

Cross-sectional Stock Returns on Fundamental Value vs. Market Value in Mergers and Acquisitions: Evidence from Japan

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Abstract

This study looks at the difference between the fundamental value and the market value of firms during the merger and acquisition process, and investigates the role of that difference on the method of payments (cash vs. stock) and on the subsequent stock performance around the merger and acquisition (M&A) announcement date. The number of M&A transactions has dramatically increased since the stock swap and stock transfer schemes were introduced in 1999. We investigate the scenario that managers who specialize in analyzing the corporate value of the firms possibly shorten the value correction time and partially reduce misvaluation in the capital market. The Means of Payment hypothesis suggests that the managers should choose stock payment over cash payment when the acquiror is over-valued in the market. However, we found that Japanese managers more positively use cash payment when the firm has sufficient financial slack (is cash rich). The Misvaluation hypothesis suggests that positive excess returns of the acquiror could be detected around the announcement day of M&A transactions, when the acquiror and/or the target is/are under-valued in the market. We found strong evidence which supports the Misvaluation hypothesis. In calculating the fundamental value of the firms, we employed the Residual Income Model, using financial analysts forecast value of future profits, after controlling the book-to-market ratio. We found strong evidence which supports the Misvaluation hypothesis. In particular, the hedging portfolio strategy supports the long position of the acquiring firms (M&A transactions are categorized as high acquiror's valuation-high target's valuation group) and simultaneously holds the short position of the acquiring firms (M&A transactions are conversely categorized as low acquiror's valuation-low target's valuation group). This combination shows more persistent and more positive abnormal returns than the long position strategy of simply holding acquired stock after all M&A transactions. However, the simple long position strategy in Japan is still positive, when compared to the US.

Keywords

Merger and acquisitions, Means of Payment hypothesis, Misvaluation hypothesis, Fundamental value, Residual income model

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Introduction

(1) Purpose

This study investigates the difference between the fundamental value and the market value of firms (Misvaluation) when mergers and acquisitions (M&A) have occurred and examines the subsequent effects on cross-sectional stock returns. The number of M&A transactions has dramatically increased since the revision of the corporate law, such as the introduction of the pure holding company (corporate law revision 1997), the stock swap and stock transfer schemes, and the corporate divestiture scheme (corporate law revision 1999; 2000). In particular, the effect of the stock swap and stock transfer schemes (which were introduced to achieve the smooth shift to the holding company and to establish the relationship between the 100% parent and subsidiary company) is remarkable. This resulted in the number of M&A transactions increasing from 669 in 1998 to 1,251 in 2001¹ [Source: Marr M&A data CD-ROM by Recof Ltd.] In the late 1990s, Japanese firms greatly relied on funding from banks, but after the stock swap schemes, many firms shifted from bank funding to stock issuance. At this time, there was a severe financial crisis which caused changes in corporate law.

This context stimulated activity in the M&A market. A shift in financing from lending (especially from main banking) to direct funding from a capital market was much needed, particularly in the environment of financial distress resulting from the disposal of bad loans by financial institutions. Large shareholders require the managers of the firms to maximize the firms' value far more than creditors do. Firms have to 'select and focus on' their business and carefully allocate their resources in order to be more efficient and to maximize their value. In these cases, M&A and spin-off transactions are utilized as enhancement methods to shorten the 'select and focus' process, as opposed to restructuring the business internally.

Within an active M&A market, larger shareholders, especially investment fund holders, increased their managerial participation. For instance, the number of buy-outs by investment funds was 31 (total transaction value was 2,292 billion yen) in 2001; 76 (total value was 9,225 billion yen) in 2006; and 86 (total value was 655.9 billion yen) in 2007; where the cumulative total number stood at 395 (total value was 40,939 billion yen) since the first occurrence of an investment by a buy-out fund in 1998 [Source: Japanese buy-out research institute Ltd.]

The increase in activity in such an M&A market increases the possibility of shortening the value correction time and partially reducing misvaluation in the capital markets. Therefore, investment funds analysts whose main business concerns corporate value,

¹ The Business Accounting Council issued a new Accounting Standards for Business Combination on October 31, 2003, which has been executed since the business fiscal year that begins after April 1, 2006. The number of the transactions of merger and acquisition reached a new high of 1,897 (total value was 1,174 billion yen) in 2006.

have much more information (including information sourced from managers of the firms who strengthen the core business) than the capital markets. Their influential position gives these analysts an advantage over individual investors, because analysts have better access to management and more opportunity to listen to management decisions. Also, these analysts play a significant role in correcting the misvaluation of the corporate market value, even more accurately than was previously imagined.

Our study investigates the difference between the fundamental value and the market value of firms (Misvaluation) when mergers and acquisitions (M&A) have occurred and their subsequent effects on cross-sectional stock returns. We examined the following two aspects:

The first aspect concerns the managers' decision of payment method (cash vs. stock). They take the discretionary viewpoint focusing on misvaluation (the difference between the fundamental value and the market value of the firm). For example, if in executing M&A the managers take into consideration the fundamental value of their own and target firms, and their own stock is over-valued or the target firm's stock is under-valued, then stocks will be positively used as the payment in M&A.

The second aspect is whether the investors will be able to profit after the M&A has occurred. If the investors supports the long position of the acquiring firms, where M&A transactions are categorized as high acquiror's valuation and/or high target's valuation group, and hold the short position of the acquiring firms, where M&A transactions are conversely categorized as low acquiror's valuation and/or low target's valuation group, this comprises a successful investment strategy.

In this paper, the Means of Payment hypothesis and the Misvaluation hypothesis were investigated by focusing on the short-term abnormal return of the M&A transactions in Japan. The fundamental value was calculated according to the Residual Income Model (RIM), a typical corporate valuation model, using stockholders' equity value and the expected future net income of the firm's value.

(2) Composition

The composition of this paper is as follows:

Section 2 reviews the previous research on short-term stock performance of M&A transactions. It discusses the short-term stock performance following those transactions, including the performance comparisons between payment methods (cash vs. stock), from 1996 to 2007.

Section 3 shows the Means of Payment hypothesis and the Misvaluation hypothesis regarding M&A transactions.

Section 4 gives a general view of our data sample, data characteristics, and the method of estimating the fundamental value of the firm.

Section 5 presents the results of our investigation of the influence of M&A transactions

on the payment of transactions (cash vs. stock) and the subsequent cross-sectional stock returns by univariate and multivariate tests.

Section 6 reports additional results of subsequent cross-sectional stock returns constructed from the hedging portfolio strategy following V/P ratio (Fundamental value to Market value ratio).

Section 7 illustrates our main conclusions and future research goals that are not included in this paper.

1. Short-term stock performance of M&A transactions

(1) Previous research of Short-term stock performance of M&A transactions

In the US, the measurement of the economic effect of M&A information has been thoroughly investigated with event study methodology for more than thirty years. S. Jensen and Ruback (1983) surveyed previous research of successful sample M&A transactions in sample periods from 1962 to 1979. They reported the following short-term excess returns occurred around M&A announcements. For target firms, the announcement effect for two days around the announcement day was 7.72% on average, whereas the announcement effect for one month is 15.90% on average. For the acquiring firms, the announcement effect for two days around the announcement day was -0.05% on average, and the announcement effect for one month was 1.37% on average.

Regarding acquiring firms, a significant excess return has not been reported prior to 1983, except for Asquith, Bruner, and Mullins (1983), who reported an average excess return of 3.48% for a one month period, during the sample period from 1963 to 1979. If we expand the sample periods to the 1990s, we find that Andrade, Mitchell, and Stafford (2001), using the sample period from 1973 to 1998, reported a significantly positive average excess return of 16.0% around the announcement day (-1, +1) for the target firms. However, there was an insignificantly average negative excess return of -0.7% around the announcement day (-1, +1) for acquiring firms. Andrade, Mitchell, and Stafford reported that acquiring firms paid a high M&A premium (the median was 37.9%) from 1973 to 1998 in the U.S. Also, taking into consideration the high M&A premium in the U.S., we may conclude that the shareholders of the target firms receive exclusive benefits of the short-term stock appreciation that occurs around M&A transactions.

In Japan, the number of M&A transactions was far lower than in the U.S., until the early 1990s. Pettway and Yamada (1986), examined sixty-six M&A transactions in the period 1977 to 1984 and reported an insignificantly negative excess return (-0.07% on average) around the announcement day (-1, +1) for the target firms. There was also an insignificantly positive excess return (0.82% on average) around the announcement day (-1, +1) for acquiring firms. Usui (2001) examined the period of 1989 to 1999 and reported an average positive excess return of 4.08% (10% significant level) around the announcement day (-1, +1) for the target

firms, as well as an average positive excess return of 1.62% (10% significant level) around the announcement day (-1, +1) for acquiring firms. His sample period included a much larger number of M&A transactions than Pettway and Yamada (1986). Similarly, Inoue (2002), examining the period 1990 to 2002, also reported an average positive excess return of 4.37% (10% significant level) around the announcement day (-1, +1) for the target firms, as well as an average positive excess return of 1.51% (10% significant level) around the announcement day (-1, +1) for acquiring firms.

(2) Measurement of the economic significance of the M&A transaction

In this paper, we adopted standard event study methodology to measure the economic effect of an M&A announcement on the acquiring firms, the target firms, and on the total economic wealth of the acquirer and target firms. Table 1 shows Cumulative Abnormal Return (CAR, equal-weighted) for various periods around the announcement day, given as (0), of the M&A, including 372 M&A transactions in the period January, 1996 to October, 2007 [Source: Recof Ltd. MARR M&A data CD-ROM]. The sample includes merger bids and tender offers in which both acquirer and target were listed on the Japanese Stock Market in order to eliminate small cases. We excluded cases where either acquirer or target was a financial institution, or cases with a bailout takeover where the transaction was a result of the target being in financial distress, etc.

According to Fuller, Netter, and Stegemoller (2002), the abnormal returns of the acquirer and target were calculated by the market adjustment model based on NYSE index data; in our study, we used the Topix indicator as a market portfolio. Regarding acquirors, we found on average short-term positive abnormal returns for the following time periods: 1.49% (1% significant level) around the announcement day (-1, +1); 1.20% (5% significant level) around the announcement day (-3, +3); and 1.35% (1% significant level) on around the announcement day (-5, +5). If we extend the announcement period from (-1, +1) to (-1, +3) or (-1, +5), the short-term positive abnormal returns worsened to 1.00% and 0.95% respectively. This means that investors over-reacted immediately after the M&A announcement.

Focusing specifically on tender offers, we found the following positive abnormal returns: 1.40% (1% significant level) around the announcement day (-1, +1); 1.57% (5% significant level) around the announcement day (-3, +3); and 0.79% (1% significant level) around the announcement day (-5, +5). Unlike M&As, we found that the announcement effect persisted for tender offers. The abnormal return of 1.40% around the announcement day (-1, +1) does not diminish. If we extended the period from (-1, +1) to (-1, +5), the positive abnormal return was maintained at the level of 1.50% (5% significant level).

Regarding targets, we found short-term positive abnormal return of 7.16% (1% significant level) on average around the announcement day (-1, +1), 7.82% (1% significant level) on average around the announcement day (-3, +3), and 8.10% (1% significant level) on average around the announcement day (-5, +5). These returns are considerably larger than those of

acquiring firms. These results show that stockholders of the target firms substantially benefit more than those of the acquiring firms. However, the total amount of the economic wealth for the holders of the acquiring and target firms is much less than that of U.S. We are emphatic on the importance of the fact that the holders of the acquiring firms also benefits from the M&A transactions, whose amount is much less than that of the target firms, contrary to the cases in the U.S., where the holders of acquiring firms are toppled down by the M&A transactions on average. We also found the persistency of the announcement effect in targets, as in acquirors of tender offer cases. The abnormal return 7.16% around the announcement day (-1, +1) does not decay, if we prolong the period from (-1, +1) to (-1, +5). The positive abnormal return 6.82% (1% significant level) around the announcement day (-1, +1) and 6.52% (1% significant level) are approximately the same level with, slightly less than, that of around (-1, +1). We could also find the positive abnormal returns of targets are caused mostly from the tender offer cases. In more friendly merger bids, we found the positive significant abnormal return 2.09% (10% significant level) only around the announcement day (-1, +1). On the other hand, in less friendly tender offers, we found the considerably larger positive abnormal returns over 10% in the various periods. These results are consistent with the economic intuition that the acquiring firms, especially in hostile tender offers, have to pay a larger portion of premiums to the stockholders of the targets.

In Japan, the number of M&A transactions has dramatically increased since the late 1990s. So, we have included late data from the 1990s in our sample period, the same as Usui (2001) and Inoue (2002) did, and we also found the similar results: that the short-term increase of stockholders' equity value is shared between the stockholders of the acquiror and target in Japan, contrary to what occurs in the United States. However, we also found that the increase of the stockholders' value of the target firm is much less than that of the U.S. One possible reason is that hostile tender offers are rarely seen in Japan, so the M&A premium in Japan is much lower than in the U.S. Our sample M&A premium is 2.43% (in medium), narrows our sample to tender offer cases, tender offer premium 5.13% (in medium).

(3) Payment method of M&A (cash vs. stock) and measurement of economic significance

The managers should positively use their own stocks as a payment of M&A transactions, when their stocks are priced higher than the fundamental value, from the view point of discretionary use of payment (cash vs. stocks). In this case, we could suppose that the short-term stock performance following stock payment transactions would be negative around the announcement day for acquiring firms. On the other hand, the managers should positively use cash as a payment of M&A transactions, when their stocks are priced reasonably or lower than fundamental value, from the view point of discretionary use of payment. In this case, we could suppose that the short-term stock performance would be positive around the announcement day for acquiring firms.

The negative short-term stock performance following stock payment M&A transactions and positive short-term stock performance following cash payment M&A transactions are consistent with the view point

of discretionary use of payment in the U.S. (Travlos, 1987; Louis, 2004). Travlos (1987) reported a significantly negative excess return of -3.94% following stock payment M&A transactions on average, and an insignificantly positive excess return of 0.25% following cash payment M&A transactions on average around the announcement day (-1, +1) for the acquiror from 1972 to 1981. Louis (2004) also reported a negative excess return of -2.28% (1% significant level) following stock payment M&A transactions on average, and a positive excess return of 0.44% (10% significant level) following cash payment M&A transactions on average around the announcement day (-1, +1) for the acquiror from 1992 to 2000, similar to the results of Travlos (1987).

On the other hand, the results of previous research in Japan are not consistent with the view point of discretionary use of payment. Inoue (2002) reported a positive excess return of 1.8% (10% significant level) following stock payment M&A transactions on average, and an insignificantly positive excess return of 0.1% following cash payment M&A transactions on average around the announcement day (-1, +1) for the acquiror from 1990 to 2002.

Table 1 shows the results of the short-term stock performance following M&A transactions, including the performance comparisons between payment methods (cash vs. stock), from 1996 to 2007 (excluding the transactions in which either or both acquiror and target are financial institutions, or the transaction involves a bailout takeover as a result of the target being in financial distress etc.). We could not detect the discretionary use of cash/stock from our sample period, as in Inoue (2002). Stock payment is used in all merger bids cases in our sample (see footnote in Table 2), so we focus on the comparisons between payment methods of tender offers. Regarding the acquiror CARs, we found that the positive abnormal returns of tender offers are caused only from the stock payment cases, not from the cash payment cases. Narrowing all tender offer cases down into the stock payment cases, the positive abnormal returns leaped from 1.40% to 2.47% (1% significant level) around the announcement day (-1, +1), from 1.57% to 3.41% (1% significant level) around the announcement day (-3, +3), and from 0.79% to 3.25% (1% significant level) around the announcement day (-3, +3), respectively. On the contrary, we could not find any significant positive signs of the cash payment tender offers. We only found an insignificant positive excess returns excess return of 0.33% on average around the announcement day (-1, +1), 0.36% around the announcement day (-3, +3), and 1.12% around the announcement day (-5, +5) for the acquiror in the cash payment cases.

Finally, turning our view points to target CARs, we found the positive significant abnormal returns over 10%, both in stock payment cases and cash payment cases. This result shows a striking contrast to the acquirors, where the positive abnormal returns of tender offers are caused only from the stock payment cases, not from the cash payment cases.

2. Means of Payment hypothesis and Misvaluation hypothesis

Regarding the influence of M&A on the stock performance, the positive effect of the disciplined management and the negative effect of the agency problem have been pointed out by previous research so far. Inoue (2006) reported that the disciplined management includes the following two economic effects: The first is a synergy effect that increases the efficiency of management by the economies of scale, the

economies of scope, and the acquisition of new technologies. The second is an effect of narrowing the rule of management. Basically, narrowing the constituent management into two groups is useful. There are managers who have strategies that increase corporate values which are beneficial to existing stockholders, but we should remove and exclude opportunistic behavioral managers to improve the efficiency of management. On the other hand, a negative effect has also been reported repeatedly by previous research. Representative negative effects are free cash flow problems (Jensen, 1986) and manager's entrenchment behavior (Shleifer and Vishny, 1986). They pointed out that the managers make use of M&A transactions as a means of pursuits of the manager's private profit: Managers tend to invest free cash flows in inefficient assets (overinvestment), or search for target firms to strengthen their managerial powers. The positive short-term excess return overviewed in Section 2 might be explained to some degree by the strength of these positive effects over negative ones. However, since the early 2000s, a lot of research in the U.S. has reported the evidence that M&A transactions were driven by the discretionary view point of managers which focus on the difference between the fundamental value and the market value of its firms.

(1) Means of Payment hypothesis

Shleifer and Vishny (2003) reported that managers have an incentive to increase the stockholder value by acquiring relatively under-valued companies through the payment of their own stock, when their own stocks are over-valued in the stock market. In these cases, the subsequent stock performance after the M&A transactions would be negative. On the other hand, the managers have the incentive to use the cash payment, when their own stocks are reasonable or under-valued in the stock market. In these cases, the subsequent stock performances after the M&A transactions would be positive.

They concluded that the managers attempted to increase their stockholders' value: Positively acquiring the relatively under-valued target firms and using the stock payment when their own stocks are relatively over-valued in the capital market, and positively using the cash payment when their own stocks are relatively under-valued in the capital market. They call these phenomenon as stock market driven acquisitions, and their assertion is widely known as Means of Payment hypothesis.

[Means of Payment Hypothesis]

The managers positively use the stock payment when their own stocks are relatively over-valued in the capital market. On the other hand, they positively use the cash payment when their own stocks are reasonable or relatively under-valued in the capital market.

Shleifer and Vishny (2003) used book value in place of fundamental value of the firm, whereas Dong, Hirshleifer, Richardson, and Teoh (2006) calculated the fundamental value of the firm by they calculated the fundamental value of the firms by using the Residual Income Model (RIM, detailed methodology is shown in Section 4 (2)). They reported the evidence that the managers execute the M&A transactions by focusing on the difference between fundamental and market value. In particular, they insisted that the cases of which both the acquiror and the target are under-valued in the market drive M&A transactions and reduce Misvaluation in the capital market. Their insistence is widely known as following the Misvaluation hypothesis.

(2) Misvaluation hypothesis

Frankel and Lee (1998) had the pioneering research that reported a positive long-term excess return by following the investment strategy constructed by hedging portfolio using RIM² with the sample of the U.S. M&A transactions, of which the sample period was from 1975 to 1993. They estimated the fundamental value of the firm by using the forecast value of the future profit and the long term growth rate by financial analysts in the I/B/E/S data base for RIM, and constructed quintile portfolios sorted by the V/P ratio. In this case, we could estimate that the fifth portfolio (the highest V/P ratio) is the most under-valued one and subsequent stock performance is the highest, and the first portfolio (the lowest V/P ratio) is the most over-valued one and subsequent stock performance is the lowest. They reported that a cumulative buy-and-hold return of hedging portfolio (long-short portfolio) strategy which holds the long position of the fifth portfolio (the highest V/P ratio) and simultaneously holds the short position of the first portfolio (the lowest V/P ratio) out-performs that of a similar hedging portfolio strategy of which benchmark was B/P ratio. They also reported that a cumulative buy and hold return of hedging portfolio based on the V/P strategy out-performs that of a similar hedging portfolio strategy, of which a benchmark was sizable (market value). In Japan, previous research also reported a positive long-term excess return by following the investment strategy constructed by hedging portfolio using RIM, similar to Frankel and Lee (1998). Okumura and Yoshida (2000) estimated the fundamental value of the firm by using the forecast value of the future profit and the long term growth rate by financial analysts in the I/B/E/S data base for RIM, Suda and Takehara (2005) estimated by substituting the forecast value of the future profit by financial analysts in Toyo Keizai data base for RIM, and Muramiya (2008) estimated by using the forecast value of the future profit by the managers as disclosed in the earnings announcement for RIM.

[Misvaluation hypothesis]

The difference between fundamental value and the market price has an impact on the following stock performances of both the acquiror and the target. The more under-priced both the acquiror and the target are in the market, the higher the stock performances of both firms around the announcement day of M&A transactions.

So, turning our view points to short term returns, we show another result. Dong, Hirshleifer, Richardson, and Teoh (2006) showed the evidence with the sample of the U.S. M&A transactions which support the Misvaluation hypothesis, of which the sample period is from 1998 to 2000. They calculated the fundamental value of the firm by using RIM and showed that the V/P ratio (fundamental value to market value) has an explanatory power after controlling the B/P ratio (book value to market value). In conclusion, they confirmed that V/P ratio, which shows what degree the market misprices the stock's intrinsic value, is not substituted for B/P ratio perfectly, and has the additional explanatory power to predict a future stock performance following the M&A transactions.

² Dechow, Hutton, and Sloan (1999) and Lee, Myers, and Swaminathan (1999), etc also reported the results of investment strategy following this V/P anomaly.

3. Characteristics of sample data and methodology

(1) Characteristics of sample data

Our study focuses on the payment method (cash vs. stock) and the short-term stock returns of both the acquiror and the target around the announcement day of M&A transactions, and tests the hypotheses addressed in Section 3. Our sample includes 142 months M&A transactions from January 1996 to October 2007, available in the database of RECOF MARR CD-ROM, where transactions satisfy the following criteria:

- (a) Neither cases where either acquiror or target was a financial institution, nor a bailout takeover where the transaction was as a result of the target being in financial distress etc.
- (b) Both acquiror and target were listed in the stock exchange in order to eliminate small cases.
- (c) The payment method of the M&A transaction (cash or stock) was identified by Nikkei Telecom 21 by Nikkei Newspaper digital Ltd. or Marle M&A data CD-ROM by Recof Ltd.
- (d) To calculate B/P ratio, financial data and stock price data was available from the Nikkei NEEDS-Financial QUEST by Nikkei Media Marketing, Inc.
- (e) To calculate V/P ratio, the financial analyst forecast value of the future profit was identified by the I/B/E/S or Toyo Keizai data base, and financial data and stock price data was available from the Nikkei NEEDS-Financial QUEST by Nikkei Media Marketing, Inc. Moreover, to calculate the cost of the equity capital of a firm, we need at least 24 months or more of monthly returns of the firm.

Table 2 shows our sample characteristics by calendar year. Focusing on tender offer cases, these numbers have dramatically increased from single digits to double digits, after stock swap and stock transfer schemes were introduced in 1999. Especially since 2002, a number of them has been constantly recorded at over 30. Paying attention to the methods of payments, all of the merger bid cases in our sample used stock payment methods, which is totally different from the U.S. cases. Firms which used the stock payment method had been much larger than firms which used the cash payment method in six years after stock swap and stock transfer schemes were introduced. However, the cash payment method has also increased to above 20 in the recent three years. Focusing on the tender offer cases, the latter has been larger than the former since 2005. Market equity (=firm size), book-to-market ratio, leverage, and ROE are calculated as of the base date: Stock price data is based on the announcement day of M&A, and financial data is based on the closest day available after the financial analysts' forecast being renewed. Regarding the firm sizes, the medium ¥128,507 billion of the acquiror is 12.36 times as the medium ¥9,245 billion of the target. The acquirors of our sample are composed of considerably big stocks, contrary to the medium size ¥15,342 billion of all the listed firms. Regarding the book-to-market ratio, the medium of the acquiror is 0.7207, and that of the target is 1.0515. Regarding financial leverage, the medium of the acquiror is 0.6468, and that of the target is 0.6038. Regarding ROE, the medium of the acquiror is 4.84%, and that of the target is 2.91%. The book-to-market is widely interpreted as the proxy variable of the firm's growth. The medium 0.7207 of the acquiror is much less than the medium book-to-market ratio 1.119 of all the listed firms, and the

medium ROE 4.84% of the acquiror is much higher than the medium ROE 3.93% of all listed firms. Therefore, the acquirors in our sample are composed of firms that are highly profitable and have the characteristics of growth stocks (i.e., low book-to-market stocks), in other words, possessing high qualified growth opportunities.

Table 3 also shows our sample characteristics by industry. The distribution of acquiror's industry had a bias to services (15.79%), retail trade (10.88%), electric & electric device (9.82%), and wholesale trade (9.47%). These four industries outdistanced others by a great number. Construction (5.96%) and foods (5.61%) were followed by four high ranked industries. In the service, retail trade, and food industries non diversification deals completely overwhelm diversification ones. On the other hand, in electric & electric devices, wholesale trade, and construction industries, and the former cases were almost the same as the latter ones.

(2)The Residual-Income Valuation Model

Dividends are the net distribution of value to the common stockholders, so a stock's intrinsic value is typically defined as the dividend discount model (DDM), which expresses the present value of its expected future dividends based on all currently available information set. Denoting the stock's intrinsic value at date t as V_t , this means that

$$V_t = \sum_{i=1}^{\infty} \frac{E_t(D_{t+i})}{(1+r_e)^i}$$

where

$E_t(D_{t+i})$ = the expected future net dividends paid for the period ending at date $t+i$,

r_e = the cost of equity capital,

Ohlson (1995) and Feltham and Ohlson (1995) demonstrates that, if the accounting system satisfies the 'clean surplus relation',

$$B_{\tau} = B_{\tau-1} + NI_{\tau} - D_{\tau}, \tau = 1, \dots$$

where

B_t = the book value of common equity at date t ,

NI_{t+i} = the net income attributable to common equity for the period ending at date $t+i$,

D_t = the net dividends paid for the period ending at date t ,

DDM can be rewritten as the current book value plus an infinite total of discounted residual income, described as the residual income model (RIM) as follows:

$$\begin{aligned} V_t &= B_t + \sum_{i=1}^{\infty} \frac{E_t[NI_{t+i} - (r_e * B_{t+i-1})]}{(1+r_e)^i} \\ &= B_t + \sum_{i=1}^{\infty} \frac{E_t[(ROE_{t+i} - r_e) * B_{t+i-1}]}{(1+r_e)^i}, \end{aligned}$$

where

B_t = the book value of common equity at date t ,

$E_t[\cdot]$ = the expectations operator at date t ,

NI_{t+i} = the net income attributable to common equity for the period ending at date $t+i$,

r_e = the cost of equity capital,

ROE_{t+i} = the after-tax return on common equity for the period ending at date $t+i$.

The equation expresses the firm's intrinsic value in terms of infinite series, but we must specify an explicit forecast period to apply RIM in practice, where it is absolutely necessary for us to estimate a 'terminal value' – an estimate of the firms' value based on the residual income earned after the explicit forecasting period. Lee et al. (1999) reports the predictive power of V_t estimates using three different forecast horizons beyond 3 years, where V_t estimates is not sensitive to the number of the forecast periods and the choice of the cost of equity capital. Then we use three period forecast horizons following Dong et al. (2006),

$$V_t = B_t + \frac{E_t[(ROE_{t+1} - r_e) * B_t]}{1 + r_e} + \frac{E_t[(ROE_{t+2} - r_e) * B_{t+1}]}{(1 + r_e)^2} + \frac{E_t[(ROE_{t+3} - r_e) * B_{t+2}]}{(1 + r_e)^2 * r_e},$$

where

B_t = the book value of common equity at date t ,

$E_t[\cdot]$ = the expectations operator at date t ,

r_e = the cost of equity capital,

ROE_{t+i} = the after-tax return on common equity for the period ending at date $t+i$,

and the last term discounts the period $t+3$ residual income as a perpetuity.

Forecast ROEs are calculated as

$$ROE_{t+i} = EPS_{t+i} / \bar{B}_{t+i-1},$$

where

EPS_{t+i} = the forecasted earnings per share (EPS) for the period ending at date $t+i$,

$$\bar{B}_{t+i-1} = (B_{t+i-1} + B_{t+i-2}) / 2,$$

We assume that the firm's book value increases with a sustainable growth rate, then the future book values of common equity at date $t+i$ are calculated as

$$B_{t+i} = B_{t+i-1} + (1 - k)EPS_{t+i},$$

To estimate the sustainable growth rate k , RIM calls for an estimate of the expected proportion of earnings to be paid out in dividends. We estimate this ratio by dividing actual dividends from the current fiscal year by the same time period;

$$k = \frac{D(t)}{EPS(t)}.$$

We exclude stock repurchases due to the practical problems associated with determining the likelihood of their occurrence in the future periods, following Lee et al. (1999). For firms with negative earnings for period t , we divide the dividends paid by (0.06 stockholders' equities) to derive an estimate of payout ratio³.

³ The long-run return-on-equities (ROE) in Japan is approximately 6%. Therefore we use 6% of ROE as a proxy for normal earnings levels when current earnings are negative. Lee et al. (1999) and Dong et al. (2006) use 6% of return-on-total-assets, which is approximately the same as the long-run performance of the United States, as a proxy for normal earnings levels when current earnings are negative.

(3) Estimation of the cost of equity capital

The cost of equity capital r_e each firm (annual rate) is estimated by Capital Asset Pricing Model (CAPM). β at the time of t is estimated by monthly base, where the estimation window is 60 months (from 60 months to 1 month before the announcement day). We require that at least the stock prices from 24 months preceding the announcement day are available. The average risk premium of Topix is 4.4% (annual rate) for 30 years, from January 1976 to December 2005 [Source: Stocks risk premium report of Japan (version in fiscal year 2006) by Ibbotson associates Japan Ltd.]. Therefore, we assume the risk premium of the market portfolio as 4.4% to estimate the cost of equity capital of each firm.

4. Results of our univariate and multivariate tests

(1) Equity valuation and univariate test

Our study estimated the fundamental value of the firm by using the forecast value of the future profit and the long term growth rate by financial analysts in the I/B/E/S data base (or Toyo Keizai data base if the forecast value is not available in the I/B/E/S data base) for RIM. Table 4 shows the V/P ratio (fundamental value to market value ratio) and B/P ratio (book-to-market ratio) of both acquirors and targets. This includes comparisons between various financial attributes and CARs by the modes of the offers (merger bids and tender offers) by consulting Nikkei Telecom 21 by Nikkei Newspaper Digital Ltd. or Marr M&A data CD-ROM by Recof Ltd. This includes comparisons between various financial attributes and CARs by the modes of the offers (merger bids and tender offers). We identified the payment methods (cash vs. stock) of 351 transactions within our sample by consulting Nikkei Telecom 21 by Nikkei Newspaper digital Ltd. or Marr M&A data CD-ROM by Recof Ltd. We calculated V/P ratios for 372 cases by using the financial analyst forecast value of the future profit and estimating the cost of equity capital by CAPM. Our sample required that both acquiror and target were listed in the stock exchange in order to eliminate small cases. All of the merger bid cases in our sample used stock payment methods.

Using univariate tests, we investigated the statistical differences of various financial attributes and CARs between the low V/P rank group and the high V/P rank group of both acquirors and targets. Table 3 summarizes the results of the differential test of mean values. We reported t values assuming independent samples.

(2) Univariate test of V/P ratio rank of the acquirers

First, we focused on the difference of the acquiror's financial attributes between the low V/P ratio rank group and the high V/P ratio rank group of the acquirors of all cases, and we treated tender offers cases separately.

Our main concern was to see if the V/P ratio was significant after controlling the B/P ratio. We found that if the acquiror's V/P ratio is high, then the B/P ratio is also high (10% significant level), although the correlation (14.26%) between these ratios is not very high. We conclude that V/P and B/P are somewhat correlated, but only marginally.

The mean ROE of high groups (14.07%) is considerably higher than the mean ROE of low groups

(-3.37%) at only the 10% significant level. Economic intuition suggests that if the current ROE is high, then the expected ROE may be high too, and some firms may be left under-valued.

The mean liquidity of high groups (12.29%) is also considerably higher than the mean liquidity of low groups (7.54%), which is significant at the 1% level. High ROE is strongly correlated with high liquidity in our sample. Liquidity in our study is defined as operating income plus depreciation minus interest, taxes, and all dividends, as a ratio to total assets; this definition is typical of the accounting area and emphasizing the cash flow viewpoint. We also found that on average, the under-valued firm (high V/P ratio firm) is inclined to have a sufficient financial slack.

On the other hand, the mean cash ratio of high groups (10.38%) is lower than the mean cash ratio of low groups (14.79%), significant at the 1% level. The Cash ratio is defined as cash equivalent plus short-term investments, as a ratio to assets. In general, B/P ratio is regarded as the best predictor of the firm's growth potential. We would predict that the firm with high growth potential (low B/P ratio firm) has an advantage in future investment opportunities because they are cash rich and have fewer financial constraints.

Secondly, we focused on the difference of the target's financial attributes between the low V/P ratio rank group and the high V/P ratio rank group of the acquirors. Despite the different financial attributes of acquirors, the targets financial attributes do not vary significantly between the low group and the high group.

Thirdly, we focused on the difference of probability of cash payment between the low V/P ratio rank group and the high V/P ratio rank group of the acquirors. In our sample, payment methods of merger bids were all stock payments; therefore, we limited our analysis to tender offer cases. The probability of cash payment by the low group (48.19%) is lower than the probability of cash payment by the high group (54.41%), but this difference is not significant. The Means of Payment hypothesis suggests that the managers should select stock payment when their own stock is over-valued in the market. This result is inconsistent with the predicted direction of the Means Payment of Hypothesis, but not significantly so. We address the results of the multivariate test of the Means of Payment hypothesis (after controlling explanatory variables) in the next section.

Finally, we focused on the difference of various CARs between the low V/P ratio rank group and the high V/P ratio rank group of the acquirors. For example, the mean acquiror CAR (-3,+3) -0.38% and the mean acquiror CAR (-5,+5) -0.09% of the low group are significantly lower than the corresponding values for the high group (2.47% and 2.37%) and are significant at the 5% and 10% levels, respectively. For nearly all of the various periods, our sample showed that the stockholders of the acquirors typically benefit from M&A transactions when acquirors are under-valued, which is consistent with the Misvaluation hypothesis.

(3) Univariate test of V/P ratio rank of the targets

First, we focused on the difference of the acquirors' V/P ratio between the low targets' V/P ratio group and the high targets' V/P ratio group. The mean acquirors' V/P ratio of low targets' V/P ratio group (1.0476) is significantly lower than of high targets' V/P ratio group (1.2512), which is only significant at the 10%

level. The mean targets' V/P ratio of the low acquirors' V/P ratio group (0.9958) is lower than the high targets' V/P ratio group (1.1378), but not significantly so. We predict that, in general, relatively under-valued acquirors positively search for relatively under-valued targets in Japan, which is similar to the conclusion pointed out by Shleifer and Vishny (2003) that misevaluation drives mergers and acquisitions in the U.S.

Secondly, we focused on the difference of the acquiror's financial attributes between the low V/P ratio rank group and the high V/P ratio rank group of the targets. The mean liquidity of the low group (9.76%) is considerably higher than the mean liquidity of the high group (7.75%), which is significant at the 10% level. This result suggests that, on average, firms with low accounting cash flow positively search for under-valued target firms (high V/P ratio firms).

Thirdly, we focused on the difference of the targets' financial attributes between the low V/P ratio rank group and the high V/P ratio rank group of the targets. Regarding the B/P ratio, the higher the V/P ratio of the target, the higher the B/P ratio of the target (5% significant level), although the covariance (18.90%) between these ratios is not so high. Moreover, ROE of all groups are negative. This means that firms with low profitability could be targets of an acquisition. The mean liquidity of the low group (4.24%) is considerably lower than the mean liquidity of the high group (9.05%), significant at the 1% level. Additionally, the mean E/P of low groups (-0.1116) is considerably lower than the mean E/P of high group (0.0123) which is significant at the 10% level. The under-valued firms' financial attributes are inclined to include a sufficient financial liquidity and a comparably high E/P.

Finally, we focused on the difference of the various CARs between the low V/P ratio rank group and the high V/P ratio rank group of the targets. In our sample, all period CARs of the acquirors and the targets, both separately and together, are significantly higher in the high group than the low group, which is consistent with Misvaluation hypothesis. For example, the mean acquiror CAR (-3,+3) 2.87%, the mean target CAR (-3,+3) 10.44%, and both the mean acquiror and target CAR (-3,+3) 13.36% of the high group are significantly higher than the respective values of the low group (-0.29%, 5.54%, and 5.21%) at the 1%, 5%, and 10% significance level, respectively. Regarding total wealth from M&A transactions, existing stockholders of acquirors and targets of the under-valued target group amazingly obtained 8.14% more than those of the over-valued group. In our univariate test, the explanatory power of the Misvaluation hypothesis is much stronger for the target V/P ratio than for the acquiror V/P ratio. The reason could be partially attributed to the size of the target firms. In our sample, the target firms' size is less than one tenth of the acquiror's size (Table 2). Investors who specialize in analyzing corporate valuation might not cover all the firms, and may pay less attention to smaller firms; therefore the smaller firms are more likely to be under-valued. Following M&A transactions, investors carefully monitor the stock values and consequently, misvaluation in the capital market diminishes.

(4)Equity valuation and multivariate regressions

(4-1) Payment Methods (Cash vs. Stock) and Means of Payment Hypothesis

Table 5 shows the results of logit multivariate regression. The Payment Method hypothesis may be

tested by examining the relationship between the V/P ratio and payment methods (cash vs. stock) after controlling other variables. The independent variable was payment method and the dependent variable was B/P ratio. In Table 5, we included the following control variables: B/P ratios of both the acquiror and the target, acquiror's liquidity, acquiror's cash ratio, diversification Dummy, log of relative equity, acquiror's log of equity, target's log of equity, and acquiror's financial leverage, in this order. The other possible variables (such as ROE and E/P) which are given in Table 4, are omitted because they do not have any additional explanatory power in our sample.

The control variables in our study are defined as follows:

Liquidity is operating income plus depreciation minus interest, taxes, and all dividends, as a ratio to total assets, emphasizing the cash flow viewpoint.

The *cash ratio* is cash equivalent plus short-term investments, as a ratio to assets.

The *diversification dummy*=1 if the acquiror and target are not in the same industry (there are thirty industrial Sectors on the Tokyo Stock Exchange); *diversification dummy*=0 if they are both in the same industry.

Relative equity is the ratio of the acquiror's market equity to the target's market equity.

Equity is the market value of the common stockholders.

Leverage is the ratio of total debt to total assets.

In our sample, the payment methods of merger bids are all stock payments; therefore, we are only able to report on tender offer cases. In Table 5, the second column gives the expected signs of the coefficient of the Payment Method hypothesis. The first row gives the coefficients, and the second row gives the *p*-value in parentheses.

The Means of Payment hypothesis suggests that managers should select stock payment when the acquiror is over-valued in the market. In the logit multivariate regression (which includes only targets' V/P, acquirors' V/P, targets' B/P, and acquirors' B/P), all coefficients of the four independent variables are not significant. However, in the regressions which feature several control variables by their order, the coefficient of the acquiror V/P is statistically significant, but in the opposite of the predicted direction. We found counter evidence of discretionary use of payment (cash vs. stock) by Japanese managers in our multivariate test, which is inconsistent with our univariate test. The direction of the sign of the payment method was also opposite in our univariate analysis, but in the univariate analysis, it was not significant. We also found that Japanese managers positively use cash payment when their firm has sufficient financial slack, which is consistent with economic intuition. However, why Japanese managers positively use cash payment even if the firm's stock is over-valued, is still an open question.

(4-2) Cumulative Abnormal Returns of the Acquirer and the Misvaluation Hypothesis

Table 6 gives the results of ordinary multivariate regression. The Misvaluation hypothesis can be tested by examining the relationship between the V/P ratio and the subsequent stock performance of the acquiror, after controlling other variables. We regress cumulative abnormal returns of the acquiror for (-3, +3) on the V/P ratios of both the acquiror and the target. In Table 6, we present control variables which were given in Table 5 and defined in the previous section. The left side presents the results of merger

bids/tender offers. The right side presents the results of tender offers alone. The second column gives the expected signs of the coefficient of the Misvaluation hypothesis. The first row gives the coefficient and the second row gives the *p*-value in parentheses.

The Misvaluation hypothesis suggests that positive excess returns of the acquiror would be detected around the announcement day of M&A transactions, when the acquiror and/or target is/are under-valued in the market. In the ordinary multivariate regression (which includes several control variables), the coefficients of the acquirors' V/P and the targets' V/P are almost in complete agreement with the predicted sign. For example, in the eighth column of merger bids and tender offers, both coefficients of the acquirors' V/P and the targets' V/P are significant at the 5% level. Likewise, in the fourteenth column of tender offers, both coefficients of acquirors' V/P and targets' V/P are significant at the 5% level and 10% level, respectively. However, the explanatory power of the targets' V/P is slightly weaker than in the univariate test. Also, the responsive effect of CAR is slightly weaker for the targets' V/P (0.79%) than the acquirors' V/P (1.25%, see column eight). The coefficient of the targets' V/P is still significant, after controlling B/P, liquidity and cash ratio, which have had strong explanatory power in previous research.

We conclude that M&A transactions can result in shortening the value correction time and partially reduce Misvaluation in the capital market within a short time. We also conclude that Japanese investors regard M&A investment as a signal of managerial opportunism, or in other words, over-investment in the poor business opportunities if the firms have sufficient financial slack and/or cash equivalent. This is consistent with the findings of Myers and Majluf (1984), Smith and Kim (1994), Lung, Stulz, and Walkling (1999), and Bowers, Moore, and Majrice Tse (2000). Finally, we confirmed that these results are similar for various periods of dependent variable CARs of the acquirors, including (-10, +10), (-5, +5), (-3, +3), (-1, +1), (-1, +3), and (-1, +5), which were not included in our original analyses.

5. Hedging portfolio strategy following V/P ratio and Misvaluation hypothesis

We executed the robust analysis by the following hedging portfolio strategy, to reinforce the findings from the multivariate analysis regarding the Misvaluation hypothesis. If Misvaluation hypothesis is true to the real economic performance, the stock performance of the acquiror, in cases where the acquiror is under-valued and the target is also under-valued, out-performs that of the acquiror, in cases where the acquiror is over-valued and the target is also over-valued in the capital market. Then we constructed four partition portfolios, of which breakpoints are based on the medium valuation ratios (V/P ratio and B/P ratio) of all listed firms, as is shown in Table 7. All M&A transactions in our sample are sorted into the four groups, as shown in Table 7.

Hedging portfolio strategy holds the long position of the acquirer firms of which M&A transactions are sorted in [high acquiror's valuation–high target's valuation group] and simultaneously holds the short position of the acquirer firms of which M&A transactions are sorted in exact reverse [low acquiror's valuation–low target's valuation group]. In this case, we could estimate that the acquirer firms of which M&A transactions are sorted in [high acquiror's valuation–high target's valuation group] are the most under-valued ones and future stock performance is the highest, and the acquirer firms of which M&A

transactions are sorted in [low acquiror's valuation–low target's valuation group] are the most over-valued ones and future stock performance is the lowest.

According to Fuller, Netter, and Stegemoller (2002), an abnormal return is calculated by the market adjustment model: in our study, we use a market portfolio based on Topix. At first, we calculate daily abnormal returns (AR_t) around the announcement day of the sample firms, of which benchmark is the estimated daily returns by the market adjusted model. Secondly, we calculate the average abnormal returns (AR) of each portfolio. Cumulative abnormal return (CAR) is the cumulated by daily abnormal returns for the testing periods. The significance of AR and CAR is identified by the cross-sectional t test.

Figure 1 plots the $CARs$ for 21 days, (-10, +10), produced by V/P and B/P based hedging portfolio strategies around the announcement day (0) of the M&A transactions for merger bids and tender offers. We could confirm that the stock performance of the acquirer firms of which M&A transactions are sorted in [high acquiror's valuation–high target's valuation group] is relatively higher than that of the acquirer firms of which M&A transactions are sorted in [low acquiror's valuation–low target's valuation group] after the announcement day. In particular, the performance of hedging portfolio based on V/P ratio is remarkably high for 3 days after the announcement day. Moreover, we could confirm that the performance of hedging portfolio based on V/P ratio (solid line) is considerably higher than that of hedging portfolio based on B/P ratio (dotted line) after the announcement day.

Table 8 shows the ARs and $CARs$ for 21 days, (-10, +10), produced by V/P and B/P based hedging portfolio strategies around the announcement day (0) of the M&A transactions. In particular, focusing on the V/P based strategy, we could detect significant signs of $CARs$ one day after the announcement day. One day after announcement day, AR is 1.28% (10% significant level), and CAR is 3.93% (10% significant level) for the V/P based strategy. CAR of the V/P based strategy is remarkably 2.8% higher than that of the B/P based strategy.

Table 9 shows $CARs$ for various periods, produced by V/P and B/P based hedging portfolio strategies around the announcement day (0) of the M&A transactions. From Figure 1, we could confirm that the stock performance of the acquirer firms of which M&A transactions are sorted in [high acquiror's valuation–high target's valuation group] is slightly higher than that of the acquirer firms of which M&A transactions are sorted in [low acquiror's valuation–low target's valuation group] before the announcement day. The stock performance of the acquirer firms of which M&A transactions are sorted in [high acquiror's valuation–high target's valuation group] out-performs that of the acquirer firms of which M&A transactions are sorted in [low acquiror's valuation–low target's valuation group] after the announcement day. CAR for (-1, +1), (-1, +3) and (-1, +5) is 1.60%, 3.57%, and 4.30%, respectively. CAR of the V/P based strategy is remarkably 3.4% higher than that of the B/P based strategy for totaling 21 days, (-10, +10). We could interpret that these results reinforce the findings from the multivariate analysis in Section 5 (4-2) that V/P ratio has the additional explanatory power after controlling B/P ratio.

6. Concluding remarks

In this paper, we found evidence that the increase in activity surrounding an M&A market increases the possibility of shortening the value correction time and partially reduces misvaluation in the capital markets.

We believe that main market players, such as investment funds analysts, whose main business focuses on corporate value, have much more information (including information directly from managers of firms who comprise the core business of the investment fund analysts) than the capital markets, and they therefore play a primary role of reducing misvaluation.

The Misvaluation hypothesis suggests that positive excess returns of the acquiror would be detected around the announcement day of the M&A transaction, when the acquiror and/or the target is/are under-valued in the market. Our data provide new evidence from Japan which supports the Misvaluation hypothesis, as was reported by Dong, Hirshleifer, Richardson, and Teoh (2006) in the U.S.

We found that a positive subsequent stock performance of firms with a high V/P ratio (under-valued) was consistent with the Misvaluation hypothesis, after controlling the B/P ratio in the multivariate analysis. Consequently, we confirm that the Residual Income Model adequately estimates the fundamental value of the firm.

We constructed four independent portfolios with divisions based on the medium valuation ratios (V/P ratio and B/P ratio) of all listed firms. A hedging portfolio strategy supports the long position of the acquiror firms, where M&A transactions are sorted into two categories (high acquiror's valuation–high target's valuation group) and simultaneously holds the short position of the acquirer firms where M&A transactions are also sorted into two categories (low acquiror's valuation–low target's valuation group).

In this case, we estimated that the acquirer firms with M&A transactions sorted into the two highest categories (high acquirors' valuation–high targets' valuation group) would be the most under-valued and that future stock performance would be the highest. We also estimated that the acquirer firms with M&A transactions sorted into the two lowest categories (low acquirors' valuation–low targets' valuation group) would be the most over-valued and that future stock performance would be the lowest.

Regarding acquirors, we found the short-term positive abnormal return of 1.29% (1% significant level) on average around the announcement day (-1, +1). However, if we extend the announcement period from (-1, +1) to (-1, +3) or (-1, +5), the short-term positive abnormal returns are only 0.84% (5% significant level) and 0.56% (not significant), respectively. This means that we could not confirm the persistence of the economic effect of the M&A announcement. However, if we construct a hedging portfolio strategy based on the V/P ratio, the acquirors' stock performance is 4.30% for (-1, +5) which is considerably higher than 1.60% and 3.57% for (-1, +1) and (-1, +3). These results show that when we construct a hedging portfolio strategy based on the V/P ratio, the economic effect of the M&A announcement has persistence.

Finally, we found that the CAR of the V/P based strategy is remarkably 3.4% higher than the B/P based strategy during 21 days (-10, +10). These results reinforce the findings from the multivariate analysis that the V/P strategy has additional explanatory power over the B/P strategy.

On the other hand, we did not find evidence which supports the Means of Payment hypothesis, which has been reported repeatedly in the U. S. The Means of Payment hypothesis suggests that the managers should select stock payment when the acquiror is over-valued in the market. We found that Japanese managers only positively use cash payment when the firm has a sufficient financial slack, which is consistent with economic intuition. However, the question of why Japanese managers positively use cash payment even if the firm's stock is over-valued is still an open question.

Our results confirm the existence of V/P and B/P anomalies in the relatively highly efficient capital market, suggesting that the market possibly overlooks the mispricing of some stocks for a long time.

Observing the managers and investment funds (who have far more information than the market) and understanding what base information they utilize in evaluating the fundamental value would be an extremely interesting research topic in the future. This may help explain why Japanese managers persist in using cash payments in M&A transactions even when the firm's stock is considered to be over-valued.

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Table 1 Acquiror and target announcement period cumulative abnormal returns (CAR)

(1) Acquiror Announcement Period CAR

Period	All	Merger Bids	Tender offres	Tender offres (stock payment)	Tender offres (cash payment)
CAR(-10, +10)	1.1076% *	0.4758%	1.5589% *	0.4935% **	0.8498%
CAR(-5, +5)	1.3548% ***	0.5021%	0.7905% ***	3.2544% ***	1.1174%
CAR(-3, +3)	1.1968% **	0.6671%	1.5751% **	3.4075% ***	0.3636%
CAR(-1, +1)	1.4889% ***	1.6099% ***	1.4025% ***	2.4667% ***	0.3321%
CAR(-1, +3)	0.9991% **	0.2959%	1.5013% **	2.9998% ***	0.3288%
CAR(-1, +5)	0.9504% **	0.1881%	1.4950% **	2.3604% ***	0.9141%
CAR(-1, +10)	0.7014%	-0.0083%	1.2082%	2.1815% **	0.4043%
<i>N</i>	372	155	217	100	93

(2) Target Announcement Period CAR

Period	All	Merger Bids	Tender offres	Tender offres (stock payment)	Tender offres (cash payment)
CAR(-10, +10)	8.6169% ***	1.9766%	13.2873% ***	13.0501% ***	16.6361% ***
CAR(-5, +5)	8.0986% ***	1.4081%	12.9358% ***	12.3522% ***	16.0449% ***
CAR(-3, +3)	7.8196% ***	1.1551%	12.6155% ***	12.0437% ***	15.5219% ***
CAR(-1, +1)	7.1614% ***	2.0934% *	10.7814% ***	10.7501% ***	13.1573% ***
CAR(-1, +3)	6.8173% ***	0.0398%	11.6946% ***	11.0506% ***	14.6614% ***
CAR(-1, +5)	6.5217% ***	-0.1576%	11.3508% ***	10.6905% ***	14.6033% ***
CAR(-1, +10)	6.1779% ***	-0.8460%	11.1181% ***	10.3334% ***	14.7260% ***
<i>N</i>	372	155	217	100	93

(3) Acquiror and Target Announcement Period CAR

Period	All	Merger Bids	Tender offres	Tender offres (stock payment)	Tender offres (cash payment)
CAR(-10, +10)	9.9810% ***	2.8981%	14.9628% ***	16.1219% ***	17.4860% ***
CAR(-5, +5)	9.4959% ***	1.9246%	14.9700% ***	15.8163% ***	17.1623% ***
CAR(-3, +3)	9.0188% ***	1.8434%	14.1824% ***	15.4896% ***	15.8855% ***
CAR(-1, +1)	8.6503% ***	3.7033% ***	12.1839% ***	13.2168% ***	13.4894% ***
CAR(-1, +3)	7.8199% ***	0.3418%	13.2014% ***	14.1089% ***	14.9902% ***
CAR(-1, +5)	7.5062% ***	0.0418%	12.9030% ***	13.2140% ***	15.5174% ***
CAR(-1, +10)	7.1134% ***	-0.4941%	12.4641% ***	12.9127% ***	15.1303% ***
<i>N</i>	372	155	217	100	93

Table 1 shows Cumulative Abnormal Returns for various periods around the announcement (day 0) of the acquisition. The sample includes merger bids and tender offers in which both acquiror and target were listed on the Japanese Stock Market during 1996-2007, but excludes cases where either acquiror or target is a financial institution, or a bailout takeover where the transaction is as a result of the target being in financial distress etc.

***, **, * denote that the difference in mean values is significant at the 1%, 5%, and 10% level (one-tailed), respectively, based on the two-sample t-test.

Table 2 Descriptive statistics of M&A transactions by calendar year

year	<i>N</i> of tender offers	<i>N</i> of merger bids	Acquiror				Target				transaction value	Total transaction value (¥ mln)	% of completed M&A	Premium	Non Diversification	Diversification	Cash payment	Stock payment	(median)
			Market equity (¥ mln)	book-to-market ratio	leverage	ROE	Market equity (¥ mln)	book-to-market ratio	leverage	ROE									
1996	0	4	177,547	0.6142	0.7572	1.60%	120,938	0.3568	0.8180	3.86%	143,999	162,040	100%	-7.73%	3	1	0	4	
1997	1	8	165,028	0.7715	0.7224	6.21%	18,062	1.0474	0.6050	3.98%	8,786	45,188	100%	-4.65%	6	3	0	9	
1998	3	16	155,705	1.0834	0.7501	3.67%	11,017	1.3261	0.7808	2.74%	8,858	15,273	100%	2.51%	13	6	3	16	
1999	13	21	102,351	0.7743	0.6609	2.22%	8,793	0.8106	0.5844	1.29%	8,954	70,744	100%	-3.69%	24	10	4	29	
2000	29	11	156,020	0.5986	0.6600	1.20%	9,283	1.3939	0.5699	0.86%	9,930	18,250	95.45%	0.59%	13	9	3	17	
2001	17	14	74,448	0.9208	0.5411	4.00%	5,901	1.3457	0.6008	1.49%	7,439	29,824	93.55%	-0.06%	17	14	4	27	
2002	24	13	105,577	1.0222	0.6648	3.07%	4,597	1.7529	0.6688	0.65%	3,397	8,299	97.30%	3.66%	21	16	3	33	
2003	28	14	124,333	0.9114	0.7250	1.90%	6,715	1.1632	0.6666	3.92%	3,800	20,998	92.86%	1.89%	25	17	11	36	
2004	29	14	175,702	0.6651	0.5601	6.21%	8,841	1.0693	0.5465	3.98%	9,285	37,230	97.67%	2.15%	18	25	10	29	
2005	31	19	69,485	0.5389	0.6406	6.47%	10,289	0.7921	0.5806	3.76%	6,441	47,326	96.00%	3.36%	27	23	19	28	
2006	36	11	186,472	0.5974	0.5614	7.68%	14,854	0.8471	0.5106	4.38%	12,300	36,117	87.23%	8.21%	30	17	19	21	
2007	24	10	378,141	0.6021	0.6361	7.52%	12,462	0.9335	0.6292	4.98%	5,911	46,170	94.12%	13.04%	22	12	17	15	
Total	217	155	128,507	0.7207	0.6468	4.84%	9,245	1.0515	0.6038	2.91%	19,092	36,598	95.16%	3.39%	153	153	93	264	

Market equity, book-to-market ratio, leverage, and ROE of both acquiror and target, transaction value, % of completed M&A, Non Diversification, Diversification, cash payment, and stock payment are reported as median values, by calendar year. The sample includes merger bids and tender offers in which both acquiror and target were listed on the Japanese Stock Market during 1996-2007, but excludes cases where either acquiror or target is a financial institution, or a bailout takeover where the transaction is as a result of the target being in financial distress etc. In our sample, payment methods of merger bids are all stock payments.

Table 3 Descriptive statistics of M&A transactions by industry

Acquiror's industry	N of tender offers	N of merger bids	Acquiror				Target			
			Market equity (¥ mln)	book-to-market ratio	leverage	ROE	Market equity (¥ mln)	book-to-market ratio	leverage	ROE
Foods	10	7	167,673	0.6686	0.4213	5.27%	16,884	0.9600	0.4199	4.15%
Textile Products	7	3	82,263	1.1554	0.7082	-2.67%	2,299	1.1421	0.8023	3.22%
Pulp & Paper	5	7	462,671	0.8376	0.6966	2.93%	18,546	1.1849	0.7737	0.02%
Chemicals	13	7	178,522	0.6611	0.7066	4.79%	15,459	1.0522	0.5341	3.06%
Drugs	1	5	423,384	0.6634	0.2882	7.19%	192,864	0.6873	0.3946	5.56%
Petroleum	1	1	493,819	1.3498	0.7592	1.62%	76,403	1.2844	0.8152	-26.22%
Rubber Products	1	2	105,988	0.4337	0.7630	5.72%	15,449	1.0449	0.7566	5.27%
Stone, Clay & Glass Products	4	4	19,455	1.1516	0.6902	2.83%	3,040	1.7839	0.7419	-4.49%
Iron & Steel	5	4	163,446	1.2741	0.7777	2.47%	7,973	0.9324	0.6750	1.40%
Non ferrous Metal & Metal Products	9	7	50,889	1.0951	0.4876	1.34%	4,823	1.2633	0.4882	1.54%
Machinery	8	14	141,793	0.6617	0.6320	4.28%	11,355	1.1745	0.5268	3.19%
Electric & Electronic Equipment	24	8	624,814	0.6459	0.5439	3.78%	9,002	1.0257	0.5524	1.10%
Shipbuilding & Repairing	1	0	164,087	1.0222	0.8622	3.75%	10,555	1.7053	0.5281	1.10%
Motor Vehicles & Auto Parts	7	5	2,082,111	0.9915	0.5890	7.30%	6,280	1.2427	0.6266	4.20%
Precision Equipment	2	3	284,209	0.6025	0.5982	13.31%	57,358	0.4908	0.6889	2.25%
Other Manufacturing	6	3	40,454	0.5414	0.4173	5.67%	5,132	1.3807	0.4843	5.42%
Fish & Marine Products	1	0	71,372	0.4781	0.8451	13.14%	30,904	0.5421	0.8474	12.64%
Mining	1	0	29,520	0.5744	0.9438	21.05%	6,208	1.7848	0.5260	-2.72%
Construction	13	15	45,897	0.9850	0.6130	5.65%	6,557	1.1052	0.7964	2.09%
Wholesale Trade	21	21	68,507	0.8054	0.7189	4.94%	7,480	1.0966	0.6291	4.60%
Retail Trade	25	10	87,366	0.5924	0.6526	6.66%	8,049	1.1231	0.5959	5.25%
Real Estate	3	2	218,529	0.2249	0.7557	18.42%	47,664	0.3882	0.6340	3.97%
Railroad Transportation	9	1	304,911	0.4494	0.8851	0.26%	14,350	1.3356	0.7705	-0.14%
Trucking	5	0	74,448	2.9563	0.4901	1.38%	5,617	3.4742	0.2092	2.19%
Sea Transportation	4	2	434,692	0.5966	0.8084	9.44%	20,740	0.5694	0.8444	-0.53%
Air Transportation	1	2	518,828	0.2780	0.9111	-55.64%	26,481	0.3956	0.6890	10.36%
Warehousing & Harbor Transportation	1	0	150,632	0.9288	0.4005	3.42%	6,940	1.4109	0.5526	6.98%
Communication Services	1	1	1,520,545	0.3048	0.7667	-40.15%	472,350	0.7028	0.6840	-1.53%
Utilities - Electric	4	0	1,422,822	0.9976	0.7526	1.54%	5,281	1.4696	0.6306	-20.14%
Services	24	21	36,880	0.4745	0.5249	6.06%	9,120	0.4807	0.4611	2.84%
Total	217	155	128506.7	0.7207	0.6468	4.84%	9,245	1.0515	0.6038	2.91%

Acquiror's industry	transaction value	Total transaction value (¥ mln)	% of completed M&A	Premium	Non Diversification	Diversification	Cash payment	Stock payment
Foods	15,813	49,623	100%	20.35%	15	2	5	10
Textile Products	1,125	3,868	80%	-12.45%	5	5	1	8
Pulp & Paper	16,485	52,196	83.33%	0.22%	11	1	1	11
Chemicals	6,992	42,137	95%	8.71%	11	9	5	14
Drugs	111,693	355,645	83.33%	1.95%	4	2	1	5
Petroleum	61,776	61,776	100%	-11.24%	2	0	1	1
Rubber Products	7,670	11,675	100%	-2.89%	2	1	1	2
Stone, Clay & Glass Products	4,106	18,910	100%	5.70%	7	1	1	7
Iron & Steel	8,213	62,045	88.89%	6.33%	3	6	1	8
Non ferrous Metal & Metal Products	3,985	14,815	100%	-6.78%	6	10	1	12
Machinery	6,305	25,195	95.45%	1.65%	13	9	5	16
Electric & Electronic Equipment	5,523	19,164	100%	3.36%	16	16	10	22
Shipbuilding & Repairing	6,599	6,599	100%	-58.48%	0	1	0	1
Motor Vehicles & Auto Parts	3,632	8,093	100%	2.84%	7	5	4	8
Precision Equipment	20,807	64,229	80%	0.52%	4	1	1	3
Other Manufacturing	3,176	27,582	100%	20.08%	2	7	5	3
Fish & Marine Products	38,283	38,283	100%	15.05%	1	0	0	1
Mining	-	-	100%	-	0	1	1	0
Construction	5,300	19,568	96.43%	-3.24%	16	12	3	23
Wholesale Trade	5,163	12,338	97.62%	7.09%	22	20	9	28
Retail Trade	5,759	41,395	91.43%	5.13%	29	6	11	21
Real Estate	3,755	54,707	80%	9.57%	1	4	3	1
Railroad Transportation	10,570	45,814	100%	7.36%	1	9	0	7
Trucking	12,572	12,382	100%	2.50%	3	2	0	5
Sea Transportation	10,474	11,334	100%	-7.05%	4	2	2	4
Air Transportation	33,529	33,529	100%	-10.84%	1	2	0	2
Warehousing & Harbor Transportation	5,660	5,660	100%	34.41%	0	1	1	0
Communication Services	948,597	948,597	100%	17.04%	1	1	1	1
Utilities - Electric	1,723	5,130	100%	16.16%	0	4	2	2
Services	9,308	19,591	93.33%	4.35%	32	13	17	26
Total	47,400	36,598	95.49%	3.39%	219	153	93	252

Market equity, book-to-market ratio, leverage, and ROE of both acquiror and target, transaction value, % of completed M&A, Non Diversification, Diversification, cash payment, and stock payment are reported as medium values, by calendar year. The sample includes merger bids and tender offers in which both acquiror and target were listed on the Japanese Stock Market during 1996-2007, but excludes cases where either acquiror or target is a financial institution, or a bailout takeover where the transaction is as a result of the target being in financial distress etc. In our sample, payment methods of merger bids are all stock payments.

Table 4 Univariate test of low acquiror V/P vs. high acquiror V/P

	All						
	Acquiror V/P Rank				Difference 1-3	<i>t-Statistics</i>	<i>p</i> -value (two-tailed)
	1	2	3				
Acquiror V/P	0.4412	0.9897	2.0332	-1.5920	***	-16.7487	0.0000
Acquiror B/P	0.8272	0.9960	0.9876	-0.1604	*	-1.6574	0.0988
Target V/P	0.9958	0.9472	1.1378	-0.1420		-0.8259	0.4097
Target B/P	1.1959	1.4896	1.3363	-0.1404		-0.9551	0.3405
Diversification	43.70%	43.90%	35.09%	8.62%		1.3841	0.1663
Acquiror Ln equity	25.3275	25.8141	25.2894	0.0381		0.1543	0.8775
Target Ln equity	23.2859	23.2023	22.9594	0.3265	*	1.6784	0.0945
Acquiror Leverage	0.6091	0.6178	0.6233	-0.0142		-0.5151	0.6070
Target Leverage	0.6051	0.5445	0.6141	-0.0090		-0.2910	0.7713
Acquiror ROE	-3.37%	2.82%	14.07%	-17.44%	*	-1.7872	0.0757
Target ROE	-53.54%	-1.08%	-7.71%	-45.83%		-1.2438	0.2156
Acquiror Cash Ratio	14.79%	10.24%	10.38%	4.40%	***	2.9272	0.0038
Target Cash Ratio	14.22%	11.79%	13.56%	0.67%		0.4012	0.6887
Acquiror Liquidity	7.54%	7.59%	12.29%	-4.75%	***	-3.5402	0.0005
Target Liquidity	6.42%	6.48%	8.28%	-1.86%		0.0071	0.1560
Probability of Cash Payment	29.37%	25.00%	25.93%	3.44%		0.5855	0.5582
Probability of Tender Offers	56.30%	62.60%	56.14%	0.16%		0.0247	0.9803
Probability of Success	97.78%	94.31%	92.98%	4.80%	*	1.8346	0.0666
Acquiror CAR(-10,+10)	-0.22%	1.87%	1.86%	-2.08%		-1.3492	0.1786
Acquiror CAR(-5,+5)	-0.09%	2.00%	2.37%	-2.46%	*	-1.8219	0.0697
Acquiror CAR(-3,+3)	-0.38%	1.75%	2.47%	-2.85%	**	-2.3149	0.0215
Acquiror CAR(-1,+1)	1.31%	1.74%	1.43%	-0.13%		-0.1369	0.8913
Target CAR(-10,+10)	8.11%	11.50%	6.00%	2.12%		0.8143	0.4163
Target CAR(-5,+5)	7.86%	10.35%	5.89%	1.97%		0.8030	0.4229
Target CAR(-3,+3)	7.67%	10.08%	5.50%	2.16%		0.8792	0.3803
Target CAR(-1,+1)	7.15%	8.15%	6.12%	1.03%		0.5376	0.5914
Acquiror & Target CAR(-10,+10)	8.05%	13.91%	7.85%	0.21%		0.0619	0.9507
Acquiror & Target CAR(-5,+5)	7.88%	12.34%	8.28%	-0.40%		-0.1377	0.8906
Acquiror & Target CAR(-3,+3)	7.26%	11.83%	8.03%	-0.78%		-0.2737	0.7846
Acquiror & Target CAR(-1,+1)	8.45%	9.88%	7.55%	0.90%		0.4100	0.6822

All							
	Target V/P Rank			Difference 1-3		<i>t-Statistics</i>	<i>p</i> -value (two-tailed)
	1	2	3				
Acquiror V/P	1.0476	1.0608	1.2512	-0.2036	*	-1.7218	0.0863
Acquiror B/P	0.8294	0.8768	1.1378	-0.3084	***	-2.7479	0.0067
Target V/P	0.0730	1.0170	2.4371	-2.3641	***	-18.3916	0.0000
Target B/P	1.1662	1.4340	1.4932	-0.3270	**	-2.2523	0.0251
Diversification	43.13%	44.23%	35.19%	7.94%		1.3018	0.1930
Acquiror Ln equity	25.5282	25.8512	25.0398	0.4884	**	2.0787	0.0386
Target Ln equity	23.2520	23.5018	22.6883	0.5637	***	3.1405	0.0019
Acquiror Leverage	0.6047	0.6047	0.6304	-0.0258		-0.9297	0.3534
Target Leverage	0.6000	0.6000	0.6176	-0.0176		-0.5755	0.5654
Acquiror ROE	8.15%	8.15%	-2.65%	10.80%		1.3627	0.1742
Target ROE	-30.14%	-30.14%	-31.32%	1.19%		0.0326	0.9741
Acquiror Cash Ratio	13.76%	13.76%	11.65%	2.12%		1.3245	0.1865
Target Cash Ratio	13.19%	13.19%	13.28%	-0.10%		-0.0632	0.9497
Acquiror Liquidity	9.76%	9.17%	7.75%	2.01%	*	1.8017	0.0727
Target Liquidity	4.24%	9.15%	9.05%	-4.81%	***	-4.1583	0.0000
Probability of Cash Payment	25.85%	29.29%	26.00%	-0.15%		-0.0264	0.9790
Probability of Tender Offers	54.38%	61.54%	61.11%	-6.74%		-1.0928	0.2745
Probability of Success	93.75%	94.23%	98.15%	-4.40%	*	-1.7076	0.0877
Acquiror CAR(-10,+10)	-0.74%	1.31%	3.64%	-4.38%	***	-2.8349	0.0050
Acquiror CAR(-5,+5)	-0.25%	1.53%	3.56%	-3.80%	***	-3.0335	0.0027
Acquiror CAR(-3,+3)	-0.29%	1.75%	2.87%	-3.16%	***	-2.6521	0.0085
Acquiror CAR(-1,+1)	0.34%	1.71%	2.98%	-2.65%	***	-3.0143	0.0028
Target CAR(-10,+10)	6.07%	9.37%	11.66%	-5.59%	**	-2.0687	0.0396
Target CAR(-5,+5)	5.72%	8.75%	10.99%	-5.27%	**	-2.0422	0.0421
Target CAR(-3,+3)	5.54%	8.60%	10.44%	-4.90%	**	-2.0002	0.0466
Target CAR(-1,+1)	5.02%	9.17%	8.40%	-3.38%	*	-1.7976	0.0734
Acquiror & Target CAR(-10,+10)	5.55%	11.06%	15.52%	-9.97%	***	-2.9494	0.0035
Acquiror & Target CAR(-5,+5)	5.44%	10.42%	14.60%	-9.15%	***	-3.0229	0.0028
Acquiror & Target CAR(-3,+3)	5.21%	10.35%	13.36%	-8.14%	***	-2.8940	0.0041
Acquiror & Target CAR(-1,+1)	5.36%	10.88%	11.38%	-6.03%	***	-2.7591	0.0062

Tender offers							
Acquiror V/P Rank							
	1	2	3	Difference 1-3		<i>t-Statistics</i>	<i>p-value</i> (two-tailed)
Acquiror V/P	0.5174	1.046472	1.8672	-1.3498	***	-20.3614	0.0000
Acquiror B/P	0.7534	0.9533	0.8247	-0.0713		-0.6080	0.5442
Target V/P	1.1440	1.1027	1.0976	0.0464		0.1904	0.8493
Target B/P	1.3115	1.6741	1.4299	-0.1183		-0.5218	0.6027
Diversification	51.32%	49.35%	43.75%	7.57%		0.8927	0.3720
Acquiror Ln equity	25.8917	26.1734	25.9903	-0.0986		-0.3140	0.7540
Target Ln equity	23.22514	22.8289	22.7647	0.4605	*	1.8179	0.0713
Acquiror Leverage	0.6061	0.6505	0.6170	-0.0109		-0.2976	0.7664
Target Leverage	0.5966	0.5261	0.6017	-0.0051		-0.1299	0.8969
Acquiror ROE	-3.49%	3.89%	7.81%	-11.29%	*	-1.93	0.057
Target ROE	-92.14%	-4.38%	-13.80%	-78.33%		-1.2037	0.2323
Acquiror Cash Ratio	14.92%	10.19%	10.05%	4.86%	**	2.2665	0.0254
Target Cash Ratio	14.69%	12.68%	14.83%	-0.15%		-0.0620	0.9507
Acquiror Liquidity	7.34%	7.99%	13.57%	-6.23%	***	-3.1881	0.0018
Target Liquidity	6.09%	6.83%	8.87%	-2.77%	*	-1.7424	0.0837
Probability of Cash Payment	54.41%	42.42%	48.19%	6.95%		0.7819	0.4343
Probability of Tender Offers	100%	100%	100%				
Probability of Success	97.37%	96.10%	95.31%	2.06%		0.6530	0.5138
Acquiror CAR(-10,+10)	-1.90%	3.62%	3.18%	-5.08%	**	-2.2126	0.0287
Acquiror CAR(-5,+5)	-0.12%	2.86%	3.36%	-3.48%	*	-1.7849	0.0765
Acquiror CAR(-3,+3)	-0.74%	2.14%	3.65%	-4.39%	**	-2.4522	0.0156
Acquiror CAR(-1,+1)	0.57%	1.52%	2.25%	-1.67%		-1.3424	0.1823
Target CAR(-10,+10)	10.19%	16.78%	12.48%	-2.29%		-0.6175	0.5380
Target CAR(-5,+5)	11.77%	15.95%	10.58%	1.20%		0.3316	0.7408
Target CAR(-3,+3)	12.00%	15.27%	10.06%	1.94%		0.5503	0.5830
Target CAR(-1,+1)	10.47%	11.90%	9.82%	0.65%		0.2318	0.817
Acquiror & Target CAR(-10,+10)	8.54%	20.40%	15.57%	-7.03%		-1.5161	0.1319
Acquiror & Target CAR(-5,+5)	11.84%	18.81%	13.93%	-2.09%		-0.5137	0.6083
Acquiror & Target CAR(-3,+3)	11.20%	17.41%	13.78%	-2.58%		-0.6605	0.5101
Acquiror & Target CAR(-1,+1)	11.04%	13.42%	12.06%	-1.02%		-0.334	0.7389

Tender offers							
	Target V/P Rank						
	1	2	3	Difference 1-3		<i>t-Statistics</i>	<i>p</i> -value (two-tailed)
Acquiror V/P	1.0821	1.0412	1.1911	-0.1090		-0.9991	0.3193
Acquiror B/P	0.7494	0.8166	0.9997	-0.2503	*	-1.8823	0.0626
Target V/P	0.0573	1.0147	2.6087	-2.5514	***	-13.6980	0.0000
Target B/P	1.3682	1.5706	1.5233	-0.1551		-0.6910	0.4907
Diversification	55.17%	48.44%	39.39%	15.78%	*	1.9343	0.0531
Acquiror Ln equity	26.1244	26.4097	25.5070	0.6174	**	2.0893	0.0384
Target Ln equity	23.0106	23.2155	22.6084	0.4022	*	1.7387	0.0841
Acquiror Leverage	0.6099	0.6372	0.6332	-0.0233		-0.6093	0.5432
Target Leverage	0.5642	0.5365	0.6203	-0.0561		-1.4589	0.1467
Acquiror ROE	5.97%	5.55%	-5.14%	11.11%		1.6271	0.1078
Target ROE	-55.43%	0.04%	-51.56%	-3.88%		-0.0614	0.9511
Acquiror Cash Ratio	14.37%	9.22%	10.93%	3.44%		1.5563	0.1217
Target Cash Ratio	14.17%	14.58%	13.26%	0.91%		0.4264	0.6704
Acquiror Liquidity	10.63%	9.48%	7.74%	2.89%	*	1.8000	0.0739
Target Liquidity	4.46%	9.08%	8.91%	-4.45%	***	-3.2928	0.0013
Probability of Cash Payment	50.00%	49.15%	44.83%	5.17%		0.5939	0.5526
Probability of Tender Offers	100%	100%	100%				
Probability of Success	95.40%	96.88%	96.97%	-1.57%		-0.4947	0.6208
Acquiror CAR(-10,+10)	-0.47%	1.90%	3.90%	-4.37%	*	-1.8902	0.0607
Acquiror CAR(-5,+5)	0.05%	2.14%	4.31%	-4.26%	**	-2.3299	0.0214
Acquiror CAR(-3,+3)	-0.60%	2.23%	3.81%	-4.41%	*	-2.6595	0.0087
Acquiror CAR(-1,+1)	0.05%	1.78%	2.82%	-2.77%	**	-2.2911	0.0233
Target CAR(-10,+10)	11.68%	14.06%	14.61%	-2.93%		-0.8222	0.4123
Target CAR(-5,+5)	12.18%	13.06%	13.79%	-1.61%		-0.4544	0.6502
Target CAR(-3,+3)	11.79%	12.98%	13.33%	-1.54%		-0.4396	0.6609
Target CAR(-1,+1)	9.48%	14.09%	9.28%	0.19%		0.0753	0.9401
Acquiror & Target CAR(-10,+10)	10.90%	16.61%	18.60%	-7.71%	*	-1.7161	0.0883
Acquiror & Target CAR(-5,+5)	12.18%	15.46%	18.10%	-5.92%		-1.4636	0.1454
Acquiror & Target CAR(-3,+3)	11.12%	15.22%	17.14%	-6.02%		-1.5656	0.1196
Acquiror & Target CAR(-1,+1)	9.53%	15.87%	12.11%	-2.57%		-0.8782	0.3813

The sample includes merger bids and tender offers in which both acquiror and target were listed on the Japanese Stock Market during 1996-2007, but excludes cases where either acquiror or target is a financial institution, or a bailout takeover where the transaction is as a result of the target being in financial distress etc, where the data is needed to (1) recognize the method of payment (cash vs. stock), and (2) calculate V/P and B/P available. V/P is the fundamental value-to-price ratio. The fundamental value V is estimated using the residual income model (RIM) where the discount rate is based on firm-specific CAPM. B/P is the book-to-price ratio.

***, **, * denote that the difference in mean values between cash and stock offers, and acquirer and target is significant at the 1%, 5%, and 10% level (two-tailed), respectively, based on the two-sample t-test.

Table 5 Logistic Regressions

		Dependent Variable (=1 [cash payment], 0 [stock payment])					
	expected sign	Tender Offers					
Target V/P		-0.0031 (0.979)	0.0241113 (0.855)	0.0452235 (0.733)	0.0417038 (0.769)	0.0323778 (0.818)	0.0245305 (0.864)
Acquiror V/P	[+]	-0.3697334 (0.183)	-0.6667436 ** (0.023)	-0.5705492 * (0.055)	-0.5840476 ** (0.049)	-0.5496064 * (0.072)	-0.570542 * (0.066)
Target B/P		-0.2264725 (0.208)	-0.1992353 (0.249)	-0.1785526 (0.292)	-0.1811177 (0.295)	-0.1012916 (0.570)	-0.1216618 (0.516)
Acquiror B/P		-0.2681805 (0.365)	-0.2190803 (0.444)	-0.2797828 (0.303)	-0.2867757 (0.306)	-0.4844921 (0.144)	-0.4940118 (0.137)
Acquiror liquidity		-	6.266713 ** (0.040)	7.381381 * (0.051)	7.663318 ** (0.040)	7.623909 ** (0.027)	7.705796 ** (0.023)
Acquiror cashratio		-	-	2.290243 (0.157)	2.325357 (0.154)	2.033143 (0.340)	1.936333 (0.366)
Diversification		-	-	-	0.4673404 (0.180)	0.5226982 (0.136)	0.5295488 (0.133)
Ln relative equity		-	-	-	-	-0.1742426 (0.180)	-
Acquiror ln equity		-	-	-	-	-	-0.1881682 (0.167)
Target ln equity		-	-	-	-	-	0.1406655 (0.426)
Acquiror leverage		-	-	-	-	0.0602718 (0.962)	0.0532001 (0.966)
Intercept		0.2838318 (0.747)	0.0122465 (0.989)	-0.436364 (0.655)	-0.5564936 (0.491)	0.157442 (0.915)	1.329946 (0.759)
N		189	189	189	189	189	189
Pseudo-R ²		0.1612	0.2028	0.2113	0.2182	0.2259	0.2263

In our sample, payment methods of merger bids are all stock payment, therefore we executed this logistic regression focusing on tender offers in which both acquirer and target were listed on the Japanese Stock Market during 1996-2007. However we excluded cases where either acquirer or target is a financial institution, or a bailout takeover where the transaction is as a result of the target being in financial distress etc., where the data is needed to calculate V/P and B/P available. V/P is the fundamental value-to-price ratio. The fundamental value V is estimated using the residual income model (RIM) where the discount rate is based on firm-specific CAPM. B/P is the book-to-price ratio. Liquidity is operating income plus depreciation minus interest, taxes, and all dividends, as a ratio to total assets, emphasizing the cash flow viewpoint. The cash ratio is cash equivalent plus short-term investments, as a ratio to assets. The diversification dummy=1 if the acquirer and target are not in the same industry (there are thirty industrial Sectors on the Tokyo Stock Exchange); diversification dummy=0 if they are both in the same industry. Relative equity is the ratio of the acquirer's market equity to the target's market equity. Equity is the market value of the common stock holders. Leverage is the ratio of total debt to total assets.

The first row reports coefficient, and the second row in parentheses reports the p-value. ***, **, * denote significant at the 1%, 5%, and 10% level (two-tailed), respectively.

Table 6 Least Squares Regressions

	Dependent Variable (=Acquirer CAR [-3,+3]) expected sign	Tender offers & Merger bids						Tender offers					
Target V/P	[+]	0.0082 ** (0.042)	0.0080 ** (0.041)	0.0075 * (0.060)	0.0075 * (0.060)	0.0076 * (0.056)	0.0079 ** (0.046)	0.0107 ** (0.043)	0.0101 ** (0.050)	0.0087 * (0.097)	0.0087 (0.101)	0.0057 (0.224)	0.0097 * (0.074)
Acquirer V/P	[+]	0.0095 (0.104)	0.0121 ** (0.050)	0.0106 * (0.057)	0.0107 * (0.059)	0.0117 ** (0.040)	0.0125 ** (0.032)	0.0239 * (0.094)	0.0315 ** (0.041)	0.0257 ** (0.041)	0.0257 ** (0.039)	0.0260 ** (0.037)	0.0329 ** (0.021)
Target B/P	[+]	0.0107 ** (0.035)	0.0102 ** (0.042)	0.0094 * (0.067)	0.0094 * (0.069)	0.0117 ** (0.020)	0.0130 ** (0.014)	0.0145 ** (0.011)	0.0141 ** (0.014)	0.0134 ** (0.022)	0.0134 ** (0.022)	0.0167 *** (0.005)	0.0189 *** (0.004)
Acquirer B/P	[+]	0.0113 (0.123)	0.0094 (0.202)	0.0098 (0.177)	0.0099 (0.181)	0.0044 (0.561)	0.0064 (0.418)	0.0166 (0.194)	0.0135 (0.267)	0.0146 (0.219)	0.0145 (0.223)	0.0057 (0.552)	0.0020 (0.863)
Acquirer liquidity			-0.0958 (0.154)	-0.0910 (0.171)	-0.0908 (0.169)	-0.1078 (0.113)	-0.1163 * (0.099)		-0.1572 * (0.074)	-0.1681 * (0.064)	-0.1684 * (0.062)	-0.2189 ** (0.025)	-0.2178 ** (0.024)
Acquirer cash ratio				-0.0769 (0.264)	-0.0762 (0.264)	-0.1038 (0.169)	-0.0947 (0.208)			-0.1374 (0.115)	-0.1375 (0.115)	-0.2411 ** (0.011)	-0.2108 ** (0.034)
Diversification					-0.0035 (0.736)	-0.0051 (0.645)	-0.0048 (0.670)				0.0014 (0.923)	0.0044 (0.744)	0.0002 (0.988)
Ln relative equity						-0.0036 (0.270)						-0.0080 * (0.072)	
Acquirer ln equity							-0.0022 (0.521)						-0.0072 (0.145)
Target ln equity							0.0063 (0.138)						0.0123 * (0.071)
Acquirer leverage						-0.0272 (0.317)	-0.024 (0.383)					-0.0860 ** (0.014)	-0.0682 * (0.060)
Intercept		-0.0168 (0.467)	-0.0130 (0.573)	-0.0038 (0.882)	-0.0014 (0.958)	0.0306 (0.441)	-0.074 (0.502)	0.1298 *** (0.000)	0.1298 *** (0.000)	0.1371 *** (0.000)	0.1410 *** (0.000)	0.1981 *** (0.000)	0.0826 (0.580)
<i>N</i>		372	372	372	372	372	372	217	217	217	217	217	217
Adj - R ²		0.0926	0.0999	0.1084	0.1087	0.1152	0.1179	0.1444	0.1648	0.1882	0.2438	0.2170	0.2202

Acquirer Announcement Period Cumulative Abnormal Returns (CAR) are measured over the 7 days (-3, 3) around the announcement (day 0) of the acquisition. The sample includes either tender offers and merger bids and tender offers in which both acquirer and target were listed on the Japanese Stock Market during 1996-2007, but excludes cases where either acquirer or target is a financial institution, or a bailout takeover where the transaction is as a result of the target being in financial distress etc, where the data needed to calculate V/P and B/P is available. V/P is the fundamental value-to-price ratio. The fundamental value V is estimated using the residual income model (RIM) where the discount rate is based on firm-specific CAPM. Liquidity is operating income plus depreciation minus interest, taxes, and all dividends, as a ratio to total assets, emphasizing the cash flow viewpoint. The cash ratio is cash equivalent plus short-term investments, as a ratio to assets. The diversification dummy=1 if the acquirer and target are not in the same industry (there are thirty industrial Sectors on the Tokyo Stock Exchange); diversification dummy=0 if they are both in the same industry. Relative equity is the ratio of the acquirer's market equity to the target's market equity. Equity is the market value of the common stock holders. Leverage is the ratio of total debt to total assets.

The first row reports coefficient, and the second row in parentheses reports the p-value. ***, **, * denote significant at the 1%, 5%, and 10% level (two-tailed), respectively.

Table 7 Four independent portfolio matrix based on valuation ratios [V/P and B/P]

		Target's V/P or B/P	
		high	low
Acquirer's V/P or B/P	high	Buy the acquiring firm's stock when both acquiring firm and target firm are relatively cheap	
	low		Sell the acquiring firm's stock when both acquiring firm and target firm are relatively expensive

V/P is the fundamental value-to-price ratio. The fundamental value V is estimated using the residual income model (RIM) where the discount rate is based on firm-specific CAPM. B/P is the book-to-price ratio.

Based on the medium valuation ratios of all listed firms, all M&A transactions were sorted into four groups:

The 1st Row, 1st Column in the Matrix represents cases where both the acquirers' and the targets' V/P or B/P ratios fall above the medium valuation ratios (V/P or B/P) of all listed firms.

The 2nd Row, 2nd Column represents cases where both the acquirers' and the targets' V/P or B/P ratios fall below the medium valuation ratios (V/P or B/P) of all listed firms.

The 1st Row, 2nd Column and 2nd Row, 1st Column positions are negligible for the purposes of this study.

Table 8 Cumulative abnormal returns for (-10 to +10) produced by V/P and B/P Trading strategies

date	V/P ratio		B/P ratio	
	AR	CAR	AR	CAR
-10	-0.4411%	-0.4411%	-0.4384%	-0.4384%
-9	0.8178%	0.3767%	0.3055%	-0.1329%
-8	-0.4446%	-0.0679%	-0.2720%	-0.4050%
-7	-0.4336%	0.5016%	0.2958%	-0.1092%
-6	0.4908%	-0.0108%	-0.1028%	-0.2120%
-5	0.1673%	0.1565%	-0.9485%	** -1.1604%
-4	-0.5298%	-0.3734%	-0.3675%	-1.5279%
-3	0.5869%	0.2135%	0.4603%	-1.0676%
-2	0.6491%	* 0.8626%	0.0563%	-1.0676%
-1	1.0425%	1.9051%	1.5099%	** 1.0676%
0	0.7411%	2.6462%	0.5507%	1.0493%
1	1.2800%	* 3.9262%	0.0665%	1.1158%
2	0.4110%	4.3372%	0.8190%	* 1.9348%
3	0.8192%	5.1564%	0.5942%	2.5290%
4	0.5149%	5.6713%	-0.2126%	2.3164%
5	-0.2568%	5.4145%	0.0828%	2.3992%
6	-0.3116%	5.1029%	0.1113%	2.5105%
7	0.4723%	5.5752%	-0.5955%	* 1.9150%
8	-0.5941%	4.9811%	0.3429%	2.2579%
9	0.0499%	5.0310%	0.1156%	2.3735%
10	0.6186%	5.6496%	-0.1306%	2.2429%
<i>N</i>	372	372	486	486

Table 8 shows abnormal returns (AR)/cumulative abnormal returns (CAR) over the twenty one days (-10, +10) around the announcement (day 0) of the acquisition, produced by V/P and B/P-based trading strategies. V/P is the fundamental value-to-price ratio. The fundamental value V is estimated using the residual income model (RIM) where the discount rate is based on firm-specific CAPM. B/P is the book-to-price ratio. For each valuation ratio, we require that both acquirer and target have known values.

The investment strategy is produced by buying acquiring firm's stock where both the acquirer's and the target's V/P or B/P ratios fall above the medium valuation ratios (V/P or B/P) of all listed firms [high V/P of Acquirer - high V/P of Target] and selling acquiring firm's stock where both the acquirer's and the target's V/P or B/P ratios fall below the medium valuation ratios (V/P or B/P) of all listed firms [low V/P of Acquirer - low V/P of Target].

The sample includes both successful and unsuccessful merger bids and tender offers in which both acquirer and target were listed on the Japanese Stock Market during 1996-2007, but excludes cases where either acquirer or target is a financial institution, or a rescue takeover where the transaction is as a result of the target being in danger of financial damage or difficulty in fulfilling commercial notes etc.

***, **, * denote that the difference in mean values is significant at the 1%, 5%, and 10% level (one-tailed), respectively, based on the two-sample t-test.

Table 9 Cumulative Abnormal Returns for various periods produced by V/P and B/P Trading strategies

period	V/P ratio	t-test	B/P ratio	t-test	Difference between V/P and B/P strategy
CAR(-1,+1)	3.0636%	**	2.1271%		0.9365%
CAR(-10,+10)	5.6496%	*	2.2429%		3.4067%
CAR(-1,+10)	4.7870%	**	3.2542%	*	1.5328%
CAR(-5,+5)	5.4253%	**	2.6112%		2.8142%
CAR(-1,+5)	4.5519%	**	3.4105%	**	1.1414%
CAR(-1,+3)	4.2939%	**	3.5403%	**	0.7535%
CAR(-3,+3)	5.5298%	***	4.0569%	***	1.4729%

Table 9 shows cumulative abnormal returns produced by V/P and B/P based trading strategies. V/P is the fundamental value-to-price ratio. The fundamental value V is estimated using the residual income model (RIM) where the discount rate is based on firm-specific CAPM. B/P is the book-to-price ratio. For each valuation ratio, we require that both acquirer and target have known values.

The investment strategy is produced by buying acquiring firm's stock where both the acquirer's and the target's V/P or B/P ratios fall above the medium valuation ratios (V/P or B/P) of all listed firms [high V/P of Acquirer - high V/P of Target] and selling acquiring firm's stock where both the acquirer's and the target's V/P or B/P ratios fall below the medium valuation ratios (V/P or B/P) of all listed firms [low V/P of Acquirer - low V/P of Target].

The sample includes both successful and unsuccessful merger bids and tender offers in which both acquire and target were listed in Japanese Stock Market during 1996-2007, but excludes cases where either acquirer or target is a financial institution, or a rescue takeover where the transaction is as a result of the target being in danger of financial damage or difficulty in fulfilling commercial notes etc.

***, **, * denote that the difference in mean values is significant at the 1%, 5%, and 10% level (one-tailed), respectively, based on the two-sample t-test.

Figure 1 Cumulative Abnormal Returns (-10 to 10) produced by V/P and B/P Trading strategies

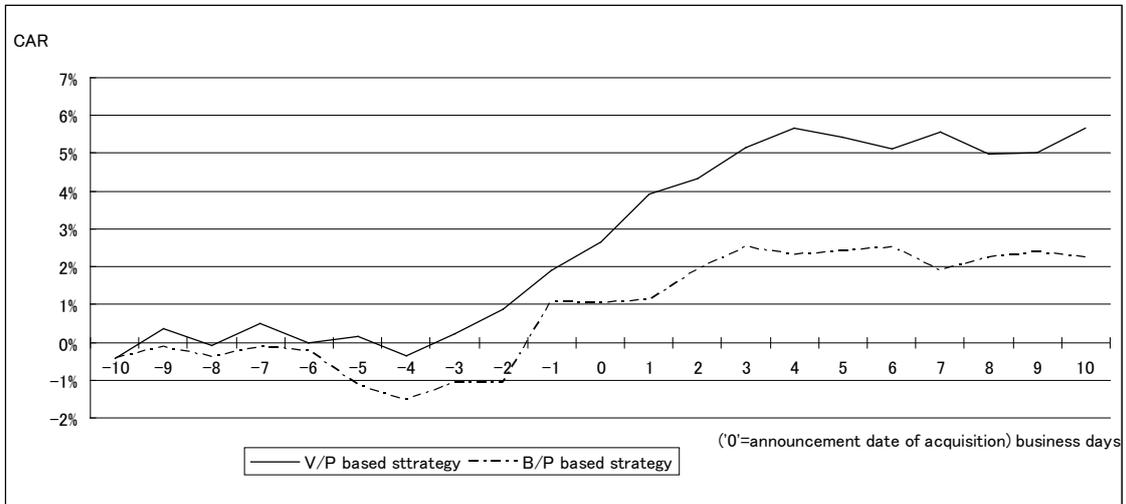


Figure 1 shows cumulative abnormal returns produced by V/P and B/P based trading strategies. V/P is the fundamental value-to-price ratio. The fundamental value V is estimated using the residual income model (RIM) where the discount rate is based on firm-specific CAPM. B/P is the book-to-price ratio. For each valuation ratio, we require that both acquirer and target have known values.

For each investment strategy, this graph depicts the cumulative abnormal returns produced by buying acquiring firms where M&A transactions are in the case of [high V/P or B/P of Acquirer - high V/P or B/P of Target] and selling acquiring firms where M&A transactions are in the case of [low V/P or B/P of Acquirer - low V/P or B/P of Target].

The sample includes both successful and unsuccessful merger bids and tender offers in which both acquirer and target were listed on the Japanese Stock Market during 1996-2007, but excludes cases where either acquirer or target is a financial institution, or a rescue takeover where the transaction is as a result of the target being in danger of financial damage or difficulty in fulfilling commercial notes etc.