ESSAYS ON THE MARKET FOR CORPORATE CONTROL

A Dissertation

by

HYUNJUNG KIM

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2009

Major Subject: Economics

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ABSTRACT

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This dissertation examines the relative importance of the information effect on corporate takeover in total takeover gains. It develops the measure of information effect based on the residual income valuation model with I/B/E/S analysts' abnormal earnings forecast revisions. Empirical results show that the information effect and the synergy are estimated to be around 4% and 22% respectively in the 1,372 US samples during 1980-2006. Furthermore, almost all of the synergy gains disappear as the deal is expected to be failed while the measured information effect remains afterwards. The evidence suggests that the information effect is more evident in the disciplinary (failed & high Tobin's-q for bidders) or acquisitional (small capitalization & high book-to-market ratio for targets) takeovers while the synergy is greater in the successful tender-offer. Overall, the corporate takeover bid generates information gains up to 15% of total takeover gains.

It also develops a theoretical model on the market for corporate control using the assumption that there exists management slack which does not contribute to shareholder wealth. This model provides explanations to several questions about corporate takeovers, which include the following: Why do managers prefer takeovers to other investment alternatives? When are they likely to occur? What are the sources of takeover gains? Do takeovers create value? Why are stock offers more common? Who gains from such transactions both in the long and short runs? Why do they occur in massive waves? Why is

diversification often attractive to bidder managers? How does corporate governance play its role during this process? And why do managers often resist takeovers? The agency model this paper develops is compatible with existing theories on takeovers including neoclassical, inefficient stock market, and the free cash flow approach. Furthermore, it is consistent with most of the empirical evidence available.

DEDICATION

To Saint Joseph, the Carpenter

ACKNOWLEDGEMENTS

NOMENCLATURE

CAR	Cumulative Abnormal Return
CAVR	Cumulative Abnormal Value Revision
CSYN	Cumulative Synergy
SMD	Stock-Market-Driven Takeover
ACD	Agency-Cost-Driven Takeover

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CHAPTER Ⅰ

INTRODUCTION

Corporate control is defined as the right to determine the management of corporate resources and the rights to hire, fire, and set the compensation of top-level managers according to Fama and Jensen (1985). Therefore, the market for corporate control represents the executive labor market or the place where corporate takeover occurs. Theories and empirical evidence have been updated by many researchers, including Jensen and Ruback (1983), Jarrell, Brickley, and Netter (1988), and Andrade et al.(2001), it is not sufficient to summarize the whole story in the market for corporate control including recent findings with neutral perspective. Chapter Ⅱ attempts to summarize the existing literature on the market for corporate control both in terms of theory and empirical evidence provided so far. This may help not only for the novice reader in this area to understand this issue, but also for others to take advantage of quick access to related literature by navigating more streamlined arguments so that they could initiate exploring research questions of interest to them.

Empirical research on mergers and acquisitions successfully demonstrated that takeover generates gains, most of which accrue to target shareholders. These gains are often reported to be around 25% of revaluation of target share (e.g., Andrade *et al.* 2001). Bradley, Desai, and Kim (1983) suggest that this phenomenon can be mainly explained by two effects, synergy effect and information effect.

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This dissertation follows the style of Journal of Financial Economics.

Synergy effect means that corporate takeover is beneficial to the target firm's shareholders as a result of takeover due to expected spillover gains. Meanwhile, information effect can be defined as "revaluation of target share which results from new arrival of information on 'stand-alone' target firm that is generated during the takeover deal process" following to Bradley, Desai, and Kim (1983).

In Chapter Ⅲ, I attempt to quantify the size of the information effect through examining total takeover gains. To this end, I develop an empirical procedure to quantify the information effect. Specifically I come up with a measure by combining an accounting based valuation approach to the model of abnormal accounting earnings forecast revision.

According to Pound (1988), analysts forecast future earnings of a target firm after a takeover announcement, base upon the assumption that the target firm will continue to run as a stand-alone entity. [1] Following Pound (1988), I use analysts' earnings forecast data to compute the intrinsic value measure of the target firm. The main advantage of the approach is that it allows us to quantify the information effect in terms of share value so that I can compare this directly with total share revaluation from actual variations in stock returns. In the below, I explain the empirical strategy in detail.

Suppose that a takeover announcement is made and the target firm's share price increases unexpectedly. Then, the information effect states that there exists much room for improvement of this target company even if actual merger does not occur. In order to measure the size of this effect, I need to have hypothetical values of target firms, which do

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[1] The Information hypothesis is rationalized in theory by Grossman and Hart (1981). They argue that takeover can be used as a tool to reduce the information asymmetry between target management and shareholders. If either the incumbent target managers inefficiently run the target resources or the target share is undervalued in the stock market for some reasons, shareholders can realize these hidden gains by exploiting the information, i.e. through acquisitions. Therefore, takeover generates information gains.

not include information about future takeover gains, yet still contain the information about ameliorating the state of the target company. Alternatively, I can select the samples of target firms whose deal did not go through and not taken by other firms later to verify if their unexpected increases in share prices are maintained. The latter method is straightforward, though there is risk of obtaining a smaller number of samples. The drawback of the former approach is, of course, difficult to have such a measure. In this paper, I attempt to overcome this issue by taking both routes. Especially for the latter, I compute target firms' values based on future earnings forecasts which are presumed to be orthogonal to synergistic gains.

Using this measure, I answer to the following questions. First, what is the size of the information effect, if it exists? Second, is the information effect independent of the effect from synergistic motives? Third, what are the sources of the information effect? In response to the questions, the empirical findings can be summarized as follows: I find that stand-alone earnings forecasts of 1,372 targets during 1980-2006 are abnormally revised upward from the takeover announcement. This is consistent with Brous and Kini (1993) who suggest a method to measure the abnormal changes of future income correcting this upward bias. Following their method and applying the intrinsic value metric, 26% of share revaluation of the target is approximately decomposed into 3.5% of information effect and 22% of synergy for total samples on their average values. Second, the magnitude of this information effect is validated in the 154 failed deals which are not subsequently taken over by other bidders. Similar to Bradley et al. (1983), positive share revaluation from the takeover announcement dramatically drops after the deal failure. However, contrary to their findings, it does not shrink to zero, but rather remains around a level of 9%, slightly over the level of the measured information effect (8.5%). This is robust in share

revaluation models and samples. From this evidence, I infer that the information effect should be appropriately quantified. Lastly, I find the evidence that the information effect is more likely driven by motives exploiting restructuring gains or undervaluation of target share, rather than by synergistic, overvaluation leveraged, or hubris/agency-cost oriented motives. The results show that the information effect is not affected by the marginal changes of variables representing the combined firm, but by the changes of variables representing the stand-alone target firm, e.g., target's book-to-market value of equity. This evidence reinforces the validity of the measure of information effect. Overall, the empirical results suggest that takeovers generate information gains and it amounts to up to 15% of total takeover gains.

In Chapter Ⅳ, I attempt to develop the model of corporate takeovers. In spite of successful research on the market for corporate control[2], this market might still be described as an open sea full of unknown species. Although researchers have attempted to solve the puzzles presented by this market regularly with updated empirical evidence,[3] the resulting information has still not led to a clearer picture. Specifically, about the issue of why mergers occur, research success has been more limited as Andrade et al. (2001) have mentioned. Furthermore, as Jensen and Ruback (1983) stated, it is difficult to identify the source of takeover gains even in the context of a single takeover.

The objective of Chapter Ⅳ is not to develop a new theory of takeovers but rather to provide the basic theoretical tool to put together the current competing existing

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[2] Throughout the paper, the corporate control is defined as the rights to determine the management of corporate resources; the rights to hire, fire and set the compensation of top-level managers following to Fama and Jensen (1985).

[3] For the summary of empirical evidences, see Jensen and Ruback (1983), and also see Jarrell, Brickley, and Netter (1988), and Andrade et al. (2001).

hypotheses and the empirical evidence that remain as separate as the pieces of an unsolved puzzle. This activity may help future readers and researchers to understand and draw the whole picture of the market for corporate control. The agent of interest in this paper is the top level manager and it is assumed that the typical agency problem, the conflict of interests of an agent occurs in any corporation with ownership and control that are separate.

Recently, there has been emerging empirical research on corporate governance in takeovers initiated by a series of corporate scandals. Most research on this issue has focused on how to design the payoff of the agent in order to remove or reduce the agency problem, i.e., the optimal contracting. As far as the takeover is concerned, most studies focus on finding empirical evidence about how either a weak corporate governance system or an executive compensation scheme is related to a bidder's valuation after a takeover offer.[4] But, such research lacks the theoretical work needed to analyze the agent's incentive as it occurs outside of the available empirical evidence. This paper offers an attempt to model the takeover decision-making process in the person of the top level manager, the agent in whom such offers are initiated, negotiated, and finalized.

Any manager's incentive to increase managerial gains might include elements such as hubris, over-confidence, a desire for empire-building with increased resources as well as performance-aligned compensation. All of these could result in different outcomes of a takeover proposal. The magnitude of this agency cost on the part of the human

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[4] A lot of examples of merger failure have been reported both in academic papers and the media although it is not sure whether the failure is from the agency cost or not. See the Economist "How mergers go wrong?" for these examples of so called failed merger. Generous CEO compensation and perks also have been issued through newswires since the recent financial crisis and bail-out plans for banks. See Wall Street Journal This Morning, (4.27) on the examples of these generous CEO perks.

characteristics of the manager depends on the firm specific CEO controlling devices or corporate governance system, which includes the compensation scheme, the supervision of the board of directors, and any existing anti-takeover protection. Therefore, incorporating the features of this corporate governance into the agent's decision making process would reinforce the validity of the model.

Chapter Ⅳ provides the rationale as to how and why agency cost drives a takeover especially under a sound and effective corporate governance system. An inefficient market could motivate shareholders to take entrenched positions against corporate piracy by outside corporate raiders. The rational agent, the manager, may exploit this firm specific anti-takeover entrenchment as his or her protection against being disciplined by an outside hostile takeover, the last resort of CEO controlling devices. This allowed agency cost could be maximized as the resources controlled by the agent increase. Therefore, the takeover of other firms by stock exchange offer is the best opportunity to realize their agency costs.

CHAPTER Ⅱ

THE MARKET FOR CORPORATE CONTROL

1. THE BIG PICTURE[5]

Before introducing the literature, it is useful to review the components of the market for corporate control in a dynamic perspective to streamline the discussion. The whole time period around a takeover can be divided into four segments or stages: the stand-alone operation period, valuation or investigation period, deal offer and negotiation period, and the post-deal period. Appendix F graphically summarizes these dynamic features in the market for corporate control.

1.1. Stand-alone operation period

In this period the firm, as a stand-alone entity, performs three typical business activities such as operation, investment, and finance. Operation is the production activity by the firm, specifically the technology that is utilized by the manager. This technology is not only affected by the manager itself but also other stakeholders such as customers, employees, government, and other firms both in the same industry and the market as a whole. [6] Investment is the capital accumulation process of acquiring additional capital in the capital

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[5] This section is for novice readers so that advanced readers may fairly skip this section.

[6] This may be the similar argument of the five forces analysis of industry or market structure suggested by Porter (1997). Five forces are the threat of substitute products, the threat of new competitors, the intensity of competitive rivalry, the bargaining power of customers, the bargaining power of suppliers. Government was added as a sixth force after.

goods market (in-house investment) or acquiring control of other firms' capital in the market for corporate control (takeover). [7] Finance is the activity to finance both operations and investments. Three types of financing such as internal, external equity, and debt financing are typically undertaken. Note that factors surrounding the financial market may affect the financing of a takeover project. Every decision made by the manager is evaluated by controlling devices making up the firm's own corporate governance system[8] such as the compensation scheme, the board of directors, and the hostile takeover as a last resort. The main focus during this period is to examine the driving force behind the takeover by realizing the gains realized by a takeover as opposed to the firm remaining a stand-alone entity. This work is not merely theoretical, but also requires empirical support.

1.2. Valuation or investigation period

In this period, the bidder evaluates the takeover of potential targets. After such an investigation, the bidder has superior or equal information to evaluate the takeover candidates than the market as a whole.[9] Takeover gains represent monetary or

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[7] Firm also performs security investment activity by owning other firm's bond or equity less than controlling shares, normally 50%. Note that these types of investment, classified as 'available-for-sale (AFS)' or 'hold-to-maturity (HTM)' security in the accounting principles, are not of our interest so to be excluded as an investment category throughout the paper.

[8] Jensen and Ruback (1983) define the corporate governance system as a repository of control rights of the acquired or current management team. Fama (1980) argue that the viability of the large corporation with diffuse security ownership is better explained in terms of a model where the primary disciplining of managers comes through managerial labor markets, both within and outside of the firm, with assistance from the panoply of internal and external monitoring devices that evolve to stimulate the ongoing efficiency of the corporate form, and with the market for outside takeovers providing discipline of last resort.

[9] This assumption is plausible from the fact that a lot of firms have "M&A" department devoted entirely to discovering and analyzing acquisition candidates. During this investigation period, the

nonmonetary gains from the takeover transaction to any stakeholders such as shareholders, debt holders, employees, and managers in both the bidder and target firm and even the investment banks providing the financial advising or underwriting services. These gains may be summarized as synergy, restructuring gain, valuation gain, and managerial gain (S-R-V-M). First, synergy could be obtained from the non-financial side by increasing product efficiency or by reducing investment overlap such as R&D or other capital expenditure. Synergy could also be derived from the financial side by generating tax benefits for the combined entity or by lowering its cost of equity. This type of takeover can be called a synergistic takeover. Another kind of takeover is achieved through restructuring gain, which is realized by disciplining inefficient management of the target through relatively efficient bidder management. This type of takeover is often called a disciplinary or allocational takeover. The third gain is the valuation one, which is achievable by exchanging the bidder firm's capital with that of the relatively undervalued target firm. In this scenario, taking-over other firm's capital means abandoning the opportunity for in-house capital investment at the same time. Therefore, if the bidder firm's capital is overvalued in the market relative to the fundamental value then the simple strategy of purchasing relatively undervalued target capital with the funds for in-house capital investment generates gains for the bidder. Note that it is hard to differentiate the restructuring gain from the valuation gain empirically since the undervaluation can be a result of inefficient management. This paper separates these two gains for conceptual purposes by assuming market efficiency in calculating the restructuring gain. Lastly, the managerial gain is achieved by realizing the manager's hubris or agency cost incentive.

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acquirer may get private information from the target candidate firm, or collect it by themselves. (see Grinblatt and Titman (2002))

Takeovers also entail physical relocation costs, legal and financial advising costs, or the cost to break through any anti-takeover defense in the case of a hostile mood. The main focus during this period is on empirically confirming or quantifying these four gains.

1.3. Deal period

The deal period begins with the announcement of the takeover offer and ends with deal closure or abandonment by any party. Most information about the takeover is released to the public during this period. This information is divided into three categories, that involving the deal itself, the firm, and the manager. First, the deal information includes the premium[10] offered, deal size (transaction value divided by bidder capitalization), form of the deal (tender offer vs. merger), method of payment (cash, stock or hybrid), level of hostility (hostile vs. friendly), level of focus (diversification vs. focused), existence of any competing bidder, and the final deal outcome (success vs. failure). The firm information includes all available financial or accounting information of the target and the bidder such as capitalization, book-to-market ratio, liquidity, leverage, Tobin's-q, or previous operating cash flow of the firm. Lastly, the CEO information includes biographical characteristics such as age and gender, past history of takeover, current compensation scheme, changes in holdings in equity, stock options, and side-payment arrangement from the takeover deal, including golden parachute, additional bonuses, or the promise of future job security. The main focus in this period is examining the market reaction to the takeover offer and how it varies across the firm according to this information.

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[10] In practice, the premium is calculated as the offered price divided by the benchmark pre-offer price of the target share. This benchmark can be one or two days, four weeks, or three months before the offer date.

1.4. Post-deal period

This period begins from the deal outcome of success or failure. Deal success creates the combined entity. Deal failure may initiate the subsequent offer by competing bidders or restructuring of the target firm because of some information obtained during the deal period. Managers both in the target and the bidder firms are expected to be disciplined by the internal and external controlling devices mentioned in the stand-alone period. Some may lose their jobs or others keep them depending on the subsequent restructuring of the firm. Some managers will attempt a management buyout (MBO) after the failure to secure their jobs or to exploit the future value increase of the firm. The main focus during this period is to examine empirically the long term performance of the combined firm in order to confirm the theoretically developed motivations behind the deal. Another area of research interest is to examine the market response to the failed deal in order to infer the rationale behind the failure.

The successful theory should be consistent with explaining the empirical evidence obtained through the four periods, from the stand-alone to post-deal periods. Therefore, the theory has to connect the driving force behind the takeover with the subsequent empirical evidence. In this context, identifying the driving force is the starting point, and this force is to what the theory is supposed to contribute the most.

2. WHAT DRIVES TAKEOVER

2.1. Neoclassical approach

This approach argues that shifts in industry structure[11] cause a takeover. Little theoretical work has been done on this issue to the author's knowledge. Empirically, Mitchell and Mulherin (1996) examine takeovers in 51 industries during 1980s and find that the total takeover and restructuring activities in an industry is positively associated with industry shocks such as deregulation, the volatility of energy prices, foreign competition[12], and financing innovation.[13] Andrade, Mitchell and Stafford (2001) confirm this argument by providing similar evidence using merger samples during the 1990s. This approach argues that synergy is the main motivator of takeover gains since industry shocks require firms to create additional value through takeovers in order to survive the shocks. Therefore, friendly focused mergers are expected to emerge from this kind of synergistic motive. Such deals are also likely to succeed since both parties would want the deal and positive post merger performance is expected under this approach.

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[11] According to Mitchell and Mulherin (1996), the structure of an industry, including the number and size of firms, is a function of factors such as technology, government policy, and demand and supply conditions and major changes, or shocks, in any of these factors which affect the industry structure cause shifts in industry structure.

[12] The effect of the volatility of energy prices is assumed to be greater as the energy dependence of the industry increases. The effect of foreign competition measured by changes in import penetration ratio which is the ratio of imports divided by new supply, however, shows weak statistical significance.

[13] For example, the emergence of the high-yield (junk) bond market enables to finance a number of acquisitions in 1980s. Long and Malitz (1985) document that the fraction of debt in capital structure is inversely related to R&D/sales at the industry level.

2.2. Q-theory of takeover

Grossman & Hart (1981)argue that a takeover can be initiated to realize the potential future restructuring opportunity of the target firm. In other words, the target firm is inefficiently managed for some reason at the time of the takeover announcement. Therefore, just the replacement of the incumbent management by new management may increase the value of the firm (this has also been called the kick in the pants hypothesis). In this model, the takeover can be seen as a means of disciplining the current inept management.[14] This type of takeover often entails some restructuring activity, such as employee layoffs and salary cuts of inefficient organizations. This model is similar to the synergistic one in the sense that it both does not harm any part of the shareholders, and it increases the wealth of target shareholders or both parties. Grossman & Hart call this kind of takeover "Allocational." Jovanovic and Rousseau (2002) modeled this hypothesis using Tobin's Q theory. Using this model, they find that a firm's takeover investment responds to its Q, the ratio of market value to the replacement cost of capital, more than its direct investment does, probably because the takeover investment is a high fixed cost and a low marginal adjustment cost activity. They also find that the merger waves of the 1900s and the 1920s, 1980s, and 1990s were a response to profitable reallocation opportunities[15], but the 1960s wave was probably caused by something else. Since this type of takeover seeks to achieve restructuring gain, which requires replacement of the management, it is more

[14] This kind of acquisitions are often structured as leveraged buyouts (LBOs) where an individual or a group often led by a firm's own management arranges to buy a public firm with the fund financed mainly with debt and take it private.

[15] They estimate the HP filtered series of "dispersion of Tobin's Q", which is the difference between the market value of asset and the replacement cost of the asset and find that each merger wave but for that of 1960s is proceeded by a rise in this dispersion.

likely to take the form of a hostile cash tender offer, which has a higher probability of deal failure due to management resistance. Empirically, many researchers report the empirical evidence that the bidder has a higher Q than the target does (e.g., Servaes 1991; Andrade *et al.* 2001).

2.3. Inefficient market approach

Shleifer & Vishny (2003) present a theoretical model of stock-market-driven acquisitions. They argue that takeovers may be motivated by exploiting the overvaluation of the bidding firm's stock by acquiring relatively undervalued target stock. They call this kind of takeovers "stock-market-driven (SMD)" acquisitions. This approach is similar to the Q-theory of takeover (Q) in the sense that both are seeking to exploit the undervaluation of the target. However, they are different in four important aspects. First, the SMD acquisition transfers wealth from target shareholders to acquirer shareholders while the Q takeover is a wealth-creating deal through restructuring. Second, gains from the SMD takeover are combinational, i.e., only realizable if the bid succeeds, while gains from the Q takeover can be achieved even if the target remains a stand-alone entity. Third, SMD assumes market inefficiency while the Q approach does not necessarily assume that. Lastly, stock is preferred as a payment in an SMD acquisition while cash is preferred in a Q acquisition.

Recently, Rhodes-Kropf *et al.* (2005) extend this argument of over-valuation into stock market to explain merger waves. They argue that waves of cash and stock purchases for takeovers could be rationally driven by periods of over- and undervaluation of the stock market. Although much empirical evidence supports this approach, it is hard to distinguish SMD acquisition from Q acquisition empirically since the proxy of misvaluation, e.g., book-

to-market of equity, is closely correlated with the Q measure. This is one of the major challenges in empirical research.

2.4. Managerial incentive approach

This approach argues that takeovers might be motivated by acquirer managers who have conflicts of interest with shareholders. As a result, such acquiring managers frequently overpay in acquiring the target firm, and the overpayment drives the upward revaluation of the target shares. This approach can be divided into two categories, such as hubris and agency cost, according to whether the takeover motive of the manager is aligned with the shareholder's interests. The hubris hypothesis is suggested by Roll (1986). He argues that managers of bidding firms might be affected by hubris so that they simply pay too much for their targets. Malmendier & Tate (2005) support his idea by providing empirical evidence showing that overconfident managers overestimate the returns on their investment projects and view external funds as unduly costly so that they do not decrease the equity holdings after the takeover. Luo (2005) argues that the insider, the manager, may have less information on the firm's prospects than outsiders, or the market, and this lack of information may generate the wrong decision.

The agency cost hypothesis is developed by Jensen (1986). He argues that because of free cash flow[16] incentives for managers, they tend to maximize the size of resources in control, empire-building, which is explicitly related to their compensation. Given this scenario, corporate acquisitions are one way that managers spend cash instead of paying it

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[16] Free cash flow is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital (Jensen 1986).

out to shareholders. Empirically, this hypothesis is supported by the negative drift in the acquiring firm's stock price following a merger announcement. This negative movement might imply that the takeover gains could be overstated or nonexistent (as in a non-value creating deal). Empirical studies suggest many symptoms signaling the hubris/agency-cost oriented mergers, including diversification (e.g., Morck *et al.* 1990; Lang & Stulz 1994; Villalonga 2004); large size bidders (Moeller *et al.* 2004); glamour acquirer (Rau & Vermaelen 1998); cash rich bidders (Harford 1999); and low leveraged bidders (Maloney *et al.* 1993). Recently, Cai & Vijh (2007) find more explicit evidence of agency cost in that the management compensation is an important motive behind corporate acquisitions.[17] This evidence related with first specific corporate governance are discussed in a latter section of this paper in detail.

3. WEALTH IMPLICATION

3.1 Who is the winner?

Overall, the target shareholders seem to gain in a takeover while the bidder shareholders seem not to gain. Empirical results on stock market reactions varies among researchers according to their takeover samples with different periods and deal characteristics (see Roll (1986); Jensen and Ruback(1983); Andrade et al. (2001)). On the share revaluation of

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[17] They examine the stock and option holdings of target and acquirer CEOs during 1993 to 2001, and find that both acquiring and target firm CEOs might be benefited from acquisitions whether the deals are successfully closing or not. They find that acquisitions enable target CEOs to remove liquidity restriction on stock and option holdings and also enable acquirer CEOs to improve the long-term value of overvalued holdings. For more discussions about benefits received by target chief executive officers and job turnovers of target CEOs in completed mergers and acquisitions, see Hartzell *et al.* (2004).

the target firm, there is no dispute on the direction revaluation even though its size varies. Jensen and Ruback (1983) report about 16 to 30 percent in tender offers and only about 10% in negotiated merger offers, while Jarrell, Brickley, and Netter (1988) report 53% in the 1980s. Andrade et al (2001) report 16% with 3,688 merger samples from 1973 to 1988. See Table 1 for the summarized empirical results that have been provided so far.

In the case of bidders, however, there is no consensus, either in the direction of revaluation or its magnitude. Loughran and Vijh (1997) find that after a size and book-to-market adjustment, tender offers result in positive abnormal bidder returns of 43% in the five years following the merger. Rau and Vermaelen (1998) find that acquirers experience long-run excess returns of 8.5% in the three years following the merger using 316 tender offer samples between 1980 and 1991. Jarrell and Poulson (1987) report significant 5% abnormal returns in 1960 tender offers while an insignificant 1% loss in the 1980s. Meanwhile, Travlos (1987) reports negative 1.47% in stock offers, and 0.24% in US cash offers. Franks, Harris, and Mayer (1988) find similar results in stock offers and 2.0% in US cash and 0.7% in UK cash offer samples. Andrade et al (2001) report negative 0.7% with 3,688 merger samples from 1973 to 1988.

Furthermore, some methodological problems have been reported with using bidder returns. First, Roll (1986) argues that there exists contaminating information, that is, information about the bidder rather than the bid itself. Second, Malatesta (1983) and Schipper and Thompson (1983) point out that the present value of the expected benefits of a bidder's acquisition program is incorporated into the share price when the acquisition program is announced or becomes apparent in the market. Some takeover announcements may not be surprising to the market if they are anticipated. The current market price may already incorporate the probability of the successful takeover, prior capitalization effect.

Asquith, Bruner and Mullins (1983) focus on the abnormal returns associated with the first four bids after the initiation of a merger program, arguing that the earlier bids in a merger program should contain more information about the profitability of the program than later bids. The third problem is one of measurement in that takeover gains may be only a small part of a bidder's stock price, and a relatively large bidder has high volatility of return, which eludes takeover gains (Asquith *et al.* 1983). Lastly, the performance extrapolation hypothesis argues that the market wrongly extrapolates the past performance of the bidder in determining the combined value of the two firms.

3.2. Does the takeover create value?

3.2.1. Stock returns

Combined firms' stock returns show mixed results. Andrade, Mitchell, and Stafford report statistically significant 1.8% returns for combined firm shares with a short daily event window of [-1,+1], while they report insignificant 1.9% returns with longer event windows of [-20, close]. Measuring total dollar gains also yields mixed results.[18] Some studies examine post-takeover long-term stock performances. For example, Andrade et al. (2001) reports negative 1.4% returns with value weighted abnormal returns for three years after the merger. However, much existing literature has raised methodological concerns about long-term event studies using the cumulative abnormal return (CAR) as a measure of share revaluation (see Barber & Lyon 1997; Kothari & Warner 1997; Andrade *et al.* 2001). Such

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[18] Malatesta (1983) reports statistically significant $32.4 million increase in terms of combined equity value on average from their 30 successful merger samples while Bradley, Desai, and Kim (1982) report statistically insignificant $17.2 million with their 162 tender-offer samples. Later, Bradley, Desai, and Kim (1988) report 7.4 percent ($117 million in 1984 dollars) gain in 236 successful tender offers which is statistically significant.

researchers are concerned that this CAR measure is not robust enough in the benchmark return estimation under some model assumptions.

3.2.2. Post-takeover accounting performance

Some research successfully reports significantly positive operating performance after a takeover, which indicates that such a takeover is a positive NPV project. Healy, Palepu, and Ruback (1992) examine post-acquisition performance for the 50 largest U.S. mergers between 1979 and 1984, and they find statistically significant increases in abnormal industry-adjusted post-merger operating cash flow returns. Their findings are also confirmed by Andrade, Mitchell, and Stafford (2001). Healy et al. also find that this performance improvement is particularly strong for firms with highly overlapping businesses, and mergers do not lead to cuts in long-term capital or R&D investments. This latter finding is inconsistent with Devos et al. (2009), who find that most of takeover gains are from cutbacks in investment.

4. SOURCES OF TAKEOVER GAINS

Empirical studies about the sources of takeover gains have focused on examining the relative importance between synergy and information effects among four takeover gains developed in theory. The information effect represents the sum of the restructuring gain and valuation gain since these are hard to identify empirically as mentioned above. However, there is no consensus on this issue yet. Moreover, there is little empirical

research to identify the source of agency cost or measure it directly in spite of the negative drift in bidder abnormal returns.[19]

4.1 Synergy hypothesis

This hypothesis argues that the most takeover gains result from synergy. Influential research by Bradley *et al.* (1983) provides the empirical evidence consistent with this hypothesis. Before them, Dodd and Ruback (1977) first examined[20] 84 unsuccessful takeovers and found that significantly positive abnormal returns of 18.96 percent in the tender offer month are persistent for five years after the offer. This result seems to be evidence that effects of synergy are not substantial. However, Bradley et al. argue that the seemingly permanent positive abnormal returns may be due to the anticipation of a future, higher-valued bid. If the target shareholders believe that the present value of this expected future bid exceeds the value of an outstanding offer, they will not accept the existing tender offer, which results in a takeover failure. Given this reasoning, they divided their sample of unsuccessful tender offers into two sub-samples: firms subsequently taken by a competing bidder within five years from the initial offer and those not taken for the same period. They find that the cumulative abnormal return (CAR) for the subsequently not-taken sample goes back to its pre-announcement level on average right after the offer is

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[19] Besides of this negative drift, some researcher suggests the positive bidder return on the announcement of bid cancellation as an evidence of agency cost takeover. This is also aligned with the argument by Dodd (1980) who mentioned that the deal termination party is important.

[20] Among lots of empirical literature on information effect, we consider Dodd & Ruback (1977) as a foundation for two reasons. First, as an event date they use the takeover announcement date instead of effective date of acquisitions. This appropriately enables us to capture the effect of information leakage before the final acquisition. Second, they consider an unsuccessful takeover sample as well as a successful one in their analysis. This dichotomy of whole sample has an important role to test the information hypotheses.

withdrawn, while CAR for subsequently taken samples remain consistent. These results are consistent with the synergy hypothesis because for the subsequently not-taken target firms, synergistic benefits may not be utilized afterwards.

Their findings facilitate the subsequent studies that attempt to identify the detailed source of synergy. The following three major sources are provided as the specific source of synergy gain: increased productive efficiency (Healy *et al.* 1992; Houston *et al.* 2001); obtaining monopolistic market power entailing monopolistic rent (Kim & Singal 1993; Sapienza 2002)[21]; and exploiting tax benefits (Jensen & Ruback 1983; Hayn 1989). Recently, Devos *et al.* (2009) successfully measured synergistic gains using Value Line analyst forecasts. They estimate that the average synergy gains are 10.3% of the combined equity value of a merging firm, which is calculated in terms of the cash flow return of a combined firm, and again this is further broken down into operating (8.38%) and financial (1.64%) synergies. They find that most of this operating synergy is from cutbacks in investment. Financial synergy from takeovers that is achievable by lowering the combined firm's cost of capital[22] or by providing various tax gains[23] to the acquiring firm is relatively small in their findings.

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[21] Ellert (1976) label this a 'monopolistic hypothesis' and differentiate with synergy hypothesis. Both of these monopolistic and productive efficiency hypotheses have been long discussed (See Lintner 1971; Mandelker 1974). However, empirical evidences show mixed signals for both kinds of synergy hypotheses. Market power(competition) does not create merger gains (Jensen & Ruback 1983).

[22] Most of takeovers during the 1960s and 1970s in the United States are conglomerate mergers which are motivated by this kind of financial synergies. Since diversification reduces the risk of bankruptcy for any given level of debt, it can increase the amount of debt in the firm's optimal capital structure which lower the firm's cost of capital (Grinblatt & Titman 2002).

[23] There is also the counter-evidence against the tax benefit. The implementation of the Tax Reform Act of 1986 is known to discourage firms to acquire other firms (Grinblatt & Titman 2002).

4.2. Information hypothesis

This hypothesis argues that the so-called information effect is the main source of takeover gains. The information effect is defined as the "revaluation of target share which results from new arrival of information on 'stand-alone' target firm that is generated during the takeover deal process." [24] Similar to Dodd and Ruback (1977), Safieddine and Titman (1999) also find a 5.14% decline in the target share on the termination date for 573 unsuccessful takeover attempts from 1982 to 1991.[25] They also found that many of these firms implemented restructuring strategies that were similar to the strategies that would have been imposed by their hostile suitors. This result may be evidence of the substantial amount of information effect.

Some researchers successfully provide evidence of the information hypothesis by introducing security analysts' accounting forecasts. Under this approach, researchers examine abnormal security analysts' earnings forecast revisions around the time of the takeover announcement. They assume that financial analysts continue to forecast earnings per share of the target firm in terms of its stand-alone value in spite of the takeover bid

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[24] This definition is followed by Bradley, Desai, and Kim (1983). The Information hypothesis is rationalized in theory by Grossman and Hart (1981). They argue that takeover can be used as a tool to reduce the information asymmetry between target management and shareholders. If either the incumbent target managers inefficiently run the target resources or the target share is undervalued in the stock market for some reasons, shareholders can realize these hidden gains by exploiting the information, i.e. through acquisitions. Therefore, takeover generates information gains.

[25] Perhaps, the threat of additional takeover attempts provides management with the incentives to cut wasteful spending and to take other steps that create value for their shareholders (Grinblatt and Titan, 2002)

announcement in order to provide investors with appropriate valuation information.[26] Therefore, if significantly positive earnings forecast revisions are observed, this means some kind of stand-alone revaluation, i.e. information effect, occurs upon announcement of takeover news. At the beginning, Pound (1988) fails to find this evidence with his or her 94 I/B/E/S enlisted firms targeted between 1979 and 1984. However, Brous & Kini (1993) find significantly positive forecast revisions using 307 tender offers between 1977 and 1988 after adjusting optimism bias and serial correlations in analysts' earnings forecasts. Sudarsanam *et al.* (2002) confirm this finding with U.K. tender offer samples using the same methodology as Brous & Kini.

5. CROSS-SECTIONAL EVIDENCE

5.1. Deal characteristics

Both the bidder and target return are negatively associated with stock offers. Travlos (1987) finds that stock exchange bidding firms have significantly negative abnormal returns at the announcement period while cash-financing bidding firms have a normal rate of return at the same time. This finding is consistent with the signaling hypothesis, which implies that stock financing conveys the negative information that the bidding firm is overvalued. He also argues that tender offers or hostile takeovers usually have the same

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[26] Pound (1988) support this stand-alone forecasting argument from analysts' retail reports as well as from his own survey of financial analysts who forecast future earnings per share for the firm they cover.

empirical implications as cash offers[27]. This contention is consistent with an argument that cash-only deals are usually value creating deals while stock payments may signal that the bidder has little wealth-creating investment opportunity or that a bidder is inefficiently managed (Myers & Majluf 1984). Uncertainty about the target's value tends to lead firms to make stock offers rather than cash offers (Eckbo *et al.* 1990).[28] Meanwhile, premiums in stock offers are much lower than those in cash offers (Travlos 1987; Franks *et al.* 1988).[29]

Asquith *et al.* (1983) argue that synergistic takeovers are more likely to succeed since these takeovers produce gains for the shareholders of both the acquirer and target. In contrast, disciplinary takeovers are more likely to fail. Non-agency cost bidders will abandon the bid as the premium increases. This tendency may result in positive bidders' returning on the announcement of bid cancellation.

A disciplinary takeover, by definition, is more likely to be resisted by the target manager, i.e., be perceived as more hostile. Empirical studies report greater target return in hostile takeovers. The takeover resistance increasing the takeover cost may truncate the low NPV offer. This may result in higher abnormal returns than in the other case, Truncation hypothesis. In the same token as deal success, a hostile attitude often results in bid failure. A lower market return rate upon bid announcement in a failed merger is

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[27] Tender offers are usually cash offers and mergers are usually common stock exchange offers. And cash offers that are typically associated with hostile takeovers (due to quicker registration) and, thus, higher premiums have the non-negative bidder returns, while generally friendly exchange offers that typically have lower premiums are associated with negative returns (Travlos 1987)

[28] Stock offers have the advantage that the acquiring firm ultimately pays less for the bad acquisitions since the acquirer's stock price is likely to perform worse after making a bad acquisition.

[29] Cash offer has tax advantage of the tax basis step-up for depreciation since it allows for the firm to write up the tax basis of the acquired firm's asset by the Tax Equity and Fiscal Responsibility Act of 1982. However since the Tax Reform Act of 1986 any increase in the value of depreciable assets of the acquired firm from electing the asset write-up has been taxed.

associated with the lower probability of success resulting from management resistance. Some researchers find that anti-takeover resistance destroys the wealth of the bidder shareholder by reducing the possibility of the takeover's success while it increases the rival's stock price by protecting the rival producer (Ellert 1976; Eckbo *et al.* 1990). While many researchers suggest hostility as a symptom of a disciplinary motive (Morck *et al.* 1988; Mitchell & Lehn 1990), Bhagat *et al.* (2005) argue that hostility is a symptom of agency costs.

Normally a tender offer, which is associated with a hostile cash offer, has greater premiums than a friendly merger offer. Grossman and Hart (1980)(1980) develop the free-rider problem[30] that exists in the case of tender offers.

Bid competition or the existence of potential bidders is positively associated with a greater premium. This is from the fact that the bidding process is like the auction (Roll, 1986). Bradley (1980) also argues that competition reduces the probability of corporate raiding or piracy.

Empirical evidence on diversification are mixed. On the one hand, some argue that diversification is a way of overcoming industry shock by seeking targets in other industries having positive NPV projects. They also argue that this could be the rational response to poor growth opportunity or technological shock (see Lewellen 1971; Campa & Kedia 2002;

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[30] There are several ways to solve this problem in practice. First, the bidder may attempt to buy target shares secretly on the open market. However, U.S. regulation requires purchasers to file a 13D report to the Securities and Exchange Commission on their intentions when their holdings reach 5% shares of outstanding share. Second, risk arbitrageurs might accumulate possible target shares with substantial amount enough to tender the offer. Third, if the bidder can transfer the wealth from the target to its own subsidiary by selling attractive price, minority shareholders will accept the tender. Fourth, two-tiered offer, in which second tier offer price is lower than the first one, might force the minority shareholder to sell their shares. However, in these days many firms have so called 'fair price amendments' in their corporate charters which require the second-tier price to be equal to the first one. For more details, see Grinblatt and Titman (2002).

Graham *et al.* 2002; Villalonga 2004)). Or diversification may have financial synergy in the form of the one-time tax credit. On the other hand, there are evidence that this conglomeration decreases the value of the combined firm, i.e., resembles an agency cost oriented takeover.[31]

5.2. Firm fundamentals

Moeller et al (2004) find that large acquirers tend to pay more than small ones, and they infer that this might represent the agency cost (size effect). Harford (1999) argues that a more cash rich acquirer is likely to raise the agency cost involved takeover bid (liquidity effect). He found that cash-rich firms are more likely to attempt acquisitions which are value decreasing, more frequently diversifying acquisitions. Furthermore, these acquisitions tend to be followed by abnormal declines in operating performance. Maloney et al. (1993) find that a highly leveraged firm is less likely to make agency cost oriented investment decisions since it has less resources to waste on unprofitable mergers and acquisitions (leverage effect). Lang, Stulz, and Walkling (1991) find that bad bidders with low Tobin's-Q and large free cash flows offer takeover bids that result in negative stock market reactions upon the takeover announcement. Schwert (2000) documents the lower valuations of targets of hostile takeovers than those of average targets, whereas Andrade et al. (2001) show that in 66% of the mergers between 1973 and 1998, the acquirer's Q exceeded the target's Q. Rau and Vermaelen (1998) show that value bidders with high book-to-market of equity outperform glamour bidders in the three years after the

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[31] This evidence is supported by several studies (Morck *et al.* 1990; Lang & Stulz 1994; Graham *et al.* 2002; Villalonga 2004).

completion of the merger, and that glamour bidders pay more frequently with stock than do value bidders. Growth firms which have stable economic histories and substantial free cash flows with few growth opportunities are more likely to be over-valued firms. They are less likely to have profitable projects or more likely to have excess capacity so that they might attempt agency cost-oriented takeovers (Jensen 1986)[32]

5.3. Corporate governance characteristics

Empirical research in corporate finance has provided evidence that strong corporate governance systems are positively associated with higher firm value. The influential research of Gompers, Ishii, and Metrick (2003) finds that firms with stronger shareholder rights had higher firm values, higher profits, higher sales growth, lower capital expenditures, and fewer corporate acquisitions. Bebchuck and Cohen (2009a) find that management entrenchments represented as six provisions in the IRRC universe, e.g. staggered boards, are associated with a reduction in firm value as measured by Tobin's Q. La Porta et al. (2002) show that firm value is positively associated with the rights of minority shareholders. Chhaochharia and Grinstein (2007) find that firms that are less compliant with the provisions of rules such as the Sarbanes-Oxley Act and various amendments to the U.S. stock exchanges' regulations which were motivated by the 2001-2002 corporate scandals earn positive abnormal returns compared to firms that are more compliant when these rules are announced.

5.3.1. CEO compensation

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[32] Jensen provide the empirical evidence in the oil industry, however, he predicts that stock exchange deals are likely to be initiated by bidders with small or no free cash flows.

Empirical studies provide evidence that the executive compensation arrangement seems to fail in reducing the agency cost. Bebchuk and Fried (2003) argue that the design of this compensation would also be partly a product of this agency problem. They argue that the greater power of managers entails greater executive compensation and provide the various reasons why the board of directors frequently fails to control the CEO.[33] CEOs of firms with stronger takeover protections, such as a staggered board, get pay packages, e.g. golden parachutes, that are both larger and less sensitive to performance, and their compensations are camouflaged by stealth compensation[34] or outside compensation consultants. Recently, Cornett et al. (2008) find that stock option compensation is positively correlated with earnings management, and once the likely impact of earnings management is removed from profitability estimates, the relation between performance and option compensation disappears. Some researchers find that executives have incentives to hedge the risks of the equity based option awards by selling previously owned shares, and this hedging incentive is more evident in managers with higher levels of ownership (Lambert & Larcker 1985; Ofek & Yermack 2000). In the case of corporate takeover, however, there is a strong positive relation between acquiring managers' equity-based compensation (EBC) and stock price performance around and following acquisition announcements (Mehran 1995). Datta et al. (2001) report that compared to low EBC managers, high EBC managers pay lower acquisition premiums and acquire targets with higher growth opportunities. Holmstrom and Kaplan (2001) report that leveraged buyout

[33] Directors might care about the future re-nomination or multi-nomination which usually influenced by the current CEO. They usually have limited information on the executive compensation which is so complicated that it is often justified by outside compensation consultants who are in favor of current CEO. Furthermore they tend to approve gratuitous farewell payment package with sympathy to leaving CEOs.

[34] For example, pension plans, deferred compensation, postretirement perks, consulting contracts, and executive loans could be used as stealth compensation.

activity, which was often part of, or in response to, hostile offers, constituted close to 2 percent of the stock market value in the late 1980s, but was virtually nonexistent in the 1990s. They argue that hostile takeovers and LBOs largely disappeared in the 1990s because of, at least in the United States, a development of management incentive mechanisms such as stock options.

Hartzell et al, (2004) find that side payments negotiated by target CEOs such as golden parachutes or special cash arrangements are positively associated with prior excess payments and negatively associated with takeover premiums and the likelihood that the target CEO becomes an executive of the acquiring company. They also find that target CEOs experience relatively higher job turnover rates several years after the takeover announcement.

5.3.2. Board of directors

Empirical study also finds that a weak board of directors is associated with agency-cost oriented takeovers. Core et al. (1999) find that executive compensation is positively correlated with relatively weak or ineffectual boards and negatively correlated with the presence of a large number of outside shareholders and a larger concentration of institutional shareholders. Bebchuk, Coates, and Subramanian (2002) find that s*taggered boards* are a key determinant for whether a target receiving a hostile bid will remain independent.

5.3.3. Anti-takeover protection

Lastly, empirical evidence shows that anti-takeover protections are associated with higher premium and lower bidder returns. Anti-takeover protections have benefits such as increased bargaining power to increase any takeover premium as well as costs such as agency cost by managers to run the firm inefficiently. Masulis et al. (2007) find that

acquirers with more anti-takeover provisions and overlapping positions of the CEO and chairperson of the board experience significantly lower announcement period abnormal returns. Jarrell and Poulson (Jarrell & Poulsen 1987) find that anti-takeover amendments, on average, lead to negative changes in the stock price of the target but positive ones when an institutional block holder exists. Comment and Schwert (1995) find that defensive mechanisms such as a poison pill might increase the bargaining power of the target, resulting in higher premiums instead of deterring the deal. However, it is still an open question as to whether this increased bargaining power also increases the side payment to target managers as well as increases the premium. Jarrell and Bradley (1980) find that the 1968 Williams Act increased takeover premiums significantly while it decreased the bidder's returns so as to reduce the volume and productivity of cash takeovers. This result is mainly due to the takeover act forcing greater disclosure delays in the execution of takeovers so that it dilutes the bidder's information gain of how to accomplish valuable corporate combinations. Schipper and Thompson (1983) shows that abnormal bidder returns were negative at the time of four takeover regulatory changes, such as the Accounting Principle Board Opinions 16 and 17, the 1969 Tax Reform Act, the 1968 Williams Amendment, and its 1970 extension. This result may indicate that these takeover regulations may increase the bargaining power of the target or truncate low profitability takeovers.

6. TIME SERIES EVIDENCE

6.1. Increasing takeover activity

There has been an observed trend of increasing corporate takeover activity. As Andrade et al. (2001) stated, the dollar value of transactions for mergers and acquisitions has increased and gets a significant portion of this increase in the total transaction cost in the stock market. This increase coincides with the development of the modern corporation in which ownership and controlling rights are separated. Although there is no detailed empirical analysis on this issue yet, this trend may indicate that a greater portion of the overall takeover activities is the agency cost oriented one.

6.2. Takeover waves

Successful theory also should explain takeover waves, in which takeover activity occurs in clusters, both in terms of time and industry. However, there is not enough evidence available about this issue. Historically, four waves have been observed and categorized as follows: the oligopoly wave of the 1920s, the conglomerate wave of the 1960s, the hostile cash tender-offer wave of the 1980s, and the recent friendly stock exchange wave of the 1990s, although there is no agreement on the driving forces behind the two most recent waves.

All of the four approaches to the driving force of takeovers support the wave phenomenon. The neoclassical approach argues that industry-wide shocks such as

deregulation[35] and technology innovation drive waves (Mitchell & Mulherin 1996; Andrade *et al.* 2001). Business cycle factors such as recessions[36] or credit crunch may explain takeover waves, especially in terms of time clustering. Harford (2005) argues that this macro-level liquidity component causes industry merger waves to cluster in time even if industry shocks do not.

The Q-approach provides empirical evidence that takeover waves are followed by dispersion of Tobin's-q (see Jovanovic, 2002).[37] The inefficient stock market approach contends that the overvaluation of the 1990s is responsible for that takeover wave (Shleifer and Vishny, 2003). Rhodes-Kroft et al. (2004) also support this idea by arguing that rational targets without perfect information will accept more bids from over-valued stock bidders during market peaks because they overestimate synergies. Some researchers suggest that corporate governance issues led to the merger wave of the 1980s and 1990s (Holmstrom & Kaplan 2001).

7. REMAINING ISSUES

In the theory of the market for corporate control, there are few models to explain the relations or causalities among takeover motives and sources of takeover gains. Specifically in the case of the managerial incentive approach, more rigorous modeling work is required.

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[35] Permissive stance toward mergers by the Justice Department during the Reagan administration and deregulation of transportation, communications, and financial services in 1980s may be these examples.

[36] The temporary decline in M&A activity at the end of 1980s coincide with a recession and the collapse of the junk bond market and the 1990s wave is coincided with the bull market, or exuberant mood of stock market.

[37] However, Chattergee (1992) argue that the firm level restructuring shock brings disciplinary takeover while the industry wide shock brings takeover wave.

There is also no consensus on the background of takeover waves, especially that of the recent 1990s.

Empirically, including the manager's hubris or agency cost as one of major takeover gains is required. Therefore, dichotomous analysis such as synergy vs. information effect is no longer persuasive. Rather it is necessary to quantify and compare more explicitly each takeover gain with more rigorous analysis. One example of this is incorporating the success probability of the deal and examining whether the capital market could forecast this appropriately during the deal announcement period.

Meanwhile, empirical study should also focus on finding cross-sectional evidence on the agency cost using rich evidence recently developed about corporate governance issues. Examples of these research questions are as follows. Does the manager who wants an agency cost oriented takeover pay higher advising fees to investment bankers to justify the offer? Is takeover resistance from disagreement with the premium or disagreement with the side-payment to the target CEO? Did the demise in hostile takeovers in the 1990s result from the decrease of disciplinary takeovers, or did it merely reflect the increase in hostile takeover protection mechanisms? Is the inefficient manger actually disciplined after a deal failure? How is management entrenchment associated with agency cost takeovers?

CHAPTER Ⅲ

MEASURING INFORMATION EFFECT ON TAKEOVERS

1. RELATED LITERATURE

Before developing the model of information effect, I review the earlier literature on the information effect. The first section reviews the five main sources of takeover gains by their motives. Since the information effect is defined on the target share revaluation, i.e. total takeover gains, these include the sources of information effect by construction. The Second section reviews the literature on whether the information effect has a significant portion in takeover gains or not.

1.1. Takeover motives: sources of takeover gains

1.1.1. Synergistic

This hypothesis argues that the combining of two firms by mergers results in an increased aggregate market value of two firms. Three rationales are provided as specific sources of synergy gain: increased productive efficiency (Healy *et al.* 1992; Houston *et al.* 2001); obtaining monopolistic market power entailing monopolistic rent (Kim & Singal 1993; Sapienza 2002)[38]; exploiting tax benefit (Jensen & Ruback 1983; Hayn 1989). These synergistic opportunities might be initiated by industry restructuring or deregulation

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[38] Ellert (1976) label this a 'monopolistic hypothesis' and differentiate with synergy hypothesis. Both of these monopolistic and productive efficiency hypotheses have been long discussed (See Lintner 1971; Mandelker 1974). However, empirical evidences show mixed signals for both kinds of synergy hypotheses.

which is consistent with neo-classical theory of merger waves (Andrade *et al.* 2001). See Devos *et al.* (2009) for a well-established survey about this synergy hypothesis.

1.1.2. Disciplinary

Grossman & Hart (1981) argue that the takeover can be initiated to realize the potential future restructuring opportunity of target firm. In other words, the target firm is inefficiently managed at the time of the takeover announcement for some reason. Therefore, just the replacement of the incumbent management by new management may increase the value of the firm (kick in the pants hypothesis). In this context, the takeover can be a means of disciplining the current inept management. This kind of takeover is similar to the synergistic one in the sense that it both does not harm any part of the shareholders, and it increases the wealth of target shareholders or both parties. Grossman & Hart call this kind of takeover as an 'Allocational'.

1.1.3. Acquisitional

Grossman & Hart (1981) also argues that some takeovers are motivated by acquiring management who has obtained asymmetric information which signals that the target firm is undervalued at the time of announcement (sitting on a gold mine hypothesis). In this context, corporate takeovers act as means of exploiting the undervaluation. This kind of takeover is different with the synergistic and disciplinary ones in the sense that this is not a wealth-creating deal but rather discovering the hidden wealth of a target share. However, an acquisitional takeover is similar to a disciplinary one since the gains for these kinds of takeovers can be achieved as a stand-alone entity without any physical combination of two firms.

1.1.4. Overvaluation-leveraged

Sleifer & Vishny (2003) argues that takeovers may be motivated to exploit the overvaluation of bidding firm's stock by acquiring relatively undervalued target stock. They call these kinds of takeovers "stock-market-driven (SMD)" acquisitions. This is similar to the acquisitional takeovers in the sense that both are seeking to exploit the misvaluation of the stock market. However they are different in two points. First, overvaluation-leveraged acquisition transfers wealth from target shareholders to acquirer shareholders while the other is a wealth-creating deal in the point of target shareholders without any transfer of wealth. Second, gains from overvaluation-leveraged takeovers are combinational, i.e. only realizable in the bid success, while gains from the acquisitional one can be achieved as stand-alone entity. Third, cash cannot be used as a payment in the overvaluation-leveraged acquisition while it can be chosen in the acquisitional mergers. Travlos (1987) find that stock exchange bidding firms have significantly negative abnormal return while cash-financing bidding firms have a normal rate of returns at the announcement period. This is consistent with the signaling hypothesis, which implies that stock-financing conveys the negative information that the bidding firm is overvalued. He also argues that tender offers or hostile takeovers usually have the same empirical implication as cash offers[39]. Shleifer & Vishny (2003) present a theoretical model of stock-market-driven acquisitions. Recently, Rhodes-Kropf *et al.* (2005) extend this argument of over-valuation into stock market wide explaining merger waves. They argue that waves of cash and stock purchases for takeovers could be rationally driven by periods of over- and undervaluation of the stock market.

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[39] Tender offers are usually cash offers and mergers are usually common stock exchange offers. And cash offers that are typically associated with hostile takeovers (due to quicker registration) and, thus, higher premiums have the non-negative bidder returns, while generally friendly exchange offers that typically have lower premiums are associated with negative returns (Travlos 1987)

1.1.5. Hubris/agency-Cost

This hypothesis argues that takeovers might be motivated by acquirer managers who have conflict of interests between themselves and shareholders. As a result, they frequently overpay in acquiring the target firm and the overpayment makes the upward revaluation of target share. Unlike the above four hypotheses, this hubris/agency-cost motive does not aligned with the shareholder's interests, and the agency cost arises from the information asymmetry between managers who make all corporate investment decisions including mergers and acquisitions and the shareholders who delegate these rights. In this context, takeover gains paid to target shareholders as premium could be illusive and the so called winner's curse is often observed. Roll (1986) argues that managers of bidding firms might be infected by hubris so that they simply pay too much for their targets. Malmendier & Tate (2005) argue that overconfident managers overestimate the returns to their investment projects and view external funds as unduly costly. Jensen (1986) argues that because of free cash flow[40] incentives of managers, they tend to maximize the size of resources in control which is explicitly related with their compensation. In this context, corporate acquisitions are one way that managers spend cash instead of paying it out to shareholders.

Empirically, this hypothesis might explain the challenging evidence of negative drift in acquiring firm's stock price following the merger announcement. This negative movement might imply that the takeover gains could be overstated or nonexistent. Empirical studies suggest many symptoms signaling the hubris/agency-cost oriented mergers; diversification (e.g., Morck *et al.* 1990; Lang & Stulz 1994; Villalonga 2004); large size bidder (Moeller *et al.* 2004); glamour acquirer (Rau & Vermaelen 1998); cash rich

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[40] Free cash flow is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital (Jensen 1986).

bidders (Harford 1999); low levered bidders (Maloney *et al.* 1993). Recently, Cai & Vijh (2007) find more explicit evidence of agency cost that the management compensation is an important motive behind the corporate acquisitions.[41]

1.2. Significance of information effect: "synergy vs. information"

Empirical literature on the significance of information effect shows conflicting evidences. They are summarized into two approaches according to their measures of information effect.

1.2.1. Market approach

The first approach uses abnormal stock returns to test these competing hypotheses and concludes that the information effect is negligible. In this approach, movements of abnormal stock returns are examined for the unsuccessful takeovers. With significant information effect, some significant portion of positive share revaluation of target at the announcement should be persistent even after the deal is withdrawn. Dodd and Ruback (1977) firstly examined[42] 84 unsuccessful takeovers and found that significantly positive

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[41] They examine the stock and option holdings of target and acquirer CEOs during 1993 to 2001, and find that both acquiring and target firm CEOs might be benefited from acquisitions whether the deals are successfully closing or not. They find that acquisitions enable target CEOs to remove liquidity restriction on stock and option holdings and also enable acquirer CEOs to improve the long-term value of overvalued holdings. For more discussions about benefits received by target chief executive officers and job turnovers of target CEOs in completed mergers and acquisitions, see Hartzell *et al.* (2004).

[42] Among lots of empirical literature on information effect, we consider Dodd & Ruback (1977) as a foundation for two reasons. First, as an event date they use the takeover announcement date instead of effective date of acquisitions. This appropriately enables us to capture the effect of information leakage before the final acquisition. Second, they consider an unsuccessful takeover sample as well

abnormal returns of 18.96 percent in the tender offer month are persistent for five years after the offer. However, Bradley *et al.* (1983) provide the counter-evidence with opposite direction. They argue that the seemingly permanent positive abnormal returns may be due to the anticipation of a future, higher-valued bid. If the target shareholders believe that the present value of this expected future bid exceeds the value of an outstanding offer, they will not accept the existing tender offer, which results in a failure. With this reasoning, they divided their sample of unsuccessful tender offers into two sub-samples; subsequently taken by competing bidder within five years from the initial offer and subsequently not-taken sample for the same period. They find that cumulative abnormal return (CAR) for subsequently not-taken sample go back to its pre-announcement level on average right after the offer is withdrawn, while CAR for subsequently taken samples are persistent. This is consistent with synergy hypothesis because for the subsequently not-taken target firms, synergistic benefits may not be utilized afterwards.

1.2.2. Security analyst approach

Second approach introduces security analysts' accounting forecasts to test these confronting hypotheses and concludes that information effect exists significantly. This approach examines abnormal security analysts' earnings forecast revisions around the takeover announcement. They assume that financial analysts continue to forecast earnings per share of target firm as its stand-alone value in spite of the takeover bid announcement in order to provide investors with appropriate valuation information.[43] Therefore, if

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as a successful one in their analysis. This dichotomy of whole sample has an important role to test the information hypotheses.

[43] Pound (1988) support this stand-alone forecasting argument from analysts' retail reports as well as from his own survey of financial analysts who forecast future earnings per share for the firm they cover.

significantly positive earnings forecast revisions are observed, this means some kind of stand-alone revaluation, i.e. information effect, occurs by takeover news. At the beginning, Pound (1988) fails to find this evidence with their 94 I/B/E/S enlisted firms targeted between 1979 and 1984. However, Brous & Kini (1993) find significantly positive forecast revisions with 307 tender offers during 1977 to 1988 after adjusting optimism bias and serial correlations in analysts' earnings forecasts. Their methodology will be discussed later in section 3. Sudarsanam *et al.* (2002) confirm this finding with U.K. tender offer samples by the same methodology with Brous & Kini.

2. METHODOLOGY

One critical assumption ruling the previous section is that both the synergy and the information effect are fairly measured. In this section, I develop the methodology to explicitly measure the information effect in terms of share values. Synergy is measured indirectly by subtracting the explicitly measured information effect from the revaluation of the target share.

2.1. Information Effect

2.1.1. Discounted Residual-Income Approach

One explicit way to measure the information effect is to extract only stand-alone parts from the total revaluation of the target share. Therefore, the successful measure of information effect should satisfy two features: the terms of share value; and stand-aloneness. First, the measure should be expressed in terms of share revaluation. Here the value of share$(V_{i,t}^{*})$ is

typically defined as the present value of its expected future dividends based on all currently available information as follows.

$$V_{i,t}^* = \sum_{i=1}^{\infty} \frac{\mathbb{E}_t\big[D_{i,t}^j \mid \Omega\big]}{\left(1 + r_i^e\right)^i} \tag{1}$$

In this equation, $D_{i,t}^j$ represents the dividend of jth upcoming fiscal period at time t for the firm i, and $\mathbb{E}_t[\cdot \mid \Omega]$ represents the expectation based on information available at time t and r_i^e represents a cost of equity of the firm i which is assumed to be constant. Second, stand-aloneness requires that the measure should be free from the effect of a takeover event, i.e. as if there is no bid offered. Existing performance measures, however, are not qualified as successful measures of the information effect. Typical stock performance measures, e.g. CAR, cannot separate the stand-alone values. One successful-looking measure of information effect is the abnormal earnings forecast revisions introduced by Brous & Kini (1993). Although this may be qualified as stand-alone measure, it does not sufficiently provide an implication of valuing a share.[44] On the methodology of Brous & Kini, I will discuss later in this section.

Discounted residual income approach sometimes referred to as Edwards-Bell-Ohlson (EBO) valuation equation provide the answers to these questions. Ohlson (1995) demonstrate that, as long as a firm's earnings and book value are forecasted, the intrinsic

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[44] They use abnormal change of accounting earnings forecasts. Accounting earnings, however, have some limitations as a proxy for its share value. Most of all, accounting earnings is not exactly linked to the firm's cash flow to shareholders, i.e. a dividend which is directly contributed to its equity value. Second, earning is so volatile that it has negative values sometimes. Third, earnings may diverge from its stock price that implicitly gives us a misleading, inaccurate share value. Lastly, one or two earning numbers may tell us the direction of the firm's valuation in a qualitative sense however, they may not provide us an idea of how much its intrinsic value changes in the quantitative sense.

value written as (12) can be rewritten as the reported book value, plus an infinite sum of discounted future residual incomes as follows.

$$V_{i,t}^* = B_{i,t}^0 + \sum_{j=1}^{\infty} \frac{\mathbb{E}_t[NI_{i,t}^j - r_i * B_{i,t}^{j-1}]}{(1+r_i)^j} \tag{2}$$

In this equation, each of $B_{i,t}^j, NI_{i,t}^j$ represents the firm's book value per share and net income per share for the jth upcoming fiscal period. Any kind of time frequency can be used as a fiscal period only if the accounting earnings are reported, i.e. quarterly or yearly. This accounting based valuation model explicitly represents the intrinsic value of share since the above equation is derived from (12). This is also supported by empirical evidences (Lee *et al.* 1999). [45] In this context, this intrinsic value of share is considered as an alternative measure of share price. Furthermore, this measure can be designed as stand-alone valuation of share as long as security analysts' earnings forecasts ($F_{i,t}^j$) are used as expected future net incomes ($\mathbb{E}_t[NI_{i,t}^j]$) in (13). The rationale is that financial analysts are assumed to continue to forecast earnings per share of a target firm as its stand-alone value in spite of the takeover news in order to provide investors with appropriate valuation information (Pound 1988). Finally I can develop the change of the intrinsic value of share, i.e. revaluation, from the first difference of the intrinsic value normalized by its share price. I call this revaluation as 'intrinsic value revision(VR_t)' since the value of share is changed as security analysts revise their forecasts on future earnings and I express it as follows.

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[45] They examined the relative valuation measure of intrinsic value over price (V/P) using Dow 30 stocks during 1963-1996. They find that the first-order autocorrelation for the V/P measures are smaller that the case of other traditional measures such as earnings (E/P) or book value (B/P) and also show that V/P follows a stationary process meanwhile others follows unit-root, and V/P has values close to 1 on average which varies from 0.60 to 0.74 according to a discount rate and an explicit estimation period the model assumes. This means that when V/P deviates from its mean, it reverts back more quickly in the subsequent time period.

$$VR_{i,t} = \frac{\Delta V_{i,t}^*}{P_{i,t-1}} = \frac{V_{i,t}^* - V_{i,t-1}^*}{P_{i,t-1}} \tag{3}$$

In this definition, $P_{i,t-1}$ represents the share price prior to the takeover announcement. By normalization, this measure is similar to the stock return measure.[46] The only difference is that the value revision is a stand-alone measure, i.e. a measure of the information effect.

2.1.2. Abnormal Value Revision (AVR)

In order to implement the value revision equation (14) empirically, I adopt the three period model by Lee *et al.* (1999) where residual incomes maintain their levels beginning with the third fiscal year. From this assumption and clean surplus accounting[47], I can derive the empirical version of value revision as follows (see appendix for this derivation in detail).

$$VR_{i,t} = \frac{k_{i,t}^e FR_{i,t}^1}{(1+r_i)} + \frac{k_{i,t}^e FR_{i,t}^2}{(1+r_i)^2} + \frac{FR_{i,t}^3}{(1+r_i)^2 r_i} \tag{4}$$

In this equation, $k_{i,t}^e$ represents the expected future dividend payout ratio with all the available information set at time t and $FR_{i,t}^j$ represents the analysts' earnings forecast revision. The analysts' forecast revision is defined as $FR_{i,t}^j = (F_{i,t}^j - F_{i,t-1}^j)/P_{i,t-1}$ where $F_{i,t}^j$ represents the I/B/E/S analysts' consensus earnings forecast for the jth upcoming fiscal year at time t.

This value revision is measurable since all the variables in RHS of (15) are available as data. However this measure might be a biased one if the security analysts' earnings

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[46] By this normalization, value revisions, calculated from different amounts and times, are also able to be averaged or compared to each other as the market returns.

[47] Clean surplus relation requires that earnings include all gains and losses affecting the book value so that the change in book value from period to period is equal to earnings minus net dividends: $(B_t^{i+1} = B_t^i + NI_t^{i+1} - D_t^{i+1})$.

forecasts are biased. Much of accounting literature point out that analyst earnings forecasts appear to be upwardly biased on average (O'Brien 1988; Lys & Sohn 1990; Abarbanell 1991; Brown 1993). In other words, their forecasts are overly optimistic[48] ahead of the fiscal year and are then systematically revised downwards as approaching to the fiscal year end. As a result, any forecast revisions for specific fiscal period would be significantly negative until the fiscal period ends. In order to correct this optimism bias, I adopt the model of expected forecast revision by Brous & Kini (1993). They assume that analysts are expected to revise their earnings forecasts as follows.

$$\mathbb{E}[FR_{i,t}^{j}] = k_i + \frac{1}{T}\sum_{s=1}^{T}\delta_{i,t-s} \tag{5}$$

In this equation, the drift term (k_i) is a constant period mean of all available forecast revisions $(FR_{i,t})$ with the same forecast end date outside the event window of [-2, +4] months. The error term $(\delta_{i,t-s})$ is defined as the difference between k_i and the actual forecast revision at month t. Like Brous & Kini (1993), I assume that $FR_{i,t}$ follows the fourth-order moving average process since approximately 20% of analysts are expected to revise their forecasts every month. If I define the abnormal analyst earnings forecast revision as $AFR_{i,t}^{j} = FR_{i,t}^{j} - \mathbb{E}[FR_{i,t}^{j}]$ then this is calculated by substituting expected revision obtained from the equation (16). Finally if I define abnormal intrinsic value revision as $AVR_{i,t} = VR_{i,t} - \mathbb{E}[VR_{i,t}]$ then the new measure of information effect $(AVR_{i,t})$ is written as follows.

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[48] For rationales behind the optimism bias, many hypotheses are suggested in accounting literature: career concern incentives to develop their reputations (Hong & Kubik 2003); cognitive bias hypothesis (Easterwood & Nutt 1999); investment banking incentives (Michaely & Womack 1999); security trading incentives (Cowen *et al.* 2006); strategic reporting hypothesis (Lim 2001); self selection hypothesis (McNichols & O'Brien 1997) (Das *et al.* 2006); rational expectations hypothesis (Lim 2001; Gu & Wu 2003); and earnings management hypothesis (Abarbanell & Lehavy 2003).

$$AVR_{i,t} = \frac{k_{i,t}^e \, AFR_{i,t}^1}{(1+r_i)} + \frac{k_{i,t}^e \, AFR_{i,t}^2}{(1+r_i)^2} + \frac{AFR_{i,t}^3}{(1+r_i)^2 r_i} \tag{6}$$

In this equation, however, three ex-ante variables should be determined as a priori; abnormal analysts' earnings forecast revisions($AFR_{i,t}^1$, $AFR_{i,t}^2$, $AFR_{i,t}^3$) for the upcoming three fiscal years, cost of equity capital(r_i), and dividend-payout ratio ($k_{i,t}^e$).

First, the abnormal analyst forecast revisions can be calculated from (16). However, earnings forecasts data in the monthly I/B/E/S summary tape are available in many cases only for the current($F_{i,t}^1$) and following($F_{i,t}^2$) fiscal year while forecasts for the third fiscal year($F_{i,t}^3$) are sparse. As a consequence, $AFR_{i,t}^3$ is difficult to calculate. Therefore, I regenerate abnormal forecast revision for the third fiscal year as $AFR_{i,t}^3 = AFR_{i,t}^2 \times ALTG_{i,t}$, where $ALTG_{i,t}$ represents an abnormal long term growth rate of earnings per share at time t calculated by the same method as others.[49] Second, the cost of equity capital(r_i) is calculated from the capital asset pricing model (CAPM). The market risk premium assumed in the CAPM is the average annual premium over the risk-free rate for the CRSP value-weighted index over the preceding 30 years. For a riskless rate, I use the one month U.S. Treasury bill rate. Frankel & Lee (1998) find that the choice of r_i has little effect on their analysis.

Lastly, the expected firm-specific dividend payout ratio is calculated as an average of the recent five year dividend payout ratios from the announcement date ($k_{i,t}^e =$

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[49] In our samples, average long-term growth rate of earnings per share for the target firm also shows optimism bias like raw earnings per share for near upcoming fiscal years.

$\frac{1}{n}\sum(D_{i,t}/NI_{i,t})$). Following Lee *et al.* (1999), if $k_{i,t}^e < 0$ owing to negative EPS, I divide

dividends by (0.06 × total assets) to derive an estimate of the payout ratio.[50]

2.1.3. Cumulative Abnormal Value Revision (CAVR)

Now the information effect can be obtained by cumulative abnormal value revision (CAVR)

with appropriate event window around the takeover announcement. If the announcement

time is defined as zero, then this relation can be written as follows.

$$CAVR_i\,[\,t_0, T\,] = \sum_{t=t_0}^{T} AVR_{i,t} \tag{7}$$

In this equation, t_0 and T represent the beginning and ending time of the takeover

announcement event window.

2.2. Synergy

For the time being, let us assume that the total takeover gains to target shareholders are

composed of synergy and information effect and no other gains exist. Since the information

effect can be obtained as Equation (18), if the total gains can be given, then the synergy is

calculated as a residual term by subtracting the information effect from the total gains. In

order to measure the total gains to target share holders, typical cumulative abnormal

return around the takeover announcement with market model[51] is adopted in this paper.

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[50] FYI, the cost of equity in our samples is reported on average to be 10.06%, average dividend payout ratio is reported to be 15.11% with 3.59% standard deviation during our sample periods.
51 FYI, in the market model, individual stock return is specified as $R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$ where R_{it} represents a daily stock return for firm i at time t, R_{mt} does a return on the equally weighted market portfolio in time t, α_i, β_i does regression parameters, and ε_{it} does a stochastic error term assumed to be *i.i.d.* normal with mean zero and constant variance σ_i^2. Finally, cumulative abnormal

Denote the $AR_{i,t}$ the periodic abnormal return of the i stock at time t, then the periodic synergy denoted as $SYN_{i,t}$ is defined as the difference between the periodic abnormal return (AR) and the periodic abnormal analyst value revision (AVR) as follows.

$$SYN_{i,t} = AR_{i,t} - AVR_{i,t} \tag{8}$$

As the same token with the CAR and CAVR, synergy is defined as a cumulative term of these measures for an appropriate event window that is written as follows.

$$CSYN_i[\, t_0, T\,] = CAR_i\,[\,t_0, T] - CAVR_i\,[\,t_0, T]$$

$$= \sum_{t=t_0}^{T} (AR_{i,t} - AVR_{i,t}) = \sum_{t=t_0}^{T} SYN_{i,t} \tag{9}$$

Note that this synergy measure is calculated with an assumption that the total takeover gains to target shareholder (CAR) and the information effect is captured for the same event windows, $[\,t_0, T\,]$. Under the situation where these two measures have different event windows, however, synergy can be measured as follows.[52]

$$CSYN_i[\, t_0,\, T_1,\, T_2\,] = CAR_i\,[\,t_0,\, T_1] - CAVR_i\,[\,t_0,\, T_2\,] \tag{10}$$

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return to the individual stock is given as $CAR_i[\,t_0, T\,] = \sum_{t=t_0}^{T}(R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{mt})$, where t_0 and T represent the beginning and ending time of the takeover announcement event window.

52 In general setting, the synergy can be defined with different event horizons for each of CAR or CAVR that can be written as $CSYN_i[\, t_1,\, t_2, T_1,\, T_2\,] = CAR_i\,[\,t_1,\, T_1] - CAVR_i\,[\,t_2,\, T_2]$. For convenience of our discussion, let us assume that only the ending points of the event windows are different between these two measures of CAR and CAVR. This is because that synergy included in the CAR will decrease as the probability of the combination of two firms decreases. If this kind of counter-synergy event, e.g. deal failure, occurs following the announcement, the synergy should be calculated with shorter horizon than the normal event windows used for the other counterpart, CAVR. Therefore, if the sample includes failed deals, then the synergy may be measured by Equation 21.

3. EMPIRICAL RESULTS

3.1. Data

3.1.1. Sample Selection

Table 1 describes the sample selection procedure. The sample selection process generates four sample groups as some queries are applied sequentially. The largest sample labeled "DEAL" includes takeovers which have deal characteristics. This sample comes from the Securities Data Company's (SDC) U.S. mergers and acquisitions database. I select US domestic mergers and acquisitions announced between 1980 and 2006. I consider only 'control-oriented takeovers' where acquiring firms end up with all the shares of the acquired firm from initial ownership of less than 50% of the target shares. I further require that both the deal value is greater than U.S. $1 million. The deal value is defined by SDC as the total value of consideration paid by the acquirer, excluding fees and expenses. I further exclude the deals that are announced and completed at the same time. Finally, this procedure selects 21,636 takeover deals in the DEAL sample. If an additional restriction that both the bidder and the target are public firms, then the legitimate deals, labeled as "PDEAL" group, are reduced into 13,070 observations.

The third largest sample group labeled "PRIC" represents takeovers that have share revaluation measures, cumulative abnormal returns (CARs) as well as deal characteristics. In addition to PDEAL group, target firm should be listed on the Center for Research in Security Prices (CRSP) during the event window, [-10, +10] trading days from takeover announcement date. This procedure reduces the sample size into 4,740 observations.

Table 1

Sample selection

This table reports the sample selection process which yields five different sample groups with different names. As more queries apply, the number of samples included in these groups also decreases by definition. The first group named "DEAL" is from the Security Data Company(SDC) domestic mergers and acquisitions(M&A) database. This group represents M&A deals so that deal characteristics such as tender-offer, deal status, or premium are available for all observations in it. The second group named "PDEAL" represents the deals between public acquirers and targets. The third group named "PRIC" is from the Center for Research in Stock Prices (CRSP). This group represents stock market or investor reaction for the M&A deals so that cumulative abnormal returns (CARs) for deal announcement are available for all deals in it. The forth group named "VALU" is from the I/B/E/S summary dataset and the COMPUSTAT industrial annual dataset. This group represents the financial analysts' reaction so that cumulative abnormal value revisions (CAVRs) where the value is calculated by 'residual income model', are available for those deals in it. The last group "ACCO" is also from the Compustat, but additionally the acquirer has accounting data such as leverage, liquidity or Tobin's-q so that I can consider acquirer's fundamental characteristics which are important to understand its motives behind the M&A offer. The group of the major interest in this paper is "VALU". Because this group contains both CARs and CAVRs for each deals in it and the main focus is to analyze CAVRs which is a proxy of analyst evaluation on M&A news, and compare this with the other market correspondence, CARs.

No. of obs. After Query	Sample Group	Query Description
21,636	DEAL	(1) US domestic deals offered between 1980 and 2006 covered in SDC Platinum
		(2) Deal value is $1 million or higher
		(3) Percent of shares acquirer seeks is no less than 50%.
		(4) Deal closing does not come with the announcement simultaneously.
		(5) Deal should be a finalized one; neither pending nor unknown status.
13,070	PDEAL	(6) Deals are between public firms
4,740	PRIC	(7) The target has CRSP stock price during [−10, +10] trading days from the bid
1,372	VALU	(8) The target is covered by I/B/E/S at announcement month, and
		(9) The target has EPS forecasts for the following fiscal period.
		: current (FY1) and following(FY2) fiscal year and long run growth rate(LTG).
		(10) The target has at least 5 previous earnings forecast data prior to the bid
		(11) The target has dividend payout ratio identified by Compustat.
810	ACCO	(12) Both acquire & target have previous fiscal year accounting data in Compustat

The fourth largest sample group labeled "VALU" represents takeovers which also have cumulative abnormal value revisions (CAVRs), a measure of the information effect in this paper, as well as cumulative abnormal returns (CARs), a measure of total takeover gains to target shareholders. Upon PRIC sample, I take additional restriction that target firms are also covered by the I/B/E/S summary dataset within a [-2,+4] monthly event window and there exist consensus earnings forecasts for the current (FY1) and following (FY2) fiscal year and long run growth rate (LTG). Furthermore, target firms are required to have at least 5 previous forecast data prior to the announcement. In other words, they should have at least three forecasting data samples to estimate the expected forecast revision in calculating CAVRs. After all, this procedure generates 1,372 observations. This is the default sample in this paper since I can examine both information effect and share revaluation with this sample.

The smallest sample labeled "ACCO" represents takeover deals which have accounting data of both the acquirer and target as well as deal characteristics, CARs, and CAVRs. In order to find the sources of the information effect, I should explicitly examine the firm's fundamentals. In other words, accounting data should reflect the hidden information on the status quo of the target firm which leaks to acquirer managers prior to the announcement. Furthermore, the acquirer-side accounting information plays an important role both in the "disciplinary" takeovers and the "hubris/agency-cost" oriented ones for revaluating target shares. In this sample, therefore, both parties should be covered by Compustat Industrial annual tape at the time of announcement. Finally, this additional condition generates 810 observations. This sample will be used for examining sources of takeover gains to target shareholders.

Table 2
Sample summary by decades

This table reports summary statistics of the sample. Panel A reports deal characteristics of 1,372 U.S. domestic takeover deals between public firms from 1980 to 2006 where the offer price is over US$ 1 million and the acquirer pursued more than 50% of target shares. Furthermore, the target is also listed on CRSP and covered by Compustat and I/B/E/S dataset ("VALU" sample). 'Hostile' is classified as the way that Security Data Company (SDC) defines. 'Conglomeration' is the deal in which acquirer and target has different two digits SIC codes. 'Days to closing (withdrawn)' is the day difference between announcement and closing(withdrawn). Premium is calculated from the four weeks pre-offer stock price of the target firm. Panel B reports the summary of firm fundamentals from the 810 "ACCO" samples where both acquirer and target are covered by COMPUSTAT. 'Liquidity' is defined as cash(Compustat data36) divided by book value of asset(Compustat data44). 'Leverage' is defined as book value of debt divided by market value of equity which is calculated as a sum of book value of debt and market value of equity. 'Tobin's Q' is defined as market value of asset divided by book value of asset. 'Operating Cash Flow' is defined as earnings before interest, depreciation and amortization (EBITDA, Compustat data21) divided by book value of asset. 'BEME' is defined as book value of equity (Compustat data60) divided by market value of equity followed by Fama-French (1996). "Capitalization" is defined as market value of equity at the end of previous month from takeover announcement. Student t-test and sign test are performed for those null hypotheses that the relative ratio ("Target/Acquirer") is equal to one and that the frequency of the case where acquirer has greater value than the target ("Acquirer > Target(%)") is equal to 50%. Statistical significances are denoted as *(10%), ** (5%), ***(1%).

A. Deal characteristics	Total	1980s	1990s	2000s
Successful	82.4%	76.0%	84.4%	81.2%
Cash only	24.3%	42.1%	18.1%	28.8%
Stock only	41.6%	19.0%	50.1%	34.6%
Hostile attitude	7.4%	20.9%	5.6%	3.1%
Tender offer	19.4%	50.2%	14.7%	10.0%
Competing bid	10.7%	18.1%	9.0%	10.0%
Conglomeration	36.7%	50.2%	33.0%	36.9%
Days to closing (median)	126	99	127	133
Days to Withdrawn (median)	87	58	103	77
Premium (median)	33.8%	38.4%	35.8%	27.6%

B. Firm Fundamentals	Acquirer(A)	Target(T)	T/A (median)	T < A (%)
Liquidity	0.15	0.18	4.08 ***	47.28
Leverage	0.38	0.39	1.43 ***	44.32 ***
Operating Cash Flow (OCF)	0.09	0.09	1.06	49.01
Tobin's Q	2.49	2.05	0.98	64.07 ***
BEME	0.40	0.53	1.75 ***	32.72 ***
Capitalization (Million $)	84.84	8.89	0.32 ***	94.32 ***
Number of observations	1,372	221	842	309

3.1.2. Summary Statistics

Table 2 reports summary statistics of the sample. Panel A describes summary statistics for the deal characteristics as defined by SDC. Each deal characteristic is reported by three decades to examine the waves where takeover samples may be clustered by time and industry. Most deal statistics are consistent with existing literature on merger waves. Among the three periods under examination, the 1980s is the most conspicuous. This period is also described as a combative takeover mood where hostile, competing cash tender-offers are dominant. As a result, the duration of the deal process is relatively short and takeovers in this period are more likely to fail with respect to the other periods. More than half of takeovers are conglomerate mergers, a combination of different industries (two-digit SIC code), in this period of corporate raiders. On the other hand, the 1990s are a period of "friendly stock-financed mergers". As Andrade *et al.* (2001) argue, mergers of the 1990s look important in number of events and its market values, so that more than 60% of the observations in total samples are distributed in this period. Lastly, the 2000s does not show much difference from the 1990s. For the total 1,373 deals, approximately 82% of takeovers are successful, and a failed bid is finalized more quickly (87 days) than a successful one (126 days). The premium calculated from the difference between the offered bid price and the share price four weeks prior to the takeover announcement is about 34% in terms of median of the total sample. Most of the above deal characteristics are also similar in the other sample groups defined in the paper.

Panel B of table 2 describes summary statistics for fundamental characteristics of the 810 ACCO sample. In the remainder of this section, these accounting fundamentals are

defined for the rest of the paper; [53] 'Liquidity' is cash divided by the book value of asset; 'Leverage' is the book value of debt divided by market value of equity being calculated as a sum of the book value of debt and the market value of equity; 'Tobin's-Q' is defined as the market value of asset divided by the book value of asset; 'Operating cash flow (OCF)' is defined as earnings before interest, depreciation and amortization (EBITDA) divided by the book value of asset. 'BEME' represents book-to-market value of equity following from Fama & French (1996); "Capitalization" is defined as the market value of equity at the end of the recent month from the takeover announcement. From this table, the target firm looks slightly more liquid and more undervalued and has a smaller firm size than the acquiring firm. This may indicate that the target firm might be a worthwhile acquisition. On the other hand, this panel does not show much difference in leverage, operating cash flow, and Tobin's-q between target and acquirer.

3.2. Measuring information effect

3.2.1. Existence of Information Effect

Table 3 reports the security analysts' average abnormal earnings forecast revisions (AFRs) for 1,373 VALU samples calculated from the fourth order moving average model by Brous & Kini (1993).[54] The majority of results are also consistent with their work. The number of observations consistently decreases from the event month 0 since targets are delisted after

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[53] FYI, we report the specific Compustat data item numbers for several accounting data used in this paper as follows: cash (=data1); book value of asset (=data6); EBITDA (=data13); book value of equity (=data60).

[54] In order to control outliers, earnings forecast revisions outside the 3*SD from the mean are winsorized in our samples.

the deal success which takes four months on average. Panel-A reports raw data of analysts' earnings forecast revisions (FRs). Every forecast revisions in [-5, +5] event months has a significantly negative value for each of the three upcoming fiscal years. This may reflect the optimism bias in security analysts' earnings forecasts.[55] Panel B shows the results after this bias is corrected. Abnormal forecast revisions (AFRs) are significantly positive especially during [0, +3] months for all three fiscal years. If I cumulate these abnormal reactions during four months, these are 0.48%, 0.37%, and 0.43% for each corresponding current (FY1), second (FY2), and third (FY3) fiscal year. As expected, abnormal forecast revisions outside the event window, e.g. [-4, -1], are not significantly different from zero. From this, I presume that the model adopted here effectively eliminates the optimism bias in analysts' earnings forecasts. Figure 1 shows the reaction of the abnormal earnings forecast revisions graphically. Again, a significant upward reaction in abnormal earnings forecast is observed after the event month 0 and this positive revision persists for three or four months thereafter. However less than 1% of abnormal forecast revision looks small enough to be negligible considering that the corresponding share revaluation is usually reported to be approximately 25%. Therefore in order to convince the significant information effect, appropriate translation of these positive accounting earnings revision into valuation terminology of a share, i.e. quantification, is required.

3.2.2. Timing difference among measurements

Table 4 reports the quantification result of information effect which is calculated from the model developed in the previous section with a discounted residual income approach. Furthermore, measurement results of share revaluation and the synergy are also provided

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[55] This negative drift may represent the fact that the target firms usually suffers from the relatively poor performance before receiving the takeover offers. To examine this argument against the optimism bias hypothesis remains as a future research.

Table 3

Analysts' earnings forecast revisions on takeover announcement

This table reports analysts' consensus forecast revisions for earnings per share of target firms around the takeover announcement month according to different fiscal years. Samples for this table are 1,372 U.S. domestic control-oriented mergers and acquisition deals between public firms valued over one million dollars from 1980 to 2006 and target firms are identified in SDC, CRSP, COMPUSTAT and I/B/E/S ("VALU" sample). "FY1" means upcoming first fiscal year for which annual earnings are not reported, i.e. normally current fiscal year. "FY2" means next second upcoming fiscal year in which earnings are not available. "FY3" denotes third upcoming fiscal year. "Forecast revisions (FRs)" are calculated as the difference between current and previous monthly earnings forecast divided by the stock price of previous month from the takeover announcement. Abnormal revisions (AFRs) are calculated using a fourth-order moving average model by Brous & Kini (1993). Earnings forecasts for target firms are from I/B/E/S and each firm should have at least 5 previous forecasting data before announcement, i.e., at least three forecasting data outside the monthly event window (-2, +4). Furthermore, forecasting revisions outside the 3*SD from the mean are winsorized for dealing with outliers. In this table, FR and AFR are average values of observations for each period. The null hypothesis is that the average raw(abnormal) revision equals zero. Cross-sectional standardized t-statistic is below the each revision value. Statistical significances are provided as *(10%), ** (5%), *** (1%).

Event month	A. Forecast Revision (FR)			B. Abnormal Forecast Revisions (AFR)			N
	FY 1	FY 2	FY3	FY 1	FY 2	FY3	
-5	-0.0025 ***	-0.0017 ***	-0.0022 ***	-0.0001	0.0003	0.0004	845
	-8.64	-7.19	-7.32	-0.25	1.13	0.99	
-4	-0.0024 ***	-0.0017 ***	-0.0022 ***	0.0003	0.0003	0.0003	1,040
	-10.13	-7.99	-8.38	1.25	1.09	0.9	
-3	-0.0026 ***	-0.0019 ***	-0.0023 ***	0.0002	0.0003	0.0003	1,204
	-10.02	-8.69	-8.69	0.7	0.93	0.77	
-2	-0.0022 ***	-0.0022 ***	-0.0027 ***	0.0007 ***	0.0001	0.0001	1,263
	-9.49	-9.1	-9.22	2.9	0.25	0.34	
-1	-0.0022 ***	-0.0019 ***	-0.0024 ***	0.0005 **	0.0003	0.0002	1,316
	-10.38	-9.53	-10.12	2.28	1.26	0.62	
0	-0.0016 ***	-0.0013 ***	-0.0015 ***	0.0011 ***	0.0010 ***	0.0014 ***	1,373
	-9.81	-8.74	-8.35	5.82	4.95	5.42	
1	-0.0009 ***	-0.0008 ***	-0.0011 ***	0.0015 ***	0.0012 ***	0.0014 ***	1,209
	-7.34	-6.78	-6.87	7.9	6.63	6.02	
2	-0.0006 ***	-0.0006 ***	-0.0007 ***	0.0016 ***	0.0012 ***	0.0015 ***	992
	-5.08	-4.68	-4.77	7.65	7.23	7.6	
3	-0.0007 ***	-0.0007 ***	-0.0009 ***	0.0013 ***	0.0007 ***	0.0009 ***	726
	-5.62	-5.33	-5.83	7.13	3.91	4.1	
4	-0.0008 ***	-0.0010 ***	-0.0013 ***	0.0008 ***	0.0000	-0.0001	482
	-4.24	-4.71	-5.03	3.21	0.18	-0.23	
5	-0.0005 **	-0.0005 **	-0.0008 ***	0.0011 ***	0.0005 **	0.0004	349
	-2.58	-2.48	-2.96	4.62	2	1.24	
cumulative	-0.0052 ***	-0.0047 ***	-0.0058 ***	0.0048 ***	0.0037 ***	0.0043 ***	1,373
[0,3]	-13.52	-13.14	-13.74	10.79	8.03	7.84	
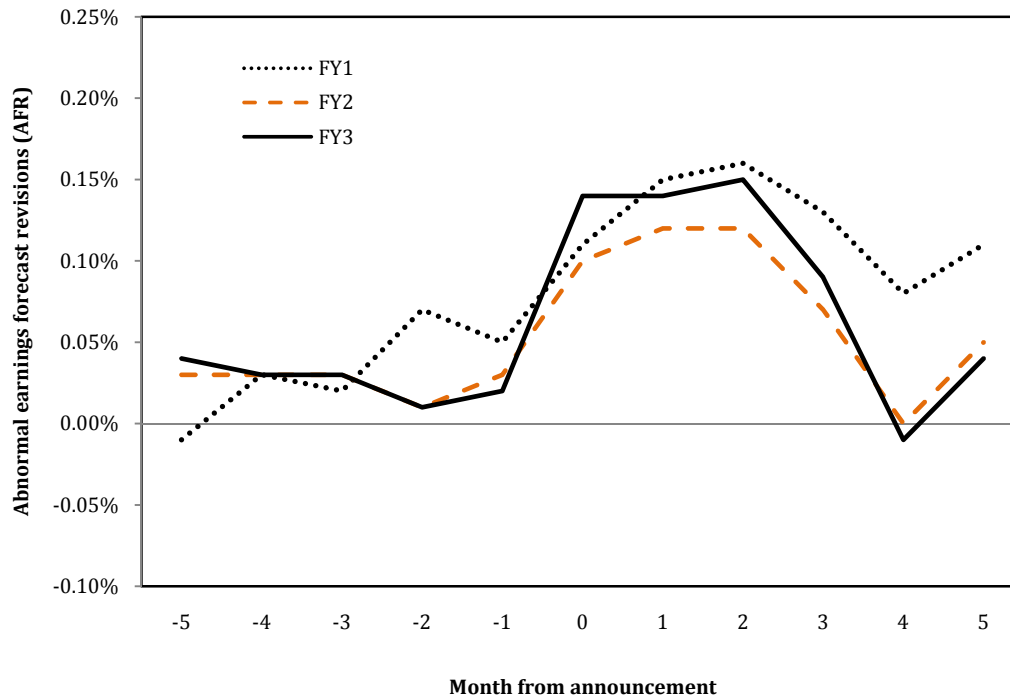
Figure 1. Abnormal earnings forecast revisions on takeover announcement

This figure shows abnormal earnings forecast revisions on the takeover announcement by three different forecasting horizons. "FY1" means upcoming first fiscal year in which annual earnings are not reported. "FY2" and "FY3" means the next second and the third fiscal year respectively. Abnormal revisions are calculated by fourth order moving average model by Brous & Kini(1993).

together in this table. Monthly information effect is reported as average abnormal analyst value revision (AVR) where [-1,+3] months from takeover announcement are used as event windows to estimate expected forecast revisions. Monthly share revaluation of the target is measured by average abnormal return (AR). [56] Monthly synergy denoted as SYN is calculated as a residual term by distracting the AVR from its corresponding monthly AR.

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56 To be consistent with monthly abnormal analysts' value revision(AVR), we set the zero event month as [-10, +10] CRSP trading days from the announcement. Thus, daily event window runs as [-31, +94] trading days in order to generate the [-1,+4] monthly event window.

Table 4

Dividing takeover gains

This table reports the abnormal return, analyst value revision and synergy both with periodic and cumulative terms. The sample used in this table includes 1,372 U.S. domestic control-oriented mergers and acquisition deals between public firms valued over one million dollars from 1980 to 2006 and target firms are identified in SDC, CRSP, COMPUSTAT and I/B/E/S. "Abnormal returns(AR) is calculated using the market model with OLS errors and equally weighted CRSP index estimated for [-283, +32] CRSP trading day windows. "Abnormal analyst value revision (AVR)" is obtained from the method used in this paper where the intrinsic value revision is calculated from the "three period residual income model" empirically performed by Frankle and Lee (1998) and abnormal revision for those corresponding those three years are calculated using the method used by Brous and Kini (1993). "Synergy (SYN)" is calculated as a difference between abnormal return and abnormal analyst value revision for each observation. CAR, CAVR, CSYN is defined as aggregation of ARs, AVRs, and SYNs from the five months before the announcement. All these variables are reported as average terms of observations for each corresponding month. The null hypothesis is the these average values equals zero. Student t-statistics are reported below each values and statistical significances are denoted as *(10%), ** (5%) and ***(1%).

month from announce	periodic			cumulative [-5,]			N
	AR	AVR	SYN	CAR	CAVR	CSYN	
-5	-0.85%	0.29%	-1.14%	-0.78%	0.29%	-1.14%	845
	-2.04	0.91	-2.25	-2.04	0.91	-2.25	
-4	0.28%	0.20%	0.08%	-0.29%	0.43%	-0.93%	1,040
	0.70	0.73	0.17	-0.80	1.12	-1.53	
-3	0.28%	0.22%	0.06%	-0.05%	0.60%	-0.68%	1,204
	0.69	0.69	0.12	-0.13	1.19	-0.95	
-2	0.86% **	0.05%	0.81%	0.61%	0.62%	0.24%	1,263
	2.15	0.16	1.70	1.35	1.06	0.30	
-1	2.07% ***	-0.17%	2.24% ***	2.68% ***	0.42%	2.43% ***	1,315
	4.77	-0.55	4.63	4.06	0.68	2.77	
0	23.41% ***	1.17% ***	22.23% ***	26.09% ***	1.58% **	24.51% ***	1,372
	34.33	4.71	31.90	28.32	2.46	23.33	
1	0.38%	1.20% ***	-0.81% **	26.37% ***	2.63% ***	23.74% ***	1,208
	1.03	5.42	-1.87	26.12	3.84	20.59	
2	-0.03%	1.23% ***	-1.28% ***	26.33% ***	3.52% ***	22.81% ***	991
	-0.07	6.45	-2.87	24.56	4.93	18.39	
3	-0.35%	0.89% ***	-1.10% **	26.31% ***	3.99% ***	22.31% ***	725
	-0.68	4.02	-2.01	23.16	5.44	16.89	
4	-0.23%	-0.37%	-0.03%	26.55% ***	3.86% ***	22.68% ***	481
	-0.40	-0.92	-0.04	22.62	5.13	16.67	
5	-0.73%	0.16%	-0.71%	26.84% ***	3.91% ***	22.93% ***	348
	-1.03	0.55	-0.92	22.06	5.16	16.32	

The pattern of monthly ARs is similar to that of AVRs except the timing and the magnitude.[57] As long as timing is considered, investors seem to respond to the same takeover event not only earlier but also more quickly than the security analysts. Significantly positive AVRs are smoothed over [0, +3] months within a range from 0.89% to 1.23%. And most of them outside this window are not significantly different from zero. On the other hand, significantly positive ARs are observed in [-2, 0] months which is earlier than the case of AVR. Importantly, most of them are concentrated or dominant in a zero event month so that about 23% abnormal return is observed in this single period. Similar to AR, monthly synergy is significantly different from zero in [-1, 0] window. As a result, CAR and CSYN have significantly positive values from one month before the announcement while the CAVR does from two months before the event.

This can be inferred from the model developed in Section 2 of this paper. Since the share revaluation is a response to the takeover bid, this news itself can leak to shareholders before the announcement. From the news shareholders can catch the fact that the target is a worthwhile bid, and from the bid premium, which is considered as the share revaluation in the model they revaluate their own shares immediately after the announcement. Since no significant ARs are observed after the announcement month 0, shareholders do not seem to change their revaluation. Meanwhile, it would take more time for security analysts to gather some specific information to evaluate the stand alone firm from the news of the takeover bid. Furthermore, some analysts may delay their evaluations

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57 Comparing CAVR and CAR is the same as comparing the reactions of two different parties in the market, investors and security analysts, on the same event of the takeover announcement. Key differences between the two parties may be stand-aloneness in valuation and the information set at the time of the takeover announcement. In this context the difference in timing and magnitude of response may represent their characteristics.

Table 5

Quantification

This table reports three measures of takeover announcement for two different sample groups with short and long event windows. "VALU" sample group includes 1,372 U.S. domestic control-oriented mergers and acquisition deals between public firms valued over one million dollars from 1980 to 2006 and target firms are identified in SDC, CRSP, COMPUSTAT and I/B/E/S. "ACCO" sample group includes 810 deals which has bidder accounting information in the "VALU" sample group. "Cumulative abnormal returns (CAR) is calculated using the market model with OLS errors and equally weighted CRSP index estimated for [-283, +32] CRSP trading day windows and the accumulation window ends in zero event month. "Cumulative abnormal analyst value revision (CAVR)" is obtained from the method used in this paper where the intrinsic value revision is calculated from the "three period residual income model" empirically performed by Frankle and Lee (1998) and abnormal revision for those corresponding those three years are calculated using the method used by Brous and Kini (1993). "Cumulative synergy (CSYN)" is calculated as a difference between CAR and CAVR for each observation where CAR is cumulated until zero event month at most, that is represented by 0 in the middle of the event window. The null hypothesis is that these average values equals zero. Student t-statistics are reported below each values and statistical significances are denoted as *(10%), ** (5%) and ***(1%).

A. Short window	CAR [-1,0]		CAVR [-1,+3]		CSYN [-1,0,+3]		N
VALU	0.2548	***	0.0342	***	0.2206	***	1,372
	32.08		6.53		25.86		
ACCO	0.2775	***	0.0333	***	0.2442	***	810
	26.88		5.45		22.59		
B. Long window	CAR [-5,0]		CAVR [-5, +5]		CSYN [-5,0,+5]		N
VALU	0.2609	***	0.0391	***	0.2218	***	1,372
	27.59		5.16		19.83		
ACCO	0.2881	***	0.0370	***	0.2511	***	810
	23.33		4.36		18.32		

because of their herding behavior. Accounting literature argues that herding behavior is broadly observed among security analysts which makes them act as followers to some leaders (Welch 2000; Clement & Tse 2005).

3.2.3. Quantification

Although empirical results show that the information effect is significant, it takes relatively small portion from the total takeover gains to target shareholders. Table 5 reports the
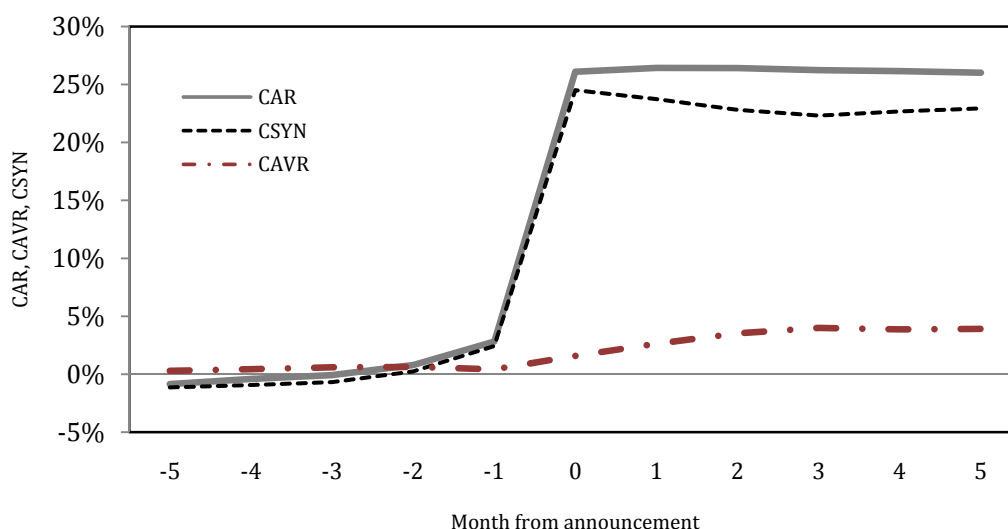
Figure 2. Takeover gains divided into the information effect and the synergy

This figure shows cumulative abnormal return (CAR), cumulative abnormal anlyst value revision (CAVR) and cumulative synergy (CSYN) on the takeoverannouncement. Abnormal return in CAR is calculated from the market model with OLS errors and equally weighted CRSP index estimated for [-283,32] CRSP trading day windows. Abnormal analyst value revision in CAVR is calculated from "three period residual income model" empirically performed by Franckle and Lee (1998) where abnormal revisions for those corresponding three periods are calculated according to the method used by Brous and Kini (1992). Cumulative synergy (CSYN) is calculated as a difference between CAR and CAVR.

quantification results by varying the horizon of the event window and the definition of the sample group. It shows that the information effect is estimated around 4% while the synergy is around 22% in terms of CAVR and CSYN in the 1,372 VALU sample. Note that the synergy measured as CSYN has extended form of event window denoted by $[-x, 0, +y]$ as expressed in Equation 21 of the Section 3. [58] Results are similar either in the short or long event horizon while the synergy is measured slightly greater, up to 3%, in the ACCO sample groups than that of VALU sample group. Overall, empirical results indicate that the

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[58] This is because both the VALU and ACCO sample group includes failed deals where synergy captured as abnormal stock return might disappear as the deal is failed or expected to be failed. Considering that most failed deals are withdrawn within 90 days from the announcement, it is reasonable to consider the synergy in the short horizon around the announcement, e.g. zero in this table, when it looks probable to succeed in the perspective of investors.

information effect takes about 15% of all takeover gains to target shareholders and the remaining 85% goes to synergy. Figure 2 shows this relation among CAR, CAVR, and CSYN for the long horizon event windows of [-5,+5] month.

3.3. Validating the measure: "failed-deal" analysis

Theory predicts that the synergy should disappear as the physical combination of two firms is expected to be futile, in other words, deal failure. Table 6 reports the time-series movements of CAR, CAVR and CSYN during [-1, +5] event months for 154 failed takeover samples. In this table, some failed deals which have the long negotiation period, measured as calendar days between the announcement and the withdrawn event, exceeding the 180 days either have negative announcement CARs are removed from the original failed deal observations. [59] I divide the failed deal samples into two subgroups with the same criteria used by Bradley *et al.* (1983) into 'Finally-Taken' and 'Remain-Independent'. The former includes deals which were initially withdrawn but finally taken over by another bidder within 5 years from the initial bid failure. The latter includes takeovers which is not taken-over and remains independent firm even after 5 years. In the failed deal sample, 109 deals are included in the Finally-Taken group and 45 deals go to Remain-Independent group. Remain-Independent group is of interest in this paper since Finally-Taken group is

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[59] The first restriction makes the synergy measured in the [-1, +5] windows only includes the one remained even after the deal failure. From the 242 original failed deal observations in VALU sample group, 58 observations are removed by this restriction. The second restriction is adopted since this paper assumes non-negative takeover gains to target shareholders: synergy or information effect. There are few theories on the value-decreasing deal, i.e., with negative CAR, for target shareholders. Negative abnormal return to the takeover announcement may represent the possibility of the agency cost of the target management. However this is beyond the scope of this paper at this point and time. Additionally, 30 observations are removed from this restriction

Table 6

Failed deal : Finally-taken vs. Remain-independent deals

This table reports cumulative abnormal return (CAR), cumulative abnormal analyst value revision (CAVR) and cumulative synergy (CSYN) for the 154 "failed deal" samples in the corresponding monthly accumulation window starting from one month before the announcement. "Failed deal" sample includes U.S. domestic control-oriented mergers and acquisition deals between public firms valued over one million dollars from 1980 to 2006 and target firms are identified in SDC, CRSP, COMPUSTAT and I/B/E/S and its initial offer is withdrawn instead of successfully closed. Furthermore, this failed merger sample is divided into two groups as "finally-taken (FT)" and "remain-independent (RI)" group. The former is successfully acquired by other takeover offer within 5 years from its initial offer while the latter is not. "Cumulative abnormal return (CAR)" is an aggregation of abnormal returns calculated using the market model with OLS errors and equally weighted CRSP index estimated for [-283, +32] CRSP trading day windows. "Cumulative abnormal analyst value revision (CAVR)" is an aggregation of abnormal analyst value revision obtained from the method introduced in this paper where the intrinsic value revision is calculated by "three period residual income model" empirically performed by Frankle and Lee (1998) and abnormal revisions for those corresponding those three years are calculated according to the method used by Brous and Kini (1993). "Cumulative synergy (CSYN)" is an aggregation of synergy calculated as a difference between abnormal return and abnormal analyst value revision for each observation. CAR, CAVR, and CSYN are reported as those average terms of observations in their corresponding months. The null hypothesis is that these average values equals zero. For t-statistics, portfolio time-series method by Brown & Warner (1985) is used for CAR and cross-sectional standardized t-statistics are used for CAVR, CSYN. For testing the null hypothesis that the difference of CAR, CAVR, CSYN equals zero, student t-statistics under the unequal variance assumption. These t-statistics are reported below each of the CAR, CAVR, CSYN. and statistical significances are denoted as *(10%), ** (5%) and ***(1%).

| Monthly event window	CAR			CAVR			CSYN		
	Finally-taken (n=109)	Remain-independent (n=45)	Difference	Finally-taken (n=109)	Remain-independent (n=45)	Difference	Finally-taken (n=109)	Remain-independent (n=45)	Difference
(-1,-1)	-1.06%	2.08%	3.14%	0.57%	2.40%	1.83%	-1.52%	0.19%	1.71%
	-0.75	0.799	1.21	0.50	1.48	0.88	-0.85	0.08	0.59
(-1,0)	25.64% ***	27.09% ***	1.44%	2.86% *	3.36%	0.50%	22.79% ***	23.73% ***	0.94%
	12.882	7.354	0.29	1.73	1.51	0.17	7.30	6.49	0.20
(-1,1)	26.75% ***	23.79% ***	-3.00%	3.76% *	7.71% **	3.96%	22.99% ***	16.07% ***	-6.90%
	10.971	5.274	-0.48	1.95	2.66	1.12	6.10	3.56	-1.18
(-1,2)	26.61% ***	17.82% ***	-8.80%	4.54% **	8.95% ***	4.42%	22.07% ***	8.86%	-13.20% *
	9.454	3.421	-1.28	2.37	3.19	1.27	5.61	1.60	-1.95
(-1,3)	27.35% ***	9.75% **	-17.60% **	4.57% **	8.85% **	4.28%	22.78% ***	0.90%	-21.90% ***
	8.688	1.674	-2.31	2.35	3.05	1.20	5.09	0.16	-3.01
(-1,4)	27.64% ***	9.68% *	-18.00% **	4.41% **	9.48% ***	5.07%	23.23% ***	0.21%	-23.00% ***
	8.016	1.518	-2.29	2.17	3.32	1.39	4.89	0.04	-3.26
(-1,5)	26.65% ***	8.99% *	-17.70% **	4.59% **	8.46% ***	3.87%	22.05% ***	0.53%	-21.50% ***
	7.155	1.305	-2.00	2.30	2.75	1.05	4.23	0.09	-2.65
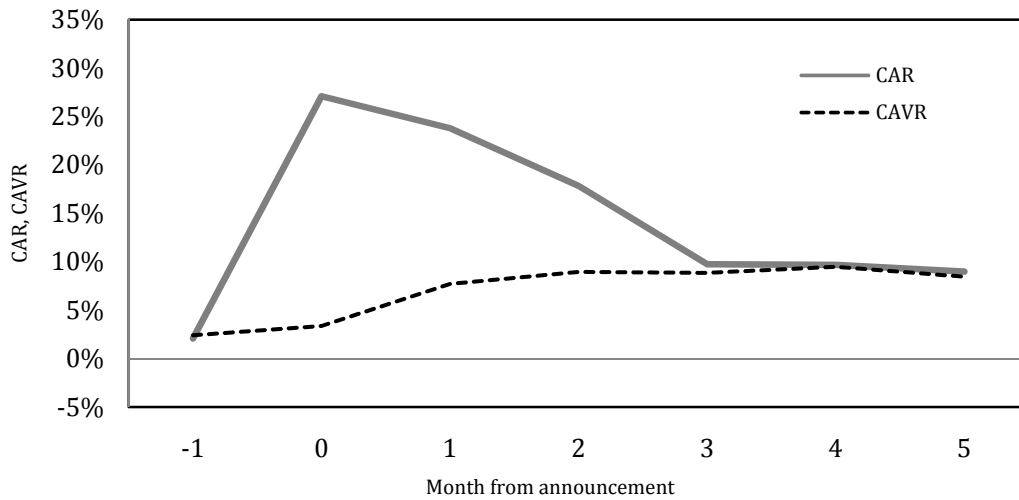
Figure 3. Remain-Independent Deals

This figure shows average values of cumulative abnormal returns (CAR) and cumulative average abnormal analyst value revision(CAVR) on takeover announcement for "initially-failed takeover"deals which is not successfully acquired by any other bidder within 5 years from its initial offer. "CAR" is calculated from the market model and "CAVR" is from three period residual income model proposed by Frankle and Lee (1998) where its three period component of abnormal earnings forecast revisions are followed by Brous and Kini (1993).

Figure 4. Finally-Taken Deals

This figure shows average values of cumulative abnormal returns (CAR) and cumulative average abnormal analyst value revision(CAVR) on takeover announcement for "initially-failed takeover"deals which successfully acquired by other takeover offer within 5 years from its initial offer. "CAR" is calculated from the market model and "CAVR" is from three period residual income model proposed by Frankle and Lee (1998) where its three period component of abnormal earnings forecast revisions are followed by Brous and Kini (1993).
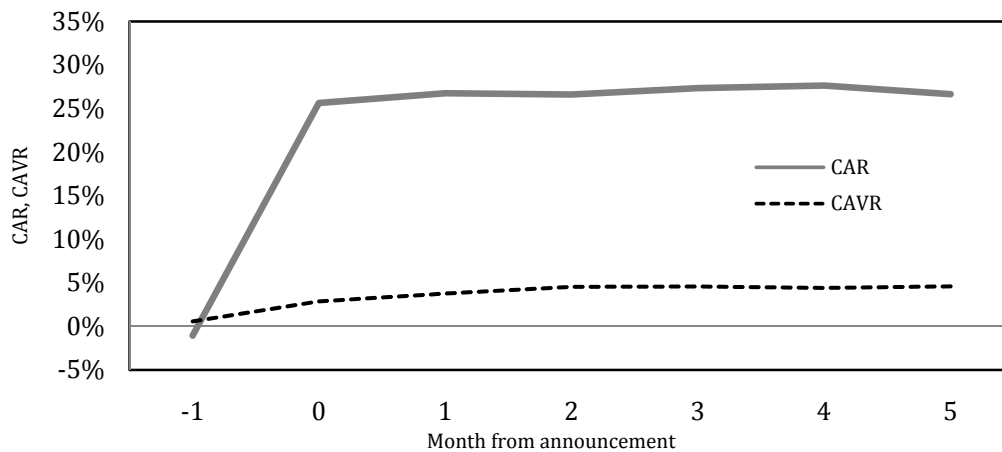
more likely implement the successful takeover by any other bidder in the long run so that the market participants may expect this fact through various sources of information.

In consistent with the theory, 24% of CSYN at the announcement month dramatically shrinks to zero at the end of five months from the announcement for the Remain-Independent group while the Finally-taken group maintains its level around 23%. On the other hand, CAVR has similar pattern between two groups where it continues to increase from the announcement up to 5% in the "Finally-Taken" group, or 9% in the "Remain-Independent" group at the end of five months from the announcement. This result indicates that the deal failure does not affect the stand-alone measure of the information effect, CAVR.[60] From a different angle, CAR converges to CAVR in the Remain-Independent group. Another column of this table shows that 27% CAR at the announcement month shrinks to 9%, slightly over the 8.5% CAVR at the five months from the announcement.

However, in the Finally-Taken group, CAR and CAVR do not converge but show separate sample paths apart to the end (27% vs. 5%). Figure 3 and 4 graphically summarize these empirical results. Furthermore, these patterns are robust in CAR model and sub-grouping which will be discussed later.

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[60] For testing the statistical significance, portfolio time series (Brown & Warner 1985) is applied to the CAR while the cross-sectional standard deviation test is applied to the CAVR. This is because for the case of analyst forecast revision data, there is only a small number of observations are available outside the event window, i.e. small observations for estimation, so that it does not add much value to calculate the variance of value revisions for the target firm with these small observations. FYI, other alternative tests has similar results for significance of CAR measure: e.g., Patell's test (Patell 1976); estimated GLS(Sanders & Robins 1991); Collins-Dent test (Collins & Dent 1984); the standardized cross-sectional test (Boehmer *et al.* 1991); cross-sectional standard deviation; generalized sign tests (Cowan 1992).

3.4. Sources of Gains

Table 7 reports the results of two kinds of univariate analyses in order to examine the source of measured synergy or the information effect. First, CAVR and CSYN with short event horizons are reported for different subgroups divided by proxy variables representing sources of takeover gains argued by previous studies. Next columns provide Pearson correlation coefficients between these measures for each corresponding variable.

3.4.1. Sources of the information effect

'Tobin's-Q', defined as market value of total assets divided by its book value, is adopted as a proxy of management efficiency following to existing literature (e.g., Lang *et al.* 1989). Theory predicts that the greater the acquirer's Tobin's-Q, i.e. efficient management, the greater the CAVR should be observed. Panel-B of this table divides takeover deals into a large and small group according to the median value of each accounting variable. Results show that the higher the bidder's Q, the greater the CAVR is reported. The Large group has a greater CAVR (3.9%) than the small group (2.8%); however, these are not statistically significant. This may reflect the difficulty of measuring the management efficiency exclusively as well as precisely. In order for the takeover sample to be more disciplinary, I compare this Tobin's-Q only in failed deals. This is because failed takeovers are more likely to be a disciplinary takeover as shown in the Panel-A of this table. Failed deals have a significantly greater CAVR than successful ones (6.2% > 2.7%). Therefore, if I compare Tobin's-Q in the failed merger samples then the difference in the information effect becomes significant. The high bidder Q group with failed outcome has a far greater CAVR than that of the small group (10.2% > 2.6%)

Table 7
Univariate analysis

This table reports the three performance measures of takeover announcement as of CAR, CAVR, and CSYN by sub-groups segmented by deal and firm characteristics. Samples are 1,356 U.S. domestic control oriented takeover deals between public firms from 1980 to 2006 where the target is identified in SDC, CRSP, and I/B/E/S, and both acquirer and target are covered by COMPUSTAT. "Cumulative abnormal return (CAR)" is an aggregation of abnormal returns calculated using the market model with OLS errors and equally weighted CRSP index estimated for [-283, +32] CRSP trading day windows. "Cumulative abnormal analyst value revision (CAVR)" is an aggregation of abnormal analyst value revision obtained from the method introduced in this paper where the intrinsic value revision is calculated by "three period residual income model" empirically performed by Frankle and Lee (1998) and abnormal revisions for those corresponding those three years are calculated according to the method used by Brous and Kini (1993). "Cumulative synergy (CSYN)" is an aggregation of synergy calculated as a difference between abnormal return and abnormal analyst value revision for each observation. CAR, CAVR, and CSYN are reported as those average terms of observations. Accumulation is applied for monthly event window of [-1,3] for each of them in this table. 'Liquidity' is defined as cash (Compustat data36) divided by book value of asset (Compustat data44). 'Leverage' is defined as book value of debt divided by market value of equity which is calculated as a sum of book value of debt and market value of equity. 'BEME' is defined as book value of equity (Compustat data60) divided by market value of equity followed by Fama-French (1996). "Capitalization (CAP)" is defined as market value of equity at the end of previous month from takeover announcement. Statistical significances of coefficients are denoted as *(10%), ** (5%), *** (1%).

Variables	Subgroup Comparison				Correlation	
	CAVR [-1,+3]		CSYN [-1,0,+3]		CAVR [-1,+3]	CSYN [-1,0,+3]
A, Deal dummy	d=1	d=0	d=1	d=0		
1980s	3.8%	3.3%	31.1%	23.4% **	0.010	0.083 ***
1990s	3.4%	3.1%	25.1%	22.8%	0.008	0.035
Success	2.7%	6.2% **	26.5%	15.5% ***	-0.079 **	0.138 ***
Cash-only	5.4%	2.6% **	30.5%	22.4% ***	0.069 **	0.115 ***
Stock-only	2.7%	3.8%	21.5%	26.4% **	-0.032	-0.079 **
Hostile	4.4%	3.1%	29.5%	24.2%	0.021	0.046
Tender-offer	5.3%	2.9% *	34.3%	22.1% ***	0.054	0.154 ***
Competing bid	7.6%	2.8% **	15.9%	25.5% ***	0.085 **	-0.097 ***
Same industry	3.4%	3.2%	22.6%	27.7% **	0.008	-0.079 **
B. Firm financials	(Large)	(Small)	(Large)	(Small)		
Acquirer liquidity	3.3%	3.4%	25.8%	23.1%	0.024	0.051
Acquirer leverage	2.7%	3.9%	23.5%	25.4%	-0.072 **	-0.023
Acquirer OCF	3.8%	2.9%	25.7%	23.2%	0.019	-0.001
Acquirer Tobin's-Q	3.9%	2.8%	25.0%	23.9%	0.015	-0.019
(& Failed)	10.2%	2.6% **	6.5%	23.0% **	0.136 *	-0.185 **
Acquirer BEME	3.6%	3.1%	23.1%	25.7%	-0.001	0.010
Acquirer CAP	1.8%	4.9% **	25.4%	23.4%	-0.105 ***	0.037
Target Tobin's-Q	3.0%	3.6%	22.4%	26.4% *	-0.024	-0.115 ***
Target BEME	4.2%	2.5%	26.7%	22.1% **	0.142 ***	0.070 **
Target CAP	1.2%	5.5% ***	19.8%	29.1% ***	-0.154 ***	-0.183 ***

and the correlation between the CAVR and acquirer's Tobin's-Q is also significantly positive (0.201). Some researchers suggest hostility as a symptom of a disciplinary motive (Morck *et al.* 1988; Mitchell & Lehn 1990), however, the empirical results show weak evidence for this argument. Hostile takeover has a greater CAVR than a friendly one (4.4%>3.1%); however the difference is not statistically significant.[61] These results are graphically summarized in the Figure 5.[62]

In order to capture the symptom of target share undervaluation, suggested by the theory as another important source of information effect, large book-to-market value of equity (BEME) and the small market capitalization (CAP) for target firm is adopted following to

Fama & French (1996). In consistent with theory, the large target BEME group has a significantly greater CAVR than the small group (4.2% > 2.5%) and the small CAP target group has a significantly greater CAVR (5.5% >1.2%). One interesting result is about cash-only deals which may be another candidate of information containing takeover bid. This group has a significantly greater CAVR than the stock included deals (5.3% > 2.8%). Correlation table provided in the Appendix shows that cash-only deals are positively correlated with target book-to-market ratio (0.11) and negatively correlated with the

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[61] An alternative explanation on hostility may be provided. Bhagat *et al.* (2005) argue that hostility is a symptom of agency costs. In our model, agency cost does not affect the information effect but affects share revaluation in a positive direction. Therefore, if we assume that hostile takeovers has a mixed type of disciplinary and hubris/agency-cost motives, then the combination of significantly greater CAR and insignificantly greater CAVR for hostile takeovers against a friendly one could be rationalized.

[62] Table 7 applies to the 810 ACCO samples since accounting variables such as BEME or Tobin's-Q are considered simultaneously as well as deal characteristics. However, all of above results, as long as it is regard to the deal characteristic, are also robust in the 1,372 VALU sample.
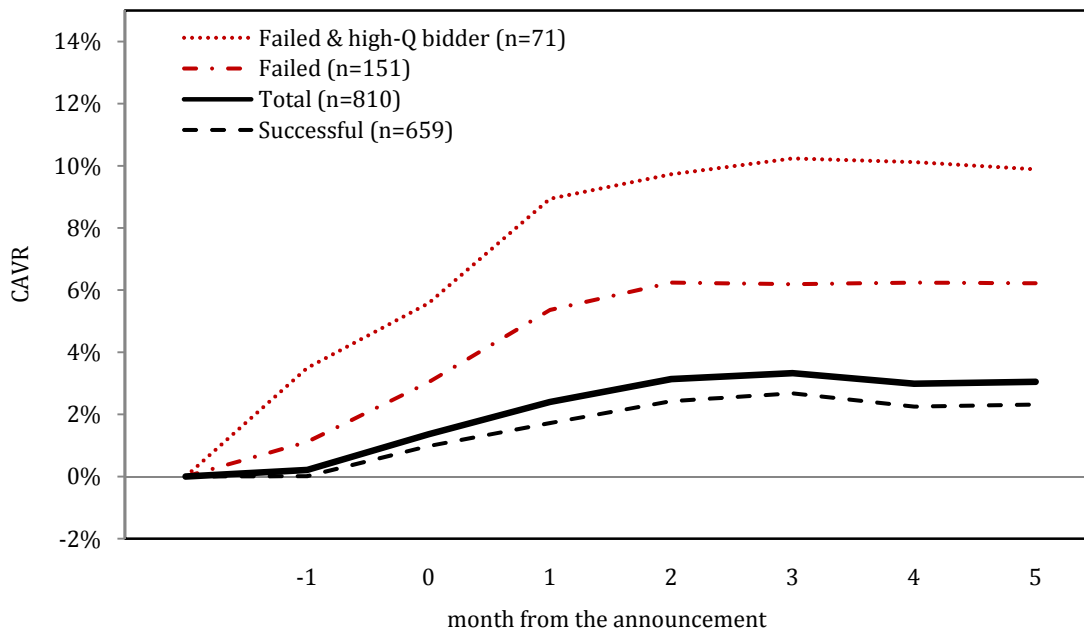
Figure 5 . Information effect by subgroup

This figure shows cumulative abnormal anlyst value revision (CAVR) on the takeover announcement for 810 U.S. domestic deals ("ACCO" sample). Abnormal analyst value revision is calculated from "three period residual income model" empirically performed by Frankle and Lee (1998) where abnormal revisions for those corresponding three periods are calculated according to the method used by Brous and Kini (1993).

target capitalization (-0.14) with significances. This may suggest that cash-only deals may be motivated, to some extent, by acquiring the undervalued target share.63

3.4.2. Sources of Synergy

In spite of recent findings by Devos et al. (2009), it still seems to be hard to explicitly measure the synergistic gain with some accounting data. Synergy measure, CSYN, in this paper is also the implicit measure driven by CAR and CAVR. With these shortcomings as taken, most of the empirical results support the existing literature.

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63 However cash-only deal dummy does not significantly correlated with acquirer's Tobin's-q which is considered as a proxy of disciplinary takeover. Therefore, these types of takeover deals are more likely to be acquisitional rather than disciplinary according to the empirical results in this paper.
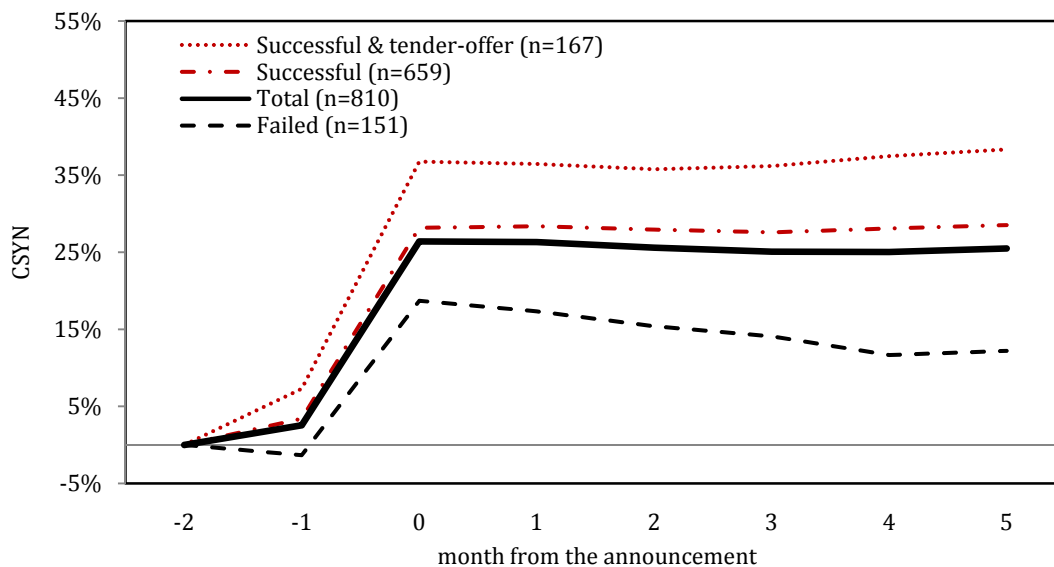
Figure 6 . Synergy by subgroup

This figure shows cumulative abnormal anlyst value revision (CAVR) on the takeover announcement for 810 U.S. domestic deals ("ACCO" sample). Abnormal analyst value revision is calculated from "three period residual income model" empirically performed by Frankle and Lee (1998) where abnormal revisions for those corresponding three periods are calculated according to the method used by Brous and Kini (1993).

Asquith *et al.* (1983) argue that synergistic takeovers are more likely to succeed since it gains for shareholders of both the acquirer and target. The table shows that successful takeovers have a significantly greater CSYN than failed deals (26.5% > 15.5%). Furthermore, CSYN is positively correlated with a successful dummy (0.138) while CAVR is negatively correlated with successful dummy (-0.079). Based on these findings, successful dummy is the most obvious variable to differentiate the synergy and information effect in this table. Bradley *et al.* (1983) argue that a tender offer is motivated by synergy. In the table, tender offers have a significantly greater CSYN than mergers (34.3% > 22.1%) while the CAVR does not differentiate the tender offers and mergers. The other deal characteristics may support the above findings. Since a tender offer normally entails a cash

payment, a significantly greater CAR of cash-only deals against stock included deals (30.2% > 22.4%) can be rationalized.[64] Andrade *et al.* (2001) argue that the mergers in 1990s may be a period of synergistic opportunities initiated by industry restructuring or deregulation which is consistent with neo-classical theory of merger waves. Empirical evidence seems to support their findings. Although the 1990s dummy does not differentiate the CSYN from other period (25.1% vs. 22.8%) with statistical significance, it is statistically significant under 10% when only merger samples are considered (23.4% vs. 18.8%). These results are graphically summarized in the Figure 6.

3.4.3. Synergy vs. Information

Table-8 reports multiple linear regression results for the CAVR and CSYN on several deal and firm characteristics. Three different specifications best explaining the CAR or CAVR are reported respectively in this table. Closely correlated deal variables, e.g. "success and competing" or "% of stock and tender offer" do not enter as explanatory variables at the same time. Most of the results are consistent with the previous univariate analysis and the existing literature. In the model-1 of CAVR regressions, significantly negative coefficient (-0.034) for successful dummy is reasonable considering that disciplinary takeover is more likely to be failed. Furthermore, variables representing undervaluation of the target share also have appropriate coefficients both in direction and statistical significance; target BEME (0.067), and target capitalization (-0.014). Coefficient for bidder's BEME representing the restructuring potential of the target firm by efficient bidder management shows appropriate direction (-0.040) with statistical significance.

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[64] In conclusion, our empirical results suggest that cash only deals include deals of both synergistic and informational takeovers. This is consistent with an argument that cash-only deals are usually value creating deals (Travlos 1987)

Table 8
Multiple Regression

This table reports results of least square multiple regression for two dependent variables of CAVR and CSYN on the variables representing deal or firm characteristics. Samples are 810 U.S. domestic control oriented takeover deals between public firms from 1980 to 2006 where the target is identified in SDC, CRSP, and I/B/E/S, and both acquirer and target are covered by COMPUSTAT ("ACCO"). "Cumulative abnormal analyst value revision (CAVR)" is an aggregation of abnormal analyst value revision obtained from the method introduced in this paper where the intrinsic value revision is calculated by "three period residual income model" empirically performed by Frankle and Lee (1998) and abnormal revisions for those corresponding those three years are calculated according to the method used by Brous and Kini (1993). "Cumulative synergy (CSYN)" is calculated by subtracting CAVR[-1,+3] from CAR[-1,0] which is obtained by the market model with OLS error. CSYN and CAVR are reported as those average terms of observations. 'BEME' is defined as book value of equity (Compustat data60) divided by market value of equity followed by Fama-French (1996). "Capitalization (CAP)" is defined as market value of equity at the end of previous month from takeover announcement. Panel-B presents Pierson correlation coefficients among residuals from six different regression specifications in Panel-A. Statistical significances of coefficients are denoted as *(10%), ** (5%), *** (1%).

A. Regression

Variables	CAVR [-1,+3]			CSYN [-1,0,+3]		
	1	2	3	4	5	6
Constant	0.046 *	0.019	0.024	0.097 **	0.169 **	0.135 **
	1.86	1.21	1.27	2.28	4.69	2.76
Success (1/0)	-0.034 *			0.104 ***		0.104
	-1.74			3.12		3.13
Competing bid (1/0)		0.046 **	0.047 **		-0.084 **	
		1.98	2.04		-2.11	
% of stock			-0.002			-0.037
			-0.14			-1.33
Tender-offer (1/0)	0.023	0.019		0.081 ***	0.088 ***	
	1.26	1.06		2.57	2.80	
Hostile (1/0)	-0.009	-0.005	0.002	0.134 ***	0.109 **	0.153 ***
	-0.33	-0.18	0.07	2.82	2.35	3.24
Same industry (1/0)	0.010	0.007	0.006	-0.027	-0.020	-0.031
	0.71	0.54	0.44	-1.13	0.3999	-1.31
Bidder BEME	-0.040 *	-0.044 **	-0.044 **	-0.005	0.008	-0.008
	-1.74	-1.97	-1.98	-0.13	0.21	-0.21
Bidder CAP	0.000			0.031 ***	0.036 ***	0.031 ***
	0.04			3.91	4.70	3.84
Target BEME	0.067 ***	0.066 ***	0.067 ***	0.026	0.025	0.027
	3.49	3.44	3.48	0.80	0.02	0.84
Target CAP	-0.014 ***	-0.015 ***	-0.016 ***	-0.056 ***	-0.058 ***	-0.057 ***
	-2.62	-3.39	-3.44	-6.05	-6.20	-6.03
Adj. R-square	0.041	0.043	0.041	0.090	0.084	0.084
Observations	810	810	810	810	810	810

B. Correlations among residuals

CSYN [-1,0,+3]	CAVR [-1,+3]		
	4	5	6
1	-0.410 ***	-0.406 ***	-0.415 ***
2	-0.404 ***	-0.410 ***	-0.419 ***
3	-0.415 ***	-0.412 ***	-0.410 ***

Competing bid dummy also have significantly positive coefficient (0.046) in the model 2. Dummy variables representing synergistic gains as discussed before, have significantly positive regression coefficients: successful (0.097); success (0.104), hostile (0.134); tender-offer (0.081). Coefficients in accounting variables show that synergy is greater when large bidder (0.031) acquires small target (-0.056). Overall, success dummy and competing dummy most differentiate the synergy and information effect with adverse sign of coefficients in this table. Panel B presents correlation between residuals from CAVR and CSYN regressions. For every match from each three regressions, they are strongly and negatively correlated under 1% significance level. This may indicate that when there is a lot of new information revealed by the announcement, the synergies tend to be low.

4. DISCUSSION

4.1. Revisiting failed-deal analysis

One of the decisive empirical evidences for information effect is that announcement CAR approach to CAVR after the deal is withdrawn shown in figure 3. However, a lot of existing literatures has raised methodological concerns in long-term event studies using the cumulative abnormal return (CAR) as a measure of the share revaluation (see Barber & Lyon 1997; Kothari & Warner 1997; Andrade *et al.* 2001). They are concerned that this CAR measure is not robust in the benchmark return estimation and some model assumptions. [65] Although this paper may not belong to the long-horizon event study,

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[65] For the robustness of the CAVR, it has some limitations to be examined because it uses relatively small observations to estimate the expected revision so that alternative approach except averaging a

further evidence of robustness of this abnormal return measure is helpful to reinforce the empirical findings.

In conclusion, the finding is robust in the CAR calculations. Table 9 reports the cumulative average abnormal returns (CARs) calculated from different ways with daily[66] stock return data. Let us first stick to the previous subgroup definition such as Finally-Taken and Remain-Independent and OLS errors in the model. To the market model, base model to estimate the benchmark return in this paper, Fama-French 3 factor model or Fama-French 3 factor model with momentum factor, i.e., 4 factor model, is compared. They yield similar CARs (7.34% or 9.48%) with that of the market model (8.99%) in both subgroups and these values are also similar to CAVR (8.46%). However, with the GARCH error assumption, CARs are over-estimated relative to that of OLS assumption. This means that the synergy measured as difference between CAR and CAVR is also greater in the GARCH assumption so that Remain-Independent group has some positive synergy at the end of the event window instead of being totally disappeared. Overall, these results reinforce the argument that total takeover gains to target shareholders in the Remain-Independent deals dramatically shrink toward the level of the information effect. In other

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constant estimation period is hard to launch. We try to increase the number of observations for the estimation by grouping forecast revisions sharing the same fiscal period index, i.e. FY1, FY2, FY3 instead of sharing the same forecast end date. However although this model can increase observations, it does not appropriately capture abnormal reactions on the takeover event.

[66] Long horizon analysis with monthly returns do not used in the table. This is from the concern that benchmarking the recent five year return performance, for example, might overstate the recent performance of the status-quo target firm. Since most target firms suffer from their recent poor stock performances in the sample. For 4,740 deals in the PRIC samples, average market adjusted return of the target share with long horizon, [-74,-11] event months, is 0.31% while the same return for the short horizon, [-11,-4], recent eight months, is -0.23%. Accounting performance also shows a similar pattern. The average operating cash flow (OCF) of the target firm continuously decreases during the 5 years prior to the takeover announcement from 12.0% to 10.8%.

Table 9

Robustness of CAR models & assumptions

This table reports cumulative average abnormal returns (CARs) for 154 failed takeover deals which have non-negative abnormal returns for the event month with the market model, default model used in this paper. Results with various assumptions are reported for the CRSP daily trading day estimation window; [-283, -32]. To estimate the benchmark return, three different models are applied; market model, Fama-French 3 factor, Fama-French 3 factor with momentum factor. For considering the error of the model, the results from both OLS and GARCH are reported. Samples are divided into two groups in which the first group represents synergy contained one ("Finally-Taken" or "Reoffered") while the other group represents the one not containing the synergy ("Remain-Independent" or "Abandoned"). "Finally-Taken" group means its initial offer is withdrawn, but, successfully acquired by other takeover offer within 5 years from its initial offer while "Remain-independent" group is finally withdrawn, i.e., not taken by any others. "Reoffered" means the initial offer is withdrawn but the other bid is offered subsequently or concurrently by another acquirer within one year from the deal-failure while "Abandoned" means no subsequent offer occurs. By default, OLS error is assumed and additionally alternative results of "GARCH" error assumption are provided in second panel below the OLS results. For comparison purpose, cumulative abnormal analyst value revisions for the corresponding groups are also reported in the panel-B of this table. The null hypothesis is that the CAR or CAVR equals zero. t-values are reported below the CAR or CAVR which the former is calculated from the time-series portfolio method by Brown and Warner (1985) and the latter is the cross-sectional standardized t-score. Statistical significance denoted as *(10%), ** (5%) and *** (1%).

		Finally-Taken (n=109)	vs.	Remain-Independent (n=45)	Reoffered (n=95)	vs.	Abandoned (n=59)
A. Cumulative abnormal return							
CAR [-1,+5]	Market Model	26.65% ***		8.99% *	28.52% ***		10.17% *
(OLS)		7.16		1.31	7.95		1.58
	Fama-French (3 factor)	25.66% ***		7.34%	27.22% ***		9.18% *
		6.96		1.08	7.65		1.44
	Fama-French (4 factor)	24.99% ***		9.48% *	26.30% ***		11.05% **
		6.78		1.40	7.38		1.75
CAR [-1,+5]	Market Model	29.67% ***		14.73% **	31.80% ***		14.85% **
(GARCH)		7.97		2.13	8.87		2.29
	Fama-French (3 factor)	29.18% ***		12.60% **	30.90% ***		13.76% **
		7.93		1.84	8.68		2.16
	Fama-French (4 factor)	28.69% ***		14.79% **	30.22% ***		15.63% ***
		7.80		2.17	8.48		2.47
B. Cumulative abnormal analyst value revision							
CAVR [-1,+5]		4.59% **		8.46% ***	4.05% *		8.42% ***
		2.30		2.75	1.92		3.09

words, almost all of synergy gains expected at the announcement not expected to implement any more as deal fails. This table also provides the CAR results according to the alternative definition of subgroups. "Reoffered" represents failed deals where at least one other suitor places takeover bids to the same target within a year from the initial deal failure. "Abandoned" represents the opposite case where no other bidder is interested in taking over the control of the target firm for a year. "Abandoned" is matched to the "Remain-Independent" group in the previous setting which is considered as having low probability of realizing the synergy. Almost all results are also robust in this sample description. CAR of "Abandoned" group has 9% to 11% which is slightly over the CAVR (8.4%) in the estimation models with OLS errors. Appendix 5 shows movements of CAR and CAVR calculated from six different settings for two different subgroups of failed deals. All six pairs of figures show similar patterns.

4.2. Sources other than synergy

This paper assumes that CSYN measure only contains synergy. However, as reviewed in the literature review, other combinational gains from "stock-market-driven (SMD)" or "agency-cost-driven (ACD)" takeover may be included in the CSYN since it is calculated by subtracting the information effect, CAVR, from total takeover gains, CAR. Second panel of Table 10 reports four performance measured of takeover announcement compared in subgroups divided by variables representing these two sources. Before this work, the first panel provides the correlations.

Table 10
Sources other than synergy: SMD vs. ACD

This table reports the statistics which provide how four different takeover performance measures are varied by factors other than synergy or the information effect. Panel-A reports correlation between these performance measures (Premium, CAR, CAVR, CSYN) and sub-groups segmented by SMD, bidder Governance index, and bidder Entrenchment index. Samples are from U.S. domestic control oriented takeover deals between public firms from 1980 to 2006 where the target is identified in SDC, CRSP, and I/B/E/S. "Premium" is calculated from the four weeks pre-offer stock price of the target firm. "Cumulative abnormal return (CAR)" is an aggregation of abnormal returns calculated using the market model with OLS errors and equally weighted CRSP index estimated for [-283, +32] CRSP trading day windows. "Cumulative abnormal analyst value revision (CAVR)" is an aggregation of abnormal analyst value revision obtained from the method introduced in this paper where the intrinsic value revision is calculated by "three period residual income model" empirically performed by Frankle and Lee (1998) and abnormal revisions for those corresponding those three years are calculated according to the method used by Brous and Kini (1993). "Cumulative synergy (CSYN)" is calculated by subtracting CAVR[-1,+3] from CAR[-1,0]. Premium, CAR, CAVR, and CSYN are reported as those average terms of observations. 'SMD' represents stock-market driven takeover defined as stock-only deals where bidder BEME is both less than the target BEME (relatively over-valued) and less than 33 percentile of all observations. 'BEME' is defined as book value of equity (Compustat data60) divided by market value of equity followed by Fama-French (1996). "Governance index" is defined as Gompers, Ishii, and Metrick (2003) and the "Entrenchment index" is defined as Bebchuck, Cohen, and Farrell (2009). P-values are provided below each of the correlation coefficient in Panel-A and the student-t statistics for null hypothesis that the measure equals zero. Statistical significances of coefficients are denoted as *(10%), ** (5%), *** (1%).

	Premium	CAR [-1,0]	CAVR [-1,+3]	CSYN [-1,+3]	N
Panel-A. Correlation coefficient					
SMD (1/0)	0.0280	-0.0243	0.0113	-0.0296	810
	0.446	0.490	0.748	0.400	
Bidder Governance index	-0.0225	-0.0607	-0.0157	-0.0517	637
	0.578	0.126	0.693	0.193	
Bidder Entrenchment index	-0.0746 *	-0.1041 **	0.0142	-0.1088 **	551
	0.086	0.015	0.739	0.011	
Panel-B. Subgroup comparison					
(1) SMD dummy					
0	0.4007 ***	0.2804 ***	0.0325 ***	0.2479 ***	696
	29.41	25.74	4.86	21.68	
1	0.4282 ***	0.2599 ***	0.0382 **	0.2217 ***	114
	12.06	8.37	2.58	6.91	
[0 - 1]	-0.027	0.0205	-0.006	0.0262	810
	-0.76	0.69	-0.32	0.84	
(2) Bidder Entrenchment index					
0	0.4218 ***	0.3156 ***	0.0152	0.3004 ***	71
	12.95	9.1	0.85	8.25	
1	0.4108 ***	0.3140 ***	0.0418 ***	0.2722 ***	99
	10.93	9.84	3.45	9.15	
2	0.3972 ***	0.2697 ***	0.0215 **	0.2482 ***	134
	16.91	11.43	2.09	10.42	
3	0.4169 ***	0.2612 ***	0.0161	0.2451 ***	123
	13.07	10.76	1.11	8.94	
4-6	0.3424 ***	0.2296 ***	0.0309 **	0.1988 ***	124
	13.97	11.01	2.55	9.6	
[(0,1) - (4,5,6)]	0.0730 **	0.0850 **	-0.0002	0.0852 ***	294
	1.99	2.59	-0.01	2.64	

SMD dummy is generated following to Devos et al. (2009). In order to exploiting the overvaluation of the acquirer share to the target share, two conditions should be met. First, the method of payment should be a form of stock exchange[67] (Shleifer & Vishny 2003). For this consideration, stock-only deals are chosen in the sample. Second, the bidder stock should be relatively overvalued against the target share. Third, absolutely overvalued bidders are only chosen. Book-to-market value of equity (BEME) is used as a proxy for share overvaluation. For satisfying the absolute overvaluation, bidders should have BEME less than 33 percentile of total 810 bidders in the ACCO sample. SMD dummy does not have significant correlation neither with CSYN nor with the other performance measures. This is also supported by subgroup comparison in the second panel. CSYN is not significantly different between SMD (24.8%) and non-SMD (22.2%) takeover.

In order to examine the gains from the agency-cost-driven takeover, bidder Entrenchment index[68], developed by Bebchuck, Cohen, and Farrell (2009b) is used as a proxy. Rational for this is that the more bidder managements are protected by their corporate governance system, the more likely to raise the agency-cost oriented takeover bid resulting in the positive premium, CAR, or CSYN. However, empirical evidence in this paper shows the opposite direction. As shown in the panel A of Table 10, bidder Entrenchment index is negatively correlated with premium (-0.0746), CAR (-0.1041), and CSYN (-0.1088) with significance while it is not significantly correlated with CAVR.

[67] Stock-only payment itself is necessary for overvaluation-leveraged takeovers, but not sufficient as our results in table 6 indicate. Stock-only payment samples have a significantly lower CAR than a non-stock payment deal (20.6% < 29.4%). This is partly because non-stock payment deals are more likely to be synergistic. In some sense, stock payment may act as a signal that the bidder has little wealth-creating investment opportunity or a bidder is inefficiently managed (Myers & Majluf 1984).

[68] This table also provides the correlation results using Governance index developed by Gompers, Ishii, and Metrick (20003). However this index is not significantly correlated with any of four performance measures.

Subgroup comparison results shown in the second panel of this table are consistent with correlations in the upper panel. Specifically, CSYN decreases from 30.04% to 19.88% as the bidder Entrenchment index increases. Testing for difference between highly entrenched group with 4, 5, 6 index and less entrenched group with 0 or 1 index, reports significantly positive difference (0.0852) under 1% significance level. This empirical result suggests that takeover gains included in CSYN does not include the agency-cost of bidder management.

These are also supported by univariate analysis previously discussed in Table 7. Harford (1999) argues that a more cash rich acquirer is likely to raise the agency cost involved takeover bid.[69] Maloney et al(1993) also argue that a high leveraged firm is less likely to make agency cost oriented investment decisions since it has less resource to waste on unprofitable mergers and acquisitions. Both the bidder's liquidity and the leverage are not significantly correlated with CSYN. Moeller et al (2004) argue that a large acquirer tends to pay more than the small ones and this might represent the agency cost. The results do not support this argument. Bidder capitalization is not significantly correlated with CSYN and rather it is negatively correlated with CAVR. Diversification, a deal between two different two digit SIC codes, is suggested as a proxy of agency-cost (Morck *et al.* 1990; Lang & Stulz 1994). There is mixed result with regard to focused deal, between same two-digit SIC codes. Focused deal dummy is significantly negatively correlated with CSYN. However this does not simply indicate that the conglomerate deal is driven by agency cost of bidder management since diversification could be a rational response to poor growth opportunity or technological shock (see Lewellen 1971; Campa & Kedia 2002; Graham *et*

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[69] He found that cash-rich firms are more likely to attempt acquisitions which is value decreasing, more frequently diversifying acquisitions. Furthermore, these acquisitions are followed by abnormal declines in the operating performance.

al. 2002; Villalonga 2004). Finally, I do not find the evidence that successfully explains agency-cost oriented takeovers in this paper.[70]

4.3. Limitations

4.3.1. Analyst's earnings forecast

Throughout the paper, I assume that security analysts forecast "stand-alone" value of the target firm so that their forecasts are not affected by the takeover announcement news. However, I are not certain that all the analysts would act like this. Some analysts might quickly absorb this big corporate news into their forecasts. Furthermore, individual security analysts may have a difference in experience, employer size, analyst coverage, brokerage house characteristics, or firm-specific experience (Clement 1999; Jacob *et al.* 1999; Mikhail *et al.* 2003). Unfortunately, consensus forecasts data does not capture these features. Lastly, I/B/E/S earnings forecasts are only available for a few fiscal years ahead. Most security analysts in I/B/E/S release their forecasts only for two fiscal years ahead while forecasts for three to five upcoming fiscal years are relatively sparse. This may impede the precise quantification of the information effect calculated from the discounted sum of an infinite series of future residual income changes. Although these limitations above are beyond the scope of this paper at this point, they are challenging topics in corporate finance or accounting research.

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[70] There is few theories on whether the agency cost is solely motivate the takeover deals or not. Rather it is more likely to be combined or camouflaged with other value creating motives such as synergy or the information effect. Furthermore, it is hard to measure explicitly the agency cost from total takeover gains to target shareholders. This may be challenged in the separate project.

Table 11
Generalizability : Sample comparisons

This table reports deal characteristics of four different sample groups. Group "DEAL" is composed of samples from U.S. domestic takeover deals from 1980 to 2006 where the offer price is over US$ 1 million and the acquirer pursued more than 50% of target shares. "PDEAL" sample contains only deals between public firms. "PRIC" group samples additionally require to be listed on CRSP. Furthermore, "VALU" samples additionally require to be covered by Compustat and I/B/E/S dataset. The last group "ACCO" includes samples where the acquirers are also identified by Compustat. 'Hostile' is classified as the way that Security Data Company (SDC) defines. 'Conglomeration' is the deal in which acquirer and target has different two digits SIC codes. 'Days to closing (withdrawn)' is the day difference between announcement and closing (withdrawn). Premium is calculated from the four weeks pre-offer stock price of the target firm. Student's t test is performed for performance measures; CAR, CAVR, and CSYN. Null hypothesis is the mean value is different from the other samples. Statistical significances are denoted as *(10%), ** (5%), *** (1%).

	Samples				
	DEAL	PDEAL	PRIC	VALU	ACCO
A. Deal Characteristics					
Successful	84.0%	89.1%	86.0%	82.4%	81.4%
Cash only	31.3%	21.3%	27.8%	24.3%	25.4%
Stock only	30.6%	42.9%	40.0%	41.6%	39.9%
Hostile attitude	3.5%	2.4%	5.2%	7.4%	8.0%
Tender offer	10.4%	11.5%	21.1%	19.4%	18.9%
Competing bid	6.1%	4.3%	8.7%	10.7%	10.9%
Conglomeration	47.3%	39.2%	36.9%	36.7%	35.9%
Days to closing (median)	109	113	125	126	122
Days to Withdrawn (median)	90	91	78	87	97
Premium (median)	36.7%	43.8%	41.1%	39.6%	40.5%
B. Performance Measures					
CAR [-1,0]			26.81%	25.83%	28.58%
CAVR [-1,+3]				3.91%	3.77%
CSYN [-1,0,+3]				21.71%	24.44%
Number of observations	21,636	13,070	4,740	1,372	810

4.3.2. Sample selection

Another possible concern for the empirical results is that the samples may be too small to generalize empirical findings to original population. Number of observations is

dramatically reduced from 13,070 to 810 as queries apply. This dramatic sample reduction might entail a so called "sample selection bias". For example, "survival bias" or "size bias" may be occurred since CRSP, I/B/E/S, and Compustat are usually covers large firms which survive. As shown in Table 11, performance measures such as CAR, CAVR, and CSYN do not show much difference from each other. The problem occurs because the CAR is not available for the original samples and the CAVR and CSYN is not available for the two largest samples. Panel-A shows that most deal characteristics are similar among four samples except some combative features. The proportion of hostile bids and tender-offers in the DEAL or PEAL samples are smallest among all sample groups. The empirical results show that both of these types of takeovers have a significantly greater CAR, but not a significantly different CAVR with the other subgroups. In this context, I can presume that 26% of the CAR is possible to underestimate the original share revaluation in spite of no quantitative evidence. However, there is not much clues to suspect the 4% CAVR reported in this paper is biased from the original information effect in population.

CHAPTER IV

CORPORATE GOVERNANCE DRIVEN TAKEOVERS

1. THE BASIC SETTING

1.1. The timeline and the management contract

There are N firms[71] in the economy that produce distinct products. There are sufficiently many shareholders in each firm who only own capital. There are also a number of agents who only own production technology in the executive labor market. According to the management contract, the agent, who would otherwise be without a wage, rents his or her human capital or technology to shareholders. The employment contract would have been signed at time c and would terminate at time T when the manager would retire. The event date of the interest is denoted as time t, and the agent will make the takeover decision at this time. Given this context, let us call the pre-takeover period the 'stand-alone period' and the post-takeover period the 'takeover period' from this latter event date forward. Similarly, the reader should assume that no share of the firm in question has been acquired by any other firm during the first period since this model is focused on the takeover decision making period. During his or her tenure as a CEO, the managing agent performs three typical firm activities, operation, investment, and finance. Both the stock market and

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[71] Firm is defined as a nexus of contracts among factors of production where the ownership of securities and the corporate control are separated following to Fama (1980). He argue that shareholders, the risk bearers in the modern corporation, also have markets for their services-capital markets-which allow them to shift among teams with relatively low transaction costs and to hedge against the failings of any given team by diversifying their holdings across teams. Therefore, the separation of ownership and management implies the efficient allocation of risk bearing in this context.
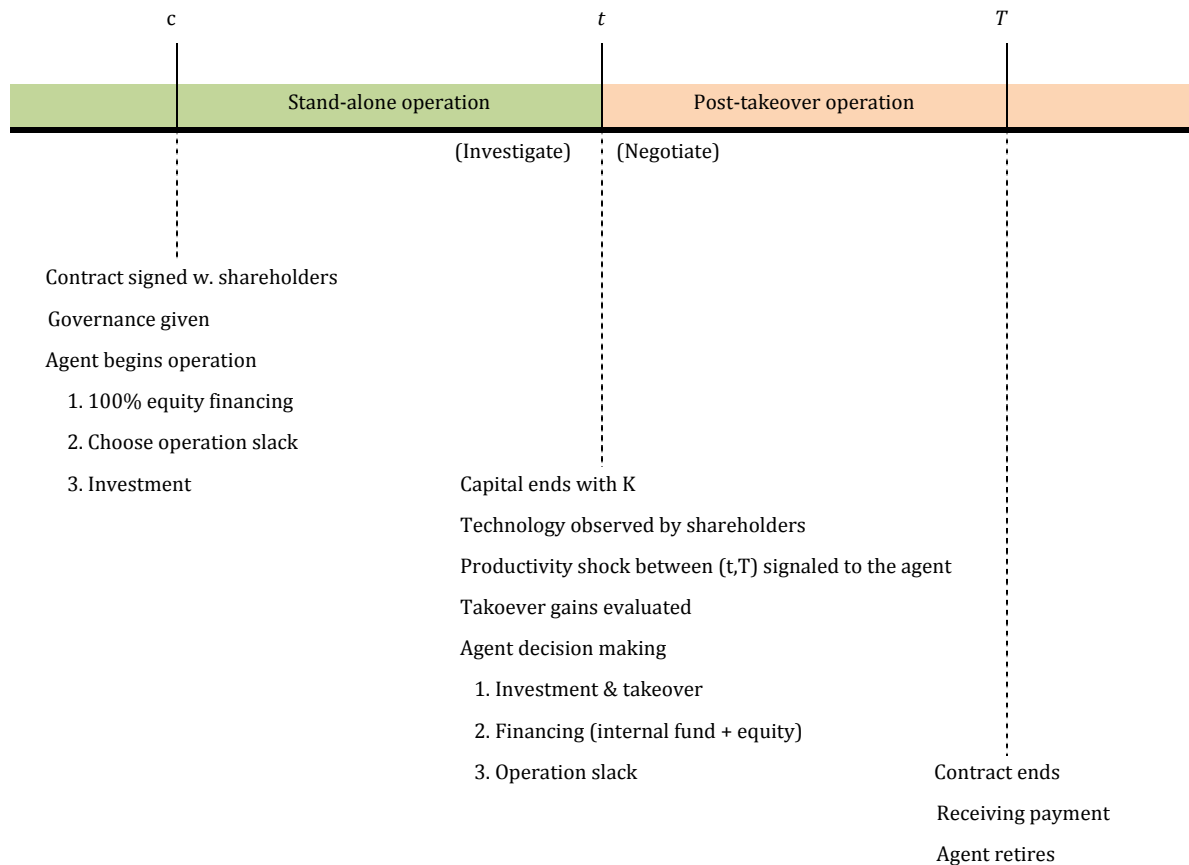
	c	t	T
		Stand-alone operation	Post-takeover operation

(Investigate)   (Negotiate)

Contract signed w. shareholders

Governance given

Agent begins operation

   1. 100% equity financing

   2. Choose operation slack

   3. Investment

Capital ends with K

Technology observed by shareholders

Productivity shock between (t,T) signaled to the agent

Takoever gains evaluated

Agent decision making

   1. Investment & takeover

   2. Financing (internal fund + equity)

   3. Operation slack

Contract ends

Receiving payment

Agent retires

Figure 7 Timeline of the model

This table shows the information flow during the corporate takeover process. Factors which is suggested as a driving force of merger wave is denoted as * or **. Neoclassical theory argues that the industry-wide shock on foreign competition, energy price, technology shock such as financial innovation derives merger wave, and these variables are denoted as '*'. Meanwhile, the behavioral theory argues that the over-valued stock market may derive the 1990s merger wave that is express as '**'. 'Internal (firm) situation, denoted as '***', such as free cash flow, corporate governance system, and executive compensation scheme, may be determined endogenously as a result of the optimal control mechanism or another kind of agency cost by the existing CEO. However I assume these variables are exogenously given for the simplicity of the discussion in this paper. I also assume that there is an industry-wide spillover effect, denoted as '(+)' when the takeover offer is announced.

the executive labor market are assumed to be temporarily inefficient but not necessarily so in the long run. The compensation to the agent is paid at the end of the contract period (T) in the form of equity shares. Both the agent and the shareholders are risk

neutral, and there is no depreciation of the capital. Figure 7 summarizes the basic timelines

and the assumptions under this model.

1.2. The firm value

Let P_{it} be the per capita value of a firm i at time t. This would be a sum of discounted future

cash flows estimated at time t precluding the takeover of any other firm.[72] This value can

be written as follows.

$$P_{it} = F(k_{it}, q_{it}), \qquad i = 1, \dots, N. \tag{11}$$

This value has two components, the observed value function and misvaluation of

the firm. The former, $p(k, q)$, is observed by shareholders from the previous operations

including investments. I will assume that both k_{it} and q_{it} are non-negative real numbers

which are bounded above and p is strictly increasing in q_{it}, and $f(0,0) = 0$.[73] In order to

compare the productivity of the agents with different kinds of capital, all capital stocks are

expressed into the capital $i, i.e., k_{jt} = K_{jt}(\frac{P_{it}}{P_{jt}})$. The remaining misvaluation component, θ_{it},

is unknown to shareholders at time t. This misvaluation can represent the upcoming firm

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[72] In other words, this current price is written as $P_{it} = E_t \sum_{s=t}^{\infty} \{y_{is}/(1 + r_{is})\}$ where r represents the cost of capital while $y_{it} = f(k_{it}, q_{it})$ represents the free cash flow (FCF) of the firm which is the operating cash flow (OCF) net of the capital expenditures (CAPEX) for given time.

[73] One simple form of the price function where capital and the productivity determine the firm's cash flow is the linear function such as $p = qk$. Alternatively, we can consider the convex price function such as $p = qk - c(k)$ where $c'(k) > 0$, $c''(k) > 0$ so that the profitability declines after some point of the capital accumulation. Since the price is a sum of future cash flows which are determined by a lot of factors, it is hard to identify an appropriate functional specification. Therefore the simple qk function seems to be enough to discuss the complicated argument such as takeovers.

specific productivity shock or represent the insufficient disclosure[74] of the firm status or merely represent the market microstructure. This information is asymmetrically delivered to the manager who controls the firm while it is not available to shareholders who expect that the future will be the same as today at best. Therefore, the misvaluation parameter has time dependent value that can be expressed as $(\theta_{is}|s < t) = 1$ and $(\theta_{is}|s \geq t) = \theta_{it}$.[75] For simplicity, this information asymmetry is resolved until time T, which is considered as a sufficiently lengthy period of time from the current time t so that the share price is equal to the intrinsic value of the capital. Now this relation can be written as

$$V_{it} = P_{it}\theta_{it} = P_{iT}, \tag{12}$$

where $E[\theta_{it}] = 1$, and $\theta_{it} \subset (0, \infty)$. As long as θ_{it}, the misvaluation parameter, has a different value from one, the misvaluation of a share occurs and this can be expressed as follows.

[Definition 1] The stock market is efficient when $\theta_{it} = 1$ across all firms and times while it is inefficient otherwise. In an inefficient market at time t, the share is undervalued when $\theta_{it} > 1$, overvalued when $\theta_{it} < 1$, and appropriately valued when $\theta_{it} = 1$.

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[74] For various reasons, the stock market is not perfectly efficient. Most of all, there can be insufficient disclosure or window dressings on the status quo of the firm fundamentals, or privately obtained information by the manager on the changes in the future operating environment such as government regulation, investment opportunity, industry structure, oil shock, foreign competition, technology innovation, relations with labor union, or the firm's corporate governance scheme.

[75] In the continuous time setting, this misvaluation is assumed as diffusion process such as $d\theta_{it} = \mu dt + \sigma dz_{it}$ where z_{it} is standard Brownian motion. However, the dynamics in continuous time is not the main interest of this paper, we remains this kind of extension as a future research.

1.3. Operation

Let us look at the productivity (q_{it}) of a manager in detail. Assume that the executive labor market is sufficiently efficient so that shareholders can hire the manager who best fit the firm regardless of the firm size. This appropriate fit means that an entrepreneur's production technology is appropriately evaluated in the market. For simplicity of discussion, I will assume that this potential technology (q^*) is the same across firms.[76] Regulations ($\bar{\tau}$) [77] governing all firms restrict the technology in some way. The typical agency problem, the deviation of a manager's interest from those of the shareholders, occurs in any corporation with ownership and control that are separate. Let a_{it} be the average value of this operational slack chosen by the manager of the firm i from the beginning of the contract up to time t. Then the difference in the production technology observed by shareholders at time t is determined only by this amount of the operational slack. This difference can be written as follows

$$q_i = q^* - \bar{\tau} - a_i = \bar{q} - a_i, \tag{13}$$

where $a_i \subset (0, \bar{q})$. For simplicity, assume that the operational slack is not time variant so that the technology does ($q_i = \bar{q} - a_i$). That is, the manager keeps the level of the per capita operational slack to the end of the contract period once it is set at the beginning stage of the whole operation. In order to analyze this operational slack, one should

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[76] Alternatively, we may assume that the best production technology to each firm is different across firms. For example, the technology difference may be associated with the distinct vintage of each firm (product) following to the product life cycle theory. However, we adopt the same potential technology endowment assumption in order to analyze the effect of distinctive management slack or firm specific governance system.

[77] Taxation, industry regulation, anti-takeover or antitrust rules may be included in this category.

introduce the per capita agency cost function of $G(k, a)$ satisfying $F(k, q \pm a) = F(k, q) \pm G(k, a)$, and $G(k, a)$ is also strictly increasing in a.[78]

[Definition 2] Denote A_{it} is the per capita agency cost of the firm i at time t. Then the agency cost is defined as the difference between the share value running at full capacity of operational technology ($\bar{q}$) and that with some positive amount of operational slack (a_i). That is, $A_{it} = G(k_{it}, a_i)\theta_{it} = F(k_{it}, \bar{q})\theta_{it} - F(k_{it}, q_i)\theta_{it}$ where $q_i = \bar{q} - a_i$.

Also assume that the management slack is divided into the two following components: one for the employee and the other for managers themselves. Denote the former as employee slack (a_i^E) and the latter as private management slack (a_i^M). Examples of employee slack include idle or excessive labor, generous employee retirement plans, or fringe benefits excessive as compared to other. Since these values are determined by the manager who controls them, this slack may represent the weakness of the manager from the perspective of shareholders. In contrast, management slack may represent private benefits enjoyed by the manager. Typical examples are perks such as private jets or facilities that present costs to the firm and deferred payments such as beneficiary pension plans or farewell bonuses at retirement. Assume that only the management slack can add to the utility of the manager while the employee slack is attributed to employees. In this context, if corporate restructuring is defined as an attempt by managers to reduce operational slack, managers might prefer employee slack as the target. If I let ϕ_i be the

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[78] $G(k, a)$ can be driven from the relation of production function and the price function. Let the periodic per capita agency cost function $g(k, a)$ is defines as same fashion as above, that is, $f(k, q \pm a) = f(k, q) \pm g(k, a)$. Then the value from the unit operational slack $G(k, a)$ is calculated as $G_{it} = E_t \sum_{s=t}^{\infty} (g(k_{it}, q_{it})/(1 + r_{is}))\}$ where r represents the cost of capital.

portion of the total agency cost attributed to the agent, then the following equation summarizes the above argument.[79]

$$a_i = a_i^M + a_i^E \tag{14}$$

$$G(k_{it},\ a_i^M) = \phi_i\ G(k_{it}, a_i) \tag{15}$$

Note that the employee slack $\left(a_i^E\right)$ is given as constant over time for a single manager while different among managers so that this figure represents the competence of the manager. Therefore, the management portion of the total slack (ϕ_i) is determined by the operational slack, which is controlled by the manager. Theoretically, the manager can choose both the total operational slack (a_i) and the management portion (ϕ_i) independently. However, each manager in his or her own labor market is different in the ability to control this employee slack which determines the difference in technology. Employee retirement plans or fringe benefits are not likely to be changed by the manager once they are set, and they seem not to be flexible even in the case of declensions in expected performance.

1.4. Investment

A firm's capital (k) is the other factor affecting a firm's profit in addition to the manager's technology (q) and the productivity shock (θ) discussed above. There are two ways to increase capital for a firm. Internal investment is one way to increase the same kind of capital as the current one, and a corporate takeover is a way to acquire a different kind of

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[79] It is assumed that there is no dead weight loss for benefits from the operational slack to be transferred to private benefits with different destinations. In terms of utility, private benefits from the operational slack is not equal to the monetary compensation since some part of the former is earmarked to be consumed such as private jet or health center while the cash compensation has no such restriction. Furthermore, some extra money or efforts may be required to implement it since it would be monitored by the board. This utility discount is a kind of dead weight loss we call in this paper.

capital since each firm produces distinct products.[80] Let z be the investment opportunity

set for bidder firm, and then this can be expressed as $Z = \{x; j \neq i\}$ where x represents the

internal investment and j the takeover of another firm. No depreciation or perfect

maintenance of a capital level is assumed. Any takeover may create value. A takeover could

be the result of the operating side such as production efficiency, reduction in capital

expenditure, or increasing market power. Or it could be the result of the financial side such

as tax deduction or decreasing the cost of capital by reducing the default risk.[81] Whatever

the reasons are, let us call $s(k_{it}, k_{jt})$ the synergy creating the desire for a takeover, which

is the increased value of the combined firm compared to the summation of the stand-alone

firm values without the takeover. That is, $s_{it}^j = s(k_{it}, k_{jt}) = E_t \sum_{s=t}^{\infty} syn_{is}^j$. For simplicity of

discussion, I will consider the situation where the internal investment and the takeover are

mutually exclusive projects because of budget constraints. Let v_{it}^j be the per capita value of

the firm i taking over the firm j and y_{it}^x be the corresponding value without a takeover.

Then these values are written as follows:

$$V_{it}^x = P_{iT}^x = F(k_{it} + x_{it}, q_{it})\, \theta_{it}, \tag{16}$$

$$V_{it}^j = P_{iT}^j = \frac{1}{(1+\kappa^j)} F(k_{it}, q_{it})\theta_{it} + \frac{\kappa^j}{(1+\kappa^j)} \left\{ F(k_{jt}, q_{it})\theta_{jt} \right\} + s_{it}^j. \tag{17}$$

In this equation κ^j represents the relative size of the target capital defined as a target

capital divided by the bidder capital. Note that the synergy is not applied to the second

term of the RHS in equation (12). This is because the change in the technology of the stand

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[80] Alternatively, the corporate takeover can be viewed as an acquisition of old capital while the investment is corresponding to the acquisition of new capital. See Jovanovic and Rousseau (2002) for this argument.

[81] For the summary of discussions on these sources of takeovers including recent empirical tests, see Devos et al (2009). They find, however, that most of the synergy is coming from the reduction in investment, which is almost up to 80 percent of the total synergy measured.

alone target firm ($q_{jt} \rightarrow q_{it}$) could be achieved without the physical combination of two firms, i.e., through merely replacing the management team from the outside executive labor market.

Let $c(i_{it}, k_{jt})$ be the total cost to be paid for investing the same kind of capital (i_{it}) and for acquiring a different kind of capital(k_{jt}) already employed by the other firm. Most importantly, the purchasing price should be counted as a primary cost for both of the firms which is basically evaluated by the current cost of each capital (p_{it}, p_{jt}^*). Note that the purchasing price of the target capital (p_{jt}^*) is greater than the current price considering the fact that some premium would be added in practice ($p_{jt}^* > p_{jt}$). In order to focus on the takeover, assume that there is no additional cost to install the newly added capital for both kinds. However, the takeover requires additional cost which is not paid to the target shareholders such as in the case of a golden parachute. This additional cost is denoted as $e(k_{jt}, \epsilon_{jt})$. Then the investment cost is given as follows.[82]

$$C_{it}^x = c(k_{jt} = 0) = \kappa^x P_{it}, \tag{18}$$

$$C_{it}^j = c(k_{jt} > 0) = \kappa^j \{(1 - \omega)P_{jt}^* + \epsilon_{jt}\}. \tag{19}$$

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[82] The periodic synergy of the combined firm in the integral of Equation (8) can be defined as follows;

$$syn_{ct} = (OCF_{ct} - CAPEX_{ct}) - \frac{1}{(1+\kappa^j)}(OCF_{it} - CAPEX_{it}) - \frac{\kappa^j}{(1+\kappa^j)}(OCF_{jt} - CAPEX_{jt}),$$

where the operating cash flow of the target (j) is defined under the production technology of the bidder (i) management. In the extreme case where the synergy is not from the operating efficiency but only from the reduction in investment which is argues by Devos et al. (2009), then the periodic synergy is written as follows; $syn_{ct} = (\frac{1}{(1+\kappa^j)}CAPEX_{it} + \frac{\kappa^j}{(1+\kappa^j)}CAPEX_{jt}) - CAPEX_{ct}$. Also note that we omit the other costs of takeover such as relocation cost, financial or legal advising cost for simplicity of discussion.

1.5. Finance

One thing I should now consider is the budget constraints of the manager. For the time being, let us assume that no debt or equity financing is used by firms and no dividend is paid to shareholders. That is, the internal investment and the takeover are both financed only by the internal fund[83], which is generated from past operations. Now the budget constraint of the agent can be written as

$$0 < C_{it}^z \leq \sum_{s=0}^t y_{is}(k_{is}, \bar{q}) = \bar{Y}_{it}. \tag{20}$$

While the second inequality relation $(C \leq \bar{Y})$ constrains the size of the additional investment (or the takeover target), the first inequality condition $(0 < \bar{Y})$ acts as a necessary condition for the additional investment (or takeover).

[Definition 3] *Corporate takeover* is defined as acquiring the control of the target firm by the incumbent management team of the bidder firm with a substantial amount of the internal fund generated from past operations.

Note that the full capacity of the production technology $(\bar{q})$ is included in the Equation (4) instead of the agency cost involved one (q_i). This figure does not represent the nonexistence of the agency problem, but rather the result from the assumption of reinvestment by the agent. This issue will be discussed in Section 3. Finally, Equation (10)

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[83] Alternatively the external financing amount is a function of the internal fund, i.e., the result from the past performance of the firm which is positively associated with the financing capacity. However, this may not change the fundamental fact that the internal fund is the most important factor of budget constraint. Arguments with financing conditions or the optimal capital structure in the case of takeover are beyond the scope of this paper, we defer these analyses to the future research.

makes the agent's problem at time t be independent of any past decision making by the agent so that he or she only cares about future cash flow from the current investments.

Note that the RHS of Equation (9) is not affected by the management slack decision but only affected by the series of capital up to time $(g_i(k_{i*}))$. That is, the agency problem does not distort the previous capital investment decisions that are the result of the optimization of the agent. This lack of distortion enables the manager's decision on future investment and the takeover to be immune from past decisions. In contrast, previous management slack decision increases the expected payoff of the agent by increasing the compensation ratio. If I denote the new compensation ratio as μ', then this is greater than the original one and positively associated with the operational slack $(\mu'(a_i) \geq \mu)$.

1.6 Manager's problem

Let W_{iT} be the compensation given at manager retirement and μ be a compensation rate which is given at the contract date and assumed to be the same across the firm for simplicity. Since the compensation is given in terms of equity shares, i.e., μP_{iT} where $\mu = k_{i0}^M / k_{i0}$, this can be described as

$$W_{iT} = \bar{w}_{i0} + \mu k_{i0}(P_{iT} - P_{i0}), \tag{21}$$

where $\bar{w}_{i0} = \mu P_{i0}$. Note that the compensation is composed of a fixed salary $(\bar{w}_{i0})$ and performance-based bonus $(\mu \int dP_{is})$, which represents the value increase of the share during the whole contract period. Meanwhile, the agency cost is another source of the payoff to the agent.

$$A_{it}^x = (k_{it} + x_{it})G(k_{it} + x_{it}, a_i)\,\theta_{it}, \tag{22}$$

$$A_{it}^j = k_{it}G(k_{it}, a_i)\theta_{it} + k_{jt}\,G(k_{jt}, a_i)\theta_{jt}. \tag{23}$$

Let Π_{iT}^z be the total contingent payoff of the agent of firm i at time t with possible events of investment; internal investment ($z = x$) or the takeover of target ($z = j$). If I denote Π_{it} as the payoff generated from the previous operations, then the contingent gains to the agent from these investment opportunities are the difference between the contingent payoff and the continuation payoff. Mathematically,

$$\Pi_{iT}^z = \Pi_{it} + \mu k_{i0}\Delta P_{it}^z + \phi_i\Delta A_{is}^z, \tag{24}$$

where $\Delta P_{it}^z = (V_{it}^z - C_{it}^z - P_{it})$, and $\Delta A_{is}^z = A_{is}^z - P_{it}, z \in Z$ holds. The per capital value gains (ΔP_{it}^z) from the investment can be calculated as a difference between the post investment value of the share net of its cost and the current share price before the investment decision. For simplicity of discussion, assume that no further investments will be made until the end of the contract, i.e., keeping the same level of the capital after the investment at time t. Finally, the bidder agent's problem can be written as follows. At time t, the agent of the firm i will choose investment project $z \in Z$ which maximizes the contingent payoff (Π_{iT}^z) under the firm's budget constraint and the corporate governance reigning at that time.

Therefore, the takeover occurs only when there exists any $j \neq i$ satisfying $(\Pi_{it}^j - \Pi_{it}^x) > 0$. From the previous equations, I can derive the payoff gain from takeover to the internal investment as follows (see Appendix for derivation).

$$[\,\Pi_{it}^j - \Pi_{it}^x\,] \approx SYN + RST + VAL + AGC \tag{25}$$

$$SYN = \mu k_{i0}s_{it}^j \tag{26}$$

$$RST = \frac{\mu k_{i0}\kappa^j}{(1+\kappa^j)}G(k_{jt}, a_{jt} - a_{it})\theta_{jt} \tag{27}$$

$$VAL = \frac{\mu k_{i0}\kappa^j}{(1+\kappa^j)}\{F(k_{jt}, q_{jt})\theta_{jt} - F(k_{it}, q_{it})\theta_{it}\} \tag{28}$$

$$AGC = \eta\phi_i\{x_{it}[G(k_{jt}, a_{it})(\theta_{jt} - \theta_{it})] + \omega k_{jt}\phi_i G(k_{jt}, a_{it})\theta_{jt}\} \qquad (29)$$

In these equations, SYN, RST, VAL, AGC represent takeover gains to the agent over internal investment such as synergy, information gain, valuation gain, and agency gain. As I mentioned before, sources of the synergy, SYN, might be various, including tax benefits or any reductions in investment. The restructuring gain, RST, represents the gains from the information on the target firm which can be inefficiently managed $(a_{jt} > a_{it})$ or the undervaluation of the firm, high θ_{jt}.[84] The valuation gain, VAL, is from the difference in the per capita value of two firms $(V_{jt} - V_{it})$ since that value is defined as Equation (2). A few scenarios are possible for such a gain. It can occur when the target firm is undervalued while the bidder is appropriately valued. Another possible scenario is that the bidder firm is overvalued while the target is appropriately valued. Sometimes this gain may be achieved as long as the bidder firm is relatively overvalued as compared to the target firm when both firms are overvalued in a climate of general market overvaluation. Finally, the agency gain, AGC, may be positively associated with management slack (a_i^M) and the size of the stock exchange ratio (ω) and relative overvaluation of the target share to the bidder share $(\theta_{jt} - \theta_{it})$.

[Definition 4] With takeover gains defined as Equation (16) to (19), a corporate takeover is *synergistic* if $SYN > 0$, *restructuring* if $RST > 0$, *valuational* if $VAL > 0$, *agency-cost driven* if $AGC > 0$.

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[84] Grossman and Hart (1982) call the former as "allocational" while the latter as "acquisitional". The allocational takeover is often labeled as "disciplinary" takeover. Bradley, Desai, and Kim (1983) call the allocational one as "kick-in-the-pant' hypothesis while the acquisitional one as "sitting on a gold mine" hypothesis.

Note that even though I label the takeover with valuational gains as a valuational takeover, market inefficiency $(\theta_{it}, \theta_{jt} \neq 1)$ affects most of the takeover gains and is hard to be separated from valuational takeovers alone. In addition, it is important to note that the information and valuation gain is positively associated with the relative size of the target firm capital over the bidder firm capital (κ^j).

2. CORPORATE GOVERNANCE AND TAKEOVERS

As Equation (19) shows, positive management slack gives the agent a substantial amount of implicit payoff. This section shows how this positive management slack is not only compatible with the management control mechanisms which have been developed since the modern corporation appeared, but it also can motivate a takeover. There are three major schemes to control the agent so as to remove the agency cost or the management slack of the firm operation: these are optimal contracting, the corporate board of directors as an internal control, and the threat of a hostile takeover by other firms.

2.1. Optimal contract

An optimal contract is the compensation scheme which aligns the agent's payoff with that of shareholders so that there is no incentive for the agent to deviate from the shareholders' interests. Many performance-based executive compensation packages have been developed such as endowment of the equity, restricted shares, or management stock options. In this paper, I consider the case of equity based compensation.

Equation (14) shows that the agent's payoff depends on two components, explicit compensation ($\mu_i W_{iT}^z$) and the implicit agency cost ($\phi_i A_{is}^z$). For simplicity, assume that the operational slack is chosen at the beginning of the contract and remains constant over time. Then the expected marginal payoff from this slack is calculated as follows (see Appendix for details).

$$\frac{\partial \Pi}{\partial a_i} = \mu_i \frac{\partial W_i}{\partial a_i} + \phi_i \frac{\partial A_i}{\partial a_i} = (\phi_i - \mu_i) G(k_i, a_i) \,. \tag{30}$$

This equation indicates that the payoff of the agent increases as the operational slack increases whenever the management quota of the total agency cost is greater than the compensation ratio, i.e., the management quota of the total equity capital ($\phi_i > \mu_i$) if all other things are equal.

One critical assumption here is that the operational slack decision currently made does not affect the future path of capital accumulation. The budget constraint of the agent, Equation (10), assumes that the private benefits extracted from the operational slack by both the agent and employees remains in the firm. This retention is possible only when the agent and employees participate in the external financing activity as a shareholder or lender. Their consumption of these private benefits is delayed until time T so that the money remains in the firm as a form of the capital asset instead.[85]

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[85] However, not all of the private benefit can be transferred to cash which is paid for the equity or debt purchase considering that the perks such as private jet cannot be translated into cash while the farewell bonus can be endowed with cash. Alternatively we can assume that the manager can finance the amount of money corresponding to the noncash benefit by private banking and reinvest to the firm. Or it may reflect the negligible size of the operating slack relative to the fund required to the corporate investment. In practice, this kind of management participation as shareholder or lender is observed in the case of leveraged buyout (LBO), specifically the management buyout (MBO). Whatever the rationales are, we can make the capital accumulation be free from the management slack decision from the above assumption that enables us to focus on the takeover decision making and the agency cost itself.
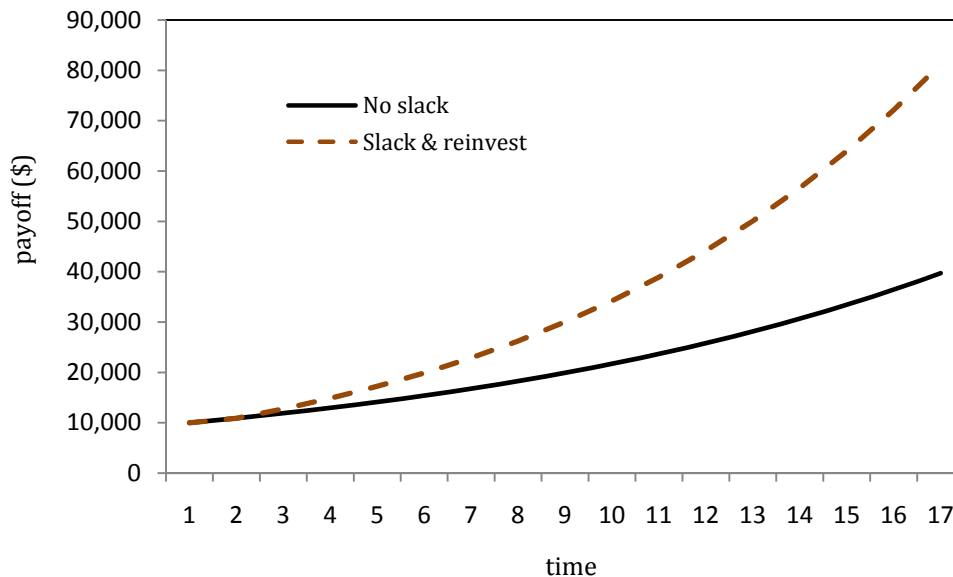
Figure 8 . The operational slack and the payoff of manager

This figure shows simulated result of payoffs for the agent with and without operational slack. Solid line represents the agent's periodic performance based payoff in the case of no operational slack. Dotted line represents the opposite case. For comparison, some amount of private payoff from the operational slack is reinvested to the same firm to the extent that it makes the next period investment does not be affected by the previous slack decision. For simulation, typical "y=qk" type production function is used where initial capital starts from 1 million and compensation ratio is 0.1 and technology parameter (q) equals 0.01 and slack parameter (a) equals 0.1. No depreciation is assumed.

Figure 8 shows this relation with the simulated result with the simple linear production technology such as $y = f(k, q) = qk$. The difference in the expected payoff is increasing as time goes by when management slack exists and is then reinvested into the shares. The dotted line represents the expected payoff in terms of management slack when the management portion of the slack (ϕ_i) equals one while the solid line represents a situation without operational slack. The other case with positive (ϕ_i) would be that obtaining between these two lines. Finally, the rational agent would choose positive agency cost as long as the agent is competent enough to transfer the shareholders' benefits into private

ones, i.e., $\phi_i > \mu_i$. Considering that CEO equity holdings are less than 1% on average in the public corporation, such an agency cost is probable. The fundamental reason behind this is that the agent would have a limited time horizon for his or her decision making. Although the restricted shares and stock options expand the prospect of the agent to a couple of years later than the case of equity endowment, these factors may not remove the agency cost incentive completely.[86]

2.2. Board of directors

Shareholders comprise the control mechanism to reduce the manager agency problem both internally and externally. The former is represented by the corporate board of directors while the latter is represented by a takeover.

[Definition 5] The firm has '*sound corporate governance*' if the board of directors only allows alternative investment proposals, including takeovers, of which NPV is expected to be not only positive but also greater than that of the incumbent internal investment project. The board of directors is *effective* if the agent having offered the negative NPV project is disciplined during his or her tenure.

Under sound corporate governance as defined above, a corporate takeover proposal is passed by the board of directors only when $\mathbb{E}[\Delta P_{it}^j] \geq \mathbb{E}[\Delta P_{it}^x]$, and $\mathbb{E}[\Delta P_{it}^j] >$

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[86] In a dynamic situation where the operational slack is variant over time, the time to retirement for a agent may affect the magnitude of the agency cost over time. Empirical evidence shows that decision makings of old CEOs are more likely to be motivated by the agency cost.

0. This relation is rewritten as follows if the NPV of any investment project z is defined in terms of price such as $\Delta P_{it}^z = (V_{it}^z - C_{it}^z - P_{it})$ where $z \in Z$ (see Appendix for details).

$$\gamma_i \{SYN_{it}^e + VAL_{it}^e + INF_{it}^e\} > \xi > 0, \tag{31}$$

$$\gamma_i = \frac{K_{it}}{K_{it} + \omega K_{jt}} = \frac{1}{(1 + \omega \frac{P_{jt}\theta_{jt}}{P_{it}\theta_{it}})}. \tag{32}$$

Note that the γ_i in Equation (22) represents the bidder shareholders' ownership portion of the combined firm after the takeover, i.e. $V_{it}^j = \gamma_i V_{it}^j + (1 - \gamma_i)V_{it}^j$. It is positively associated with the relative overvaluation of the bidder to the target firm, i.e., $\frac{\theta_{jt}}{\theta_{it}}$. This association is because of the different interests obtaining among the agent and the shareholders, who care about the relative overvaluation more than the agent since it increases their share over the future shareholders from the target firm as well as it increases the valuation gain (VAL). Note that this overvaluation gain is available only in the case of a positive stock exchange offer, i.e., $\omega > 0$. In the inequality described above, the superscript e represents the expectation by the board of directors with their information set (Ω^B), which is between that of shareholders and the agent $(\Omega^S \leq \Omega^B \leq \Omega^M)$; the more such shareholders are well-informed by the agent, the more accurately they evaluate takeover gains. Under an effective board of directors, expected gains are equal to the actual gains since the rational agent has no incentive to over-report takeover gains in order for the takeover proposal to be passed the board.

[Hypothesis 1] Let the takeover and takeover gains be defined as in Definition 3,4 and Equation (16) ~ (19) and the board of directors as Definition 5. Then under a sound and

effective board of directors, the corporate takeover cannot be motivated only by the agency gain.[87]

2.3. The market for corporate control

A corporate takeover is known as an external market mechanism to discipline the inefficient incumbent management team. However, this control mechanism may fail to remove the agency cost completely as long as there is a firm-specific management entrenchment that is considered as an additional takeover cost to the potential bidder firm.

[Definition 6] The market for corporate control is efficient when any positive restructuring gains from the difference in the agency cost are quickly realized by other superior management teams in the economy.

For various reasons, each corporation in the economy has its own management entrenchment, often in the form of corporate charters. One example of this management protection is from the stock market inefficiency assumed in this paper. As I mentioned before, there is information asymmetry among agents, boards of directors, and shareholders, i.e., $(\Omega^S \leq \Omega^B \leq \Omega^M)$. Therefore, shareholders are exposed to the hostile tender offer when their share is undervalued. So-called corporate raiders, who seek out this undervaluation, attempt to acquire a substantial amount of target shares in the open market by tender offer. This tender offer would be hostile because the board of directors

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[87] In other words, the so called free cash flow hypothesis argued by Jensen (1986) may not be applied under the effective and sound board of directors.

and the management of the target firm would not be inclined to accept the offer. In other words, the premium might not be sufficient to its real hidden value if it is solely motivated by a restructuring gain. Shareholders have incentives to bolster the controlling right of the firm to some extent against any encroaching outside management teams. Poison pills, golden parachutes, or staggering boards are examples of such management entrenchment. Moreover, this entrenchment may be driven by the agents themselves. However, I have not considered this case because sound corporate governance has been assumed in this paper.[88] Rational agents who know the risks of losing control of the firm because of outside competent managers will constrain their operational slack as much as possible as opposed to not being disciplined. However, management entrenchments add to the cost of any takeover to any external bidders so that some amount of operational slack is rationalized by managers as beyond the reach of this threat.[89] Firm specific management entrenchment acts as an upper boundary to such slack. Finally, the agent will choose a_i^* satisfying the following equation (see Appendix for the proof).

$$G(k_{it}, a_i^*) = \epsilon_i. \tag{33}$$

As long as the management entrenchment is positive, the optimal agency cost is also positive. Equation (19) indicates that the agency gain is determined by the size of the capital acquired and the unit agency cost. Therefore, agency cost can motivate a takeover.

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[88] Optimal contract is the one which makes these operational slacks during the whole contract period be zero or the payoff (π_{it}) is not a function of the operational slack (a_i). However this issue is beyond the scope of this paper. Some researchers find the evidences of the failure in the optimal contract with various reasons (see Bebchuck et al, 2004).

[89] Equation (6) is based on the assumption that the manger specific λ_i, management portion of the total operational slack, is expected as the same as those of the other managers ($j \neq i$).

[Hypothesis 2] Let the corporate takeover defined as Definition 2, 3 and assume that the stock market is inefficient. Then the agency cost driven takeover could occur even though the market for corporate control is efficient.

3. MODEL IMPLICATIONS

3.1. Stock market responses

Market response is the evaluation of the market participants on the offered deal price with the available information at that time. The offered price (P_{jt}^*) should be greater than the current price in order for the deal to be considered by target shareholders, and it should be less than $\bar{P}_{jt}^s$, which makes the takeover gain net of the additional takeover cost be zero. Therefore, the offer price is determined by the bargaining power of the target agent against the bidder agent which is denoted as β_{ji} where $\beta_{ji} \in (0,1)$. If there are many potential bidders in the market for corporate control, then this parameter would be close to one. Since the offer also has the possibility to fail, bidders will evaluate the contingent payoff by incorporating the success probability of the deal. Let the bid premium and the success probability be π_{jt} and ρ_{jt} where the premium is defined as the difference between the offered price and the pre-offer price for the target share. Then the share revaluation o f the target firm is written as $P_{jt}' - P_{jt} = \rho_{jt}\pi_{jt} = \rho_{jt}(P_{jt}^* - P_{jt})$, and this can be rewritten as follows.

$$P_{jt}' - P_{jt} = \frac{\rho_{jt}\beta_{jt}(1+\kappa^j)}{(1-\omega)\kappa^j}\left\{ SYN + RST + VAL + \sigma AGC - \frac{\kappa^j}{(1+\kappa^j)}\epsilon_j\right\} \tag{34}$$

Note that under the sound and effective board of directors ($\sigma = 0$), the agency gain (AGC) would be zero given the corporate governance constraint. This equation indicates that the share revaluation of the target results from the four takeover gains and success probability and the relative size of the acquired capital. Given these parameters, the share revaluation of the bidder can be written as follows.

$$P'_{it} - P_{it} = \frac{\rho_{jt}(1-\beta_{jt})(1+\kappa^j)}{(1-\omega)\kappa^j}\left\{ SYN + RST + VAL - \frac{\kappa^j}{(1+\kappa^j)}\epsilon_j - \frac{\kappa^j(1-\omega)}{(1+\kappa^j)}\sigma AGC\right\} \qquad (35)$$

As Equation (24) and (25) indicate, the direction and the magnitude of the share valuation is the same except for the agency gain. Since some part of the agency gain is paid as a premium unless the board of directors is both sound and effective, this factor increases the target share value while it simultaneously decreases the bidder share value. Under the sound and effective corporate governance system, the difference in the share revaluation between the bidder and the target depends only on the bargaining power and the relative size of the target firm since this share revaluation should again be normalized by its own price.

3.2. Cross-sectional difference in the market response[90]

Agency cost takeover is likely to occur in the case of stock exchange offers under favorable financing conditions and weak corporate governance systems. Loosening financing constraints will increase the size of the fund available to acquire the target. Loosening the efficiency of the corporate control market will also increase slack incentives, as will weak

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[90] From this section, please note that only the basic ideas are provided and detailed arguments are not sufficiently developed yet so that some sections even remain unwritten. The remaining contents are work in progress at this time on this preliminary draft.

and ineffective boards of directors. Firmly entrenched CEOs are likely to raise the agency cost oriented takeovers. Greater management entrenchment will increase the slack incentives. Stock offers increase the agency cost by increasing acquired capital. Cash offers can be one of any other types of takeover such as synergistic, restructuring, or valuation oriented ones. Hostile takeovers are likely to be disciplinary, which require the replacement of the incumbent management team. Given such a disciplinary context, tenders offer are more likely to be disciplinary in nature.

A conglomeration which is a takeover of a target within a different industry is likely to be a valuational takeover since the misvaluation of the target or the future prospects for profit might be different among different industries. Because of such differences, a focused deal is more likely to be a synergistic or a restructuring oriented one. However, the existence of a conglomeration effort itself does not indicate anything about the agency cost takeover. Under a weak and ineffective board of directors, the agent might have some incentives for entering a different industry for which information asymmetry between the agent and others is greater so that an agency cost takeover could occur. In the final analysis, this is the empirical issue to be resolved.

3.3. Takeover waves

A takeover wave can be explained by the industrial or overall market-wide shocks or factors which drive the takeover in the model. The 1980s are labeled as an era of hostile cash tender offer wave of takeovers. Given the arguments of this paper, takeovers from this period can be characterized as primarily motivated by the restructuring of inefficient targets, i.e., disciplinary takeovers. However, the major driving forces behind takeovers

during the 1990s are not yet identified. Friendly stock exchange offers have been common phenomena. Therefore, all types of takeovers except the disciplinary one can be the candidate during this period, whether synergistic, valuation, or agency cost.

CHAPTER V

SUMMARY AND CONCLUSION

In this dissertation, I attempt to measure information effect explicitly so that I could decompose the takeover gains into the stand-alone information effect and combinational synergy gains from the takeover. Two competing hypotheses contradictorily posit that each one of these two takeover gains is dominant. Synergy hypothesis argues that combination gains are an overwhelming source of share revaluation while information hypothesis argues that the information effect is the major source of takeover gains.

I develop a model which differentiates these gains. The model attributes the information effect to a disciplinary or an acquisitional type of takeover, and also attributes the combinational gains to a synergistic, overvaluation-leveraged or hubris/agency-cost oriented takeover. After all, dominance between these takeover gains is a matter of how often these competing types of takeovers actually occur in the corporate control market. I quantify this information effect with new measurement based on the residual income valuation model. By a discounted summation of series of forecasted accounting earning revisions provided by security analysts, I measure an abnormal change in the intrinsic value of a target share around the takeover announcement. I call this measure of the information effect CAVR, compared to the other measure of share revaluation (CAR) or synergy (CSYN). I assume that financial analysts forecast the stand-alone earnings of the target firm regardless of the takeover announcement.

The evidence suggests that the information effect is approximately 4% while the synergy is about 22% in the 1,372 observations. Information effect takes almost over 1/6

of total takeover gains. Important implication, however, is that it is not negligible but significant. This is more evident in the failed merger sample considered as disciplinary oriented takeovers in this paper. In failed takeover sample, information effect (6.2%) takes more than 1/4 in total share revaluation.

The empirical analysis of CAR and CAVR is also consistent with the model prediction on failed mergers. I further separate the sample of unsuccessful targets that are subsequently taken over within five years from the initial offer, i.e. finally successful takeovers. With the new failed merger samples which only contain subsequently not-taken deals, I find that the positive CAR at the announcement dramatically shrinks and approaches to the CAVR after the deal is withdrawn. This is because the combinational gains become futile and only the information gains on the stand-alone target firm remains after the deal is broken.

I also find empirical evidences on sources behind the share revaluation and information effect. And disciplinary takeover that is expected to be failed or has a competent acquirer with a high Tobin's-Q has a greater information effect. An acquisitional takeover exploiting the undervaluation of target share with a high book-to-market ratio and small market capitalization also has a significantly greater information effect. On the other hand, synergistic merger, which is expected to succeed and more likely to be a cash tender-offer, has greater share revaluation while it does not affect the information effect. A stock-market-driven takeover, in which, stock is preferred as payment and acquirer has a lower book-to-market ratio than the target stock, does not differentiate the synergy that means synergy measured in this paper does not contain the sources from this kind of stock-market-driven takeover. Furthermore, as long as the agency-cost oriented takeover

is concerned, which is characterized as cash rich, low levered, large size, and highly entrenched bidders, no evidence is provided.

Finally, it is possible to reconcile the two competing hypotheses from these empirical findings. In conclusion, both of the information effect and combinational gains are an important source of takeover gains although the former is relatively smaller than the latter. To measure the combinational gains such as synergy with more explicit way[91], however, still remains as a challenging question. Future research may focus on discovering these specific gains more narrowly. Recently, Devos *et al.* (2009) measured synergistic gains and finds the specific sources behind it using Value Line analyst forecasts. They estimate the average synergy gains to be 10.3% of the combined equity value of a merging firm. Although it is hard to directly compare these results to the measured synergy (22.5%), it may help to imagine the relative importance between the synergy and the information effect.[92]

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[91] This synergy gain (10.3%) is calculated in terms of the cash flow return of a combined firm and again this is decomposed into operating (8.38%) and financial (1.64%) synergies. Major differences of this study with our study are that they use analysts' forecasts from Value Line which has no optimism bias they argue, and they examine the abnormal revision within the short-term window around the deal closing date instead of the announcement date. Our method is difficult to apply to measure synergy gain following their methodology since observations in the estimation window to calculate the expected revision are significantly reduced if the event window is extended to the closing date. This could be discussed in a separate project.

[92] Some researchers try to measure synergy gains by a post-merger stock performance (Loughran & Vijh 1997; Rau & Vermaelen 1998; Andrade *et al.* 2001) or a post-merger operating performance (Healy *et al.* 1992). However, we do not introduce these long-term event studies in this paper since a number of methodological concerns have been proposed on these methods.

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APPENDIX A. CALCULATING ANALYST VALUE REVISION

This appendix gives additional details of deriving abnormal analyst value revision representing changes in share value of stand-alone firm. The intrinsic value of a share calculated from the residual income valuation model is written as follows in the "three period model" where residual incomes maintain their levels from the upcoming third fiscal year on.

$$V_{i,t}^* = B_{i,t}^0 + \frac{(F_{i,t}^1 - rB_{i,t}^0)}{(1+r_i)} + \frac{(F_{i,t}^2 - r_iB_{i,t}^1)}{(1+r_i)^2} + \sum_{j=3}^{\infty} \frac{(F_t^3 - r_iB_{i,t}^2)}{(1+r_i)^j}$$

In this equation, F_t^j represents I/B/E/S analysts' consensus earnings forecast for the jth upcoming fiscal year end at time t. At the same token, intrinsic value of a share at time $t-1$ is written as follows.

$$V_{i,t-1}^* = B_{i,t-1}^0 + \frac{(F_{i,t-1}^1 - r_iB_{i,t-1}^0)}{(1+r_i)} + \frac{(F_{i,t-1}^2 - r_iB_{i,t-1}^1)}{(1+r_i)^2} + \sum_{j=3}^{\infty} \frac{(F_{i,t-1}^3 - r_iB_{i,t-1}^2)}{(1+r_i)^j}$$

Analyst value revision at time t, defined as a first difference of intrinsic value of share, normalized by its share price at time $t-1$, denoted as P, is written as follows.

$$VR_{i,t} = \frac{V_{i,t}^* - V_{i,t-1}^*}{P} = \frac{\Delta V_{i,t}^*}{P}$$

$$= \frac{(B_{i,t}^0 - B_{i,t-1}^0)}{P} + \frac{(F_{i,t}^1 - F_{i,t-1}^1) - r_i(B_{i,t}^0 - B_{i,t-1}^0)}{P(1 + r_i)}$$

$$+ \frac{(F_{i,t}^2 - F_{i,t-1}^2) - r_i(B_{i,t}^1 - B_{i,t-1}^1)}{P(1 + r_i)^2}$$

$$+ \sum_{j=3}^{\infty} \frac{(F_{i,t}^3 - F_{i,t-1}^3) - r_i(B_{i,t}^2 - B_{i,t-1}^2)}{P(1 + r_i)^j}$$

$$= \frac{\Delta B_{i,t}^0}{P} + \frac{\Delta F_{i,t}^1 - r_i \Delta B_{i,t}^0}{P(1 + r_i)} + \frac{\Delta F_{i,t}^2 - r_i \Delta B_{i,t}^1}{P(1 + r_i)^2} + \sum_{j=3}^{\infty} \frac{\Delta F_{i,t}^3 - r_i \Delta B_{i,t}^2}{P(1 + r_i)^j}$$

In order to get the above analyst value revision, unknown future book values, $\left(B_{i,t}^1, B_{i,t}^2\right)$, should be determined. Clean surplus relation suggests that the book value per share equals to the book value per share at previous fiscal period plus earnings per share minus net dividends per share. From this relation, future book values are written as follows.

$$B_{i,t}^1 = B_{i,t}^0 + F_{i,t}^1 - D_{i,t}^1 = B_{i,t}^0 + (1 - k_{i,t}^e)F_{i,t}^1$$

$$B_{i,t}^2 = B_{i,t}^1 + F_{i,t}^2 - D_{i,t}^2 = B_{i,t}^1 + (1 - k_{i,t}^e)F_{i,t}^2$$

Let $k_{i,t}^e$ represent the expected future dividend payout ratio with all available information set at time t. Then changes in book value per share in equation are written as follows.

$$\Delta B_{i,t}^0 = (B_{i,t}^0 - B_{i,t-1}^0) = 0$$

$$\Delta B_{i,t}^1 = (B_{i,t}^1 - B_{i,t-1}^1) = \Delta B_{i,t}^0 + \left(1 - k_{i,t}^e\right)\Delta F_{i,t}^1 = (1 - k_{i,t}^e)\Delta F_{i,t}^1$$

$$\Delta B_{i,t}^2 = (B_t^2 - B_{t-1}^2) = \Delta B_{i,t}^1 + \left(1 - k_{i,t}^e\right)\Delta F_{i,t}^2 = \left(1 - k_{i,t}^e\right)\Delta F_{i,t}^1 + \left(1 - k_{i,t}^e\right)\Delta F_{i,t}^2$$

From the above relations, analyst value revision is derived as follows.

$$VR_{i,t} = \frac{\Delta F_{i,t}^1}{P(1+r_i)} + \frac{\Delta F_{i,t}^2 - r_i(1-k_{i,t}^e)\Delta F_{i,t}^1}{P(1+r_i)^2}$$

$$+ \sum_{j=3}^{\infty} \frac{\Delta F_{i,t}^3 - r_i(1-k_{i,t}^e)\Delta F_{i,t}^1 - (1-k_{i,t}^e)\Delta F_{i,t}^2}{P(1+r_i)^j}$$

$$= \frac{\Delta F_{i,t}^1}{P(1+r_i)} + \frac{\Delta F_{i,t}^2 - r_i(1-k_{i,t}^e)\Delta F_{i,t}^1}{P(1+r_i)^2}$$

$$+ \frac{\Delta F_{i,t}^3 - r(1-k_{i,t}^e)\Delta F_{i,t}^1 - (1-k_{i,t}^e)\Delta F_{i,t}^2}{P(1+r_i)^2 r_i}$$

$$= \frac{\Delta F_{i,t}^1}{P}\left\{\frac{1}{(1+r_i)} - \frac{r_i(1-k_{i,t}^e)}{(1+r_i)^2} - \frac{r_i(1-k_{i,t}^e)}{(1+r_i)^2 r_i}\right\}$$

$$+ \frac{\Delta F_{i,t}^2}{P}\left\{\frac{1}{(1+r_i)^2} - \frac{(1-k_{i,t}^e)}{(1+r_i)^2 r_i}\right\} + \frac{\Delta F_{i,t}^3}{P}\left\{\frac{1}{(1+r_i)^2 r_i}\right\}$$

$$= \frac{k_{i,t}^e}{(1+r_i)}FR_{i,t}^1 + \frac{k_{i,t}^e}{(1+r_i)^2}FR_{i,t}^2 + \frac{1}{(1+r_i)^2 r_i}FR_{i,t}^3$$

APPENDIX B. CORRELATIONS AMONG DEAL VARIABLES

This table reports Pearson correlation coefficients among deal and accounting variables for 810 U.S. domestic control oriented takeover deals between public firms from 1980 to 2006 where the target is identified in SDC, CRSP, and I/B/E/S, and both acquirer and target are covered by COMPUSTAT ("ACCO"). '1980S(1990S)' represents deals offered during 1980s(1990s), 'SUCC' does successful, 'CASHO' does cash only payment, 'STOCKO' does stock only payment, '%STOCK' does % of stock as method of payment, 'HOSTL' does hostile, 'TENDR' does tender offer, 'COMPT' does 'competing', 'FOCUS' does focused deal, 'SMD' does stock-market driven takeover defined as stock-only deals where bidder BEME is both less than the target BEME (relatively over-valued) and less than 33 percentile of all observations. 'BEME' is defined as book-to-market value of equity. Statistical significances are provided as ***(1%), **(5%) and *(10%).

	1980S	1990S	SUCC	HOSTL	CASHO	STOCKO	%STOCK	TENDR	COMPT	FOCUS	SMD
1980S	1.00	-0.58 ***	-0.04	0.17 ***	0.10 ***	-0.15 ***	-0.18 ***	0.26 ***	0.05	-0.11 ***	-0.14 ***
1990S		1.00	0.01	-0.07 **	-0.22 ***	0.27 ***	0.30 ***	-0.10 ***	-0.06 *	0.08 ***	0.23 ***
SUCC			1.00	-0.40 ***	0.00	0.07 *	0.04	-0.04	-0.36 ***	0.04	0.05
HOSTL				1.00	0.17 ***	-0.20 ***	-0.24 ***	0.25 ***	0.28 ***	-0.03	-0.10 ***
CASHO					1.00	-0.48 ***	-0.88 ***	0.46 ***	0.08 **	-0.10 ***	-0.26 ***
STOCKO						1.00	0.78 ***	-0.35 ***	-0.11 ***	0.07 **	0.56 ***
%STOCK							1.00	-0.55 ***	-0.14 ***	0.09 **	0.43 ***
TENDER								1.00	0.12 ***	-0.16 ***	-0.21 ***
COMPT									1.00	0.04	-0.06 *
FOCUS										1.00	0.01
SMD											1.00

APPENDIX C. CORRELATIONS AMONG ACCOUNTING VARIABLES

This table reports Pearson correlation coefficients among accounting variables for 810 U.S. domestic control oriented takeover deals between public firms from 1980 to 2006 where the target is identified in SDC, CRSP, and I/B/E/S, and both acquirer and target are covered by COMPUSTAT ("ACCO"). 'LIQ' does liquidity, 'LEV' does leverage, 'OCF' does operating cash flow, 'TOBQ' does Tobin's-Q, 'BEME' does book-to-market value of equity, 'CAP' does logarithm of real market capitalization. Prefix 'B(T)' represents bidder (target). Statistical significances are provided as ***(1%), **(5%) and *(10%).

|	B_LIQ	B_LEV	B_OCF	B_TOBQ	B_BEME	B_CAP	T_LIQ	T_LEV	T_OCF	T_TOBQ	T_BEME	T_CAP
B_LIQ	1.00	-0.48 ***	-0.37 ***	0.44 ***	-0.21 ***	-0.12 ***	0.50 ***	-0.40 ***	-0.18 ***	0.22 ***	-0.12 ***	-0.16 ***
B_LEV		1.00	0.03	-0.60 ***	0.48 ***	-0.12 ***	-0.48 ***	0.76 ***	0.04	-0.35 ***	0.28 ***	0.05
B_OCF			1.00	-0.33 ***	0.34 ***	-0.05	-0.22 ***	0.00	0.43 ***	-0.17 ***	0.16 ***	0.06 **
B_TOBQ				1.00	-0.49 ***	0.21 ***	0.45 ***	-0.47 ***	-0.21 ***	0.45 ***	-0.27 ***	-0.01
B_BEME					1.00	-0.27 ***	-0.27 ***	0.34 ***	0.21 ***	-0.25 ***	0.43 ***	-0.09 ***
B_CAP						1.00	0.12 ***	-0.12 ***	-0.15 ***	0.20 ***	-0.28 ***	0.55 ***
T_LIQ							1.00	-0.58 ***	-0.39 ***	0.44 ***	-0.27 ***	-0.16 ***
T_LEV								1.00	0.09 ***	-0.46 ***	0.43 ***	0.03
T_OCF									1.00	-0.24 ***	0.25 ***	0.06 **
T_TOBQ										1.00	-0.42 ***	0.14 ***
T_BEME											1.00	-0.27 ***
T_CAP												1.00

APPENDIX D. CORRELATIONS AMONG DEAL AND ACCOUNTING VARIABLES

This table reports Pearson correlation coefficients among deal and accounting variables for 810 U.S. domestic control oriented takeover deals between public firms from 1980 to 2006 where the target is identified in SDC, CRSP, and I/B/E/S, and both acquirer and target are covered by COMPUSTAT ("ACCO"). '1980S(1990S)' represents deals offered during 1980s(1990s), 'SUCC' does successful, 'CASHO' does cash only payment, 'STOCKO' does stock only payment, '%STOCK' does % of stock as method of payment, 'HOSTL' does hostile, 'TENDR' does tender offer, 'COMPT' does 'competing', 'FOCUS' does focused deal, 'SMD' does stock-market driven takeover defined as stock-only deals where bidder BEME is both less than the target BEME (relatively over-valued) and less than 33 percentile of all observations, 'LIQ' does liquidity, 'LEV' does leverage, 'OCF' does operating cash flow, 'TOBQ' does Tobin's-Q, 'BEME' does book-to-market value of equity, 'CAP' does logarithm of real market capitalization. Prefix 'B(T)' represents bidder (target). Statistical significances are provided as ***(1%), **(5%) and *(10%).

	1980S	1990S	SUCC	HOSTL	CASHO	STOCKO	%STOCK	TENDR	COMPT	FOCUS	SMD
B_LIQ	-0.03	-0.03	-0.08 **	-0.01	0.00	0.14 ***	0.10 ***	-0.05	-0.04	0.04	0.29 ***
B_LEV	0.07 **	-0.07 **	0.02	0.05	-0.02	-0.09 **	-0.05	-0.02	0.04	0.05	-0.39 ***
B_OCF	0.28 ***	-0.21 ***	-0.01	0.10 ***	0.16 ***	-0.32 ***	-0.30 ***	0.27 ***	0.16 ***	-0.03	-0.29 ***
B_TOBQ	-0.16 ***	0.19 ***	0.00	-0.09 **	-0.09 **	0.21 ***	0.19 ***	-0.07 **	-0.09 **	0.02	0.51 ***
B_BEME	0.26 ***	-0.16 ***	-0.04	0.07 **	0.05	-0.18 ***	-0.14 ***	0.11 ***	0.09 ***	-0.01	-0.39 ***
B_CAP	-0.16 ***	0.00	0.25 ***	-0.13 ***	0.08 **	0.03	-0.02	-0.05	-0.06 *	0.00	0.15 ***
T_LIQ	-0.10 ***	0.00	0.06 *	-0.11 ***	0.01	0.17 ***	0.10 ***	-0.07 *	-0.08 **	-0.06	0.29 ***
T_LEV	0.00	0.02	-0.01	0.05	-0.03	-0.11 ***	-0.05	-0.04	0.01	0.14 ***	-0.35 ***
T_OCF	0.18 ***	-0.11 ***	-0.14 ***	0.15 ***	0.08 **	-0.22 ***	-0.18 ***	0.17 ***	0.17 ***	-0.09 ***	-0.18 ***
T_TOBQ	-0.09 **	0.06 *	0.04	-0.07 *	-0.09 ***	0.20 ***	0.17 ***	-0.09 **	-0.06 *	-0.02	0.33 ***
T_BEME	0.11 ***	-0.01 *	-0.10 ***	0.11 ***	0.11 ***	-0.15 ***	-0.16 ***	0.13 ***	0.10 ***	0.02	-0.21 ***
T_CAP	-0.09 **	-0.09 **	-0.04	0.10 ***	-0.14 ***	0.01	0.08 **	-0.08 **	0.12 ***	0.11 ***	0.03

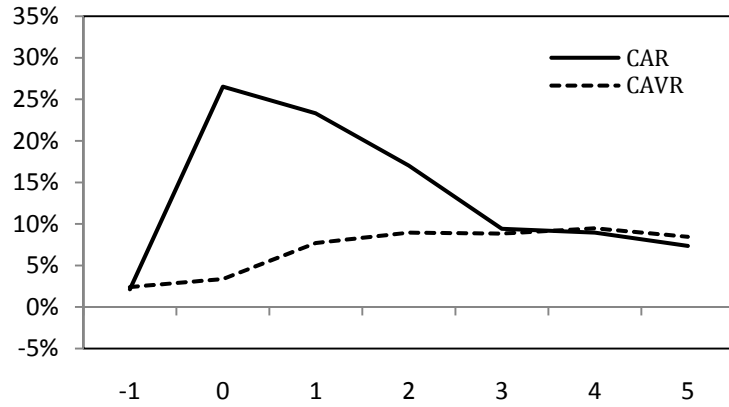# APPENDIX E. FAILED DEALS BY CAR MODELS AND SUBGROUP DEFINITIONS
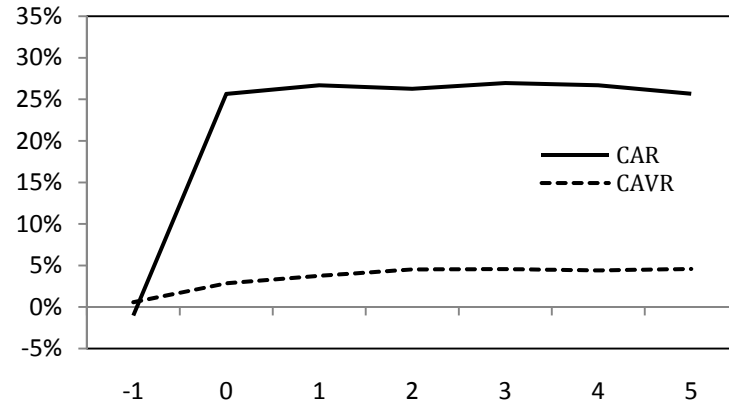
(1) Remain-independent deals: market model
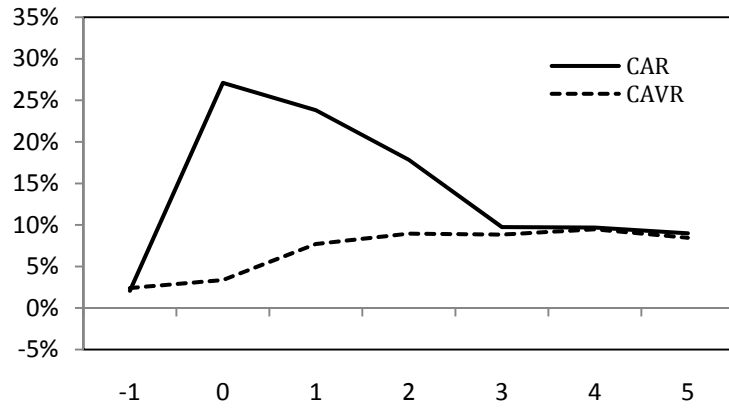
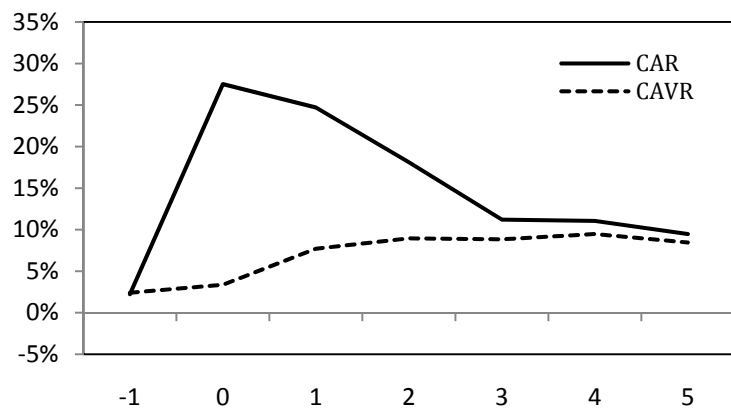(2) Finally-taken deals: market model
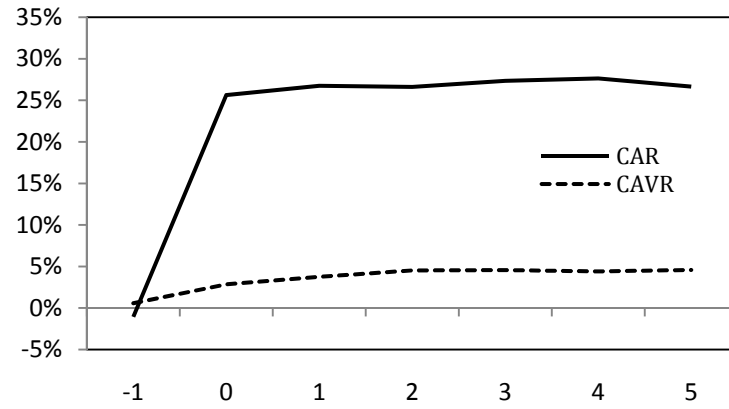
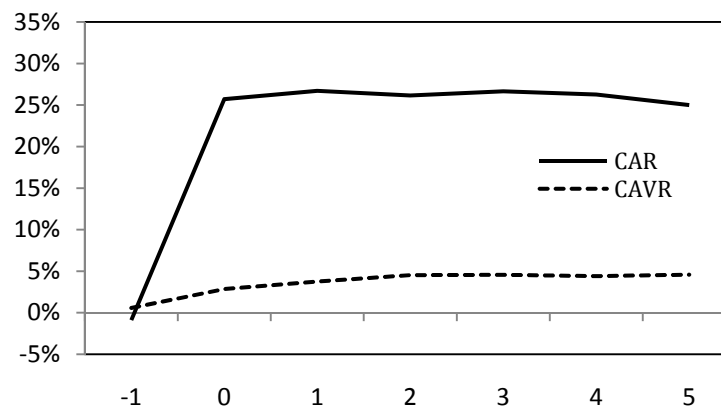(3) Remain-independent deals: Fama-French 3 factor model

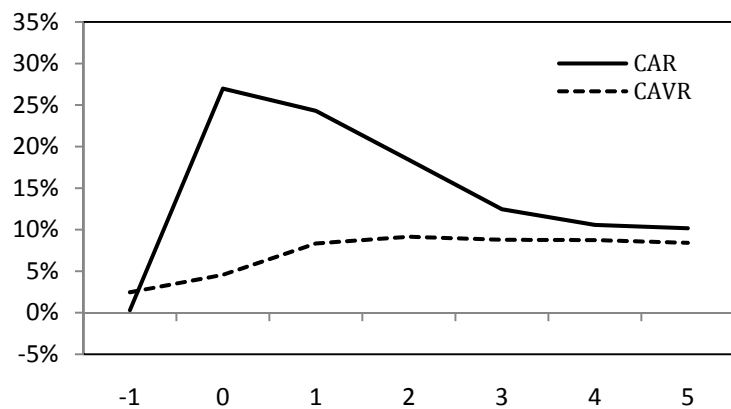(4) Finally-taken deals: Fama-French 3 factor model

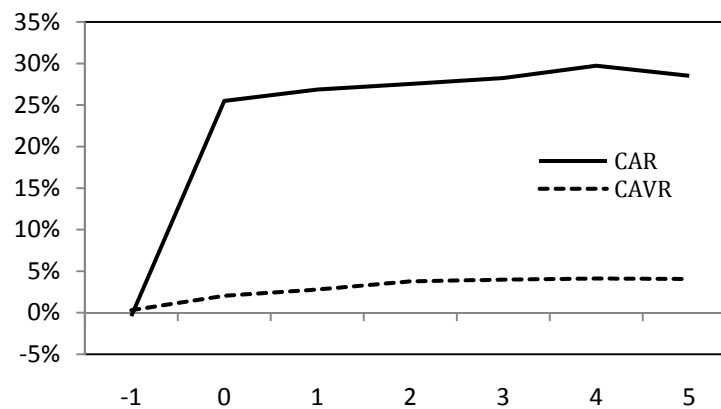(5) Remain-independent deals: Fama-French 4 factor model

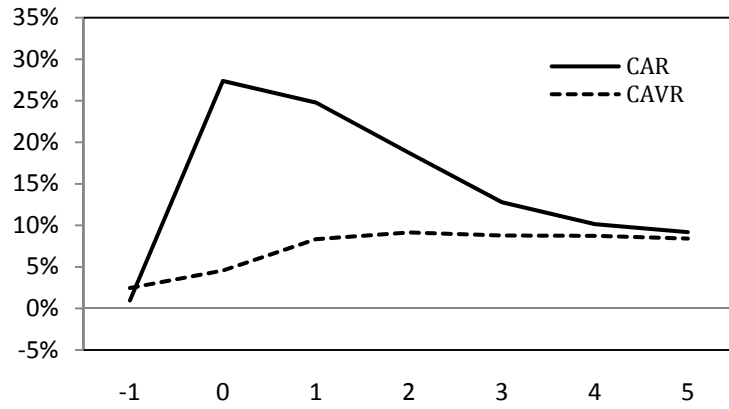(6) Finally-taken deals: Fama-French 4 factor model

(7) Abandoned deals: market model

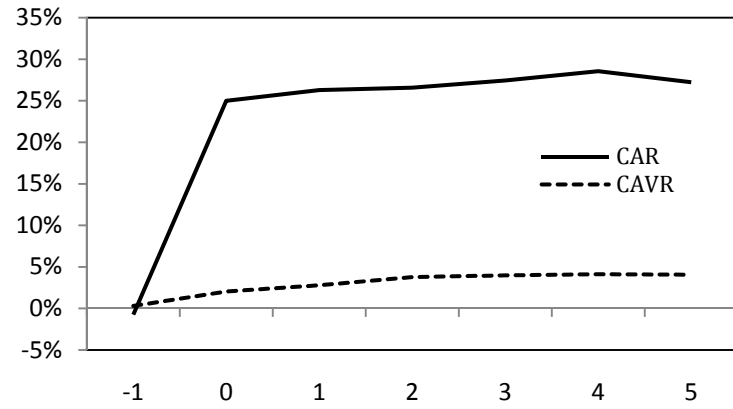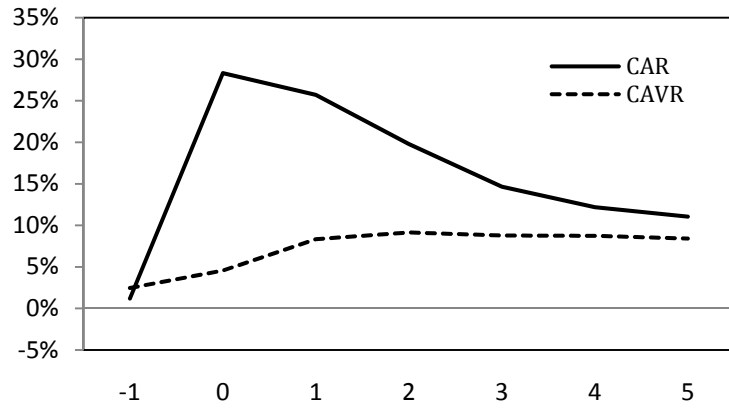(8) Reoffered deals: market model

(9) Abandoned deals: Fama-French 3 factor model
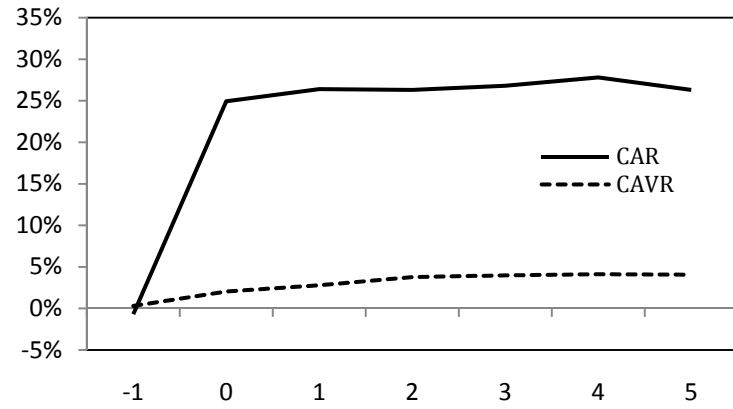

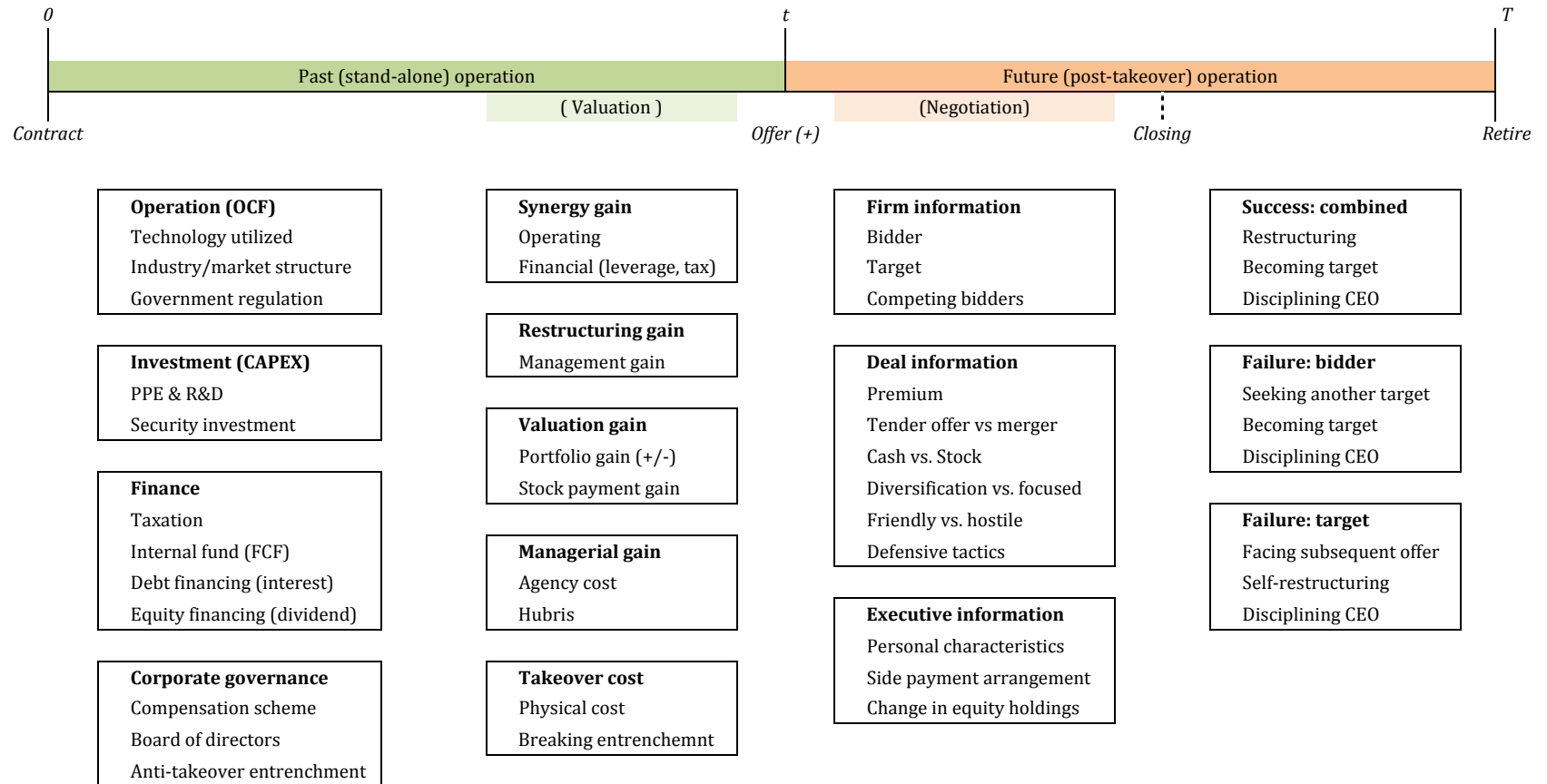## (10) Reoffered deals: Fama-French 3 factor model

(11) Abandoned deals: Fama-French 4 factor model

(12) Reoffered deals: Fama-French 4 factor model

APPENDIX F. DYNAMICS IN THE MARKET FOR CORPORATE CONTROL

0   t   T

Past (stand-alone) operation	Future (post-takeover) operation
(Valuation)	(Negotiation)

Contract   *Offer (+)*   *Closing*   *Retire*

Operation (OCF)
Technology utilized
Industry/market structure
Government regulation

Investment (CAPEX)
PPE & R&D
Security investment

Finance
Taxation
Internal fund (FCF)
Debt financing (interest)
Equity financing (dividend)

Corporate governance
Compensation scheme
Board of directors
Anti-takeover entrenchment

Synergy gain
Operating
Financial (leverage, tax)

Restructuring gain
Management gain

Valuation gain
Portfolio gain (+/-)
Stock payment gain

Managerial gain
Agency cost
Hubris

Takeover cost
Physical cost
Breaking entrenchemnt

Firm information
Bidder
Target
Competing bidders

Deal information
Premium
Tender offer vs merger
Cash vs. Stock
Diversification vs. focused
Friendly vs. hostile
Defensive tactics

Executive information
Personal characteristics
Side payment arrangement
Change in equity holdings

Success: combined
Restructuring
Becoming target
Disciplining CEO

Failure: bidder
Seeking another target
Becoming target
Disciplining CEO

Failure: target
Facing subsequent offer
Self-restructuring
Disciplining CEO

This figure shows the information flow during the corporate takeover process. Factors which is suggested as a driving force of merger wave is displayed in the first columns of stand-alone period. Neoclassical theory argues that the industry-wide shock on forein competition, energy price, technology shock such as financial innovation derives merger wave. Meanwhile, the behavioral theory argues that the over-valued stock market may derive the 1990s merger wave. 'Managerial incentive' such as free cash flow, corporate governance system, and executive compensation scheme, may be determined endogenously as a result of the optimal control mechanism or another kind of agency cost by the existing CEO. However I assume these variables are exogenously given for the simplicity of our discussion in this paper. I also assume that there is an industry-wide spill over effect, denoted as '(+)' when the takeover offer is announced.

APPENDIX G. DERIVATION OF TAKEOVER GAINS

Let the size of the agency gain is a function of the remaining tenure as a CEO. Then this can be written as $\eta = \eta(T - t), \frac{d\eta}{d(T-t)} > 0$. Finally, relative gains from takeover to the internal investment $(\Delta\Pi_{it}^j - \Delta\Pi_{it}^x)$ can be expressed as follows.

$$
\begin{aligned}
\Pi_{it}^j - \Pi_{it}^x &= \mu k_{i0}\{(V_{it}^j - C_{it}^j - P_{i0}) - (V_{it}^x - C_{it}^x - P_{i0})\} + \phi_i\eta(A_{it}^j - A_{it}^x) \\
&= \mu k_{i0}(V_{it}^j - V_{it}^x) + \phi_i\eta(A_{it}^j - A_{it}^x)
\end{aligned}
$$

$$
\begin{aligned}
V_{it}^j - V_{it}^x &= \frac{1}{(1+\kappa^j)}F(k_{it}, q_{it})\theta_{it} + \frac{\kappa^j}{(1+\kappa^j)}\{F(k_{jt}, q_{it})\theta_{jt}\} + s_{it}^j \\
&\quad -F(k_{it} + x_{it}, q_{it})\,\theta_{it} \\
&= s_{it}^j + \frac{\kappa^j}{(1+\kappa^j)}\{F(k_{jt}, q_{jt})\theta_{jt} - F(k_{it}, q_{it})\theta_{it}\} \\
&\quad + \frac{\kappa^j}{(1+\kappa^j)}G(k_{jt}, a_{jt} - a_{jt}) - \theta_{it}\{F(k_{it} + x_{it}, q_{it}) - F(k_{it}, q_{it})\} \\
&\approx s_{it}^j + \frac{\kappa^j}{(1+\kappa^j)}\{F(k_{jt}, q_{jt})\theta_{jt} - F(k_{it}, q_{it})\theta_{it} + G(k_{jt}, a_{jt} - a_{it})\theta_{jt}\}
\end{aligned}
$$

$$
A_{it}^j - A_{it}^x = \{k_{it}G(k_{it}, a_i)\theta_{it} + k_{jt}\,G(k_{jt}, a_i)\theta_{jt} - (k_{it} + x_{it})G(k_{it} + x_{it}, a_i)\,\theta_{it}\}
$$

$$\text{Since } x_{it}^* = (1 - \omega)k_{jt},$$

$$
\begin{aligned}
&= k_{it}\theta_{it}[G(k_{it}, a_i) - G(k_{it} + x_{it}, a_i)] \\
&\quad + (1 - \omega)k_{jt}[G(k_{jt}, a_i)\theta_{jt} - G(k_{it} + x_{it}, a_i)\,\theta_{it}] \\
&\quad + \omega k_{jt}G(k_{jt}, a_i)\theta_{jt}
\end{aligned}
$$

$$\approx x_{it}\left[G(k_{jt}, a_i)(\theta_{jt} - \theta_{it})\right] + \omega k_{jt} G(k_{jt}, a_i)\theta_{jt}$$

$$\Pi_{it}^j - \Pi_{it}^x \quad \approx SYN + VAL + INF + AGC$$

$$SYN = \mu k_{i0} s_{it}^j$$

$$VAL = \frac{\mu k_{i0} \kappa^j}{(1+\kappa^j)}\left\{F(k_{jt}, q_{jt})\theta_{jt} - F(k_{it}, q_{it})\theta_{it}\right\}$$

$$INF = \frac{\mu k_{i0} \kappa^j}{(1+\kappa^j)} G(k_{jt}, a_{jt} - a_{it})\theta_{jt}$$

$$AGC = \phi_i \eta \left\{x_{it}^*\left[G(k_{jt}, a_i)(\theta_{jt} - \theta_{it})\right] + \omega k_{jt} G(k_{jt}, a_i)\theta_{jt}\right\}$$

APPENDIX H. DERIVATION OF THE TAKEOVER CONSTRAINT

The rational agent will make the restructuring gain from external hostile takeover, where cash offer is assumed, be zero in order to evade the disciplinary tender offer. Since this takeover is disciplinary one, other gains are assumed to be zero. That is, $\Delta V_{it}^j = 0$, where $\widehat{\theta}_{it} = 0, \theta_{jt} = 1, \ s_{it}^j = 0, \omega = 0$. Since the management labor market is assumed sufficiently efficient, or the management entrenchment scheme is various across firm, expected minimum operational slack by other management team is zero.

The agent will choose a_{jt}^* such that $\Delta V_{it}^j(a_{jt}^*) = 0$ where $\widehat{\theta}_{it} = 0, \theta_{jt} = 1, \ s_{it}^j = 0, \omega = 0$.

$$\Delta V_{it}^j = \frac{1}{(1+\kappa^j)} p(k_{it}, q_{it})\widehat{\theta}_{it} + \frac{\kappa^j}{(1+\kappa^j)} \left\{ p(k_{jt}, q_{it})\widehat{\theta}_{jt} + g(k_{jt}, a_{jt} - Min\{a_{it}\})\theta_{jt} - \epsilon_{it} \right\} + s_{it}^j$$

$$\Leftrightarrow g(k_{jt}, a_{jt} - Min\{a_{it}\}) - \epsilon_{it} = 0$$

$$\Leftrightarrow g(k_{jt}, a_{jt} - Min\{a_{it}\}) = \epsilon_{it}$$

$$(Min\{a_{it}\} = 0)$$

$\Rightarrow$ Agent will choose a_{jt}^* such that $g(k_{jt}, a_{jt}) = \epsilon_{it}$.

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