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Original Research Article

M&A Likelihood: Impact of Firm Characteristics

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Abstract

This paper empirically examines firm-characteristics determinants of mergers and acquisitions (M&A) likelihood by Malaysian public listed firms. This study specifically investigates the impact of firm characteristics on acquisition likelihood using 9998 firm-year observations during the period from 2001 to 2018. Past studies regarding Malaysian M&As mostly focus on the performance of M&As and its determinants. Using probit regression, findings suggest that firms' size, sales growth, and stock return positively affect firm probability to involve in M&As. while, leverage, profitability, cash holding, and tangibility affect M&A likelihood negatively. The findings also suggest that firms' characteristics in the current M&A year can explain M&A decision better than they do in the pre-M&A year. Our findings provide insights to mangers, investors, and regulators in order to understand more about corporate takeovers which is an important growth and survival strategy for businesses.

Keywords: M&A likelihood, firm characteristics, probit regression, Malaysian takeover.

INTRODUCTION

Merger and acquisition are important strategies which are used by firms to enhance growth and increase efficiency [1], utilize financial capability [2], and access to new technologies [3]. There are many factors that affect M&A decision, among them are firm characteristics. Past studies in Malaysia have been intensively investigated M&A preference [4-11]. There is a lack of studies that investigate the determinants of M&A decision in the Malaysian context. Besides that, Malaysia is among the most active markets for M&As in ASEAN [1] region. During the period from 2000 to 2017, announced M&As in Malaysia represent 23% of the total value of announced M&As in ASEAN region [2]. Thus, we aim to fill this gap by examining the impact of firm characteristics on M&A decision by Malaysian firms.

LITERATURE

M&A is an important decision that is affected by firm characteristics. Findings from past studies have identified a number of characteristics related to firms that influence their decision to involve in M&A. As firms in the developed market, M&A decisions by Malaysian firms may also be subject to these characteristics' influences. These characteristics include firm size, financial leverage, sales growth, investment ratio, profitability, market to book, stock return, cash holing and tangible asset. Theories such as agency theory [12], trade-off theory [13], and market valuation theory [14] have been used to explain M&A decision in line with firm characteristics.

Firm Size

Firm size influences many corporate major decisions including M&A decision. Harford [15] reported that firm size has a positive impact on the likelihood of being an acquirer. Past studies document that firm size is positively associated with the probability of undertaking M&A [16–20]. The high probability of undertaking M&As by large firms may be due to their ability to conduct and finance M&A at lower cost compared to smaller firms.

[1]Association of Southeast Asian Nations (ASEAN) is a regional intergovernmental organization comprising ten countries in Southeast Asia, these countries are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

[2] https://imaa-institute.org/m-and-a-statistics-countries.

Financial leverage

DeAngelo, DeAngelo, and Whited [21] argue that firms investment behavior is related to capital structure and firms may involve in M&A to reach their optimal level. Dudley (2012) argues that firms can adjust their capital structure toward their target leverage ratio when they invest, under trade-off theory [13], when the level of leverage is high, firms may less interest to involve in M&A because they will move their leverage far away from the optimal. Moreover, the level of leverage can affect the ability of firms to get debt financing for new investments. Highly leveraged firms can face difficulty to finance their M&A activities compared to firms with low leverage. One of the early studies that investigated the impact on leverage on firm takeover likelihood was conducted by Harford [15] in the USA. The findings couldn't find any relationship between the lower acquisition probability and highly leveraged firm. However, majority of the past empirical studies in the developed markets document negative impact of leverage on M&A probability [18, 20, 23–26].

Sales Growth

M&A is one of the forms of corporate investment, thus increasing in sales growth will motivate firms to involve in M&A. It is observed that firms with positive growth sales are more likely to get involved in M&A, potentially as part of a growth plan [16]. Previous studies argue that firms with negative sales growth are financially constraint and may face an underinvestment situation [27]. Denis and Sibilkov [28] document that prior sales growth positively affects firm investment. In M&A context, Harford [15], Owen and Yawson [18], Levi, Li and Zhang [29] and Phalippou *et al*., [20] documented significant positive impact for sales growth on acquisition probability in the US market. Similar findings have been reported by Caprio *et al.*, [17] for listed Continental European firms. Dogru, Ozdemir, Kizildag, and Erdogan [30] document a positive significant relationship between sales growth and takeover likelihood using M&A in listed restaurants firms in the USA.

Investment

Firms enhance their growth by increasing capital expenditure and involve in M&A activities. These two forms of investments can be an alternative [31], especially when firm resources are limited. Managers treat investment (capital expenditure) and M&A differently due to the differences in the underlying incentives for both [32]. In M&A, managers are usually motivated by the higher compensation after takeover transactions. Thus, there is a potential relationship between investments via capital expenditure and firm probability to involve in M&A. Akhtar [33] documented a negative relationship between Australian firms' investment proxied by capital expenditure/total assets and the probability of undertaking M&As.

Profitability

Firm profitability is an essential factor that affects M&A decision. More profitable firms tend to engage in M&A activities. Agency theory argues that firms with excess cash are more likely to involve in M&As activities. Managers of these firms tend to use cash payment to finance M&As activities regardless of M&A quality [12, 15]. Past findings from developed markets revealed that firms with higher profits are more likely to involve in M&A activities [17-19, 23-25, 34, 35].

Market to book

Growth opportunity is an important factor that influences a firm's decisions. Harford [15] argued that firms with high market-to-book values are less likely to be targeted and less likely to suffer agency problems. Thus, these firms maximize their benefit by enhancing growth via acquiring undervalue firms. Under market valuation theory [14], the high stock valuation of these firms can reduce takeover costs by targeting undervalued firms [36]. On the other hand, firms with a low market-to-book may be less attractive to involve in M&A. Past studies also find that market-to-book ratio has a positive impact on M&A likelihood [18, 19, 23, 24, 35].

Stock Return

The high price for the stock is common indicator for the good performance of firms. Stock return is another measure for a growth opportunity and stock valuation and more considered by investors. The previous argument about market-to-book ratio can be applied with stock return. Firms with high stock return show better performance, and their stocks prices usually are overvalued, which encourage them to involve in M&A and use stock payment to settle their transactions. Harford [15] argued that firms with higher stock return are more likely to become acquirers. Similar findings have been reported in the developed market by the majority of past studies [16, 19, 20, 24, 35]

Cash holding

Under the agency theory, the high level of cash leads firms to spend more in M&A [15, 37]. This is because managers of cash-rich firms tend to engage in M&A rather than pay this cash as dividends for shareholders who can maximize their benefit. Past empirical findings also report findings that support the positive relationship that cash holding and M&A likelihood [33, 34]. In contrast, Agyei-Boapeah *et al.*, [24] document a negative relationship between cash holding and M&A likelihood by UK acquirers.

Tangibility

Tangible assets size influences the type of investment. Assets structure differ from industry to industry. At the same time, assets structure can express firm investment direction. Firms with a high ratio of tangible assets may involve in investment related to

productivity. Moreover, some studies [38, 39] argue that firms tend to invest in tangible assets to relax financial constraints and shift over time from tangible assets to investment in intangible and liquid assets. Thus, there is potential influence for tangible assets on the investment decision in form takeovers. Caprio *et al.*, [17] document a negative impact for tangible assets ratio on M&A probability. Fidrmuc and Xia [40] find that tangible assets reduce the probability of a firm to be an acquirer and increase the probability of a firm to be acquired.

DATA AND METHODOLOGY

Data

This study considers all listed firms in Bursa Malaysia for the period between 2001 to 2018. Firms with the following codes 3010 (banks), 3020 (financial services), and 3030 (insurance) are excluded because of their unique reporting standards and regulations. Firms with less than 3 years listing period are also excluded. The final sample consists of 9998 firm-year observations. For each firm in the sample, we obtain all its completed M&As date during the same period if they announced M&A. Firms' financial data obtained from Thomson DataStream database. All M&A transactions in SDC M&A database that defined as an acquisition of majority interest, acquisition of minority of interest, merger, asset acquisition, or acquisition of certain assets are considered. Following Uysal [23] M&A transactions with a value of less than USD1 million have been excluded. M&A with and less than 1% as the ratio of deal value over total assets in the pre-acquisition year have been excluded.

Table-1 displays the study sample distribution by Industrial Classifications Benchmark (ICB). Firms in Industrial Goods and Services sector represent 21.5% of the total which is the highest followed by Construction and Materials sector and Food, Beverage and Tobacco. Table-2 shows distribution of the sample by years from 2001 to 2018. Number of observations in year 2001 is lowest with 2.89% as share while number of observations in 2008 is the largest with 6.15% as share. Table-3 shows the variable definitions of this study.

Table-1: Study sample by indusrty based on Industrial Classification Benchmark (ICB)

Industry	Code	Freq.	%
Technology	1010	621	6.21
Telecommunications	1510	153	1.53
Health Care	2010	234	2.34
Real Estate	3510	218	2.18
Automobiles and Parts	4010	342	3.42
Consumer Products and Services	4020	827	8.27
Media	4030	126	1.26
Retail	4040	298	2.98
Travel and Leisure	4050	457	4.57
Food, Beverage and Tobacco	4510	1296	12.96
Personal Care, Drug & Grocery Stores	4520	192	1.92
Construction and Materials	5010	1463	14.63
Industrial Goods and Services	5020	2152	21.52
Basic Resources	5510	746	7.46
Chemicals	5520	273	2.73
Energy	6010	313	3.13
Utilities	6510	287	2.87
		9998	100%

Table-2: Distribution the sample by years

Year	Obs.	%	Year	Obs.	%
2001	289	2.89	**2010**	607	6.07
2002	425	4.25	**2011**	591	5.91
2003	484	4.84	**2012**	594	5.94
2004	493	4.93	**2013**	591	5.91
2005	523	5.23	**2014**	600	6.00
2006	565	5.65	**2015**	603	6.03
2007	607	6.07	**2016**	611	6.11
2008	615	6.15	**2017**	595	5.95
2009	612	6.12	**2018**	593	5.93

Table-3: Summary of variables definitions

Variable	Notation	Definition
Acquisition decision	*Acq_dec*	Dummy variable takes the value of 1 if the firm completed a M&A in year *t*, and 0 otherwise.
Total Assets	*TA*	The book value of total assets.
Market Value of firm	*MV*	Market value of equity (stock price times common shares outstanding) plus preferred stock plus liabilities
Market Leverage	*MLev*	Total liabilities over market value (*MV)*
Sales growth	*SalesGrowth*	Sale growth over a two-year period prior to each sample year
Investment	*Invest*	Capital expenditure over total assets in the pre-takeover year
Profitability	*Prof*	Operating income before depreciation over Total Assets (EBITDA/sales)
Market to book	*MTB*	Market value (*MV)* to total assets (*TA).*
Stock Return	*StockRet*	The firm's annual stock return
Cash Holding	*CASHTA*	Cash and short-term investments divided by the book value of assets (*TA).*
Tangibility	*TangTA*	Net property, plant, and equipment over total assets TA.

METHODOLOGY

Following past studies [15, 23, 24, 30, 33], this study uses probit regression to investigate impact of firms' characteristics on M&A probability by Malaysian listed firms. Equation 1 and 2 form the models of this study. Past studies show that there are two streams about the impact of firm characteristics on M&A, whether it is immediately or there is a lag time. In the first stream, they assume that firms level determinants in year t will affect M&A in year t+1 [17, 41, 42]. However, in the second stream, they assume that firms level determinants in year t will affect M&A in year t [16, 18, 23, 35]. Aim the fact that there are introductory strands about M&A time, This study examined the impact of the independent variables on the likelihood of M&A on year t and year t+1 in separate models.

The model includes M&A dummy as dependent variable and firm's characteristics namely firm size (TA), market leverage (MLev), sales growth (SalesGrwoth), market to book (MTB), stock return (StockRet), cash holding (CASHTA), tenability (TangTA). Mitchell and Mulherin [43] argue that M&As occur in waves and are clustered by industry. Thus, we add dummies for year and industry to consider their effects (IY effects). The robust standard error has been used during regression due to heteroscedasticity problem in our models.

$$Acq\_dec_{it} = \propto + TA_{it} + MLev_{it} + SalesGrowth_{it} + Prof_{it} + MTB_{it} + StockRet_{it} + CASHTA_{IT} + TangTA_{it} + IY\_effects \ (1)$$

$$Acq\_dec_{it+1} = \propto + TA_{it} + MLev_{it} + SalesGrowth_{it} + Prof_{it} + MTB_{it} + StockRet_{it} + CASHTA_{IT} + TangTA_{it} + IY\_effects \ (2)$$

RESULTS AND DISCUSSIONS

Univariate Analysis

Table-4 shows the descriptive statistics of the sample. The mean of total assets is RM1766.4 million. The minimum and the maximum of total assets are RM11.4 million and RM15361 million, respectively. Market leverage is 0.462 as mean. The minimum and maximum are 0.003 and 0.997, respectively. The mean of sales growth is 20%, and the minimum is -96.9%. The average of firm investment is 4.1% measured by total capital expenditure over total assets for the same year. Firm profitability is 7.9% in average measured by EBITDA over total sales for the same year. Market to book mean is 1.106 while stock return mean is 9.1%. Cash holding mean is 13.1%, while tangible assets over total assets is 35.8%.

Table-4: Descriptive statistics of the sample

Variable	Mean	Min	Max	Std. Dev.
Total assets (million RM)	1766.4	11.416	15361	6772.9
Log (TA)	12.898	9.343	18.850	1.447
Market leverage (MLev)	0.462	0.003	0.997	0.246
Sales growth (SalesGrowth)	0.199	-0.969	293.6	4.224
Investment (Invest)	0.041	-0.065	0.676	0.049
Profitability (Prof)	0.079	-2.843	3.406	0.118
Market-to-book (MTB)	1.106	0.039	14.146	0.900
Stock return (StockRe)	0.091	-0.913	14.600	0.578
Cash holding (CASHTA)	0.131	-0.086	0.993	0.128
Tangibility (TangTA)	0.358	-0.084	1.094	0.214
Obs. 9998				

Table-5 compares the descriptive statistics between two groups of firms. The first group includes all firms which not involve in M&As during the period. The second group includes all firms which involve in M&As during the period. The table also show the parametric test for the differences in means between the two groups. However, only two characteristics (firm size and cash holding) have significant differences in their mean. Firms which involve in M&As show larger size compared to firms who do not involve in M&As. Cash holding is lower for the acquirers' group. There is no significant difference in means for the remaining characteristics between the two groups.

Table-5: Descriptive statistics of the sample by groups of non-acquirers and acquirers

Variable	Non-acquirers (Obs. = 9558)				Acquirers (Obs. = 440)				Difference
	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	t-test
Total assets	**1710.7**	11.416	153607.3	6545.71	**2976.2**	20.476	132871	10502.5	3.835***
Log (total assets)	**12.878**	9.343	18.850	1.440	**13.331**	9.927	18.705	1.542	6.431***
Market leverage	**0.463**	0.003	0.997	0.247	**0.453**	0.006	0.963	0.223	0.838
Sales growth	**0.193**	-0.969	293.6	4.309	**0.314**	-0.946	22.61	1.404	0.584
Investment	**0.041**	-0.065	0.676	0.049	**0.043**	0.000	0.488	0.048	0.177
Profitability	**0.078**	-2.843	3.406	0.119	**0.080**	-0.387	0.318	0.073	0.348
Market-to-book	**1.105**	0.039	14.146	0.914	**1.129**	0.354	4.631	0.525	0.559
Stock return	**0.088**	-0.913	14.600	0.576	**0.170**	-0.776	4.077	0.598	1.035
Cash holding	**0.132**	-0.086	0.926	0.128	**0.123**	0.001	0.993	0.119	1.423*
Tangibility	**0.358**	-0.084	1.094	0.213	**0.348**	0.000	0.903	0.220	0.977

Table-6 shows the Pearson correlation among the independent variables. The correlation values among the independent variables are ranging between -0.47 and 0.34. There is potential multicollinearity issue if the correlation between two independent variables exceed 0.80. In our model, correlation values are less than 0.80 level, and the highest correlation is 0.34 between investment ratio and tangible assets ratio.

Table-6: Pearson correlation matrix of the independent variables

Variable	(1)	(2)	(3)	(4)	(5)	(8)	(7)	(8)	(9)
(1) Total assets	1.000								
(2) Market leverage	0.136*	1.000							
(3) Sales growth	0.065*	-0.028*	1.000						
(4) Investment	0.101*	-0.108*	0.080*	1.000					
(5) Profitability	0.127*	-0.410*	0.208*	0.260*	1.000				
(6) Market-to-book	0.102*	-0.462*	0.072*	0.158*	0.424*	1.000			
(7) Stock return	0.012	-0.227*	0.124*	0.005	0.205*	0.170*	1.000		
(8) Cash holding	-0.024*	-0.469*	-0.006	-0.047*	0.267*	0.264*	0.071*	1.000	
(9) Tangibility	0.063*	0.055*	-0.039*	0.338*	0.046*	-0.061*	-0.030*	-0.315*	1.000
**p<0.05*									

Multivariate Analysis

M&A decision by listed Malaysian firms are analyzed in two models to assess the impact of firm characteristics on M&A probability in year t and year t+1. Table-7 presents the results of probit regression in acquisition year and the pre-acquisition year. Firm characteristics affects firm decision to involve in M&A activities. The Pseudo R2 is 0.046 (Column 1) for the impact of firm characteristics on M&A decision in acquisition year compared to 0.037 (Column 2) for the impact of firm characteristics in the pre-acquisition year on M&A decision. The findings suggest that firm characteristics in the M&A year explain more about M&A decision than firm characteristics in the pre-M&A year.

In Column 1 of Table-7, firm size increases the probability of M&A. The influence is significant at the 1% level. Firm size increases M&A likelihood by 1% in year t. In Column 2, firm size affects M&A probability by 0.7% in year t+1, which is significant at 1%. This result suggests that large firms have more resources and tend to extend more via engaging in M&A. The findings regarding the positive impact for the firm size on M&A likelihood is consistent with past findings [19, 20, 24]. In Column 1, Market leverage affects negatively M&A probability by 2.2% in year t. In Column 2, Market leverage affects negatively M&A probability by 3% in year t+1. The findings are significant at the 5% level for both. These findings suggest that highly leveraged firms are less likely to involve in M&A activities. These firms may in financial constraint and face difficulty to access finance. The findings also suggest that the leverage ratio in the pre-year acquisition is more influence compared to leverage ratio in the acquisition year. The negative impact for leverage on M&A decision in this study is consistent with findings by previous studies [20, 29, 44].

In Column 1, sales growth significantly increases M&A likelihood by 2.7% in year t but it is insignificant in year t+1. The findings suggest that recent sales growth has more influence on M&A decision. Growth in sales enhance firms cash flow and motivate firms to involve in M&A. Firms with positive growth differ from those with negative growth; the last one may face financial constraint, which affects investment level negatively. Our findings are in line with past findings [20, 29, 30].

The result regarding investment proxied by capital expenditure over total assets is insignificant in the two models. The findings suggest that than Malaysian firms are less considering the alignment between M&A and investment. In Colum 1, firm profitability affects M&A likelihood negatively. Profitability reduces M&A likelihood by 7.4%, which is significant at the 1% level while it is insignificant in Column 2. This result suggests that firms with excess cash are less likely to involve in M&A activities compared with those with a deficit. Our finding contrasts with previous findings from developed countries [18, 19, 24, 35, 45]. Passible explanation is firms with higher profitability prefer to use excess cash to invest directly rather than M&A in order to support firm productivity and enhance its growth for short-term effects. Market to the book has insignificant influence on M&A likelihood in both models. However, past studies documented positive impact for the market to book ratio on M&A decision [18, 19, 24, 35].

Table-7: M&A probability regression

Variable	Expected sign	**(1)** $M\&A_T$		**(2)** $M\&A_{T+1}$
Total assets	+	0.010***		0.007***
		(6.32)		(4.17)
Market leverage	-	-0.022**		-0.030**
		(-2.02)		(-2.59)
Sales growth	+	0.027***		0.000
		(3.92)		(0.07)
Investment	-	-0.032		-0.005
		(-0.57)		(-0.09)
Profit	+	-0.074**		0.014
		(-2.33)		(0.94)
MTB	+	0.004		-0.002
		(1.05)		(-0.49)
Stock Return	+	0.014***		0.016***
		(2.75)		(3.18)
Cash/TA	+	-0.056***		-0.034*
		(-2.82)		(-1.68)
Tangible assets/TA	-	-0.027**		-0.030***
		(-2.27)		(-2.51)
Observations		9998		9930
Industry & year effects		yes		yes
Pseudo R2		0.046		0.037
Prob > chi2		0.000		0.000

Notes: This table reports the average marginal effects (dy/dx) of the probit regression. The dependent variable= 1 if a firm i undertakes an acquisition in year t and year t+1 in model 1 and model 2, respectively. Robust standard errors are calculated in the two models. All variables are defined in **Error! Reference source not found.** and are winsorized at the 2nd and 98th percentile, except the dependent variable, which is a dummy variable. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

The stock return has a positive significant impact on M&A. This influence increases firm probability of engaging in M&A by 3.2% in year t and 1.6% in year t. Our findings are consistent with reported empirical findings in the developed market [16, 19, 20, 24, 35]. Under the agency theory, the high level of cash leads firms to spend more in M&A [15, 37]. This is because managers of cash-rich firms tend to engage in M&A rather than pay this cash as dividends for shareholders who can maximize their benefit. Our result contradicts with past findings that report positive relationship between cash holding and M&A likelihood [33, 34]. At the same time, our result is in line with Agyei-Boapeah *et al*., [24] findings who document a negative relationship between cash holding and M&A likelihood by UK acquirers.

Cash holding decreases M&A likelihood by 5.6% in year t and 3.4% in year t+1. The findings are significant at the 1% and the10% in year t and year t+1 respectively. Our findings contrast with the argument cash-rich firms argument [15, 37]. The findings contradicts with past finding by Akhtar [33] and Hu and Yang [34] that document positive impact for cash holding on M&A. At the same time, our findings are consistent with previous findings by Agyei-Boapeah *et al*., [24] that find that the high level of cash holding is negatively associated with M&A probability by UK firms. Firm tangibility affects M&A likelihood negatively. The findings show that tangible assets ratio has average marginal effects -2.7% in year t and -3% in year t+1. The negative effect of tangibility is in line with past findings by Caprio *et al*., [17] and Fidrmuc and Xia [40].

CONCLUSION

This paper investigates the impact of firm characteristics on M&A decision by listed Malaysian firms during the period from 2001 to 2018. Limited studies have been conducted in this matter in the Malaysian context. The findings suggest that firms with the larger size, positive sales growth and higher stock return are more likely to be acquirers. On the other hand, leverage, profitability, cash holding, and tangibility reduce the firm probability to involve in M&A activities. The findings also suggest that firms' characteristics in M&A year can explain more M&A decision than firm characteristics in the pre-M&A year. These findings provide more understanding about M&A decision by Malaysian listed firms. Managers can get help by taking into considerations these determinants of M&A and timing M&A activities. Our results can help investors to understand more about the link between M&A decision and current firm situation, which help them to rationalize their investments in line with firms' investment. The study is not free from potential limitations, as it only focuses on firm characteristics' impacts on M&A decision. Future works should investigate impact of managers goals, economic factors on M&A decision.

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