

An Investigation of the Acquisition Process in the Market for Corporate Control

by

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Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy
in
Finance

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(ABSTRACT)

The dissertation explores the determinants of the choice between friendly mergers and hostile tender offers as alternative acquisition methods in the market for corporate control. The theoretical model focuses on the target management's firm specific human capital as a primary determinant of the choice. The model predicts that firm characteristics like low insider holdings and high debt, indicating the presence of incumbent management's firm specific human capital, increase the likelihood of a friendly merger as opposed to a hostile tender offer. Other firm characteristics that influence the choice of acquisition method emerge from Jensen's (1986) free cash flow theory. The empirical testing of the hypotheses uses state-based sampling and conditional maximum likelihood estimation of logit models. The results provide strong evidence in support of the theoretical model developed in the dissertation and Jensen's free cash flow theory.

Acknowledgements

I thank my co-chairmen, Dilip Shome and George Morgan for their many ideas, their encouragement and their friendship over the course of my studies. I wish to express my appreciation for the remaining members of my committee, David Dennis, Arthur Keown and Raman Kumar for their contribution to the dissertation.

A special word of thanks for my colleagues Gregory Noronha, Enyang Guo and Jack Broughton for providing their friendship and support over the course of this program. I also thank my parents and in-laws, who although far away in India, provided support and encouragement. Last I would like to express my deepest love and appreciation to my wife, Madhurima - her patience, support and encouragement made this work and graduate study all the more enjoyable.

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Chapter I

Introduction

The spectacular level of activity in the takeover market in the 1980s has resulted in significant corporate restructuring with major welfare implications for shareholders, bondholders, managers, employees and taxpayers. In 1986 alone, the value of the transactions in the market for corporate control - broadly defined as the right to manage corporate resources- was about \$180 billion. Early academic research on the takeover surge focused primarily on wealth gains to shareholders from the control transfer and on the sources of these gains. The empirical evidence suggests that corporate takeovers generate substantial gains - estimated to be about \$120 billion over the period 1981-86 - and that the wealth increases, for the most part, arise from welfare increasing efficiency gains. Research is continuing to identify more clearly the sources of gains from the transfer of corporate control and related issues such as potential conflicts of interest between shareholders and managers, alternative mechanisms of payment, etc. A research question that has not, to date, received as much attention is the question of the specific mechanisms by which transfers of corporate control are effected.

Most corporate acquisitions or takeovers are carried out through mergers, tender offers or proxy fights. A "friendly" merger is negotiated with the management of the target firm, approved by its board of directors and finally submitted for shareholder approval. A "hostile" tender offer, on the other hand, is made directly to the target shareholders without the prior approval of target management. In a proxy fight, an insurgent group led by a dissatisfied manager or a large shareholder attempts to gain controlling seats on the board of directors of the firm. There is empirical evidence that for all these transfer-of-control mechanisms, gains accrue to target shareholders and bidding firms do not lose [Jensen & Ruback(1983)]. The fact that these different acquisition mechanisms continue to co-exist in the market, suggests, following the survivor principle, that each of them enjoys a comparative advantage over others, given certain characteristics of the target and bidder firms. This study seeks to identify firm characteristics that dictate the choice of one mechanism over others. More specifically, it considers the choice between friendly mergers versus hostile tender offers in acquisitions. This objective is in keeping with the suggestion made by Harris and Raviv [1988] that "an avenue for future research is to relate firm characteristics and information structure to the likelihood of various types of takeovers."

The study develops a theoretical model where it is shown that if the target management has high firm specific human capital, then a friendly merger, rather than a hostile takeover, is the more likely acquisition mechanism. In the context of the model, firm specific human capital refers to proprietary expertise or skill of the incumbent management that can be exercised only when the individuals manage the firm's operations or technology. Firm specific human capital is not transferable to other firms and thus is not valued outside the firm but is costly for the firm (or a bidder) to replace. Although the result is proved in an analytical framework, the basic intuition is straight forward. If the target

management has a high degree of firm specific human capital and a bid is made to acquire it, an information asymmetry develops between the target management and outside shareholders regarding the extent of the synergy gain from combining the two firms. The management with high firm specific human capital will have a more accurate estimate of the synergy gain. The shareholders, realizing this, will prefer that the incumbent management deals with the bidder to avoid the possibility of a tender offer going through at a premium lower than what the bidder would be willing to pay. This reduces the likelihood of shareholders tendering at any given premium. To offset this reduced probability of tendering, the bidder has to pay a higher premium to garner a successful tender offer. In addition, the bidder in a hostile takeover has to incur the cost of replacing the high firm specific human capital of the incumbent management. All these factors push up the bidder's costs and reduce the net gain from the acquisition.

A friendly merger, on the other hand, emerges as an efficient alternative if target management possesses a high degree of firm specific human capital. Hirschey (1986) has argued that the presence of firm specific human capital creates a wedge within the market demand curve in the managerial labor market. In a competitive labor market, the managers' outside wage opportunity is based on the marginal revenue product related to non firm specific human capital. The managers' 'inside wage' or true economic value, on the other hand, is based on the true marginal revenue product, consisting of returns to both firm specific and non-firm specific human capital. The difference between the inside and outside wage represents the undervaluation of any incumbent management with firm specific human capital. In this framework, the friendly merger not only reduces the cost to the bidder but also helps to complete the managerial labor market for managers "by driving the human capital rental rates toward economic values." The incumbent management in such a merger obtains a higher return on his human capital in the form of

post merger contracts. The bidding firm is willing to offer such contracts since the cost of retaining the management falls short of the cost of replacing it. Finally, the target shareholders in the presence of management participation retains the firm specific skills of management and are likely to agree to a merger proposal.

The degree of a management's firm specific human capital is not directly observable. However, it is shown that managements' choice of observable variables like insider holdings and debt level differentiates among incumbent managements' firm specific human capital. Specifically, it is shown that incumbent management with higher firm specific human capital maximizes its expected utility of personal wealth plus net control benefits at a lower level of insider holding and a higher level of debt. The management's optimal choice pattern becomes an incidental signal for outside shareholders as well as prospective bidders. Thus, in terms of the acquisition choice, the model implies that low insider holdings and high debt of a target firm increase the likelihood of friendly mergers as opposed to hostile tender offers. In the empirical testing of this choice, however, other explanatory variables, based on predictions of theories extant in the literature, are also included. On the basis of Jensen's (1986) agency cost of free cash flow theory, the growth-liquidity mismatch of bidding and target firms are included as determinants of the acquisition mechanism.

The empirical methodology used to test these hypotheses involves the use of qualitative response models, where the endogenous variable represents the alternative acquisition method. Specifically, we use the logit model with the Gauss-Newton method of non-linear estimation. Usually in a qualitative choice model the parameter estimation is done via a maximum likelihood algorithm. However in this study, the requirement of a state based sample necessitates the use of conditional maximum likelihood to avoid certain

biases in the parameter estimates [Palepu(1986)]. The method uses the conditional likelihood (that an event is a certain choice given it is in the sample) to compute the appropriate likelihood function.

The empirical analysis is based on a sample of 50 mergers and hostile tender offers, covering the period 1978-1988. The target management's firm specific human capital is measured as a dummy variable separating firms with low insider holding and high debt from those with high insider holding and low debt. Similarly both the targets' and bidders' free cash flows are measured as dummy variables separating firms with high undistributed cash or liquidity and low internal growth from firms with opposite attributes. In addition, the level of target management's insider holding is included as a separate explanatory variable to control for any influence of management's equity ownership, other than as a signal of firm specific human capital. For instance, an increase in insider holding, depending on the level of insider holding, may lead to an alignment of managerial and shareholders' interest or to entrenchment of incumbent management. Either condition is likely to increase the likelihood of a friendly merger. To isolate the effect of firm specific human capital on the takeover mechanism, it is, therefore, necessary to control separately for the effect of insider holding on the outcome. In an alternative specification, the determinants of free cash flow viz; liquidity and growth, are disaggregated to examine their separate influences on the likelihood of a merger versus a hostile tender offer. The results strongly support the predictions of the model developed in the study and the free cash flow theory. Consistent with our model, the likelihood of a friendly merger, after controlling for any specific influence of insider holding, is significantly higher when the target management has high firm specific human capital identified by firm's choice of high debt and low insider holding. The insider holding, as a control variable is, as expected, positively associated with the likelihood of merger.

Consistent with Jensen's free cash flow theory, likelihood of a hostile tender offer is significantly higher when the target firm has high free cash flow and a merger is significantly more likely when the bidding firm has high free cash flow.

The remainder of the dissertation is organised in five chapters. Chapter 2 describes the existing literature on the market for corporate control. In Chapter 3, the theoretical model of the acquisition choice is developed. Chapter 4 develops the empirical framework that includes a description of the methodology and the model specifications. An appendix provides an analysis of the qualitative choice model. Data descriptions and the empirical results are reported in Chapter 5, and Chapter 6 concludes the study.

Chapter II

Literature Review

2.1 Introduction

The market for corporate control, often referred to as the takeover market, may be viewed, following Jensen and Ruback (1983), as the market where alternative management teams compete for the rights to manage corporate resources. In this framework, the market for corporate control complements the managerial labor market and enhances its efficiency. The shareholders in this system play a relatively passive role other than making value maximising decisions and thereby contributing to the price setting function. The growing body of research regarding the corporate takeover market has primarily addressed the following related issues.

1. Wealth effects or the extent of the gain to shareholders of bidding and target firms.
2. The sources of the gains accruing to participating firms' shareholders.

3. Conflict of interest between managers and the shareholders.
4. The choice of exchange medium by bidders in acquisitions.
5. Control related issues.
6. Alternative mechanisms for transfer of corporate control.

2.2 Wealth Effects

The empirical evidence suggests that shareholders of the participating firms, the target shareholders in particular, gain substantially from takeovers. Several studies have estimated the effect of acquisitions on the stock prices of bidders and targets. In these event studies, the abnormal stock price change around the announcement days are used as a measure of the economic impact of the proposed acquisition. Jensen and Ruback (1983) provide a summary of earlier papers on the wealth effects of mergers and acquisitions. The thirteen studies summarised in their paper [including Dodd and Ruback(1977) and Bradley, Desai and Kim (1982)] indicate that target shareholders on an average experience positive abnormal returns of 30% in tender offers and 20% in mergers. In more recent studies, Jarrell and Poulsen (1987) and Lehn and Poulsen (1987) report similar gains for targets in tender offers and leveraged buyouts. Moreover, the average premium accruing to these shareholders seems to be higher in the 80's relative to earlier years. This increase in target shareholders' premium is primarily due to the increase in multiple bid takeovers and certain regulatory changes imposing disclosure and delay rules on bidders.

The evidence on bidders' returns in acquisitions is mixed. The review of earlier studies [Bradley (1980), Bradley, Desai and Kim (1981), Asquith (1983), Eckbo (1983) to mention a few] suggests that bidders experience significantly positive excess return of 3-7% in tender offers. However in mergers, the average returns to bidders are approximately zero. The evidence on bidders' gains in more recent years comes from Jarrell and Poulsen (1987). In a sample of 663 tender offers covering the period 1962-1985, they find small but insignificantly positive abnormal returns. However in contrast to positive gains in earlier periods, the bidders in the 1980's show statistically insignificant losses.

There is however reason to believe that the estimation of bidders' returns is more problematic than for targets. The announcement of specific acquisitions will have no impact on stock price if it is fully anticipated. Malatesta (1981, 1983) and Schipper and Thompson (1983) point out that benefits to bidders are incorporated into the share price when an acquisition program is announced or becomes obvious to the market. The previously reported abnormal returns merely represent the incremental value change of each specific acquisition and thus are potentially incomplete measures of bidders' gains. Schipper and Thompson (1983) examined the stock price behaviour of 30 firms that announced acquisition programs. They find significant positive abnormal returns for bidders over the period of twelve months preceding the announcement of acquisition programs. The choice of a twelve month testing period was necessitated by the difficulties in identifying exact announcement dates. It is, however, true that the imprecise announcement month and the resultant necessity for measuring abnormal returns over a twelve month period make it difficult to determine with confidence the association between positive abnormal returns and the initiation of the acquisition programs. The above average performance observed in the study may be providing the additional resources to the bidder to undertake new investment projects such as acquisitions.

2.2.1 The Total Gains from Takeovers

Since the targets gain and bidders do not appear to lose, the evidence suggests that takeovers in general create value. However, as Jensen and Ruback (1983) rightly point out, a small percentage loss for bidders could outweigh the dollar value of a larger percentage gain for targets because bidders, on average, are significantly larger than targets. Malatesta (1983) and Bradley, Desai and Kim (1982) measure the changes in dollar values associated with successful takeovers. While Malatesta finds significant average increases of \$30 million in successful mergers, Bradley, Desai and Kim report insignificant total dollar gains of \$17.2 million in 162 tender offers. However, the average percentage change in total value of the combined target and bidder firms is a significant 10.5%. Both studies suggest, as before, that targets seem to gain more than the bidders. In a more recent study of 236 successful tender offers, Bradley, Desai and Kim (1988) report an average significant dollar gain of \$117 million. The percentage gain created by tender offers have remained remarkably constant between 7% and 8% over three sub-periods covering 1963-1984. The dollar gains, however have increased dramatically from the first two periods to the third (1981-84) primarily due to an increase in the size of target firms.

2.2.2 Distribution of Gain

The most important factor determining the share of gains seems to be how many bidders attempt to gain control of the target. The empirical evidence suggests that the premium paid by the bidder is significantly higher in multiple bid contests. In fact, the decline in bidders' abnormal returns in the 1980's might simply reflect the increase in multiple bid

takeovers. In addition regulatory changes like the Williams Act, imposing disclosure and delay rules on bidders, have also induced auction oriented contests. Other actions contributing to the increased competition are innovations in anti-takeover devices as well as court rulings favoring some of these defensive measures. Bradley, Desai and Kim (1988) use event period cumulative average residuals to explore the cross sectional differences in returns to the stockholders of the target and acquiring firms. Specifically, they consider the effects of (1) changes in the regulatory environment of the tender offer (Williams Amendment), (2) competition in the form of the multiple bids, and (3) the fraction of target shares purchased on the rates of return to shareholders. The results indicate that the target shareholders' abnormal return is higher in both, multiple bids and acquisitions, after the passage of the Williams Amendment. Further the shareholders' gain is proportional to the fraction of target shares purchased. This is consistent with a positively sloping supply of target shares due to a heterogeneous capital-gains tax position of shareholders and differing expectations about future takeover bids.

In contrast, the estimate of the appropriate regression coefficient indicates that the bidding firms earn significantly lower returns in the post Williams Amendment era. Further, the returns to acquiring firms decreased over time, and in the most recent period acquiring firms actually suffered losses. The marginal impact of a multiple bid contest on acquiring firms' return is negative but insignificantly different from zero. It is interesting to note that higher returns to targets in multiple bid contests do not translate into lower returns for acquiring firms unless the total synergistic gains are same in multiple bid and single bid contests. Consistent with this, the study finds that total synergy gains are higher for multiple bid acquisitions. It is possible that the potential for larger synergistic gains attracts multiple bidders or that competition among different bidders generates additional information that leads to higher valued allocation of the combined resources

of the two firms. Finally, the acquiring firms' returns seem to be unaffected by the fraction of target share purchased.

2.3 Sources of Gain

The empirical evidence that corporate acquisitions generate positive gains for participating firms' shareholders is consistent with the hypothesis that takeovers lead to an efficient allocation of resources. The process may "involve more efficient management, economies of scale, improved production techniques, the combination of complementary resources, the redeployment of assets to more profitable uses, the exploitation of market power or any number of value creating mechanisms that fall under the general rubric of corporate synergy" [Bradley, Desai and Kim (1988)]. An alternative hypothesis which is also consistent with the empirical evidence suggests that dissemination of new information during a bid leads to revaluation of previously undervalued target shares or prompts target management to implement a more valued operating strategy. Thus in contrast to the synergy hypothesis, the information hypothesis implies that it is the information related to a bid that generates the gain, and the increase in the value of the targets is not conditional on ultimate transfer of control.

To test the implications of these two competing hypothesis, Bradley, Desai and Kim considered the abnormal returns realised by targets in unsuccessful tender offers. The target shareholders do realise significant gains at the announcement of the original failed bid. However the firms that are not targets of subsequent successful takeover attempts in next five years return to their pre-offer value. In contrast the shares of firms experiencing successful future bids exhibit additional abnormal gains. Bradley, Desai and Kim

argued that apparent positive revaluation even in unsuccessful bids merely constitutes anticipation of higher valued future bids. The permanent gain is realised only when resources of two firms are combined together.

2.3.1 Market Power

The positive abnormal returns associated with acquisitions do not help us in identifying the actual source of synergy. Two important exceptions are studies by Stillman (1983) and Eckbo (1983) that examine and empirically reject the market power hypothesis. The market power hypothesis suggests that takeover leads to reduced competition allowing merging and other competing firms to raise prices in the product market. Stillman considered stock price reactions of rival firms at the announcement of horizontal mergers. The study finds no significant abnormal returns for these rival firms rejecting the hypothesis that mergers create values through increases in market power. Eckbo on the other hand, additionally explored the stock price reactions of rival firms at the announcement of antitrust challenges. The market power hypothesis would predict negative abnormal returns for rivals at the time the antitrust complaint is filed. However for a sample of over 125 rival firms, identified primarily by product line classification, Eckbo finds insignificantly positive abnormal returns. The difficulty in identifying the exact sources of synergy have led many financial economists to consider certain redistributive theories contending that shareholders gains are offset by economic losses of other agents such as bondholders, labor and taxpayers.

2.3.2 Wealth Transfer from Bondholders

Some critics of takeovers have suggested that shareholders' gains represent a transfer of wealth from bondholders and preferred stockholders. The acquisition of a risky target with cash will increase the required return of the bondholders. The value of outstanding bonds with fixed coupon payments will therefore decline. With combined value of the two firms remaining unchanged, absent any synergy gains, the decline in bond value will be captured as a gain by other classes of security holders like stock owners. However the empirical evidence fails to support this argument. Asquith and Kim (1982), Dennis and McConnell (1986) examined returns on various classes of securities in different mergers. Their results indicate that while average holders of common stock and convertible securities gain from mergers, the holders of non-convertible debt of participating firms neither gain nor lose. Further, Lehn and Poulsen (1987) in a study of leveraged buyouts find no evidence that shareholders' gain comes at the expense of preferred shareholders or bondholders.

2.3.3 Wealth Transfer from Labor

Some recent takeovers, particularly in the airline industry, have created conflict between acquiring firm management and unionised labor of target firms. This has led to the generalisation that shareholders gain may simply be labor's loss. Shleifer and Summers (1987) argue that the acquiring firm may exploit the long term implicit contracts between the incumbent management and the union by using pressure tactics to force wage concessions. This theory is yet to be widely tested. However in a NBER study Brown and Medoff (1987) consider evidence on Michigan's employment and wages. Although

Michigan need not be representative of the U.S. experience, the evidence suggests that wages and employment rise on average in firms subsequent to their acquisitions. Diane Dennis (1990) in a study of 118 successful tender offers, over the period 1975-1984, explores the relationship between market for corporate control and labor market. In the overall sample, the combined number of employees does not change significantly in the first three full years following successful tender offers. However in a subsample of hostile tender offers, there is a significant average decrease of 6.6% in the number of employees from the end of the year prior to completion of the tender offer to the end of the first full year following completion. Further, the observed employment decrease cannot be explained by divestiture which transfers the jobs to new owners. The impact of divestitures are offset by significant acquisition activities in period following tender offer. This decline in employment is interpreted as being consistent with a transfer of wealth from employees to shareholders.

2.3.4 Tax Motivated Takeovers

Tax motives have long been suspected as an important cause of merger and acquisition activities. The tax benefit hypothesis would suggest that the gain realised in acquisitions constitutes a subsidy provided by the taxpayers. In fact the Tax Reform Act of 1986 contain several provisions aimed at reducing the tax benefits available through mergers. Recent studies however fail to assign tax benefits a major role in explaining takeover activities. Auerbach and Reishus (1987) consider 318 mergers and acquisitions during 1968-83 period to estimate the tax benefits available in these transactions from increased use of tax losses and credits. In general these benefits are not a significant factor in majority of the large acquisitions. However in a fair number of transactions, tax con-

siderations were significant enough to affect the decision to merge. In a related study, Lehn and Poulsen (1987) find that the premium paid in leveraged buyouts is directly proportional to the potential tax benefits associated with these transactions, suggesting that, in part, these buyouts are motivated by tax considerations. In conclusion, although tax benefits appear to have some impact on takeover activity, the majority of acquisitions in last two decades were not tax motivated.

2.3.5 Short Term Myopia

The last in this set of redistributive theories contends that certain market participants like large institutional investors are concerned with short term earning performance and subsequently undervalue any corporations involved in long term development activities. Thus any corporation engaged in long term planning will become undervalued and prime takeover target. This short term myopia hypothesis contradicts the notion of market efficiency which implies that any value maximising decision should be reflected in the firm value. The market's myopic vision if true, may induce the managers to take actions that will only hurt the shareholders in the long run. Fortunately, the empirical evidence does not support this argument. A study by the SEC's office of the Chief Economist (OCE 1985) finds that firms with high institutional stock holding are not associated with decreases in research and development and subsequent takeover activities. Also stock prices react positively to the announcement of increases in research and development expenditures. Hall (1987) in a related paper shows that many acquisition activities have been directed towards firms less intensive in R&D. She also finds that firms involved in mergers show little difference in their pre and post merger R&D performance relative to the industry peers.

2.3.6 A Critique of Efficiency Arguments

Much of the empirical support for takeover as an efficiency enhancing mechanism comes from the statistical research rooted in the logic of the efficient market hypothesis. Within a time window of several days or weeks around the announcement of a merger or tender offers, the shareholders of target companies gain substantial abnormal returns while those of bidding firms do not appear to lose. The overall gain of the combined firms is significantly positive.

However, when the time frame of these event studies are extended to one or more years after the event, the acquiring firms are found to experience negative abnormal returns. In the seven one-year studies surveyed by Jensen and Ruback (1983), the abnormal return averaged -5.5%. In fact Jensen and Ruback concede in their review that "these post outcome negative abnormal returns are unsettling because they are inconsistent with market efficiency and suggest that changes in stock price during takeovers overestimate the future efficiency gains from merger."

In a recent paper, Scherer (1988) has strongly argued against the efficiency argument. He presents two testable hypotheses regarding the efficiency improvement in takeovers. First, if tender offers are motivated by incumbent managements' failure, then the tender offer targets should be less profitable than peer companies in similar industry groups. Second, if a takeover reduces inefficiencies or any in other way represents a move towards higher profit maximising operating strategy, then post takeover profitability should rise relative to pre takeover profitability after controlling for the conditions in the acquiring firm's home industry. Ravenscraft and Scherer (1987) carry out the test of these hypotheses using Line of Business Data collected by the Federal Trade Commis-

sion (FTC). The FTC's line of Business surveys cover a maximum of 471 U.S. industrial corporations that made three-fourths of all the manufacturing and mineral company acquisitions between 1950 and 1976.

For the 95 tender offer targets on which pre takeover data were available, operating income averaged 11.08% of assets. This is significantly lower than the time matched average for the principal two-digit manufacturing industries in which the tender offer target operated. Thus the tender offer targets appear to be underperformers by about 8% relative to their home industry norms.

The post takeover performance was analysed by averaging profitability indices of the acquired lines for the three years 1975-77, which on average followed the takeover by nine years. Firms subjected to tender offer-induced acquisitions were 23% less profitable on average than otherwise comparable firms not involved in tender offers, holding constant the degradation of profitability associated with the use of purchase accounting to value acquired assets. Thus contrary to the efficiency argument, tender offer takeovers reveal no significant long term improvements in operating profitability following takeovers.

Thus in summary it is clear that although the stock market responds positively to acquisitions, it is very difficult to identify with any precision the source of these gains. The extent of these gains is substantial and both statistically and economically significant. However, given the evidence of Ravenscraft and Scherer, it is possible that some of these gains may be illusory.

2.4 Management Shareholder Conflict

Takeovers serve as an external control mechanism that limits major managerial departure from maximisation of shareholders' wealth. In the presence of managerial inefficiencies, an outside investor (bidder) could take the company over, enforce new profit maximising operating strategies and realise a significant increase in value. However, these takeovers impose significant welfare losses on managers, who may be displaced and lose their organisation-specific human capital. The resultant conflict of interest may induce managers to undertake certain defensive measures against any possible takeover attempt. The direct examination of this conflict is problematic due to the difficulty in identifying benefits to managers from any decisions, errors in stock market assessment of value as well as difficulty in ex post auditing of decisions. However, some indirect evidence on costs of managerial departures from maximisation of shareholders wealth may be obtained by examining the effects on stock price of managerial actions that alter the probability of a firm being taken over.

2.4.1 Change in State of Incorporation

Corporate charters specify the governance rules for corporations, including rules that establish conditions for mergers. In the U.S., the rules specifying these constraints vary across different states. Dodd and Leftwich (1980) investigated the changes in the state of incorporation for 140 firms. Most of these firms were reincorporated in the state of Delaware which has fewer constraints and more flexibility in contractual agreements between shareholders and management. Dodd and Leftwich find significantly positive

abnormal returns around the announcement of reincorporation. Due to the difficulty in isolating the actual announcement day, they focussed on a period of twelve months prior to the event day. Their result is inconsistent with the hypothesis that reincorporation in Delaware is a managerial attempt to use minimal restrictions on charters to exploit shareholders. In more recent years, Romano (1985) finds a statistically significant stock price increase for a group of firms that reincorporate for various reasons. Moreover, in the subsample of 43 firms which reincorporated as an antitakeover device, she found a small statistically insignificant price increase at the announcement of reincorporation. Thus the evidence is not conclusive but does indicate that reincorporation in a new state does not, on average, hurt shareholders.

2.4.2 Antitakeover Amendments

Firms can amend the charters to include conditions which make the change of control more difficult. These are proposed by management and usually require a majority approval by the shareholders. These anti-takeover amendments include supermajority rules, staggered election of boards, fair price amendments, lock up provisions, etc. By increasing the stringency of takeover conditions, such amendments can reduce the probability of takeover and therefore reduce shareholders' wealth. However, these amendments might benefit shareholders by allowing the management to better represent their common interest in merger negotiations.

DeAngelo and Rice (1983) and Linn and McConnell (1983) examined the stock price effect of adopting anti-takeover amendments. They do not find any abnormal returns around the mailing date of the proxy containing these proposals. However, Linn and

McConnell record significant negative abnormal returns for firms that removed previously enacted antitakeover amendments. While this suggests that shareholders benefit from the presence of these restrictive amendments, it is not clear why they were removed. A more recent study by Jarrell and Poulsen (1987) finds that firms undergoing supermajority amendments since 1980 experienced significant negative abnormal returns. They also find that the firms undertaking these amendments tend to have relatively low institutional holdings and high insider ownership. This might help to explain how these amendments received voting approval in spite of their adverse wealth effects.

2.4.3 Dual Class Recapitalisation

Dual class recapitalisation plans structure the equity of the firm into two classes, with different rights. The major objective is to provide managers or family owners disproportionately greater voting powers. The evidence before and after 1980 suggest, not surprisingly, that the market generally values shares with voting rights more than those without. This, however, need not necessarily imply that dual recapitalisation hurts shareholders. Parch (1987) finds non negative stock price effects at the announcements of dual recapitalisation plans. For recent recapitalisations, Jarrell and Poulsen (1987) report an average abnormal return of $-.93\%$. The lack of any significant negative reaction may again depend on certain firm characteristics. The dual class firms are already controlled by insiders and recapitalisation provides a way to raise needed capital without dilution of control.

2.4.4 Reduction in Cumulative Voting Rights

Cumulative voting rights allow for a group of minority shareholders to elect directors even if the majority of shareholders oppose their election. This provision can be extremely helpful for dissidents in hostile takeover or proxy fights and the removal of these voting rights increases managerial ability to resist tender offers. Consistent with this managerial entrenchment hypothesis, Bhagat and Brickley (1984) find statistically significant negative abnormal returns at the announcement of these charter amendments.

2.4.5 Targeted Block Repurchases or Greenmail

There are several defensive measures like greenmail and poison pills that do not require voting approval by shareholders. These defensive actions as expected, are generally associated with negative stock price reactions indicating that they are economically harmful to shareholders. Greenmail occurs when target management repurchases a block of shares from a potential suitor, often paying a substantial premium over the market price. In a review of earlier studies, Jensen and Ruback (1983) conclude that the repurchase is associated with significant negative abnormal returns for the shareholders of the repurchasing firms and substantial gain for the selling firm. Since then several studies have argued that greenmail provisions need not always be harmful for the shareholders. The absence of a greenmail possibility may discourage large shareholders, reducing the outside monitoring of managers. Mikkelson and Ruback (1985) in a study of 39 cases find significant stock price decline at the announcement of greenmail. However, the target shareholders gains over the entire period starting from original purchase by the potential

hostile bidder. Thus the net gain for the shareholders is positive implying certain benefits from outside monitoring which is encouraged in the presence of greenmail.

2.4.6 Poison Pills

Since being introduced in 1982, these have become a popular defense against takeover attempts. The poison pills describe a family of contingent securities that impose financial burdens on acquirers when triggered by change of control. The primary advantages of poison pills are that they can be quickly and cheaply altered by management if a hostile acquirer has not pulled the trigger. Second if not redeemed, the pill makes the acquisitions exorbitantly expensive. Examples of poison pills include shareholders' right to buy the acquiring firm's stock at a substantial discount, issuance of debt to be immediately paid off in the event of a takeover, sale of the most profitable assets etc.

The most comprehensive study of poison pills by Ryngaert (1987) is based on an exhaustive collection of 380 poison pills adopted from 1982 to December 1985. He divides the sample between discriminatory pills (the most restrictive) and flip over pills (the least restrictive). He also accounts for whether firms are subject to takeover speculation. He reports significant negative abnormal returns even for firms with no confounding effects. The average loss is higher for firms that are subject to takeover speculation. Malatesta and Walkling (1987) in a separate study report similar negative wealth effects for the shareholders of firms issuing poison pills. Further, they find that these firms are characterised by lower insider holding and lower profitability.

2.5 Choice of Medium of Payment

Recent research has also focused on the importance of methods of payment in takeovers. There exists empirical evidence of substantial differences between returns to bidders in tender offer announcements as opposed to mergers and it is also observed that while mergers are usually common stock exchange offers, tender offers are predominantly financed by cash. These results can be interpreted to mean that the medium of payment may have an impact on shareholder returns in takeover transactions.

2.5.1 Exchange Medium and Bidders' Return

In the Myers and Majluf (1986) framework of asymmetric information, managers acting in the interest of their existing shareholders prefer to make a cash offer when their firms is undervalued while common stock exchange is considered in situations of overvaluation. The market participants thus interpret cash offers as good news and exchange offers as negative signals regarding the true value of the firm. Consequently, any stock price change during an acquisition announcement reflects both the gains from takeover as well as the information effects of the method of financing. This suggests that other things being equal, the bidder's stock returns will be higher in cash offers relative to stock exchange offers. A second source of stock price change may arise when two firms lacking perfect correlation of cash flows form a combined entity. The reduced variance of cash flows as well as any increase in debt capacity accrues as a gain to the merging firm's bondholders at the shareholder's expense resulting in a decline in stock prices.

Travlos (1987) explores the role of the method of payment in explaining returns to the bidding firm at the announcement of a takeover bid. His empirical findings are consistent with the signalling hypothesis. The results on the pure stock exchange bidding firms show that their shareholders experience statistically significant losses at announcement of takeover proposals. On the other hand, shareholders of cash financing bidders earn normal returns around event dates. To explore the wealth transfer hypothesis, the paper explores the announcement period returns to the non-convertible bondholders of bidders involved in both exchange offers and cash offers. The results show that bondholders do not gain at the announcement of the takeover bids. Instead there is some weak evidence that bondholders suffer a loss when acquisition is financed with common stock. Thus the wealth transfer to bondholders does not explain the negative abnormal returns to shareholders of the bidding firms.

2.5.2 Exchange Medium and Target's Return

Huang and Walkling (1987) look at the issue of the target firms' abnormal return associated with acquisition announcements. The target's abnormal return at the time initial announcement is related to forms of payment, degree of resistance, as well as type of offer. The paper specifically tests three different hypothesis - the abnormal returns are higher in (1) tender offers than in mergers, (2) in cash offers than in stock exchange offers, (3) and in resisted offers than in unresisted offers. The single factor regressions reveal that abnormal returns are significantly higher for (1) tender offers as opposed to mergers and (2) cash offers relative to stock exchange acquisitions. The differences in return between resisted and unresisted offers is insignificant. The most interesting results come out in the multiple regression coefficients. When both form of payment and re-

sistance effects are controlled for, mergers provide insignificantly higher abnormal returns than tender offers. Thus previously observed higher returns in tender offers than in mergers can be primarily attributed to types of payment method and degree of resistance.

2.5.3 Asymmetric Information and Exchange Medium

Robert G. Hansen (1987) presents a theory for the choice of exchange medium in mergers and acquisitions. His model involves bargaining under asymmetric information. With cash offers and when target firms know its value better than the bidder, a lemon problem arises: the target will sell only when the offer exceeds its intrinsic value. In the face of this adverse selection the bidder "must generally base its optimal offer not on unconditional expected value but on expected value conditional on the offer being accepted". To prevent this thinning of the market, the acquirer will prefer to offer stock which has desirable contingent pricing characteristics.

On the other hand, if the acquiring firm has proprietary information regarding its own value, it will not offer stocks when the target underestimates the value of the offer. In equilibrium the target uses the exchange medium and size of any stock offer as a signal of the offering firm's value. The acquiring firm, given the target's strategy, chooses the exchange medium in a way that sustains the target's belief in a single value relation.

The model yields several testable implications. First, the probability of a stock trade being observed decreases as the bidding firm increases in size relative to the target since the stock's contingent pricing effect depends on target's asset being a significant addition

to the acquirer. Further, the probability of a stock trade increases with acquirer's debt and decreases with the target's debt. The beneficial contingent pricing effect of stock is stronger, the larger the equity of the target relative to the equity of the acquirer.

2.5.4 Taxes and Exchange Medium

Brown (1986) in trying to find a motivation for a two-tier tender offer (with stock compensation in the second tier) points out that the medium of exchange is more likely to be stock if the target shareholders are in a high tax bracket. The premium to target shareholder, in cash trades, is immediately taxable while capital gains in the form of stock trades may be easily postponed till the stocks are sold and capital gains realised.

2.6 Control Related Issues

Many papers analyse the role of managerial equity ownership in governing the conflict of interest between managers and outside shareholders. In their seminal paper, Jensen and Meckling (1976) formulated the implications of agency problems in the context of managerial equity ownership. An agency problem arises when managers own only a small fraction of the ownership shares of the firm. The partial ownership may cause managers to work less vigorously than otherwise and consume more perquisites since outside shareholders bear most of the cost. Further, in a large corporation with dispersed ownership, there is not sufficient incentive for individual shareholders to spend resources in monitoring managerial behaviour. The return to this individual will be in proportion to his holding which may not be sufficient to cover the monitoring expenses. In this

framework, higher level of managerial equity ownership may help to align the incentives of managers with those of outside shareholders.

2.6.1 Management Control and Firm Value

Stulz (1988) analyses the effect of managerial control of voting rights on firm value and financing policy in the context of a takeover threat. In this framework, the conflict of interest between managers and shareholders arises solely from the fact that a successful takeover affects the welfare of shareholders and managers differently. In Stulz's model, an increase in managerial control of voting rights, α , has a two pronged effect. An increase in α has an adverse effect on firm value through a decrease in the likelihood of a hostile takeover. However, the premium offered in an attempted takeover is an increasing function of α . If the managers control a large fraction of votes, then the value of the firm's share is lowest since no tender offer will ever be made. On the other hand, if the management does not control any share, then a tender offer with a small premium becomes very likely to succeed, even though the bidder would have been willing to pay a higher premium to acquire control. The analysis thus suggests that firm value increases with α at lower levels while beyond a certain point, value is a decreasing function of α . In other words, there exists a unique value of α that maximises the value of the firm.

Morck Shleifer and Vishny (1988) independently formulate and empirically validate this hypothesis assuming that the fraction of voting rights is equal to fraction of firm's equity owned. They examine a cross sectional relation between ownership stake of the board of directors and firm performance measured by Tobin's Q and accounting profit rate. The evidence suggests a strong relation between performance measures and ownership

stake, but the relation is not monotonic. In particular, Q rises as ownership increases from 5% to 25%, decreases between 5% and 25% and rises again as ownership increases beyond 25%. The tradeoff between the alignment of manager/shareholder interests and managerial entrenchment may induce this nonmonotonic relation between insider holding and the value of a given firm. The managerial interests become more closely allied with shareholders' as inside stock ownership rises from zero. Thus value should increase with ownership until insider holding is large enough to begin to give managers control, at which point entrenchment begins to occur and value starts declining with ownership.

2.7 Alternative Mechanisms for Transfer of Corporate Control

The transfer of corporate control can occur through friendly mergers, hostile takeovers or proxy fights. These alternative mechanisms co-exist in the market for corporate control implying a comparative advantage for each over the others, given specific characteristics of the transacting entities. The theoretical and the empirical literature literature in this area is rather sparse. The only papers that deal directly or indirectly with the issue of choices among alternative transfer mechanisms are by Jensen (1986), Harris and Raviv (1989) and Hirschey (1986). In Jensen's (1986) framework, a hostile takeover is a likely outcome when the target firm is characterized by high free cash flow and its associated agency costs. Harris and Raviv (1988) analyzes the determinants of the choice between hostile tender offers and proxy fights as alternative mechanisms for transfer of control. In Hirschey (1986), a merger is the predicted outcome when the target management has high firm specific human capital.

Jensen (1986)

Jensen (1986) has provided a free cash flow hypothesis of corporate takeovers. Free cash flow is the cash flow in excess of that required to fund all of the firm's projects that have positive net present value when discounted at the relevant cost of capital. Firms that have highly profitable assets in place but low growth prospects will have large free cash flows. The theory considers the agency costs associated with conflicts between managers and shareholders over the payout of free cash. The shareholders would like managers to 'disgorge' this excess cash rather than investing it at below cost of capital or wasting it on organizational inefficiencies. However, the managers may have an incentive to retain this free cash and grow beyond the optimal size to increase their power by increasing resources under their control. The managers' compensation is often tied to sales rather than profits creating incentives for growth. Finally, firms reward middle management through promotions rather than annual bonuses. This further creates a bias toward growth to generate new positions.

Jensen points out the positive role of debt in reducing this potential agency cost. It is true that firms can disburse current free cash flows by increasing dividends and simultaneously promising to pay out future free cash flows by announcing a permanent increase in dividends. However, such a promise may not be credible. Instead, if the firm issues debt in exchange for equity, it effectively bonds its promise to pay out the future excess cash. The investors can now force the firm to maintain the promised payment of interest and principal. Debt payments are a more effective substitute for dividends and reduce the agency costs of free cash flows by reducing the cash flows available for spending at the discretion of managers. The use of leverage also has costs, including bankruptcy costs and agency costs associated with potential transfer of wealth from

bondholders to shareholders. These costs put a limit on the desirable level of debt. The optimal debt-equity ratio is achieved where marginal costs just offset the marginal benefits.

In this framework takeovers are both "evidence of the conflict between shareholders and managers and a solution to the problem". [Jensen (1986)] This theory predicts that in declining industries with high free cash flow, mergers within the industries will create value. The huge debt incurred during takeovers helps to control the agency costs of excess cash. On the other hand, acquisitions outside the industry reflect management's preference to retain resources under their control and are thus likely to be low or even negative net present value projects. Takeovers as solutions to free cash flow problems are likely to be hostile with large increases in debt and major restructuring. In this framework many acquirers will have good performance, generating free cash flows prior to acquisitions, while targets may exhibit poor performance with inefficiencies or good performance with free cash flows which they refuse to disgorge. Finally, the acquisition method is likely to be via hostile tender offers financed with cash and debt rather than stock exchange. On the other hand, the theory implies that bidders with high free cash flow are interested in acquisitions which provide them with growth opportunity. The bidders' motivation for acquisition is not necessarily synergy and thus no particular firm is of special interest to them. In this context they are likely to avoid hostile takeovers which often impose prohibitive costs on the bidder.

Harris and Raviv (1989)

The only study that has directly examined the choice between alternative takeover mechanisms is by Harris and Raviv (1989). They consider the determinants of two acquisition methods - proxy fights and tender offers. They present a theoretical model which also explicitly captures the role of incumbent management. The management's choice of resistance strategy is based on a tradeoff between potential gain in firm value (from takeover) and loss of personal benefits derived from retaining control. The management's resistance device in turn influences the takeover method and its respective probability of success. The model yields certain testable implications regarding possibility of outcomes and price effects of alternative takeover methods.

The particular resistance technique they focus on is the use of leverage or short term capital structure changes. Debt being a non-voting security affects the ownership distribution and consequently the outcome of corporate votes. They assume that debt has no benefits other than as a device for increasing management's control. On the other hand, debt reduces the expected benefits of control by increasing the probability of bankruptcy and increasing the extent of monitoring by the creditors. Thus the incumbent may choose to issue debt in exchange for equity only when a rival appears, with the interchange being completed before the rival purchases equity.

Harris and Raviv list three possible outcomes of any takeover attempt. Successful tender offers, when rival acquires sufficient number of shares to guarantee control, unsuccessful tender offers, where incumbent retains sufficient ownership, and finally proxy fights where neither contender controls enough shares to win for sure. From the management's optimization problem, one can find a relationship between debt levels and

these three alternative outcomes. The incumbent's objective is to maximise the value of its shares plus the expected benefits of control. Thus, in certain situations, incumbent might prefer to surrender rather than guarantee control through higher debt. The reason is that guaranteeing control might require issuing large amounts of debt, reducing the value of control. Also, if the rival is much more capable, then by retaining control, the incumbent forfeits a large capital gain on its shares.

Overall, they predict that targets of takeover activity will have more debt than firms that are not targets. How much debt is issued determines the feasibility of different takeover methods and outcomes. For instance guaranteeing continued control requires more debt than if one is willing to allow proxy fights. In this framework, the only advantage of proxy fights is that they ensure that the best management team will win. The target shareholders receive private signals (which are identically and independently distributed) regarding the abilities of the incumbent and the rival. Since passive investors are not candidates for control, each will vote for the candidate he believes to be the best. Further, because the signals are informative, one expects more investors to vote for the incumbent if he is, in fact, best. Aside from the implications for capital structure changes related to takeover activity, the model also provides certain hypotheses regarding price effects of takeover activities. For instance, the initiation of any takeover activity generates stock price increases, since this increases the likelihood of better management. One of the determinants of this likelihood is endogenously determined by the incumbent's choice of leverage. The results on leverage choice allow the comparison of price effects across different takeover methods. In the case of unsuccessful tender offers, stock price does not change since no change in management is possible. On the other hand, a successful tender offer is usually accompanied by stock price rise. The motivation for the incumbent to relinquish control is to obtain a capital gain on his

shares. This is more likely to be the case when the rival is more able and the control change generates substantial price appreciation. Further, the stock price rise increases in magnitude as we move from unsuccessful proxy fights to successful proxy fights and finally to successful tender offers.

Hirschey (1986)

Hirschey (1986) explores the interdependence between the managerial labor market and the market for corporate control. The main thesis of his analysis is that the existence of firm specific human capital and/or information asymmetry regarding managerial performance leads to strong form inefficiencies in the labor market. In other words, the human capital and human capital rental rates of managers do not reflect all information concerning managerial performance. The managers by virtue of their position within the firm, enjoy valuable inside information regarding not only the future prospect of the firm but also their own performance. However, for several reasons, this inside information cannot be conveyed to outside investors. Moral hazard prevents the transfer of favorable information. On the other hand, managerial self interest prevent them from disclosing any managerial inefficiencies.

Hirschey points out that the presence of asymmetric information regarding managerial performance as well as firm specific human capital creates a wedge within the market demand curve in the managerial labor market. In a competitive labor market, the outside wage will be based on the marginal revenue product curve related to non-firm specific human capital; $D_1 = MRP_1$ in figure 1. On the other hand, the maximum economic value of managerial services will be based on true marginal revenue product of the

manager, consisting of returns to both firm specific as well as non firm specific human capital; $D_2 = MRP_2$. At a given level of managerial labor supply, the difference in managerial compensation, $P_2 - P_1$, represent the extent of undervaluation for any management with firm specific human capital.

This problem of indeterminacy in managerial compensation in the presence of firm specific human capital induces the managers to indulge in self dealing in the management of information. Let D_1 reflect the true marginal revenue product of a manager while D_2 the greater but falsely perceived demand for managerial services which arise due to effect of information asymmetry. Then $P_2 - P_1$ will constitute a measure of value to managers but a cost to the stockholders. "Therefore asymmetric information and firm specific human capital work singly and in concert to undermine the basis for strong form managerial labor market efficiency".

In this framework, the market for corporate control provides a series of mechanisms that completes the managerial labor market by minimizing the agency costs associated with firm specific human capital and/or information asymmetry. For instance, mergers may be viewed as an attempt to capture the unexploited firm specific human capital of target management. Indeed mergers accompanied by the retention of target firm management constitute a revealed preference for acquisition rather than duplication of target management expertise. The mergers, in effect, increase efficiency in the labor market by driving the rental rates of human capital towards its equilibrium value. On the other hand, an unfriendly buyout is a takeover bid that results in the replacement of the target management. Hirschey points out that information asymmetry regarding managerial performance may be an important motivation for hostile takeovers. The competing management teams, specially the successful ones, are more able to detect managerial

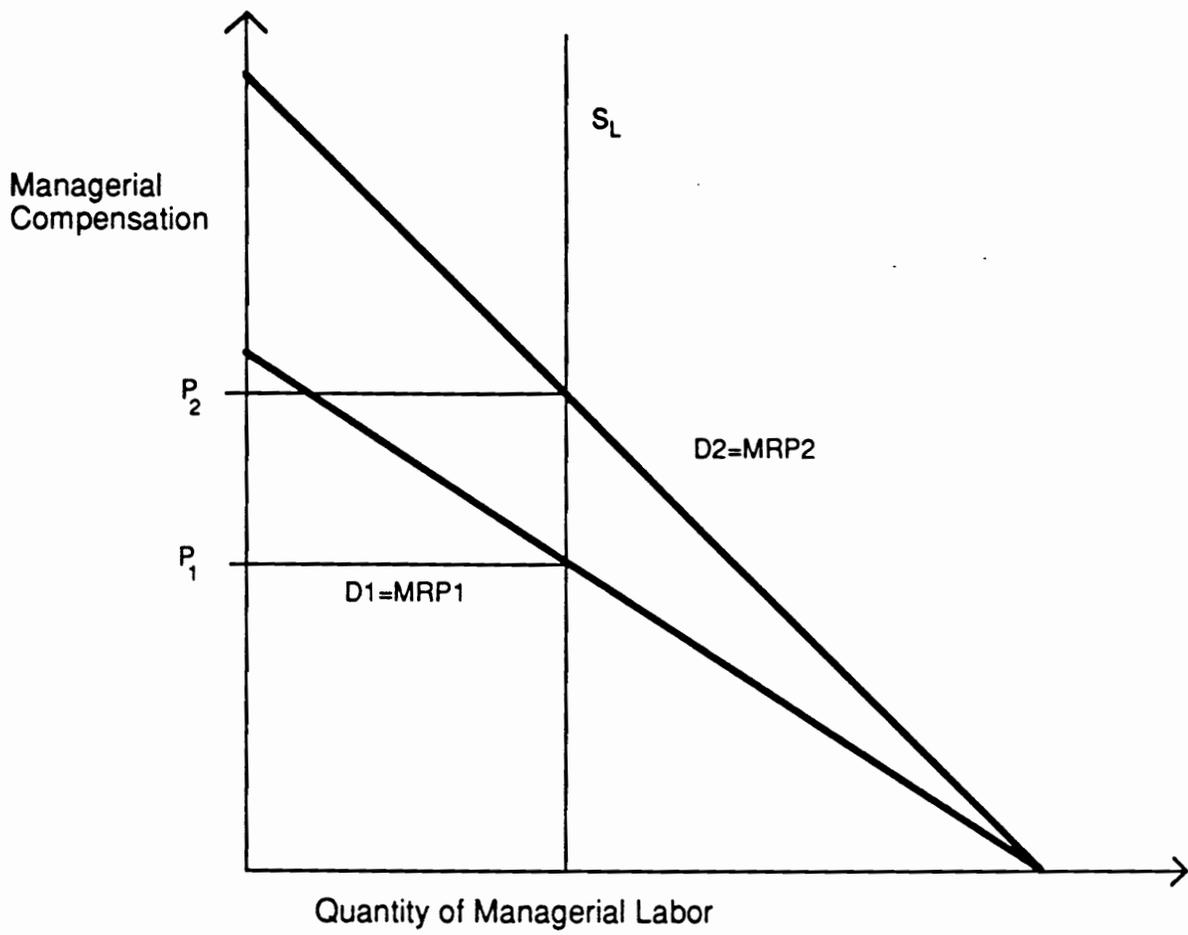


Figure 1. The Market for Managers

inefficiency and any overvaluation arising out of the information asymmetry. In other words, unfriendly takeovers, in certain ways, reflect the acquiring firm's insider information regarding target management's inefficiencies. Once more, the takeover market improves labor market efficiency through the elimination of overvalued inefficient managerial teams and the reduction of avoidable costs for shareholders.

Morck, Shleifer and Vishny (1989)

Morck, Shleifer and Vishny explore the effectiveness of internal monitoring role of the board of directors. They argue that board's effectiveness depends in part on whether the problems experienced are firm specific in nature or industry wide. In the former case it may be easier for the board to assess the problem and fire the incumbent management. However, in situations of industry wide problems like foreign competition, deregulation or technological changes, board may be less inclined to blame the current management. Under these circumstances, an external challenge in form of hostile offer may be necessary to induce restructuring and shareholders' wealth maximization.

They consider the performance and management characteristics of Fortune 500 companies that experienced control changes over the period 1981-1985. Three types of control changes are identified : internal management turnover, hostile takeovers and friendly takeovers. The evidence shows that firms undergoing internal managerial turnovers perform poorly relative to their industry but are not necessarily concentrated in poorly performing industries. In contrast, firms experiencing hostile offers are primarily concentrated in troubled industries. Further, there is mild evidence that these firms underperform with respect to their peers. These findings support the hypothesis that board

directors are capable of replacing management if the firm underperforms with respect to the industry. In contrast, the market for corporate control provides the effective monitoring in the form of hostile takeovers when the whole industry is in decline.

2.8 Summary

Over the last decade, issues pertaining to the market for corporate control have been the subject of considerable research. In particular, questions regarding wealth effects, sources of shareholder gains, medium of payment and shareholder-manager conflicts associated with transfer of corporate control have been extensively examined. These studies conclude that

1. Around the announcement date of a takeover, target shareholders experience substantial wealth gains and shareholders of bidding firms do not incur significant losses.
2. The wealth gains, for the most part, arise from welfare increasing efficiency gains rather than due to undervaluation of targets, increases in market power or wealth transfers from bondholders, labor or taxpayers.
3. Conflict of interest between target shareholders and management are associated with takeover transactions. If the resulting adoption of defence mechanisms by management reduces the probability of future takeovers, the value of the firm declines.

4. Management can increase its control of the firm by increasing its holding of voting shares, α . At low levels of α an increase in α makes the interests of management closer to those of the shareholders, and the value of the firm is predicted to increase. When α is large, an increase in α makes management more entrenched and less subject to the discipline of the market for corporate control and the value of the firm is expected to fall.

5. Returns to shareholders of bidding and target firms are higher when the medium of exchange is cash rather than stock. This is consistent with the implications of Myers and Majluf's (1986) theory of information asymmetry according to which any stock issuance constitutes a negative signal that stocks are overvalued.

Whereas the above issues relating to corporate control transfers have been fairly extensively researched, question of choices among alternative mechanisms for effecting these transfers has not been studied as thoroughly. Why do some control transfers take place through mergers, others through hostile tender offers and still others through proxy fights? Harris and Raviv's (1988) model of the determinants of the choice between hostile takeovers and proxy fights, represents the only theoretical study on this research question. This dissertation attempts, in some measure, to fill this void in the otherwise well researched area of the market for corporate control. In particular, the study develops and tests a theoretical model relating firm characteristics to the choice between friendly mergers and hostile tender offers in the takeover market. The model is developed in the next chapter and empirical tests of the model are presented in chapters IV and V.

Chapter III

A Theoretical Framework for the Merger versus Tender Offer Choice

3.1 Introduction

This chapter first develops a theoretical model of the choice between mergers and hostile tender offers based on the existence of target management's firm specific human capital. The motivation for examining firm specific human capital as the primary determinant of the choice arises from Hirschey's (1986) argument that its presence creates a strong-form inefficiency in the managerial labor market and that the market for corporate control provides mechanisms for reducing such inefficiencies.

The analysis in this chapter is developed in three parts: (1) the relationship between firm specific human capital and the combination of insider holding and debt for target firms, (2) the relationship between the latter and the probability of a successful tender offer by

the acquirer and (3) the effect of insider holding and the target firm's debt on the expected gains to the bidder from the tender offer. In total, the analysis provides the conclusion that higher levels of firm specific human capital held by incumbent management of target firms decreases the incentive for the acquirer to undertake a hostile tender offer instead of friendly merger.

The level of firm specific human capital is not directly observable, however, it is analytically shown in the first part of the chapter that its existence affects the decisions made by managers with respect to measurable firm characteristics. A model of managerial choice of corporate debt levels and insiders' personal investment in the firm is constructed. Managers are considered as being concerned with the value of their personal portfolio (consisting of equity in the firm and risk free asset) and with the costs and benefits of retaining control of the corporate entity. The analysis shows that an incumbent management with higher firm specific human capital will maximize its expected utility of personal wealth and net value of control benefits at a lower level of insider holding, α , and a higher level of debt, D . Those choices by management convey to outsiders the presence of firm specific human capital. Thus existing shareholders and potential suitors are aware of the level of firm specific human capital possessed by incumbent management of target firms.

In the second and third parts of the chapter, the focus is on the decision of the acquirer to employ a tender offer. In order to examine the expected gain to the acquirer, the second part of the chapter examines, in detail, the effect of α and debt level on the probability of a successful tender offer using an approach similar to Stulz (1988). The model demonstrates that (1) the probability of a successful tender offer, for a given premium, is directly related to the target firm's insider holding α and inversely related to

the debt level D . i.e., the probability of a success is lower when incumbent management has high firm specific human capital, indicated by its choice of low α and high debt, (2) the premium required for a successful tender offer decreases with α and increases with D , i.e., the premium required is higher for targets with high firm specific capital, primarily to offset the reduced probability of tendering and (3) as a consequence, the expected net synergy gains accruing to the bidding firm in a hostile tender offer increases with α and decreases with D , i.e., the gains are lower when the target has firm specific human capital.

The third major part of the chapter analyzes the bidder's net expected gain from using a tender offer. The bidder must consider the expected synergy gains, the cost of a premium, the cost of replacing incumbent management after the hostile tender offer is completed and the the probability that a tender offer will in fact succeed. The model presents first order conditions for the optimal premium that the bidder must offer, and then comparative static effects of α and D on the premium and ultimately on the net expected gain. The analysis shows that low α and high D (high firm specific human capital) corresponds to a lower net expected gain, i.e., a reduced incentive to a takeover by tender offer and by implication, an increased incentive to use a friendly merger to capture the synergy gains from combining the two firms. Finally, arguments made by Hirschey (1986) are used to show that for target firms where incumbent management has high firm specific human capital, takeovers through mergers rather than hostile tender offers are advantageous for all parties in the transaction.

It is recognized that firm specific human capital may not be the only determinant of the choice between hostile tender offers and friendly mergers. Accordingly, arguments are

developed for other determinants based on related literature, primarily the free cash flow hypothesis of Jensen (1986).

3.2 Model Based On Incomplete Managerial Labor Market

In any takeover process, three types of participants are involved; the target management, bidder management and a large number of outside target shareholders. These outside shareholders are passive to the extent that they do not contend for corporate control. The incumbent management's behavior is motivated by the assumption that there are benefits to being in control of the firm. Following Harris and Raviv[1988], we assume that these benefits are in addition to cash flows accruing to all security holders - managers or non managers. In other words, the market value of the firm and security prices do not reflect the benefit of control.

Managers seek to protect their control in several different ways. We will specifically concentrate on two primary mechanisms. The most obvious way of retaining control is through managerial equity ownership. In fact, the fraction α of the voting rights controlled by management is an important element of the ownership structure of publicly traded firms. However management's equity ownership is likely to be limited by their budget constraint. Furthermore, while investment in company shares makes it easier to retain control, it also forces the management to take large amounts of risk due to reduced diversification. Another way of increasing control is through issuance of non-voting securities like debt. The capital structure change through the increase in leverage

enables incumbent management to control a larger portion of voting rights for a given investment in the firm.

We assume that the incumbent managements of different firms may differ in the extent of their human capital invested in the firm. In the model developed here, the management knows the value of its firm specific human capital and thus the value of the firm. However, in the presence of asymmetric information, outside shareholders cannot arrive at the correct prices for securities and thus the true value of the firm. For management with firm specific human capital to survive in the presence of a takeover threat, information transfer must occur. Moral hazard prevents any direct information transfer. Fortunately, management's optimal strategy in retaining control provides incidental signals, allowing the outside shareholders to sort one type of management team from another.

3.2.1 Managerial Choice of Control Variables

Managers can increase their control of the firm by increasing their equity ownership, α , and/or by increasing leverage, D . The benefits of control, C , are thus increasing in α and D , [$\frac{\partial C(\alpha)}{\partial \alpha} > 0$, and $\frac{\partial C(D)}{\partial D} > 0$]. There are however costs to retaining control, either through direct equity ownership, $L(i, \alpha)$, or increased leverage, $K(i, D)$, where i indicates the degree of incumbent management's firm specific human capital. Higher i is associated with higher firm specific human capital. The cost of insider holding or direct equity ownership is increased risk exposure from reduced diversification and this cost increases with the level of insider holding, α , [$\frac{\partial L(i, \alpha)}{\partial \alpha} > 0$,]. This cost is more pronounced for management with firm specific human capital since it already has a substantial invest-

ment in the firm in the form of human capital [$\frac{\partial^2 L(i, \alpha)}{\partial \alpha \partial i} > 0$]. Debt is costly because it reduces the expected benefits of control by increasing the probability of bankruptcy, increasing the extent of monitoring by creditors, and reducing the discretion of the incumbent in allocating free cash flows [$\frac{\partial K(i, D)}{\partial D} > 0$]. However, to the extent that a large investment of human capital reduces the managers' incentive to take excessive operating/bankruptcy risk, bondholders are less concerned about wealth transfer loss through risk shift, and thus the marginal debt costs are lower. The reduction in the value of control associated with increasing debt will, therefore, be lower for management with firm specific human capital [$\frac{\partial^2 K(i, D)}{\partial D \partial i} < 0$]. The optimal combination of equity ownership and debt for achieving a given level of control will, therefore, differ for different management teams due to differing underlying cost structures. The optimal choice of equity ownership and debt issuance follows from the first order condition of management's utility maximisation. It is assumed that managements have identical concave utility functions defined over the end of period wealth. Further, no assets can be used by the managers to hedge their investment in the firm. In such a setting, the investment opportunity set of the managers consists of only a risk free bond with return R and common stock of their firm. The manager's initial wealth W_0 is thus divided between a risk free bond and investment $\alpha V(\alpha, D)$ in the firm's equity. The objective of the manager is to maximize the sum of the expected utility of his end of period wealth and the net benefits of control. Under these assumptions it is shown that :

THEOREM 1 : Management with high firm specific human capital will prefer to retain control with lower insider holding and higher debt, relative to management with low firm specific human capital.

The management maximises the following objective function with respect to two choice variables under their control, α and D :

$$H = E[U(W)] + C(D) + C(\alpha) - K(i,D) - L(i, \alpha) \quad (3.1)$$

or,

$$H = E[U[\{W_0 - \alpha V(\alpha, D)\}(1 + R) + \alpha(1 + r)V(\alpha, D)]] + C(D) + C(\alpha) - K(i,D) - L(i, \alpha)$$

where,

α = proportion of insider holding

D = target firm's debt level

W = end of the period wealth

W_0 = initial wealth of the management

V = value of the firm

R = certain rate of return on risk free bond

r = rate of return on firm's share

$C(\alpha)$ = control benefits from insider holding

$C(D)$ = control benefits from the use of debt

$K(i,D)$ = cost in terms of expected benefits of control due to use of debt

$L(i, \alpha)$ = cost of insider holding due to reduced diversification

The First Order Conditions for maximization are

$$\frac{\partial H}{\partial \alpha} = EU'(W)[-V(\alpha, D)(1 + R) + (1 + r)V(\alpha, D)] + \frac{\partial C(\alpha)}{\partial \alpha} - \frac{\partial L(i, \alpha)}{\partial \alpha} = 0 \quad (3.2)$$

and

$$\frac{\partial H}{\partial D} = EU'(W) \frac{\partial W}{\partial D} + \frac{\partial C(D)}{\partial D} - \frac{\partial K(i, D)}{\partial D} = 0 \quad (3.3)$$

Simplifying equation (3.2),

$$EU'(W)(1+r)V(\alpha, D) + \frac{\partial C(\alpha)}{\partial \alpha} = EU'(W)V(\alpha, D)(1+R) + \frac{\partial L(i, \alpha)}{\partial \alpha} \quad (3.4)$$

i.e., Marginal benefit of α = Marginal cost of α .

Since the managers' end of period wealth is not affected by the firms' debt level, $EU'(W) \frac{\partial W}{\partial D} = 0$ and equation (3.3) simplifies to

$$\frac{\partial C(D)}{\partial D} = \frac{\partial K(i, D)}{\partial D} \quad (3.5)$$

i.e. Marginal benefit of issuing debt = Marginal cost of issuing debt.

Management i's optimal choices of α and debt level D are obtained by differentiating the first order conditions (3.4) and (3.5) with respect to i.

$$EU'(W)(1+r)V(\alpha, D) + \frac{\partial C(\alpha)}{\partial \alpha} = EU'(W)V(\alpha, D)(1+R) + \frac{\partial L(i, \alpha)}{\partial \alpha} \quad (3.4)$$

Differentiating with respect to i,

$$\frac{\partial \alpha^*}{\partial i} = - \frac{\frac{\partial F}{\partial i}}{\frac{\partial F}{\partial \alpha}} = - \left[- \frac{\frac{\partial^2 L(i, \alpha)}{\partial \alpha \partial i}}{\frac{\partial^2 C(\alpha)}{\partial \alpha^2} - \frac{\partial^2 L(i, \alpha)}{\partial \alpha^2}} \right], \quad (3.6)$$

where α^* satisfies (3.4) and

$$\frac{\partial C(D)}{\partial D} = \frac{\partial K(i, D)}{\partial D} \quad (3.5)$$

Differentiating with respect to i

$$\frac{\partial D^*}{\partial i} = - \frac{\frac{\partial F}{\partial i}}{\frac{\partial F}{\partial D}} = - \left[- \frac{\frac{\partial^2 K(i, D)}{\partial D \partial i}}{\frac{\partial^2 C(D)}{\partial D^2} - \frac{\partial^2 K(i, D)}{\partial D^2}} \right], \quad (3.7)$$

where D^* satisfies (3.5).

As described earlier, it is now reasonably assumed that control benefits increase with both α and D and at a decreasing rate and that the costs of leverage and insider holding increase with α and D at an increasing rate, i.e.,

$$\frac{\partial^2 C(D)}{\partial D^2} < 0, \quad \frac{\partial^2 C(\alpha)}{\partial \alpha^2} < 0 \quad (3.8)$$

and

$$\frac{\partial^2 K(i, D)}{\partial D^2} > 0, \quad \frac{\partial^2 L(i, \alpha)}{\partial \alpha^2} > 0 \quad (3.9)$$

Using the above inequalities, the signs of $\frac{\partial D^*}{\partial i}$ and $\frac{\partial \alpha^*}{\partial i}$ are readily obtained as

$$\frac{\partial D^*}{\partial i} > 0$$

$$\frac{\partial \alpha^*}{\partial i} < 0$$

i.e., management with higher firm specific human capital maximises its objective function by choosing lower insider holding and higher debt, proving Theorem 1.

The management's optimal choice becomes an incidental signal to outside shareholders and prospective bidders. Management maximises its objective function based on the true, intrinsic value of the firm. The choice of low insider holding and high debt conveys the existence of management's firm specific human capital while high equity ownership and low debt conveys the lack of it. The information asymmetry is removed by virtue of outside investors' observation of management's choice of α and D , and thus the outside investors' valuation of securities and the firm coincides with that of the management. In other words, management's valuation becomes consistent with the market valuation in a rational expectation framework.

3.2.2 An Analysis of Tender Offer in the Presence Of Firm Specific Human Capital

In this section it is analytically shown that for a given premium offered, the probability of a successful tender offer declines with the incumbent's firm specific human capital, resulting in a higher expected cost and lower expected gains to the bidding firm.

Model Framework:

1. Control of the target firm is guaranteed by a simple majority of shares, i.e. for a tender offer to be successful the bidder must acquire at least 50% of the total outstanding shares. The bidder offers to buy exactly half of the shares at a price of $1/2V(\alpha, D) + P$, where P is the total dollar premium offered by the bidder.
2. The outside shareholders are atomistic. They cannot collude to force the bidder to pay a higher premium, rather they compete with each other for the premium.
3. Shareholders have heterogeneous opportunity costs of tendering and these costs are not known to the bidder. Differing opportunity costs of tendering among shareholders imply that the supply curve is upward sloping and those with the lowest opportunity costs tender first. For instance, theoretical arguments favoring upward sloping supply curve may be based on a heterogeneous tax structure of target shareholders. A shareholder who tenders for cash pays taxes on his capital gains, which represent the opportunity cost of tendering. On the other hand a shareholder who does not tender can keep postponing these taxes, unless the successful tender offer is followed by a cleanup tender offer.
4. The outside shareholder tenders with some probability $q(P, \alpha, D)$. In addition to the premium P , both the level of insider holding α and debt D , acting as a surrogate for management's firm specific human capital, influence the likelihood of tendering. In the presence of information asymmetry regarding the extent of the synergy gains, the target shareholders will prefer that the management deal with the bidder if the management possesses a high degree of firm specific human capital. This will reduce

the possibility of bidder paying lower premium than it would have been willing to. In other words the existence of firm specific capital shifts the supply curve of the tendering shares.

5. Given that there is uncertainty regarding the heterogeneous tax structure of target shareholders and consequently their opportunity cost of tendering, the probability $q_i(P, \alpha, D)$ cannot be determined with certainty before the bid is made. However, we assume that the proportion of total outstanding shares tendered, Q , at any given premium is distributed uniformly between $u(P, \alpha, D)$ and $d(P, \alpha, D)$ for all $P < P^*$, where the bidder never finds it profitable to offer a premium above P^* . Further, both u and d are assumed to be increasing linear functions of P and α and decreasing function of D with equal slopes, i.e., $u'_\alpha = d'_\alpha$, $u'_P = d'_P$, and $u'_D = d'_D$. So changes in P , α , or D serve to just shift the distribution right or left but do not alter the shape of the distribution.

The Probability of Success

In any tender offer the bidder's potential gain crucially depends on the offer's probability of success which in turn depends on the likelihood of target shareholders tendering at a given premium. As discussed earlier, the likelihood of individual shareholders tendering their shares is influenced primarily by the premium while the target firm's α and D , acting as a surrogates for the incumbent's firm specific human capital, influence the supply function as the shift parameter. The existence of target managements' firm specific human capital reduces the likelihood of shareholders tendering, forcing the bidder to pay

a higher premium for successful acquisition. This in turn pushes up the cost and reduces the net gain to the bidder.

We assume a simple majority rule in deciding the outcome of a hostile tender offer, i.e., the tender offer is successful if the proportion of total outstanding shares tendered is greater than 1/2. Since the bidder is uncertain regarding the probability of any shareholder tendering, $q_i(P, \alpha, D)$, the probability of the success of a hostile tender offer is the probability that Q exceeds 1/2. The assumption of a uniform distribution implies that the probability of success of a hostile tender offer is

$$\Pi(P, \alpha, D) = \frac{u(P, \alpha, D) - 1/2}{u(P, \alpha, D) - d(P, \alpha, D)} \quad (3.10)$$

The impact of insider holding, α , debt level D , and premium P on the probability of success, for a given premium P , is given by $\Pi_\alpha = \frac{\partial \Pi(P, \alpha, D)}{\partial \alpha}$, $\Pi_D = \frac{\partial \Pi(P, \alpha, D)}{\partial D}$ and $\Pi_P = \frac{\partial \Pi(P, \alpha, D)}{\partial P}$. These results are used in the Theorem 2 to measure the impact of α and D on the optimal premium. First consider the effect of insider holdings on the probability of a successful hostile tender offer:

$$\Pi_\alpha = \frac{[u(p, \alpha, d) - d(P, \alpha, D)][u'_\alpha] - [u(P, \alpha, D) - 1/2][u'_\alpha - d'_\alpha]}{[u(P, \alpha, D) - d(P, \alpha, D)]^2} \quad (3.11)$$

In the above expression, the second term in the numerator is zero since we have assumed that α just changes the location but not the shape of the distribution, i.e., $u'_\alpha - d'_\alpha = 0$. The denominator being a squared term is always positive. Further, given the assumption of uniform distribution, $u(P, \alpha, D) > d(P, \alpha, D)$. Finally, u'_α is positive since higher α indicates incumbent management's lower firm specific human capital, increasing the likelihood of any shareholder tendering. Thus the effect of an increase in

insider holding, α , is a corresponding increase in the probability of success in a hostile tender offer.

This general framework allows the possibility of even incumbent management tendering at certain high premiums. The insider's opportunity cost of tendering is much higher due to associated loss of control benefits. However, in most cases, with insiders holding on the order of 5-20%, enough shareholders will tender in successful tender offers at a premium which is substantially lower than the reservation premium of the target management.

Next, consider the effect of debt level on the probability of a successful tender offer:

$$\Pi_D = \frac{[u(p, \alpha, d) - d(P, \alpha, D)][u'_D] - [u(P, \alpha, D) - 1/2][u'_D - d'_D]}{[u(P, \alpha, D) - d(P, \alpha, D)]^2} \quad (3.12)$$

In the above expression, the second term in the numerator is again zero following the assumption that debt just changes the location but not the shape of the distribution, i.e., $u'_D - d'_D = 0$. The denominator being a square term is always positive. Further given the assumption of uniform distribution, $u(P, \alpha, D) > d(P, \alpha, D)$. Finally, $u'_D < 0$. Thus the effect of an increase in leverage on the possibility of success of a tender offer is unambiguous. An increase in leverage signals the existence of incumbent's firm specific human capital. This raises the reservation price of the target shareholders, making them less likely to tender at any given premium and consequently decreases the probability of success of a hostile tender offer.

Finally consider the effect of the premium on the probability of a successful tender offer.

$$\Pi_P = \frac{[u(P, \alpha, d) - d(P, \alpha, D)][u'_p] - [u(P, \alpha, D) - 1/2][u'_p - d'_p]}{[u(P, \alpha, D) - d(P, \alpha, D)]^2} \quad (3.13)$$

The sign of Π_P is positive. As pointed out before, the second term in the numerator is zero while denominator being a squared term is always positive. The remaining term u'_p is positive. In other words the probability of success of any hostile tender offer increases as the bidder raises the level of premium. To summarize, the probability of a successful tender offer increases with insider holding, α , and offer premium, P , and decreases with debt, D .

Expected Cost of Acquisition

The bidders' choice of whether to acquire a target firm through a merger or a hostile tender offer is based on expected gains and costs of acquisition associated with the alternative mechanisms. Since the target management's choice of α and D affects the probability of success of a tender offer, it must also effect the the expected gains to the bidder and the cost of acquisition through a hostile tender offer. Specifically, it is shown that :

THEOREM II : The firms with low insider holding and high debt, reflecting the existence of incumbent's firm specific human capital, are expected to be more costly for the bidder to acquire through a hostile tender offer.

Proof :

The objective of the bidder is to maximise the net expected benefit from a tender offer. Given the market value of the target, the bidder makes an investment in information

regarding the target and learns G , the potential gain that accrues to the bidder from the control of the target. The cost incurred by the bidder in a hostile tender offer has two components: the premium, P , offered to induce the target shareholders to tender and the cost of replacing the target management, $R(\alpha, D)$. This latter cost is obviously higher, the higher the incumbents' firm specific human capital indicated by its choice of α and D . The bidder's optimal choice of the premium follows from its maximisation of the net expected gains.

$$S = [G - P - R(\alpha, D)]\Pi(P, \alpha, D) \quad (3.14)$$

where

S = the net expected benefit

G = the bidder's potential synergy gain

$\Pi(P, \alpha, d)$ = probability of success of a tender offer

$R(\alpha, D)$ = the bidder's replacement cost of target management's firm specific human capital.

The optimal premium is determined by the first and second order conditions

$$\frac{\partial S}{\partial P} = (G - P - R(\alpha, D))\Pi_P - \Pi = 0 \quad (3.15)$$

and

$$\frac{\partial^2 S}{\partial P^2} = (G - P - R(\alpha, D))\Pi_{PP} - 2\Pi_P < 0 \quad (3.16)$$

From equation (3.13) $\Pi_P > 0$. Further, $\Pi_{PP} = \frac{\partial^2 \Pi}{\partial P^2} = 0$ This follows from our assumption that $u(P, \alpha, D)$ is a linear increasing function of dollar premium P . Thus the second order condition (3.16) is always satisfied.

At the optimal premium P^* obtainable from the solution of the first order condition (3.16), the total cost to the bidder is $P^* + R(\alpha, D)$. The relation between the bidders' cost and the target firms' insider holding, α , and debt level, D , are expressed as

$$\frac{\partial[P^* + R(\alpha, D)]}{\partial\alpha} = R_\alpha(\alpha, D) + \frac{\partial P^*}{\partial\alpha} \quad (3.17)$$

and

$$\frac{\partial[P^* + R(\alpha, D)]}{\partial D} = R_D(\alpha, D) + \frac{\partial P^*}{\partial D} \quad (3.18)$$

$\frac{\partial P^*}{\partial\alpha}$ and $\frac{\partial P^*}{\partial D}$ are obtained by differentiating first order condition (3.15) with respect to α and D

$$\frac{\partial P^*}{\partial\alpha} = \frac{R_\alpha(\alpha, D)\Pi_p - (G - P - R(\alpha, D))\Pi_{\alpha p} + \Pi_\alpha}{(G - P - R(\alpha, D))\Pi_{pp} - 2\Pi_p} = -\frac{R_\alpha(\alpha, D)\Pi_p + \Pi_\alpha}{2\Pi_p} \quad (3.19)$$

Similarly,

$$\frac{\partial P^*}{\partial D} = \frac{R_D(\alpha, D)\Pi_p - (G - P - R(\alpha, D))\Pi_{Dp} + \Pi_D}{(G - P - R(\alpha, D))\Pi_{pp} - 2\Pi_p} = -\frac{R_D(\alpha, D)\Pi_p + \Pi_D}{2\Pi_p} \quad (3.20)$$

where $R_\alpha(\alpha, D)$ and $R_D(\alpha, D)$ represent the impact of the incumbent management's firm specific human capital on the cost of replacing it. Specifically, the cost of replacing the incumbents' human capital decreases with target firms' debt and increases with its leverage, i.e., $R_\alpha(\alpha, D) < 0$ and $R_D(\alpha, D) > 0$. Substituting the above expressions for $\frac{\partial P^*}{\partial\alpha}$ and $\frac{\partial P^*}{\partial D}$ in (3.17) and (3.18) respectively

$$\frac{\partial[P^* + R(\alpha, D)]}{\partial \alpha} = R_\alpha(\alpha, D) + \frac{\partial P^*}{\partial \alpha} = \frac{R_\alpha(\alpha, D)}{2} - \frac{\Pi_\alpha}{2\Pi_P} < 0 \quad (3.21)$$

Similarly,

$$\frac{\partial[P^* + R(\alpha, D)]}{\partial D} = R_D(\alpha, D) + \frac{\partial P^*}{\partial D} = \frac{R_D(\alpha, D)}{2} - \frac{\Pi_D}{2\Pi_P} > 0 \quad (3.22)$$

This results follow from the fact that $\Pi_\alpha > 0$, $R_\alpha(\alpha, D) < 0$, $\Pi_D < 0$, and $R_D(\alpha, D) > 0$. . Thus the cost to the bidder in a hostile tender offer decreases with α and increases with target debt level, D as stated by Theorem II.

It can now be shown that

THEOREM III : The expected gains to the bidder in a hostile tender offer is a decreasing function of the target managements' firm specific human capital. In other words, bidder gains are lower in hostile takeovers if the target firm is characterised by low insider holding and high debt, reflecting the existence of incumbent's firm specific human capital.

The impact of the incumbent's choice of α and D on bidders expected gain at the optimum premium can be evaluated by differentiating the bidders' objective function with respect to α and D .

$$S^* = [G - P^* - R(\alpha, D)]\Pi(P^*, \alpha, D) \quad (3.14)$$

Thus

$$\frac{\partial S^*}{\partial \alpha} = [G - R(\alpha, D) - P^*][\Pi_\alpha + \Pi_P \frac{\partial P^*}{\partial \alpha}] - \Pi \frac{\partial P^*}{\partial \alpha} - \Pi R_\alpha(\alpha, D) \quad (3.23)$$

or, substituting the optimal bidder's premium P^* using (3.15)

$$\frac{\partial S}{\partial \alpha} = [G - R(\alpha, D) - P^*]\Pi_\alpha - \Pi R_\alpha(\alpha, D) = \Pi \left[\frac{\Pi_\alpha}{\Pi_P} - R_\alpha(\alpha, D) \right] > 0. \quad (3.24)$$

This result follows from the fact that $\Pi_\alpha > 0$, and $R_\alpha(\alpha, D) < 0$. Similarly,

$$\frac{\partial S}{\partial D} = [G - R(\alpha, D) - P^*]\Pi_D - \Pi R_D(\alpha, D) = \Pi \left[\frac{\Pi_D}{\Pi_P} - R_D(\alpha, D) \right] < 0. \quad (3.25)$$

This result follows from the fact that $\Pi_D < 0$, and $R_D(\alpha, D) > 0$. Thus the benefits to bidder in a hostile tender offer increases with α and declines with target debt level.

3.2.3 An Analysis of Mergers in the Presence of Firm Specific Human Capital

From the preceding analysis it is evident that the higher the incumbent's firm specific human capital, the higher the cost and lower the expected gains to the acquiring firm from a hostile tender offer. It remains to be shown that a friendly merger is the more likely outcome when the target management has high firm specific human capital. To justify this result we base our analysis on that of Hirschey (1986). In general, a friendly merger will result only if it is the preferred takeover strategy of incumbent management, target shareholders and the bidding firm. If the bidding firm acquires a target with high firm specific human capital through a hostile tender offer, it pays a premium above the target's market value which already incorporates the full economic value of the incumbent's firm specific human capital and in addition incurs the cost of replacing such

human capital. The latter costs are avoidable in a friendly merger. It is also in the best interest of the target management to negotiate a friendly merger at a marginally higher return on his human capital in the form of post merger contracts. The bidding firm will be willing to offer such contracts as long as their costs are lower than the cost of replacing the firm specific capital. The target shareholders as argued earlier will, given asymmetric information regarding synergy gains, prefer that the bidding firm negotiate terms with incumbent management. The target shareholders will obtain a premium above market value and retain the firm specific skills of the incumbent management.

3.3 Other Determinants of the Merger versus Tender Offer Choice

Firm specific human capital is one aspect of the firm characteristics that may have a bearing on the choice of the takeover mechanisms. Other determinants of the choice emerge from Jensen's (1986) free cash flow hypothesis of corporate takeover. The theory considers the agency costs associated with conflicts between managers and shareholders over the payout of free cash. The shareholders would like managers to disgorge this excess cash rather investing it at below cost of capital or wasting it on organizational inefficiencies. However, managers may have an incentive to retain this free cash flow and grow beyond the optimal size to increase their power by increasing resources under their control. In this framework takeovers are both an evidence of the conflict between shareholders and managers and a solution to the problem. Further, the takeovers as a solution to the free cash flow problem are likely to be hostile tender offers, often with large increases in debt and major restructuring. Thus if a target firm experiences free cash flow with low growth opportunities, then the acquisition method is likely

to be hostile tender offer. The takeover market here acts as a corrective mechanism for the free cash flow problem. On the other hand, if the bidder possesses free cash flow with low growth opportunities, takeovers represent evidence of the free cash flow problem. However these acquisitions, if undertaken within the industry, will create value since they force the the managers to pay out the excess cash to the target shareholders in the form of a premium. Moreover the bidders will be primarily interested in firms with growth opportunities. No specific firm holds any special interest for them since synergy is not the primary motivation. Under these conditions bidders are likely to avoid hostile transactions which at times may become exorbitantly costly. In other words, if bidders experience free cash flows, the resulting acquisitions are likely to be friendly. Subsequently, we include both targets' and bidders' growth-liquidity variables as determinants of acquisition method.

3.4 Summary

In this chapter a theoretical model of the determinants of the choice between mergers and tender offers is developed. The primary determinant is the target management's firm specific human capital. The following results are derived :

1. Managements with high firm specific human capital maximize their expected utility of control benefits at lower levels of insider holding and higher levels of debt. These observable choices, in turn, signal the existence of firm specific human capital to all participants in the market for corporate control.

2. For a given premium offered, the higher the firm specific human capital the lower the probability of a successful tender offer.
3. The higher the firm specific human capital, the higher the expected cost of a bidding firm in terms of premium required and the cost of replacing the target management.
4. Consequently, the expected net gain to the bidder decreases with increasing firm specific human capital of the target management.
5. The merger alternative is more beneficial to all participants - the target management, target shareholders and bidding firm. This last result is not formally derived but developed from the theoretical arguments presented by Hirschey (1986).

The chapter also develops other determinants of the merger tender offer choice based on implications of existing models or theories in the literature. In particular, it is argued, based on Jensen (1986), that the existence of free cash will effect the choice. A hostile tender offer is more likely if the target has high free cash and a merger is the more likely outcome if the bidder has high free cash flow.

Chapter IV

Empirical Framework

4.1 Introduction

In the previous chapter it was shown that the theoretical model developed, together with other models in the existing literature, provide several testable implications with respect to the merger versus tender offer choice. This chapter presents an empirical specification of the hypotheses and describes the econometric procedures used to test them. The study employs the methodology of qualitative choice models where the dependent variable represents alternative acquisition methods. The parameter estimates of these choice models specifically allows us to capture the impact of different explanatory variables on the likelihood of observing a certain type of acquisition as opposed to another. In the estimation of the statistical model, state based sampling procedures are used, based on Palepu (1986), to increase the efficiency of the parameter estimates. This, in turn, necessitates the use of conditional maximum likelihood estimation as opposed to ordinary maximum likelihood in order to remove certain biases from the estimation method.

4.2 Qualitative Choice Models

When one or more of the explanatory variables in a regression model are dichotomous in nature, they can be represented as dummy variables. However the application of the linear regression model when the dependent variable is dichotomous is more complex. Qualitative choice models, binary choice models in particular, assume that agents are faced with a choice between two alternatives and the choice they make depends on certain characteristics of the individual. In our case, the firms are faced with choices between alternative acquisition methods - merger vs tender offer - and it is assumed that their optimal choice depends on certain firm characteristics. As in a regression model, one purpose of a qualitative choice model is to determine the probability that an agent with a given set of attributes will make one choice rather than the alternative. Secondly, the models could be used for the purpose of predicting the choice made by a certain individual given his characteristics.

There are several possible model specifications, each with advantages and disadvantages. However, for simplicity, we will restrict ourselves to the situations where the probability of an individual making a choice is found by evaluating the distribution function at a value that is expressed as a linear function of individual attributes. $P(Y_i = 1) = F(H(X, \theta))$ and $H(X, \theta) = X'\beta$ is linear. Here X represents the set of attributes, β is the unknown parameter to be estimated and Y_i is a variable that indicates the individual's choice. Three common forms of probability functions most frequently used are Linear probability model, Probit model, and Logit model. The parameter estimation is carried out via some maximum likelihood algorithm as opposed to a method of least squares. The objective is to find an estimator of beta that maximises the likelihood of observing the pattern of choice in the sample. The likelihood function is maximised with

respect to the parameter vector to yield a set of normal equations. Now, due to the nature of the distribution function assumed in probit or logit, the normal equations are non-linear and thus the parameters must be obtained using an iterative method. The non-linear estimation of the model parameters can be carried out using direct optimization approach or the Gauss-Newton method. In this study, the logit model is used along with the Gauss-Newton method of estimation. Appendix A of this chapter evaluates the alternative models and estimation procedures and also compares Logit versus Discriminant analysis.

4.3 Empirical Model

The following empirical model is used in this study to specify the exact functional relationship between firm characteristics and the likelihood that an acquisition mechanism will be of a certain type. Let P_i be the probability that event i is a hostile tender offer, X_i a vector of attributes of the participating firms, i.e., target and the bidder, and β , a vector of unknown parameters to be estimated. Then, under the assumption of the logit model that the probability function F follows a logistic distribution, the relationship between P_i , X_i and β_i is written as

$$P_i = 1/[1 + e^{-\beta X_i}] \quad (4.1)$$

In other words, P_i is the logistic probability function of the measured attributes of the target and the bidder firms. The intuition behind the model is straight forward. Whether or not a particular acquisition mechanism is a hostile tender offer or a merger depends on target's own characteristics as well as the attributes of the bidder. These firm char-

acteristics are endogeneous to the choice of acquisition method. The specific functional form through which these characteristics effect the probability of a certain acquisition method is assumed to be the logistic probability function.

To see how the model specified in (4.1) may be transformed to facilitate an intuitive understanding, multiply both sides of the equation by $[1 + e^{-\beta X_i}]$ to get

$$[1 + e^{-\beta X_i}]P_i = 1 \quad (4.2)$$

Dividing by P_i and then subtracting 1 leads to

$$(e^{-\beta X_i}) = \frac{1 - P_i}{P_i} \quad (4.3)$$

or

$$(e^{\beta X_i}) = \frac{P_i}{1 - P_i} \quad (4.4)$$

By taking natural logarithm on both sides

$$\log \frac{P_i}{1 - P_i} = \beta X_i \quad (4.5)$$

The dependent variable in the regression equation is simply the logarithm of the odds that a particular choice will be made. The logit model transfers the problem of predicting probabilities within a (0, 1) interval, that is the range of allowable values for a probability function, to the problem of predicting the odds of an event's occuring within the range of entire real line.

4.4 Model Specification, Hypotheses and Variable Description

In this study, two versions of the above form of logit model are estimated for the merger versus tender offer choice. The first version is specified as

Model Specification 1 :

$$Y_i = \beta_0 + \beta_1 \text{MCONTROL} + \beta_2 \text{TARFCF} + \beta_3 \text{BIDFCF} + \beta_4 \text{INSIDER} + \varepsilon_i$$

where

$$Y_i = \log \frac{P_i}{1 - P_i}, \text{ i.e., the odds that a particular choice is made.}$$

P_i = probability of a hostile tender offer

MCONTROL is a dummy variable that captures the nature of incumbent management's control mechanism. Our theoretical framework predicts that the likelihood of hostile tender offers decreases if the incumbent management prefers to retain control with low equity ownership and higher debt reflecting existence of firm specific human capital. Accordingly the variable is assigned a value of one for firms with combination of low insider holding and high debt and zero otherwise. The coefficient β_1 , associated with MCONTROL dummy variable is hypothesized to be negative.

TARFCF is a dummy variable that measures the target firm's free cash flow. Based on Jensen and Palepu, firms with high undistributed cash and low internal growth opportunities are considered to have high free cash flow. Accordingly the dummy variable is

assigned a value of one for firms having a combination of low growth and high liquidity and zero otherwise. Jensen's free cash flow theory suggests that firms with high undistributed cash and low growth opportunities are likely to become hostile tender offer targets. Thus the coefficient β_2 , of TARFCF is expected to be positive.

BIDFCF is measured in the same way as the target's growth-liquidity mismatch. Jensen's free cash flow theory suggests that acquisitions motivated by high bidder free cash flow are likely to be friendly mergers. In Jensen's framework, horizontal acquisitions within the industry will tend to create value as they facilitate exit. On the other hand, takeovers outside the industry are more likely to have low or even negative values since managers know very little about managing such firms. However, the negative effect may be outweighed by reduction in waste from internal expansion and disgorgement of free cash flows to target shareholders. Moreover, the bidders' acquisition is not necessarily motivated by synergy, and thus bidders are not interested in any specific firm. In general they are seeking growth opportunities. Thus the coefficient, β_3 , associated with bidders growth-liquidity mismatch dummy, BIDFCF, is expected to have a negative sign.

INSIDER is the extent of target firms' insider holding and is included to control for impacts of managerial equity ownership other than to signal firm specific human capital, in combination with debt. In an agency framework, it may be argued that higher insider holding helps to align the interest of the managers with that of the shareholders. Further, the empirical evidence in Morck, Shleifer and Vishny suggest that conditions necessary for entrenchment, like voting control starts to set in at levels of insider holding as low as 5%. Both the convergence of interest and the entrenchment hypotheses are likely to increase the likelihood of friendly mergers, although for different reasons. The alignment

of interests reduces agency problems and discourages bidders replacing the target management. On the other hand, entrenchment substantially reduces the probability of a success of any hostile acquisition attempts. Thus the associated coefficient β_4 , of the *INSIDER* variable is hypothesized to be negative.

In the second version of the model the components of the target and bidding firms' free cash flow variables are introduced separately to capture their individual effects. Thus

Model Specification 2 :

$$Y_i = \alpha_0 + \alpha_1 MCONTROL + \alpha_2 TARGROW + \alpha_3 BIDLIQ \\ + \alpha_4 TARLIQ + \alpha_5 BIDGROW + \alpha_6 INSIDER + \epsilon_i$$

$$Y_i = \log \frac{P_i}{1 - P_i}, \text{ i.e., the odds that a particular choice is made.}$$

P_i = probability of a hostile tender offer

TARGROW is the growth rate in the assets of the target firm. Jensen's free cash flow theory of corporate takeovers implies that friendly mergers are likely when target firms' growth opportunities are adequately supported by acquiring firms' free cash flows. In this situation the objectives of both the target and bidder management are consistent with each other, reducing the likelihood of any managerial resistance. The bidding firm disgorge the excess cash flows in a productive manner releasing value for the combined entity. Thus the coefficient of *TARGROW* is expected to be negative.

BIDLIQ is the bidding firm's undistributed cash flow. As discussed above higher cash flow of the bidding firm increases the likelihood of friendly merger and thus the coefficient is expected to be negative.

TARLIQ is the undistributed cash flow of the target firm. Jensen's theory also suggests that target firms refusing to disgorge the free cash flows are likely to experience hostile takeover attempts from bidders having high growth opportunities. The same incentives that prevented the target management from disgorging the excess cash flows in the first place, now induce them to resist beneficial takeover attempts. Thus the coefficient α_4 of TARLIQ is is hypothesized to be positive.

BIDGROW is the growth rate in the assets of the bidding firm. Again to be consistent with Jensen's theory, higher growth rate of the bidding firm seeking targets with high liquidity will increase the likelihood of hostile tender offers and hence the associated coefficient α_5 should be positive.

All other variables, and associated hypotheses regarding their coefficients are as in Model 1.

4.5 Measurement of variables

GROWTH: Growth of a firm is defined as the annual rate of change in total assets. Asset data is available as Industrial Compustat data item 6. The annual percentage asset growth is computed and averaged over the three years prior to the acquisition year.

LIQUIDITY: Following Lehn and Poulsen (1989), the Liquidity or free cash flow for each firm is measured as CF/EQ, where

$$CF = INC - TAX - INTEXP - PFDDIV - COMDIV$$

INC = operating income before depreciation

TAX = total non-deferred income taxes

INTEXP = gross interest expense

PFDDIV = total preferred dividend requirement

COMDIV = total dividends declared on common stock

EQ = market value of common equity.

The variable CF/EQ is measured as of the end of the fiscal year immediately preceding the year of the acquisition. Compustat items 13, 16, 15, 19, 21, 24 and 25 are used in the calculation for INC, TAX, INTEXP, PFDDIV, COMDIV and EQ respectively.

DEBT: Debt is the ratio of the long term debt of a firm to its total assets. Compustat item 9 is used for long term debt and data item 6 is used to calculate assets.

INSIDER: The insider holding is defined as the product of the stock price and the number of shares held by officers and directors. The data on number of shares held by the insiders is obtained from the target firm's last available proxy statement prior to its acquisition. The value of insider holding is subsequently scaled by the firm's asset size in the year prior to the acquisition.

MCONTROL: This is a dummy variable that captures the nature of incumbent management's control mechanism. The variable is assigned a value of one for firms with combination of low insider and high debt and zero otherwise. If the firm value for a

variable is greater than the sample average for that variable, then the firm is considered to have a "high" value for the variable and is defined as having a low value otherwise.

TARFCF : This is a dummy variable to indicate target firm's growth-liquidity mismatch. It is assigned a value of one for firms having a combination of low growth and high liquidity and zero otherwise. Again if the firm value for a variable is greater than the sample average for that variable, then the firm is considered to have a "high" value for the variable and is defined as having a low value otherwise.

BIDFCF : This is measured in the same way as the target's growth-liquidity mismatch.

4.6 Sample Design and the Palepu (1986) Correction

Consider a population of N events (mergers and tender offers) consisting of N_1 mergers and N_2 hostile tender offers, with a desired sample size is n . In the case of random sampling, n such events are randomly drawn from the population. However, we will employ state-based sampling where n_1 events are randomly drawn from the merger population and n_2 events are drawn from the tender offer population; n_1 and n_2 adding up to the sample size n . There is a valid econometric justification for preferring a state-based sample over a random sample in estimating the acquisition choice mechanism. In spite of the recent increase, the number of hostile tender offers is much smaller than the number of mergers. If a random sample is drawn from the population, the sample will consist of an overwhelming majority of one type of choice. The information content of

such samples for model estimation will be small leading to imprecise parameter estimates.

However, as Palepu (1986) points out, the efficiency gain in state-based samples is conditional on the use of an estimation technique that recognises the nature of the sampling procedure. It is here that most earlier studies fail. They employ estimation methods that assume random sampling. Manski and Lerman (1977) show that this leads to inconsistent and asymptotically biased estimates of model parameters and acquisition probabilities. To see the nature of the bias and subsequent correction in the estimation procedure, consider an event i in the population with a probability P of being a hostile tender offer. Let p' be the probability that event i in the sample is a hostile tender offer (T.O.) Using Baye's Rule for conditional probability

$$p' = \Pr(i \text{ is a T.O.} | i \text{ is sampled}) \quad (4.8)$$

or

$$p' = \frac{\Pr(i \text{ is a T.O.}) \Pr(i \text{ is sampled} | i \text{ is T.O.})}{\Pr(i \text{ is a T.O.}) \Pr(i \text{ is sampled} | i \text{ is T.O.}) + \Pr(i \text{ is not T.O.}) \Pr(i \text{ is sampled} | i \text{ is not a T.O.})}$$

In the situation of random sampling, the probability of i being sampled is the same whether hostile tender offer or not. Hence the above expression reduces to P . However, under state-based sampling, this is not the case. If N_1 and N_2 are the numbers of hostile tender offers and mergers in the population and n_1 and n_2 are the corresponding numbers in the sample, then

$$p' = \frac{P(n_1/N)}{P(n_1/N_1) + (1 - P)(n_2/N_2)} \quad (4.9)$$

The use of the simple maximum likelihood procedure consists of maximising the sample likelihood function. In a state-based sample, the probability (P) of an event being a hostile tender offer in the population is not the same as the probability (p') of an event being a hostile offer in the sample. Since the sample likelihood is formed using (p'), the maximisation of sample likelihood yields biased estimates. When the biased estimates of the acquisition probabilities are used to predict targets, the observed prediction accuracies do not reflect the true predictive ability of the models.

These biases however can be avoided by recognising the nature of samples in the estimation procedure. Manski and McFadden (1981) provide two such possibilities: The conditional maximum likelihood estimator (CMLE) and weighted maximum likelihood estimator (WMLE). The former uses the conditional probability (that the firm is a target given that it is included in the sample) to compute the likelihood function.

In choosing the estimation sample, all the available hostile tender offers in the population are selected. However, out of all mergers which met the selection and data requirements, only 12% are included in the sample. Hence the probability that a firm in the population is in the sample is one if it is a hostile tender offer and only .12 if it is a merger. Under this sampling we have

$$p' = \frac{1 \cdot (P)}{(1) \cdot P + .12(1 - P)} = \frac{1}{1 + .12 \frac{1 - P}{P}} \quad (4.10)$$

Since

$$(e^{\beta X_i}) = \frac{P_i}{1 - P_i} \quad (4.4)$$

we have

$$p' = 1/[1 + .12e^{-\beta X_1}] = 1/[1 + e^{-\ln(.12)\beta X_1}] \quad (4.11)$$

Now the functional form p' is also logistic. This is a convenient feature of a logistic probability model. The likelihood function to be maximized in the estimation uses the above expression for p' . Subsequent to the estimation, the parameters that determine population probability can be easily recovered. All the parameters, other than the constant term, are unaffected and the constant terms in the two models differ by a known value, $\ln(0.12)$.

Palepu(1986) also points out the problem of using the state based sample as a prediction test sample. In judging the forecasting usefulness of a model, the statistic of interest usually is the expected error rate when the model is used to forecast the firm in the population as targets and non-targets. Since a state based sample is non-random by definition, the error rate inferences based on it are not directly generalisable to the population. The use of a contrived sample obscures the difficulty of predicting a target in population (with overwhelming majority of non-targets). Unlike the case of model estimation, there is no econometric justification for employing state based samples in prediction tests. In fact, a large sample or even the entire population of firms at a given time should be employed in prediction tests to avoid these biases.

This study is primarily concerned with testing whether a set of variables bears a significant statistical relationship to the nature or form of acquisition method. To this end, the testing of predictive accuracy of the model is not necessary. Instead the focus is more on overall explanatory power of the model and significance of the estimated coefficients of the variables. The study employs the conditional maximum likelihood as the appro-

priate estimation procedure. This provides estimates which are consistent and asymptotically normal so that conventional tests of significance are applicable.

APPENDIX

Three common forms of probability functions most frequently used in qualitative choice models are :

1. Linear probability model.
2. Probit model.
3. Logit model.

The regression form of the linear probability model is

$$Y_i = \alpha + \beta X_i + \varepsilon_i$$

This model has some obvious defects:

1. $X'\beta$ is not constrained to lie between 0 and 1 as probabilities should. This creates problems in interpreting predicted values of Y as probabilities. An alternative approach may be to estimate parameters alpha and beta subject to the constraint $0 < Y_i < 1$ - a nonlinear estimation problem. This leads to parameter estimates with lower variances, as expected, but there is no guarantee that the estimates will be unbiased.
2. It can be shown that

$$\sigma_i^2 = E(\varepsilon_i)^2 = E(Y_i)[1 - E(Y_i)]$$

Thus the error terms are heteroscedastic, i.e., the variances will be relatively low for observations with P_i close to 0 or 1 while observations close to $P_i = .5$ will have high variances. A weighted least square procedure employed to account for the heteroskedasticity need not be efficient.

3. The distribution of error terms are not normal. Thus one cannot apply classical statistical tests.

An obvious solution to problem (1) is to transform the original model in such a way that the predictions will lie in the $[0,1]$ interval. In other words, the requirement of the transformation process is to translate the values of the attribute X which may range in value over the entire real line, to a probability which ranges in value from 0 to 1. Secondly, the transformation should preserve the relationship between the dependent variable and the attributes. These two requirements suggest the use of cumulative probability functions. $P_i = F(\alpha + \beta X_i) = F(Z_i)$, where F is cumulative probability functions. The probability functions used in probit and logit models are the standard normal distribution functions and the logistic distribution functions respectively. Both are symmetric around zero, they have variances equal to 1 and $\frac{\pi^2}{3}$ respectively and the logistic distribution has slightly heavier tails. Because of the close similarity of the two distributions, it is difficult to distinguish between them unless one has a large number of observations. In dichotomous models, it does not matter much whether one uses a probit or logit model, except in cases where data are heavily concentrated in the tails due to characteristics of the problem being studied.

To understand the working of the model, we assume that there exists a theoretical index Z determined by the explanatory variables X . This index Z directly influences

individuals in making one choice over another. Z is assumed to be a continuous variable which is random and normally distributed for the usual econometric reasons. One may write

$$Z_i = X_i' \beta \quad P_i = F(Z_i)$$

where $F(\)$ is the cumulative distribution function, either normal or logit.

What makes this problem different from the standard problem in econometrics is that we assume that the observations of Z are not available. Instead we have data which distinguish only whether individual observations falls in one category of Z (say high values) or other (low values).

The most common characteristics of qualitative choice models is that parameter estimation is carried out via some maximum likelihood algorithm as opposed to the method of least squares. The objective is to find an estimator of beta that maximises the likelihood of observing the pattern of choice in the sample. An important feature of the maximum likelihood approach is the reliance on individual rather than grouped observation. Further, the maximum likelihood estimation procedure has large sample properties of consistency and asymptotic normality of the parameter vector beta so that conventional tests of significance are applicable. The likelihood function is maximised with respect to the parameter vector to yield a set of normal equations. Now due to the assumed nature of the distribution function, the equations are non-linear, and thus the parameter estimates must be obtained using an iterative method.

Non-linear Estimation

The common methods of nonlinear estimation are the Direct Optimisation approach and the Gauss-Newton method. In the direct optimisation approach, we directly minimise the sum of squared residuals to obtain the parameter estimates. This approach faces some computational difficulties. The normal equations themselves are nonlinear in parameters and it is difficult to solve for them. Also, often times we do not achieve a closed form solution. In the Gauss-Newton method, the non-linear equations are linearised through a Taylor series expansion around some initial set of coefficients values. Ordinary Least Squares is used to obtain another set of coefficient values and then the non-linear equations are linearised around these new values. This iteration is continued until convergence of the parameters are obtained. However there is no guarantee of convergence. Further, the method is also sensitive to the starting value chosen (the results we get may vary depending on our starting values). There are two variations of the Gauss-Newton procedure that deals with this problem of non-convergence. The Hartley modification adjusts the parameter values obtained at each iteration to guarantee convergence. On the other hand, the Marquardt compromise is used if we have a strong linear dependency between different Z 's in the Gauss-Newton version of the model. The method basically uses ridge regression at each iteration to stabilise the estimates and to obtain convergence.

All of these nonlinear estimation techniques have problems. They do not guarantee global minimum but only local minimum. One has to run several regression with different starting values to decide the global minimum. Our usual statistical tests are not valid because error terms are not normally distributed and the sum of square

residuals will not follow chi-square distribution. However if we have used a linearisation process to estimate the equation, we can apply these tests only on the final linearisation of the iterative process. Fortunately in our case it can be shown that the loglikelihood function is globally concave and therefore the solution is unique. An useful implication of this fact is that any iterative procedure which is guaranteed to converge also converges to the global maximum.

Logit vs Discriminant Analysis

The logistic regression model is usually formulated mathematically by relating the probability of some event E occurring, conditional on a vector of explanatory variables X , through the functional form of a logistic cumulative distribution function. The normal discrimination or classification problem is usually formulated by assuming that two populations are multivariate normal with equal covariance matrices and the cost of misclassification are equal. The rationale for a logistic formulation of the relationship between qualitative and other variable is summarised by Press and Wilson(1978).

- a. The logistic formulation is applicable not only when the explanatory variables are multivariate normal with equal covariance matrices, but also when the explanatory variables are dichotomous or some are multivariate normal and some dichotomous (as in our case). Thus one advantage of using logit model is that it is relatively robust, i.e., many types of underlying assumptions lead to the same logistic formulations. The linear discriminant analysis is strictly applicable only when the underlying variables are jointly normal with equal covariance matrices.

- b. When explanatory variables do not follow multivariate normal with equal covariances for each state of the dependent variables, the discriminant function estimators of the slope coefficient will not be consistent.
- c. Maximum likelihood estimators are functions of a sufficient statistic while discriminant function estimators are not. According to the Rao-Blackwell Theorem, one can achieve smaller mean squared error using estimators based on sufficient statistics.
- d. Maximum likelihood estimation of the logistic regression model forces the expected number of cases to equal the observed number of cases which is an intuitively desirable property.
- e. There is some evidence that use of discriminant function estimators may tend to generate substantial bias in some applications. McFadden (1976) concludes that in a Bayesian analysis "for a typical prior distribution of the explanatory variables, multivariate normal, estimates of the selection probability parameters based on discriminant analysis will be substantially biased."

Evaluation of Binary Choice models

When evaluating binary choice models, care must be taken with respect to several points. First the estimated coefficients do not represent the increase in the probability of the event occurring given a unit increase in the corresponding independent variable. Rather the coefficients reflect the effect of a change in the independent variable upon $F(P)$ for the probit model and upon $\ln[P/(1-P)]$ for the logit model. In both cases the increase in the probability depends on the original probability and

thus on the initial value of all the explanatory variables and their coefficients. This is because $P = F(X'\beta)$ and $\frac{\partial P}{\partial X_j} = f(X'\beta)\beta_j$, where $f(\cdot)$ is the probability density function associated with $F(\cdot)$. Thus while the sign of the coefficient does indicate the direction of the change, the magnitude depends on $F(X'\beta)$ which reflects the steepness of the cumulative distribution function at $X'\beta$.

The usual individual and joint hypothesis tests about coefficients and confidence intervals can be constructed from the estimate of the asymptotic covariance matrix using the Wald or Likelihood ratio statistic and relying on the assumption of asymptotic normality. Consider the test of a linear hypothesis of the form $Q'\beta = C$. Q is a $q \times k$ matrix of known constants. k represents the number of elements in β and q a vector of known constants, appropriately determined by the researcher.

Two well known tests are (1)Wald's test and (2)Likelihood ratio test. Wald's test can be used with any estimator while the likelihood ratio test must be based on either maximum likelihood estimator or with any estimator with the same asymptotic distribution. Let $\hat{\beta}$ be an arbitrary consistent estimator and let $\hat{V}\hat{\beta}$ be a consistent estimate of its asymptotic variance covariance matrix. Then Wald's test of the hypothesis is based on the statistic called Wald

$$\text{WALD} = (Q'\hat{\beta} - C)[Q'(\hat{V}\hat{\beta})Q]^{-1}(Q'\hat{\beta} - C) \sim \chi^2_q$$

The hypothesis is to be rejected if the value of the statistic exceeds a prescribed critical value.

The likelihood ratio test is defined as

$$\text{LRT} = 2[\ln(\hat{\beta}_m) - \ln(\hat{\beta}_{cm})] \sim \chi^2_q$$

where $\hat{\beta}_{cm}$ denotes the constrained maximum likelihood obtained by maxising the loglikelihood function with respect to beta subject to the constraint $Q'\beta = C$. The null hypothesis is rejected if the value of the statistic (which is always non-negative) exceeds a prescribed critical value.

Investigators are also frequently interested in a scalar measure of model performance. The use of R^2 based on sum of squared residuals, as in standard regression model, cannot be defended strongly in Qualitative response models since these are essentially heteroscedastic regression models.

1. One of the most popular measure uses the value of chi-square statistic in likelihood ratio test, where $\hat{\beta}_{cm}$ is evaluated with $\beta = 0$.
2. The second measure is called pseudo R^2 or Macfadden R^2 .

$$R^2_{\text{pseudo}} = 1 - \frac{\log(\hat{\beta})}{\log(\hat{\beta}_H)}$$

Where $L(\hat{\beta}_H)$ is the loglikelihood of the model constrained by the null hypothesis that all coefficients are equal to zero. This measure is 1 when model is a perfect predictor in the sense that $P = F(X\hat{\beta}) = 1$ when $Y_i = 1$ and $P_i = 0$ when $Y_i = 0$. The measure takes a value 0 when $\log L(\hat{\beta}) = \log L(\hat{\beta}_H)$. Between these limits the value of R^2 has no obvious intuitive meaning. However Hansen showed that Pseudo

R^2 can be given meaning in an information theoretic context. Specifically R^2 measures the percentage of the uncertainty in the data explained by the model.

Chapter V

Data and Results

5.1 Introduction

This chapter presents descriptive statistics of the data and the results of the tests of the hypotheses presented in chapter 4. The theoretical model predicts that firms characterised by low insider holdings and high debt have incumbent management with high firm specific human capital and are more likely to be involved in friendly mergers than hostile tender offers. The other financial characteristics which may influence the choice of acquisition method follow from the implications of other existing theories of corporate takeovers, in particular from Jensen's free cash flow theory. The influence of these characteristics on the acquisition method is also tested, and the results reported.

5.2 Sample Description

There were 941 successful acquisitions during the period 1978-1988. The list of these various acquisitions was prepared from the delistments from the stock exchange and confirmed by the Wall Street Journal Index. The Wall Street Journal Index also provided the nature of these acquisition, i.e., hostile tender offers, friendly mergers, leveraged buyouts etc. A total of 60 hostile tender offers were initially identified. An offer was termed hostile if the target board and/or management made any public statement of opposition to the offer made by the successful bidder. Of these, only 25 could be included in the final estimation sample after screening for data requirements. The sample excludes utilities and financial firms. The merger events were picked randomly but closely matched the corresponding number of hostile tender offers in each calendar year over the sample period. From the population of 207 mergers, approximately 12% or 25 are included in the state based estimation sample. Tables 1 and 2 contain the list of mergers and hostile tender offers that constitute the sample for this study. Table 3 provides the summary statistics of the financial variables of the sample firms which are subsequently used in the empirical testing.

Preliminary inferences may be drawn from the descriptive statistics. Consistent with our hypothesis, target firm's debt is higher in mergers than hostile tender offers. However, the level of insider holdings is considerably higher for target firms in friendly mergers. This suggests that higher insider holdings, in itself, increases the likelihood of mergers, supporting the agency arguments mentioned before. The target firms' liquidity is higher while the growth is lower in the tender offer sample which lends support to Jensen's free cash flow theory. The differences between debt, insider holdings and target liquidity, between merger and tender offer sample, are all statistically significant at 10% level.

In the theoretical model, the firm specific human capital is conveyed by combination of low insider holdings and high debt while the free cash flow is similarly captured through a mismatch of liquidity and growth. Subsequently, in the estimation of the logit model, firm specific human capital and free cash flow is measured with dummy variable. When $MCONTROL = 1$, indicating the existence of high firm specific human capital, 62% of the target firms were acquired in friendly mergers. On the other hand, the percentage of friendly acquisitions drops to 40% when we consider target firms having $MCONTROL = 0$, reflecting incumbent management's low firm specific human capital. Similar differences exist for the free cash flow measure. As much as 69% of the target firms are acquired in hostile tender offers when they had free cash flow ($TFCF = 1$), while only 29% experienced hostile offers in the absence of free cash flow problem. These results indicate preliminary support for firm specific human capital and target free cash flow as determinants of the acquisition choice.

5.3 Test Results

Two different versions of the logit model are estimated. The parameter estimates of the logit acquisition choice models and the associated t statistics are presented in tables 4 and 5. Also presented in the tables are the likelihood ratio indices for each version of the model. These ratios are estimates of the overall explanatory power of the model. Further, the likelihood ratio statistic is computed to test the null hypothesis that all the parameters in the model are simultaneously equal to zero.

Table 1. List of Merger Firms

TARGETS (1)	BIDDERS (2)
CP National Corp	Alltel Corp
General American Oil Co-TX	Phillips Petroleum Co
Inexco Oil	Louisiana Land & Exp
Universal Resources	Questar Corp
Dictaphone Corp	Pitney Bowes Inc
Chesebrough-Pond's Inc	Unilever Group
Buckhorn Inc	Myers Industries Inc
Brockway Inc	Owens-Illinois Inc
General Steel Inds	Lukens Inc
Omark Industries Inc	Blount Inc
AZL Resources Inc	Tosco Corp
GCA Corp	General Signal Corp
Data Terminal System Inc	National Semiconductor Corp
RCA Corp	General Electric Co
A.B.A. Industries Inc	General Defense Corp
Republic Airlines Inc	NWA Inc
Entex Inc	Arkla Inc
Amfac Inc	JMB Realty
Associated Dry Goods Corp	May Department Stores Co
Dillon Cos	Kroger Co
Lifestyle Restaurant	Bombay Palace Restaurant
Hotel Properties Inc	Hotel Investors Trust
UCCEL Corp	Computer Associates Intl Inc
Advanced Systems Inc	National Education Corp
Lorimar	Telepictures Corp

Table 2. List of Tender Offer Firms

TARGETS	BIDDERS
(1)	(2)
Kraft Inc	Philip Morris
Norton Simon Inc	Esmark Inc
Western Pac.Inds.	Danaher Corp
General Foods Corp	Philip Morris
Graniteville Co	Southeastn Pub Svc co
Jonathan Logan Inc	United Merchants & Mfrs Inc
Ludlow Corp	Tyco Laboratories Inc
Standard Oil Co	British Petroleum Plc
Armtek Corp	Mark IV Inds Inc
Moore McCormack Res	Southdown Inc
Chicago Pneumatic Tool Co	Danaher Corp
Computervision Corp	Prime Computer
Lundy Electronics & System	Transtechology Corp
Mcgraw-Edison Co	Cooper Inds Inc
Conrac Corp	Mark IV Inds Inc
American Motors Corp	Chrysler Corp
Ex-cell-o Corp	Textron Inc
HMW Inds Inc	Clabir Corp
Lenox Inc	Brown-Forman
Burgess Inds	Valley Industries
Dorchester Gas Corp	Damson Oil Corp
Daylin Inc	Grace (W.R.) & Co
Jewel Cos Inc	American Stores Co
Lucky Stores Inc	American Stores
Saga Corp	Marriott Corp

Table 3. Summary Statistics

Variables (1)	Mean(T.O) (2)	Mean(Merger) (3)	Difference (4)
TARDEBT	0.2260	0.3213	-0.0953
TARGROW	0.0454	0.1549	-0.1095
BIDGROW	0.3649	0.20522	0.1597
TARLIQ	0.1062	-0.1209	0.2271
BIDLIQ	0.1306	0.1199	0.0107
INSIDER	0.0310	0.0680	-0.0370

TARGROW = Target Asset Growth Rate
BIDLIQ = Bidder Undistributed Cash
BIDGROW = Bidder Asset Growth Rate
TARLIQ = Target Undistributed Cash
INSIDER = Insider Holding
TDEBT = Target Debt

5.3.1 Model Specification 1:

$$Y_i = \beta_0 + \beta_1 \text{MCONTROL} + \beta_2 \text{TRDUMMY} + \beta_3 \text{BIDFCF} + \beta_4 \text{INSIDER} + \varepsilon_i$$

where

$$Y_i = \log \frac{P_i}{1 - P_i}, \text{ i.e., the odds that a particular choice is made.}$$

P_i = probability of a hostile tender offer

In model 1, the variables included are target management's firm specific human capital (MCONTROL), target firms' growth-liquidity mismatch dummy (TARFCF), bidding firms growth-liquidity mismatch dummy (BIDFCF) and the level of target firm's insider holding (INSIDER).

1. The MCONTROL, as explained before, is a dummy variable that proxies for firm specific human capital. It takes a value of one for the firms having low insider holding and high debt, hence high firm specific human capital. The coefficient of this MCONTROL dummy is negative and statistically significant at 1% significance level. Thus the evidence supports the implications of the theoretical framework that target firms with lower insider holding and higher debt, reflecting the existence of incumbent management's firm specific human capital, have a higher probability of being acquired through friendly merger transactions, other things equal.
2. Jensen's free cash flow theory suggests that takeovers may serve as a corrective mechanism for the agency costs associated with free cash flow. Free cash flow is the

Table 4. Estimates of Logit Acquisition Choice Model (1)

Variables (1)	Expected Sign (2)	β_i (3)	T Values (4)
INTERCEPT		0.05185	0.286
MCONTROL	-	-0.72032	-3.88*
TARFCF	+	1.584776	8.80*
BIDFCF	-	-0.68320	-3.54*
INSIDER	-	-7.98852	-4.81*
L.R. Index	.51		
L.R.Statistic	60.43*		

MCONTROL = Dummy Variable for Low Insider Holding and High Debt
TARFCF = Dummy Variable to Indicate Target Firm's Free Cash
BIDFCF = Dummy Variable to Indicate Bidding Firm's Free Cash
INSIDER = Target Firm's level of Insider Holding

* Statistically significant at the 1% level.

cash in excess of that required to fund all the firm's projects that have positive net present value when discounted at relevant cost of capital. The agency problem arises when the management refuses to disgorge these cash flows to the shareholders and instead wastes it on organisational inefficiencies or nonprofitable investments. Under these conditions a high growth firm may generate substantial gains by taking over a target firm with high free cash flow and utilising the excess liquidity in exploiting its internal growth potential. Although this is beneficial to the target firm shareholders, management stands to lose substantial benefits of control, inducing them to resist these acquisitions. Thus, it is argued that firms experiencing free cash flow with low growth opportunities are likely to become hostile tender offer targets. The TARFCF was assigned a value of one if the target firm had high free cash flow i.e., low growth and high undistributed cash flow and zero otherwise. Consistent with this hypothesis, the coefficient of the TARFCF is positive and statistically significant indicating that firms with high free cash flows are indeed likely to be acquired through a hostile tender offer.

3. Jensen's free cash flow also has certain implications regarding the impact of the bidding firm's free cash flow on the nature of the acquisition method. Bidding firms with high cash flows and low growth opportunities will be primarily interested in acquiring firms with growth potential. No specific firm is of any special interest to them since synergy is not necessarily the primary motivation for the takeover. The bidders are therefore likely to avoid hostile transactions which can be more costly. These acquisitions are also less likely to be resisted by the target management since the cash flows of the bidders allows them to exploit the target's existing growth potential. The empirical evidence strongly supports this conclusion. The coefficient

of BIDFCF which takes on a value of 1 if the bidder has high free cash flow and zero otherwise, is significantly negative indicating the higher likelihood of friendly mergers.

4. The extent of the target firms' insider holding, INSIDER, is included to control impacts of managerial equity ownership other than to signal firm specific human capital, in combination with debt. As discussed earlier, direct agency arguments can be used to predict a higher likelihood of friendly mergers with increasing insider holding. The empirical evidence is consistent with these arguments. On its own, the extent of insider holding substantially increases the likelihood of mergers as indicated by the strongly significant and positive coefficient of the INSIDER variable. Its impact however is independent of the influence of insider holding in conjunction with debt. The inclusion of the insider holding variable does not reduce the significance of MCONTROL dummy which is a combination of insider holding and leverage, reflecting the existence or non-existence of incumbent managements' firm specific human capital. Thus, even after controlling for other effects of insider holding, firm-specific human capital remains a primary determinant of the choice of acquisition method.

5.3.2 Model Specification 2 :

$$\log \frac{P_i}{1 - P_i} = \alpha_0 + \alpha_1 MCONTROL + \alpha_2 TARGROW + \alpha_3 BIDLIQ \\ + \alpha_4 TARLIQ + \alpha_5 BIDGROW + \alpha_6 INSIDER + \varepsilon_i$$

Table 5. Estimates of Logit Acquisition Choice Model (2)

Variables (1)	Expected Sign (2)	β_i (3)	T Values (4)
INTERCEPT		0.03276	0.168
MCONTROL	-	-1.00020	-4.521*
TARGROW	-	-3.998545	-5.224*
TARLIQ	+	4.55307	6.526*
BIDGROW	+	3.33489	5.888*
BIDLIQ	-	1.85370	1.423
INSIDER	-	-14.22840	5.084*
L. R. Index	.58		
L. R. Statistics	68.4*		

MCONTROL = Dummy Variable for Low Insider Holding and High Debt
TARGROW = Growth Rate of the Target Firms
TARLIQ = Undistributed Cash Flow of Target Firms
BIDGROW = Growth Rate of the Bidding Firms
BIDLIQ = Undistributed Cash Flow of the Bidding Firms
INSIDER = Insider Holding of the Target Firms

* Statistically significant at the 1% level.

where

$Y_i = \log \frac{P_i}{1 - P_i}$, i.e., the odds that a particular choice is made.

P_i = probability of a hostile tender offer

In the second version of the logit model, the two variables used to define the target and bidding firms' growth liquidity mismatch are introduced separately to examine the specific type of influence of the individual variables. Jensen's free cash flow theory of corporate takeovers implies that friendly mergers are likely when target firms growth opportunities are adequately supported by acquiring firms free cash flows. In this situation the objectives of both the target and bidder management are consistent with each other reducing the likelihood of any managerial resistance. The bidding firm disgorges the excess cash flows in a productive manner releasing value for the combined entity. On the other hand, target firms refusing to disgorge the free cash flows are likely to experience hostile takeover attempts from bidders having high growth opportunities. The same incentives which prevented the target management from disgorging the excess cash flows in the first place, now induce them to resist the beneficial takeover attempts.

The results tend to strongly validate these implications. *Ceteris paribus*, higher target undistributed cash and bidder growth significantly increase the likelihood of hostile tender offers while higher bidder undistributed cash leads to friendly mergers. The bidder undistributed cash variable however is statistically insignificant. The coefficients do not suggest that all acquisitions result from a matching of high growth and liquidity. However, if the takeover market as a whole is efficient in removing managerial inefficiencies or creating synergy gains, then the majority of the transactions will reflect the underlying value maximising motivations, e.g., cash rich firms acquiring growth firms in friendly

mergers or high growth firms displacing the inefficient management of the firm with excess cash flow, in a hostile transaction.

5.3.3 Acquisition, Insider Holding and Firm Specific Human Capital

The coefficient of INSIDER is negative, suggesting that firms with greater insider holding are more likely to be acquired through friendly transactions. However the coefficient of the logit model do not represent the increase in the probability of the event occurring given a unit increase in the corresponding independent variable. Rather, the coefficients reflect the effect on the log of the odds that a certain choice is made. To capture the magnitude of the impact of the independent variables on the acquisition method, we report in table 6 the probability of a representative acquisition being a hostile tender offer at various levels of insider holding assuming either low or high degree of firm specific human capital of the target management. The probability estimates are generated from the logit regression in table 5 using the mean values of the independent variables for the sample.

These estimates provide a measure of the independent variables' impact in economic terms rather than in terms of the statistical significance of the associated coefficients. The results suggest, as expected, that the likelihood of mergers increases with insider holding regardless of the existence of firm specific human capital. However, at all levels of insider holdings the probability of hostile tender offer is significantly reduced, by approximately 20% if the target management possess firm specific human capital as indicated by low insider holding and high debt (MCONTROL = 1). Firms with higher insider holdings have management with substantial control and hence are difficult to

displace in a hostile acquisition attempt. The probability of a successful hostile tender offer drops below 50% when the level of insider holding reaches 5% level. This is consistent with the evidence of Morck, Shleifer and Vishny who find that entrenchment of the incumbent management may set in even at 5% level of insider holding. Further, if the increased equity ownership helps to induce the management to work in the interest of the existing target shareholders, bidders will have very little incentive to replace the incumbent management.

Table 6. Probability of acquisition being a tender offer at various level of insider holding assuming either existence or non-existence of firm specific human capital.

INSIDER (1)	MCONTROL = 1 (2)	MCONTROL = 0 (3)
0.01	0.411	0.654
0.03	0.344	0.588
0.05	0.283	0.517
0.07	0.229	0.440
0.10	0.162	0.345
0.14	0.098	0.229
0.20	0.044	0.100
0.25	0.022	0.058
0.30	0.011	0.029
0.39	0.003	0.008

MCONTROL = Dummy Variable for Low Insider Holding and High Debt
 INSIDER = Insider Holding of the Target Firms

0.39 is the maximum value of insider holding

Chapter VI

Conclusion

This dissertation provides a theory of the choice of acquisition methods in the market for corporate control. It is argued that firm characteristics of both target and bidder firms influence the choice between friendly mergers and hostile tender offers as alternative acquisition methods. In the theoretical model developed in the study, target management's firm specific human capital is the key determinant of the choice between friendly mergers and hostile tender offers. Although firm specific human capital is not directly observable, firm characteristics like low insider holdings and high debt reveal the extent of target management's firm specific human capital. The analysis shows that incumbent management with a high degree of firm specific human capital will maximise its expected utility of personal wealth and net value of control benefits at a lower level of insider holding, α , and a higher level of debt, D . These choices by the management convey to outsiders the degree of firm specific human capital possessed by target management.

The model theoretically proves that when target management has high firm specific human capital, as indicated by its choice of lower α and high D, the probability of a successful tender offer is lower, the bidder's cost of acquisition higher, and its net expected gain lower. It is also argued that in such a situation a friendly merger increases the welfare of target managers, target shareholders and bidding firms. The model, therefore, predicts that the presence of firm specific human capital increases the likelihood of friendly mergers as opposed to hostile takeovers. In the empirical testing of the model, other determinants of the choice follow from Jensen's free cash flow theory. The free cash flow theory predicts that (1) firms with high free cash flow are likely to become hostile takeover targets and (2) bidding firms with high free cash flows will prefer friendly acquisitions.

The predictions of the models are tested using a logit specification. A state based sampling procedure is used to improve the efficiency of the parameter estimates and biases associated with such sampling are avoided by using conditional maximum likelihood estimation procedure. The results provide strong evidence in support of the dissertation's theoretical model and Jensen's free cash flow theory. Consistent with the theoretical model, combination of low insider holding and high debt increase the likelihood of friendly mergers. Consistent with Jensen's theory, target free cash flow makes a hostile tender offer more likely while bidding firm's free cash flow increases the chances of a friendly merger. Thus the study provides much needed theory and empirical research regarding the choice of acquisition methods - an issue which has not received much attention in the otherwise well-researched area of corporate control.

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