TO MERGE AND ACQUIRE WHEN THE TIMES ARE GOOD?
THE INFLUENCE OF MACRO FACTORS ON THE JAPANESE M&A PATTERN

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To Merge and Acquire When the Times are Good?

- The Influence of Macro Factors on the Japanese M&A Pattern*

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Abstract

After the burst of the "bubble" economy and the subsequent recession of the 1990's, a new era of M&A started in Japan. Following the deregulation in a number of non-tradable sectors, a relatively large number of foreign firms have entered the Japanese market, using M&As as a tool for market entry. In many sectors, the sudden exposure to international competition forced the Japanese firms in the formerly protected industries to restructure and streamline their operations in order to survive the new order. For the foreign firms, the opened-up economy has offered new business opportunities, and a chance to compete on more equal terms with the Japanese firms in their home market. Furthermore, foreign firms have now also discovered M&As as a cost-efficient tool to enter the Japanese market and achieve market-specific knowledge, instead of making expensive greenfield investments and joint ventures. For Japanese firms, international M&As have become a viable alternative to domestic ones due to market liberalization and the economic realities of the 1990s.

Here, it is interesting to ask to what extent macro factors have influenced the pattern of M&As in Japan. Can macroeconomic variables explain the Japanese M&A activities, or do other factors explain them? What are the effects of institutional changes on the M&A pattern during the 1990's? In this paper, the short-run pattern of Japanese post-bubble inward (cross-border) and domestic M&As is analyzed econometrically, using Japanese macroeconomic and M&A data.

The conclusions are that the post-reform pattern represents a significant shift from the previously low levels of M&As, and that domestic and inward M&As are influenced differently by macro factors, suggesting differing rationale for doing M&As. The estimation results also suggest some support for the "fire sale" argument as a driving force for Japanese M&As during the period of post-bubble recession.

Keywords: Mergers & Acquisitions, Institutional change, Japan.
JEL codes: D21, E32, F21, F23, G34, G38, L16

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* This paper is based on an earlier article by the author (Nakamura, 2002).

1 Introduction

Mergers and acquisitions (M&As) are not a new phenomenon in Japanese business history. Especially after the end of the Allied occupation of Japan in 1952, the number of domestic M&As rose sharply due to the reconsolidation of former *zaibatsu* firms broken up by the occupation authorities. During the Japanese post-war economic recovery period, M&As between non-*keiretsu* firms became more and more common.

However, after the burst of the "bubble" economy in 1991 a new era of M&As started. Along with the deregulation in a number of non-tradable sectors, a large influx of foreign firms using M&As as a tool for entering the Japanese market occurred. In many sectors, the sudden exposure to international competition forced the Japanese firms in the formerly protected industries to restructure and streamline their operations in order to survive the new order. For the foreign firms, the opened-up economy provided new business opportunities, and a chance to compete on more equal terms with the Japanese firms in their home market.

Recently, inward M&As have been identified by the Japanese firms as a useful tool due to market liberalization and the economic realities of the 1990s. Furthermore, foreign firms have begun to utilize M&As as a cheaper method for entering the Japanese market and acquire market-specific knowledge, instead of using expensive greenfield investments and joint ventures.

M&As as a phenomenon have interested scholars for many years. A special feature of M&As, namely the wave-like pattern of M&As, has been discussed at length in the literature. In fact, the wave pattern of mergers has been a topic within economics for about hundred years[1], starting with the great merger waves occurring in the United States during the last decades of the 19th century. Despite the emergence of modern financial economics, researchers have fallen short of developing a general theory of M&As and M&A waves. As a result, most research has been empirical and ad hoc in nature; linear time series analyses have been predominant, but more recently, non-linear time series models and Markov switching-regime models have been applied (e.g. Town, 1992).

[1] Resende, p. 85.

In the literature, there are also suggestions for psychological factors influencing M&A patterns, e.g. the "herd" behavior. Due to the limited scope of this paper, the psychological aspects of M&As, however interesting, will not be discussed here.

This paper is purely empirical in nature, employing a model inspired by Ali-Yrkkö (2002). Owing to the nature of the data available, the analysis of this paper is limited to the Japanese M&A pattern from 1988 to 2002. The analysis focuses on the influence of selected macroeconomic and financial variables on the pattern of M&As to see whether the Japanese economic activity can explain the most recent wave of M&As. In addition, dummy analysis is conducted in order to assess the influence of the 1998 Tokyo Big Bang reforms and seasonal effects.

2 Previous studies

Why do an M&A? The general motives for M&As are discussed at length in the literature (see e.g. Chapman & Edmond, 2000; Röller et al., 2000; UNCTAD, 2000; Ali-Yrkkö, 2002; Chen and Findlay, 2003). However, the common neo-classical view of M&As, all other things being equal, is that they are regarded as a method for an acquirer to increase the value of his own company and to procure the future cash flow of the acquired company (so-called "due diligence"). For the acquired company, an M&A could mean a way out of a financially distressed situation or a means to cash in a value increase for an entrepreneur. Other exogenous factors naturally affect the M&A decisions, such as macroeconomic variables and the state of the financial markets.

Historically, the steel and chemical industries[2] have seen major M&A activity after the Second World War, and during the 1980's, the US and Europe saw many M&As in the financial sector after far-reaching deregulations. But the M&A waves have not been limited to these industries only. An example of studies in M&A patterns is found in Walter (1993), who has made a value ranking of M&A deals in US and Europe during 1985 and 1991. He found a tendency that the bulk part of M&As were occurring in similar industries on both sides of the Atlantic, involving all major industries. However, he does not discuss in depth the influence of the business environment on these firms or how it has affected the number of M&A deals. Further,

a discussion on how external shocks have affected the pattern of M&As is also lacking.

In another study, Barkoulas et al. (2001) have analyzed the US M&A wave pattern through Gaussian semiparametric and Maximum Likelihood methods. Their results reveal that post-wave effects on the US M&A pattern, denoted by the authors as "long-memory process", have had long-lasting effects on the M&As during the subsequent periods. This "long-lasting memory" denotes a lagged process after shocks[3], and Barkoulas et al. found that these "shock" effects were significant not only in the short run, but also had long-term effects by influencing subsequent M&A waves. The authors also discuss what mechanisms trigger merger waves. Following Gort's (1969) arguments, Barkoulas et al. suggest that the underlying causes depend basically on different perceptions of corporate value, i.e. that the shareholders of a company value their stocks lower than the potential acquirer after a "shock". More and more M&As will then take place, and after reaching a critical mass, a merger wave will start.

The studies of the kind that were referred to above do not directly measure the effects from the institutional framework or the business environment (i.e. neither on the macro-level nor the micro-level) on the M&A activities of the analyzed industries, nor do they analyze the effects of various types of shocks in explaining M&A patterns. To see the pattern in M&As more or less as isolated events in ownership change without regarding exogenous variables is not particularly rewarding, since there is an apparent risk that important trigger mechanisms for M&As are missed.

The M&A pattern in Japan has been very similar to the ones in the US and EU with deals occurring mostly in the same industries. However, one major exception to the Western M&A pattern does exist: cross-border M&As have been virtually non-existent in Japan. Especially for international mergers, the number of deals has always been extremely low[4].

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[2] Including the pharmaceutical industry.

[3] Unfortunately, the authors do not define clearly whether their meaning of "shocks" means disturbances on the industrial, country or global level; these do not necessarily affect firms in the same manner.

[4] There is no reliable data on international mergers in Japan before 1985, but the occurrence has been low ever since the modernization of the country in the 19th century. After 1988 there have only been four international mergers in Japan, all initiated by Korean, Taiwanese, or US firms. The preferred

An attempt to study the influence of external factors on M&A pattern is found in Ali-Yrkkö (2002), where the author has tried to explain the pattern of M&As in Finland from macroeconomic variables. The time period under study was 1980-2001, during which Finland saw a boom and a sudden plunge in GDP growth. As in Japan, Finland experienced a "bubble" led by heavy international borrowing by the private sector, which was made possible by the far-reaching liberalization of the financial markets and a reform of the tax system. Subsequently, this led to a dramatic rise in the private consumption. Around 1990, Finland experienced severe external shocks: the COMECON trade suddenly disappeared, and a speculative attack on the Finnish Markka occurred, resulting in a heavy drop in the private sector consumption[5]. Obviously, this aggregate shock was clearly reflected in the Finnish M&A activities.

Ali-Yrkkö's results show the high explanatory power of the independent variables (GDP, market capitalization and the number of listed firms) on the European (and Finnish) M&As. From the results, he suggests that the M&A decision can be seen as a top-down flow, where macro-level factors cause shocks on the industrial level, to which managers on the micro-level react and make decisions whether or not to engage in M&A activity (see Figure 1).

The factors chosen by Ali-Yrkkö are rather intuitive, and are to a large extent self-explanatory. The factors *Shocks*, *Economic motives*, *Managerial motives* and *Hubris motives* do however require some comments. A *Shock* can be defined as a sudden revaluation of the current order. Good examples are the oil crises of the 1970's or the IT revolution in the 1990's, but also a revaluation of human values (e.g. globalization) and a change in legal frameworks (e.g. deregulations) can have extensive influence on an individual firm's M&A decision. *Economic motives* are factors like cost efficiency and increased market shares. *Managerial motives* are defined by Ali-Yrkkö as being the "hidden" and opportunistic behavior of managers, much in line with what is discussed in the literature on moral hazard. *Hubris motives* (cf. Roll, 1986) are a set of irrational motives for carrying out an M&A, such as overoptimistic expectations on a particular deal. However relevant to M&A studies, variables such as *Hubris motives*

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entry mode for foreign firms has been more traditional, such as through acquisitions, joint ventures or greenfield investments.

[5] See further Drees and Pazarbasioglu (1998).

have to be defined carefully in order to be useeful in a quantitative analysis such as the one found in this paper.

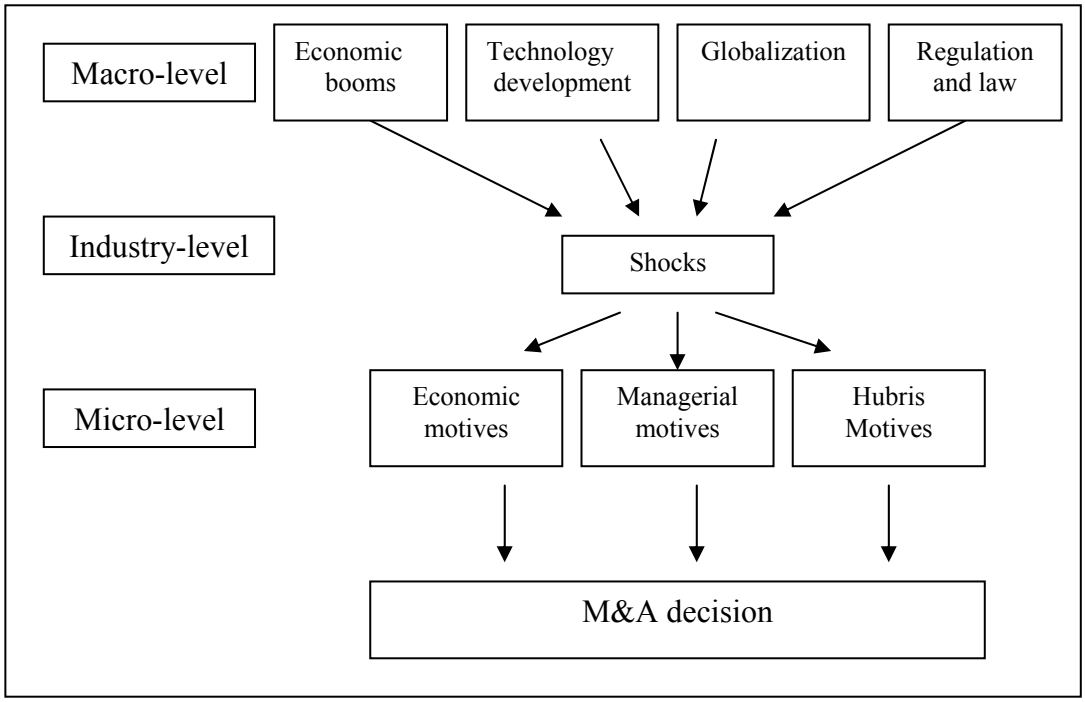

Figure 1. Causes of mergers and acquisitions (From Ali-Yrkkö, 2002, p. 25)**.**

Industrial shocks as a trigger for M&A activity is consistent with the analyses made using longer time series on M&A. In a sectoral study on the M&A wave pattern in the UK, Resende (1999) found through Markow switching models that the shock effect on M&A waves was significant, and was more profound on an aggregate level than on a sector level. Resende found three interesting properties in the data. First, the existence of merger waves in the data sample was significant. Second, the random walk specification was strongly rejected, thus indicating that endogenous shocks had a significant influence on the M&A pattern. Third, the M&A waves in one sector appear to display co-movements with other sectors.

Using US data, Town (1992) has also found evidence for external shocks influencing the M&A pattern. Focusing primarily on finding appropriate models describing long time series of M&As, Town discusses the triggers to US merger waves from the end of the 19th century. Town means that the merger waves coincide with important institutional changes or external shocks, but it is not obvious *a priori* whether these exogenous factors or shocks have a positive or negative effect on M&As. An example of this is the 1929 Great Depression in the US, which should have had a tremendous

depressive effect on the number of M&As if the hypothesis that M&A waves covaries positively with business cycles was true (see e.g. Nelson, 1959). As a matter of fact, the opposite was true in the case of the Great Depression – the number of M&As increased. Therefore, there has to be more to M&As than merely being influenced by business cycles.

The contradiction that M&As are driven either by booms or recessions is potentially a hard nut to crack for anyone doing research on M&As. However, one solution to this paradox might be to analyze the problem from two different angles. On the one side, from the perspective of the buyer, there are several modes of M&A. Traditionally a "pure" merger (apart from mergers that are *de facto* acquisitions) is carried out by swapping shares or setting up completely new legal entities, whereas an acquisition is carried out mainly through cash deals. From the 1980's and onwards, acquisitions involving share issuing have become more and more common in all major industrialized countries, including Japan. But again, in terms of absolute numbers, the number of deals involving share swapping is very low in Japan compared to the US and Europe. This is a reflection of the structure of the Japanese M&As, which for example during the 1995-2001 period, to a large extent involved firms that were not listed on the stock exchange[6].

For M&As where payment in shares play an important part in the deal settlement, the same rationale as for share issues comes into force. Therefore, M&As paid in shares are rare during economic activity downturns, since the stock market trading decreases in terms of price, traded volume and number of calls. Under such conditions, an attractive take-over bid (TOB) can suddenly become unattractive, and as long as an M&A deal is dependent on share swapping or share issuing, that particular deal will become hopelessly futile. Cash deals are rather straightforward and uncomplicated compared to deals involving payment with shares, and are more common during recessions when companies with ample cash reserves or funding possibilities[7] typically acquire financially distressed companies. For the Japanese case, this has been the most frequently occurring type of firm acquisition.

[6] The non-listed firms' share (mostly SMEs) of the total number of M&As was between 56% and 70% (MARR, July 2001, p. 40).
[7] For example, investment funds or other firms using bank loans or bond issues.

A seller's motives for engaging in an M&A are more diverse and difficult to identify in an exact manner. Therefore, it is again useful for this analysis to separate the boom and recession situations. Connecting to the earlier observations that M&A deals that involve share issuing or swapping tend to take place during booms, a seller might benefit from this type of offer by acquiring securities in the post-M&A entity. On the other hand, cash offers might be a tempting option for the seller during recessions in order to bail out from business, or in other words, get the most out of the remaining value of the firm before "it's too late"[8].

Other studies where macroeconomic variables have been used in order to explain M&A activity are Shea (1991) (bond yields), Sowell (1992) (GDP), Baillie and Bollerslev (1994) (interest rate differentials), and Diebold and Lindner (1996) (real interest rates).

In this study, the pattern of the M&As that have occurred in Japan between 1988 and 2002 is analyzed on an aggregate level in order to see whether the M&A activity can be estimated using macroeconomic variables. In addition, a dummy analysis is employed to assess the between-group differences and the effects of one-time shocks on the M&A pattern.

3 The model

As mentioned above, the development of a general merger theory is still in its infancy. There exist few theoretical papers on this topic compared to the abundant number of empirical papers. However, the methodology of M&A analysis has developed rapidly during the 1990's, owing much to the long and complete series of US statistics on M&As. There is still lively discussion in the literature about the variables that should be used to explain M&A patterns. The research on M&As has therefore been, and still is, based on trial and error, and the quest for variables that give a good fit in econometric analyses will probably continue for the foreseeable future.

Having said this, there are good reasons to believe that macroeconomic variables are important factors in explaining M&A patterns and the M&A decision making process

[8] Here, we have the problem of asymmetric information. A buyer or a seller might not have exactly the same information as the counterpart, leading to opportunistic behavior and wrong valuation of assets and future cash flow. However, the problem of corporate valuation *per se* is not discussed in this paper.

in firms. In the European setting, cross-border M&As have often been a matter for large corporations. But as we have seen above, the number of cross-border M&As in Japan is dwarfed by the large number of M&As occurring domestically. Even within the EU, which supposedly has abolished all hindrances to free capital movement, the number of cross-border M&As is lower compared to domestic M&As (40% and 60%, respectively, of all European M&As between 1987 and 1998; Mucchielli and Kohler, 2000). Also, on a global level, domestic M&As accounted for 75 - 80% of all M&As in terms of number of deals between 1987 and 1999[9]. Japan constitutes no exception to this trend; however, its inward cross-border M&As are almost non-existent when compared to the EU (see Figure 2).

Historically and to the present day, the trigger for many M&A decisions in Japan has been a matter of timing and future ownership structure (such as difficulties in finding a successor to the family business) rather than a long-term business development strategy. Even though this primarily applies to SMEs, the domestic large firm M&As have also been a result of more arbitrary rather than systematic decision making. Therefore, in looking at past M&As, there are reasons to believe that the M&A pattern in the short run is rather unsystematic for an individual firm. In addition, it is hard to separate M&A deals that are results of profound analyses from deals that have been carried out due to governmental pressure and other irrational reasons[10]. In this context, it is worth noting that concepts such as due diligence only recently have become common in the management and the normative M&A literature in Japan.

The rationale for the choice of the model variables is as follows. For a firm considering an M&A, several considerations have to be taken into account before a deal is settled. Within the firm, factors like the financial and business situations are of course crucial. Relating to the Ali-Yrkkö (2002) model (see Figure 1), these are the micro-level factors in M&A decisions. These micro-level factors are in turn influenced by the context in which the firm is doing business, that is, the macro-level factors. Macro factors include the common macroeconomic indicators such as (real and nominal) GDP, interest rate, and exchange rate, as well as institutional factors

[9] UNCTAD, p. 107.
[10] M&As of this kind have occurred mostly within the financial sector and especially among the savings associations and the savings unions.

such as the legal structure, industrial regulations, and commonly accepted business practices.

Earlier research has shown that shocks are important triggers to M&As. As seen in Figure 1, Ali-Yrkkö cites the examples of economic booms, technology development, globalization and changes in regulations and law as causes of shocks. For Japan, the financial industry is an interesting example of how an industry was exposed to a "shock", although this example is not representative for all industries. In 1998, Japan took the first steps in the most extensive deregulatory reform so far. Suddenly domestic banks and financial institutions were faced with liberalized competition from both domestic and foreign firms. The new competitors introduced new business methods such as new technology (i.e. internet banking), franchising, and new financial products in order to increase revenues and cut costs. The domestic financial firms' counter-move was to engage very actively in M&As and to emulate the competitors' technology and business ideas. It is clear that the changes in institutional framework, or "shocks", forced the formerly protected financial firms to behave in a way they would never have done otherwise.

The starting point for deriving a prediction model for M&As occurring in Japan has been to consider the context in which a CEO or the board of a company, is found when an M&A decision is made. While simultaneously considering the micro and macro-level factors, it is assumed that a CEO has the power of calling off a potential deal at any time. Further, it is also assumed that a CEO has perfect information about the current business situation both within the industry and for the country in general. If these assumptions hold, the macroeconomic variables that should influence CEOs in M&A decisions (when such an opportunity appears) should be the current aggregate economic environment (such as GDP growth, exchange rate and changing institutional settings, in period *t*) and the situation in the financial markets in period *t*.

OLS and Maximum Likelihood (ML) estimations were used for the analysis. Even though more sophisticated methods are employed in earlier research, there are two major reasons for the choice of using OLS estimation. First, there exists no M&A time series data for Japan of similar length as that for the US. Second, even though the OLS method is rather crude, the estimation that is obtained gives a fairly good indication of the structure of the phenomenon under study.

A pilot model was formulated to see whether the JPY/USD exchange rate, used as a proxy for measuring the inward M&As, had any influence on the M&A activity. However, there are problems with including such a variable, because it is highly probable that the exchange rate explians not only the dependent variable, but also the other macroeconomic variables that are included as independent variables (i.e. multicollinearity). However, the purpose of the model was to see the extent of the disturbances the exchange rate caused, and as such, it became an interpretation tool for the results from the final models. Not surprisingly, tests indicated serious multicollinearity in the pilot model[11], and neither the coefficient of determination nor the parameters were statistically significant. As a result, the exchange rate variable was dropped.

The final model (hereafter called the *basic model*) chosen was:

$$\ln\text{TotM\&A}_t = \beta_1 + \beta_2 \ln\text{NomGDP}_t + \beta_3 \ln\text{Topix}_t + \varepsilon_t, \qquad (1)$$

where:
$\ln\text{TotM\&A}_t$ = the total number of M&As (inward + domestic; not pooled) in period t,
$\ln\text{NomGDP}_t$ = the Japanese nominal GDP (seasonally adjusted data; in 1995 prices, denominated in JPY) in period t,
$\ln\text{Topix}_t$ = the average Topix index in period t,

β are the parameters, t denotes time period and ε is the error term.

All variables consist of quarterly data, and were transformed to natural logarithms.

The choice of the GDP and the Topix index as independent variables was quite simple and straightforward. The GDP was used as an indicator for general economic activity. As mentioned above, the choice of variables was made considering the viewpoint of a CEO, and therefore the nominal GDP was chosen in favor of the real GDP. The same rationale applies to the choice of the Topix index as an indicator for equity market conditions.

[11] Results not shown here.

4 The data

The history of data recording relating to mergers and acquisitions in Japan is very short. A reliable recording of M&As was initiated only in 1985. However, due to heavily restricted access to the earliest data, only the M&A data from 1988 to 2002 was obtained from Recof (2003). These limitations in time dimension have restricted this study to a short-run M&A pattern analysis instead of a long-run analysis, such as for the M&A waves studies mentioned earlier[12]. The data for the other variables used in the model was obtained through IMF and the EcoWin database.

The data is organized to form a quarterly time series, covering the period from January 1988 (88-1) to December 2002 (02-4), forming a total of 60 observations[13].

As seen in Figure 2, the absolute number of domestic *and* inward M&As in Japan during the fourth quarter of 2002 was about six times the level in the beginning of 1988. Most striking is the development after the so-called "Tokyo Big Bang" reforms of April 1998. Included in the reform package were not only law amendments and deregulation of the financial markets, but also tougher requirements on transparency in accounting and corporate governance, which usually are positive factors in promoting M&As. The reform package was meant to be implemented over a two-year period, although the actual implementation time turned out to be three to four years. In spite of the delay, the number of M&As increased dramatically already during the first quarter following the introduction of the reforms. This was due to amendments in the Commercial Law and the Anti-Monopoly Law, which permitted the formation of holding companies, relaxed rules on mandatory notification to the authorities and allowed other forms of payment besides cash.

[12] Based on US data, Golbe and White (1993) have hypothesized that a length of a merger wave is about forty years. This is probably not directly applicable to the historical M&A pattern in Japan, but it gives an indication of the time horizon that is necessary in studying M&A waves.
[13] For bivariate and partial correlations, please see the Appendix.

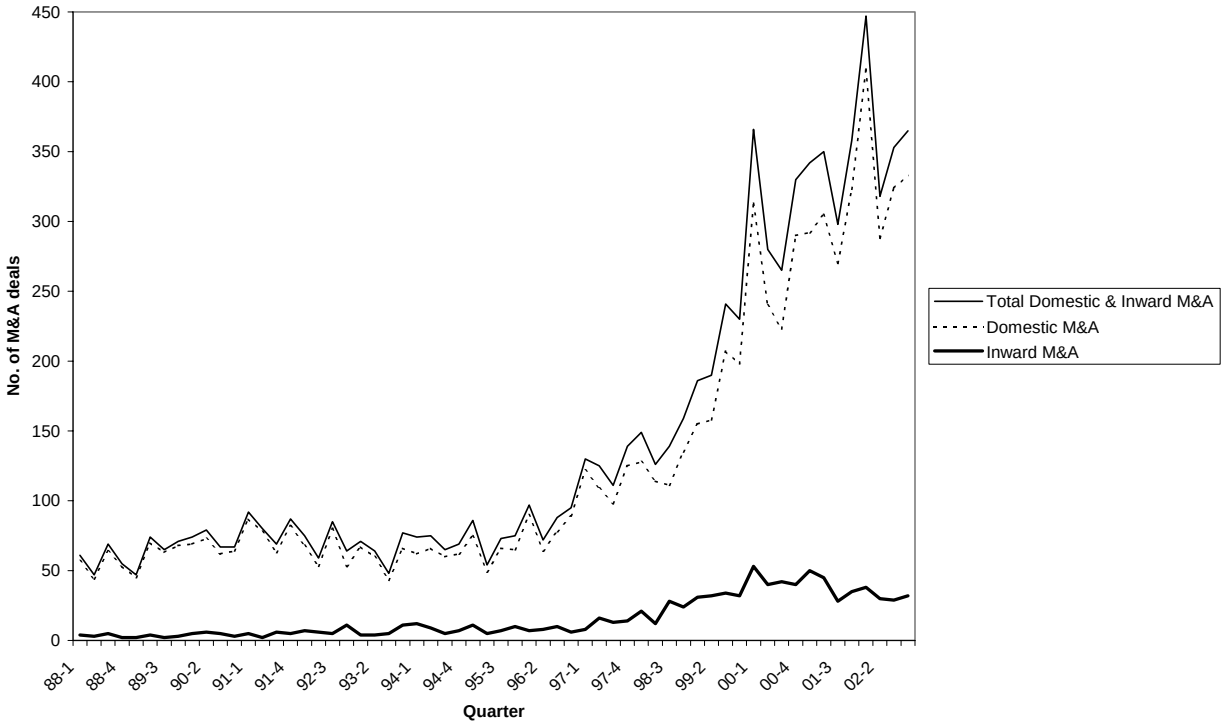

Figure 2. Number of M&As in Japan between 1988 and 2002 (non-cumulative quarter-to-quarter change). Data source: Recof (2003). Author's calculation.

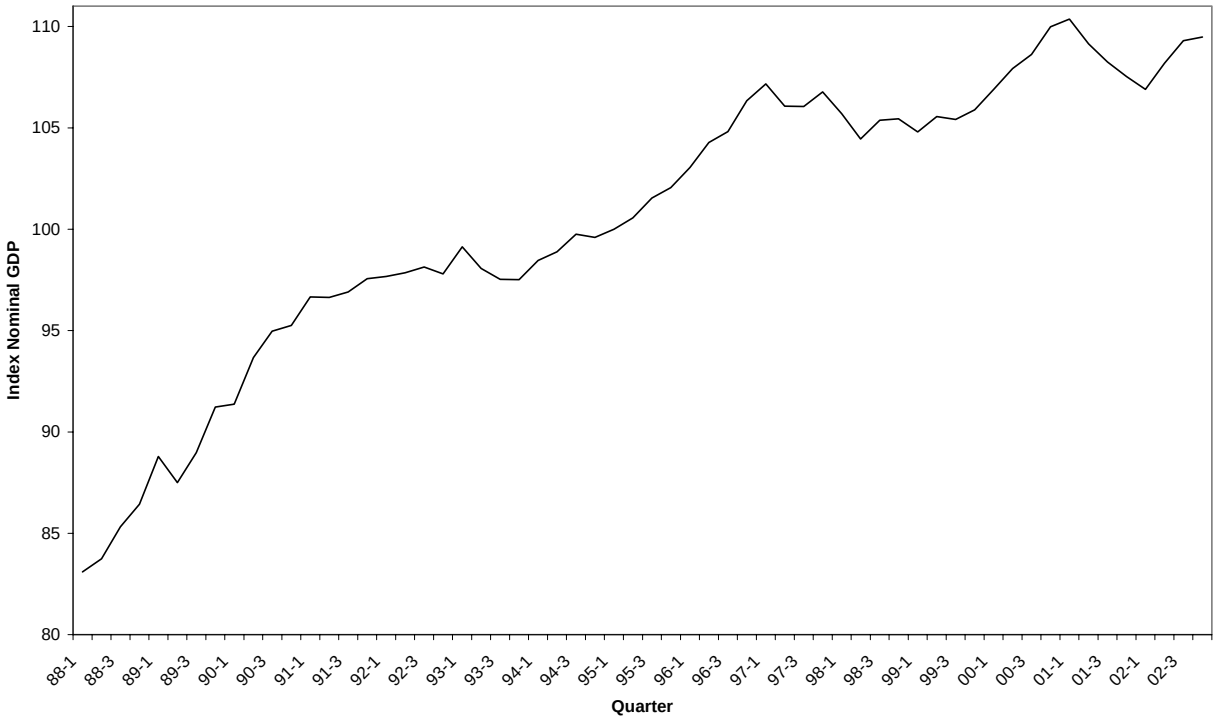

Figure 3. Index of the nominal GDP between 1988 and 2002 in 1995 prices (100 = 1st quarter 1995). Data source: IMF. Author's calculation.

The *quarterly* nominal GDP (Figure 3) had a steady growth trend during the period. We can observe here the sharp difference in trends between the first quarters (the final years of the "bubble" era) compared to the last quarters (after 1997). This reflects the dramatic change in intensity of the Japanese economic activity and the depth of the country's GDP growth problem during the entire 1990's. If the assumptions specified in section 3 hold, the slowdown in the Japanese GDP growth should therefore be reflected in the short-run M&A pattern.

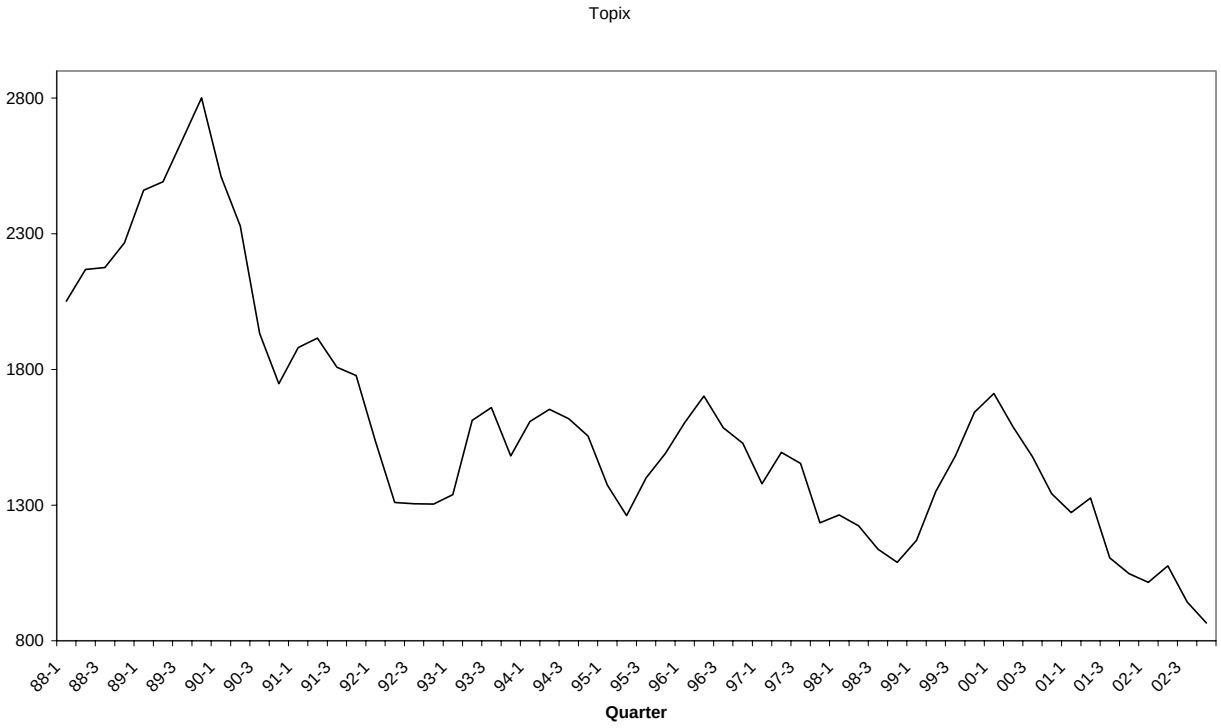

Figure 4. The Topix index between 1988 and 2002. Data source: EcoWin. Author's calculation.

The development pattern of the Topix index, which has fallen sharply since the speculation years of the 1980's, suggests a random walk pattern. The Dickey-Fuller Test on 5% level indicates that this pattern indeed is non-stationary, or follows a random walk pattern[14]. Again, if the assumptions specified in section 3 hold, the Topix index should also be a factor influencing a firm's M&A decision, i.e. whether it is fruitful or not for a firm to carry through an M&A deal.

[14] Tests not shown here.

5 Results of the analysis

The basic model is estimated with OLS, and after correction for autocorrelation, also with the ML method. The dummy models are all estimated with the ML method. The results from the econometric analyses are presented in Tables 1 and 2.

5.1 The basic model

Table 1. Regression results

***,**,* significant at 1%, 5% and 10% level respectively.

	(1)	(2)
	Basic OLS model	ML estimation model (adjusted for autocorrelation)
	Dep variable: lnTotM&A	Dep variable: lnTotM&A
Constant	-79.33***	-43.69
	(-4.23)	(-1.62)
lnNomGDP	6.48***	3.81*
	(5.12)	(1.91)
lnTopix	-0.13	-0.19
	(-0.36)	(-0.56)
Adj R^2	0.570	0.887
N	60	60
F-statistics	40.17***	232.56***

Figures in parenthesis are t-values.

As seen in Table 1, the results from the regression analysis suggest that the Japanese M&A pattern can be explained to a high degree by the chosen independent variables, that is, the nominal GDP and the Topix index. The parameters are significant, and the signs are the expected ones, given the pattern of Figures 2 to 4. It is statistically clear that the nominal GDP has a strong influence on the M&A pattern, and the variation of the dependent variable follows the variation of the nominal GDP. However, the same results suggest that the influence of the Topix index is limited, and varies negatively with the total number of M&As. This result is opposite to what Ali-Yrkkö (2002) found in his study for European conditions. Given that the variable "Market capitalization"[15] in his model is equal to the market value of listed securities, Topix should be, as the broadest indicator of the average value of securities at the Tokyo Stock Exchange (TSE), a comparable variable to measure the same phenomenon. If this assumption is true, the results here suggest interesting differences between the

patterns of European and Japanese M&As. As already mentioned, the sign was positive for European conditions, while the sign is negative for nearly all models in this study (see Tables 1 and 2). There are several possible reasons for this difference in results. First, the time period for the present study is relatively short, covering only one M&A wave. If a longer time series were available, more significant results would have probably emerged. Second, given that the parameters of the regression analyses in this paper are valid, the difference in sign could emerge from a unique pattern in the firm composition of M&A deals. Third, the fact that Japanese firms are sold off due to owner companies' need for cash could affect the results. The two latter possibilities are discussed below.

Compositions of firms in the M&A data

In contrast to the common practice in Europe and North America, most M&A deals in Japan between SMEs, or between SMEs and larger firms, are settled in cash. In countries where M&As mostly consist of deals between listed firms, the total market value of listed stocks should affect the number of M&A deals in a more direct manner. SME stocks, which often are owned by founders and families, are not subject to market valuation on a daily basis and are affected only indirectly by the conditions in equity markets. Therefore, since few SME shares are traded on the TSE, we would not expect any large-scale influence of the Topix index on the number of M&As. Another indication of the high involvement level of unlisted SMEs in Japanese domestic M&As is the low number of *hostile* TOBs occurring in Japan. Taken together, the results from the regression confirm that M&As in Japan on average are not particularly influenced by the performance of the stock markets. Rather, for firms in general and SMEs in particular, the development of the stock exchanges in Japan is reduced to a mere indicator of the general business and financial situation.

The "fire sale" argument

Other probable explanations for the negative sign on the Topix variable in the basic model are that larger firms sold off their subsidiaries or business units as a means to raise cash to increase their short-term liquidity, and that the SME owners sold off their businesses to avoid bankruptcy. According to some of the empirical literature (e.g.

[15] See page 5 of this paper.

Kumps and Wtterwulghe, 1980; Mueller, 1987), the number of M&As should correlate positively with economic booms – and hence also with the equity markets. The rationale is that firms are able to build up large cash reserves due to increased revenues. However, as reported earlier, Nelson (1959) has shown from the data on US M&As during the Great Depression in 1929 that the level of M&As increased dramatically during the years following the Wall Street Crash. As Ali-Yrkkö (2002) has underlined[16], more economic upturns than M&A waves been observed during the 20th century.

However, if we instead regard the negative correlation of Topix and the total number of M&As as an evidence of firms selling off whole or parts of their business via M&As in order to raise cash, then the results from the basic model are easier to understand. If we return to the Nelson (1959) study, one of the reasons for the US M&A pattern was the severe credit crunch that also left financially healthy firms without short-term credits, causing them to go bankrupt. Firms with ample cash reserves then took the chance to acquire the healthy firms at bargain prices because of their low share values. Arguably, a similar situation also prevailed in Japan during the latter part of the 1990's, when the full extent of the banking crisis was revealed. Firms of all sizes were forced to rationalize their operations, and M&As were used as a means to yield extraordinary income to "save face" in order to show shareholders and creditors nice-looking balance sheets at the end of the fiscal year. In addition, many SMEs were creditors to credit unions and credit associations, which were hardest hit by the banking crisis, and the SMEs encountered hard times while trying to negotiate with non-bank creditors for survival. As a consequence, many SMEs ended up on the M&A market.

Having said this, the results of the basic model should be taken with some caution due to the limitations in the data material and the nature of the chosen variables. Therefore, I will not make any extensive interpretations of the magnitude of the variables' influence on the total M&As, and the basic model should be seen as a background for the continued analysis done with the dummy models below.

[16] Ali-Yrkkö, p. 15.

5.2 The dummy models

While the estimation of the basic model (Equation 1) yielded few significant parameters, the results of the dummy models are more interesting. The dummy model differs somewhat from the basic model, and was:

$$\ln M\&A_t = \alpha_1 + \alpha_2 D_{kt} + \beta_1 \ln NomGDP_t + \beta_2 \ln Topix_t + \varepsilon_t, \quad (2)$$

where:
$\ln M\&A_t$ = the pooled data of domestic and inward M&As in period t[17],
$\ln NomGDP_t$ = the Japanese nominal GDP (seasonally adjusted data; in 1995 prices, denominated in JPY) in period t,
$\ln Topix_t$ = the average Topix index in period t,
D_{kt} = Dummy variable k for period t,

β are the parameters, t denotes time period and ε is the error term.

Dummy models testing for differences not only in the intercept but also in the regression line were also estimated (the variables and subscripts are the same as above):

$$\ln M\&A_t = \alpha_1 + \alpha_2 D_{kt} + \beta_1 \ln NomGDP_t + \beta_2 (\ln NomGDP_t \cdot D_{kt}) + \beta_3 \ln Topix_t + \beta_4 (\ln Topix_t \cdot D_{kt}) + \varepsilon_t. \quad (3)$$

These alternative models were then tested against each other with a Generalized Likelihood-Ratio (LR) test (results in Table 3, Appendix). For the dummy models testing for inward M&As (Model 3) and seasonal effects (Model 7) respectively, there were no indications that the regression lines were significantly different between the dummy model estimating only the intercept and the dummy model estimating dummy parameters for all variables.

[17] Instead of the sum of all M&A occurring in a period (the variable lnTotM&A), the domestic and inward M&As were separated and pooled (the variable lnM&A).

Table 2. Dummy (pooled) regression results

***,**,* significant at 1%, 5% and 10% level respectively.

	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variable	Dummy model ML estimation Dep variable: lnM&A	Dummy model ML estimation Dep variable: lnM&A	Dummy model ML estimation Dep variable: lnDomesticM&A	Dummy model ML estimation Dep variable: lnInwardM&A	Dummy model ML estimation Dep variable: lnM&A	Dummy model ML estimation Dep variable: lnDomesticM&A	Dummy model ML estimation Dep variable: lnInwardM&A
Constant	-63.42***	-36.61**	-37.49**	-43.01**	-66.03***	-40.76	-88.17**
	(-2.95)	(-2.15)	(-2.43)	(-2.15)	(-3.10)	(-1.49)	(-2.51)
lnNomGDP	5.41***	6.03***	3.05***	3.89***	5.58***	3.52*	7.24***
	(3.61)	(5.15)	(2.92)	(2.90)	(3.76)	(1.73)	(2.96)
lnTopix	-0.38	-0.16	0.24	-0.82**	-0.35	-0.10	-0.61
	(-1.04)	(-0.52)	(0.79)	(-2.04)	(-0.96)	(-0.30)	(-1.01)
Dummy ($M\&A_{INWARD} = 1$)	-2.34***	-39.18*			-2.31***		
	(-10.08)	(-1.67)			(-9.87)		
Dummy (Big Bang = 1)		0.98***	-175.04***	-112.70			
		(9.66)	(-3.22)	(-1.63)			
lnNomGDP · Dummy (Big Bang = 1)		-3.01*	13.52***	7.76			
		(-1.89)	(3.34)	(1.50)			
lnTopix · Dummy (Big Bang = 1)		0.35	-0.29	1.61***			
		(0.79)	(-0.62)	(2.66)			
Dummy ("March effect"; First quarter = 1)					0.12**	0.11***	0.13
					(2.32)	(2.68)	(1.30)
Adj R^2	0.938	0.947	0.884	0.852	0.940	0.886	0.789
N	120	120	60	60	120	60	60
F-statistics	597.98***	356.42***	90.78***	69.20***	467.03***	153.24***	74.35***

T-values in parenthesis. Observe that the dependent variable for Models 5, 6, 8 and 9 are the group-wise total of M&As (i.e. n = 60 instead of n = 120).

For the dummy models 4 to 6, which control for the 1998 Big Bang reform, a significant difference in fit existed between the dummy models (i.e. the model of Equation 2 vs. the model of Equation 3). Therefore, dummy models similar to Equation 3 were used for estimating Big Bang effects on M&As.

The level of inward M&As compared to the domestic M&As

The first dummy model (Column 3 in Table 2) was designed to see whether there were differences in the intercept between domestic M&As and inward M&As. As expected, the differences in the intercept were substantial and statistically significant. Other things being equal, the level of inward M&A was on average 9,6%[18] of the domestic M&A level during the period 1988 - 2002. This difference was statistically significant on the 5% level.

Difference between pre- and post-Big Bang periods

For the second dummy model (Column 4 in Table 2), additional dummies were augmented to investigate differences in the intercept and the regression line between the pre- and the post-Big Bang period. The purpose here was, besides testing the stability of the model over time, to test whether the 1998 Big Bang institutional reforms had any statistically significant effects on the total number of M&As. Looking at Figure 2, there are good reasons to believe that the Tokyo Big Bang reforms have had effects on the short-run M&A pattern. As expected, the differences in the intercept and the regression lines were statistically significant (t-test on 5% level) for the *domestic* M&A group. In other words, we can establish that, from a statistical point of view, a significant structural change has taken place. For the pooled model and the model with only *inward* M&As, the difference in pre- and post-Big Bang period intercepts was not significant[19]. Thus, the overall pattern observed in Figure 2 was confirmed in the regressions.

In the period after the 1998 Big Bang reforms, the total level of M&As was on average 166% higher than in the pre-Big Bang period (holding other variables

[18] Antilog of the dummy parameter minus one, following Halvorsen and Palmquist's (1980) suggestion for obtaining the relative change in the mean of the dependent variable.

constant)[20]. However, after breaking up the pooled dataset to a domestic and an inward M&A group, an interesting pattern emerged. It is clear from the estimation results that domestic M&As are influenced to a higher degree by the GDP, while the variation of the Topix index influences the inward M&As significantly. This is noteworthy, since the Topix variable has been insignificant in all other models. Why do the two groups of M&As can differ so much? In order to answer this question, we must return to what was said in section 5.1 about the composition of firm size in the M&A data. From the Recof (2003) data, it is apparent that SMEs dominate the domestic M&A group, while large firms dominate the inward M&A group. As said earlier, few SMEs are listed on the TSE, while the foreign firms are mostly engaged in M&As with large listed firms. The results of Models 5 and 6 therefore just confirm the qualitative structure of the Japanese M&A pattern.

The "fire sale" hypothesis and seasonal effects

A third dummy model (Column 7 in Table 2) was included in the analysis to investigate whether there existed seasonal effects in the data material. Connected to the "fire sale" hypothesis discussed above and the question why the Topix index was negatively correlated with the M&A levels, the Recof (2003) data showed that in nine years out of the 1988 to 2002 period, most M&A deals were announced in March[21]. Intuitively, this seems to imply that firms took the chance to sell off parts of their businesses in order to improve their balance sheets prior to the end of the Japanese fiscal year, which for the majority of firms ends on 31 March. In order to test this hypothesis, a dummy model that takes the existence of quarterly effects into account was constructed. All other things being equal, the t-value shows a statistical significant difference in the number of M&As announced during the first quarter compared to the rest of the year. The magnitude for this difference was on average about 13% higher than during the rest of the year. Thus, the results suggest that firms were involved in M&As more frequently during the first quarter, implying that firms sold off businesses to raise cash just before the end of the fiscal year.

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[19] Should not be confused with the LR test (Table 3, Appendix) and the significant individual t-values (Table 2).

[20] Antilog of the dummy parameter minus one, following Halvorsen and Palmquist's (1980) suggestion for obtaining the relative change in the mean of the dependent variable.

[21] The actual date for the settlement of a deal is not known from the data, but from the point of view of financial markets, the dates of the announcement and the conclusion of an M&A deal are more interesting.

Since this seasonal increase in M&As might be different between the two groups as it is for the Big Bang effects, two additional dummy models were constructed and estimated. In terms of magnitude, the seasonal effect was similar between the groups; however, the significance was low for the inward M&A group. A formal LR test (Table 3, Appendix) was also performed for the pooled model (Model 7). The null hypothesis could not be rejected, implying that the intercept and the regression lines were the same for both the model with only an intercept dummy and the model including dummies also for the independent variables. The LR test results therefore confirm that the M&A activity increases significantly just before the end of the Japanese fiscal year, and there is no difference between the domestic and the foreign firms.

6 Conclusions

The purpose of this paper has been to study the influence of selected macro variables on the Japanese M&A pattern, using a model inspired by another study on the European short-run M&A pattern, made by Ali-Yrkkö (2002). The overall regression results indicate the relevance of macro variables in explaining M&A patterns also in the Japanese setting. These results also suggest that there is a possibility that other variables can explain Japanese M&As better, such as other macro and microeconomic variables or qualitative variables like managerial motives, irrational behavior and cultural values.

Thus, the results of this analysis are in line with parts of Ali-Yrkkö's results and model (Figure 1) by indicating that macro variables (in this context the GDP, the Topix index and the Big Bang reform) can be important factors in explaining short-run M&A patterns. However, what Ali-Yrkkö calls "Economic booms" in his model, might better be rephrased as "Pace of economic growth". From the regression results, there is a statistically significant indication that economic growth does affect the M&A pattern in the short run. Considering that Japanese economic growth has anything but "boomed" in the 1990's, the estimation results, which still showed a strong influence on the dependent variable from GDP, are particularly interesting. However, in order to clearly establish the relationship between GDP growth and the

M&A pattern, a longer time series is needed in order to see if this relationship is valid also in the long-run perspective (e.g. over the post-war period).

In addition, it is also important to consider the "softer" sides of M&A decisions that are difficult to see in the quantitative data. One example is the test for seasonal effects, which showed a significant shift in the average M&A pattern during the first quarter each year, but did not really explain the logic behind such behavior – that is something only interviews and surveys can give an answer to. As already mentioned, there are many decision variables for a CEO to consider before an M&A deal is settled, and apart from managerial motives, irrational behavior and cultural values, events such as unexpected disclosures or access to hidden information (about persons or the firms involved) on either side can be decisive factors for the outcome of a deal.

Connecting to Nelson's (1959) arguments vs. those of Town (1992), the estimation results of this paper are not transparent and it is hard to evaluate from this sample whose arguments are most consistent with the Japanese situation. The record-long recession in Japan during the 1990's with falling stock indices has coincided with a sharp increase in the number of M&As; the empirical literature offers no strong evidence for the hypothesis that the level of M&As is directly influenced by the development on the equity markets. In addition, the Japanese M&A pattern has also varied positively with the GDP growth. Therefore, further research is needed to establish the relation between macro variables and the M&A pattern for the Japanese case.

Additional suggestions for future research are the collection of longer time series and between-group analyses – not only between nationalities, but also between industries. Long-term time series would undoubtedly be of great value for a profound analysis of the Japanese M&A pattern and in constructing robust models. Another improvement would also be to divide the data into subcategories based on the size of firms (in terms of capital, turnover, number of personnel, etc.) and size or payment type of M&A deals (e.g. cash or share swapping). In any case, there is a lot to be done in this specific study area, but the main future challenge for researchers is the formulation of a robust theory of M&A.

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Appendix

***,**,* significant at 1%, 5% and 10% level respectively.

	Test value	Decision
Model with Intercept Dummy only (H_0) or Model with Dummies for all estimated variables (H_1)		
Generalized Likelihood-Ratio (LR) test 5%; $LR_{crit} = \chi^2_{2\,df} = 5.99$		
Model 3	0.3309	Accept H_0
Model 4	12.28	Reject H_0
Model 5	9.0425	Reject H_0
Model 6	7.7412	Reject H_0
Model 7	0.2870	Accept H_0

Table 3. Model specification tests

Correlations

		LNTOTM_A	LNNOMGDP	LNTOPIX
LNTOTM_A	Pearson Correlation	1	.764**	-.628**
	Sig. (2-tailed)	.	.000	.000
	N	60	60	60
LNNOMGDP	Pearson Correlation	.764**	1	-.797**
	Sig. (2-tailed)	.000	.	.000
	N	60	60	60
LNTOPIX	Pearson Correlation	-.628**	-.797**	1
	Sig. (2-tailed)	.000	.000	.
	N	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4. Bivariate correlations of the variables included in the model.

```
Controlling for..    LNTOPIX

            LNTOTM_A   LNNOMGDP

LNTOTM_A      1.0000      .5612
             (    0)    (   57)
             P= .       P= .000

LNNOMGDP       .5612     1.0000
             (   57)    (    0)
             P= .000    P= .

(Coefficient / (D.F.) / 2-tailed Significance)
```

Table 5. Partial correlation between the dependent variable and lnNomGDP, controlling for lnTopix.

```
Controlling for..    LNNOMGDP

            LNTOTM_A    LNTOPIX

LNTOTM_A      1.0000     -.0480
             (    0)    (   57)
             P= .       P= .718

LNTOPIX       -.0480     1.0000
             (   57)    (    0)
             P= .718    P= .

(Coefficient / (D.F.) / 2-tailed Significance)
```

Table 6. Partial correlation between the dependent variable and lnTopix, controlling for lnNomGDP.

```
Controlling for..    LNTOTM_A

            LNNOMGDP    LNTOPIX

LNNOMGDP      1.0000     -.6321
             (    0)    (   57)
             P= .       P= .000

LNTOPIX       -.6321     1.0000
             (   57)    (    0)
             P= .000    P= .

(Coefficient / (D.F.) / 2-tailed Significance)
```

Table 7. Partial correlation between the independent variables, controlling for the dependent variable.