

THE EFFECT OF ACQUIRING FIRM'S GROWTH OPPORTUNITY ON THE VALUE RELEVANCE OF GOODWILL

**Yuji Shirabe. Doctoral student, Graduate School of Commerce and
Management, Hitotsubashi University.**

Abstract

In recent years, mergers and acquisitions (M&A) have become increasingly important for Japanese firms to achieve growth. In this situation, how does the stock market recognize and evaluate the goodwill generated as a consequence of M&A? Given that Japanese companies have increasingly used M&A as for a tool for growth, we can say that the growth opportunity of the acquiring firms is an important factor that affects valuation of goodwill in the stock market. In this study, we investigate the link between growth opportunity and the value of goodwill in the stock market.

The results of our study show that the market valuation of newly acquired goodwill is positively influenced by the growth opportunities of acquiring firms in Japan. Therefore, this study implies that M&A works better when it is done to utilize internal growth opportunity rather than to incorporate external growth opportunities into the firm.

Does Acquiring Firm's Growth Opportunity Affect Market Valuation Of Goodwill?

Introduction

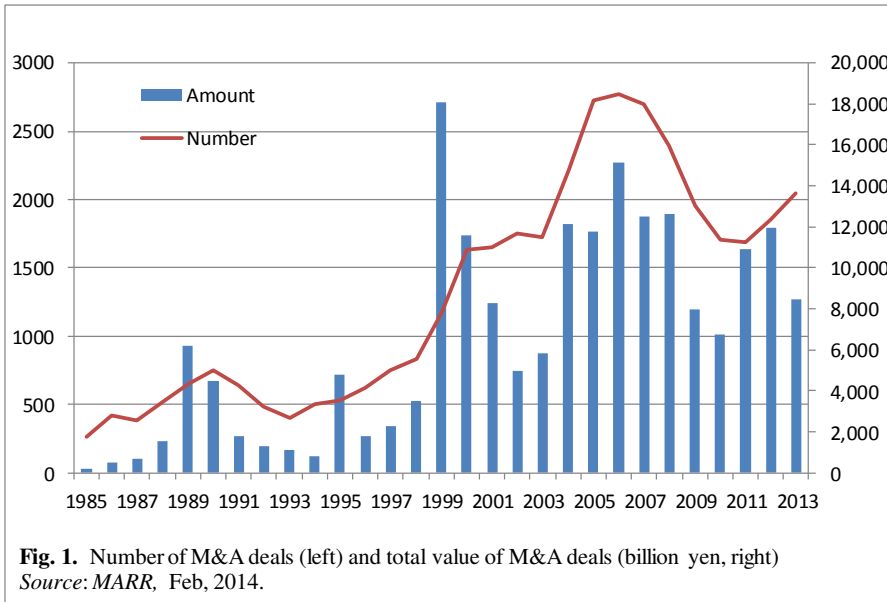
In recent years, merger and acquisition (M&A) has become an increasingly important tool for achieving growth in Japan. Japanese enterprises, faced with a shrinking domestic market and expansion in emerging markets, must acquire firms more aggressively for growth. Historically, M&A deals in Japan have not been common. Miyajima [2007] stated that the causes of this lack of M&A activity include (1) the existence of the main-bank system, (2) restrictions of horizontal mergers under the Antimonopoly Act, and (3) firms' strong preference for internal growth. This situation changed in the late 1980s. The yen appreciated rapidly in the wake of the Plaza Accord and the real purchase price of foreign companies substantially decreased. In this period, the acquisition of foreign companies by Japanese companies occurred with great frequency (Miyajima, 2007). Figure 1 shows that the number and value of M&A deals in Japan.¹ There were only 260 deals, collectively worth 207.2 billion yen, in 1985, which increased to 645 deals, collectively worth 6.174 trillion yen, in 1989. In

¹MARR is the M&A journal published by Recof Data Corporation, which is a standard provider of the M&A database in Japan.

the late 1990s, a second M&A boom occurred. Many of the M&A deals during this period were caused by temporary factors such as the restructuring of heavy industry in the face of intensified international competition and the restructuring of the financial industry following the collapse of the bubble economy and deregulation.

Therefore, many of the traditional M&A deals in Japan occurred in response to temporary events and were not pursued as a part of a growth strategy of companies on an ongoing basis. In the 2000s and later, however, many M&A deals have regularly occurred to achieve growth in many industries, including the information and communication industry and the pharmaceutical industry (e.g., the 2006 acquisition of Vodafone Japan corporation by Softbank and the 2011 acquisition of Nycomed, a Norwegian pharmaceutical company, by Takeda Pharmaceutical Company Limited). Despite negative economic events such as the global financial crisis of 2008 and the Great East Japan Earthquake of 2011, many M&A deals have been carried out in recent years. This indicates that M&A has become more common for Japanese companies as a growth strategy, rather than as a response to temporary events.

Given this situation, how does the stock market recognize and evaluate the goodwill generated as a consequence of M&A? Japanese companies have increasingly used M&A as a tool for growth, and so we can say that growth opportunity is an important factor that affects the valuation of goodwill in the stock market. As is well known, previous studies have found a strong relation between acquisition and growth opportunity (e.g. Andrade et al., 2001; Miyajima, 2007). These studies show that firms having more growth opportunity are more likely to acquire other firms. Additionally, other previous studies have consistently found a positive relation between goodwill and firm value, that is, goodwill is value-relevant (e.g., Jennings et al., 1996; McCarthy and Schneider, 1995; Henning et al., 2000). However, few studies have examined whether the growth opportunities of acquiring firms affect the market valuation of its purchased goodwill. Given the fact that Japanese companies have increasingly used M&A as a tool for growth, it is necessary to answer this question. This study investigates the link between growth opportunity and the value of goodwill in the stock market.



We find that the stock market attaches high value to the newly purchased goodwill for firms with larger growth opportunity than for firms with smaller growth opportunity. This research has two main implications. First, we introduce growth opportunity as a new perspective in the literature on goodwill value-relevance and investigate the relation between growth opportunity and the valuation of goodwill in the stock market. Previous studies have been limited in their examination of the factors that affect goodwill valuation, and further, these studies focus on only the components of goodwill. Thus, this research may be the first to focus on the characteristics of goodwill as an asset that arises from M&A conducted as part of a growth strategy. Second, this study provides a recommendation for companies considering M&A as a part of growth strategy. In recent years, M&A deals by mature companies have become common in Japan. However, according to the findings of this paper, the goodwill of companies with less growth opportunity tends to be less valued on the stock market than that of firms with more growth opportunity. Therefore, the present study shows that M&A works better with respect to goodwill when it is done to utilize internal growth opportunity rather than to incorporate external growth opportunity into the firm.

The remainder of this paper is organized as follows. Section 2 reviews the literature and develops the hypotheses. The research design is presented in Section 3. Section 4 describes our sampling method and sample data. Results of the analysis and robustness checks are presented in Section 5, followed by a conclusion in Section 6.

2. Prior Literature and Hypothesis Development

A number of prior studies investigate the relation between goodwill and firm value (e.g., Jennings et al., 1996; McCarthy and Schneider, 1995; Henning et al., 2000, Nagata, 2002; Bugeja and Gallery, 2006; Yamaji, 2008; Al-Jifri and Citron, 2009; Oliveira et al., 2010). In the past, there have been differences in the accounting standards on whether to capitalize purchased goodwill, but now, firms must capitalize the purchased goodwill in all of the major accounting standards. After the capitalization of goodwill became mandatory, many studies have examined empirically whether goodwill is valued or not.

Jennings et al. (1996) examine the value relevance of goodwill by performing multiple regression analyses with an estimation equation in which the dependent variable is market capitalization and the independent variables are book value of goodwill, tangible assets, other assets, and debt. They find that there is a positive correlation between the book value of goodwill and market capitalization, and conclude that the stock market sees goodwill as a valuable asset. Similarly, McCarthy and Schneider (1995) investigate the relation between goodwill and firm value by using an estimation equation in which the dependent variable is market capitalization and the independent variables are book value of goodwill, total assetsexcluding goodwill, debt, and net profit. They show that the coefficient of goodwill is significantly positive, which implies that the stock market values goodwill on average.

Nagata (2002) analyzes the value relevance of goodwill in Japan from 1997 to 1999 by using an estimation equation similar to that of Jennings et al. (1996). The result of multiple regression shows that stock price is significantly correlated with the carrying value of goodwill. Yamaji(2008) also examines the value relevance of goodwill in Japan from 2002 to 2005 by using an estimation equation in which the dependent variable is stock price and the independent variables are book value of goodwill, net assetsexcluding goodwill, and net profit. This study also finds that the coefficient of goodwill is significantly positive. These results show that the Japanese stock market also places the value on goodwill.

Al Jifri and Citron (2009) and Oliveira et al. (2010) examine the impacts of the adoption of new accounting requirements on the value relevance of purchased goodwill. Both of these studies find that the adoption of new accounting policies affected the market valuationof goodwill.

Every study described above examines whether total goodwill is valued in the stock market. However, Henning et al. (2000) and Bugeja and Gallery (2006)focus on the components of goodwill, whichdistinguishes these studies from other previous studies. Henning et al. (2000) adopt the framework of Johnson and Petrone(1998) and divide goodwill into various components to examine whether the stock market distinguishes among or attaches different value to each component. The analysis targets companies included in Compustat from 1990 to 1994, and the results show that stock price is positively correlated with the going-concern component and the synergy component and

negatively correlated with the overestimation component and the overpayment component. The results imply that investors attach different values to each component of goodwill. Bugeja and Gallery (2006) examine whether goodwill evaluation is affected by the “age” of goodwill. They find that recently acquired goodwill is valued but goodwill acquired more than two years previously is not valued as such in the Australian stock market.

As stated above, many of the previous studies, such as Jennings et al. (1996) and Yamaji (2008), show that goodwill, in total, is valued in various stock markets. However, it is possible to suppose that goodwill acquired in any given year has a different value relevance, that is, stock markets do not see goodwill equally in terms of value. Stock markets can get information about goodwill acquired in the past years and cannot get information about goodwill acquired in the current year. This is because a relatively long time has passed since the older goodwill was acquired, whereas just a little time has passed since the new goodwill was acquired. As a result, the stock market can value older goodwill appropriately and discount the value of new goodwill. However, at the same time, it is possible to hypothesize that markets value new goodwill, since investors know from past experience that goodwill typically has a value to the firm, and thus, they value new goodwill before any accounting tests are applied. Considering that market valuation precedes accounting valuation (Ball and Brown, 1968; Beaver, 1968), we take the latter view and develop Hypothesis 1 (H1).

H1: Goodwill acquired in the current year is valued in the stock market.

M&A is often used as part of a growth strategy (Morck et al., 1988; Miyajima, 2007). Miyajima (2007) classifies M&A with synergy as having integration effects and growth effects. In Miyajima (2007), for the latter, acquiring firms can increase their competitiveness and firm value by gaining the managerial resources that enable them to utilize their growth opportunity. Jovanovic and Rousseau (2002) show that firms with a high Tobin’s Q, an indicator of future growth opportunity, tend to acquire other businesses. Additionally, Andrade et al. (2001) examine 4,258 M&A deals from 1973 to 1998 in the United States. They find that the Tobin’s Q of the acquiring firm is higher than that of the acquired firm in about two-thirds of these M&A deals. Miyajima (2007) investigates M&A deals from 1995 to 2004 in Japan and also finds that Tobin’s Q of the acquiring firm is significantly higher than that of the acquired firm.

Given the strong link between M&A and growth opportunity, it is expected that there is a relation between growth opportunity and the goodwill accumulated through M&A. If firms have abundant growth opportunity, such firms can use their goodwill in their growth opportunity and achieve high levels of earnings. Therefore, we develop Hypothesis 2a (H2a) and Hypothesis 2b (H2b).

H2a: The goodwill of firms with higher rates of sales growth is highly valued in the stock market.

H2b: The goodwill of firms considered by investors as having larger growth opportunity is highly valued in the stock market.

Both H2a and H2b mean that investors value the goodwill of firms with larger growth opportunity than that of firms with smaller growth opportunity.

3. Research Design

To examine the value relevance of goodwill, we modify a regression model so that market capitalization is written as a function of the book value of equity and earnings. Many prior studies in the value relevance literature use similar models (see Holthausen and Watts, 2001; Barth et al, 2001). As stated in Section 2, many of the previous studies about the market valuation of goodwill employ similar regression models. Following previous studies, we estimate regression equation (1) to test H1. Definitions of each variable are as follows.

$$MV_t = \alpha_0 + \alpha_1 NI_t + \alpha_2 BVEXGW_t + \alpha_3 GWXGWAQ_t + \alpha_4 GWAQ_t + \varepsilon \quad (1)$$

Next, we describe $GWAQ_t$, a proxy variable for book value of new goodwill acquired in the current year at closing date of year t . First, we calculate goodwill for year t before amortization by adding goodwill amortization for year t to the book value of goodwill at the closing date of

Variable	Definition
MV_t	Market capitalization three months after closing date of year t
NI_t	Net income for year t
$BVEXGW_t$	Book value of equity excluding book value of total goodwill at closing date of year t
$GWXGWAQ_t$	Book value of total goodwill at closing date of year t excluding new goodwill acquired in year t
$GWAQ_t$	Book value of new goodwill acquired in the current year at closing date of year t ((book value of total goodwill at closing date of year t + goodwill amortization for year t - book value of total goodwill at closing date of year $t-1$) * residual rate of goodwill)

year t . When goodwill for year t before amortization is larger than book value of goodwill at the closing date of year t , the excess can be considered as new goodwill acquired in the current year. Second, we calculate a residual rate of goodwill for each observation as $(1 - (\text{goodwill amortization for year } t / (\text{book$

value of total goodwill at closing date of year $t +$ goodwill amortization for year t)).

Then, we estimate $GWAQ_t$ by multiplying new goodwill acquired in the current year by the average residual rate. The reason that we do not use residual rates of each observation directly is that there are indications that firms amortize their goodwill over a longer period than the maximum amortization period allowed by accounting standards, and so it is inappropriate to adopt these rates. The estimated average residual rate of goodwill is 84.5%. This means that the estimated average amortization period is 6.45 years ($1 / (1 - 0.845)$), which seems reasonable. We are interested in the coefficient of $GWAQ_t$, α_4 , and expect that it is positive.

In order to test H2a, we estimate regression equation (2). We introduce two new independent variables to examine how growth opportunity affects market valuation of goodwill. One variable is the rate of sales growth ($CAGR_t$), and the other is the interaction term with $GWAQ_t$ ($GWAQ_t * CAGR_t$). Definitions of new variables are as follows.

$$MV_t = \alpha_0 + \alpha_1 NI_t + \alpha_2 BVEXGW_t + \alpha_3 GWXGWAQ_t + \alpha_4 GWAQ_t + \alpha_5 GWAQ_t * CAGR_t + \alpha_6 CAGR_t + \varepsilon \tag{2}$$

Variable	Definition
$CAGR_t$	Compound annual growth rate of sales during $(t-3)$ – $(t-1)$
$GWAQ_t * CAGR_t$	Interaction term of $GWAQ_t$ and $CAGR_t$

$CAGR_t$ is a proxy variable of an acquiring firm’s growth opportunity. By introducing the interaction term of $GWAQ_t$ and $CAGR_t$, we can examine how growth opportunity affects the market valuation of goodwill. The variable of interest is $GWAQ_t * CAGR_t$, and its coefficient, α_5 , is expected to be positive.

To test H2b, we divide all firms in the sample into four groups on the basis of the Tobin’s Q ((market capitalization + book value of debt) / book value of total asset). Then, we estimate regression equation (1) for each group. The reason that we do not use a similar method to those used in the test of H2a is that Tobin’s Q is highly correlated with MV_t and so it would be inappropriate to use the same method. If the growth opportunity of the acquiring firm has a positive effect on the value relevance of goodwill, the coefficient of $GWAQ_t$, α_4 , for the higher Tobin’s Q’s group will be larger than that of the lower Tobin’s Q group. In order of increasing of Tobin’s Q, the coefficients α_4 of each group are named as $\alpha_{4,q1}$, $\alpha_{4,q2}$, $\alpha_{4,q3}$, $\alpha_{4,q4}$. We expect that $\alpha_{4,q1} < \alpha_{4,q2} < \alpha_{4,q3} < \alpha_{4,q4}$.

In this study, all variables that indicate an amount of money (MV_t , NI_t , $BVEXGW_t$, $GWXGWAQ_t$, $GWAQ_t$) are scaled by the book value of total asset at closing date of year $t-1$. To control for year effects and industry effects, year dummy variables and industry dummy variables are included in both regression equations (1) and (2). To handle heteroscedasticity, standard errors are corrected by the method of White [1980].

4. Sampling Procedure and Data

4.1. Sampling procedure

The data used in this study are collected from Nikkei's "NEEDS-FinancialQUEST" database, which is widely used in the analysis of Japanese companies. Our sample period is 2000–2013. Firm-year observations that meet the following criteria are included in our sample:

- (a) the firm should be a nonfinancial company;
- (b) the firms' fiscal year ends on March 31;
- (c) all variables must have data available;
- (d) the value of $GWAQ_t$ before scaling should be above the median in the first sample; and
- (e) observations in the top and bottom 1% for each variable in the first sample are excluded.

Criterion (d) is needed to limit the observations to those with an economically significant $GWAQ_t$. In all, 1,917 firm-year observations fulfill these criteria.

4.2. Data

Table 1 shows descriptive statistics and Table 2 presents the correlation matrix. Table 3 shows the distribution of observations by industry and fiscal year. Although Table 2 indicates that $CAGR_t$ and $GWAQ_t * CAGR_t$ are highly correlated, these VIFs are lower than 10. Thus, we do not change equation (2).

Table 1. Descriptive Statistics

	Mean	s. d.	Min	25%	Median	75%	Max	N
MV_t	0.661	0.559	0.046	0.299	0.504	0.806	5.021	1917
NI_t	0.024	0.036	-0.175	0.009	0.022	0.042	0.172	1917
$BVEXGW_t$	0.416	0.200	0.007	0.261	0.408	0.553	1.647	1917
$GWXGWAQ_t$	0.015	0.028	0.000	0.001	0.004	0.015	0.191	1917
$GWAQ_t$	0.014	0.026	0.000	0.002	0.005	0.014	0.242	1917
$CAGR_t$	0.048	0.102	-0.233	-0.010	0.035	0.093	0.635	1917

Table 2. Correlation Matrix

	①	②	③	④	⑤	⑥	⑦
① MV_t		0.6696	0.5967	0.1402	0.156	0.2418	0.2658
② NI_t	0.5458		0.4977	0.127	0.1386	0.2313	0.2424
③ $BVEXGW_t$	0.5183	0.4332		-0.0473	0.1592	0.0219	0.064
④ $GWXGWAQ_t$	0.083	0.0926	-0.1258		0.3378	0.1556	0.2215
⑤ $GWAQ_t$	0.1748	0.0831	0.058	0.2064		0.0861	0.3608
⑥ $CAGR_t$	0.2472	0.1758	0.0167	0.1172	0.0696		0.8628
⑦ $GWAQ_t * CAGR_t$	0.2527	0.113	0.0322	0.1262	0.4503	0.4864	

Pearson (Spearman) correlations are reported below (above) the diagonal.

MV_t	Market capitalization three months after closing date of year t
NI_t	Net income for year t
$BVEXGW_t$	Book value of equity excluding book value of total goodwill at closing date of year t
$GWXGWAQ_t$	Book value of total goodwill at closing date of year t excluding new goodwill acquired in year t
$GWAQ_t$	Book value of new goodwill acquired in the current year at closing date of year t (book value of total goodwill at closing date of year t + goodwill amortization for year t - book value of total goodwill at closing date of year $t-1$) * residual rate of goodwill)
$CAGR_t$	Compound annual growth rate of sales during the period $t-3$ to $t-1$
$GWAQ_t * CAGR_t$	Interaction term of $GWAQ_t$ and $CAGR_t$

5. Results

5.1. Main results

Table 4. Regression results for the tests of Hypothesis 1 and Hypothesis 2a

Dependent variable	MV_t	H1		
		Standard model	Equation (1)	H2a Equation (2)
Expected sign				
NI_t	+	5.893 [10.99]***	5.9323 [11.18]***	5.4831 [10.75]***
$BVEXGW_t$	+	0.9275 [10.14]***	0.9094 [10.46]***	0.9395 [12.74]***
GW_t	+	1.8326 [5.81]***		
$GWXGWAQ_t$	+		1.4157 [3.93]***	1.2315 [3.41]***
$GWAQ_t$	+		2.2724 [4.24]***	1.3579 [2.38]**
$CAGR_t$	+			0.5865 [4.18]***
$GWAQ_t * CAGR_t$	+			14.6416 [2.25]**
_cons	?	0.0126 [0.17]	0.0206 [0.28]	0.0022 [0.03]
<i>Year Dummy</i>		Included	Included	Included
<i>Industry Dummy</i>		Included	Included	Included
Adj. R-squared		0.5271	0.5276	0.5526
N		1,917	1,917	1,917

* p<0.1, ** p<0.05, *** p<0.01

*** (**, *) Significant at the 1% (5%, 10%) level, two-tailed. Definitions of variables are as follows. MV_t is Market capitalization three months after closing date of year t . NI_t is Net income for year t . $BVEXGW_t$ is Book value of equity excluding book value of total goodwill at closing date of year t . $GWXGWAQ_t$ is Book value of total goodwill at closing date of year t excluding new goodwill acquired in year t . $GWAQ_t$ is Book value of new goodwill acquired in the current year at closing date of year t ((book value of total goodwill at closing date of year t + goodwill amortization for year t - book value of total goodwill at closing date of year $t-1$) * residual rate of goodwill). $CAGR_t$ is Compound annual growth rate of sales during the period $t-3$ to $t-1$. $GWAQ_t * CAGR_t$ is Interaction term of $GWAQ_t$ and $CAGR_t$.

Table 4 shows the regression results for H1 and H2a. In column 1 of Table 4, we report the regression results of the standard regression model with market capitalization as a dependent variable and net income, book value of equity excluding goodwill, and goodwill as independent variables, a model widely used in the previous studies. The results indicate that coefficients of each variable are significantly positive, and these results are consistent with previous studies. The significantly positive value of the coefficient of GW_t implies that the stock market values goodwill in our sample.

In column 2 of Table 4, we present the regression results of equation (1) for H1. The results indicate that the coefficient of $GWAQ_t$ is positive (2.2724) and statistically significant ($p < 0.01$). These results imply that not only total goodwill but also new goodwill acquired in the current year is valued by investors in Japan; this is consistent with the hypothesis that since investors know goodwill to be valuable on average, they value goodwill even when the goodwill was acquired recently. From these results, H1 is supported.

Column 3 reports the estimation results of equation (2) for the test of H2a. We are interested in the coefficient of $GWAQ_t * CAGR_t$. The coefficient is positive and statistically significant. This result indicates that firms achieving higher growth in the past receive higher market valuation for their own goodwill in the stock market. Based on these results, it is plausible to say that investors attach higher value to the goodwill of firms with abundant growth opportunity and encourage such firms to acquire goodwill.

Table 5 presents the regression results for the test of H2b. We test H2b by regressing equation (1) for each subgroup classified by Tobin's Q. Column 1 shows the regression results of the group with the least growth opportunity, with each subsequent column showing firms with more growth opportunity than the previous column. The results for the group with the greatest growth opportunity are shown in column 4. These results indicate that the coefficients of $GWAQ_t$ are positive for each group, though there are differences in the level of statistical significance. Moreover, these results show that the groups with more growth opportunity have a larger positive value for the coefficient of $GWAQ_t$. This suggests that the stock market tends to highly value the goodwill of firms that are considered by investors to have larger growth opportunity, which is consistent with the results of the test for H2a.

We test these differences among the coefficients of $GWAQ_t$ ($\alpha_{4,q1} < \alpha_{4,q2} < \alpha_{4,q3} < \alpha_{4,q4}$) statistically. Taking the comparison of $\alpha_{4,q1}$ with $\alpha_{4,q2}$ for example, we first make the second quartile dummy variable, $Dummy_{2nd\ quartile}$ and its interaction term with $GWAQ_t$, $GWAQ_t * Dummy_{2nd\ quartile}$. We then regress MV_t on NI_t , $BVEXGW_t$, $GWXGWAQ_t$, $GWAQ_t$, $Dummy_{2nd\ quartile}$, and $GWAQ_t * Dummy_{2nd\ quartile}$ for the joint sample of the first and second quartile groups. The coefficient of the interaction term indicates the excess value of the coefficient of $GWAQ_t$. We adopt the same method for each joint sample. The results show that all of the coefficients of the interaction term for each joint sample are positive

and statistically significant. This means that the differences among the coefficients of $GWAQ_t$ ($\alpha_{4,q1} < \alpha_{4,q2} < \alpha_{4,q3} < \alpha_{4,q4}$) are statistically significant. In summary, our regression results for the sample of the Japanese firms present evidence to support our hypotheses, H1, H2a, and H2b. This suggests that new goodwill is valued and that the acquiring companies' growth opportunity has a positive effect on the value relevance of goodwill in Japan.

[Table 5 Regression results for the test of hypothesis 2b]

Dependent variab	MV_t	H2b			
		Equation (1)			
	Expected sign	1st Quartile	2nd Quatrtil	3rd Quartile	4th Quartile
NI_t	+	0.5775 [4.16]***	0.1004 [1.21]	0.7605 [5.22]***	4.7842 [3.48]***
$BVEXGW_t$	+	0.6938 [22.04]***	0.9818 [65.88]***	0.9973 [49.00]***	1.701 [7.75]***
$GWXGWAQ_t$	+	1.1696 [8.64]***	1.0021 [9.59]***	0.9721 [6.95]***	2.3409 [3.20]***
$GWAQ_t$	+	0.3425 [1.27]	1.043 [10.61]***	1.5741 [9.79]***	3.4339 [4.90]***
_cons	?	0.0264 [0.81]	0.0275 [1.67]*	0.1107 [4.67]***	-0.2046 [-1.10]
<i>Year Dummy</i>		Included	Included	Included	Included
<i>Industry Dummy</i>		Included	Included	Included	Included
Adj. R-squared		0.781	0.9461	0.914	0.4636
N		480	479	479	479

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

*** (**, *) Significant at the 1% (5%, 10%) level, two-tailed. Definitions of variables are as follows. MV_t is Market capitalization three months after closing date of year t . NI_t is Net income for year t . $BVEXGW_t$ is Book value of equity excluding book value of total goodwill at closing date of year t . $GWXGWAQ_t$ is Book value of total goodwill at closing date of year t excluding new goodwill acquired in year t . $GWAQ_t$ is Book value of new goodwill acquired in the current year at closing date of year t ((book value of total goodwill at closing date of year t + goodwill amortization for year t - book value of total goodwill at closing date of year $t-1$) * residual rate of goodwill). $CAGR_t$ is Compound annual growth rate of sales during the period $t-3$ to $t-1$. $GWAQ_t * CAGR_t$ is Interaction term of $GWAQ_t$ and $CAGR_t$.

5.2. Robustness check

In the preceding section, we test H2a by estimating equation (2) and H2b by estimating equation (1) for each subgroup. These results generally support the hypotheses and suggest that the acquiring company's growth opportunity has a positive effect on the value relevance of new goodwill in Japan. In this section, we conduct tests to check the robustness of our findings. Specifically, we change the proxy variable for growth opportunity in the retest for H2a and use an alternative measurement for classifying our sample in the retest for H2b. Descriptive statistics and the correlation matrices for these tests are omitted.

5.2.1. Robustness check for H2a

In the main test for H2a, we use $CAGR_t$, the compound annual growth rate of sales during the period from $t-3$ to $t-1$ as a proxy variable for growth opportunity. To check the robustness of the results, we retest H2a by using GR_t , the growth rate of sales in the year $t-1$. Table 6 shows the regression results of the retest.

The results show that the estimated coefficient of $GWAQ_t * GR_t$ is significantly positive at the 1% level and does not differ much from that of $GWAQ_t * CAGR_t$ in the main results. Additionally, there are not any significant differences for other coefficients from the main results. These results of the retest also support H2a. Hence, the results of the primary test for H2a are robust.

Table 6. Regression results of the retest for H2a

Dependent variable	MV_t	H2a
		Equation (2)
Expected sign		
NI_t	+	5.6393 [10.78]***
$BVEXGW_t$	+	0.9291 [11.63]***
$GWXGWAQ_t$	+	1.2493 [3.39]***
$GWAQ_t$	+	1.5609 [3.21]***
GR_t	+	0.2515 [2.38]**
$GWAQ_t * GR_t$	+	12.9546 [2.46]**
_cons	?	0.0213 [0.30]
<i>Year Dummy</i>		Included
<i>Industry Dummy</i>		Included
Adj. R-squared		0.541
N		1917

* p<0.1, ** p<0.05, *** p<0.01

5.2.2. Robustness check for H2b

In the main test for H2b, we use Tobin's Q to partition the main sample into four groups. To check the robustness of the results, we retest H2b by using PBR_t , the price-book-value ratio, as the value for grouping firms into quartiles. The regression results of the retest are shown in Table 7.

The regression results of the retest indicate that the coefficient of $GWAQ_t$ increases as PBR_t becomes higher and that they are generally consistent with that of the main analysis using Tobin's Q.² Therefore, the results of the main test

²We perform the same test as in the primary analysis. The results show that the differences between the coefficients of $GWAQ_t$ ($\alpha_{4,q1} < \alpha_{4,q2} < \alpha_{4,q3} < \alpha_{4,q4}$) are statistically significant.

for H2b are robust even when an alternative measure for growth opportunity is used.

Table 7. Regression results of the retest for H2b with firms grouped by PBR_t

Dependent variable	MV_t	H2b			
		Equation (1)			
	Expected sign	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
NI_t	+	0.581 [4.95]***	0.4124 [3.99]***	0.8939 [3.62]***	2.9644 [2.70]***
$BVEXGW_t$	+	0.5781 [23.79]***	0.9443 [43.60]***	1.3636 [38.33]***	2.401 [13.72]***
$GWXGWAQ_t$	+	0.8723 [7.22]***	0.8517 [6.90]***	1.3461 [9.03]***	2.9526 [4.19]***
$GWAQ_t$	+	0.4167 [1.80]*	0.9881 [7.61]***	1.5578 [7.00]***	2.7707 [4.82]***
_cons	?	0.095 [2.95]***	0.0018 [0.10]	0.0483 [1.26]	-0.2936 [-1.30]
<i>Year Dummy</i>		Included	Included	Included	Included
<i>Industry Dummy</i>		Included	Included	Included	Included
Adj. R-squared		0.7623	0.9236	0.9196	0.677
N		480	479	479	479

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6. Conclusion

Does an acquiring firm's growth opportunity affect the market valuation of goodwill? We performed a number of tests to answer the question and concluded that the market valuation of goodwill is positively influenced by the growth opportunities of acquiring firms in Japan. In other words, investors attach higher value to the goodwill of firms with larger growth opportunity than that of firms with smaller growth opportunity. The findings of this study are reasonably robust since the results of the robustness check are consistent with the results of the primary tests.

As discussed above, previous studies have been limited in their examination of the value relevance of goodwill and the factors that affect the evaluation. Further, these studies only focus on the components of goodwill. Therefore, this research may be the first to focus on the characteristics of the goodwill, that is, an asset that arise as a result of M&A as a growth strategy. In this study, we introduce growth opportunity into the goodwill value-relevance literature and investigate the relation between growth opportunity and the valuation of goodwill in the stock market. In addition, this study has implications for Japanese companies planning M&As as a part of growth strategy. In recent years, M&A deals by mature companies have become common in Japan. According to the findings of this paper, however, the goodwill of companies with less growth

opportunity tend to be less valued by investors than that of firms with more growth opportunity. Therefore, this study implies that M&A works better when it is done in order to utilize internal growth opportunity rather than to incorporate external growth opportunity into the firm.

We cannot say whether our findings and implications can be generalized to different conditions such as other countries or other types of markets such as bond markets. These are remaining issues for future research.

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