The impacts of MA on employment and labor productivity in Japan

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The Impacts of M&A on Employment and Labor productivity in Japan

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Abstract

Whether the active M&A in Japan has brought about positive or negative impacts on the volume of employment is not only the concern of each firm, but also the center of national interests in the context of national industrial policies. M&A activities, however, vary in terms of micro behavior of each firm such as motivation, management and organization as well as of the industrial category that each firm belongs to, and the employment consequences may differ depending on the types of firms' micro behavior and the industrial sectors.

This chapter tried to come up with some aggregated consequences of M&A in Japan on employment volume on empirical bases, by the M&A categories in which we take firms' behaviors and industrial sectors into consideration to maximum extent. To be specific, we examined employment-effects of M&A in Japan by the deal type (merger and acquisition) and by the sector (manufacturing and non-manufacturing), tracing the effects in the long term, using large dataset with 9,880 sample firms and 2,530 M&A cases for the period from 1995 to 2008.

Our main findings were: the "acquisition" with the key role of "extension and growth" proved to have positive effects in the dynamic terms on target firms' employment, mainly in manufacturing sector with high labor productivity. On the other hand, the "merger" with key function of "consolidation" turned out to have negative impacts dynamically on post-merger firms' employment, mainly in non-manufacturing sector with low labor productivity. The strategic implication might to be that the different employment responses to M&A events between manufacturing and non-manufacturing reflect the difference in labor productivity between them, i.e. the dual structure of Japanese economy.

Key words: M&A, acquisition, merger, dynamic employment effects
JEL Classification Codes: D21, M51

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1. Introduction

The purpose of this chapter is to present some empirical evidence of the effects of merger and acquisition (hereafter referred to simply as M&A) on employment in Japan. Our research question is whether the active M&A in Japan has brought about positive or negative impacts on the volume of employment, which is not only the concern of each firm, but also the center of national interests in the context of national industrial policies. M&A activities, however, vary in terms of micro behavior of each firm such as motivation, management and organization as well as of the industrial category that each firm belongs to, and the employment consequences may differ depending on the types of firms' micro behavior and the industrial sectors. Our role in this paper is to come up with an aggregated consequence of M&A on employment volume on empirical bases, by the M&A categories in which we take firms' behaviors and industrial sectors into consideration to maximum extent. This study concentrates on the case of Japan. Japan has experienced an M&A boom since the latter half of the 1990s, following the global surge of M&A. The M&A activities in Japan reached a peak in 2006, in which the number of M&A cases amounted to 2,775, and its deal value deserved about 15 trillion yen (nearly three percent of GDP). In spite of this reality, empirical studies on Japanese M&A, including its employment effects, have been extremely limited in the literature on firm behavior. The evidence presented in our study, can also contribute to providing an implication in the context of Japanese industrial structure and policy.

The analytical focuses in this study, which are somewhat different from the previous literatures, are as follows. First, we examine employment effects of M&A, by the *deal type*, i.e. merger and acquisition. The employment impacts of M&A may vary depending on a variety of typologies of M&A motives and functions. It seems, however, to be difficult to work out the employment impacts by M&A motives and strategies through econometric methods, since the micro data of firms at a nation-wide level do not usually include the information on the M&A motives and strategies of individual firms. Thus, we have to seek for a second-best approach for estimating employment effects by econometric methods, as well as for taking M&A motives and functions into account. We herein depend on the typology of Miyajima (2007a), which classified M&A activities into the deal type, and described the functions of each deal type. Miyajima (2007a) emphasized that the "extension and growth" function fits in with the acquisition type since it is rational for firm growth to keep the independence of target firms avoiding merging costs, while the "consolidation" function essentially fits in with the merge type.[2] Then, we hypothesize that the type of "merger" with "consolidation" a key function would rather include more of the elements that lead to employment reduction (e.g. curtailing administration costs, reorganizing overlapped offices), whereas the type of "acquisition" with "extension and growth" a key function would include more of the elements that make employment expand (e.g. strengthening core competency, extending projects).

Second, we further classify M&A by the *sector*, i.e. manufacturing and non-manufacturing. We would herein like to present a hypothesis that manufacturing and non-manufacturing would produce different employment effects of M&A, from the viewpoint of the difference in their labor productivities in the context of Japanese economy. McKinsey (2000) reported the dual structure of Japanese economy: the labor productivity of

[2] It is true that there are many exceptional examples in the archetypical division of Miyajima (2007a), such as 'strong acquires' making rationalizations in 'weak' target firms. In addition, it should also be noted that the division of Miyajima (2007a) is adaptable to Japan, and not always to other countries, since there are differences in the preference for acquisitions and mergers among countries. For instance, the acquisitions, which maintain the legal independence of the target firms, are more common in Japan than in the United States and the United Kingdom, due to fewer restrictions on listed firms and a strong desire to maintain corporate cultures in Japan (see Miyajima 2007b).

export-driven manufacturing sector in Japan is 20 percent higher than that in U.S., whereas the labor productivity of domestic services sector in Japan is 37 percent lower than that in U.S. economy. The reports interpreted it in such a way that non-manufacturing sector is small-scaled, and insulated from competition by subsidies, regulations and other domestic factors, whereas manufacturing sector is exposed to fierce global competition. Thus, we hypothesize that in the chance of M&A events, the employment curtailment occurs more easily in non-manufacturing sector than in manufacturing sector, since non-manufacturing sector may hold excess employment under the low level of labor productivity.

Third, we construct panel data for estimation with 9,880 sample firms and 2,530 M&A cases for the period from 1995 to 2008, using extensive micro data of firms' financial statements. The data cover the control samples of firms that have not experienced M&A, which are necessary to extract pure effects of M&A. The samples also include unlisted firms as well as listed firms on stock markets.

The paper proceeds as follows. Section 2 describes the recent trends in M&A in Japan; Section 3 represents the empirical framework, estimation results and discussions; and the last section offers our conclusions.

2. Recent Trends in M&A in Japan

Japan has experienced a so-called M&A boom since the latter half of the 1990s. Table 1 and Figure 1 indicates the remarkable increase in the number of M&A cases, from around 500 cases in the mid 1990s to around 2,000 cases in the 2000s, although showing a decline after 2008 due to the global financial crisis. The number of M&A reached a peak in 2006, in which the cases amounted to 2,775, and their deal values deserved about 15 trillion yen (nearly three percent of GDP).

We herein describe the M&A activities since the 1980s in brief by referring to Table 1. The first boom, in rather small scale, came in the latter half of the 1980s. The major cases in that period were the ones in which Japanese firms acquired foreign firms (IN-OUT style in Table 1). The "bubble economy" made Japanese companies go ahead into foreign markets, with the Sony Corporation's acquisition of CBS Records Inc. and Columbia Pictures Entertainment a typical example. The second boom, in larger scale and longer term, started in the latter half of the 1990s. In this boom, domestic M&A (IN-IN style in Table 1) took a dominant role to pursue industry consolidation amid the burst of "bubble economy" and the fierce competition with emerging Asian economies. In the steel industry, for example, two of Japan's major steelmakers – Kawasaki Steel Corp. and NKK Corp. were merged into JFE Holdings. The legal system reforms such as the introduction of new accounting rules on a group-wide basis, also contributed to this boom. Another type of cross-border M&A in which Japanese companies were acquired by foreign ones (OUT-IN style in Table 1), became active since the end of the 1990s, although the share of the number stayed at around ten percent. This type of M&A could often be seen as a case for strengthening the domestic presence of foreign companies, with the Citigroup's acquisition of the Nikko Cordial group a typical example. The activated role of foreign investment funds also contributed to its increase.

We next touch upon the question on what factors have driven the M&A waves in Japan. There has been a rich set of literature on the predictors of M&A waves in general. Harford (2005) described two general classes of models to explain M&A waves: the neoclassical model, in which industries responding to shocks reorganize through M&A, and thereby create a clustering of merger activity; and, the behavioral model, in which rational managers take

advantage of consistent pricing errors in the market to buy real assets with overvalued stock. Harford (2005) compared the two models in his analysis, and supported the neoclassical model –economic, regulatory and technological shocks drive industry merger waves– as modified to include a role for capital liquidity. Concerning with the Japan's case, Arikawa and Miyajima (2007) examined which of the two models as the neoclassical and stock-market-driven ones was applicable to the Japan's M&A waves. Their findings supported not the "market-driven" model but the neoclassical one, showing that the 1990s-2000s M&A boom in Japan came from some sort of shock that impacted on the growth opportunities and profitability of industry[3]. Miyajima (2007b) stated that the recent, rapid increase in M&A in Japan has been driven by economic shocks - both positive and negative - such as technological innovation and sharp falls in demand, and that the increase in M&A has facilitated resource allocation in terms of downsizing less profitable divisions and expanding high-growth divisions. These findings that the M&A in Japan has been driven by real shocks, lead us to recognize the significance in examining the labor impact of the M&A in the latter section of this paper.

3. Empirical Study

We now turn to empirics. Before launching into the analysis, we first clarify the methodology and data. We then exhibit the estimation results, and discuss them.

3.1 Methodology

For the estimation, we adopt the labor demand function. The labor demand function contributes to extracting the pure labor impacts that are caused only by M&A events, by controlling the other economic variables that are theoretically considered to affect labor demand. We adopt an ordinary dynamic labor demand function, derived by Nickell (1984) and Bresson et al. (1996) and employed by Conyon et al. (2002), Gugler and Yurtoglu (2004), and Kubo and Saito (2007). It assumed that firms determine the optimal path of their employment by minimizing their costs, under the conditions that firms are output-constrained, have a technological constraint which can be represented by a Cobb–Douglas production function, and face continuous quadratic adjustment costs. The empirically testable labor demand model can finally be derived in such a way that the actual level of employment is expressed as a function of lagged values of employment and other determinants such as production and factor costs (user cost of capital and wage). We then specify an estimation equation by adding M&A dummy variables to the labor demand model, so that the coefficients of M&A dummy variables purely signify the M&A's impacts on employment, and other factors' impacts on employment are absorbed into labor demand function.

We first specify the labor demand function as follows:

$$E_{it} = \text{const.} + \alpha E_{it-1} + \beta_1 Q_{it} + \beta_2 Q_{it-1} + \gamma_1 W_{it} + \gamma_2 W_{it-1} + \delta_1 C_{it} + \delta_2 C_{it-1} + \eta_t D_t + \theta_j ID_j + f_i + \varepsilon_{it} \quad (1)$$

where E_{it}, Q_{it}, W_{it} and C_{it} denote the logarithms of employment, real output, real wage, and user cost of capital regarding firm i in period t. Dt are a set of time dummies to account for technical progress and business cycle effects, ID_j is a set of industry dummies to signify the

[3] As well as testing the two hypotheses, they described the impact of legal reform on promoting M&A: the lifting of the ban on holding companies (1997), the introduction of stock transfer system (1999), tax incentive measures for revitalizing industry (1999), etc.

specific effect of the industry that a firm belongs to[4], and f_i is firm-specific fixed effects that reflects intra-firm differences in technology and management. ε_{it} is an equation disturbance term.

As we mentioned, the method of extracting the pure impacts of M&A on employment is to add M&A dummy variables to the labor demand function specified above. Following our analytical concern, we classify the dummy into the one for acquisition and the other for merger. Our estimation does not include time dummies, since the estimation period is limited to thirteen years, and since time dummies may have multicollinearity with the M&A dummies in the sense that the M&A activities can be influenced by business cycle. It also has to be noted that, due to data constraints, our estimation focuses on the employment effects of not the acquirer but the *target* firm in the cases of acquisition, and, in the case of merger, the firm that continues to exist after merger, which we call "*post-merger firm*" thereafter. For the purpose of capturing the *dynamic* employment effects of the M&A, we specify the equations for the baseline estimation covering ten-year lags in the following ways.

$$\begin{aligned} E_{it} = \text{const.} + \alpha E_{it-1} + \beta_1 Q_{it} + \beta_2 Q_{it-1} + \gamma_1 W_{it} + \gamma_2 W_{it-1} + \delta_1 C_{it} + \delta_2 C_{it-1} + \theta_j ID_j + f_i + \varepsilon_{it} \\ + \lambda_{a0} DA_{it} + \lambda_{b0} DM_{it} \\ + \lambda_{a1} DA_{it-1} + \lambda_{b1} DM_{it-1} \\ + \lambda_{a2} DA_{it-2} + \lambda_{b2} DM_{it-2} \\ \cdots \\ + \lambda_{a10} DA_{it-10} + \lambda_{b10} DM_{it-10} \qquad (2) \end{aligned}$$

where *DA* and *DM* denote the dummy for acquisition and merger, respectively.[5] For instance, $DA_{it-n} = 1$ if the firm i is acquired by another firm in the period of t-n. The key statistics of interest, λ_0, measures the *immediate* impact of the M&A on labor demand in percentage terms relative to the non-M&A labor trends, and λ_1, λ_2,$\cdots$ represent the *dynamic* impact on post-M&A employment. The case that λ_n is significantly positive (negative), means that positive (negative) impacts of M&A on employment come out *n* years after the M&A event. We examine the dynamic impact until ten years later due to data constraints. The ordinary labor demand function expects positive sign of sale's coefficient β, negative sign of wage's coefficient γ, and positive sign of the coefficient of user cost of capital δ. Our analysis further extends the baseline estimation above by classifying M&A dummies into manufacturing and non-manufacturing sector. To be specific, the dummy for acquisition, *DA*, for instance, is divided into *DA*_m for manufacturing sector and *DA*_nm for non-manufacturing sector.

Another focus of our analysis is concerned with estimation techniques. Equation (2) contains a lagged dependent variable among the explanatory variables, and thereby the Ordinary Least Squares (OLS) estimator is inconsistent. Obtaining consistent estimates requires the application of an instrumental variables estimator or Generalized Method of Moments (GMM). We herein adopt the system GMM estimator (two-step, robust) developed by Arellano and Bover (1995), and Blundell and Bond (1998), who argue that additional instruments can be obtained in a dynamic model from panel data if we utilize the orthogonality conditions between lagged values of the dependent and the disturbances. We also present the test results for autocorrelations in the table that follows.

[4] The industry classification (j = 43) follows that of the data source, the "Financial Statements Statistics of Corporations by Industry".
[5] On the estimation, we added other dummies related to M&A, i.e. the dummies for capital participation and increase, which do not accompany ownership changes. Since we could not get any significant coefficients on them, we omitted any explanation on their effects.

3.2 Database

One of the contributions in our study consists in extensive database as we emphasized in Introduction. The database is constructed from two sources. The primary source for getting M&A information is the "MARR M&A DATA CD-ROM" presented by the "RECOF DATA Corporation".[6] We use this data source, since it provides M&A data with the wider coverage of the information on M&A activities in Japan than such international data sources as Bloomberg database and Thomson Financial one. This data source allows us to classify M&A activities into the deal type (merger and acquisition), and also into domestic and cross-border cases. In this data, the "merger" is defined to be a case in which firms are merged and a new legal entity is formed, and the "acquisition" is a case where more than 50 percent of the target firm's equity is acquired by another firm.

The micro-data for firm's behaviors, i.e. employment, output, wage and user cost of capital is collected by the Financial Statements Statistics of Corporations by Industry, made by the Policy Research Institute of the Ministry of Finance in Japan. The data cover the control samples of firms that have not experienced M&A, which are necessary to extract pure effects of M&A. Our estimation targets the firms whose capital values are 600 million yen and over[7], and whose sectors exclude those of finance and insurance[8], due to the data availability of statistics. The sample firms, however, have wide coverage in that they include not only firms listed on the stock exchange markets in Japan, but also unlisted firm.[9] The data for employment is derived from the item of "Number of employees" in the statistics.[10] The data for output is from the "Sales" in the profit and loss statements. The data for wage is calculated by dividing the "Personnel expenses" by the "Number of employees".[11] The data for user cost of capital is from the "Interest expenses" in the profit and loss statements. We herein use nominal data, not real data, since our estimation period within thirteen years indicates price stability.

We combine the data from two sources above, and construct panel data with 9,880 sample firms for the period from 1995 to 2008 after checking the data availability of both data sources. Table 2 shows that the total number of the M&A cases between 1996 and 2008 is 2,530, including 626 cases of "acquisition", and 1,904 of "merger". The observed firms have the statistics of average (standard deviations) for employees: 1,165 (1,479); for million yen of sales: 86,887 (126,328); and for thousand yen of wages: 5,939 (2.367).

3.3 Estimation Results

Table 3a represents the results of the baseline estimation. The test results for autocorrelations indicate the validity of all the estimations from Equation (a) to (c), since all the AR(2) statistics reveal the absence of second-order serial correlation in the first-differenced errors. All the estimations represent that the inclusion of the lagged

[6] The "RECOF DATA Corporation" is a name of private company, whose mission is to provide M&A related database. The "MARR M&A DATA CD-ROM" is a name of M&A database provided by the "RECOF DATA Corporation". For the details, see http://www.recofdata.co.jp/english.do.

[7] This database covers the firms with their capital values below 600 million yen. But these firms' data are collected by the sample survey in which the samples are replaced every year, thereby being impossible to be traced as time-series data on individual firm base. Thus we focus on the firms with their capital values 600 million yen and over, whose data are collected by complete survey.

[8] The statistics classify the sectors into manufacturing and non-manufacturing. The non-manufacturing sector covers construction, wholesale and retail trade, real estate, goods rental and leasing, information and communications, transport and postal activities, electricity, and services.

[9] If we focused on the listed firms, the sample size would be reduced from 9,880 firms towards less than 3,000 firms.

[10] This statistic counts on the part-time job workers as the number of employees. But the number is adjusted by the level equivalent to the full-time job workers. For instance, in case that there are two part-timers who work by half of a full-timer, they are counted as one employee.

[11] The "Personnel expenses" in this context means the sum of salaries and bonus for employees, which do not include any welfare expenses.

dependent variable of employment is positively discernable, thus implying inertia in firm employment and justifying forming the dynamic panel model; the coefficients of output, wage, and user cost of capital in the period t have expected signs at the significant level, whereas those in the period t-1 have opposite signs.[12] As for the coefficients of the M&A dummies, positive employment impacts are significantly identified four or five years after M&A in the "acquisition" (hereafter we focus only on significant impacts). As for the case of the "merger", negative effects come out three years after, while immediate effects are definitely positive.[13]

Table 3b reports the outcomes of two-sector estimation. Regarding the "acquisition", manufacturing sector shows positive and continuous employment effects two years after M&A, while non-manufacturing sector indicates positive impacts only five and six years after. On the other hand, in the "merger" case, negative and continuous impacts come out one year after in non-manufacturing sector, whereas clear dynamic effects do not come out in the manufacturing sector. In short, we found the positive dynamic effects of the "acquisition" on target firms' employment mainly in manufacturing, and the negative dynamic effects of the "merger" on the post-merger firms' employment mainly in non-manufacturing.

3.4 Discussions

We first clarify the goal of our paper here again. Our study examines the employment effects of M&A, by the deal type of merger and acquisition and by the sector of manufacturing and non-manufacturing, in the dynamic terms covering ten years, by using the analytical framework of labor demand function. We propose the following hypotheses, and put them into the empirical tests. The first hypothesis, the one regarding with the deal type, is that the "acquisition" with the key function of "extension and growth" tends to have positive effects on employment, whereas the "merge" with the essential function of "consolidation" inclines to produce its negative impacts. The second hypothesis, the one on the sector, is that non-manufacturing with low labor productivity is more likely to receive negative impacts of M&A on employment than manufacturing with high productivity.

We then discuss the empirical findings in the previous section in the context of our two hypotheses above. Our first finding about the "acquisition", i.e. dynamic positive effects on target firms' employment mainly in manufacturing, seems to be consistent with our hypotheses. The positive employment effects of the "acquisition" appear to reflect its "extension and growth" function, i.e. the one for strengthening core competency, extending projects, etc., if we follow the typology of Miyajima (2007a). And this positive employment effects appear to show up reasonably in manufacturing sector, which has less room to curtail employment volume under its higher labor productivity in Japan.

Our second finding on the "merge", i.e. dynamic negative effects on post-merger firms' employment mainly in non-manufacturing, seems to be also consistent with our hypotheses. The negative employment impacts of the "merge" appear to reflect its "consolidation" function, i.e. the one for curtailing administration costs, reorganizing overlapped offices, etc., according to the typology of Miyajima (2007a). In addition, this negative employment effects

[12] The wage has larger degree of coefficient with an opposite sign in the period t-1. This may come from the problem of data source. The Financial Statements Statistics of Corporations by Industry is based on each firm's financial statements. Each firm's financial statement differs in the starting month of fiscal year. The data may, therefore, include lagged figures in case that a firm adopts a fiscal year with an earlier starting month.

[13] The immediate positive effect of the "merger" is a natural, senseless result, since our analysis traces only the post-merger firms' employment, not merged firms' one, through the pre-merger period. Thus, we hereafter omit explanation on immediate merger effects. Kubo and Saito (2007) represented a negative impact as an immediate employment effect of the "merger". This is because they trace the employment of both merging and merged firms even through the pre-merger period, thereby being able to estimate a net effect of the "merger".

appear to come out reasonably in non-manufacturing sector, which seems to have excess employment volume under its lower labor productivity in Japan. Some of the previous studies, e.g. Conyon et al. (2002), Gugler and Yurtoglu (2004), and Kubo and Saito (2007), which dealt with only the "merger" case, verified its negative employment impacts, although Gugler and Yurtoglu (2004) and Kubo and Saito (2007) estimated only its immediate effects. In this sense, our finding on the "merger" impacts is consistent with the previous studies' outcomes, except that its negative effects concentrate on non-manufacturing in our analysis.

We can summarize the discussions above as follows. The "acquisition" with the key role of "extension and growth" proved to have positive effects in the dynamic terms on target firms' employment, mainly in manufacturing sector with high labor productivity; On the other hand, the "merger" with key function of "consolidation" turned out to have negative impacts dynamically on post-merger firms' employment, mainly in non-manufacturing sector with low labor productivity. The implication peculiar to Japanese M&A cases consists in the different employment responses to M&A events between manufacturing and non-manufacturing, which reflect the difference in labor productivity between them, i.e. the dual structure of Japanese economy. For the managers in non-manufacturing, the "merger" may be an effective instrument to rationalize excess employment, while for the managers in manufacturing, the "acquisition" may be an opportunity to expand and diversify the projects with high productivity.

5. Concluding Remarks

This paper provides empirical evidence on the dynamic effects of M&A on employment in Japan. The main contributions are: targeting employment effects of M&A, examining them by the deal type (merger and acquisition) and by the sector (manufacturing and non-manufacturing), tracing the effects in the long term, using large dataset with 9,880 sample firms and 2,530 M&A cases for the period from 1995 to 2008, and focusing on the case of Japan.

Our main findings are as follows: The "acquisition" with the key role of "extension and growth" proved to have positive effects in the dynamic terms on target firms' employment, mainly in manufacturing sector with high labor productivity; On the other hand, the "merger" with key function of "consolidation" turned out to have negative impacts dynamically on post-merger firms' employment, mainly in non-manufacturing sector with low labor productivity. The strategic implication might to be that the different employment responses to M&A events between manufacturing and non-manufacturing reflect the difference in labor productivity between them, i.e. the dual structure of Japanese economy.

Figure 1. M&A Developments in Number

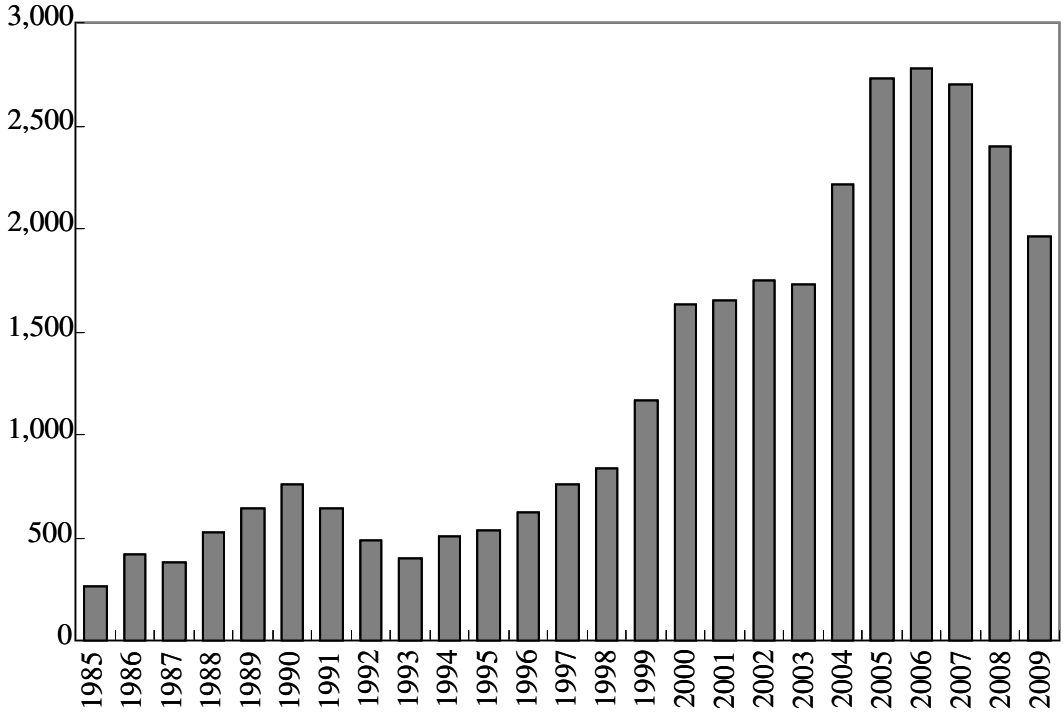

Table 1. M&A Developments in Number Classified into Market Entry Style

	IN-IN		IN-OUT		OUT-IN		Total	Deal Value
	Number	Portion %	Number	Portion %	Number	Portion %	Number	trillion yen
1985	161	61.9	78	30.0	21	8.1	260	n.a.
1986	223	53.3	181	43.3	14	3.3	418	n.a.
1987	206	53.9	158	41.4	18	4.7	382	n.a.
1988	218	41.7	291	55.6	14	2.7	523	n.a.
1989	245	38.0	388	60.2	12	1.9	645	n.a.
1990	268	35.5	463	61.4	23	3.1	754	n.a.
1991	309	48.4	301	47.2	28	4.4	638	n.a.
1992	253	52.4	186	38.5	44	9.1	483	n.a.
1993	234	58.9	120	30.2	43	10.8	397	n.a.
1994	249	49.3	196	38.8	60	11.9	505	n.a.
1995	255	48.0	222	41.8	54	10.2	531	n.a.
1996	320	51.5	239	38.5	62	10.0	621	n.a.
1997	453	60.2	224	29.7	76	10.1	753	2.24
1998	488	58.5	236	28.3	110	13.2	834	3.48
1999	721	61.7	266	22.8	182	15.6	1,169	18.09
2000	1,066	65.2	368	22.5	201	12.3	1,635	11.61
2001	1,190	72.0	289	17.5	174	10.5	1,653	8.28
2002	1,352	77.2	264	15.1	136	7.8	1,752	4.94
2003	1,352	78.2	213	12.3	163	9.4	1,728	5.80
2004	1,680	76.0	320	14.5	211	9.5	2,211	12.12
2005	2,129	78.1	411	15.1	185	6.8	2,725	11.74
2006	2,174	78.3	421	15.2	180	6.5	2,775	15.09
2007	2,020	74.9	367	13.6	309	11.5	2,696	12.45
2008	1,824	76.0	377	15.7	198	8.3	2,399	12.52
2009	1,520	77.7	299	15.3	138	7.1	1,957	7.24

Note) M&A inside the same group is excluded.
Source) MARR M&A Database presented by the RECOF.

Table 2. Number of the Cases of M&A and Observed Firms

	Acquisition ①			Merger ②			①+② M&A Total	Observed Firms
	M.	Non-M.	Total	M.	Non-M.	Total		
1995	-	-	-	-	-	-	-	5,936
1996	0	1	1	9	23	32	33	6,135
1997	0	0	0	16	22	38	38	6,293
1998	3	1	4	29	34	63	67	6,300
1999	0	2	2	50	62	112	114	6,342
2000	8	4	12	44	71	115	127	6,372
2001	16	21	37	53	85	138	175	6,407
2002	18	27	45	65	88	153	198	6,551
2003	22	21	43	69	107	176	219	6,424
2004	13	66	79	81	102	183	262	6,370
2005	24	70	94	91	127	218	312	6,370
2006	35	82	117	69	139	208	325	6,175
2007	34	68	102	87	153	240	342	5,949
2008	19	71	90	89	139	228	318	5,697
Total	192	434	626	752	1,152	1,904	2,530	9,880[2)]

Note: 1) M: Manufacturing sector, Non-M. Non-Manufacturing sector

2) The toal number is the one of firms observed between 1995 and 2008.

Table 3a. Results of Baseline Estimations

Et	(a)		(b)		(c)	
Const.	-1.014	(0.177) ***	-1.161	(0.437) ***	-1.140	(0.434) ***
Et-1	0.966	(0.026) ***	0.965	(0.026) ***	0.968	(0.026) ***
Qt	0.257	(0.020) ***	0.262	(0.021) ***	0.258	(0.021) ***
Qt-1	-0.134	(0.020) ***	-0.134	(0.020) ***	-0.136	(0.020) ***
Wt	-0.208	(0.016) ***	-0.205	(0.016) ***	-0.204	(0.017) ***
Wt-1	0.207	(0.016) ***	0.209	(0.016) ***	0.210	(0.016) ***
Ct	0.011	(0.003) ***	0.010	(0.003) ***	0.010	(0.003) ***
Ct-1	-0.004	(0.003)	-0.004	(0.003)	-0.005	(0.003)
DAt	-0.022	(0.018)			-0.019	(0.018)
DAt-1	-0.190	(0.025)			-0.019	(0.024)
DAt-2	0.021	(0.031)			0.023	(0.030)
DAt-3	0.049	(0.032)			0.048	(0.031)
DAt-4	0.063	(0.040)			0.067	(0.039) *
DAt-5	0.098	(0.045) **			0.106	(0.044) **
DAt-6	0.130	(0.047) ***			0.131	(0.047) ***
DAt-7	0.126	(0.053) **			0.129	(0.052) **
DAt-8	0.020	(0.074)			0.047	(0.070)
DAt-9	0.501	(0.074)			0.076	(0.070)
DAt-10	0.038	(0.074)			0.065	(0.069)
DMt			0.056	(0.011) ***	0.055	(0.011) ***
DMt-1			0.003	(0.010)	0.002	(0.010)
DMt-2			-0.013	(0.012)	-0.015	(0.012)
DMt-3			-0.022	(0.011) *	-0.024	(0.011) **
DMt-4			-0.021	(0.012) *	-0.022	(0.012) *
DMt-5			-0.020	(0.013)	-0.020	(0.013)
DMt-6			0.003	(0.016)	0.003	(0.016)
DMt-7			-0.030	(0.017) *	-0.031	(0.017) *
DMt-8			0.020	(0.018)	0.020	(0.018)
DMt-9			0.031	(0.020)	0.000	(0.019)
DMt-10			0.008	(0.022)	0.005	(0.022)
Industry D.	Yes		Yes		Yes	
AR(1)	-14.432	***	-14.403	***	-14.357	***
AR(2)	0.334		0.365		0.348	

(Notes)
i) ***, **, and * indicate rejection at the 1 percent, 5 percent, and 10 percent significant levels.
ii) AR(k) signify the coefficients in the test that the average autocovariance in residuals of order k is zero.
iii) Standard errors are shown in parentheses.

Table 3b. Results of Estimations by Sector

E t						
Const.	-0.890	(0.181) ***				
E t-1	0.968	(0.023) ***				
Q t	0.266	(0.020) ***				
Q t-1	-0.155	(0.019) ***				
W t	-0.238	(0.018) ***				
W t-1	0.200	(0.015) ***				
C t	0.010	(0.002) ***				
C t-1	-0.003	(0.002)				
DA_m t	-0.013	(0.019)		DA_nm t	-0.006	(0.030)
DA_m t-1	-0.029	(0.026)		DA_nm t-1	0.035	(0.046)
DA_m t-2	0.126	(0.039) ***		DA_nm t-2	0.020	(0.063)
DA_m t-3	0.150	(0.040) ***		DA_nm t-3	0.081	(0.085)
DA_m t-4	0.156	(0.041) ***		DA_nm t-4	0.166	(0.129)
DA_m t-5	0.173	(0.061) ***		DA_nm t-5	0.383	(0.193) **
DA_m t-6	0.228	(0.063) ***		DA_nm t-6	0.548	(0.306) *
DA_m t-7	0.169	(0.075) **		DA_nm t-7	0.904	(0.576)
DA_m t-8	0.086	(0.110)		DA_nm t-8	2.812	(1.887)
DA_m t-9	collinearity			DA_nm t-9	4.814	(3.191)
DA_m t-10	collinearity			DA_nm t-10	6.774	(4.497)
DM_m t	0.079	(0.011) ***		DM_nm t	0.031	(0.017) *
DM_m t-1	0.014	(0.011)		DM_nm t-1	-0.038	(0.018) **
DM_m t-2	-0.026	(0.013) *		DM_nm t-2	-0.060	(0.023) ***
DM_m t-3	0.000	(0.011)		DM_nm t-3	-0.102	(0.026) ***
DM_m t-4	0.005	(0.011)		DM_nm t-4	-0.099	(0.027) ***
DM_m t-5	0.002	(0.014)		DM_nm t-5	-0.084	(0.025) ***
DM_m t-6	0.033	(0.016) **		DM_nm t-6	-0.078	(0.030) ***
DM_m t-7	0.009	(0.019)		DM_nm t-7	-0.101	(0.031) ***
DM_m t-8	0.034	(0.020)		DM_nm t-8	-0.044	(0.030)
DM_m t-9	0.034	(0.026)		DM_nm t-9	-0.075	(0.027) ***
DM_m t-10	0.041	(0.028)		DM_nm t-10	-0.075	(0.033) **
AR(1)	-15.269	***				
AR(2)	0.675					

(Notes)
i) ***, **, and * indicate rejection at the 1 percent, 5 percent, and 10 percent significant levels.
ii) AR(k) signify the coefficients in the test that the average autocovariance in residuals of order k is zero
iii) Standard errors are shown in parentheses.

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