechan-isms (ACM)	ACM & Firm Characte-ristics	Base Model	Agency Control Mechan-isms (ACM)	ACM & Firm Characte-ristics
Parameter Estimates and t Statistics for Regression Models						
CEO=Chair or NO Chair		0.02 0.51	0.0005 0.01		0.02 0.77	0.01 0.38
CEOWN		-0.15 -1.04	-0.10 -0.63		-0.01 -0.06	-0.01 -0.09
NMGTDIR		-0.00 -0.02	-0.01 -0.18		-0.05 -0.54	-0.04 -0.35
BLOCKOWN		-0.02 -0.25	-0.04 -0.63		0.04 0.71	-0.24 0.38
INSTITOW		0.07 0.62	0.04 0.38		0.10 1.00	0.09 0.83
HQ	-0.13 10.10 ***	-0.14 -10.03 ***	-0.14 -9.04 ***	-0.12 9.86 ***	-0.14 -10.31 ***	-0.14 -9.54 ***
LQ	0.44 4.28 ***	0.50 4.30 ***	0.43 3.42 ***	0.41 4.14 ***	0.44 4.13 ***	0.42 3.58 ***
PINDEPT		0.01 0.15	0.01 0.08		-0.01 0.11	-0.003 -0.05
TOTAL		-0.01 -1.01	-0.01 -1.17		-0.002 -0.36	-0.002 -0.40
DR1	-0.18 -2.73 ***	-0.12 -1.38	-0.10 -1.02	-0.20 -3.08 ***	-0.12 -1.41	-0.13 -1.41
IND		0.03 0.90	0.06 1.46		0.06 1.80	0.08 2.12 **
LSALES	0.01 0.415	-0.01 -0.30	-0.001 -0.02	0.01 0.70	-0.01 -0.26	-0.004 -1.24
IFCFSALE			-2.29 -0.61			-3.65 -1.52
SQRESVAR			-2.28 -0.05			-24.96 -0.59
NFXASSET	-0.08 -1.02		-0.17 -1.52	-0.04 -0.43		-0.09 -0.88
Adjusted R Squares	0.72	0.71	0.70	0.71	0.72	0.72
F value # of OBS.	29.14 *** 55	12.00 *** 55	9.75 *** 55	27.51 *** 55	12.89 *** 55	10.44 *** 55

TABLE A2. COMPARISON OF SGASALE REGRESSION MODELS TO SHOW THE EXPLANATORY POWER OF THE BASE MODEL

$$SGASALE1 \text{ or } SGASALE 3 = a_0 + \beta X + E$$

*** 98% significance ** 95% significance * 90 % significance

Dependent var. Independent Variables	SGASALE1			SGASALE3		
	Base Model	Agency Control Mechanisms (ACM)	ACM & Firm Characteristics	Base Model	Agency Control Mechanisms (ACM)	ACM & Firm Characteristics
Parameter Estimates and t Statistics for Regression Models						
CEO=CHAIR		0.02 0.28	0.07 1.21		0.04 0.65	0.08 1.32
CEOOWN	-0.44 2.31 **	-0.51 -2.24 **	-0.63 -2.73 ***	-0.53 -2.88 ***	-0.67 -2.91 ***	-0.75 -3.19 ***
NMGTDIR		-0.46 -2.70 ***	-0.36 -2.01 *	-0.29 -1.87 *	-0.34 -2.01 *	-0.26 -1.41
BLOCKOWN	0.12 1.26	0.14 1.31	1.16 1.55	0.07 0.82	0.12 1.16	0.14 1.29
INSTITOW		-0.01 -0.03	0.07 0.38		-0.08 -0.44	-0.02 -0.12
HQ	0.06 2.60 ***	0.05 2.29 **	-0.05 1.95 *	0.06 2.83 ***	0.05 2.34 ***	0.05 2.00 *
LQ	-0.02 -0.11	-0.01 -0.04	0.15 0.80	-0.02 -0.13	0.03 0.17	0.16 0.81
PINDEPT		-0.09 -0.76	-0.06 -0.53		-0.07 -0.63	-0.05 -0.42
TOTAL		0.01 1.26	0.01 1.41		0.01 1.20	0.01 1.28
DR1	-0.14 -1.29	-0.20 -1.42	-0.28 -1.91 *	-0.09 -0.81	-0.16 -1.17	-0.23 -1.54
IND		-0.02 -0.27	-0.07 -1.13		-0.01 -0.16	-0.05 -0.82
LSALES	-0.12 -3.78 ***	-0.15 -2.89 ***	-0.16 -2.99 ***	-0.12 -3.80 ***	-0.14 -2.62 ***	-0.14 -2.61 ***
IFCFSALE	6.10 1.12		7.67 1.36	4.65 0.87		5.73 1.00
SQRESVAR			72.95 1.06			62.34 0.89
NFXASSET			0.37 2.22 **			0.29 1.74 *
Adjusted R Squares	0.54	0.50	0.54	0.53	0.50	0.52
F value # of OBS.	8.45 *** 52	5.50 *** 52	5.20 *** 52	8.28 *** 52	5.42 *** 52	4.68 *** 52

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