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Discussion Paper Series

**Market Reactions to Accounting Policy Choices for Mergers and Acquisitions:  
Evidence for the Japanese Adoption of International Accounting Standards**

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# **Market Reactions to Accounting Policy Choices for Mergers and Acquisitions: Evidence for the Japanese Adoption of International Accounting Standards**

## **Abstract**

The purpose of this paper is to explore, through M&As accounting policies, whether the Japanese adoption of IFRS is favorable for market participants. M&As are excellent prototypes for this study, because they have a substantial impact upon firms' financial statements. Additionally, Japanese M&A accounting standards still maintain the amortization period within twenty years, which is practical in creating a sharp contrast comparison with the impairment approach outlined by the IFRS 3 and SFAS141/142.

We focus on how the recognition and implementation of three different measurement rules, such as the pooling-of-interests, purchase with the amortization of goodwill, and purchase with the immediate expensing of goodwill, influence investors' interpretations of earning numbers. First, we found that investors interpreted earning figures congruently despite the different accounting policies used. This phenomenon is consistent with the functional fixation hypothesis, which suggests that investors are bottom-line oriented. Second, we found that acquiring firms' who choose to expense entire goodwill values within the *current* fiscal year in order to alleviate investors'

concerns that the M&A would negatively impact bottom-line earnings, and we have found that this is done successfully, convincing investors to regard the immediate write-off as an irrelevant item to the firm's future earnings.

**Key words**

Mergers and Acquisitions; Purchase method; Pooling-of-interests method; Goodwill; Amortization; IFRS adoption

## **1. Introduction**

The purpose of this paper is to explore, through M&As accounting policies, whether the Japanese adoption of IFRS is favorable for market participants. M&As are excellent prototypes for this study, because they have a substantial impact upon firms' financial statements. Additionally, Japanese M&A accounting standards still maintain the amortization period within twenty years, which is practical in creating a sharp contrast comparison with the impairment approach outlined by the IFRS 3 and SFAS141/142.

In this paper we analyze how the recognition and implementation of three different measurement rules, such as the pooling-of-interests, purchase with amortization of goodwill, and purchase with immediate expensing of goodwill, influence investors' interpretations of earning numbers. The accounting method's influence is especially important in mergers and acquisitions (M&As), because the cost of the M&A premium (or goodwill) is one of the most substantial accounting items on the financial statement.

Until recently, there have been no consistent comprehensive accounting rules regarding M&As in Japan, even though researchers have often indicated that there should be more consistency especially for firm disclosures. For example, there was a rule which required parent companies to disclose a consolidated statement given the condition that the subsidiary companies maintained their legal status after mergers, but

no rule has been applied in cases where company mergers with subsidiary firms resulted in the termination of their legal status. This difference between case specific regulations raises the potential inconsistency of having a consolidated financial statement when the parent company owns 100% of the subsidiary firm's shares, and having another different financial statement when the parent company legally merges with the subsidiary firm terminating its shares.

After more than three years of deliberation, the Business Accounting Council issued the "Accounting Standards for Business Combinations" on October 31, 2003, which finalized a series of important changes that are collectively referred to in Japan as the Accounting Big Bang. This trend for standardization was emphasized starting in the latter half of the 1990s until the beginning of the 21<sup>st</sup> century in order to enhance the transparency of financial statements. This accounting standard was effective from the April 1, 2006 fiscal year. However, there were still some significant differences between the Japanese GAAP, and the Western IFRS 3 and SFAS141/142. Japanese firms that met specified criteria could utilize the pooling method, and some firms would cleverly reorganize the M&A contractual terms in order to meet the outlined stipulations and use the pooling method. Firms that did not meet these criteria had to follow the purchase method prescriptions that require the recognition of goodwill with a subsequent

amortization period between two and twenty years.

In 2004, taking into consideration the great differences in M&A policies between the Japanese GAAP and IFRS 3, the Committee of European Securities Regulators (CESR) in conjunction with the EU's equivalence assessment, required that the inconsistency amongst business combination standards be remedied by all Japanese firms which publicly issue stocks and bonds in European nations, bringing them into accordance with IFRS 3. The CESR demanded the supplement pro-forma based summary financial statement for cases employing the pooling method.

Since the Tokyo Agreement with IASB in August 2007, the Accounting Standards Board of Japan (ASBJ) has been working on eliminating major accounting differences and issued a new accounting standard for business combinations in December 2008. This standard eliminates the pooling method and complies with the purchase method to converge with the IFRS 3 and SFAS141/142. However, the new standard still maintains the amortization period within twenty years, rather than adopting the impairment approach used in the IFRS 3 and SFAS141/142. The IFRS and SFAS stipulate that all firms involved in mergers and acquisitions shall use the purchase method, not the pooling-interest method, and the goodwill shall not be written off in the fiscal period of acquisition unless it is impaired.



In this study, we are concerned with the effects of the accounting methods and amortization periods on the subsequent market performance. Our base assumption is that investors estimate firms' intrinsic value based on forecast numbers of bottom-line future earnings, and buy or sell the stock accordingly, which is in line with the functional fixation hypothesis. Therefore, it is imperative to understand how accounting methods affect future bottom line earnings and affect the investors' reaction.

In order to examine the role of accounting methods and amortization periods on subsequent market performances of M&As, we assess each accounting procedure differential influence following the effective date of M&As. The accounting methods include: (1) pooling-of-interests, (2) purchase with amortization of goodwill, and (3) purchase with immediate expensing of goodwill. Typically in Japan, firms listed in emerging stock exchanges<sup>1</sup> adopted the purchase with immediate expensing of goodwill method, which has been prohibited since 2006<sup>2</sup>. This method mitigates the *current* bottom line earnings, but does *not* affect *future* bottom-line earnings. This

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<sup>1</sup> such as in JASDAQ, MOTHERS in the Tokyo Stock Exchange, or HERCULES in the Osaka Stock Exchange

<sup>2</sup> The introduction of the M&A accounting standard, which was effective since April 2006, ASBJ discussed whether they should accept the accounting practice of writing off the entire goodwill value within the first fiscal year. ASBJ concluded, however, that writing off the entire excess cost value of an acquired entity within the *current* fiscal year would produce unrealistic results, because this goodwill might contribute to a series of future earnings. Therefore, ASBJ prohibited the immediate write-off of goodwill for reasons similar with the SFAS 141 (paras, B69-70).

accounting procedure deserves our attention, because it yields the same future bottom-line earnings as firms who use the purchase with impairment method prescribed by IFRS 3 and SFAS 141/142.

The next section describes the history of M&As in Japan and the characteristics of our sample. The third section presents our hypotheses regarding the market reaction to accounting policy differences. The fourth section describes our methodologies and results, which will be discussed in the final section along with our research conclusions.

## **2. Characteristics and Long-term Performance of M&As in Japan**

### **(1) History of M&As in Japan**

Figure 1 shows the number of all public and private M&As in Japan from 1996 to 2007. After the introduction of stock swap and stock transfer schemes in 1999, the number of M&As rose sharply from 661 in 1998 to 1,251 in 2001. The universally applied Accounting Standards for Business Combinations became effective on April 1, 2006, and the cases of M&As rose to a record high of 1,897 (total value was 11,749 billion yen) in 2006. In the past three years, the average annual number of M&As has been 1,911 (Data Source; RECOF MARR (Mergers and Acquisitions Research Report) CD-ROM).

[Figure 1]

What accounts for the dramatic increase of M&As over the last ten years? First, corporate managers in Japan have become more aware of the importance of identifying suitable targets and implementing efficient restructuring following M&As. Both of these efforts are used to improve financial performance and recover from a deteriorated level of capital caused by the most severe and prolonged recession to hit the Japanese economy since World War II. Even though the 10-year long recession ended in 2005, it left the Japanese economy vulnerable for the following few year. Second, the introduction of stock swap and stock transfer schemes facilitated a smoother M&A process.

## **(2) Sample Characteristics**

Table 1 shows our sample characteristics for both tender offers and merger bids organized by calendar year. Our sample includes M&A transactions from January 1996 to December 2006 (available from the RECOF MARR CD-ROM database) that meet the following criteria:

- (a) Both the acquirer and target are listed in the stock exchange in order to exclude small cases.
- (b) The acquirer and/or target are not financial institutions, nor involved in a bailout takeover where the transaction is a result of the target suffering financial distress.
- (c) The accounting procedure of the M&A transaction is identifiable from annual reports as either the purchase method or the pooling-interest method.
- (d) The amortization period is identifiable in the financial statement.

Financial data was collected from the Nikkei NEEDS-Financial QUEST and stock price data was collected from the Nikkei Portfolio Master, both of which are part of Nikkei Media Marketing, Inc. Three hundred five M&A transactions satisfied the above criteria. For tender offers, the number of listings for targets and acquirers dramatically increased from the single digits to double digits after the introduction of the stock swap and stock transfer schemes in 1999. The annual number of tender offers exceeded thirty in 2002.

The merger bid cases in our sample used the stock payment method, which is totally different from the U.S. and U.K. payment method typified with a half stock payment, half cash payment in merger bids transactions<sup>3</sup>.

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<sup>3</sup> In the U.S. between 1977 and 2000, there were 1,218 stock and 1,542 cash payment cases (Rhodes-Kropf et al., 2005, p. 569, Table 1). In the U.K. from 1985 to 2000, there

In tender offers cases, Japanese listed firms used a mix of cash and stock payment. From 2000 to 2003, the number of firms which used the stock payment method exceeded the number of firms that used cash payments. However, the cash payment method also increased during the period 2005 to 2007.

The financial attributes of the acquirers and targets in our sample included the following: market equity (which represents firm size), book-to-market ratio, financial leverage, and ROE. Our data was based on figures that were available on the M&A effective dates.

The median market equity value of the acquiring firms (¥100,121 million) is 13.74 times greater than the medium market value of the target firms (¥7,286 million). The acquirers are typically large, and our sample acquiring firms' median stock value is considerably higher than the median stock value listed on the stock exchange (¥100,121 million vs. ¥13,604 million).

The median book-to-market ratios of the acquirers and targets are 0.7459 and 1.0167 respectively. The medium financial leverage of the acquirers and targets are 0.6417 and 0.6173 respectively. The median ROE of the acquiring firms (4.790%) is 1.59 times greater than the medium ROE of the target firms (3.009%). The book-to-market ratio is

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were 84 stock and 134 cash payment cases (Abhyankar et al., 2005, p. 682, Table 1).

widely interpreted as a measure of the firm's growth. The acquirers' median book-to-market ratio (0.7459) is much lower than the median book-to-market ratio of all the listed firms (0.8818), and the medium ROE of the acquirers (4.790%) is much higher than the medium ROE of all listed firms (4.092%). Therefore, the acquirers in our sample have a high profitability and characteristics of growth stocks (i.e., low book-to-market ratio). In other words, the acquirers possess a great amount of potential for growth.

Table 2 shows our sample's characteristics sorted by industry (Nikkei Medium Classification Industry Code). 45% of acquiring firms in our sample are highly concentrated into four sectors. These four sectors are services (15.17%), wholesale trade (11.26%), retail trade (9.89%), and electrics/electrical equipment (8.51%). Construction (6.44%) and Machinery (5.98%) are ranked as the fifth and sixth most competitive sectors. In the service, wholesale trade, and retail trade sectors, there were more intra-sector M&As (non-diversified) compared to inter-sectors (diversified: between sections) acquisitions. Electric/electrical equipment, construction, and machinery industries, on the other hand, showed equal proportions of diversified and non-diversified M&As.

Table 3 shows our sample's characteristics as well as premiums sorted according to

firms' accounting policies. Japanese M&As have a very low average 2.530% premium (value-weighted premium is 9.61%; see Table 3, Panel (A)), in comparison to the high average 63.41% and 45% premiums found in the U.S.,<sup>4</sup> and U.K.,<sup>5</sup> respectively. For merger bids alone, the average premium is negative (-1.054%). Firms that adopted the purchase with amortization of goodwill method had the largest sized firm of the three accounting methods. In our sample, all three accounting policy groups were considerably larger than the average listed firm, and are considered to be growth stocks (i.e., have low book-to-market ratios). We interpret acquiring firms' low book-to-market ratio to mean that certain acquiring firms have a greater amount of opportunity to target other firms' resources and expand their business positively. In other words, firms which have minimally prosperous opportunities or are operated under crude management unable to make the most of the firm's resources (high book-to-market ratio) could become a target of M&As. Previous research has indicated that the long-term stock performance of either large or high growth possibility firms is generally lower than the stock performance of their smaller and lower growth possibility counterparts (e.g., Fama and French, 1992, 1993). Our sample of acquiring firms show median market

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<sup>4</sup> In the United States from 1980 to 1991, there was a calculated 45.05% median and 63.41% average for firm premiums (Rau and Vermaelen, 1998, p. 235, Table 2).

<sup>5</sup> In the U.K., from 1985 to 2004, there was a calculated 40% median and 45% average for firm premiums (Antoniou et al., 2008, p. 272, Table 1).

values (¥39,245 million for pooling-interest method, ¥104,582 million for purchase with amortization of goodwill method, and ¥53,655 million for purchase with immediate incurrence of goodwill method) that are all considerably higher than the median market value (¥13,604 million) for all listed firms on the stock exchange. Our sample of acquiring firms has a median book-to-market ratio of 0.8945 for pooling-interest method, which is very close to the median book-to-market ratio (0.8818) for all firms listed on the stock exchange. However, our sample's median for the purchase with amortization of goodwill method (0.6997), and for the purchase with immediate incurrence of goodwill method (0.5722) are significantly lower than the median book-to-market ratio for all listed firms. Therefore, if we focus only on our sample's financial characteristics and considerably lower average premiums, disregarding M&A events, we can expect that our sample's acquiring firms will have a long-term stock performance that is lower than the bench mark reference portfolio.

[Table 1]

[Table 2]

[Table 3]



### **3. Market Reaction to Accounting Policy Choices**

#### **(1) Purchase with Amortization of Goodwill Method vs. Pooling-Interest Method**

If a business combination is structured in such a way that the tax consequences are unaffected by the accounting method choice, then the future direct cash flows are also unaffected. In these cases, if investors are *homo economicus*, variance between accounting methods regarding business combinations should not affect the investors' estimate of the firms' intrinsic value. However, the results of previous research are contrary to rational thinking (an anomaly), and are explained through psychology or behavioral economics. For example, investors focus on bottom-line earnings and automatically respond to events that will affect future earnings regardless of the accounting policy. This reflexive response is known as the mechanistic hypothesis or the functional fixation hypothesis. The functional fixation hypothesis maintains that investors routinely interpret earnings numbers without considering the accounting procedure used to calculate them, evincing a direct, positive relationship between bottom-line earnings and subsequent stock performances (Leftwich, 1980; Watts and Zimmerman, 1986).

Previous research (Hopkins, 1996; Hirst and Hopkins, 1998; Maines et al., 2000;

Hopkins et al., 2000) also suggests that financial analysts focus primarily on the raw accounting numbers in the body of a financial statement, even though they could adjust the accounting numbers by using information in the footnotes. For example, in the Hopkins et al. (2000) study, financial analysts were provided with different accounting numbers attributable to disparate accounting policies regarding business combinations, although in reality the actual economic transactions of the hypothetical M&A were identical. In their study, the financial analysts estimated a lower intrinsic value for firms which adopted the purchase with amortization method than firms which adopted the pooling-interest-method. They tended to estimate a firm's intrinsic value without adjusting for the different accounting policies between the pooling-interest and purchase with amortization methods, even if they were able to do so by using information in the footnotes. Therefore, we propose hypotheses 1 as follows:

**Hypothesis 1:** The purchase with amortization of goodwill method has a negative impact on the future EPS, whereas the pooling-interest method has a favorable impact on it. Therefore, the long-term stock performance of a firm which uses the purchase with amortization of goodwill method *will be lower* than a firm which uses the pooling-interest method.

## **(2) Purchase with Amortization of Goodwill Method vs. Immediate Incurrence of Goodwill Method**

In the United States, when acquiring firms use merger bids or tender offers to take over firms such as high-tech or pharmaceutical companies, the acquirers often allocate a substantial portion of the accounting acquisition premium to ongoing research and development and then immediately record it as an expense (Deng and Lev, 1998). In Japan, on the other hand, until the Japanese Accounting Standard for Business Combination was implemented in 2006, no comprehensive accounting rules existed. Acquiring firms often adopted the immediate incurrence of goodwill method, especially those listed in stock exchanges for emerging stocks. Although specific accounting practices vary between the two countries and are used in different contexts, they result in the same consequence: the amount of goodwill is immediately expensed.

When Japanese firms adopted the immediate incurrence accounting procedure, they usually emphasized that the charge to the income was temporary and atypical. Therefore, we have reasoned that in the purchase with amortization of goodwill method, investors realize the immediate expense of goodwill as *an extraordinary item for the current fiscal year* and regard it as an irrelevant item to the firm's future EPS. Conversely,

investors see the amortization cost of goodwill as *an ordinary item*, and regard it as a constant affect to the firm's future EPS. Accordingly, the estimated future EPS should be higher with the immediate incurrence of goodwill method compared to the amortization of goodwill method. Henceforth, we propose our second hypothesis as follows:

**Hypothesis 2:** The long-term stock performance of firms that use the purchase with amortization of goodwill method *will be lower* than firms that use the immediate incurrence of goodwill method.

**(3) Market Performance on the Purchase with Goodwill Amortization Method as a Function of Time (One vs. Three Years Following the M&A Date)**

Even though raw accounting numbers may vary as a function of the firm's adopted accounting choices, we believe that investors only focus on the bottom line numbers to estimate a firm's future EPS. Therefore, the time that has elapsed after an M&A should not affect the estimation of the future EPS. Our argument also holds true for cases where firms adopt the purchase with amortization method.

Contrary to our view, however, some popular corporate valuation textbooks

recommend that investors estimate a firm's intrinsic value by adding the amortization charge of goodwill back into the raw earning numbers (White et al., 1997). In fact, when FASB conducted field visits (as referred in the accounting standards in 1999, para. B79), they found that investors and creditors regard the amortization charge of goodwill as not an ordinary but as an extraordinary cost when making investment decisions. Their rationale, which is contrary to our belief, suggests that investors add back the amortization cost when business combinations occur.

Hopkins et al. (2000) provided limited support for White's et al. claim, because their experimental analysis showed investors adding the amortization charge back if only for a short period after an M&A event; investors do not add the charge back after relatively long periods of time. Hopkins and his fellow researchers examined the perceptions of fifty financial analysts and found that investors often forget about goodwill charge with the abundance of newly acquired information, and therefore, neglect to add it back after long periods of time have passed.

Taking into consideration the Hopkins et al. findings, we should further investigate whether our argument still holds true for cases where firms adopt the purchase with amortization method leading to our fourth hypothesis as follows:

**Hypothesis 3:** The third year stock performance of acquiring firms *is no higher than* the first year performance given the condition that their accounting procedure is consistently the ‘purchase with amortization of goodwill.’

If our data supports hypothesis 3, we are able to reconfirm that investors do merely react mechanically to bottom-line earnings numbers rather than considering the different accounting procedures.

## **4. Methodology and Results**

### **(1) Methodologies**

In order to measure the long-term stock performance of acquiring firms using the abnormal return, we created a reference portfolio. The reference portfolio was comprised of companies that shared two risk factors with our sample stock: book-to-market ratio and size in accord with Fama and French (1992, 1993). The following procedures were employed in the construction of the reference portfolio:

- (a) First we identified all stocks which were listed during the same month that each M&A occurred. We divided these stocks into five groups based on firm size to define the boundaries of each quintile.

(b) Within each quintile, we further sorted the stocks into five groups based on the book-to-market ratio to define the boundaries of the inner quintile, creating twenty-five cells. Each acquiring firm's stock performance was compared to the average stock performance of firms in its corresponding cell, yielding its abnormal return.

Barber and Lyon (1997) and Kothari and Warner (1997) indicated that the cumulative abnormal return (CAR) compared against market performance may result in misspecification. This problem implies that the statistical Type I error is more likely, or that the null hypothesis (that the abnormal return equals zero) is rejected more frequently by chance alone. In Japan, previous research also indicated that using the abnormal return (AR) with the TOPIX benchmark often has a positive bias. Therefore, we calculated AR against the mean return of the reference portfolio by applying the bootstrap test in order to avoid misspecification problems. We charted the experimental distributions using 1,000 samples with the bootstrap method, and we judged the statistical significance by calculating the  $p$  value of our sample from these distributions.

## **(2) Results**

Descriptive statistics for the equal-weighted and value-weighted CARs are reported

in Table 4. Panel (A) of Table 4 reports the results of three accounting methods each taken over three time periods (1<sup>st</sup> year, 3<sup>rd</sup> year, and total 3 years). The performance in our sample, the size of which is indicated by  $N$ , is measured by the cumulative abnormal returns after the effective date of M&As. The top half of Panel (A) shows the results of equal-weighted CARs, while the bottom half shows the results of value-weighted CARs. The statistical results of equal-weighted CARs are consistent with the results of the value-weighted CARs. Please note that we are only able to test the differentials between accounting policies for the equal-weighted CARs, the results of which will be expounded upon in the following paragraph.

The total 3 year performance of all three accounting policy groups are statistically higher than the bench mark reference portfolio. The total 3 year performance of firms using the pooling-interest method is 18.982% ( $p$  value  $< 0.05$ , two-tailed), using the purchase with amortization method reports 5.397% ( $p$  value  $< 0.1$ , two-tailed), and using the purchase with immediate incurrence of goodwill method reports 27.763% ( $p$  value  $< 0.1$ , two-tailed). If we focus only on our sample's financial characteristics and disregard M&A events, we can expect that the 3 year performance of our sample acquiring firms will be lower than the bench mark reference portfolio, because our sample acquiring firms' median market value is considerably higher than the median



market value for all firms listed on the stock exchange and our sample acquiring firms' median book-to-market ratio is lower than the median book-to-market for all firms listed on the stock exchange. However, contrary to our expectations based on financial characteristics, the average 3 year performance (10.191%) is considerably higher than the benchmark reference portfolio by a 1% significance level. Therefore, we are able to conjecture that, in Japan, the average investor appreciates the M&As affect positively.

Panel (B) of Table 4 reports *t* test results for our three hypotheses. First, the long-term performance of firms using the purchase with amortization of goodwill method (5.397%) is significantly lower than firms using the pooling-interest method (18.982%) (*t* value = 1.7495, *p* value = 0.0410, one-tailed), which supports hypothesis 1. Secondly, the long-term performance of firms using the purchase with amortization of goodwill method (5.397%) is significantly lower than firms using the purchase with immediate expensing of goodwill method (27.763%) (*t* value = 1.3160, *p* value = 0.0948, one-tailed), which supports hypothesis 2. We further tested market performance as a function of time (one vs. three years following the M&A effective date) for firms using the purchase with goodwill amortization method. Our results are consistent with hypothesis 3. The three year performance for firms using the purchase with amortization of goodwill method (2.518%) is not significantly different from the same firms' first

year performance (1.359%) ( $t$  value = 0.2955,  $p$  value = 0.3839, one-tailed).

[Table 4]

## 5. Concluding Remarks

In Japan, after the introduction of stock swap and stock transfer schemes in 1999, the number of mergers and acquisitions (M&As) dramatically increased. This increase in M&As suggests that corporate managers have become aware of the importance of identifying suitable targets, and implementing efficient restructuring strategies following M&As. Our sample data shows that Japanese managers use stock swap and stock transfer schemes positively when they acquire target firms. Between 1999 and 2006, in cases where both the acquiring firms and target firms are publicly traded, the number of stock payments (199: 115 mergers plus 84 tender offers) is much greater than the number of cash payments (92)<sup>6</sup>.

The financial characteristics of our sample of acquiring firms are as follows: the median market value is considerably higher than the median market value for all listed firms, and the median book-to-market ratio is lower than the median book-to-market

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<sup>6</sup> We could not identify the payment method (cash vs. stock) for 14 cases.

ratio for all listed firms. Therefore, if we focus only on our sample's financial characteristics and disregard M&A events, we can expect that our sample acquiring firms' long-term stock performance will be lower than the bench mark reference portfolio. However, our results provide the evidence that the average investor appreciates the M&As' affect positively: acquiring firms' long-term stock performance is considerably higher than the bench mark reference portfolio.

In this study, we analyzed the effect of the accounting method and amortization periods upon the subsequent market performance. The accounting methods include: (1) pooling-of-interests, (2) purchase with amortization of goodwill, and (3) purchase with immediate expensing of goodwill. If an M&A is structured such that tax consequences are unaffected by the accounting method choice, then the method chosen does not influence the firm's business or future direct cash flows. Therefore, if investors are *homo economicus*, differences amongst accounting procedures in M&As should not evince a direct, positive relationship between bottom-line earnings and the subsequent stock performance. However our results, which support our aforementioned hypothesis 1, indicate that the long-term stock performance of firms using the purchase with amortization method is significantly lower than firms using the pooling-interest method. This suggests that investors respond reflexively. They focus primarily on bottom-line

earnings and automatically respond to events that will affect future earnings regardless of the accounting policy that has been employed.

We included firms using the purchase with immediate expensing of goodwill method in our sample. This accounting procedure, prohibited after 2006, was typically adopted by firms listed in the emerging stock exchange in Japan. These firms deserve our attention, because their accounting procedure yields the same future EPS as firms who use the purchase with impairment method prescribed in IFRS 3 and SFAS 141. IFRS 3 and SFAS 141 require all business combinations to use the purchase with impairment method, which is ironically not permitted under the Japanese GAAP. Our results supporting hypothesis 2, indicate that the long-term stock performance of firms using the purchase with amortization method is significantly lower than firms using the purchase with immediate expensing of goodwill method. The latter firms, indeed, generate higher future earnings, suggesting that investors regard the immediate expensing of goodwill as *an extraordinary item for the current fiscal year* and as an irrelevant item to the firm's future earnings.

The Japanese adoption of the IFRS is controversial, but the ASBJ is attempting to require that all listed firms adopt the IFRS by 2015-2016. This proposal for universal adoption will be decided upon at the latest by the end of 2012. This study shows that

since investors are misled by differences in accounting procedures, the current Japanese GAAP is unfavorable for Japanese firms. The adoption of standard accounting procedures is necessary to remedy investors' misperceptions. However, adoption of the IFRS will create the new controversy that impairment costs are up to the discretion of the management. The absence of an independent evaluation of impairment costs (goodwill is inherently invisible and intangible and its evaluation is subjective) may lead to the two consequences of leaving the investors with uncertainty, and giving managers the flexibility in reporting accounting numbers<sup>7</sup>.

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<sup>7</sup> Watts (2003), Ramanna (2008), and Ramanna and Watts (2009) have repeatedly pointed out these problematic consequences.

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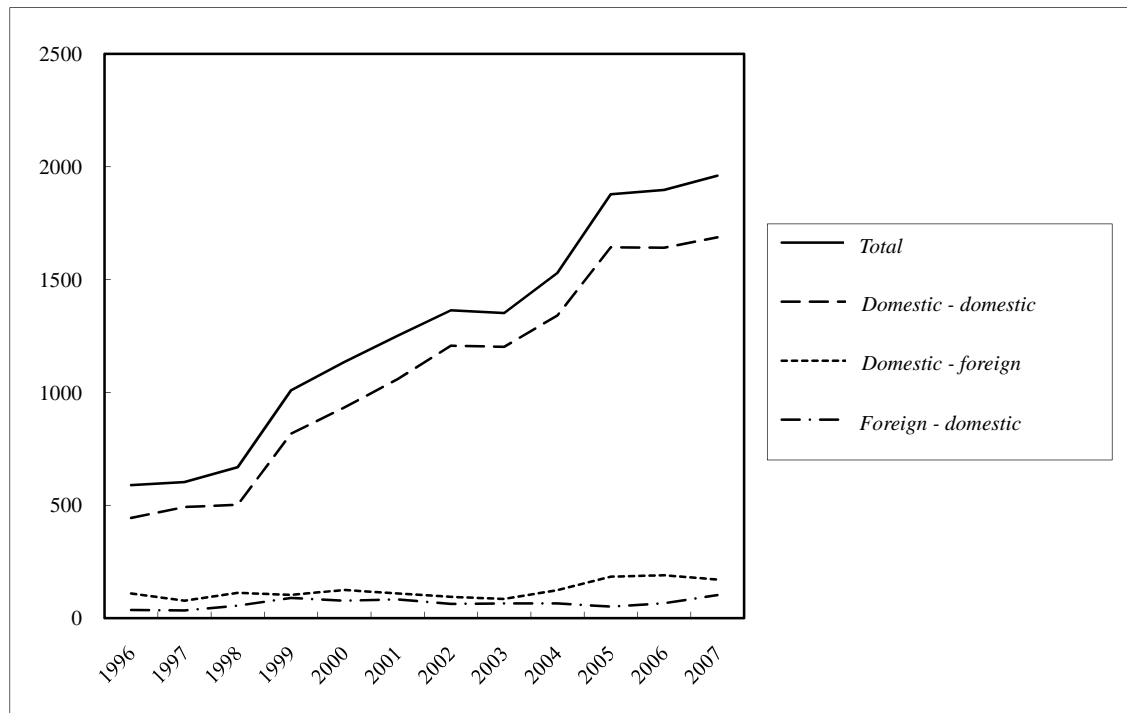


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Figure 1 Historical Chart of the Number of Mergers and Acquisitions Cases in Japan



Data Source: RECOF MARR (Mergers and Acquisitions Research Report) CD-ROM.

This figure includes all M&As from 1996 to 2007 in Japan. Acquirers and targets were either public or private.

*Domestic-domestic* - both acquirer and target are Japanese companies.

*Domestic-foreign* - the acquirer is Japanese and the target is foreign.

*Foreign-domestic* - the acquirer is foreign and the target is Japanese.

Table 1 Sample Characteristics (by calendar year)

Year	Acquiror				Target				Transaction value (¥mln)	Total transaction value (¥mln)	Premium (Equal-weighted)	N of tender offers	N of merger bids	N of Non diversification	No of Diversification	N of Cash payment (tender offers)	No of Stock payment (tender offers)	median
	Market equity (¥mln)	Book-to-market ratio	Financial leverage	ROE	Market equity (¥mln)	Book-to-market ratio	Financial leverage	ROE										(mean)
1996	153,756 (269,927)	0.5275 (0.4685)	0.6505 (0.6335)	1.625% (4.163%)	11,139 (82,721)	0.3064 (0.1188)	0.8309 (0.9336)	3.633% (3.401%)	13,288 (98,424)	295,272	-4.747% (-0.805%)	0	3	2	1	0	0	
1997	15,520 (54,724)	0.6307 (0.6964)	0.6661 (0.6463)	4.968% (3.012%)	9,600 (63,540)	0.6157 (0.6137)	0.5291 (0.5595)	3.060% (22.455%)	8,940 (72,339)	506,372	-10.715% (-12.481%)	0	7	6	1	0	0	
1998	165,028 (3,251,812)	1.0009 (1.1008)	0.6643 (0.5941)	4.280% (4.087%)	13,050 (42,192)	1.1186 (0.9686)	0.6050 (0.6038)	5.922% (10.731%)	8,858 (32,399)	356,385	-2.903% (0.738%)	3	8	6	5	3	0	
1999	49,330 (239,410)	1.0536 (1.2437)	0.6609 (0.5978)	2.885% (3.176%)	9,625 (18,404)	1.4869 (1.4419)	0.7383 (0.6720)	1.292% (-5.975%)	8,973 (14,791)	295,811	-5.741% (-1.613%)	6	14	14	6	5	1	
2000	67,003 (109,491)	0.6862 (0.8897)	0.6985 (0.6376)	1.942% (-1.809%)	4,244 (22,688)	1.0849 (1.4975)	0.6700 (0.6607)	0.439% (-16.626%)	2,525 (20,730)	373,148	-5.80% (-3.454%)	12	7	13	6	3	8	
2001	83,031 (176,845)	0.9208 (1.1881)	0.4825 (0.5087)	4.419% (3.114%)	5,007 (24,400)	1.4968 (1.6492)	0.5091 (0.5225)	2.500% (-4.364%)	7,710 (22,005)	550,117	-1.220% (1.704%)	12	13	17	8	6	6	
2002	98,770 (486,778)	0.9235 (1.8731)	0.6572 (0.6334)	3.686% (3.113%)	4,540 (17,165)	1.5237 (3.5726)	0.6803 (0.6688)	-5.013% (-4.924%)	3,464 (16,594)	597,399	8.701% (10.376%)	26	11	20	17	10	14	
2003	72,713 (179,295)	1.0132 (1.5858)	0.6745 (0.6355)	2.918% (2.383%)	3,218 (23,587)	1.7415 (-7.2212)	0.6489 (0.6124)	1.551% (-5.383%)	3,865 (16,318)	603,775	3.000% (12.154%)	24	17	26	15	8	15	
2004	68,747 (190,331)	0.7680 (0.8210)	0.6502 (0.6357)	4.766% (9.783%)	4,238 (18,202)	1.0638 (1.2155)	0.6477 (0.6067)	3.585% (-11.992%)	3,557 (11,512)	518,061	0.855% (1.995%)	39	7	23	23	17	19	
2005	86,130 (238,764)	0.5967 (0.6990)	0.6086 (0.5776)	6.360% (3.017%)	5,952 (34,975)	0.8102 (0.8300)	0.5752 (0.5531)	4.227% (-79.503%)	4,868 (58,784)	2,939,175	-1.159% (-5.230%)	39	14	31	22	23	13	
2006	153,943 (463,229)	0.5151 (0.5358)	0.6267 (0.6145)	8.190% (9.736%)	10,476 (45,016)	0.6224 (0.7071)	0.6173 (0.5558)	4.478% (-83.297%)	7,184 (45,762)	1,921,997	5.134% (8.082%)	29	14	26	17	17	8	
Total	80,886 (271,312)	0.7459 (1.0559)	0.6474 (0.6083)	4.890% (4.679%)	5,898 (28,836)	1.0556 (0.2631)	0.6184 (0.6013)	2.848% (-29.237%)	4,784 (30,468)	8,957,512	1.277% (2.625%)	190	115	184	121	92	84	

Market equity, book-to-market ratio, financial leverage, and ROE, transaction value, Premium, Non Diversification, Diversification, cash payment (tender offers), and stock payment (tender offers) are reported as median values and mean values, by calendar year. In our sample, payment methods of merger bids are all stock payments.

Our sample includes M&A transactions from January 1996 to December 2006 (available from the RECOF MARR CD-ROM database) that meet the following criteria:

- Both the acquirer and target are listed in the stock exchange in order to exclude small cases.
- The acquirer and/or target are not financial institutions, nor involved in a bailout takeover where the transaction is a result of the target suffering financial distress.
- The accounting procedure of the M&A transaction is identifiable from annual reports as either the purchase method or the pooling-interest method.
- The amortization period is identifiable in the financial statement.

The number of M&A transactions which satisfied these criteria is 305.

Table 2 Sample Characteristics (by acquirer's industry)

Acquiror's industry	Acquiror				Target				median (mean)
	Market equity (¥mln)	Book-to-market ratio	Financial leverage	ROE	Market equity (¥mln)	Book-to-market ratio	Financial leverage	ROE	
Foods	97,742 (278,114)	0.9600 (1.0001)	0.3021 (0.3493)	4.350% (4.378%)	11,014 (20,199)	0.9299 (0.8741)	0.3737 (0.4834)	6.003% (-18.350%)	
Textiles	119,058 (186,957)	1.1233 (1.6465)	0.6572 (0.5876)	0.418% (-0.551%)	10,355 (24,803)	1.1186 (1.2333)	0.7651 (0.6548)	2.066% (-1.274%)	
Pulp & Paper	555,437 (378,173)	0.7867 (0.9136)	0.7146 (0.6823)	1.136% (0.705%)	12,068 (52,692)	0.7927 (0.9354)	0.8166 (0.7896)	-5.200% (-12.503%)	
Chemicals	135,143 (211,826)	0.6726 (0.8480)	0.6992 (0.6963)	4.968% (4.600%)	8,503 (71,898)	1.0845 (1.3547)	0.5216 (0.5387)	3.060% (5.676%)	
Drugs	94,929 (302,596)	0.6812 (0.9528)	0.3898 (0.4208)	7.026% (7.162%)	75,389 (203,291)	0.9709 (1.1755)	0.4350 (0.4475)	5.558% (3.223%)	
Petroleum	465,891 (408,944)	0.9334 (0.9599)	0.7467 (0.7418)	1.261% (-0.333%)	76,403 (132,087)	0.5585 (0.8986)	0.8152 (0.7798)	-4.319% (-6.036%)	
Rubber	1,324,285 (1,324,285)	0.6412 (0.6412)	0.6959 (0.6959)	-0.495% (-0.495%)	33,604 (33,604)	0.9662 (0.9662)	0.5591 (0.5591)	5.738% (5.738%)	
Stone, Clay & Glass	17,712 (50,738)	1.2011 (1.4903)	0.7050 (0.6711)	2.836% (0.075%)	3,753 (16,009)	1.6188 (2.1474)	0.6908 (0.6632)	0.808% (-14.513%)	
Iron & Steel	297,950 (523,156)	1.1375 (1.0959)	0.8324 (0.7838)	2.576% (-2.488%)	8,923 (76,295)	1.1366 (2.5902)	0.7227 (0.7146)	-4.128% (-5.273%)	
Non-ferrous Metal	74,336 (184,352)	1.0951 (1.4692)	0.5139 (0.5558)	2.433% (-24.826%)	4,643 (22,599)	1.5594 (2.1742)	0.5237 (0.5437)	1.094% (-16.939%)	
Machinery	72,707 (198,532)	0.7235 (0.9067)	0.6533 (0.6260)	5.131% (7.391%)	6,798 (23,887)	1.0411 (1.5152)	0.5353 (0.5278)	3.875% (9.981%)	
Electric & Electronic Equipment	64,973 (184,771)	0.6467 (0.7400)	0.5078 (0.4337)	5.700% (5.4106%)	5,434 (13,015)	1.1295 (1.1016)	0.5652 (0.5929)	-1.571% (-25.002%)	
Shipbuilding & Repairing	164,087 (164,087)	1.0222 (1.0222)	0.8622 (0.8622)	3.745% (3.745%)	10,555 (10,555)	1.7053 (1.7053)	0.5281 (0.5281)	1.100% (1.100%)	
Motor Vehicles & Auto Parts	97,483 (1,450,899)	1.0995 (1.1422)	0.6712 (0.6458)	6.605% (2.044%)	3,430 (4,846)	1.3749 (1.7407)	0.6129 (0.6760)	1.787% (-46.429%)	
Precision Equipment	284,209 (307,137)	0.4576 (0.3635)	0.6289 (0.5453)	6.459% (7.749%)	57,358 (67,163)	0.3274 (-0.1985)	0.8877 (1.0032)	2.252% (-7.597%)	
Other Manufacturing	65,542 (98,166)	0.5359 (0.6606)	0.5563 (0.4724)	9.299% (9.224%)	4,575 (18,811)	1.3347 (1.5985)	0.4588 (0.4559)	3.313% (-11.951%)	
Mining	1,532,026 (1,532,026)	0.2685 (0.2685)	0.4269 (0.4269)	18.598% (18.598%)	333,531 (333,531)	0.4975 (0.4975)	0.3011 (0.3011)	5.590% (5.590%)	
Construction	79,016 (265,042)	1.0124 (1.3065)	0.5238 (0.5964)	4.513% (11.507%)	5,398 (7,032)	1.5355 (1.6391)	0.5946 (0.6152)	2.352% (-4.090%)	
Wholesale Trade	45,862 (83,502)	0.9004 (1.9312)	0.7340 (0.6817)	4.855% (5.546%)	4,917 (13,773)	1.0645 (2.0754)	0.6848 (0.6935)	2.239% (1.840%)	
Retail Trade	50,540 (411,094)	0.5924 (0.6958)	0.6971 (0.6510)	6.656% (6.236%)	5,594 (25,067)	1.0745 (-9.1970)	0.6037 (0.6084)	5.273% (-0.819%)	
Real Estate	39,350 (230,146)	0.5638 (0.5946)	0.7685 (0.7917)	12.432% (157.369%)	4,352 (6,886)	0.7772 (0.7029)	0.6706 (0.6841)	-0.381% (-814.671%)	
Railroad Transportation	399,566 (419,632)	0.5482 (0.5403)	0.8727 (0.8612)	-3.380% (-8.839%)	22,373 (73,300)	0.9283 (1.3113)	0.8453 (0.8298)	-7.813% (-13.501%)	
Trucking	125,075 (125,075)	2.2542 (2.2542)	0.4336 (0.4336)	3.155% (3.155%)	5,097 (5,097)	4.3976 (4.3976)	0.2572 (0.2572)	2.343% (2.343%)	
Sea Transportation	554,329 (603,980)	0.4672 (0.4698)	0.7849 (0.7848)	12.758% (15.826%)	2,506 (21,467)	0.4775 (0.6936)	0.7923 (0.7947)	4.146% (14.399%)	
Air Transportation	298,198 (298,198)	0.1562 (0.1562)	0.9121 (0.9121)	-77.015% (-77.015%)	6,101 (6,101)	0.7452 (0.7452)	0.3381 (0.3381)	7.872% (7.872%)	
Warehousing & Harbor Transportation	93,959 (93,959)	0.4973 (0.4973)	0.4658 (0.4658)	-23.220% (-23.220%)	6,755 (6,755)	0.9536 (0.9536)	0.7020 (0.7020)	-7.843% (-7.843%)	
Communication Service	31,513 (31,513)	3.2221 (3.221)	0.6230 (0.6230)	6.148% (6.148%)	7,130 (7,130)	3.5226 (3.5226)	0.0174 (0.0174)	-7.780% (-7.780%)	
Utilities -Electric	940,436 (940,436)	0.9976 (0.9976)	0.7526 (0.7526)	8.618% (8.618%)	5,029 (5,029)	3.8052 (3.8052)	0.5613 (0.5613)	-18.501% (-18.501%)	
Services	31,819 (70,308)	0.4746 (0.6571)	0.5053 (0.4983)	7.039% (0.056%)	5,664 (13,296)	0.4951 (0.9708)	0.4629 (0.4924)	3.175% (-82.177%)	
Total	80,886 (271,312)	0.7459 (1.0559)	0.6474 (0.6083)	4.890% (4.679%)	5,898 (28,836)	1.0556 (0.2631)	0.6184 (0.6013)	2.848% (-29.237%)	

Market equity, book-to-market ratio, financial leverage, and ROE, transaction value, Premium, Non Diversification, Diversification, cash payment (tender offers), and stock payment (tender offers) are reported as median values and mean values, by acquirer's industry. In our sample, payment methods of merger bids are all stock payments.

Our sample includes M&A transactions from January 1996 to December 2006 (available from the RECOF MARR CD-ROM database) that meet the following criteria:

- (a) Both the acquirer and target are listed in the stock exchange in order to exclude small cases.

Table 2 (Continued)

Acquiror's industry	Transaction value (¥mln)	Total transaction value (¥mln)	Premium (Equal-weighted)	N of tender offers	N of merger bids	N of Non diversification	No of Diversification	N of Cash payment (tender offers)	median
									(mean)
Foods	8,688 (19,831)	218,142	-3.725% (5.983%)	8	4	8	4	4	2
Textiles	1,499 (4,598)	41,386	-10.732% (-13.535%)	8	3	5	6	3	3
Pulp & Paper	16,034 (56,742)	453,935	-1.398% (-2.684%)	3	5	6	2	0	3
Chemicals	6,901 (45,503)	728,040	6.858% (13,144%)	12	5	9	6	5	7
Drugs	65,013 (234,542)	938,166	8.055% (7.976%)	1	3	2	2	1	0
Petroleum	61,776 (103,482)	413,928	-8.960% (9.833%)	2	2	4	0	2	0
Rubber	17,461 (17,461)	34,921	1.124% (1.124%)	0	2	1	1	3	2
Stone, Clay & Glass	2,643 (16,415)	164,153	-1.134% (-6.508%)	5	5	7	3	0	5
Iron & Steel	9,013 (69,551)	556,404	9.239% (-3.012%)	5	3	2	6	3	3
Non-ferrous Metal	1,825 (14,182)	198,545	-11.447% (-9.773%)	9	5	6	8	5	2
Machinery	3,583 (22,365)	447,298	-11.095% (-4.995%)	9	11	12	8	5	7
Electric & Electronic Equipment	2,626 (9,376)	140,635	-5.684% (-4.144%)	12	5	9	8	0	1
Shipbuilding & Repairing	6,599 (6,599)	6,599	-59.483% (-59.483%)	1	0	0	1	1	5
Motor Vehicles & Auto Parts	2,859 (5,095)	45,858	0.339% (6.608%)	6	3	5	4	2	0
Precision Equipment	20,308 (69,104)	207,313	-2.624% (-28.632%)	2	1	1	2	3	2
Other Manufacturing	3,176 (33,820)	236,740	17.335% (17.931%)	5	2	1	6	4	3
Mining	360,596 (360,596)	360,596	5.134% (5.134%)	0	1	1	0	0	0
Construction	5,026 (14,849)	237,576	-5.797% (-4.744%)	8	8	11	5	4	3
Wholesale Trade	5,046 (12,466)	498,645	6.823% (7.108%)	19	21	24	16	8	11
Retail Trade	4,630 (61,643)	1,972,563	5.792% (13.978%)	26	9	26	9	16	8
Real Estate	2,442 (2,763)	13,814	-8.124% (-6.719%)	5	0	1	4	5	0
Railroad Transportation	18,193 (74,478)	446,870	0.124% (0.0755%)	6	0	1	5	1	5
Trucking	12,335 (12,335)	24,670	16.205% (16.205%)	2	0	1	1	0	2
Sea Transportation	1,733 (5,539)	27,694	0.660% (-1.285%)	5	0	3	2	2	3
Air Transportation	10,878 (10,878)	10,878	7.143% (7.143%)	1	1	0	2	0	0
Warehousing & Harbor Transportation	8,160 (8,160)	16,320	-15.013% (-15.013%)	2	0	0	2	2	0
Communication Service	2,575 (2,575)	2,575	0.286% (0.286%)	1	0	0	1	1	0
Utilities -Electric	1,592 (1,592)	1,592	38.337% (38.337%)	2	0	0	2	1	1
Services	4,856 (12,752)	510,065	0.284% (3.113%)	25	16	36	5	15	9
Total	4,784 (30,468)	8,957,512	1.277% (2.625%)	190	115	184	121	92	84

(b) The acquirer and/or target are not financial institutions, nor involved in a bailout takeover where the transaction is a result of the target suffering financial distress.

(c) The accounting procedure of the M&A transaction is identifiable from annual reports as either the purchase method or the pooling-interest method.

(d) The amortization period is identifiable in the financial statement.

The number of M&A transactions which satisfied these criteria is 305.

Table 3 Sample Characteristics (by accounting policies)

Accounting Policy	N	Acquirer				Target				median (mean)
		Market equity	Book-to-market ratio	Financial leverage	ROA	Market equity	Book-to-market ratio	Financial leverage	ROA	
		(¥mln)				(¥mln)				
pooling-of-interest method	78	39,245 (171,999)	0.8945 (1.1977)	0.6574 (0.6138)	3.367% (4.156%)	9,364 (526,454)	1.2079 (1.7679)	0.5702 0.5622	3.119% (2.855)%	
purchase with amortization of goodwill method	209	104,582 (324,921)	0.6997 (1.0264)	0.6422 (0.6111)	3.642% (3.713%)	5,151 (21,791)	1.0322 (2.1566)	0.6360 0.6149	1.342% (0.838%)	
purchase with immediate incurrence of goodwill method	18	53,655 (79,206)	0.5722 (0.7844)	0.6290 (0.5518)	4.496% (4.345%)	4,622 (7,464)	0.5393 (28.2435)	0.5487 0.6132	2.000% (1.109%)	
Total	305	80,886 (271,312)	0.7459 (1.0559)	0.6474 (0.6083)	3.553% (3.864%)	5,898 (28,836)	1.0556 (0.2631)	0.6184 0.6013	1.836% (1.370%)	

Market equity, book-to-market ratio, financial leverage, and ROE of both acquirer and target are reported as median values and mean values, by accounting policies. In our sample, payment methods of merger bids are all stock payments.

Our sample includes M&A transactions from January 1996 to December 2006 (available from the RECOF MARR CD-ROM database) that meet the following criteria:

- Both the acquirer and target are listed in the stock exchange in order to exclude small cases.
- The acquirer and/or target are not financial institutions, nor involved in a bailout takeover where the transaction is a result of the target suffering financial distress.
- The accounting procedure of the M&A transaction is identifiable from annual reports as either the purchase method or the pooling-interest method.
- The amortization period is identifiable in the financial statement.

The number of M&A transactions which satisfied these criteria is 305.

Table 4 Panel (A)

		<i>Equal-weighted CAR</i>					<i>Benchmark: Reference Portfolio</i>		
Accounting Policies	N	Timeframes							
		3rd year performance	p-value		1st year performance	p-value	Total 3 years performance	p-value	
(1) pooling-of-interest method	78	10.297%	0.028	**	4.715%	0.233	18.982%	0.035	**
(2) purchase with amortization of goodwill method	209	2.518%	0.127		1.359%	0.308	5.397%	0.089	*
(3) purchase with immediate incurrence of goodwill method	18	12.175%	0.132		6.640%	0.315	27.763%	0.098	*
ALL	305	5.078%	0.025	**	2.529%	0.261	10.191%	0.007	***

		<i>Value-weighted CAR</i>					<i>Benchmark: Reference Portfolio</i>		
Accounting Policies	N	Timeframes							
		3rd year performance	p-value		1st year performance	p-value	Total 3 years performance	p-value	
(1) pooling-interest method	78	14.194%	0.042	**	-3.361%	0.712	16.348%	0.020	**
(2) purchase with amortization of goodwill method	209	0.382%	0.436		-4.937%	0.955	-1.340%	0.977	
(3) purchase with immediate incurrence of goodwill method	18	7.861%	0.221		1.542%	0.532	19.937%	0.055	*
ALL	305	4.164%	0.088	*	-3.677%	0.250	4.556%	0.114	

Panel (A) of Table 4 reports the results of three accounting methods each taken over three time periods (1st year, 3rd year, and total 3 years). The performance in our sample, the size of which is indicated by *N*, is measured by the cumulative abnormal returns after the effective date of M&As. The top half of Panel (A) shows the results of equal-weighted CARs, while the bottom half shows the results of value-weighted CARs. In our sample, payment methods of merger bids are all stock payments.

Our sample includes M&A transactions from January 1996 to December 2006 (available from the RECOF MARR CD-ROM database) that meet the following criteria:

- Both the acquirer and target are listed in the stock exchange in order to exclude small cases.
- The acquirer and/or target are not financial institutions, nor involved in a bailout takeover where the transaction is a result of the target suffering financial distress.
- The accounting procedure of the M&A transaction is identifiable from annual reports as either the purchase method or the pooling-interest method.
- The amortization period is identifiable in the financial statement.

The number of M&A transactions which satisfied these criteria is 305.

We determined the statistical cut-off points by calculating distributions drawn up experimentally 1,000 times by the bootstrap method.

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

Table 4 Panel (B)

Hypothesis	<i>t</i> -statistics ( <i>p</i> -value)
H1: Purchase with ratable amortization method (Total 1 to 3 years) < Pooling-of-interest method (Total 1 to 3 years)	1.7495 ** (0.0410)
H2: purchase with amortization of goodwill method (Total 1 to 3 years) < purchase with immediate incurrence of goodwill method (Total 1 to 3 years)	1.3160 * (0.0948)
H3: purchase with amortization of goodwill method (Past (3 years ago)) < purchase with amortization of goodwill method (RECENT (within 1 year))	0.2955 (0.3839)

Panel (B) of Table 4 reports *t* test results for our three hypotheses.

Predictions are directional by hypotheses 1 to 3, so *p*-values are one-tailed.

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