

1997

## **An Analysis of Medium of Exchange in Takeovers.**

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**AN ANALYSIS OF MEDIUM OF EXCHANGE IN TAKEOVERS**

**A Dissertation**

**Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agriculture and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy**

**in**

**The Interdepartmental Program in Business Administration**

**by**

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August 1997**

**UMI Number: 9808756**

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## **Acknowledgments**

**I am grateful to Professor William R. Lane for directing my graduate studies and research problems and for always providing invaluable guidance in developing and completing my dissertation.**

**I also thank other committee members - Professors Faik Koray, Ji-Chai Lin, Robert Perlis, and Gary C. Sanger - for providing helpful comments.**

**Special thanks are given to the I/B/E/S and, particularly, Professor George M. Frankfurter for allowing me to use the I/B/E/S database in my dissertation.**

**Last, but by no means least, I would like to express my appreciation to my grandfather, Chin-Shi, my parents, Cheng-Tsz and Lin Hsueh-Tzu, and my brothers and sisters, Hon-Bin, Bor-Ruoh, Sharon, and Lilian, for providing love and encouragement during my academic studies.**

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## **Abstract**

**This dissertation provides a detailed analysis of the medium of exchange in corporate takeovers. Previous theoretical works and empirical evidence suggest three distinct (but not necessarily mutually exclusive) elements of information asymmetry: the bidder's value, the target's value, and the synergy from a takeover. Chapter two of this dissertation integrates the theory of financial intermediation into the research of the medium of exchange in takeovers. The research question is how the bidders with favorable information employ financial intermediaries, such as accounting firms, investment banks, and commercial banks, to reduce the market's unfavorable reaction to announcements of equity-financed takeovers. Chapter three examines whether the method of payment conveys information about the value of the target firms. Chapter four analyzes the information content of changes in payment terms in the takeover process.**

**Results in chapter two indicate that the existence of high-quality financial intermediaries, particularly commercial banks, of bidders reduces the market's unfavorable reaction to announcements of equity-financed takeovers. In stock offers, the bidders' announcement excess returns are a positive function of bidders' commercial banking relationship. The evidence on accounting firms and investment banks is not found.**

**Evidence in chapter three does not support the notion that the method of payment in takeovers conveys information about the value of the target companies.**

Revisions of analysts' forecasts of earnings for the target firms at announcements of tender offers involving stock as the method of payment are similar to those at announcements of cash tender offers. This suggests that if there is any information revealed by the medium of exchange in takeovers, the information is unlikely to be about the value of the targets.

Results in chapter four are consistent with the notion that changes in the medium of exchange in takeovers reveal information about the value of the bidders. After controlling for changes in the takeover premium which accompany the revisions of payment terms, bidders' announcement excess returns are approximately two percent lower for increases in the stock component than for increases in the cash component. Taken together, the evidence presented in this dissertation suggests that the medium of exchange in takeovers conveys information about the bidders' value rather than the targets' value.

## Chapter 1

### Introduction

**Mergers and acquisitions combine the resources of two separate corporate entities. The bidder can choose from cash, stock or a combination of both as the method of payment. Over the past few years, several papers have provided hypotheses to explain the motivation behind the choice of medium of exchange in corporate takeovers. Two of the strongest involve the revelation of private managerial information and consideration of the tax consequences of the acquisition. Extant literature (Travlos, 1987, Wansley, Lane, and Yang, 1987, and Kaplan and Weisbach, 1992) reports that the use of stock to finance a takeover conveys unfavorable information about the value of the bidder because the market views that the bidder managers, acting in the best interests of shareholders, would not issue equity unless these managers believe the bidder's common shares to be overvalued in the market. The information theories on the medium of exchange in takeovers are not confined to whether the medium of exchange conveys information about the bidder's value. Several theoretical works have centered on elements other than the bidder's value as the focus of information asymmetry. For example, Fishman (1989) theorizes that the method of payment in takeovers conveys information about the synergy from a takeover. Hansen (1987) provides a model where the information advantage possessed by the bidder and the target about the value of their own firms determines the choice of the medium of exchange in a takeover.**

Secondly, there are tax considerations associated with the method of payment in takeovers (Carleton, Guilkey, Harris, and Stewart, 1983, Wansley, Lane, and Yang, 1983, and Huang and Walkling, 1987). A cash takeover creates an immediate capital gains tax for shareholders of the target firms, while an equity-financed acquisition defers the tax payment until the new shares are sold.

This dissertation provides a detailed empirical analysis of information theories on the medium of exchange in takeovers. Chapter two integrates the theory of financial intermediation into the takeover research. The question addressed is how the bidders with favorable information utilize financial intermediaries to reduce the market's unfavorable reactions to announcements of equity-financed takeovers. For example, a bidder might decide to use common shares to finance a takeover because of requests by the target's shareholders (because of tax consideration discussed above) rather than bidder managerial belief that the bidder's shares are overvalued. Thus, bidders with favorable information in stock offers have an incentive to differentiate themselves from those with unfavorable information in stock offers. The theory of financial intermediation calls for the use of high-quality financial intermediaries to certify high-quality bidders in stock offers. The empirical results, particularly those on commercial banks, are generally consistent with this view.

Chapter three examines whether the method of payment in takeovers conveys information about the value of the target's common shares. Previous studies analyze the stock returns of the target. When using this stock return approach, however, it is difficult to examine whether the method of payment reflects the value of the target

because target's announcement excess returns combine any information effects with the tax effects (as above) associated with the medium of exchange. Thus, chapter three analyzes whether the revisions of analysts' forecasts of earnings for the targets depend on the method of payment. Analysts' reactions to announcements of tender offers involving stock as the medium of exchange are found to be similar to those to announcements of cash tender offers. Thus, the results are inconsistent with the hypothesis that the method of payment conveys information about the value of target's assets.

Chapter four analyzes changes in the medium of exchange in the takeover process. The research question is whether the decision to alter the medium of exchange in takeovers conveys information about the value of the bidders. The results indicate that, after controlling for changes in takeover premium which accompany revisions of the medium of exchange, bidders' announcement excess returns are approximately two percent lower for increases in the stock component than for increases in the cash component. Thus, changes in payment terms in takeovers reveal information about the value of the bidders.

Taken together, the evidence suggests that the choice of the medium of exchange in takeovers reflects the value of the bidders rather than the targets. Furthermore, financial intermediaries, particularly commercial banks, monitor and certify the bidder's decision to issue common shares to finance mergers and acquisitions. The higher the bidder's commercial banking relationship, the more favorable the market's reaction to an announcement of a stock offer.

## Chapter 2

### Information Asymmetries, Certification, and Monitoring

#### 2.1. Introduction

Studies of the medium of exchange in takeovers have provided two major explanations why managers of bidding companies choose equity or cash to finance acquisitions: (1) target shareholders' tax consequences associated with the choice of payment method to finance takeovers, and (2) private information about the value of the firms involved in takeovers. Recent studies on financial intermediaries argue that intermediaries mitigate similar problems arising from corporate insiders' private information about firm value. The integration of this area of research into takeovers, however, is largely unexplored.

This paper integrates the theory of financial intermediation into the takeover research by examining whether the presence of high-quality financial intermediaries reduces the information problems associated with stock financing in takeovers. This paper provides a theoretical framework to analyze how the market uses the choice of financial intermediaries to alter the valuation of the firm upon announcements of equity-financed investment projects, including takeovers. The model shows that the value of external monitoring in stock offers should exceed that in cash offers. This study also provides further empirical evidence consistent with the view that the presence of recognized and reputable outside monitors, particularly commercial banks, reduces the adverse selection problem associated with the use of common shares to finance



investment projects. The share price reactions to announcements of stock offers are found to be a positive function of the bidders' commercial banking relationship. Furthermore, the value of external monitoring generated by commercial banks is concentrated in takeovers that are financed by common shares. The results on investment banks and auditors are considerably weaker. These findings are robust with respect to specifications of bidders' announcement excess returns, and inclusion of previously tested variables relating to characteristics of takeovers and seasoned equity offerings.

The remainder of this paper is organized as follows. Section 2.2 reviews related extant literature. Section 2.3 sets out a theoretical analysis and hypotheses. Sections 2.4 and 2.5 discuss the method of empirical analysis and data collection. Section 2.6 presents empirical results. Concluding remarks are presented in section 2.7.

## **2.2. Takeovers, medium of exchange, and financial intermediation**

### **2.2.1. Mergers and acquisitions**

Corporate takeovers are frequently viewed as an arena in which managerial teams compete for the rights to manage corporate resources. In their review of the literature on mergers and acquisitions, Jensen and Ruback (1983) conclude that corporate takeovers generate positive value gains, that target shareholders benefit, and that bidder shareholders do not lose. In addition, the gains created by takeovers, on average, do not appear to come from the creation of market power. The two most likely sources of gains to bidders are synergy and undervalued targets. Bidders, however, can be

motivated to acquire a target for reasons not related to either synergy or the target's undervaluation.

The key question is how to explain the value gains from mergers and acquisitions. Bradley (1980) studies the stock price behavior around interfirm tender offers and concludes that synergy is the dominant source of value gains. He views the tender offer as a bid for the right to manage the resources of the target firm in a competitive market for corporate control. Bradley argues that corporate "raiding" (i.e. the bidder profiting from purchasing a majority of the target firm's assets at a price that is lower than their intrinsic value) is not an important explanation for interfirm tender offers because the post-execution (referring to the tender offer per se) market price of the target's shares is significantly higher than its pre-announcement level. If corporate "raiding" were an important explanation for interfirm tender offers, the market price of the target share subsequent to a successful tender-offer would be lower than its pre-announcement level. Bradley also finds that the shareholders of successful acquiring firms realize a capital gain as a result of the acquisition of the target's shares. These gains, however, are not realized through the market appreciation in the purchased target shares. While the post-execution market price of the target shares is significantly higher than its pre-announcement level, the post-execution price is significantly less than the share price paid by the acquiring firm. The fact that the acquisition of the target shares (which is a financial loss on paper) is a positive net-present-value investment suggests that the value of the control of the target shares stems not from these shares' proportional claims to the target's net cash flows but rather from the reallocation of the

target's resources. Thus, Bradley interprets these results as consistent with a synergy interpretation of interfirm tender offers.

The other possible motive for mergers and acquisitions is that managers of bidding firms have private information about the targets' intrinsic value that is not impounded in the targets' share prices. Although previous studies suggest that the private-information hypothesis is unlikely to fully explain the magnitude of value gains from takeovers, this hypothesis cannot be ruled out. Bradley, Desai, and Kim (1983) analyze successful versus unsuccessful interfirm tender offers. The results indicate that the permanent positive revaluation of the target shares following unsuccessful bids is due primarily to the emergence of or the expectation of another bid that would ultimately lead to the transfer of control of the targets' resources. The rejection of a tender offer is found to have differential effects on the share prices of unsuccessful bidders, depending on whether the tender offers result in an ultimate change in the control of the targets' resources. It is concluded that tender offers are attempts by bidders to exploit potential synergies, not merely private information about the targets' intrinsic value.

Bhagat, Brickley, and Loewenstein (1987) use option pricing theory to analyze interfirm cash tender offers and also find that the information hypothesis is insufficient to explain the magnitude of value gains from cash tender offers. Bhagat, Brickley, and Loewenstein view target shareholders as holding a put option on the target's shares during the post-announcement but pre-expiration period (tender period). The observed target's market share prices are for a portfolio consisting of the underlying stock and the put option. The target's underlying (not observed) stock price subsequent to the tender

offer announcement is calculated by using an option pricing model and found to be significantly higher than the pre-announcement stock price. Thus, the put option is an important component of the announcement-period return. These results suggest that the bidder and target have synergies that allow the bidder to make a bid that is substantially higher than the pre-announcement target's stock price.

On the other hand, Brous and Kini (1993) continue the argument that a takeover announcement conveys information about the target's intrinsic value. They examine analysts' earnings forecasts for a sample of takeover targets and report that the announcement-month earnings forecasts are systematically revised upward. This suggests that a takeover announcement conveys favorable information about the value of the target firms. In addition, excess forecast revisions are significantly higher for targets with low Tobin's  $q$ -ratios than for targets with high  $q$ -ratios, lending further support to the signaling hypothesis (assuming that the lower the  $q$ -ratio of a firm, the more likely the firm is undervalued in the market).

Alternatively, managers of acquiring firms could merely seek prestige and monetary rewards associated with managing a large corporation, regardless of whether the acquisitions are value-enhancing for shareholders. Roll (1986) argues that managers of acquiring companies over-estimate their abilities to manage the target firms. Consequently, bidders acquire the target firms by paying a price that is more than the targets' actual worth to the acquiring firms. In addition, Jensen (1986) also contends that managers who have little ownership of the firm have incentives to invest in projects that benefit themselves.

## **2.2.2. Medium of exchange in takeovers**

### **2.2.2.1. Tax effects**

A cash takeover creates an immediate liability for capital gains tax for shareholders of target companies, while an equity-financed acquisition defers taxes until the new shares are sold. Carleton *et al.* (1983), Wansley, Lane, and Yang (1983), and Huang and Walkling (1987) argue that this tax effect predicts a larger takeover premium for cash acquisitions than for acquisitions that use equity for payment. Bidders are willing to pay the higher cash price because the cash payment allows the acquiring firms to "write up" the tax bases of some of the acquired assets when their fair market value exceeds book value. This would result in higher depreciation expenses and, thus, higher after-tax cash flows for the acquiring firms.

Wansley, Lane, and Yang (1983) examine the differences in returns to target firms after controlling for both merger type and method of payment, and report evidence consistent with the tax effect. They find that shareholders of target firms in cash transactions earn, on average, 33.54 percent excess returns from 40 days prior to the original takeover announcement through the announcement day. This number is almost twice the excess return (17.47 percent) earned by shareholders of target firms when the takeovers are financed by equity. Wansley, Lane, and Yang attribute this return difference to three factors: (1) a tax effect that requires a larger takeover premium for cash transactions than for securities-financed ones to compensate target company shareholders for capital gains tax burdens; (2) regulatory requirements that favor cash as the medium of exchange (because, unlike cash acquisitions, securities-financed bids must

have a registration statement approved by the Securities and Exchange Commission); and (3) the increasing popularity of cash takeovers during a period of generally higher takeover premiums.

Huang and Walkling (1987) provide further evidence supportive of this tax effect. Huang and Walkling avoid *ex post* selection and classification bias by focusing on the original rather than subsequent announcements. They also control for the interdependence of payment method, acquisition type (i.e. tender offer or merger), and target's managerial resistance. After controlling for acquisition type and managerial resistance, Huang and Walkling still find that announcement excess returns earned by target firms in cash offers are significantly higher than those in stock offers. The results lend additional and strong credence to the tax hypothesis.

Other empirical evidence on tax effects (particularly, on the bidder's side) is less clear. For example, Carleton *et al.* (1983) report that "lower dividend payout ratios and lower market-to-book ratios increase the probability of being acquired in a cash takeover relative to being acquired via an exchange of securities" (p. 825). They further argue that the association of a high market-to-book ratio with the security payment partially supports the tax effect argument because market-to-book ratios approximate the level of capital gains liabilities of target company shareholders. That is, the higher the market-to-book ratio, the higher the potential capital gains liabilities, and, thus, the more advantageous are equity securities for payment. On the other hand, this finding is inconsistent with another aspect of the tax effect in that a high market-to-book ratio also represents a potential large tax saving to the bidder arising from the write-up of target

assets to their fair market values. Auerbach and Reishus (1988) use three different measures for the potential tax benefits of the write-up of acquired assets, and report that none of the measures are statistically significant or important in explaining the choice of the method of payment in takeover bids.

#### **2.2.2.2. Information asymmetries**

Myers and Majluf (1984) address the information asymmetry between the firm's managers and outside investors over the value of the firm's shares. Myers and Majluf claim that the market believes that managers, acting in the best interests of shareholders, will not issue equity unless they view the shares of their firms to be overvalued in the market. Thus, in a takeover, the market would interpret the use of the acquirer's shares to finance takeovers as unfavorable information about the value of those shares, while the use of cash signals positive information.

Fishman (1987) assumes that both the bidder and the target have private information about the valuation of the target (operated as part of the bidder). Additionally, there exists a cost of collecting information about the valuation for the target, and there are two potential bidders for a target, implying that a takeover offer will bring forth potential competition for the target. Under these settings, when the bidder has information that the target has a high valuation, the bidder will use cash to pre-empt a competing bid. (The pre-empting role of cash arises from the assumption that a competing bidder's expected payoff from the takeover is decreasing in the initial bidder's valuation for the target.) When the bidder's information about the valuation for the target is less optimistic, the bidder will use equity as the payment method to solicit the

private information possessed by the target (about the valuation for the target operated as part of the bidder).

Hansen (1987) emphasizes the importance of information asymmetry between the target's managers and outside investors about the value of the target's assets. In Hansen's theory, when the target firm has private information that the acquirer does not have about the target's value, for every cash offer that is acceptable (i.e. wealth increasing) to the acquirer, there exists a stock offer that dominates that cash offer. That is, the expected wealth of the stock offer exceeds that of the cash offer. Thus, bidder's managers prefer stock to cash as the payment method in order to mitigate the adverse selection problem arising from the target's managers having superior information about the value of target's assets.

A non-trivial question is why do we observe any cash offers ? Hansen reconciles his theory with this empirical observation by introducing into his model the tax effect associated with payment method (discussed above). In the presence of a tax effect, the optimal choice of payment method (cash or stock) faced by the bidder depends on the relative importance of the tax effect and private information possessed by the target firm. Another means to reconcile Hansen's theory with the empirical observation of some cash offers is to allow the acquirer to have private information about the value of its assets. Like the tax effect, the information advantage on the acquirer side reduces the importance of private information possessed by the target.



### **2.2.2.3. Empirical evidence on information asymmetries**

Empirical evidence supports Myers and Majluf's (1984) argument for the method of financing in takeovers, while evidence for Hansen's (1987) and Fishman's (1989) arguments is less clear. Wansley, Lane, and Yang (1987) and Travlos (1987) present evidence consistent with the hypothesis that the payment method conveys information about the value of the bidding firm. Wansley, Lane, and Yang examine both pre-bid cumulative average prediction errors (*CAPE*) and announcement effects to bidders in cash and securities transactions. For acquisitions using securities for payment, the excess returns to bidders from 40 days prior to through 40 days after the takeover announcement day total -1.51 percent (*t*-value -1.07), while for cash acquisitions, the excess returns total 6.17 percent (*t*-value = 2.31) over the same examination period. Furthermore, the announcement effects, the excess returns from 1 day prior to through the announcement day, are significantly positive for the cash bids but significantly negative for securities-financed bids. Wansley, Lane, and Yang conclude that the evidence is generally consistent with the notion that "when the bidding firm's management considers its own stock to be overvalued (undervalued), securities (cash) will be relatively more attractive as a payment method" (p. 412).

Travlos (1987) also provides evidence supportive of the information effect of payment method in takeovers on the value of bidding firm. He finds that equity-financed takeover bids are associated with significantly negative announcement prediction errors to bidders, while cash offers are associated with positive prediction errors, irrespective of the type of takeover bid (merger or tender offer). Furthermore, nonconvertible bonds of

bidding firms that utilize equity for payment experience significantly negative prediction errors at the takeover announcement, while those of bidders that use cash to finance takeovers experience slightly positive prediction errors. Cross-sectional analyses indicate that the announcement-period prediction errors of bidders are significantly negatively related to the proportion of the transaction financed by common shares of bidding companies. Travlos concludes that "the evidence is consistent with the findings provided by the empirical literature on new offerings of common stock" (p. 944) and that "the market interprets a cash offer as good news and a common stock exchange offer as bad news about the bidders' true value" (p. 944).

Kaplan and Weisbach (1992) analyze divestitures following acquisitions completed between 1971 and 1982, and conclude that their evidence "is consistent with the idea that stock financing of an acquisition is a negative signal of the acquirer's value, rather than a negative signal about the acquisition" (p. 126). Specifically, they find that bidder abnormal returns are 3.52% lower (significant at the 1% level) for equity-financed acquisitions than for cash acquisitions, and that the *ex post* success of acquisitions (based on whether the targets are subsequently divested because of their poor performance) is independent of the type of payment method in acquisitions. That is, the cash acquisitions are as likely to be poorly performing as are securities-financed ones. The latter result does not support Fishman's (1989) theory that bidding firms use cash to acquire highly-valued targets.

Empirical evidence on whether the medium of exchange in takeovers signals the value of the target's shares is provided by Sullivan, Jensen, and Hudson (1994), who

analyze the relation between the method of payment and valuation effects associated with terminated merger proposals. These authors report significantly higher cumulative excess returns for the target's shareholders after termination of cash offers than after termination of stock offers even 250 days after termination when no subsequent takeover bids follow. The evidence, however, is weak because it is rarely announced which party (i.e. the bidder or the target) terminates the deal. The identity of the party calling off the deal is important because a deal canceled by the bidder conveys exactly the opposite information (about the target's value) than does a deal canceled by the target.

### **2.2.3. Information asymmetry and the role of financial intermediaries**

The presumption of information asymmetry between corporate insiders and outside investors about the value of the firm has given rise to the development of models that argue that financial intermediaries expend resources to gather private information to evaluate and monitor corporate activities. This section reviews the literature on the role of three types of financial intermediaries: investment banks, commercial banks, and accounting firms.

Diamond (1984), and Ramakrishnan and Thakor (1984), among others, argue that *bank loans* impound asymmetric information and provide monitoring services. In their models, banks process private information to evaluate and monitor borrowing firms at lower costs than other market participants. Diamond argues that a financial intermediary such as a bank has a cost advantage in processing the private information about corporate activities because the alternative is either duplication of effort if each security-holder (e.g., atomistic shareholders) monitors directly, or a free-rider problem,

in which case no security-holder monitors. Ramakrishnan and Thakor (1984) show that if information asymmetries are present, banks can enhance the welfare for the society as a whole by rectifying these asymmetries. Special attention is paid to some mechanisms, such as forming a coalition, employed by intermediaries to reduce the uncertain payoff nature associated with gathering information. Further, Fama (1985) argues that the periodic and short-term nature of bank loans reduces the needs of other security-holders to perform costly monitoring and evaluation of corporate activities because other security-holders can periodically infer the value of borrowing firms by observing the willingness of banks to grant borrowers renewals of short-term loans.

Titman and Trueman (1986) theorize that in the presence of information asymmetry, accounting firms gather private information to certify corporate activities. An important element of Titman and Trueman's model is that the higher the quality of a financial intermediary, the more weight the market places on the information produced by this intermediary. Managers with favorable asymmetric information find it optimal to hire high-quality auditors to confirm managers' favorable private information, while managers with unfavorable inside information would choose low-quality auditors over high-quality ones in the fear that high-quality auditors would be more likely to detect and reveal the unfavorable private information.

Titman and Trueman (1986) contend that the argument of managerial choice of accounting firms can be applied to the choice of investment banks, namely that the choice of investment banks signals the quality of managers' private information about the firm's value. Investment banks that underwrite unseasoned equity offerings have

reputation at stake, and earn a return on this reputation. It is shown that reputable managers (or entrepreneurs) with favorable asymmetric information find it optimal to retain high-quality investment banks to confirm the quality of the private information. Conversely, managers with unfavorable private information will choose low-quality investment banks to underwrite the issues because high-quality investment banks would be more likely to detect and reveal this unfavorable private information. Thus, managerial choice of investment banks signals the quality of managers' information about the firm's value.

Several financial economists also argue that investment banks use their reputation to certify that the offer price in an equity issuance is consistent with private information. Booth and Smith (1986) analyze the cost of underwriter certification, and develop a theory of the role of investment banks in certifying that risky prices reflect adverse inside information. Beatty and Ritter (1986) suggest that high-quality investment banks only underwrite high-quality and low-risk issues, implying that the choice of investment banks for underwriting an equity offering signals the inside information about the firm's value.

In a world of incomplete information, managers with favorable private information have an incentive to employ credible mechanisms by which outside investors can infer the quality of the private information and the value of the firm. This self-sorting process leads to a shift from a 'lemons' market, as described in Akerlof (1970), where assets are priced with *average* risk of all assets in a category (e.g. used cars as a category) to a 'separating' equilibrium where assets are priced according to their asset-specific risks, resulting in an improvement in information efficiency.

Empirical evidence supports the notion that financial intermediaries, such as investment banks, commercial banks, and accounting firms, provide valuable monitoring and certification services that mitigate the problems arising from the information asymmetry between managers and outside investors about the firm's value. James (1987) presents empirical evidence that bank loans impound private information and monitoring services. He reports that the borrowing firms experience statistically significant positive excess returns when new bank credit agreements or expansions of existing bank loan agreements are announced. Beatty and Ritter (1986) report evidence supportive of the notion that investment banks which misprice initial public offerings subsequently lose market share of underwriting business. This result emphasizes the importance of investment banks' reputation in the process of underwriting equity offerings. Slovin, Sushka, and Hudson (1990) find that the market reaction to announcements of seasoned equity offerings varies with the presence of accounting firms, commercial banks, and underwriters. They find that the prediction errors of the firms that announced seasoned equity offerings are positively related to the quantity of bank debt in a firm's capital structure, the quality of the investment bank that underwrites the issue, and the quality of the accounting firm that audits the firm. The evidence is consistent with the notion that commercial banks, underwriters, and auditors perform monitoring and certification roles in the security issuance process.

## **2.3. A Theoretical Analysis and Hypotheses**

### **2.3.1. A theoretical analysis**

#### **2.3.1.1. The model**

A model to analyze how financial intermediaries serves to convey information in a firm's decision to issue shares to finance investment projects, such as takeovers, is developed from Titman and Trueman's theory (1986) of entrepreneurs' choice of intermediary quality in new shares offerings. This analysis differs from Titman and Trueman's model in that the bidder maximizes the value of the firm given the bidder's private information, while, in Titman and Trueman, entrepreneurs maximize expected utility.

Basic assumptions of this model are: (1), the focus of information asymmetry is about the value of the bidder's shares, not about the value of the target's shares or synergy. (2), the market places more weight on the information provided by high-quality intermediaries than on the information by low-quality intermediaries. Titman and Trueman (1986) argue that high-quality intermediaries expend more resources to process private information, and, thus, would be able to offer a more precise and trustworthy estimate of a firm's prospects. (3), investors (including bidder's shareholders) are risk-neutral. This assumption is made to simplify the analysis. The implication of this assumption is that investors are indifferent between taking the expected value of a gamble with certainty and taking the gamble itself (a gamble is a payoff structure with uncertain outcome). Bidder's managers are assumed to act in the best interest of their shareholders.

Suppose the bidder has decided to acquire the target. The bidder will produce a random cash flow  $c$  at the end of the period. The market updates its belief about the value of  $c$  upon the arrival of information (or signal) related to  $c$ .

The bidder receives private information about  $c$  through observing the signal  $i$ . That is, given  $c$ ,

$$\tilde{i} = c + \tilde{\varepsilon}_1 \quad (1)$$

where  $\tilde{\varepsilon}_1 \sim N(0, 1/h)$  and is independent of  $c$ . Assuming that the prior distribution  $c$  is diffuse, the posterior distribution conditional on  $i$  is normal with mean  $i$  and variance  $1/h$ .

Although outside investors do not have the same information access as corporate insiders do, investors receive useful information from other sources. One source is the information revealed or disclosed by financial intermediaries (such as auditors, commercial banks, and investment banks) that have access to corporate activities. For example, (1), the market participants can observe the willingness of commercial banks to make loans to the bidders as a signal of how lending banks view the prospects of the bidders. (2), accounting firms summarize their estimates about the bidders' activities in the financial reports. (3), bidders' investment banks provide their assessments about the bidders' corporate activities in the negotiation process in takeovers. Observing such information generates investors' assessment of a firm's cash flow. Specifically, given  $c$ , the investors' estimate of a firm's cash flow is:

$$\tilde{\pi} = c + \tilde{\varepsilon}_2 \quad (2)$$



where  $\tilde{\varepsilon}_2 \sim N(0, 1/q)$  and is independent of  $c$ .  $q$  is the quality of an intermediary.

Assuming that the prior distribution  $c$  is diffuse, the posterior distribution conditional on  $\pi$  is normal with mean  $\pi$  and variance  $1/q$ .  $\tilde{\varepsilon}_1$  is assumed to be independent of  $\tilde{\varepsilon}_2$ .

Investors can estimate the firm's end-of-period cash flow,  $c$ , by taking into account the bidder's optimal choice of intermediary quality. This is sustainable if the choice of intermediary quality is a strictly increasing function of bidder's private information,  $i$ . Under this scenario, investors would be able to infer the bidder's private information  $i$  from the knowledge of the intermediary quality,  $q^*$ , optimally chosen by bidder. This inference,  $f(q^*)$ , is such that:

$$f(q^*) = i \quad (3)$$

Investors have two sources of information to estimate the firm's cash flow,  $c$ : information released by the intermediary, and the firm's choice of intermediary quality. Under the notion that high-quality intermediaries expend more resources to process the information and have higher reputation capital at stake than lower-quality intermediaries do, the former are presumed to offer a more precise estimate of  $c$ . Thus, the market will place more weight on the information provided by high-quality intermediaries. Investors' re-assessment of  $c$  upon an announcement of stock offer is then characterized by:

$$E(\tilde{c} | \pi, q^*) = k(q^*)\pi + (1 - k(q^*))f(q^*) \quad (4)$$

where

$$k(q^*) = q^* / (q^* + h) \quad (5)$$

Equation (5) implies that the higher the intermediary quality,  $q$ , the more weight the market will place on the information the intermediary produces.

Because investors are risk-neutral, the re-evaluation of the bidder's value before the intermediary cost,  $m(q)$ , is :

$$v(\pi, q^*) = E(\tilde{c} | \pi, q^*) \quad (6)$$

The bidder acts in the best interests of its shareholders. Thus, the bidder maximizes its market value after the intermediary cost given the private information,  $i$ , it observes. Equivalently, the bidder maximizes the market's re-evaluation of the bidder's shares, net of intermediary cost, given  $i$ :

$$E(\tilde{W} | i) = E(v(\pi, q) | i) - m(q) \quad (7)$$

The bidder pays  $m(q)$  for the services provided by intermediary.  $m(q)$  increases with intermediary quality,  $q$ , i.e.  $m'(q) > 0$ , reflecting the notion that the higher the quality of an intermediary, the higher the intermediation cost.

Differentiating equation (7) with respect to  $q$  gives the first-order condition for the optimal choice of intermediary quality:

$$(i - f(q)) h / (q + h)^2 + h f'(q) / (q + h) - m'(q) = 0 \quad (8)$$

The choice of  $q$  will correctly reveal the bidder's private information,  $i$ , if there is a strictly increasing function  $f(q)$  which simultaneously satisfies equation (3) and (8).

Substituting equation (3) into (8) and solving for  $f(q^*)$  yields investors' inference schedule as:

$$f(q^*) = \int_{q_{\min}}^{q^*} m'(t)(t + h)dt / h + z \quad (9)$$

where  $z$  is the constant term obtained from the integral process.  $q_{\min}$  is the lowest level of intermediary quality.

Differentiating equation (9) with respect to  $q^*$  yields:

$$f'(q^*) = m'(q^*) (q^* + h) / h > 0 \quad (10)$$

The equation above holds because the cost function of the use of intermediary,  $m(q)$ , is an increasing function of the intermediary quality,  $q$ .

Equation (10) implies that, first, the investors' inference function,  $f(q^*)$ , about the bidder's private information,  $i$ , is a one-to-one function in mathematical terms. Should the inference function not be a one-to-one function, investors would be unable to correctly infer the private information possessed by corporate insiders. This is because a non-one-to-one function may have the cases where two different values of  $q^*$  have the same value of  $i$ . Second, the inference function is a strictly positive function in  $q^*$ . Thus, cross-sectionally, the better the bidder's private information, the higher the intermediary quality chosen by the bidder's managers.

#### **2.3.1.2. Re-evaluation of the bidder's value in a stock offer and intermediary quality**

Cross-sectionally, the market's re-assessment of the bidder's value in stock offers is a strictly positive function of the bidder's choice of intermediary quality. That is, the market uses the information of the intermediary quality chosen by a bidder to alter the re-evaluation of the bidder's shares: the higher the choice of intermediary quality made by a bidder, the more favorable the market's reaction to an announcement of a stock offer.

*Proof:*

Substituting  $f(q^*) = i$  into equation (7) yields:

$$k(q^*)i + (1 - k(q^*))f(q^*) - m(q^*) = f(q^*) - m(q^*) \quad (11)$$

Differentiating equation (11) with respect to  $q^*$  and using equation (10) gives the following result:

$$f'(q^*) - m'(q^*) = m'(q^*)(q^* + h)/h - m'(q^*) = (q^*/h)m'(q^*) > 0 \quad (12)$$

Equation (12) holds because of the fact  $q^* > 0$ ,  $h > 0$ , and the assumption  $m'(q^*) > 0$ . The intuition of equation (12) is that the market's reaction to announcements of stock offers increases with  $q^*$ , the optimal choice of intermediary quality made by the bidders.

### 2.3.1.3. What deters low-quality firms from mimicking high-quality firms

A separating equilibrium is such that a bidder (denoted as bidder 1) with less favorable private information finds it not worthwhile to mimic another bidder (bidder 2) with more favorable information. The intuition is that if bidder 1 did mimic bidder 2, the high-quality intermediary would have revealed the less favorable information possessed by bidder 1.

*Analysis:*

Observe equations (4) and (5).

Consider two bidders: bidder 1 has less favorable information than bidder 2.

Bidder 2 optimally chooses the intermediary quality,  $q_2$ , according to equation (8), where the subscript indicates the bidder. This implies that the *marginal net* benefits of using the next higher-quality intermediary are zero (or, slightly negative, to be technically

correct). Marginal net benefits are measured by changes in the firm's value minus changes in intermediary cost as a result of employing a higher-quality intermediary.

If bidder 1 did mimic bidder 2 by choosing the same intermediary quality,  $q_2$ , used by bidder 2,  $\pi_2$  is expected to be less than  $\pi_1$  (where the subscript denotes the bidder) because the information generated by the intermediary for firm 1 is expected to be less favorable than for firm 2. With the same  $f(q_2)$ ,  $k(q_2)$  and intermediation costs  $m(q_2)$  for both firms at  $q_2$ , expected value of bidder 1 is strictly lower than that of firm 2.

Since the marginal net benefits of bidder 2 at  $q_2$  are zero, the marginal net benefits of bidder 1 at  $q_2$  must be strictly negative. This implies that, to maximize its market value, bidder 1 will choose a lower intermediary quality  $q_1 < q_2$ .

In summary, it is the difference in marginal benefits (rather than marginal costs) of the use of intermediaries that deters such mimicking.

### 2.3.2. Cash offers versus stock offers

The difference between a cash offer and a stock offer is that investors do not confer with any private information to evaluate cash, while investors rely on indications of insiders' private information to set the value of new common shares. Since, unlike a stock offer, a cash offer incurs no information problems at all, the value of external monitoring in a stock offer should exceed that in a cash offer.

The price reaction of bidders' shares in response to the announcement of stock financing of a takeover likely reflects both the information effect and the investment effect from a takeover. This study does not argue for a zero investment effect from a takeover, but rather assumes that the investment effect, on average, is unaffected by

medium of exchange in the absence of competition among bidding firms. Prior studies on the medium of exchange in takeovers (such as Travlos, 1987, and Wansley, Lane, and Yang, 1987) also implicitly make such an assumption.

### **2.3.3. Major hypotheses**

Both theoretical model (Myers and Majluf, 1984) and empirical evidence (Wansley, Lane, and Yang, 1987, and Travlos, 1987) support the notion that the market interprets the decision to issue equity to finance a takeover as an unfavorable signal about the value of the bidding firm's shares. Conversely, the market views the use of cash as the payment method as favorable (or, at least not negative) information about the value of the bidders' shares. Thus, financial intermediaries should play an important role in addressing at least two problems associated with equity-financed takeovers: adverse selection and moral hazard.

When a takeover is financed by the bidder's stock, an adverse selection problem arises because managers of the bidding firm are more informed than outside investors (including managers and shareholders of the target firm) about the value of bidder's shares. Titman and Trueman (1986) and Booth and Smith (1986) theorize that investment banks certify the quality of private information in the process of underwriting equity offerings and, therefore, help facilitate the self-sorting of managers with favorable asymmetric information. Similarly, the analysis in section 2.3.1 argues that, in equity-financed takeovers, a bidder with favorable private information finds it optimal to employ a high-quality investment bank to confirm that it is of a high value.

Titman and Trueman (1986) and the analysis in section 2.3.1 theorize that the choice of auditors (accounting firms) signals the quality of corporate insiders' private information about the firm's value. When the bidder's managers use securities to finance takeovers, an adverse selection problem arises because these managers know more about the value of their firms than do outsiders. As discussed in section 2.3.1, the certification performed by high-quality auditors facilitates self-selection of the firms with favorable private information. Thus, the reputation of auditors can mitigate the adverse selection problem associated with stock financing of a takeover.

When a takeover is financed by bidder's equity, shareholders of target firms face a potential moral hazard problem because the bidder's share value depends on the managerial efforts subsequent to the stock offer. Banking theory predicts that commercial banks can effectively mitigate a moral hazard problem associated with equity-financed takeovers. Theoretical models such as those of Diamond (1984), Ramakrishnan and Thakor (1984), and Fama (1985) argue that bank loans impound private information and that commercial banks are monitors of corporate activities in the lending process because of the banks' cost advantage of monitoring and the short-term nature of bank loans. Because bank monitoring generates benefits for other security holders (including atomistic shareholders) throughout the life of bank loans, it reduces the moral hazard problem associated with external financing. Based on this line of reasoning, managers of bidding firms with unfavorable private information or high tastes for consuming excessive perquisites find bank loans (which entail monitoring) costly, while those with favorable asymmetric information or low tastes for perquisites

consumption employ bank loans to differentiate themselves from others. A test of the theory of financial intermediation within the context of the medium of exchange in takeovers is equivalent to the tests of following two arguments. One, as argued above, within the group of equity-financed takeovers, the market reaction to a stock offer for the bidder that uses high-quality financial intermediaries should be more favorable (or less unfavorable) than that for the bidder that employs low-quality intermediaries.

Two, for all the takeover announcements, the benefits of external monitoring in stock offers should exceed those, if any, in cash offers. This is because the market views a stock offer, but not cash offer, as a negative signal about the firm's value (Myers and Majluf, 1984). Thus, in a cash offer, the benefits provided by financial intermediaries to resolve any problem of information asymmetry are largely reduced. The effect of the presence and reputation of financial intermediation on the bidder's share price reaction to a takeover announcement measures these monitoring benefits.

## **2.4. Method of analysis**

### **2.4.1. Measuring the market's reactions to takeovers**

#### **2.4.1.1. Event study method**

Stock price reactions to announcements of takeover bids are measured by standard event study methodology as described in Brown and Warner (1985). Under the assumption of semi-strong form market efficiency, the announcement effects provide an unbiased estimate of the market's valuation adjustments in response to the information contained in the announcement.



For the 200-trading-day estimation period ( $t=-250, -51$ ; where  $t=0$  represents the event's first appearance date in the *Wall Street Journal*), market model parameters are obtained by regressing individual daily returns on the corresponding equal-weighted daily market index returns, which are provided by the *CRSP* files. The market model is defined as:

$$R_{jt} = a_j + b_j R_{mt} + \varepsilon_{jt} \quad (13)$$

where:

- $R_{jt}$  = rate of return for security  $j$  on day  $t$ ,
- $R_{mt}$  = rate of return for the market index on day  $t$ ,
- $a_j$  = mean return not explained by the market,
- $b_j$  = security  $j$ 's sensitivity to the market's return,
- $\varepsilon_{jt}$  = the statistical error.

The predicted return for a firm on a day in the event period is the return predicted by the market model on that day using the estimates of  $a_j$  and  $b_j$  from the pre-event estimation period. That is, the predicted return for security  $j$  on day  $t$  in the event window is:

$$\hat{R}_{jt} = \hat{a}_j + \hat{b}_j R_{mt} \quad (14)$$

The prediction error for security  $j$  on day  $t$  in the event window is then defined as:

$$PE_{jt} = R_{jt} - \hat{R}_{jt} \quad (15)$$

The cumulative prediction error for security  $j$  over the event window  $t = t_1$  to  $t_2$  is calculated as:

$$CPE_{j,(t_1, t_2)} = \sum_{t=t_1}^{t_2} PE_{jt} \quad (16)$$

The share price reaction for the bidding firms that announce a takeover are estimated by calculating the average daily prediction error,  $APE$ , for all bidders on day  $t$ . That is,

$$APE_t = \frac{1}{N} \sum_{j=1}^N PE_{jt} \quad (17)$$

where  $N$  is the number of bidders in the sample.

The cumulative average prediction error ( $CAPE$ ) over an event-window ( $t= t_1$  to  $t_2$ ) is the sum of the daily average prediction errors:

$$CAPE = \sum_{t=t_1}^{t_2} APE_t \quad (18)$$

The average price reaction to a takeover announcement is the  $CAPE$  estimated over the two-day event window ( $t= -1, 0$ ).

To test whether the  $CAPE$  of a sample is significantly different from zero, the test statistic is obtained by dividing the  $CAPE$  by the square root of the product of the estimation-period variance and the number of days in the  $CAPE$  event-window ( $t_1, t_2$ ). The test statistic is distributed as Student-t under the null hypothesis that the  $CAPE$  is equal to zero if the  $APE$  are independent, identically distributed, and normal.

#### **2.4.1.2. Robustness of measuring excess returns: mean- and market-adjusted returns**

To examine the sensitivity of the results in this paper to the specifications of the above procedure for measuring the announcement excess returns, prediction errors based

on mean- and market-adjusted returns are also calculated. The use of mean-adjusted returns addresses one problem of the standard event-study methodology by avoiding the specification of the risk factors of stock returns. The use of market-adjusted returns in the event-study controls for a drastic market-wide movement on the announcement date.

#### 2.4.2. Multivariate regression analysis and variable specifications

A weighted-least-squares regression framework is used to test whether the reputation of financial intermediaries mitigates the negative signal conveyed by the decision to use equity to finance a takeover. The dependent variable is the two-day announcement-period cumulative prediction errors for the takeover sample. The independent variables include variables relating to certification and monitoring of financial intermediaries, and other relevant variables suggested by extant literature.

Specifically:

$$\begin{aligned}
 CPE_i = & a_0 + a_1 ACC_i + a_2 BANK_i + a_3 INV_{1,i} + a_4 INV_{2,i} + a_5 ACC_i \bullet STOCK_i \\
 & + a_6 BANK_i \bullet STOCK_i + a_7 INV_{1,i} \bullet STOCK_i + a_8 INV_{2,i} \bullet STOCK_i \\
 & + a_9 STOCK_i + a_{10} COMBO_i + a_{11} MULT_i + a_{12} TENDER_i \\
 & + a_{13} OWN_{1,i} + a_{14} OWN_{2,i} + a_{15} SIZE_i + a_{16} RUNUP_1 \\
 & + a_{17} RUNUP_2 + e_i
 \end{aligned} \tag{19}$$

where  $CPE_i$  is the two-day announcement-period cumulative prediction error of firm  $i$  that announces a takeover.

$ACC_i$  takes the value of one if the accounting firm employed by the bidder is one of the Big Six accounting firms, and zero otherwise. Following Dopuch and Simunic (1982) and Slovin, Sushka, and Hudson (1990), the following auditors are identified as

Big Six accounting firms: Arthur Andeson, Coopers & Lybrand, Deloitte & Touche, Ernst and Young, KPMG Marwick, and Price Waterhouse. (Prior to the merger "wave" among accounting firms in the late 1980s, the Big Eight are generally considered as the high-quality accounting firms: Arthur Anderson, Peat Marwick, Arthur Young, Ernst and Whinney, Touche Ross, Price Waterhouse, Coopers and Lybrand, and Deloitte, Haskins, and Sells.) Dopuch and Simunic argue that the accounting firms above have higher credibility than other accounting firms because auditor's reputation is more important than the procedure in the auditing process.

Following Slovin, Sushka, and Hudson (1990),  $BANK_i$  is the 'debt in current liabilities' minus long-term 'debt due in one year' (both obtained from the COMPUSTAT database) scaled by the sum of the book value of debt and the market value of equity. Long-term debt due in one year is subtracted to focus on the periodic and short-term nature of bank loans. Although debt in current liabilities includes liabilities due non-banks, the short-term nature of these liabilities is consistent with Fama's (1985) argument about short-term of bank loans. Slovin, Sushka, and Hudson (1990) provide a detailed discussion about the appropriateness of this variable.

$INV_{1,i}$  takes a value of one if the investment bank employed by the bidder in a takeover is prestigious, and zero otherwise. Following Bowers and Miller (1990) and Servaes and Zenner (1996), five investment banks in acquisitions are classified as prestigious (or first-tier): First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley, and Salomon Brothers. This classification rule is largely based on Hayes' (1979) discussion that a small set of investment banks dominate the industry. Ideally, to test

whether the results are robust with respect to specification of high-quality investment banks, a continuous variable based on the underwriting revenues of investment banks should be used in a separate test. Two difficulties emerge. First, *Investment Dealers' Digest* publishes data of related underwriting revenues only for the fifteen top investment banks each year. Second, even if such data were available for each investment bank, there are more than six categories of related underwriting revenues: revenues based on common stock offerings with a full credit to lead investment banks only, common stock offerings with a full credit to all participating investment banks, common stock offerings disaggregated by whether foreign offerings or closed-end funds are excluded, initial public offerings, etc. So far, there is no widely accepted practice as to which category should be used to rank investment banks.

$INV_{2i}$  takes a value of 1 if the identity of investment bank in a takeover is not disclosed by the bidder; and 0 otherwise. Excluding offers where the identity of bidders' investment banks is not disclosed would significantly reduce the number of observations on bidders' accounting firms and commercial banks.

$STOCK_i$  equals 1 if the offer is a stock offer at the announcement; and 0 otherwise.

$COMBO_i$  takes a value of 1 for a offer that is funded through a combination of stock and cash (including debentures); and 0 otherwise. This variable is included to control for the presence of combination offers in the sample. To preserve a large sample size, this study does not exclude the offers funded through a combination of stock and cash. Travlos (1987) uses a similar approach. Alternatively, one could eliminate all the

combination offers from the sample. Amihud, Lev, and Travlos (1990) use that approach to examine how the bidder's managerial ownership relates to the medium of exchange in takeovers.

$MULT_i$  takes the value of one if there is a knowledge that a takeover involves multiple bidders at the announcement, and zero otherwise. This variable is included because Bradley, Desai, and Kim (1988) and Niden (1993) find that the competition among bidders tends to decrease the announcement returns to bidders but increase the returns to targets. The observations are based on the first bid of the ultimately successful bidder.  $MULT_i$ , therefore, captures the downward bias this selection procedure imposes on the bidder's announcement returns.

$TENDER_i$  is equal to 1 for a tender offer, and 0 otherwise. Announcements are checked against all 14D-1 forms compiled by the *Lexis/Nexis* Inc. to identify a tender offer. This variable is included because Huang and Walkling (1987) report that tender offers tend to be cash offers. Since this study contrasts cash offers with stock offers, it is possible that any difference between cash offers and stock offers is a result of acquisition type (i.e. tender offer or merger) rather than a result of the form of payment.

Ownership variables  $OWN_{1,i}$  and  $OWN_{2,i}$  take the form of binary variables rather than continuous variables because (1) Stulz's (1988) model suggests a non-linear effect of the target's managerial ownership on the takeover premium and probability of the success of a bid and (2) Morck, Shleifer, and Vishny (1988) report a non-linear relation between the firm's managerial ownership and the firm's value. In Stulz's theory, strengthening managerial control of the firm at the low and high managerial ownership

levels increases the value of the firm, while such a strengthening at the middle managerial ownership level leads to a decrease in the value of the firm. Based on Amihud, Lev, and Travlos' (1990) finding that negative bidders' excess returns for takeovers funded through stock are mainly concentrated in bidders with a low managerial ownership (less than 5 percent of bidder's number of shares outstanding),  $OWN_{1,i}$  takes the value of one if the bidder's directors and officers as a group own less than 5 percent of their firm's shares prior to the takeover announcement, and zero otherwise. In addition,  $OWN_{2,i}$  takes the value of one if the bidder's managerial ownership exceeds 25 percent prior to the announcement; and zero otherwise. Amihud, Lev, and Travlos (1990) report that their results (as above) are not sensitive to the specification of managerial ownership (e.g. ownership by top two, top five managers, or all directors and managers).

$SIZE_i$  is the logarithm of the market value of the bidder's equity at the end of the year prior to the takeover announcement. Theoretical models (Fama, 1985, and Diamond, 1991) and empirical evidence (Slovin, Johnson, and Glascock, 1992) argue that firm size is likely to be positively related to the public information available about the firm in the market.

$RUNUP_1$  is the price run-up of the bidder's stock over the 49-day (days -50 to -2) pre-announcement period, while  $RUNUP_2$  is the price run-up in the *CRSP* equally-weighted index returns over the 49-day pre-announcement period.  $RUNUP_1$  is included in the analysis because security issuance literature, such as Masulis and Korwar (1986), and Asquith and Mullins (1986), finds that firms tend to conduct seasoned equity offerings subsequent to a period in which the issuers' stock prices rise.  $RUNUP_2$  is

included because some studies on security issuance, such as Asquith and Mullins (1986), find that seasoned equity issuance is made following an increase in the general level of stock prices. The above 48-day pre-announcement period is defined as days -50 to -2 because (1) the time period used to estimate market-model parameters is days -250 to -51 (where day 0 represents an event's announcement date) and (2) the cumulative prediction errors for an announcement are estimated from days -1 to 0.

It is necessary to include interaction terms in the regression analysis above to compare benefits of external monitoring in stock offers to those in cash offers. The interpretation of coefficient estimates of these interaction terms is provided in section 2.6.3.

The Goldfeld-Quandt test is employed to test for heteroscedasticity in the multivariate regression analysis. The rationale and procedure of Goldfeld-Quandt test are discussed in the Appendix.

## 2.5. Data

The initial sample consists of acquisitions announced during the period January 1989 through December 1995 as reported in the *Mergerstat Review*. The identity of the accounting firm for a company is obtained from *Compact Disclosure*. The bank loan (as defined in section 2.4.2) data come from the *COMPUSTAT* database. The identity of the investment bank involved in a takeover is obtained from the *Wall Street Journal* and *Mergers and Acquisitions*. The announcement date of a proposed bid is the initial date of the first public announcement of the offer in the *Wall Street Journal Index* or the filing date of the first 14D-1 form (for a tender offer), whichever is earlier. Following



Wansley, Lane, and Yang (1987) and Travlos (1987), only successful bids are included in the sample of this study. Travlos (1987) compares unsuccessful bids with successful ones, and find that results on unsuccessful bids are qualitatively similar to those on successful ones. The method of payment is the *initial* method of payment announced in a bid. Wansley, Lane, and Yang (1987) report that there are few changes between initially announced payment method and the actual payment method. The payment method is first obtained from the *Mergerstat Review*, and then checked against the *Wall Street Journal*. If there is a discrepancy between the payment methods for an offer reported by *Mergerstat Review* and the *Wall Street Journal*, the stories for that offer in the *Wall Street Journal* are examined to determine the initial method of payment. An offer is a tender offer if the search of the *Lexis/Nexis* database indicates that the bidder for that offer submits a 14D-1 form. The information of whether an offer involves multiple bidders at the announcement is obtained from the *Wall Street Journal*. All returns, such as announcement returns and the price run-ups over the pre-announcement period, are from the *CRSP* database.

For the acquisitions to be included in the sample, they must meet the following criteria:

First, the acquiring firm must have return data on the Center for Research in Security Prices (*CRSP*) tapes over the period 250 days prior to through 51 days after the announcement date so that the market reaction to a takeover announcement can be assessed.

Second, utilities firms (SIC codes 4900-4999) and financial companies (SIC codes 6000-6999) are excluded. Asquith and Mullins (1986) and Masulis and Korwar (1986) argue that the nature of information, if any, revealed by equity offerings of these firms differs from that of industrial firms. These researchers suggest that regulation of these firms implies a less severe problem of asymmetric information.

Third, the acquirers must end up with obtaining more than 50% of the common shares of the targets. Acquisitions resulting in less than 50% ownership are excluded from the sample. Both friendly and hostile acquisitions are included in the analysis.

Fourth, no confounding corporate events to the bidding firm (such as dividends or earnings announcements) occur during the period two days before through one day after the announcement date of a proposed bid.

Fifth, the target's shares must be publicly traded. This requirement is imposed because the motive of a private target firm to accept a stock offer may differ from that of public target company, such as liquidity considerations.

## **2.6. Empirical Results**

### **2.6.1. Distribution of the sample**

Table 2.1 presents summary statistics. The full sample consists of 324 takeover announcements over the period January 1989 through December 1995. The distribution of announcements disaggregated by medium of exchange and year is reported in panel A. For the full sample, a relatively large number of the takeovers, 158 out of 324 (or 48.77 percent), use stock as the medium of exchange. Ninety six acquisitions (or 29.63 percent) are financed by cash or debentures. Seventy takeovers (or 21.60 percent) are

Table 2.1

Summary statistics for takeover announcements by publicly-traded industrial firms over the period January 1989 through December 1995.

Full sample contains 324 takeover announcements. Restricted sample contains 94 announcements, where all the accounting firms, investment banks, and commercial banking relationship of the bidders are known. Utilities firms (SIC codes 4900-4999) and financial companies (SIC codes 6000-6999) are excluded from the sample. Combination offers are those funded through a combination of cash and stock. Cash offers include those financed by cash and debenture. ACC takes the value of one if the bidder uses a Big-Six accounting firm. INV<sub>1</sub> equals one if the bidder employs a first-tier investment bank and zero otherwise. INV<sub>2</sub> equals one if the identity of bidder's investment bank is not disclosed and zero otherwise. TENDER takes the value of one for a tender offer and zero otherwise. MULT is equal to one if there are more than one bidders at the takeover announcement and zero otherwise. OWN<sub>1</sub> takes the value of one if ownership by officers and directors as a group is lower than 5 percent and zero otherwise. OWN<sub>2</sub> equals one if ownership by officers and directors exceeds 25 percent and zero otherwise.

*Panel A: Number of announcements by medium of exchange and year: full sample*

		Year							
		1989	1990	1991	1992	1993	1994	1995	Total
Payment method	Cash	32	9	3	5	9	18	20	96
	Combination	5	7	12	13	12	7	14	70
	Stock	16	22	29	11	18	29	33	158
	Total	53	38	44	29	39	54	67	324

*Panel B: Characteristics of takeover announcements: full sample*

Descriptive measure	Mean	Median	Min.	Max.
Market value of the bidder's equity, millions	4,663	1,187	9	87,193
Purchase price for the target, millions	826	176	10	19,000
Purchase price / market value of bidder's equity	0.57	0.23	0.001	11.04
Bidder's book value of debt / market value of equity	2.00	0.46	0.01	9.23
Bank loan / (book value of debt + market value of equity)	0.030	0.001	0	0.65
Equity ownership by bidder's officers and director as a group	0.12	0.05	0.0001	0.71

(table con'd)

Summary statistics for takeover announcements by publicly-traded industrial firms over the sample period January 1989 through December 1995.

*Panel C: Counts of indicator variables with the value of one: full sample*

Indicator variable	Number of the counts	% of the full sample
ACC = 1	313	96.60
INV <sub>1</sub> = 1	52	16.05
INV <sub>2</sub> = 1	227	70.06
TENDER = 1	63	19.44
MULT = 1	23	7.10
OWN <sub>1</sub> = 1	176	54.32
OWN <sub>2</sub> = 1	46	14.20

*Panel D: Number of announcements by medium of exchange and year:  
restricted sample (94 announcements)*

		Year							Total
		1989	1990	1991	1992	1993	1994	1995	
Payment method	Cash	7	1	1	2	1	6	8	26
	Combination	1	1	1	5	4	4	7	23
	Stock	4	4	11	1	10	11	4	45
	Total	12	6	13	8	15	21	19	94

(table con'd)

Summary statistics for takeover announcements by publicly-traded industrial firms over the sample period January 1989 through December 1995.

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*Panel E: Characteristics of takeover announcements: restricted sample (94 announcements)*

Descriptive measure	Mean	Median	Min.	Max.
Market value of the bidder's equity, millions	7,489	2,428	113	68,116
Purchase price for the target, millions	2,279	1,021	75	19,000
Purchase price / market value of bidder's equity	0.91	0.46	0.013	2.80
Bidder's book value of debt / market value of equity	1.52	0.51	0.01	9.65
Bank loan / (book value of debt + market value of equity)	0.033	0.008	0	0.56
Equity ownership by bidder's officers and director as a group	0.09	0.03	0.01	0.70

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*Panel F: Counts of indicator variables with the value of one: restricted sample (94 announcements)*

Indicator variable	Number of the counts	% of the restricted sample
ACC = 1	90	95.74
INV <sub>1</sub> = 1	52	55.32
TENDER = 1	26	27.66
MULT = 1	9	9.57
OWN <sub>1</sub> = 1	59	62.77
OWN <sub>2</sub> = 1	12	12.77

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funded through a combination of stock and cash. The sampling criteria selects one to three percent of all mergers and acquisitions appearing in *Mergerstat Review*. Because the sample represents large transactions with more complete information available for bidders, targets, and offers, the results are not generalizable to all mergers and acquisitions. The selected transactions, however, are likely to be those of greater economic importance. The sample is also comparable to those drawn in previous studies of takeovers.

The mean values of characteristics of the bidders are reported in panel B. The mean size of the bidder's market capitalization is \$4,663 million and the median value is \$1,187 million. The mean value of the transaction price divided by the market value of the bidder's equity is 0.57, while the median value is 0.23. The maximum value of the ratio of the transaction price to the market value of the bidder's equity is 11.04 (i.e., Columbia Healthcare Corp.'s acquisition of HCA Healthcare Corp. on October 4, 1993). The mean ratio of bidders' bank loan (defined in section 2.4.2) as a percentage of the sum of its book value of total debt and market value of equity is 0.030; the median value is 0.001. The mean ratio of book value of debt to market value of equity is 2.00; the median value is 0.46. The mean value of equity ownership by bidders' officers and directors as a group is 0.12, while the median value is 0.05.

Panel C of Table 2.1 provides descriptive statistics on dummy variables used in the regression analysis. Most of the bidders (313 out of 324) in the sample use Big Six accounting firms. Fifty-two bidders use at least one of the first-tier investment banks: First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley, and Salomon Brothers.

Forty-five bidders use non-first-tier investment banks or do not use any investment banks at all. A search of the *Wall Street Journal* and *Mergers and Acquisitions* finds that the rest of the bidders in the sample do not disclose whether or not they use any investment banks. Approximately 19 percent of the takeover announcements are tender offers. Twenty-three of 324 takeovers in the sample involve more than one bidder at the initial announcement. Most of the bidders in the sample (54.32 %) have a managerial ownership below 5 %; while only 14.20 % of bidders have a managerial ownership above 25 %. The managerial ownership is measured by the percentage of common shares owned by officers and directors as a group.

Panels D, E, and F of Table 2.1 report the characteristics of the restricted sample, which contains 94 takeover announcements where all the investment banks, accounting firms, and commercial banking relationships for the targets are known. As discussed in section 2.4.2, to preserve a sufficient sample size, both the full sample (324 announcements) and the restricted sample (94 announcements) are analyzed to test the theory of financial intermediation in takeovers. The results, discussed in section 2.6.4, indicate that the conclusions on external monitoring in takeovers are qualitatively similar in both samples.

### **2.6.2. Regression results disaggregated by the medium of exchange**

Table 2.2 reports Pearson correlation coefficient estimates for the variables used in the empirical tests. The results reveal that tender offers tend to be associated with the use of cash as the form of payment. The correlation coefficient between STOCK and TENDER is significantly negative at the 1 percent level. TENDER and COMBO are

Table 2.2 Pearson correlation coefficients of variables for 324 takeover announcements from January 1989 to December 1995

BANK is calculated as "debt in current liabilities" minus "debt due in one year" scaled by the sum of debt's book value and equity's market value. ACC takes a value of 1 if the bidder uses a Big Six auditor; and 0 otherwise. INV<sub>1</sub> equals 1 if the bidder employs a prestigious investment bank in the takeover; and 0 otherwise. INV<sub>2</sub> is equal to 1 if the identity of the investment bank involved in a takeover on the bidder's side is not disclosed; and 0 otherwise. STOCK equals 1 for a stock offer; and 0 otherwise. COMBO equals 1 for a combination offer; and 0 otherwise. TENDER equals 1 if the offer is a tender offer; and 0 otherwise. MULT takes the value of 1 if the offer involves multiple bidders at the announcement; and 0 otherwise. OWN<sub>1</sub> equals 1 if ownership by bidder's officers and directors as a group is below 5 %; and 0 otherwise. OWN<sub>2</sub> equals 1 if ownership by bidder's officers and directors exceeds 25 %; and 0 otherwise. SIZE is the logarithm of the market value of bidder's equity. *p*-values are in parentheses.

	MULT	STOCK	COMBO	OWN <sub>1</sub>	OWN <sub>2</sub>	SIZE	BANK	INV <sub>1</sub>	INV <sub>2</sub>	ACC	
TENDER	0.08 (0.17)	-0.44*** (0.00)	-0.12** (0.02)	0.11* (0.06)	-0.04 (0.44)	0.13** (0.02)	-0.02 (0.68)	0.08 (0.16)	-0.14** (0.01)	-0.00 (0.96)	TENDR
MULT		-0.17*** (0.00)	0.10* (0.07)	0.01 (0.83)	-0.01 (0.87)	0.06 (0.29)	0.06 (0.32)	0.04 (0.47)	-0.08 (0.14)	0.05 (0.38)	MULT
STOCK			-0.53*** (0.00)	-0.08 (0.17)	0.04 (0.53)	-0.03 (0.63)	-0.12** (0.03)	0.03 (0.62)	0.01 (0.92)	-0.01 (0.89)	STOCK
COMBO				-0.05 (0.39)	0.00 (0.94)	-0.04 (0.46)	0.11* (0.05)	0.01 (0.84)	-0.02 (0.72)	0.06 (0.31)	COMB
OWN <sub>1</sub>					-0.44*** (0.00)	0.39*** (0.00)	0.11* (0.05)	0.05 (0.33)	-0.11** (0.04)	-0.06 (0.31)	OWN <sub>1</sub>
OWN <sub>2</sub>						-0.31*** (0.00)	0.01 (0.86)	-0.04 (0.51)	0.03 (0.54)	0.02 (0.70)	OWN <sub>2</sub>
SIZE							0.07 (0.22)	0.22*** (0.00)	-0.31*** (0.00)	0.09* (0.09)	SIZE
BANK								0.08 (0.15)	-0.02 (0.77)	0.04 (0.49)	BANK
INV <sub>1</sub>									-0.68*** (0.00)	0.03 (0.58)	INV <sub>1</sub>
INV <sub>2</sub>										0.04 (0.48)	INV <sub>2</sub>

(table con'd)



### Pearson correlation coefficients of variables for 324 takeover announcements from January 1989 to December 1995

BANK is calculated as "debt in current liabilities" minus "debt due in one year" scaled by the sum of debt's book value and equity's market value. ACC takes a value of 1 if the bidder uses a Big Six auditor; and 0 otherwise. INV<sub>1</sub> equals 1 if the bidder employs a prestigious investment bank in the takeover; and 0 otherwise. INV<sub>2</sub> is equal to 1 if the identity of the investment bank involved in a takeover on the bidder's side is not disclosed; and 0 otherwise. STOCK equals 1 for a stock offer; and 0 otherwise. COMBO equals 1 for a combination offer; and 0 otherwise. TENDER equals 1 if the offer is a tender offer; and 0 otherwise. MULT takes the value of 1 if the offer involves multiple bidders at the announcement; and 0 otherwise. OWN<sub>1</sub> equals 1 if ownership by bidder's officers and directors as a group is below 5 %; and 0 otherwise. OWN<sub>2</sub> equals 1 if ownership by bidder's officers and directors exceeds 25 %; and 0 otherwise. SIZE is the logarithm of the market value of bidder's equity. *p*-values are in parentheses.

	TENDER	MULT	STOCK	COMBO	OWN <sub>1</sub>	OWN <sub>2</sub>	SIZE	BANK	INV <sub>1</sub>	INV <sub>2</sub>
RUNUP <sub>1</sub>	-0.10 <sup>*</sup> (0.08)	-0.01 (0.90)	0.06 (0.26)	-0.04 (0.51)	0.07 (0.22)	0.00 (0.89)	-0.04 (0.49)	0.08 (0.15)	-0.05 (0.40)	0.04 (0.52)
RUNUP <sub>2</sub>	-0.02 (0.68)	-0.00 (0.97)	-0.03 (0.63)	0.06 (0.28)	-0.00 (0.98)	0.00 (0.89)	0.09 <sup>*</sup> (0.09)	-0.08 (0.17)	0.00 (0.89)	0.02 (0.68)
	ACC	RUNUP <sub>2</sub>								
RUNUP <sub>1</sub>	0.08 (0.18)	0.18 <sup>***</sup> (0.00)								
RUNUP <sub>2</sub>	0.03 (0.60)									

<sup>\*</sup>, <sup>\*\*</sup>, and <sup>\*\*\*</sup> indicate statistical significance at the 10, 5, and 1 percent levels, respectively, in two-tailed tests.

also negatively correlated at the 5 percent level. In addition, SIZE is positively correlated with the use of two high-quality intermediaries: first-tier investment banks (INV<sub>1</sub>) and Big-Six accounting firms (ACC). This suggests that large firms tend to use prestigious investment banks and auditors. SIZE, however, is not significantly correlated with BANK. The payment method variables (STOCK and COMBO) are generally not correlated with two external monitoring variables (INV<sub>1</sub>, and ACC) at conventional levels. This insignificance in correlation alone, however, does not imply that external monitors play no role in addressing the information asymmetry problem (as discussed in section 2.3.4). The bidder's pre-announcement share price run-up, RUNUP<sub>1</sub>, and the run-up of equally-weighted market returns, RUNUP<sub>2</sub>, are not correlated with the payment method variables.

Results on bidders' two-day announcement excess returns for takeovers disaggregated by the medium of exchange are consistent with those reported by previous studies (Wansley, Lane, and Yang, 1987, Travlos, 1987, and Kaplan and Weisbach, 1992). Table 2.3 indicates a mean value of announcement excess returns for stock offers of - 2.09 %, significant at the 1 % level ( $t$ -value = -4.91). Approximately seventy percent of bidders in stock offers experience negative announcement excess returns significant at the 1 % level based on Wilcoxon signed ranks test ( $z$  value = -5.31). The median value of bidders' announcement excess returns is - 1.78 percent. The mean values of bidders' excess returns for both cash and combination offers are insignificantly different from zero at conventional levels ( $t$ -values for cash offers and combination offers are -0.55 and -0.96, respectively). Wilcoxon signed ranks tests on the proportion of

Table 2.3

Bidder's two-day announcement cumulative average prediction errors (CAPE) for 348 takeover announcements over the period January 1989 through December 1995.

Initial takeover announcements come from *Mergerstat Review*. All announcements are checked against the *Wall Street Journal*. Utilities firms (SIC codes 4900-4999) and financial companies (SIC codes 6000-6999) are excluded from the sample. Combination offers are those funded through a combination of cash and stock. Cash offers include those financed by cash and debenture. Two-day cumulative average prediction errors (CAPEs) are calculated by using standard event-study method as described in Brown and Warner (1985). The test statistic on CAPE is obtained by dividing the CAPE by the square root of the product of the estimation-period variance and 2 (which is the number of days in the event window). Significance test on the proportion of negative two-day announcement prediction errors is based on Wilcoxon signed ranks test and reported as  $z$  value.

Category	Sample size	Mean CAPE	$t$ -value	% negative returns	$z$ -value	Median CAPE
Cash offers	96	- 0.24 %	- 0.55	50.00%	-0.30	- 0.02 %
Combination offers	70	- 0.64 %	- 0.96	57.90%	-1.26	- 0.62 %
Stock offers	158	- 2.09 %	- 4.91***	70.32%	-5.31***	- 1.78 %

\*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively, in two tailed tests.

negative excess returns also provide the same insignificance results for both cash and combination offers.

The value of external monitoring in a multivariate regression framework is examined next. The dependent variable is the two-day announcement excess returns, CPE, for the sample of takeover announcements disaggregated by the medium of exchange. Because Goldfeld-Quant test yields a  $F$ -value of 3.15 (significant at the 1 percent level), coefficients are estimated using weighted least squares with the standard error of estimation period residuals (obtained from the market model) as the weighting factor to adjust for heteroscedasticity in the variances of stock returns across firms in the sample.

Table 2.4 presents the test results for the takeover announcements by the method of payment. The specifications of the proxies for external monitoring follow previous studies of Servaes and Zenner (1996), Slovin, Sushka, and Hudson (1990), and Dopuch and Simunic (1982). Details of variable specifications are discussed in section 2.4.2.

Table 2.4 presents the test results. For cash offers, the null hypothesis that all coefficients but the intercept are equal to zero cannot be rejected at conventional levels ( $F$ -value = 1.22). This suggest that none of the independent variables, including external monitoring variables and ownership variables, are important factors in explaining bidders' announcement excess returns in cash offers. Similarly, test results for combination offers indicate that the null hypothesis that all coefficients but the intercept are equal to zero cannot be rejected at conventional levels ( $F$ -value = 1.15).

Table 2.4

**Estimated coefficients of regressions of cumulative excess returns surrounding takeover announcements made between January 1989 through December 1995**

ACC takes a value of 1 if the bidder uses a Big Six auditor, and 0 otherwise. INV<sub>1</sub> equals 1 if the bidder employs a prestigious investment bank in the takeover, and 0 otherwise. INV<sub>2</sub> is equal to 1 if the identity of the investment bank involved in a takeover on the bidder's side is not disclosed, and 0 otherwise. STOCK equals 1 for a stock offer, and 0 otherwise. COMBO takes a value of 1 for a combination offer, and 0 otherwise. TENDER equals 1 if the offer is a tender offer, and 0 otherwise. MULT takes the value of 1 if there are multiple bidders at the announcement, and 0 otherwise. OWN<sub>1</sub> equals 1 if equity ownership by bidder's officers and directors as a group is below 5 %; and 0 otherwise. OWN<sub>2</sub> equals 1 if ownership by bidder's officers and directors is larger than 25 %; and 0 otherwise. SIZE is the logarithm of the market value of bidder's equity. RUNUP<sub>1</sub> is the bidder's stock price run-up over a 49-day per-announcement period. RUNUP<sub>2</sub> is the price run-up of equally-weighted CRSP index over a 49-day pre-announcement period. Prestigious investment banks and Big Six auditors are defined in section 2.4.2. BANK is calculated as 'debt in current liabilities' minus 'debt due in one year' scaled by the sum of debt's book value and equity's market value.

Independent variable	Coeff.	Cash offers		Combo offers		Stock offers	
Intercept	$b_0$	4.14	(1.45)	-7.80	(-1.12)	-3.75	(-1.24)
ACC	$b_1$	-0.20	(-0.11)	9.98	(1.59)	-0.36	(-0.15)
BANK	$b_2$	-6.46	(-0.96)	-1.15	(-0.21)	13.78	(2.40) <sup>***</sup>
INV <sub>1</sub>	$b_3$	-1.46	(-1.01)	-2.73	(-1.33)	-0.18	(0.13)
INV <sub>2</sub>	$b_4$	-0.35	(-0.31)	0.92	(0.52)	-0.04	(-0.04)
MULT	$b_5$	0.89	(0.73)	-0.99	(-0.52)	-4.90	(-1.85) <sup>*</sup>
TENDER	$b_6$	-1.85	(-2.12) <sup>***</sup>	0.46	(0.22)	4.21	(1.17)
OWN <sub>1</sub>	$b_7$	-0.78	(-0.74)	2.07	(1.48)	0.47	(0.46)
OWN <sub>2</sub>	$b_8$	0.23	(0.13)	-2.24	(-1.31)	2.78	(2.10) <sup>***</sup>
SIZE	$b_9$	-0.27	(-1.10)	-0.51	(1.10)	0.18	(0.58)
RUNUP <sub>1</sub>	$b_{10}$	0.13	(0.47)	0.33	(0.51)	0.15	(0.67)
RUNUP <sub>2</sub>	$b_{11}$	-0.22	(-0.19)	0.79	(-1.76) <sup>*</sup>	-1.07	(-1.21)
$F$		1.22		1.15		1.91 <sup>***</sup>	
$R^2$		0.14		0.17		0.13	
Adjusted $R^2$		0.03		0.02		0.06	
# of observations		96		70		158	

<sup>\*</sup>, <sup>\*\*</sup>, and <sup>\*\*\*</sup> denote statistical significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

For stock offers, however, the  $F$ -value for the test of the hypothesis that all coefficients but intercept are equal to zero is 1.91, significant at the 5 percent level. The banking relationship variable has a significantly positive coefficient 13.78 at the 5 percent level ( $t$ -value = 2.40). Thus, investors use the information of the bidder's banking relationship to alter the valuation of the bidder's shares in stock offers. The high-ownership variable,  $OWN_2$  (which takes the value of one if bidders' managerial ownership exceeds 25 %; and zero otherwise), has a positive coefficient significant at the 5 percent level ( $t$ -value = 2.10). This is consistent with Stulz's (1988) and Amihid, Lev, and Travlos' (1991) argument that the market views the financing decisions applied by firms with relatively high managerial ownership to be consistent with shareholders' value maximization (since managers with relatively high equity ownership act as they are the owners of the firm). All other coefficients are insignificantly different from zero at conventional levels for stock transactions.  $MULT$  (capturing the competition effect in a takeover) obtains a negative coefficient estimate at the 10 percent level, consistent with the notion that the competition in takeovers decreases the returns to bidders.

### **2.6.3. Regression results for the entire sample**

Unlike in seasoned equity and initial public offerings, bidders' managers in equity-financed takeovers are "bound" in that the proceeds are earmarked to purchase the targets' assets. Thus, it is necessary to compare the market reactions in the presence of high-quality external monitors in stock offers to those in cash offers. Under the argument set forth by Myers and Majluf (1984), Wansley, Lane, and Yang (1987), Travlos (1987), and the theoretical analysis in section 2.3.1, the value of external

monitoring in stock offers should exceed that in cash offers because the information signaled by stock offers is less favorable (or more unfavorable) than the information, if any, conveyed by cash offers.

The interaction terms (ACC•STOCK, BANK•STOCK, and INV<sub>1</sub>•STOCK) capture the benefits of external monitoring in stock offers, compared to those in cash offers. To see why, consider four bidders: bidder 1 of a cash offer and bidder 2 of a stock offer use Big-Six accounting firms and first-tier investment banks, and have  $p$  % bank debt in their capital structure; bidder 3 of a cash offer and bidder 4 of a stock offer use non-Big-Six accounting firms and, non-first-tier investment banks, and have  $q$  % bank debt in their capital structure. The regression equation (Equation 19 in section 2.4.2) predicts bidder 1's announcement excess return to be  $a_0 + a_1 + (p/100)a_2 + a_3 + a_{11} + a_{12} + \dots + a_{17}$  (assuming for now that all independent variables are important in explaining bidders' excess returns). Bidder 2's announcement excess return is predicted to be  $a_0 + a_1 + (p/100)a_2 + a_3 + a_5 + (p/100)a_6 + a_7 + a_9 + a_{11} + a_{12} + \dots + a_{17}$ . Similarly, bidder 3's and bidder 4's excess returns are projected to be  $a_0 + (q/100)a_2 + a_{11} + a_{12} + \dots + a_{17}$  and  $a_0 + (q/100)a_2 + (q/100)a_6 + a_9 + a_{11} + a_{12} + \dots + a_{17}$ , respectively. The benefits, if any, of external monitoring in *cash* offers are obtained by subtracting bidder 3's excess return from bidder 1's excess returns: namely  $a_1 + ((p-q)/100)a_2 + a_3$ . The benefits of external monitoring in *stock* offers can be obtained by subtracting bidder 4's excess return from bidder 2's excess returns: namely  $a_1 + ((p-q)/100)a_2 + a_3 + a_5 + ((p-q)/100)a_6 + a_7$ . It then follows that the coefficients of interaction terms (i.e.,  $a_5$ ,  $a_6$ , and  $a_7$ ) capture the benefits of external monitoring in stock offers, compared to cash offers.

Table 2.5

Estimated coefficients of regressions cumulative excess returns surrounding takeover announcements made between January 1989 through December 1995.

The coefficients are estimated using weighted least squares with the standard error of estimation-period residuals as the weighting factor to adjust for heteroscedasticity. ACC takes a value of 1 if the bidder uses a Big Six auditor, and 0 otherwise. INV<sub>1</sub> equals 1 if the bidder employs a prestigious investment bank in the takeover, and 0 otherwise. INV<sub>2</sub> is equal to 1 if the identity of the investment bank involved in a takeover on the bidder's side is not disclosed, and 0 otherwise. STOCK equals 1 for a stock offer, and 0 otherwise. COMBO takes a value of 1 for a combination offer, and 0 otherwise. TENDER equals 1 if the offer is a tender offer, and 0 otherwise. MULT takes the value of 1 if there is a knowledge that the offer involves multiple bidders at the announcement, and 0 otherwise. OWN<sub>1</sub> equals 1 if equity ownership by bidder's officers and directors as a group is below 5 %, and 0 otherwise. OWN<sub>2</sub> equals 1 if ownership by bidder's officers and directors is larger than 25 %, and 0 otherwise. SIZE is equal to the logarithm of the bidder's market capitalization in equations 5.1 and 5.2; and equals 1 if the bidder's market capitalization is below the median value of all industrial firms on the CRSP tape, and 0 otherwise. RUNUP<sub>1</sub> is the bidder's stock price run-up over a 49-day per-announcement period. RUNUP<sub>2</sub> is the price run-up of equally-weighted CRSP index over a 49-day pre-announcement period. *t*-values are in parentheses.

Independent variable		Coeff.	Market model CPE	Mean-adjusted CPE	Binary size		
Intercept	$a_0$	0.00	(0.00)	-0.01	(-0.00)	-0.70	(-0.31)
ACC	$a_1$	0.87	(0.42)	0.99	(0.47)	0.61	(0.29)
BANK	$a_2$	-2.06	(-0.51)	-1.91	(-0.46)	-1.93	(-0.48)
INV <sub>1</sub>	$a_3$	-1.43	(-1.18)	-1.24	(-1.00)	-1.32	(-1.09)
INV <sub>2</sub>	$a_4$	0.51	(0.52)	0.36	(0.36)	0.65	(0.67)
ACC•STOCK	$a_5$	-0.99	(-0.32)	-0.29	(-0.09)	1.12	(-0.36)
BANK•STOCK	$a_6$	17.53	(2.61)***	18.47	(2.69)***	16.91	(2.50)**
INV <sub>1</sub> •STOCK	$a_7$	1.70	(0.93)	1.56	(0.83)	1.56	(0.85)
INV <sub>2</sub> •STOCK	$a_8$	-0.56	(-0.38)	-0.60	(-0.39)	-0.55	(-0.37)
STOCK	$a_9$	-1.78	(-0.55)	-2.52	(-0.76)	-1.67	(-0.52)
COMBO	$a_{10}$	-0.74	(-0.89)	-0.77	(-0.91)	-0.77	(-0.93)
MULT	$a_{11}$	-0.51	(-0.52)	-0.36	(-0.36)	-0.58	(-0.60)
TENDER	$a_{12}$	-1.08	(-1.32)	-0.99	(-1.18)	-1.13	(-1.37)
OWN <sub>1</sub>	$a_{13}$	0.66	(1.03)	0.80	(1.23)	0.53	(0.88)
OWN <sub>2</sub>	$a_{14}$	1.47	(1.55)	1.67	(1.72)*	1.62	(1.73)*
SIZE	$a_{15}$	0.14	(-0.78)	-0.18	(-1.01)	-0.73	(-0.63)
RUNUP <sub>1</sub>	$a_{16}$	0.15	(-1.06)	0.18	(1.23)	0.16	(1.13)
RUNUP <sub>2</sub>	$a_{17}$	-0.71	(-1.12)	-0.75	(-1.16)	-0.82	(-1.29)
$F$		2.10***		2.19***		2.08***	
$R^2$		0.10		0.11		0.10	
Adjusted $R^2$		0.05		0.06		0.05	
# of observations		324		324		324	

\*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.



Table 2.5 presents evidence consistent with notion that external monitors, particularly commercial banks, generate *additional* value gains for bidders in stock offers, compared to cash offers. In Table 2.5, with the market model generated CPE as the dependent variable, the coefficient estimate of the interaction term STOCK•BANK is 17.53, significantly positive at the 1 percent level (with *t*-values of 2.61). There is no evidence of any significant effects of Big Six accounting firms and first-tier investment banks on bidders' announcement excess returns in stock offers. The coefficient estimates of ACC•STOCK and INV<sub>1</sub>•STOCK variables are insignificantly different from zero at conventional levels. Unlike in Table 2.4, the high-ownership variable, OWN<sub>2</sub>, is no longer significant, implying that the managerial ownership effect is sensitive with respect to the sample selection (and, possibly, the definition of a "high" managerial ownership). Other independent variables are insignificantly different from zero, after controlling for the existence of banking relationship and managerial ownership.

Taken together, the results are consistent with the notion that the market uses the information of bidders' banking relationships to assess bidders' value in stock offers. The results on accounting firms and investment banks are insignificant. Why does the market view commercial banks to be more effective monitors than accounting firms and investment banks in stock offers ? One explanation is that accounting firms and investment banks may not commit as much capital or do not have as great an information advantage as do commercial banks. As Fama (1985) argues, bank loans place the commercial bank's equity at risk throughout the maturity of the loan, and, commercial banks have information access (to the client firms) that other market participants do not

have. Thus, commercial banks have both incentive and information advantage to monitor the client firms.

#### **2.6.4. Other variables and sensitivity tests**

Brown and Warner (1985) report that the estimation of excess returns is generally insensitive to the models selected. Nevertheless, mean- and market-adjusted (using value-weighted *CRSP* returns as benchmark) returns are also used to calculate CPEs for the dependent variable in the regression analysis. The use of mean-adjusted returns avoids the specification of risk factors of stock returns. The use of market-adjusted returns takes into account potential drastic market-wide price movements at the announcement dates. Table 2.5 also reports the regression results using two-day mean-adjusted returns to generate CPEs. The findings on external monitoring are similar to those using the market model CPE as the dependent variable. Only BANK•STOCK and OWN<sub>2</sub> have estimated coefficients significantly different from zero at the 10 percent level or better. Similarly, the regression results using the market-adjusted returns to calculate CPEs (not reported here) indicate that only BANK•STOCK and OWN<sub>2</sub> exhibit estimated coefficients significantly different from zero at conventional levels. BANK•STOCK obtains a coefficient estimate of 17.79 and a *t*-value of 2.65, significant at the 1 percent level, while OWN<sub>2</sub> has a coefficient estimate of 1.72 and a *t*-value 1.81, significant at the 10 percent level.

Slovin, Johnson, and Glascock (1991) argue that the firm size effect is not linear. The firm-size effect arises because relatively large firms tend to use prestigious investment banks and Big Six auditors. Fama (1985) and Diamond (1991) argue that the

benefits of certification and monitoring services provided by intermediaries like commercial banks are directly related to borrower size. This is because firm size is positively related to the amount of public information about the firm available in the market.

To address the firm-size effect, I use a binary variable that takes a value of one if the bidder is below the median market value of all industrial firms on the *CRSP* database; and zero otherwise. All industrial firms on the *CRSP* database, not just the all the firms in my sample, are used to eliminate the selection bias of the takeover sample. The results are reported in Table 2.5. This variable obtains an insignificant coefficient of -0.73 (*t*-value: -0.63). This suggests that the firm-size effect is not an important variable explaining bidders' announcement excess returns in takeovers. More importantly, the inclusion of this binary variable does not affect the coefficients of the external monitoring variables.

The impact of specification of independent variable  $INV_2$  (which takes the value of one if the identity of bidders' investment bank is not disclosed; and zero otherwise) on the regression results is tested. It is likely that the result (in Tables 2.4 and 2.5) that bidders' use of first-tier investment banks in stock offers does not affect bidders' announcement excess returns is due to the fact that about two-thirds of bidders in the entire sample do not disclose the identity of investment banks. To investigate this possibility, the regression analysis is conducted on the 94 takeover announcements where the identities of all three intermediaries (i.e. accounting firms, commercial banks, and investment banks) are disclosed.

Table 2.1 reports the summary statistics of this restricted sample. A comparison of these 94 announcements to the full sample (324 announcements) reveals that the bidders in the restricted sample are generally larger firms, have a lower managerial ownership, involve more competition, and are more likely to be tender offers. However, the distribution of the methods of payment is similar for both the full and restricted samples.

Table 2.6 presents the test results for the restricted sample. Consistent with the results for the full sample, Table 2.6 indicates that the market uses the information of bidders' banking relationship to re-assess bidders' value in stock offers. The evidence on external monitoring provided by auditors and investment banks are still insignificant. Specifically, the coefficient of interaction term of banking relationship and stock (i.e.,  $BANK \bullet STOCK$ ) is positive at the 5 percent level, with a point estimate of 35.78. Coefficient estimates of interaction terms  $ACC \bullet STOCK$  and  $INV_1 \bullet STOCK$  remain insignificantly different from zero at conventional levels. The high-ownership variable (which equals one if bidders' managerial ownership is larger than 25 %; and zero otherwise) has a coefficient estimate insignificantly different from zero at conventional levels.  $TENDER$  (for a tender offer), however, obtains a negative coefficient estimate at the 10 percent level. It is premature to make a conclusion simply based on this significant result on  $TENDER$  since  $TENDER$  is insignificant in the tests of the full sample. The fifth and sixth columns of Table 2.6 use bidders' mean-adjusted returns as the dependent variable; while the seventh and eighth columns use a binary variable to capture bidders' size (namely, the binary variable takes the value of one if bidders' equity

Table 2.6

Estimated coefficients of regressions cumulative excess returns surrounding takeover announcements where all the identities of accounting firms, investment banks, and commercial banks are known.

The coefficients are estimated using weighted least squares with the standard error of estimation-period residuals as the weighting factor to adjust for heteroscedasticity. ACC takes a value of 1 if the bidder uses a Big Six auditor, and 0 otherwise. INV<sub>1</sub> equals 1 if the bidder employs a prestigious investment bank in the takeover, and 0 otherwise. STOCK equals 1 for a stock offer, and 0 otherwise. COMBO takes a value of 1 for a combination offer, and 0 otherwise. TENDER equals 1 if the offer is a tender offer, and 0 otherwise. MULT takes the value of 1 if there is a knowledge that the offer involves multiple bidders at the announcement, and 0 otherwise. OWN<sub>1</sub> equals 1 if equity ownership by bidder's officers and directors as a group is below 5 %; and 0 otherwise. OWN<sub>2</sub> equals 1 if ownership by bidder's officers and directors is larger than 25 %; and 0 otherwise. SIZE is equal to the logarithm of the bidder's market capitalization in equations 5.1 and 5.2; and equals 1 if the bidder's market capitalization is below the median value of all industrial firms on the CRSP per-announcement period. RUNUP<sub>2</sub> is the price run-up of equally-weighted CRSP index over a 49-day pre-announcement period. Prestigious investment banks are First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley, and Salomon Brothers. BANK is calculated as 'debt in current liabilities' minus 'debt due in one year' scaled by the sum of debt's book value and equity's market value. Big Six auditors are Arthur Anderson, Coopers & Lybrand, Deloitte & Touche, Ernst and Young, KPMG Marwick, and Price and Waterhouse. *t*-values are in parentheses.

Independent variable	Coeff.	Market model CPE	Mean-adjusted CPE	Binary size
Intercept	$a_0$	5.33 (0.91)	6.63 (1.10)	-0.27 (-0.05)
ACC	$a_1$	0.57 (0.11)	0.50 (0.09)	2.44 (0.41)
BANK	$a_2$	-14.71 (-1.17)	-19.93 (-1.54)	-18.06 (-1.35)
INV <sub>1</sub>	$a_3$	-0.73 (-0.49)	-0.42 (-0.27)	-1.13 (-0.75)
ACC•STOCK	$a_4$	-1.59 (-0.16)	2.00 (0.27)	-3.94 (-0.50)
BANK•STOCK	$a_5$	35.78 (2.14)**	39.25 (2.27)**	41.94 (2.34)***
INV <sub>1</sub> •STOCK	$a_6$	1.19 (0.54)	1.08 (0.48)	1.22 (0.56)
STOCK	$a_7$	-5.00 (-0.67)	-8.62 (-1.13)	-2.12 (-0.27)
COMBO	$a_8$	-3.49 (-1.63)	-3.88 (-1.75)	-3.29 (-1.58)
MULT	$a_9$	-1.42 (-0.74)	-0.95 (-0.48)	-1.18 (-0.61)
TENDER	$a_{10}$	-4.18 (-1.95)*	-4.48 (-2.03)*	-4.47 (-2.03)*
OWN <sub>1</sub>	$a_{11}$	2.54 (1.63)	3.12 (1.94)	1.90 (1.31)
OWN <sub>2</sub>	$a_{12}$	1.04 (0.48)	1.44 (0.64)	1.50 (0.69)
SIZE	$a_{13}$	-0.51 (-1.14)	-0.67 (-1.44)	4.17 (1.25)
RUNUP <sub>1</sub>	$a_{14}$	0.12 (0.31)	0.15 (0.37)	0.08 (0.20)
RUNUP <sub>2</sub>	$a_{15}$	-1.73 (-0.95)	-1.95 (-1.04)	-1.49 (-0.82)
<i>F</i>		1.65*	1.71*	1.67*
<i>R</i> <sup>2</sup>		0.24	0.25	0.24
Adjusted <i>R</i> <sup>2</sup>		0.10	0.10	0.10
# of observations		94	94	94

\*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

value is lower than the median value of all industrial firms on the *CRSP* database, and zero otherwise). The results indicate that the conclusions about auditor, banking relationship, and investment banks remains the same as in Table 2.5 with respect to specifications of bidders' announcement excess returns, equity size, and variables pertaining to studies of seasoned equity offerings (such as bidders' stock price run-up and price run-up of equally-weighted *CRSP* index returns over the pre-announcement period).

Table 2.6 can be interpreted with the following example to illustrate the value generated by bidders' commercial banking relationship in stock offers. Consider two bidders in stock takeovers: bidder 1 with a 4 % bank debt (which is approximately at the bottom of the highest quartile among all bidders in the sample) in its capital structure, and bidder 2 with a zero bank debt. Further assume that the choice of auditor quality, the choice of investment bank quality, and the managerial ownership are the same for two bidders. The third and fourth columns of Table 2.6 indicate that the share price reaction to bidder 1's stock offer announcement would be 1.43 ( $= 0.04 \bullet 35.78$ ) percentage points higher than that to bidder 2's stock offer announcement.

Finally, because over 96 percent of the sample employed a "Big Six" accounting firm, ACC effectively becomes the intercept. To check for effects of this specification, the regressions in Table 2.5 were estimated without ACC. The results are similar with the exception that the estimate of coefficient on STOCK becomes significant at the 10 percent level (coefficient = -2.70,  $t = -1.80$  for the market model CPE regression). This

finding is consistent with prior finding that announcement effects for bidders in stock transactions are smaller than those for cash or combination offers. The details are not presented here. Similar results are obtained for the regressions in Table 2.6 where ACC is omitted.

## **2.7. Conclusions**

Previous studies have provided two major theories to explain the choice of medium of exchange in takeovers: tax considerations, and private information revealed by announcements of equity-financed takeovers. In this paper, Titman and Trueman's (1986) model of entrepreneurs' choice of intermediary quality in new shares offerings is modified to analyze how the choice of financial intermediaries that monitor the firm conveys private information possessed by corporate insiders in a takeover. Next, empirical tests determine whether the financial market uses the information about a bidder's choice of investment bank, accounting firm, and commercial banking relationship to assess the private information possessed by the bidder's managers in a stock offer. The results on commercial banks are consistent with the theory of financial intermediation. In stock offers, the share price reactions are positively related to bidders' commercial banking relationship. Further, of all takeover announcements in the sample, the external monitoring generated by bidders' commercial banking relationship in stock offers generates higher value gains to the bidders, relative to those for cash offers. Evidence that the choice of high-quality accounting firms and first-tier investment banks alters the market reactions to announcements of stock offers is not found. Thus, the results presented in this paper suggest that commercial banks are effective external

**monitors and serve to reveal the private information possessed by corporate insiders about the prospects of the firm.**



## **Chapter 3**

### **Analysts' Earnings Forecasts for Takeover Targets and Medium of Exchange**

#### **3.1. Introduction**

Theories which employ informational asymmetry to explain why managers of bidding firms choose equity or cash as the medium of exchange in takeovers differ from one another in the focus of that asymmetry: (1) the value of the bidding firm's shares, (2) the value of any synergy, and (3) the value of the target firm's shares. Although there is plenty of empirical evidence on the first two theories (see Wansley, Lane, and Yang, 1987, Travlos, 1987, and Huang and Walkling, 1987, for the first theory, and Kaplan and Weisbach, 1992, for the second one), empirical evidence on the third theory is relatively scarce.

The objective of this paper is to offer new evidence on whether the medium of exchange in takeovers conveys information about the value of target firms. Previous literature has examined the stock returns of the targets in takeover bids (e.g., Wansley, Lane, and Yang, 1983, and Sullivan, Jensen, and Hudson, 1994). This stock-return approach, however, is difficult to interpret since it combines any information effects of the medium of exchange with the tax effects associated with the medium of exchange. A tax effect results from the fact that gains to shareholders of the targets in cash transactions are immediately taxable, while gains to shareholders of the targets in stock-financed takeovers are deferred until the new shares are sold (see Wansley, Lane, and Yang, 1983, and Huang and Walkling, 1987). This study avoids the tax effect by

examining whether analyst earnings forecast revisions for target firms depend on the payment method in takeover bids. The major hypothesis tested is that an announcement of using cash to finance a takeover conveys favorable information about the value of the target firm, while the use of equity as the payment method signals relatively unfavorable information.

In contrast to a similar prior study (Brous and Kini, 1993), this study finds that financial analysts do not unambiguously revise upward their earnings forecasts for the target firms in takeover attempts. Specifically, the results in this study indicate that, for all tender offers in the sample, analysts significantly raise their earnings forecasts for the current forecast-year for the target firms at the month following the initial takeover announcement, but not for the following forecast-year. The present study and the study by Brous and Kini differ by time period studied. The difference in time is significant in that during earlier period cash dominated these transactions, while stock is the dominant medium of exchange during the more recent period. This suggests that the difference in results is likely to be time dependent.

This study also finds that unexpected earnings forecast revisions for the targets in cash tender offers do not significantly differ from those in tender offers that are financed in part by stock. This result holds regardless of whether revised earnings forecasts are for the current forecast-year or the following forecast-year. This suggests that the market does not perceive the choice of payment method in takeovers to convey information about the target's value.

The remaining of this paper is organized as follows. Section 3.2 reviews related theories and empirical evidence. Section 3.3 discusses the foundation of the empirical analysis used in this study. Section 3.4 sets out major hypotheses. Section 3.5 describes method of analysis. Empirical results are provided in section 3.6. Section 3.6 concludes this chapter.

### **3.2. Related models and empirical evidence**

Myers and Majluf (1984) focus on the information asymmetry between the firms' managers and outside investors over the value of the firms' shares. Myers and Majluf argue that the market believes that managers will not issue common shares unless they view the shares of their firms to be overvalued in the market. Thus, in a takeover, the market would interpret the use of bidder's stock as payment method as unfavorable information, while the use of cash as favorable information about the bidders' value.

Empirical evidence provided by Wansley, Lane, and Yang (1987), and Travlos (1987) is consistent with Myers and Majluf's (1984) argument on payment method in takeovers. Specifically, Wansley, Lane, and Yang (1987) find that the announcement excess returns to stockholders of the bidder are significantly positive for cash bids but significantly negative for bids financed by securities. In addition, Travlos (1987) finds that irrespective of acquisition type (i.e., mergers or tender offers), cash offers are associated with significantly positive announcement-period excess returns to bidders, while equity-financed bids are associated with significantly negative excess returns to bidders. Furthermore, nonconvertible bonds issued by bidders involved in equity-financed takeovers experience significantly negative excess returns at the takeover

announcement, while those issued by bidders in cash offers experience slightly positive excess returns. Taken together, the evidence is supportive of the notion that the market views a cash offer as good news and a stock offer as bad news about the bidders' value.

Fishman (1987) assumes that both the bidder and the target have private information about the valuation of the target (operated as part of the bidder). He also assumes that costs of collecting information about the valuation for the target are nontrivial, and a takeover offer will bring forth potential competition for the target. Under these settings, when the bidder has information that the target has a relatively high valuation, the bidder will use cash to acquire the target and to pre-empt a competing bid. When the bidder's information about the valuation for the target is less optimistic, the bidder will use equity as the payment method to solicit the private information possessed by the target.

Empirical evidence provided by Kaplan and Weisbach (1992), however, is inconsistent with Fishman's argument (1987). Kaplan and Weisbach find that, *ex post*, the cash acquisitions are just as likely to be poorly performing as the takeovers funded through equity.

Hansen (1987) emphasizes the information asymmetry between the target's managers and outside investors about the value of the target's assets. In Hansen's theory, when the target firm has private information that the acquirer does not have about the target's value, for every cash offer that is acceptable (i.e. wealth increasing) to the acquirer, there exists a stock offer that dominates that cash offer. That is, the expected wealth of the stock offer exceeds that of the cash offer.

To reconcile his theory with the empirical observation of some cash offers, Hansen (1987) introduces into his model the tax effect associated with payment method (discussed in section 3.1). In the presence of a tax effect, the optimal choice of payment method (cash or stock) faced by the bidder depends on the relative importance of the tax effect and private information possessed by the target firm. Another means to reconcile Hansen's theory with the existence of cash offers is to allow the acquirer to have private information about the value of its assets. Like the tax effect, the information advantage on the bidder's side reduces the importance of information advantage on the target's side, and, thus, allows the model to be consistent with the empirical observation of some cash offers.

Sullivan, Jensen, and Hudson (1994) provide evidence consistent with the notion the medium of exchange conveys information about the value of the target firms. They examine whether differences in the market's reaction to terminated merger proposals depends on the medium of exchange. Examining 123 merger proposal announcements over 1980 - 1988 that were subsequently canceled, Sullivan, Jensen, and Hudson find significantly higher cumulative excess returns for target shareholders after termination of cash offers than after termination of stock offers, even when no subsequent bids follow. They interpret this result as supportive of the view that the medium of exchange conveys information about the target firms' stand-alone value or its unique synergy potential, consistent with Fishman (1987). Further, Sullivan, Jensen, and Hudson (1994) do not find a revaluation of the bidders' shares after the termination of merger proposals. It is possible, however, that the insignificant difference in the returns for the bidding firms is a

consequence of the "long-term" nature of the period examined (which starts at the announcement date and ends at the termination date).

### **3.3. Foundation of the analysis**

This section discusses two key assumptions underlying the analysis: one, financial analysts continue to provide forecasts for target firms as stand-alone entities, and two, revisions of analysts' forecasts of earnings represent changes in the market's expectations about the firm's value.

#### **3.3.1. Do analysts continue to issue forecasts for the firms in takeover bids as stand-alone entities ?**

This chapter assumes financial analysts continue to provide forecasts for target firms as stand-alone entities during takeover bids. Pound (1988) examines retail reports from brokerage houses, conducts a survey, and concludes that during takeover bids, analysts indeed issue forecasts for target companies as independent entities, rather than as a part of bidders. As Pound points out, takeover contests normally result in large share price increases for target firms, and thus, create high demand among investors for analysts' evaluations of the targets. To meet this high demand and assist investors in assessing the fairness of takeover prices offered by bidders, analysts continue to forecast stand-alone earnings (and values) for target firms. One example provided by Pound (1988, p. 209) is the following:

*"In evaluating the fairness of Nestle's 1984 bid for Carnation, Value*

*Line stated: 'The offer is a fair one, in our opinion. It is 14.4 times*

*1984's estimated earnings and 12.6 times 1985's – a healthy price for a food company, even one as cash rich and profitable as Carnation.'"*

### **3.3.2. Do revisions of analysts' forecasts of earnings reflect changes in the market's expectations ?**

Several studies suggest that revisions of analysts' forecasts of earnings impound the information relevant to the pricing of the underlying securities. Brown and Rozeff (1978) compare time-series models with analyst forecasts, and conclude that analyst forecasts are superior to time-series models as measures of expectations of earnings. Brown, Foster, and Noreen (1985) provide an extensive analysis and summarize other research on analysts' earnings forecasts. They conclude that there is significant positive covariance between analyst forecast revisions and *firm-specific* excess returns. This implies that analysts revise their earnings forecasts in concert with the information that affects the value of securities.

Studies of various other financial events have viewed revisions of earnings forecasts as indicative of the information content of the event. Among these events are: open-market share repurchases (Bartov, 1991, and Hertznel and Jain, 1991), seasoned equity offerings (Healy and Palepu, 1990, and Brous, 1992), tender offers (Pound, 1988, and Brous and Kini, 1993), dividend policy (Ofer and Siegel, 1987, and Shen, 1994), and equity-for-debt swaps (Israel, Ofer, and Seigel, 1989). For example, Brous (1992) reports that analysts systematically revise downward earnings forecasts for the firms that announce plans to issue seasoned equity. This finding is consistent with the view that announcements of seasoned equity offerings convey unfavorable information about the

value of the firm. Pound (1988) and Brous and Kini (1993) examine whether takeover bids convey information about the target firms by analyzing analyst forecasts. Neither Pound or Brous and Kini examine the medium of exchange in takeovers.

If the bidder and the target have private information about *the value of the target* (instead of the value of any synergy), the bidder will use cash to acquire the target when the bidder has information indicating a relatively high valuation of the target. Cash is also used to pre-empt competing bids because the use of cash signals a high valuation of the target, and the competing bidders' expected payoffs decrease in the initial bidder's valuation of the target (Fishman, 1987). (The bidder learns of the value of the target by expending resources to collect information about the target's assets.) When the bidder is less certain of its information about the value of the target, equity will be offered to solicit the information possessed by the target. Based on this argument, we expect to observe revisions of analyst earnings forecasts for target firms in cash takeover bids to exceed those in securities-exchange acquisitions. That is, revisions of analysts' forecasts of earnings for the target firms in response to announcements of cash takeover bids should exceed revisions in response to announcements of equity-financed offers.

### **3.4. Method of Analysis**

#### **3.4.1. Estimating excess earnings forecast revisions**

Previous research has identified two statistical properties of analysts' earnings forecasts that are relevant in determining the excess earnings forecast revisions. First, O'Brien (1988) and Brous (1992) report that analysts' earnings forecasts are subject to an optimism bias. Analysts, on average, tend to overestimate earnings at the early stage



of the forecast-year and then systematically revise downward their forecasts as time goes by. This optimism bias implies that the observed monthly earnings forecast revision (i.e. the difference between the mean of the earnings forecasts for a firm at month  $t$  and at month  $t-1$ ) is not zero.

Second, Brous and Kini (1993) observe that approximately 20 percent of the analysts following the same firm update their forecasts each month. This implies that any information released in a particular month will be impounded in the means of monthly analysts' forecast revisions over several *subsequent* months. Thus, the means of monthly forecast revisions should be positively serially correlated. For example, suppose a favorable information about the prospects of IBM was released in May, and 20 percent of the analysts following IBM update their earnings forecasts at the end of May. Without losing generality, assume no other information about IBM is released during the subsequent four months. Under this scenario, we would expect to observe positive earnings forecast revisions at the end of May because of the favorable information. We should also expect to observe positive forecast revisions over four subsequent months because the remaining 80 percent of the analysts following IBM would impound this favorable information into their forecasts over this four-month period. Therefore, in general, the serial correlation of the means of monthly forecast revisions is positive. Brous (1992) provides evidence for the serial correlation of monthly forecast revisions.

Because of these two features of analysts' forecast revisions, a fourth-order moving average time-series model is used to estimate unexpected earnings forecast revisions. A fourth-order (rather than fifth-order) moving average model capture the

observation that, on average, 20 percent of the analysts update their forecasts each month. In general, if  $1/N$  of the analysts update their forecasts every month, an  $(N-1)th$  order moving average is appropriate to specify the process of analysts' forecast revisions.

A fourth-order moving-average (MA(4)) model is used instead of an autoregressive (AR) model because the autocorrelation of observations in an MA(4) model is well consistent with the positive serial correlation of monthly analyst forecast revisions (as discussed above). In contrast, an AR model (i.e.,  $Y_t = \theta Y_{t-1} + \dots$ ) does not correspond with the process of analyst forecast revisions. An autoregressive integrated moving average (ARIMA) model is not used in the analysis because there is no economic theory or evidence on analyst forecast behavior to support the adjustment of 'integration' (e.g., by applying the operation of  $y_t - y_{t-1}$  to the entire time-series observations). Hamilton (1994) provides a detailed discussion about the statistical properties of AR, MA, and ARIMA models.

The analysis follows Brous and Kini's (1993) procedure for estimating the unexpected forecast revisions. The observed (unadjusted) monthly analyst earnings forecast revision for firm  $i$  during month  $t$ ,  $FR_{it}$ , is calculated:

$$FR_{it} = (F_{it} - F_{it-1}) / P_{it-1} \quad (20)$$

where  $F_{it}$  = mean of analysts' earnings forecasts for firm  $i$  at month  $t$ ,

$P_{it-1}$  = price of common stock of firm  $i$  at the end of month  $t-1$ .

Share price,  $P_{it-1}$ , rather than other variables such as actual earnings per share, is used to deflate the difference in earnings forecasts in equation (20) for two reasons. First, Christie (1987) suggests that share price is less correlated with earnings than are other

variables. Second, Pound (1988) argues that the use of share price as the denominator improves the distribution of earnings revisions, relative to normalizing on previous earnings or previous forecasts, because earnings series are highly unstable (for example, switching from negative to positive earnings for two consecutive quarters or years) and seasonal. Brous and Kini (1993) also use the share price to deflate earnings forecasts to obtain forecast revisions, as in equation (20).

Because financial analysts are subject to the optimism bias described above, each earnings forecast revision is decomposed into forecastable and unforecastable components:

$$FR_{i,t}^k = \alpha_i + \gamma_{i,t} \quad (21)$$

where  $FR_{i,t}^k$  = forecast revision for firm  $i$  submitted by individual analyst  $k$  at month  $t$ ,

$\alpha_i$  = forecastable component of forecast revision for firm  $i$ ,

$\gamma_{i,t}$  = unforecastable component of forecast revision.

$\gamma_{i,t}$  is not serially correlated because the probability of the arrival of favorable information (relating to firm  $i$ ) is expected to be the same as that of unfavorable information. The term  $\gamma_{i,t}$  reflects the information analysts receive or process during the current month  $t$ .

Suppose analysts update their earnings forecasts every  $n$  months. The 'aggregate' forecast revisions for the group of analysts who update their forecasts during month  $t$ ,  $GFR_{i,t}$ , can be expressed as:

$$GFR_{i,t} = n\alpha_i + \sum_{j=0}^{n-1} \gamma_{i,t-j} \quad (22)$$

The lagged terms of  $\gamma_{i,t-j}$  (i.e.,  $\gamma_{i,t-1}, \gamma_{i,t-2}, \dots, \gamma_{i,t-(n-1)}$ ) are included to reflect the information about the firm's prospects that was received or processed by the  $\frac{1}{n}$  of analysts over the preceding  $n-1$  months.

The mean earnings forecast revision for firm  $i$  at month  $t$ ,  $FR_{i,t}^*$ , is then :

$$FR_{i,t}^* = \frac{1}{n} GFR_{i,t} = a_i + \frac{1}{n} \sum_{j=0}^{n-1} \gamma_{i,t-j} \quad (23)$$

In this study,  $n$  is equal to 5 because approximately 20percent of the analysts whose earnings forecasts are available on the I/B/E/S database, which is used in this study, are assumed to update their forecasts each month (Brous and Kini, 1993).

The expected mean forecast revision at month  $t$  for firm  $i$ ,  $E(FR_{i,t}^*)$ , is estimated by taking the expectation of equation (23). That is:

$$E(FR_{i,t}^*) = a_i + \frac{1}{n} \sum_{j=1}^{n-1} \gamma_{i,t-j} \quad (24)$$

The term  $\gamma_{i,t}$  drops out of the equation (24) because  $E(\gamma_{i,t})$  is zero [to be technically correct,  $E(\gamma_{i,t} | \text{time} = t) = 0$ ], reflecting the notion that the impact on share prices of good news is, on average, the same as that of bad news.

The unexpected forecast revision at month  $t$  for firm  $i$ ,  $UFR_{i,t}$ , can be written as:

$$UFR_{i,t} = FR_{i,t}^* - E(FR_{i,t}^*) = \gamma_{i,t} \quad (25)$$

To obtain the expected forecast revisions, defined by equation (24), the MA(4) model is estimated using all months for which earnings forecasts are available, excluding event months -6 to +6, consistent with Brous and Kini (1993). The unexpected component,  $\gamma_{i,t-j}$ , is measured as the difference between the forecastable component,  $a_i$ ,

and the actual forecast revision in month  $t$ . Thus, the expected forecast revision for firm  $i$  in month  $t$  equals  $a_i$ , plus the weighted average of the four previous months' unexpected component, where the weights are equal to 0.5.

### **3.4.2. Alignment between event dates and I/B/E/S earnings forecasts**

It is important to incorporate analysts' behavior of updating their earnings forecasts in estimating unexpected earnings forecasts. Brown, Foster, and Noreen's (1985) survey of analysts' behavior indicates that approximately 85 percent of all financial analysts revise their earnings forecasts in response to earnings-related information within five business days. Thus, seven calendar days are allowed from the initial takeover announcement date to the first possible date when I/B/E/S recorded an earnings forecast revision related to the takeover announcement. That is, the event month zero for forecasts is defined as the thirty-calendar-day window from 7 calendar days after to 36 days after the initial announcement date.

### **3.4.3. Multivariate regression analysis**

Multivariate regression framework is used to analyze whether the medium of exchange and managerial resistance to a takeover bid convey information about the value of target firms. The model is specified as:

$$UFR_i = \alpha_0 + \alpha_1 METHOD_i + \alpha_2 RESIST_i + \varepsilon_i \quad (26)$$

where  $UFR_i$  = unexpected forecast revision in response to takeover bid announcement  $i$ , as defined by equation (25);

$METHOD_i = 1$  for an offer funded through stock or a combination of

cash and stock; 0 for a cash offer;

$RESIST_i = 1$  if the target's management is opposed to the bid within 30 calendar days subsequent to the initial takeover announcement; and 0 otherwise;

$\varepsilon_i =$  statistical error term.

No interaction term, i.e.,  $METHOD_i \bullet RESIST_i$ , is included in equation (26) because none of combination offers in my sample are hostile takeovers. The inclusion of this interaction term would cause a serious multicollinearity problem in estimating the coefficients in equation (26).

The independent variable  $RESIST_i$  indicates whether the target's managers are opposed to the bid over a 30-day period following the initial takeover announcement.  $RESIST_i$  is included in the analysis because Pound (1988) reports that analysts' forecasts of earnings fall significantly when the target's management resists the takeover bid. A 30-day period is chosen to incorporate all effects of resistance on unexpected earnings forecast revisions because the dependent variable in the regression is *monthly* unexpected earnings forecast revisions. Table 3.2 indicates that most of the targets in hostile takeover attempts (14 out of 17, or 82.35 percent) in the sample disclose the targets' attitude toward the bid within 30 calendar days subsequent to the initial takeover announcement.

The test of the hypothesis described in section 3.3 is equivalent to the test of coefficients  $\alpha_1$ . That is, if forecast revisions in cash offers exceed those in stock offers, then  $\alpha_1$  should be negative.

#### 3.4.4. "Whisper earnings"

Forecasts of yearly rather than quarterly earnings are used in estimating unexpected forecast revisions to minimize the problem associated with the "whisper earnings" phenomenon. The following section describes the "whisper earnings" phenomenon and discusses the implications. The *Wall Street Journal* (January 15, 1997) reports that after the close of a quarter (and before the actual earnings announcement date), published earnings forecasts for that quarter no longer represent the market's expectations. Instead, the market's "true" expectations on which traders make their buy or sell decisions are "whisper earnings", rumors which swirl among traders and institutional investors. "Whisper earnings" likely exist because analysts tend to focus on the upcoming year, and the close of a quarter typically precedes the actual earnings announcement date by a few weeks. Thus, once a quarter is over, analysts rarely update their earnings forecasts for that quarter. As an analyst interviewed by the *Wall Street Journal* (January 15, 1997, p. C1) put it:

*"Once a quarter is over, I never bother changing [earnings] estimates.*

*..... The focus is on the coming year."*

The implications of the [arguable] existence of "whisper earnings" for this study are that, in the case where takeover bids are announced surrounding the close of a quarter and the actual earnings announcement dates, observations of analysts' earnings forecasts are truncated (i.e. some of earnings forecasts are unobservable). These unobservable earnings forecasts would have been available had these analysts continued to issue forecasts after the close of a quarter. Also, for takeover bids that are announced

well before the close of a quarter, analyst forecasts should not be subject to the "whisper earnings" phenomenon, and, thus, the forecasts for these announcements do not suffer a loss of observations (i.e. truncation).

There are at least two possible approaches to minimize the problem associated with the "whisper earnings" phenomenon. The first approach, used here because of the sample size concern, is to analyze annual rather than quarterly earnings forecasts. Annual forecasts have fewer truncated observations around the takeover announcement dates than do quarterly forecasts because more takeover announcements fall between the close of a *quarter* and the actual earnings announcement date than between the close of a *fiscal year* and the actual earnings announcement date corresponding to that year (since the number of quarters exceeds that of years in a fixed time span). Second, takeover bids can be disaggregated based on whether they are announced between the close of a quarter and the actual earnings announcement date. Test results of these two groups of takeover bids are then contrasted to examine whether the results on the entire sample are robust to the reported "whisper earnings" phenomenon.

The existence of "whisper earnings", nevertheless, implies that some analyst forecasts around the close of a quarter are still not reported by analysts over the *estimation period* used here to estimate the unexpected earnings forecast revisions. The second approach is not used because only 10 combination offers and 74 cash offers (all of which are tender offers) during January 1988 to December 1995 survive the sample selection criteria of this study. Imposing the restrictions of the second approach would have resulted in further reduction of the sample size.



### 3.5. Data

The initial takeover announcements come from *Mergerstat Review* and *Mergers and Acquisitions* over the period January 1988 to December 1995. These announcements are then checked against all 14D-1 forms compiled by the Lexis/Nexis Inc. to identify tender offers. A tender offer is a takeover attempt where the bidder bypasses the target firm's board of directors and offers to buy shares directly from target firm shareholders. The bidder in a tender offer is required to file a 14D-1 form to the Securities and Exchange Commission. To be included in the final sample of this study, the target firms must meet the following criteria:

First, the bidder must intend to obtain more than 50 percent of the target's common shares outstanding. Partial acquisitions of 50 percent or fewer of the shares are excluded from the sample.

Second, the target's share prices must be available on the *CRSP* database so that analyst earnings forecasts can be normalized by the target's share price, as discussed in section 3.5.1.

Third, each target firm must be followed by financial analysts whose earnings forecasts are available on the *I/B/E/S* database.

Fourth, the announcement date is defined as either the first filing date of 14D-1 forms submitted to the SEC or the initial *Wall Street Journal* announcement date, whichever is earlier.

Fifth, the *Wall Street Journal Index* is searched to determine whether there are subsequent changes in method of payment. Any takeover in which the payment method

switches either from cash to stock or from stock to cash is excluded from the sample. Changes in payment method make it difficult to unambiguously define the payment method for the target, particularly when the two different payment methods are announced within a 30-day time span (since estimates are of *monthly* forecast revisions in response to a takeover announcement).

Sixth, the information whether the target's management resists a takeover attempt comes from the *Wall Street Journal Index*.

Seventh, the bidder must be a publicly-traded firm so that the bidder can choose from cash, stock, and combination of cash and stock as payment method.

### 3.6. Empirical Results

Tables 3.1 presents the frequency distribution of the tender offers in the final sample. Of the 84 tender offers where analysts' forecasts of earnings per share for the current forecast-year for the targets are available at the takeover announcement in the sample, 74 announcements, or 88.10 percent, take the form of cash as payment method. The remaining 10 tender offers, or 11.90 percent, are funded through a combination of cash and stock. Surprisingly, no stock offers survive the data selection criteria as described in section 3.5. There are two stock tender offers (the target firms: CMX Corp. and Costar Corp.) appearing over the period January 1988 to December 1995. However, revisions of analysts' forecasts of yearly earnings for CMX Corp. reported by the I/B/E/S end at November 30, 1983, nearly five years earlier than the offer announcement date November 8, 1988. Revisions of forecasts of earnings for Costar Corp. are also unavailable on the I/B/E/S database seven calendar days subsequent to the

Table 3.1

Frequency distribution of the sample of tender offers announced over the period January 1988 to December 1995

The targets of these tender offers are followed by financial analysts whose forecasts are available in the I/B/E/S database at the takeover announcements. In addition, the bidders must intend to obtain more than 50 percent of the targets' common shares outstanding. No partial acquisitions are included. The targets' share prices must be available on the CRSP database. The bidders are publicly-traded firms.

	1988	1989	1990	1991	1992	1993	1994	1995	Total
Cash offers	22	6	7	9	5	9	10	6	74
Combination offers	1	0	1	2	2	1	2	1	10
Stock offers	0	0	0	0	0	0	0	0	0
Total	23	6	8	11	7	10	12	7	84

offer announcement date, making data insufficient to estimate analysts' response to the announcement (see section 3.4.2 for why there must be at least seven days allowed from the takeover announcement date to the first date when I/B/E/S recorded a forecast revision related to the takeover announcement).

Table 3.2 provides summary statistics of the target firms in the sample. Overall, the characteristics (except the target's attitude toward a takeover bid) are similar in cash offers and combination offers. During the takeover month (i.e. a month subsequent to a tender-offer announcement), the mean value of the number of revisions of earnings for a target in a cash offer is 3.64, and the median value is 2. For combination offers, the mean value of the number of forecast revisions for a target during the takeover month is 3.8, while the median value is 3. For all months excluding months -6 to +6, the difference in the numbers of revisions of earnings for a target in cash offers and in combination offers is likewise insignificant. The mean values of forecast revisions for cash offers and combination offers are 2.7 and 3.6, respectively. The median values for cash offers and combination offers are the same (i.e., 3). There is, however, a difference in the target's attitude toward a bid between cash offers and combination offers. In seventeen of the 74 cash offers, or 22.97 percent, the target firm resists the takeover attempts. In contrast, none of the targets in the ten combination offers publicly resist the bids. Of these 17 hostile cash tender offers, 14 targets (or 82.35 percent) disclose their disapproval toward the bid within 30 calendar days subsequent to the initial takeover announcement. Of the ten combination offers, six have sufficient information to

Table 3.2

## Descriptive statistics of target firms in the sample

			Range	
	Mean	Median	Minimum	Maximum
Number of forecast revisions submitted by analysts for the target in the takeover month:				
Cash offers	3.54	2	1	11
Combination offers	3.87	3	1	7
Number of forecast revisions submitted by analysts for the target each month (excluding months -6 to +6):				
Cash offers	2.7	3	0	38
Combination offers	3.6	3	0	23
Market value of the target's equity before the announcement (in \$ million) :				
Cash offers	413.88	115.21	1.10	7,690
Combination offers	406.07	244.36	34.40	4,343
Percentage of value offered for stock in combination offers where this percentage is known:				
Combination offers	54.56	50.01	40.00	80.00
Percentage of takeover attempts where the target's management resists the takeover:				
Cash offers	22.97 (i.e., 17 out of 74)			
Combination offers	0.00			
Percentage of hostile takeover bids where the target's attitude toward a bid is disclosed with 30 calendar days following the initial takeover bid:				
Cash offers	82.35 (i.e., 14 out of 17)			
Combination offers	Not applied			

determine the percentage of the dollar value paid for by stock. The mean value of this percentage is 54.56, while the median value is 51.

Table 3.3 reports the average unexpected forecast revision for the sixteen months surrounding the takeover announcement for all targets for which forecasts of current-year earnings are available. Consistent with Brous and Kini (1993), the average unexpected forecast revision of earnings for the current forecast-year over the month following the initial announcement (i.e., event month zero) is significantly positive at the 10 percent level, and 50.7 percent of revisions are positive (significant at the 5 percent level based on Wilcoxon Signed Ranks test). Further, Brous and Kini argue that the measures of analysts' forecast revisions in their study (and, therefore, in this chapter) are understated because investment banking and legal fees related to the bid are likely to incur in the year of a takeover attempt. Thus, the result on revisions of analysts' forecast of earnings for the current-fiscal year is consistent with the notion that a takeover announcement conveys favorable information about the value of the target firm. The mean and median unexpected forecast revisions for the target in response to the takeover announcement are 0.015649 and 0.000588, respectively.

Table 3.4 presents monthly revisions of analysts' forecasts of earnings for the following- fiscal year. In contrast to Table 3.3, Table 3.4 does not support the notion that an takeover announcement conveys information about the value of the target. At event month 0, neither the mean nor the median value of the unexpected revisions of following-year earnings forecasts is significantly different from zero at conventional levels. The insignificant results formed here for the following forecast-year are

Table 3.3

Monthly average unexpected forecast revisions (UFR) of earnings per share for the current forecast-year for the takeover announcements made over January 1988 - December 1995: All offers

Each event month is a 30-day interval, relative to event month zero. Event month zero is defined as the 30-day interval, (+7, +36), relative to the takeover announcement date, as described in section 3.4.2. FR denotes forecast revisions. The unexpected forecast revisions, UFR, are calculated by using a fourth-order moving average model. The null hypotheses are, one, the average unexpected earnings forecast revision equals zero, and, two, the percentage of positive unexpected forecast revisions equals 50 percent. *t* test and Wilcoxon signed ranks test are used to test the first and second hypotheses, respectively.

	# of Month obs.	Raw FR	Expected FR	Mean UFR	<i>t</i> -value	Median UFR	% positive UFR
-11	103	0.001713	-0.007579	0.009292**	2.18	0.000357	54.4
-10	97	-0.009753	0.001183	-0.010936	-1.02	-0.001030	46.4
-9	102	-0.007514	0.005316	-0.012829*	-1.95	-0.001159	40.2*
-8	103	-0.003621	0.004352	-0.007973	-1.50	-0.000421	48.5
-7	111	-0.003442	-0.000618	-0.002418	-0.49	-0.000459	44.6
-6	104	-0.008223	-0.003379	-0.004861	-1.17	0.000272	50.5
-5	102	-0.000854	-0.002004	0.001263	0.17	-0.000311	47.6
-4	102	-0.004130	-0.003068	-0.001193	-0.18	-0.001476	42.3
-3	101	-0.010308	-0.002323	-0.008616	-1.41	-0.001809	39.4**
-2	100	-0.000618	-0.001969	0.001261	0.29	0.000506	52.9**
-1	94	-0.012455	-0.001381	-0.011842	-1.55	-0.002006	36.5**
0	84	0.012977	-0.002673	0.015649*	1.86	0.000588	50.7**
1	61	-0.014183	0.003593	-0.017775	-1.42	-0.001462	41.2
2	38	-0.011534	0.001128	-0.012662	-0.77	0.001099	55.3
3	26	-0.002833	-0.001897	-0.000936	-0.04	0.000031	50.0
4	21	-0.010204	0.001269	-0.011473	-0.52	0.000777	52.4

\*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively, at two-tailed tests.

Table 3.4

Monthly average unexpected forecast revisions (UFR) of earnings per share for the following forecast-year for the takeover announcements made over January 1988 - December 1995: All offers

Each event month is a 30-day interval, relative to event month zero. Event month zero is defined as the 30-day interval, (+7, +36), relative to the takeover announcement date, as described in section 3.4.2. FR denotes forecast revisions. The unexpected forecast revisions, UFR, are calculated by using a fourth-order moving average model. The null hypotheses are, one, the average unexpected earnings forecast revision equals zero, and two, the percentage of positive unexpected forecast revisions equals 50 percent. *t* test and Wilcoxon signed ranks test are used to test the first and second hypotheses, respectively.

	# of Month obs.	Raw FR	Expected FR	Mean UFR	<i>t</i> -value	Median UFR	% positive UFR
-11	76	0.021332	0.002036	0.002949	0.68	0.001617	57.1
-10	74	0.002215	-0.002105	0.004321	0.66	0.000407	54.1
-9	84	0.012675	0.002426	0.010249	1.22	-0.000606	47.6
-8	78	-0.015920	0.003261	-0.019181*	-1.64	-0.004441	38.5***
-7	97	-0.001684	0.003834	-0.005519	-1.25	-0.000897	45.4
-6	89	-0.019104	-0.003559	-0.003633	-0.33	0.003526	56.7*
-5	92	0.003464	-0.000809	-0.006957*	-1.87	-0.003215	41.5**
-4	87	0.012873	-0.006292	0.002315	0.36	0.000043	51.1
-3	78	-0.007027	-0.001581	-0.006104	-1.30	0.000251	48.1
-2	85	-0.009683	-0.001629	-0.008251	-0.98	-0.002052	45.3
-1	66	-0.003857	0.001033	-0.004858	-0.53	-0.000285	47.8
0	50	-0.007277	0.004396	-0.011673	-0.82	-0.001355	46.0
1	31	-0.002490	0.000938	-0.003428	-0.49	0.002276	58.1
2	24	-0.001466	0.000495	-0.001961	-0.39	-0.001814	45.8
3	16	0.009720	-0.009813	0.019533	0.83	0.005800	62.5
4	17	-0.014550	0.008019	-0.022569**	-2.69	-0.008465	29.4***

\*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively, at two-tailed tests.



inconsistent with Brous and Kini's (1993) finding of significantly positive unexpected forecast revisions of earnings for the following forecast-year for tender offers announced between January 1977 and December 1988. This suggests that the evidence that a takeover announcement conveys favorable information about the target's value is time-specific.

Tables 3.5 and 3.6 provide unexpected forecast revisions of earnings for the current forecast-year for cash tender offers and for tender offers funded through a combination of cash and stock, respectively. Tables 3.5 and 3.6 reveal little evidence supportive of the notion that payment method in takeovers conveys information about the target's value. For cash offers, the average unexpected forecast revision for the current forecast-year at event month zero (i.e., at the month following the initial takeover announcement) is significantly positive at the 5 percent level. The proportion of positive unexpected forecast revisions for the current forecast-year, however, is not significantly different from 50 percent. Moreover, for month +1, UFR is significantly negative and the percent positive is significantly below 50 percent. For combination offers, none of the average unexpected forecast revisions or the proportion of positive unexpected forecast revisions of earnings for the current forecast-year at the announcement month is significantly different from zero.

Similarly, Tables 3.7 and 3.8 indicate that unexpected forecast revisions of earnings for the following forecast-year disaggregated by payment method yield inconclusive results. Specifically, in cash tender offers, the mean value and proportion of positive unexpected forecast revisions of earnings for the following forecast-year at the

Table 3.5

Monthly average unexpected forecast revisions (UFR) of earnings per share for the current forecast-year for the takeover announcements made over January 1988 - December 1995: Cash offers

Each event month is a 30-day interval, relative to event month zero. Event month zero is defined as the 30-day interval, (+7, +36), relative to the takeover announcement date, as described in section 3.4.2. FR denotes forecast revisions. The unexpected forecast revisions, UFR, are calculated by using a fourth-order moving average model. The null hypotheses are, one, the average unexpected earnings forecast revision equals zero, and, two, the percentage of positive unexpected forecast revisions equals 50 percent. *t* test and Wilcoxon signed ranks test are used to test the first and second hypotheses, respectively.

	# of	Raw	Expected	Mean		Median	%
Month	obs.	FR	FR	UFR	<i>t</i> -value	UFR	positive
							UFR
-11	94	0.002359	-0.007979	0.010338**	2.24	0.000287	54.3
-10	85	-0.005285	-0.003015	-0.002270	-0.27	-0.001030	45.9
-9	90	-0.007925	0.002757	-0.010682*	-1.79	-0.001159	38.9**
-8	90	-0.006338	0.000118	-0.006456	-1.35	-0.000380	48.9
-7	98	-0.002561	-0.002073	-0.000020	-0.00	-0.000449	44.4
-6	90	-0.008476	-0.002665	-0.005834	-1.24	-0.000724	46.2
-5	89	-0.007392	-0.002780	-0.004704	-1.16	0.000278	50.0
-4	90	-0.008012	-0.005301	-0.002947	-0.42	-0.001571	41.3
-3	90	-0.010500	-0.003567	-0.007648	-1.14	-0.001597	39.8
-2	87	-0.004634	-0.004179	-0.000650	-0.14	0.000460	51.7
-1	84	0.001772	-0.004158	-0.011189	-1.31	-0.001694	37.9
0	74	0.013250	-0.002802	0.016052**	1.88	-0.000099	48.4
1	53	-0.025232	0.002389	-0.027621**	-2.05	-0.001652	37.2*
2	29	0.007280	-0.002389	0.009669	1.74	0.001477	58.6
3	20	-0.025116	0.002827	-0.027943	-1.54	-0.002755	40.0
4	17	-0.010645	0.001077	-0.011722	-0.43	0.000814	58.8

\*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively, at two-tailed tests.

Table 3.6

Monthly average unexpected forecast revisions (UFR) of earnings per share for the current forecast-year for the takeover announcements made over January 1988 - December 1995: Combination offers

Each event month is a 30-day interval, relative to event month zero. Event month zero is defined as the 30-day interval, (+7, +36), relative to the takeover announcement date, as described in section 3.4.2. FR denotes forecast revisions. The unexpected forecast revisions, UFR, are calculated by using a fourth-order moving average model. The null hypotheses are, one, the average unexpected earnings forecast revision equals zero, and, two, the percentage of positive unexpected forecast revisions equals 50 percent. *t* test and Wilcoxon signed ranks test are used to test the first and second hypotheses, respectively.

	# of Month obs.	Raw FR	Expected FR	Mean UFR	<i>t</i> -value	Median UFR	% positive UFR
-11	9	-0.005034	-0.003406	-0.001627	-0.25	0.000938	55.6
-10	12	-0.041402	0.030922	-0.072324	-1.14	-0.001386	50.0
-9	12	-0.004431	0.024505	-0.028936	-0.84	-0.001326	50.0
-8	13	0.015183	0.033659	-0.018476	-0.69	-0.001338	46.2
-7	13	-0.010145	0.010350	-0.020495	-1.42	-0.003382	46.2
-6	14	-0.006580	-0.007968	0.001388	0.24	0.004285	78.6*
-5	13	0.045418	0.003306	0.042112	0.82	-0.004840	30.8
-4	12	0.025634	0.013677	0.011957	0.60	-0.000488	50.0
-3	11	-0.008682	0.007853	-0.016536	-1.45	-0.007664	36.4*
-2	13	0.026872	0.012818	0.014054	1.13	0.004895	61.5
-1	10	-0.013652	0.003677	-0.017329**	-2.26	-0.017187	30.0**
0	10	0.011229	-0.001844	0.013073	1.39	0.002408	60.0
1	8	0.045206	0.010063	0.035143	1.25	0.005164	62.5
2	9	-0.072157	0.012462	-0.084619	-1.32	-0.014180	44.4
3	6	0.071446	-0.017641	0.089086	1.34	0.018589	83.3
4	4	-0.008331	0.002083	-0.010414	-1.32	-0.009459	25.0

\*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively, at two-tailed tests.

announcement month are insignificant (with an average value of -0.01591 and a  $t$ -value of -0.99, and a proportion of positive unexpected revisions equal to 44.2 percent with a  $z$ -value of -0.39). In combination offers, the average announcement-month unexpected revision and proportion of positive unexpected revisions are likewise insignificant at the conventional levels (0.01438 with a  $t$ -value of 0.76, and 0.57 percent with a  $z$ -value of 0.37, respectively).

A regression analysis framework is used to formally test whether the target's resistance toward a bid is associated with an unexpected downward revision of analyst earnings forecasts, and whether payment method in takeover bids conveys information about the value of the target. The test results are provided in Table 3.9. Consistent with Brous and Kini's (1993) findings,  $F$ -values for both regression analyses are insignificant at the conventional levels (0.59 when the dependent variable is  $UFR_i$  with respect to the current forecast-year, and 0.79 when the dependent variable is  $UFR_i$  with respect to the following forecast-year, respectively). This means, first, that target's resistance variable  $RESIST_i$  is not important in explaining unexpected forecast revisions for either the current forecast-year or the following forecast-year. In other words, the target's resistance toward a takeover bid is not associated with unexpected earnings forecast revisions.

Second, the insignificant  $F$ -values for both regression analyses in Table 3.9 also imply that the payment method variable,  $METHOD_i$ , is not important in explaining unexpected forecast revisions of earnings for the current forecast-year and the following forecast-year at the initial takeover announcement. Thus, the evidence in this study does

Table 3.7

Monthly average unexpected forecast revisions (UFR) of earnings per share for the following forecast-year for the takeover announcements made over January 1988 - December 1995: Cash offers

Each event month is a 30-day interval, relative to event month zero. Event month zero is defined as the 30-day interval, (+7, +36), relative to the takeover announcement date, as described in section 3.4.2. FR denotes forecast revisions. The unexpected forecast revisions, UFR, are calculated by using a fourth-order moving average model. The null hypotheses are, one, the average unexpected earnings forecast revision equals zero, and, two, the percentage of positive unexpected forecast revisions equals 50 percent. *t* test and Wilcoxon signed ranks test are used to test the first and second hypotheses, respectively.

Month	# of obs.	Raw FR	Expected FR	Mean UFR	<i>t</i> -value	Median UFR	% positive UFR
-11	67	0.002407	0.000977	0.001430	0.30	0.001481	55.2
-10	65	0.003160	-0.005291	0.008451	1.21	0.000517	55.4
-9	72	0.000577	-0.002935	0.003512	0.59	-0.000295	48.6
-8	69	-0.010045	-0.001511	-0.008534	-1.60	-0.004907	37.7**
-7	84	-0.004832	0.000176	-0.005008	-1.20	-0.000941	42.9
-6	78	-0.009265	-0.005504	-0.003761	-0.30	0.003590	57.7
-5	81	-0.008903	0.000095	-0.008966**	-2.26	-0.003574	39.0*
-4	77	0.018308	-0.006670	0.006015	0.96	0.000043	51.3
-3	70	-0.006659	-0.002804	-0.004573	-0.93	0.000251	47.9
-2	76	-0.011778	-0.002351	-0.009674	-1.03	-0.002159	42.9
-1	59	-0.001335	0.000566	-0.001823	-0.18	0.000206	51.7
0	43	-0.009830	0.006085	-0.015915	-0.99	-0.001369	44.2
1	26	-0.006931	0.002268	-0.009199	-1.27	0.001477	53.8
2	18	-0.001932	0.000156	-0.002087	-0.44	-0.001814	44.4
3	12	0.025866	-0.007400	0.033266	1.19	0.002414	58.3
4	14	-0.022735	0.002099	-0.024834**	-2.57	-0.010504	21.4*

\*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively, at two-tailed tests.

Table 3.8

Monthly average unexpected forecast revisions (UFR) of earnings per share for the following forecast-year for the takeover announcements made over January 1988 - December 1995: Combination offers

Each event month is a 30-day interval, relative to event month zero. Event month zero is defined as the 30-day interval, (+7, +36), relative to the takeover announcement date, as described in section 3.4.2. FR denotes forecast revisions. The unexpected forecast revisions, UFR, are calculated by using a fourth-order moving average model. The null hypotheses are, one, the average unexpected earnings forecast revision equals zero, and, two, the percentage of positive unexpected forecast revisions equals 50 percent. *t* test and Wilcoxon signed ranks test are used to test the first and second hypotheses, respectively.

	# of	Raw	Expected	Mean		Median	%
Month	obs.	FR	FR	UFR	<i>t</i> -value	UFR	positive
							UFR
-11	9	0.148128	0.009132	0.014259	1.56	0.002706	70.0
-10	9	-0.004605	0.020900	-0.025505	-1.69	-0.006091	44.4*
-9	12	0.085266	0.034597	0.050669	1.09	-0.001761	41.7
-8	9	-0.060963	0.039846	-0.100809	-1.09	-0.000388	44.4
-7	13	0.018654	0.027471	-0.008817	-0.45	0.001828	61.5
-6	11	-0.083060	0.009081	-0.002726	-0.30	0.000113	50.0
-5	11	0.087972	-0.006907	0.007842	0.76	0.003505	58.3
-4	10	-0.029516	-0.003344	-0.026172	-0.92	-0.001937	50.0
-3	8	-0.010380	0.009124	-0.019504	-1.24	-0.001573	50.0
-2	9	0.008239	0.004467	0.003772	0.51	0.010600	66.7
-1	7	-0.025473	0.004968	-0.030441	-1.73	-0.012973	14.3*
0	7	0.008403	-0.005984	0.014387	0.76	0.001563	57.1
1	5	0.020603	-0.005976	0.026579	1.65	0.017461	80.0
2	6	-0.000068	0.001513	-0.001581	-0.10	0.004482	50.0
3	4	-0.038719	-0.017054	-0.021665	-0.53	0.014506	75.0
4	3	0.023648	0.035648	-0.012000	-0.70	0.001586	66.7

\*, \*\*, and \*\*\* denote statistical significance at the 10, 5, and 1 percent levels, respectively, at two-tailed tests.

Table 3.9

Estimated coefficients of regressions for revisions of analysts' forecasts of earnings for takeover bids over the period January 1988 to December 1995

The *t*-values are in parentheses. The regression model tested is:

$$\text{UFR}_i = \alpha_0 + \alpha_1 \text{METHOD}_i + \alpha_2 \text{RESIST}_i + \varepsilon_i \quad (26)$$

where  $\text{UFR}_i$  = unexpected forecast revision for target *i* at takeover announcement;  
 $\text{METHOD}_i$  = 1 for an offer funded through stock or a combination of cash and stock; 0 for a cash offer;  
 $\text{RESIST}_i$  = 1 if the target's management is opposed to the bid within 30 calendar days subsequent to the initial takeover announcement; and 0 otherwise;  
 $\varepsilon_i$  = statistical error term.

	Dependent variable	
	UFR <sub>i</sub> with respect to current forecast-year	UFR <sub>i</sub> with respect to following forecast-year
Intercept	0.0245* (1.75)	0.031** (1.99)
METHOD <sub>i</sub>	-0.011 (-0.35)	-0.020 (-0.56)
RESIST <sub>i</sub>	-0.027 (-1.08)	-0.033 (-1.22)
<i>F</i> -value	0.59	0.79
<i>R</i> <sup>2</sup>	0.02	0.02
Number of observations	84	50

\* and \*\* denote statistical significance at the ten and five percent levels, respectively, for two-tailed tests.

not support the notion that the method of payment in takeover bids conveys information about the value of the targets.

### **3.7. Conclusions**

This chapter empirically tests whether the payment method in takeovers conveys information about the value of the target firms. This study does not use the targets' share price reactions to takeover announcements because of the presence of tax effect associated with the method of payment. Rather, this paper uses analyst earnings forecasts as a proxy for the expected value of the targets to test the information hypothesis (with respect to the targets) of the medium of exchange in takeovers.

Empirical tests in this study yield two major results. First, no evidence is found supportive of the notion that the method of payment in takeover bids conveys information about the value of the targets. Unexpected analyst forecast revisions for tender offers funded through a combination of stock and cash are not significantly different from those for cash offers. This suggests that the market perceives that the information, if any, revealed by payment method in takeovers is not about the value of the target firms.

Second, inconsistent with the prior study of Brous and Kini (1993), takeover announcements result in analysts revising upward their earnings forecasts for the targets for the current forecast-year, but not for the following forecast-year. Moreover, the upward revision is statistically significant for cash offers but not for others. The inconsistency with Brous and Kini suggests that prior study's result that the market



**perceives a takeover bid to convey favorable information about the target's value is time-specific.**

## **Chapter 4**

### **Changes in Payment Terms in the Takeover Process**

#### **4.1. Introduction**

**This chapter analyzes how changes in the medium of exchange in the takeover process affect the value of the bidder's common shares. Two major hypotheses are proposed to analyze changes in the terms of exchange: (1) there is information revealed about the value of the firm in announcements of changes in payment terms, and (2) there is a wealth transfer between shareholders of the bidder and those of the target.**

**This chapter finds that after controlling for the change in takeover premium, bidders' share price reactions to announcements of increases in the cash component as a percentage of the acquisition price are generally more favorable than those to announcements of increases in the stock component. An increase in the cash component, on average, generates approximately two percent announcement-period excess return to bidders, relative to an increase in the stock component. This is generally consistent with Myers and Majluf's (1984) theory that the market views the decision to issue common shares to finance investment projects as unfavorable information about the value of the issuing firms. There is no evidence to support the view that the market's re-evaluation of the bidder's shares upon announcements of revisions of payment terms is a result of any concurrent changes in takeover premium.**

**The remainder of this chapter is organized as follows. Section 4.2 provides a theoretical discussion and the empirical hypotheses. Section 4.3 describes the method of**

analysis. Section 4.4 explains the data used in this study. Section 4.5 presents empirical results. Conclusions are provided in section 4.6.

#### **4.2. Theoretical discussion and empirical hypotheses**

Previous studies by Myers and Majluf (1984) and Roll (1986) suggest how the market should react to changes in payment terms: the information hypothesis and the wealth transfer hypothesis, respectively.

The information hypothesis indicates that the market alters its valuation of the bidder's common shares based on information inferred from a bidder's decision to revise the payment terms. This argument builds on Myers and Majluf's (1984) theory that the market views the use of common stock to finance investment projects as unfavorable information about the value of issuing firms. Accordingly, in corporate takeovers, announcements of increases in the stock component as a percentage of acquisition price for the target convey negative information about the value of the bidder's shares. The market would revise downward these bidder's share prices. Conversely, announcements of increases in the cash component reveal the bidder managers' belief that the bidder's common shares are at least not overvalued in the market. Thus, the market would on average revise upward these bidder's share prices upon these announcements.

The wealth transfer hypothesis views changes in payment terms as a byproduct of revisions in the overall takeover process. Revision in terms can arise because, for example, a hostile bidder perceives an increase in the effectiveness of the target's resistance. Another reason for changes in terms would be the entry of other bidders, which are likely to bid up the takeover premium for the target. Thus, changes in

payment terms per se might not convey any information about the value of firms in takeovers but represent bidder firms conceding more of the expected gains from the acquisition to the target's shareholders to increase the probability of a successful bid. Roll (1986) argues that a large portion of announcement excess returns for target firms in takeovers is a wealth transfer to the target from the bidder, the result of the bidder's overoptimistic view of its abilities to manage the target firm. Thus, the wealth transfer hypothesis predicts that changes in the market value of the bidder at announcements of changes in payment terms would be a negative function of changes in the takeover premium.

### **4.3. Method of analysis**

#### **4.3.1. Measuring the announcement excess returns**

##### **4.3.1.1. Event study method**

Share price reactions to announcements of changes in the medium of exchange in takeovers are measured by the standard market model event study method as described in Brown and Warner (1985). Under the assumption of semi-strong form market efficiency, the procedure provides an estimate of how the market interprets the information contained in the announcement of a change in the payment terms of a takeover bid.

Consistent with the procedure used elsewhere in this dissertation, the estimation period for the market model parameters spans a 200-trading-day period ( from 250 days before through 51 days before the event's first appearance date in the *Wall Street Journal*). The parameters of the market model are estimated by regressing individual

daily returns on the corresponding equal-weighted daily market index returns:

$$R_{jt} = a_j + b_j R_{mt} + \varepsilon_{jt} \quad (27)$$

where:

$R_{jt}$  = rate of return for security  $j$  on day  $t$ ,

$R_{mt}$  = rate of return for the market index on day  $t$ ,

$a_j$  = mean return not explained by the market,

$b_j$  = security  $j$ 's sensitivity to the market's return,

$\varepsilon_{jt}$  = the statistical error.

All returns are from the Center for Research in Security Prices (*CRSP*) database.

The predicted return for a firm on a day in the event period is the return predicted by the market model on that day, using the estimates of  $a_j$  and  $b_j$  from the pre-event estimation period. That is, the predicted return for security  $j$  on day  $t$  in the event window is:

$$\hat{R}_{jt} = \hat{a}_j + \hat{b}_j R_{mt} \quad (28)$$

The prediction error for security  $j$  on day  $t$  in the event window is then defined as:

$$PE_{jt} = R_{jt} - \hat{R}_{jt} \quad (29)$$

The cumulative prediction error for security  $j$  over the event window  $t = t_1$  to  $t_2$  is calculated as:

$$CPE_{j,(t_1, t_2)} = \sum_{t=t_1}^{t_2} PE_{jt} \quad (30)$$

The share price reaction for the bidding firms that announce changes in payment terms is estimated by calculating the average daily prediction error,  $APE$ , for all bidders on day  $t$ :

$$APE_t = \frac{1}{N} \sum_{j=1}^N PE_{jt} \quad (31)$$

where  $N$  is the number of bidders in the sample.

The cumulative average prediction error ( $CAPE$ ) over an event-window ( $t = t_1$  to  $t_2$ ) is the sum of the daily average prediction errors:

$$CAPE = \sum_{t=t_1}^{t_2} APE_t \quad (32)$$

The price reaction to the announcement is the  $CAPE$  estimated over the two-day event window ( $t = -1, 0$ ).

To test whether the  $CAPE$  of a sample is significantly different from zero, the test statistic is obtained by dividing the  $CAPE$  by the square root of the product of the estimation-period variance and the number of days in the  $CAPE$  event-window ( $t_1, t_2$ ). The test statistic is distributed as Student-t under the null hypothesis that the  $CAPE$  is equal to zero if the  $APE$  are independent, identically distributed, and normal.

#### **4.3.1.2. Robustness of measuring excess returns: mean- and market-adjusted returns**

As in the earlier chapter, the sensitivity of the results to the event study procedure based on the market model is examined by repeating the analysis using both mean- and market-adjusted returns to calculate prediction errors obtained. The use of mean-adjusted returns eliminates the problem of specification of risk factors of stock

returns in the standard event-study method. The use of market-adjusted returns addresses the problem of controlling for market-wide price movements on the announcement date.

#### 4.3.2. Cross-sectional regression analysis

The following regression analysis framework is used to analyze changes in payment method in takeovers:

$$CPE_i = \beta_0 + \beta_1 STOCK_i + \beta_2 \Delta P_i + \beta_3 \Delta P_i \bullet STOCK_i + \varepsilon_i \quad (33)$$

where:

$CPE_i$  = two-day (-1, 0) cumulative excess returns earned by the bidding firm at announcement  $i$ ,

$\Delta P_i$  = changes in acquisition price as a percentage of the market value of the bidder's equity prior to announcement  $i$ ,

$STOCK_i$  = 1 for an increase in the stock component as a percentage of the acquisition price; and 0 otherwise.

The bidder's market capitalization is used as the denominator in calculating  $\Delta P_i$  because the dependent variable,  $CPE_i$ , is measured as a percentage (i.e., stock returns) on the bidder's equity.

An interaction term,  $\Delta P_i \bullet STOCK_i$ , is included in the analysis to capture the effects of changes in terms on the probability of success of the offer. Increases in the takeover premium are, naturally, likely to increase the probability of the success of an offer. In addition, Huang and Walkling (1987) and Wansley, Lane, and Yang (1983) note that the bidder in stock offers must submit a registration statement and obtain

approval from the *Securities and Exchange Commission* before it can offer new shares to the target's shareholders. Thus, the use of all cash as the method of payment reduces the time necessary to complete the takeover process. In a hostile bid, faster transactions give the target management less chance and time to implement takeover defense, such as soliciting a white knight (i.e., a friendly and late-entry bidder). Offers involving stock are, therefore, likely to have a lower possibility of takeover success than are all cash offers. By extrapolation (and consistent with some market folklore), increases in the cash component of an offer would raise the probability of success of that bid. Thus, if the method of payment influences the probability of success of an offer, changes in the payment terms also are likely to influence that probability. Since any share price effect on the bidder from changes in acquisition price reflects both the wealth transfer effect (as above) and the probability of takeover success, the regression includes the interaction term.

The test of the empirical hypotheses described in section 4.2 is equivalent to the tests of coefficients  $\beta_1$  and  $\beta_2$  in equation (21). That is, the information hypothesis predicts  $\beta_1$  will be negative, while the wealth transfer hypothesis predicts  $\beta_2$  will be negative. If changes in the payment terms change the influence of the wealth transfer effect for increases in stock (by changing the probability of success, as argued), then the sign of  $\beta_3$  will indicate the direction of that interactive effect.

#### 4.4. Data

The sample of announcements of changes in payment method come from two sources: (1) the 348 takeover announcements from January 1989 to December 1995 as



described in the second chapter, and (2) searches of the *Lexis/Nexis* database. The *Lexis/Nexis* database is searched for combinations of keywords "change\$", "alter\$", "revis\$", "modify", "modifies", "modified", "payment method", "medium of exchange", "cash and stock", "combination", "all-cash", and "all-stock" to generate a sample of takeover announcements. After elimination of all obviously unrelated announcements, the remaining announcements are checked against the *Wall Street Journal* to identify announcements of changes in payment terms in takeovers. In addition, to be included in the sample, the bidders must have stock return data on the Center for Research in Security Prices (*CRSP*) database over a 250-day period prior to the announcement date so that the market reaction to an announcement can be estimated. Partial acquisitions are excluded from the sample. The process above yields the final sample of 30 announcements of revisions of the medium of exchange in corporate takeovers made over the period January 1976 to December 1995.

## **4.5. Empirical results**

### **4.5.1. Distribution of the sample**

Table 4.1 provides summary statistics. Panel A reports the distribution of the thirty announcements of changes in the medium of exchange in takeovers made over the period January 1976 to December 1995. Twenty announcements report increases in the cash component as a percentage of acquisition price, while ten announcements report increases in the stock component. Of these thirty announcements, in three the bidders revise the payment terms twice (see Table 4.5 for details of the announcements). To estimate how often the payment terms in takeovers are altered, these thirty

Table 4.1

Summary statistics for the sample of announcements of changes in payment terms in corporate takeovers made over the period January 1976 to December 1995

**Panel A: Distribution of announcements of changes in payment terms by years**

Year	1976	1978	1979	1980	1983	1984	1985	1986	1987
Increase in stock	0	2	0	1	0	0	1	1	0
Increase in cash	2	0	1	1	1	1	1	0	2

Year	1988	1989	1990	1991	1992	1993	1994	1995	Total over 1976-1995
Increase in stock	1	2	0	2	0	0	0	0	10
Increase in cash	2	0	2	2	2	1	1	1	20

**Panel B: Payment methods before and after announcements of changes in payment terms**

Initial bid \ New bid	Combination offers				
	Cash offers	Increase in cash portion	Increase in stock portion	Stock offers	Total
Cash offers	Not applied	Not applied	2	2	4
Combo offers	9	5	3	3	20
Stock offers	3	3	Not applied	Not applied	6
Total	12	8	5	5	30

(table con'd)

**Panel C: Characteristics of announcements of changes in payment terms in takeovers made over the period January 1976 to December 1995**

	Mean	Median	Range	
			Minimum	Maximum
The market value of the bidder's equity prior to the announcement of changes in payment terms (in million dollars)	3,497.64	402.71	7.52	39,180.63
Changes in takeover premium (in million dollars)	30.03	0.00	-75.20	853.73
Changes in takeover premium divided by the market value of the bidder's equity	0.0067	0.00	-0.0859	0.2422

**Panel D: A description of the nature of the takeover bids**

COMPET takes a value of one if there are more than one bidders for an announcement of changes in payment terms; and zero otherwise. RESIST equals one if the target's management publicly resist the takeover bid; and zero otherwise.

	Number of announcements	Percentage of the entire sample
COMPET = 1	2	6.67 %
RESIST = 1	9	30.0 %

announcements are checked against the 324 takeover announcements used in the second chapter. Results reveal that of the 30 announcements of changes in payment terms, eight also appear in the 324 announcements used in the second chapter. Thus, roughly speaking, 2.50 percent (i.e.,  $8 / 324$ ) of all takeover announcements involving publicly traded firms experience revisions of payment terms.

Panel B of Table 4.1 reports the distribution of changes in payment terms in takeovers disaggregated by how the payment terms are altered. Two features are noteworthy. First, out of all the 30 announcements in the final sample, 20 ( $= 12 + 8$ ) announcements, or 66.67 percent, experience increases in the cash component as a percentage of the acquisition price. Second, of 20 announcements with a combination of cash and stock as the initial payment method, 14 ( $= 9 + 5$ ) takeovers, or 70 percent, shift toward more cash payment. Thus, provided that changes in payment terms are warranted, the decisions on changes are asymmetric: changes in the medium of exchange in takeovers during the sample period tend to be increases in the cash component, or equivalently, decreases in the stock component.

The mean values of selected characteristics of the announcements are presented in Panel C of Table 4.1. Of the thirty announcements, in 14 announcements (11 and 3 involving increases in the cash and stock components, respectively) changes in the cash component (and thus the stock component) as a percentage of the acquisition price can be determined. The percentage of changes in payment terms for remaining 16 ( $= 30 - 14$ ) announcements cannot be determined because, for example, their payment terms involve convertibles or preferred stock. The changes in payment terms for these 14

announcements where the stock and cash components are known are substantial.

Specifically, the mean value of changes in terms for the 11 cash-increase announcements is 47.95 percentage points increases in the cash component; the median value is 51.44 percentage points. Bidders in the 3 stock-increase announcements increase the stock component by 45, 100, and 100 percentage points, respectively.

Panel C of Table 4.1 also reports that the mean size of the bidder's market capitalization prior to the announcement of changes in payment terms is \$ 3.50 billion and the median value is \$ 402.71. The mean value of changes in takeover premium is \$ 30.03 million and the median value is zero. The last row of Panel C shows that the average change in the acquisition price is very small relative to the market value of the bidder. The mean ratio of changes in acquisition price to the bidder's market capitalization prior to the announcement is 0.0067; while the median ratio is zero.

Panel D of Table 4.1 provides additional information about the nature of the takeover bids. In nine of the thirty, announcements of changes in payment terms, the target management publicly resists the takeover bid. Bidders in five of these nine contested offers increase the cash component in the payment terms. Thus, target resistance does not seem to favor increases in one medium over the other. In addition, only two of thirty, takeovers involve more than one bidder as disclosed by the *Wall Street Journal*. Both of these involve a switch to all-cash offers from offers funded through a combination of cash and stock. The sample is too small for any conclusions, but this result is consistent with Fishman's (1989) argument and market folklore that cash is used to preclude or defeat other bidders.

#### **4.5.2. Share price reactions to announcements of changes in payment terms and regression results**

Table 4.2 reports the bidder's share price reactions to announcements of revisions of payment terms disaggregated by changes in takeover premium and changes in payment terms. Holding the change in takeover premium constant, the bidder's announcement-period excess returns in cash offers are generally more favorable than those in stock offers. Specifically, when the cash component is increased but the takeover premium remains unchanged, the mean announcement-period excess returns to bidder is 2.18 percent, significantly different from zero at the 5 percent level ( $p$ -value = 0.0138); the median value is 1.81 percent. In contrast, the bidders who decrease the cash component (or, equivalently, increase the stock component) but do not change the takeover premium experience insignificant announcement excess returns. When there is an increase in the cash component and a decrease in takeover premium, the bidders experience, on average, a 3.81 percent excess return, significant at the 10 percent level (in spite of only 4 observations in this group). In comparison, the announcement excess returns to bidders who decrease both cash component and takeover premium are insignificant at the conventional levels. The evidence on bidders who increase both the stock component and the acquisition price is less clear. The average announcement excess return to these bidders is not significantly different from zero (the median value is - 0.55 percent), a result not supportive of the information hypothesis and the wealth transfer hypothesis. The number of observations for this group of bidders, however, is only two.

Table 4.2

**Announcement cumulative excess returns disaggregated by changes in payment terms and of takeover premium**

*P*-values of *t*-tests are in parentheses. The first, second, and third numbers in square brackets are the median value of announcement excess returns, the number of bidders with positive announcement excess returns, and the number of bidders, respectively.

	Changes in payment terms		
	Increase in stock component	Increase in cash component	Sub-sample
Increase in takeover premium	- 0.55 % (0.8655) [- 0.55 %, 1, 2]	0.22 % (0.8931) [0.16 %, 3, 5]	0.00% (0.9986) [0.16%, 4, 7]
Decrease in takeover premium	-0.66 % (0.8782) [-0.66 %, 1, 2]	3.81 %* (0.0803) [4.20 %, 4, 4]	2.32% (0.2037) [2.93%, 5, 6]
No change in takeover premium	-0.32 % (0.6914) [0.32 %, 3, 6]	2.18%** (0.0138) [1.81 %, 9, 11]	1.30%** (0.0494) [0.93%, 12, 17]
Sub-sample	-0.44% (0.5881) [0.32%, 5, 10]	2.01%*** (0.0058) [2.28%, 16, 20]	

\*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels, respectively, in two-tailed tests.

Table 4.3 presents an ANOVA test examining changes in variance based on the directions of changes in payment terms and changes in acquisition price. As argued above, an interaction term is included to capture the effects of changes in payment terms on the probability of the success of an offer. The overall test yields an  $F$ -value 2.53, significant at the 10 percent level. Furthermore, the effect of increases in the stock component (measured as a category) on bidders' two-day announcement excess returns is significantly negative at the 5 percent level ( $F$ -value 6.26). No supporting evidence of either the effect of changes in the acquisition price or the interactive effect is found.

Because changes in acquisition price are continuous, a multivariate regression framework is used to examine whether changes in the medium of exchange in takeovers convey information about the bidder's value. The announcement-period is defined as a two-day event window (days -1 and 0) because it is possible that announcements are made after the markets close. Changes in acquisition price are measured as a continuous number rather than a discrete number as in the ANOVA test above.

The regression results, presented in Table 4.4, are consistent with the ANOVA results. After controlling for concurrent changes in takeover premium, bidders' share price reactions to announcements of increases in the cash component are more favorable than those for increases in the stock component. No evidence is found in support of the notion that a wealth transfer between bidder and target explains the bidder's share price reactions to announcements of changes in the medium of exchange. Specifically, the second column of Table 4.4 reports coefficient estimates using market-model cumulative



Table 4.3

Analysis of Variance (ANOVA) for announcements of changes in payment terms in takeovers from January 1976 to December 1995

$\Delta PRC$  is defined as changes in acquisition price for announcement  $i$  and takes three levels (i.e., no change, increase, or decrease in acquisition price) in the ANOVA test.  $STOCK$  takes a value of one for an increase in the stock component as a percentage of acquisition price for the target; and zero otherwise.

Source of variance	Sum of squares	Degrees of freedom	F-value
STOCK	0.00365422	1	6.26**
$\Delta PRC$	0.00155200	2	1.33
STOCK• $\Delta PRC$	0.00164607	2	1.41

Overall test F-value = 2.53\*

\* and \*\* indicate statistical significance at the 10 and 5 percent levels, respectively, in two-tailed tests.

prediction errors, *CPEs*, as the dependent variable. The overall test of the null hypothesis  $\beta_1 = \beta_2 = \beta_3 = 0$  is not rejected at the 10 percent level. The indicator variable, *STOCK*, which takes a value of one for an increase in the stock component as a percentage of acquisition price for the target and zero otherwise, is significantly negative at the 10 percent level ( $t$ -value = -1.935). The intercept estimate, 1.7 percent ( $t$ -value = 3.047), can be interpreted as the average announcement excess returns to bidders who increase the cash-stock ratio in payment method (i.e., *STOCK* = 0) but do not change the overall value of the acquisition price for the target (thus,  $\Delta P = 0$ ). The estimates of the coefficients for other independent variables,  $\Delta P_i$  and interaction term  $\Delta P_i \bullet \text{STOCK}_i$ , are not significantly different from zero at conventional levels. Thus, there is no evidence supportive of a wealth transfer between bidder and target as an explanation for bidder excess returns at the announcement of changes in payment terms. A possible reason for the insignificant result on the wealth transfer hypothesis is that the average change in acquisition price is very small relative to the market value of the bidder. As indicated in Panel C of Table 4.1, the mean value of changes in acquisition price divided by the market value of the bidder's equity is only 0.0067; while the median value is zero. Because the dependent variable in the multivariate regression analysis is measured as two-day announcement cumulative prediction errors, *CPEs*, it is likely that the relatively imprecise measurement of *CPEs* (because of, for example, bid-ask spreads) explains the insignificant results on the wealth transfer hypothesis.

The regression equation estimated in Table 4.4 predicts a significant and positive share price response to an announcement of an increase in the cash component (i.e., +1.7

percent with a  $p$ -value of 0.0052), but an insignificant share price reaction for an increase in the stock component (-0.2 percent = 1.7 - 1.9 percent,  $p$ -value = 0.73) in the absence of changes in takeover premium. One possible explanation for this result is that increases in the stock component likely reflect both the signaling effect and the investment effect from a takeover. Revisions of payment terms can increase this investment effect by enhancing the probability of takeover success through catering to the needs of the target's shareholders (for example, the tax considerations) or to those of the target's management (for example, the concern of target managerial ownership, Stulz, 1988). To control for this investment effect, announcements of increases in the cash component must be used as a baseline against which those of increases in the stock component are analyzed. Accordingly, the result in Table 4.4 that STOCK is significantly negative indicates that the market infers the *choice* of changes in payment terms (i.e., an increase in either the cash or the stock component) as indicative of the bidder's belief whether the bidder's shares are overpriced in the market.

To examine whether the results are sensitive to how the excess returns are measured, the market- and mean-adjusted returns are also used to calculate *CPEs* for the dependent variable. The use of market-adjusted returns takes account of potential market-wide price movements at the announcement dates; while the use of mean-adjusted returns avoids the specifications of risk factors of stock returns. Columns 3 and 4 of Table 4.4 present the regression results using announcement-period market- and mean-adjusted returns to generate *CPEs*. The findings are similar to those using the market model *CPE* as the dependent variable and show the results are robust to the

Table 4.4

Regression analysis for announcements of changes in payment terms in takeovers over the period January 1976 to December 1995

Dependent variable is  $CPE_i$ , two-day cumulative excess returns earned by the bidding firm at announcement  $i$ .  $\Delta P_i$  is defined as changes in takeover premium as a percentage of the bidder's market capitalization prior to announcement  $i$ .  $STOCK_i$  takes a value of one for an increase in the stock component as a percentage of acquisition price for the target; and zero otherwise. Market-adjusted CPE uses value-weighted *CRSP* index returns for obtaining cumulative excess returns.  $t$ -values are in parentheses.

The regression model analyzed is the following:

$$CPE_i = \beta_0 + \beta_1 STOCK_i + \beta_2 \Delta P_i + \beta_3 \Delta P_i \bullet STOCK_i + \varepsilon_i \quad (33)$$

	Market model CPE	Market-adjusted CPE	Mean-adjusted CPE
Intercept	0.017*** (3.047)	0.017*** (3.076)	0.020*** (3.321)
$STOCK_i$	-0.019* (-1.935)	-0.020** (-2.056)	-0.023** (-2.132)
$\Delta P_i$	-0.197 (-1.438)	-0.167 (-1.222)	-0.189 (-1.260)
$\Delta P_i \bullet STOCK_i$	0.093 (0.548)	0.092 (0.541)	0.103 (0.558)
$F$	2.581*	2.327*	2.493*
$R^2$	0.23	0.21	0.22
Adjusted $R^2$	0.14	0.12	0.13
Number of observations	30	30	30

\*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1 percent levels, respectively, in two-tailed tests.

alternative calculations of *CPEs*. Only *STOCK* and the intercept exhibit coefficient estimates significantly different from zero at conventional (5 and 1 percents, respectively) levels.

#### **4.6. Conclusions**

A small portion of corporate takeovers experiences revisions of their payment terms. This chapter presents evidence about the effects of equity issuance within the framework of changes in payment method in takeovers. Two issues are addressed in this chapter: one, whether the market infers information about the value of the bidders from the decision to revise the terms of payment, and two, whether the market re-evaluations of bidders' common shares upon announcements of revisions of payment terms are a result of a wealth transfer between bidder and target. The results indicate that, after controlling for the effect of changes in takeover premium, bidder's share price reactions to announcements of increases in the cash component are generally more favorable than those for increases in the stock component. The relatively unfavorable bidder's share price reactions to announcements involving increases in the stock component is not related to changes in takeover premium accompanying revisions of payment terms. Cross-sectionally, the decision to increase the stock component in the offer generates a statistically significant and negative 1.9 percent excess returns to bidders, relative to announcements of increasing the cash component. Thus, the evidence is generally consistent with Myers and Majluf's (1984) model that the market believes that corporate management, acting in the best interests of shareholders, will not issue common shares unless managers believe the firm's shares to be overvalued.

**Table 4.5. Description for 30 announcements of changes in payment method over the period January 1976 to December 1995**

The stated or inferred reasons for changes in payment method are in parentheses. The first and second numbers in the square brackets are the percentages of a combination offer funded by cash and stock, respectively. No such percentages are assigned for a combination offer if the terms are too complicated to determine the percentages of cash and stock in a combination offer (for example, the offer involves convertible debts as payment method).

Bidder firm	Original bid	New bid	Bidding war ?	Public resistance to the initial bid ?	Changes in takeover premium ?
Coca-Cola Enterprises	Stock (Analysts suggested that the target's business conditions were worse than they were a few months ago.)	Combination [51.44%, 48.56%]	No	No	Decrease
Xonics Inc.	Stock (The bidder was in final negotiations with the Securities and Exchange Commission concerning the investigation of possible securities violations.)	Combination	No	Yes	No
Mercantile National	Combination (No reason was given.)	Combination and an increase in cash	No	No	No
Consolidated Foods	Combination (Under the new offer, the family controlling the target would receive cash rather than a combination of cash and securities previously announced.)	Combination and an increase in cash	No	No	No

(table con'd)

Description for 30 announcements of changes in payment method over January 1976 to December 1995

Bidder firm	Original bid	New bid	Bidding war ?	Public resistance to the initial bid ?	Changes in takeover premium ?
Florida National Banks of Florida Inc.	Combination (No reason was given.)	Cash	No	No	No
Monumental Corp.	Combination (No reason was given.)	Cash	No	No	Increase
Sun Banks Inc.	Combination [40%, 60%] (The change was made because the bidder management believed that bidder's shares were undervalued.)	Combination [45%, 55%]	No	No	No
Damson Oil Corp.	Combination (The <i>Wall Street Journal</i> described as "novel" the initial payment method, which called for 25 percent of the target's shares to be paid for by securities whose payoffs were contingent on the bidder's subsidiary.)	Cash	Yes	No	No
GAF Corp.	Combination (Sources said that the move was partly intended to frustrate the target's attempt to install a "poison pill".)	Cash	No	Yes	No
Turner Broadcasting Systems Inc.	Cash (The bidder management indicated that it could not raise financing for the initial all-cash offer.)	Combination	No	No	No

(table con'd)

Description for 30 announcements of changes in payment method over January 1976 to December 1995

Bidder firm	Original bid	New bid	Bidding war ?	Public resistance to the initial bid ?	Changes in takeover premium ?
Unisys Corp.	Combination [40%, 60%] (No reason was given.)	Cash	No	No	No
Acmat Corp.	Stock (The target did not respond to the initial stock offer. The bidder sweetened the offer and altered the payment method.)	Combination [33.9%, 66.1%]	No	No	Increase
Acmat Corp.	Combination [33.9%, 66.1%] (The bidder revised, again, the offer. The new cash offer had a slightly lower market value than the previous combination offer.)	Cash	No	No	Decrease
PacifiCorp	Combination (The bidder argued that the package was altered because the target's assets were deeply impaired.)	Stock	No	Yes	No
PacifiCorp	Stock (This second-time modification of the terms was intended to make the deal as easy to understand as possible.)	Cash	No	Yes	Increase

(table con'd)



Description for 30 announcements of changes in payment method over January 1976 to December 1995

Bidder firm	Original bid	New bid	Bidding war ?	Public resistance to the initial bid ?	Changes in takeover premium ?
Tyson Foods Inc.	Combination [91.11%, 8.89%] (The bidder stepped up its efforts to acquire the target by launching an all-cash tender offer.)	Cash	Yes	Yes	Increase
Healthcare Services Group	Combination (The terms were changed because the bidder's annual revenues were lower than expected.)	Combination and a decrease in cash	No	No	Decrease
Bankers Trust of South Carolina	Preferred stock (The bidder re-submitted its offer after the bidder withdrew the initial bid without elaboration.)	Convertible preferred	No	No	No
Bankers Trust of South Carolina	Convertible preferred (No reason was given on this second-time revision in payment method.)	Stock	No	No	No
American Telephone & Telegraph Co.	Cash (The bidder switched from a cash tender offer to a "friendly" merger as the target management eventually agreed to talk with the bidder about the offer.)	Stock	No	Yes	No
Vidmark Inc.	Stock (No information concerning the reasons was disclosed.)	Cash	No	No	No

(table con'd)

Description for 30 announcements of changes in payment method over January 1976 to December 1995

Bidder firm	Original bid	New bid	Bidding war ?	Public resistance to the initial bid ?	Changes in takeover premium ?
House of Fabric Inc.	Cash (The initial hostile tender offer ended up with a mutually-agreed stock offer.)	Stock	No	Yes	Increase
SuperValu Inc.	Combination [92.35%, 7.65%] (The <i>Wall Street Journal</i> suggested that changes in the terms might be related to a shift in the competition in the target's industry.)	Combination and an increase in cash	No	No	Decrease
International Family Entertainment Inc.	Combination (The move was intended to give the target's shareholders more choices concerning the payment method.)	Combination and an increase in cash	No	No	No
International Family Entertainment Inc.	Combination [75%, 25%] (The bidder launched an all-cash tender offer out of concern over other companies gaining more control of the target through the purchase of the target's shares in the open market. The target in this announcement differs from that in the announcement above.)	Cash	No	No	No
California Energy Co.	Combination [71.43%, 28.57%] (The bidder escalated its efforts to acquire the target by raising the bid.)	Cash	No	Yes	Increase

(table con'd)

Description for 30 announcements of changes in payment method over January 1976 to December 1995

Bidder firm	Original bid	New bid	Bidding war ?	Public resistance to the initial bid ?	Changes in takeover premium ?
James River Corp.	Combination (Changes in the offer were to reflect modifications of the target's asset disposition.)	Combo and an increase in stock	No	No	Decrease
McCaw Cellular Communications Inc.	Cash (Changes in terms were made subsequent to unfavorable court ruling on the target in an unrelated litigation. The bidder, first, reduced the dollar value, but not the payment method, of the initial offer. The target rebuffed the bidder's move. The bidder, then, raised the bid and altered the payment method. )	Combination	No	Yes	Increase
American International Group Inc.	Stock (No official reason was given. The bidder switched to a cash tender offer from a stock-swap offer.)	Cash	No	No	No
Old Kent Financial Corp.	Combination [45%, 55%] (The bidder believed that majority of the target's shareholders would rather receive stock instead of cash because of tax considerations.)	Stock	No	No	No

## Chapter 5

### Conclusions

The purpose of this dissertation has been to examine the information theories of the medium of exchange in takeovers. Previous evidence supports the notion that the market, on average, revises downward the bidders' share prices upon announcements of equity-financed takeovers because the market interprets that managers would not use common stock to finance takeovers unless these managers believe their firms' shares to be overvalued in the market. This dissertation extends this argument by integrating the theory of financial intermediation into takeover literature. Consistent with the theory of financial intermediation, the evidence in this dissertation indicates that outside agents, particularly commercial banks, certify and monitor the bidder's decision to issue common stock to finance a takeover. In stock offers, the bidder's announcement excess returns are positively related to bidder's commercial banking relationship. The evidence on other financial intermediaries, such as accounting firms and investment banks, is not found.

Theoretical models and empirical evidence suggest that the medium of exchange in takeovers conveys information about elements other than the bidders' value: i.e., the targets' value or the synergy from a takeover. This dissertation examines whether the medium of exchange conveys information about the value of the targets by testing whether revisions of analysts' forecasts of earnings for the targets in cash tender offers differ from those in tender offers involving stock as the method of payment. Cross-sectional results indicate that the forecast revisions in response to announcements of cash

takeover bids are similar to those in reaction to announcements of takeover attempts involving stock as the method of payment. Thus, the evidence suggests that if there is any information conveyed by the medium of exchange in takeovers, the information is unlikely to be about the value of the target's common shares.

The results based on changes in the medium of exchange in takeovers corroborate the argument that the choice of the method of payment conveys information about the value of the bidder's shares to the market. Parallel to Wansley, Lane, and Yang's (1987) finding that bidders earn more favorable excess returns in cash takeovers than in stock-financed takeovers, announcements of altering the medium of exchange in takeovers convey information about the value of the bidder's common shares. After controlling for changes in the takeover premium which accompany the revisions of payment terms, bidders' excess returns are approximately two percent higher for increases in the cash component (as a percentage of the acquisition price) than for increases in the stock component.

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## Appendix

The purpose of Goldfeld-Quandt test is to determine whether there exists heteroscedasticity in error terms in equation (19). Such a heteroscedasticity occurs when variances of stock returns vary across firms. Specifically, when the diagonal elements of  $\Psi = [e_1 \ e_2 \ \dots \ e_N]' \bullet [e_1 \ e_2 \ \dots \ e_N]$  are not all identical, heteroscedasticity exists. All  $\text{cov}(e_i, e_j)$ , with  $i \neq j$ , are assumed to be zero because (1) two different takeover announcements in the sample tend to occur at different calendar times, and (2) without any assumptions,  $\Psi$  is impossible to estimate given that there are  $(N+1)N/2$  parameters in  $\Psi$  while there are only  $N$  observations (which is less than the number of parameters in  $\Psi$ ).

If the test rejects the null hypothesis of homoscedasticity, weighted least squares procedure is employed to obtain the best linear unbiased estimator of the coefficients. That is, both dependent and independent variables are scaled by the standard error of estimation period residuals obtained from the market model.

### **Vita**

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**DOCTORAL EXAMINATION AND DISSERTATION REPORT**

**Candidate:** YUAN-SHING LIAO

**Major Field:** BUSINESS ADMINISTRATION (FINANCE)

**Title of Dissertation:** AN ANALYSIS OF MEDIUM OF EXCHANGE IN TAKEOVERS

**Approved:**



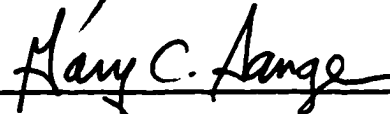
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**Date of Examination:**

JUNE 26, 1997