

# An Empirical Analysis On The Effects Of M&A Between The Merging Firms And The Merged Firms

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**요약** 본 논문은 우리나라 M&A 시장이 선진국형의 시장 경쟁원리에 근거하여 보다 자율적이고 경쟁적인 분위기하에서 이루어 졌던 1990년부터 1997년까지의 기업합병 사례들을 대상으로 합병기업과 피 합병기업간의 M&A 사례를 표본으로 하여 합병성과를 실증 분석하였다. 합병성과 측정모형은 시장모형(market model) 과 시정조정모형(market adjusted model)을 이용하여 누적비정상 평균수익률(CAR)을 비교 검토하였다. 본 연구의 결과는 80년대의 기존 연구와는 특징적 차이가 있는 것으로 나타났으며 합병기업보다 피 합병기업에게 큰 폭의 정(+)의 누적초과 수익이 나타났다.

**Abstract** In this study, we empirically compared and investigated the impacts and effects of M&A between the merging firms and the merged firms during the period from 1990 to 1997 which the developed countries' market principles were adopted and more autonomous and competitive M&A market were activated. For this purpose, this paper has set hypothesis and tested by analyzing those AAR, and CARs employing both market model and market adjusted model. The empirical results revealed in this research show that the CAR is more positive for merged firms than merging firms which are contrast with results of previous studies researched in 1980s.

**Key Words** : synergy effects, market model, market adjusted model, CAR, t-value, the merging and merged firms.

## 1. INTRODUCTION

Many studies on M&A activities have been accomplished about the motives and effects of M&A so far with the concerns and investigations of M&A in Korea from the 1980s. These researches until now show that the motivation of M&A about most corporations is to get synergy effect, and also it is limited to review the existence or non-existence of the change of the stock price of whether the information of public announcement will be reflected in PER during before and after public announcement date of Merger and it will make effects on the shareholder's wealth of the merged corporation or not.

However, there are numerous controversies regarding the effects of M&A and sharp contrasts among previous studies in terms of positive and negative effects for the merging and merged firms respectively.

In addition, it is prospected that M&A activities will be also activated earnestly in Korea due to the abolition of the Securities and Exchange Act article

200 which was the restricted regulations of M&A, starting from 1998, the entire permission of hostile M&A, relaxation action about the regulations simplifications of restricting the investment from foreign capital, and the allowance of hostile M&A that can be purchase the stocks up to 100% for foreigners.

Specifically, previous researches carried out in Korea were mainly on M&As that occurred during the period between 1970 and the early 1990s, during which capital markets were limited and M&As in the non-matured, non-autonomous, and non-competitive buyer's market were also taking place. Therefore, one of the distinguishing characteristics of merger activities that occurred during the period was that the performance of merging firms in the stockholders' advantage(cumulative average abnormal return : CAR) was superior to that of merged firms, and related mergers more than non-related mergers.

However, In this study, we empirically compared and investigated the impacts and effects of M&A between the merging firms and the merged firms during the period from 1990 to 1997 which the developed countries' market principles were adopted and more autonomous and competitive M&A market

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were activated.

The paper also covered an assessment of changes and scales of merger performances, their synergy effects, and a competitive analysis with the results of 1980's similar research.

## 2. MODEL AND EMPIRICAL TEST

### 2.1 Testable Hypothesis

Hypothesis : The performance of M&A which occurred during period 1990-1997 reveals more abnormal return(AR, CAR) than those of M&A during 1980s in terms of seller's market that mean merged firms get more positive higher CAR than those of merging firms.

### 2.2 Data for Analysis

This paper utilizes The Shinpyung Daily Stock Return File to compute stock return associated with M&A announcement. The M&A announcement data was collected from The Securities Market Daily from 1990 to 1997. AR and CAR were calculated by using KIS-SMAT(Korea Investors Service-Stock Market Analysis Tool) data files and KSRI-SD(Korean Security Research Institute-Stock Database).

Initially a total of 86 samples were collected from mergers that occurred from 1990 to 1997. Of those, 65 samples of merging and merged firms were selected.

### 2.3 Market Model

In case of using market model for calculating abnormal return of stock, we could find out significant changes of stock prices before and after announcement of M&A by comparing fluctuations of price during periods unaffected with disclosure information.

The paper measured cumulative abnormal return (CAR) on the date of announcement. Abnormal returns were measured by using methodology similar to that described in Dodd and Warner(1983) and Travlos(1987).

The market model was used as the benchmark for predicting return. It specifies the following linear relationship between security; returns and returns on a market portfolio.

$$\tilde{R}_{jt} = \alpha_j + \beta_j \tilde{R}_{mt} + \tilde{\epsilon}_{jt}$$

where  $\alpha_j$ ,  $\beta_j$  = the intercept and slope for stock  $j$ , respectively,  $\tilde{R}_{jt}$  = the return on stock on day  $t$ ,  $\tilde{R}_{mt}$  = the return on the value-weighted market index on day  $t$ ,  $\tilde{\epsilon}_{jt}$  = the error term for stock  $j$  on day  $t$ .

The estimated abnormal return is given by

$$AR_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j \cdot R_{mt}) \quad (1)$$

where ,  $\hat{\alpha}_j$  and  $\hat{\beta}_j$  are the ordinary least squares estimate of  $\alpha_j$  and  $\beta_j$  These OLS coefficient are estimated over the period  $t = -180$  to  $t = -50$  relative the date of the first public announcement.

### 2.4 Market Adjusted Model

$$AR_{jt} = R_{jt} - R_{m,t} \quad (2)$$

Daily abnormal returns are calculated for each firm over the event period  $t = -50$  to  $t = +10$  for a sample of firms, a daily each day was computed by,

$$AAR_t = \frac{1}{N} \cdot \sum_{j=1}^N AR_{jt} \quad (3)$$

The cumulative average abnormal return(CAR) is also determined by summing AAR over various intervals :

$$CAR_j = \sum_{t=1}^T AAR_t \quad (4)$$

The expected values  $AAR_t$  and  $CAR_t$  are zero in the absence of abnormal performance.

### 2.5 Test of Hypothesis

Test of Statistic of AAR and CAR are based on the average standardized abnormal return(ASAR<sub>t</sub>) and the average standardized cumulative abnormal return (ASCAR), respectively

$$H_0: AAR_t = 0$$

$$t = \frac{AAR}{S/\sqrt{n}} \quad (5)$$

where, AAR : average abnormal return

S : standard deviation  
 n : number of sample

$$t = \frac{AAR_{t1} - AAR_{t2}}{\sqrt{S_1^2/n_1 + S_2^2/n_2}} \quad (6)$$

where,  $AAR_{t1}$  : AAR of merging group1  
 $AAR_{t2}$  : AAR of counterpart group2  
 $S_1$  : standard deviation of AAR for merging group1  
 $S_2$  : standard deviation of AAR for counterpart group2  
 $n_1, n_2$  : sample number of two groups, respectively  
 merging group1 : merging firms,  
 counterpart group2 : merged firms,

### 3. THE RESULTS OF EMPIRICAL TEST

In this section, we investigate the results of empirical evidences revealed in accordance with tests of hypothesis for M&A types employing both market model(Model - I) and market adjusted model(Model - II).

#### 3.1 Difference Analysis for Effects of M&A Between Merging and Merged Firms

Table 1 presents summary statistics on sample firms based on Table 2 comparing Model - I with Model - II.

Table 2 shows the difference of effects regarding daily cumulative abnormal return(CAR)between merging and merged firms and results of t-values during the period t-50 to t+10.

Figure 1, Figure 2 also show the CAR comparison between merging and merged companies employing both Model - I and Model - II respectively.

According to the result analysis on merger effects between merging companies and merged companies, merging firms in the measurement of the rate of excess return during the period from t-50 to t+10 show negative excess return, from -4% to -7%.

On the other hand, merged companies show the

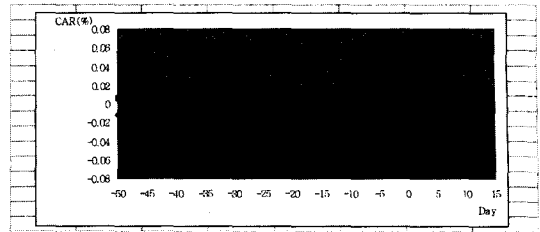


Fig. 1. The CAR Comparison Between Merging and Merged Firms(Model - I)

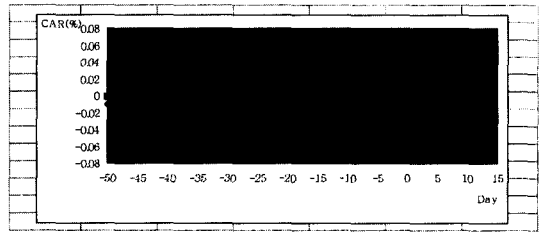


Fig. 2. The CAR Comparison between Merging and Merged Firms(Model - II)

positive excess return of +6.3% after they register a merger, which implies that stockholders of merged firms obtain more benefit out of merger performance than those of merging firms. This result supports the first hypothesis of the study, "the merger outcome in 1990s characterized by a more autonomous market produces more positive excess return for stockholders of merged firms than those of merging ones.

However, the result analysis differs from the results of previous studies, which show the merger benefit of merging firms is superior to that of merged firms. In the study on the merger outcome of merged companies,

Young-Gwang Jang(1985) presented that merging firms exhibit positive excess return while negative excess return in merged firms is observed. According to the study based on merger samples collected from 1980 to 1993, conducted by Sang-Duck Choi (1991), the merger result of merged companies show

Table 1. The Comparison of M&A effects by CAR

cumulative period	Model				Model					
	merging	merged	DCAR	t-value	merging	merged	DCAR	t-value		
$T_{50}T_0$	-0.048	0.002	-0.050	-1.92	c	-0.023	0.040	-0.063	-6.20	a
$T_0T_{+10}$	-0.023	0.062	-0.084	-3.22	a	-0.025	-0.039	0.015	1.55	c
$T_0T_{+10}$	-0.023	0.062	-0.084	-3.22	a	-0.025	-0.039	0.015	1.55	c

**Table 2. The Effects Difference Analysis Between Merging and Merged Firms**

DAY	Model I				Model II			
	merging	merged	DCAR	t-Value	merging	merged	DCAR	t-Value
-50	-0.0121	0.0062	-0.0183	-0.6985	-0.0107	-0.0015	-0.0092	-0.9037
-49	-0.0115	-0.0038	-0.0077	-0.2939	-0.0101	0.0131	-0.0232	-2.2790 b
-48	-0.0156	-0.0031	-0.0125	-0.4771	-0.014	0.0086	-0.0226	-2.2200 b
-47	-0.0115	-0.0043	-0.0072	-0.2748	-0.009	0.0078	-0.0168	-1.6503 c
-46	-0.0057	-0.0064	0.0007	0.0267	-0.0036	0.0103	-0.0139	-1.3654 d
-45	-0.0069	0.0012	-0.0081	-0.3092	-0.0054	0.0069	-0.0123	-1.2083
-44	-0.0065	0.0037	-0.0102	-0.3893	0.0007	0.0009	-0.0002	-0.0196
-43	-0.0207	0.0141	-0.0348	-1.3282	-0.0124	-0.0086	-0.0038	-0.3733
-42	-0.0264	0.0165	-0.0429	-1.6374 d	-0.0185	-0.0086	-0.0099	-0.9725
-41	-0.0227	0.0156	-0.0383	-1.4618 d	-0.0161	-0.009	-0.0071	-0.6974
-40	-0.0279	0.0079	-0.0358	-1.3664 d	-0.0206	-0.0067	-0.0139	-1.3654 d
-39	-0.0186	0.0123	-0.0309	-1.1794	-0.0102	-0.0015	-0.0087	-0.8546
-38	-0.0205	0.0172	-0.0377	-1.4389 d	-0.0122	-0.0072	-0.005	-0.4912
-37	-0.0161	0.0155	-0.0316	-1.1261	-0.0071	-0.0098	0.0027	0.2652
-36	-0.0215	0.0175	-0.039	-1.4885 d	-0.0127	-0.0048	-0.0079	-0.7760
-35	-0.0334	0.0271	-0.0605	-2.3092 b	-0.0231	-0.0108	-0.0123	-1.2083
-34	-0.0471	0.0257	-0.0728	-2.7786 a	-0.0354	-0.0127	-0.0227	-2.2299 b
-33	-0.0424	0.0287	-0.0711	-2.7137 a	-0.0295	-0.0186	-0.0109	-1.0707
-32	-0.043	0.0286	-0.0716	-2.7328 a	-0.0298	-0.0205	-0.0093	-0.9136
-31	-0.0409	0.0246	-0.0655	-2.5000 b	-0.027	-0.0175	-0.0095	-0.9332
-30	-0.0277	0.0159	-0.0436	-1.6641 C	-0.0137	-0.0114	-0.0023	-0.2259
-29	-0.03	0.0215	-0.0515	-1.9656 b	-0.0158	-0.0162	0.0004	0.0393
-28	-0.0313	0.0292	-0.0605	-2.3092 b	-0.0168	-0.0154	-0.0014	-0.1375
-27	-0.0269	0.0167	-0.0436	-1.6641 C	-0.0124	-0.0033	-0.0091	-0.8939
-26	-0.0265	0.018	-0.0445	-1.6985 C	-0.0116	-0.0032	-0.0084	-0.8251
-25	-0.0306	0.025	-0.0556	-2.1221 b	-0.0143	-0.0066	-0.0077	-0.7564
-24	-0.0357	0.0323	-0.068	-2.5954 a	-0.0189	-0.0164	-0.0025	-0.2456
-23	-0.0386	0.0285	-0.0671	-2.5611 b	-0.022	-0.0097	-0.0123	-1.2083
-22	-0.0359	0.0134	-0.0493	-1.8817 C	-0.0192	0.0003	-0.0195	-1.9155 C
-21	-0.0287	0.0055	-0.0342	-1.3053 d	-0.0104	0.0088	-0.0192	-1.8861 C
-20	-0.0278	0.0123	-0.0401	-1.5305 d	-0.0084	0.0043	-0.0127	-1.2475
-19	-0.0353	0.0312	-0.0665	-2.5382 b	-0.0161	-0.011	-0.0051	-0.5010
-18	-0.0352	0.0261	-0.0613	-2.3397 b	-0.0159	-0.0071	-0.0088	-0.8644
-17	-0.034	0.02	-0.054	-2.0611 b	-0.0135	-0.0021	-0.0114	-1.1198
-16	-0.0276	0.0208	-0.0484	-1.8473 C	-0.0083	-0.0014	-0.0069	-0.6778
-15	-0.0181	0.0141	-0.0322	-1.2290	0.0013	0.005	-0.0037	-0.3635
-14	-0.0245	0.0091	-0.0336	-1.2824	-0.0046	0.008	-0.0126	-1.2377
-13	-0.0214	0.0031	-0.0245	-0.9351	-0.0008	0.0094	-0.0102	-1.0020
-12	-0.023	-0.004	-0.019	-0.7252	-0.0036	0.0172	-0.0208	-2.0432 b
-11	-0.0234	-0.0034	-0.02	-0.7634	-0.0035	0.017	-0.0205	-2.0138 b
-10	-0.0184	0.0123	-0.0307	-1.1718	0.0006	0.0085	-0.0079	-0.7760
-9	-0.0102	0.0095	-0.0197	-0.7519	0.0093	0.0132	-0.0039	-0.3831
-8	-0.009	0.0068	-0.0158	-0.6031	0.0116	0.0184	-0.0068	-0.6680
-7	-0.0091	-0.0089	-0.0002	-0.0076	0.0112	0.0344	-0.0232	-2.2790 b
-6	-0.015	-0.0022	-0.0128	-0.4885	0.005	0.0283	-0.0233	-2.2888 b
-5	-0.0217	0.006	-0.0277	-1.0573	-0.0032	0.0257	-0.0289	-2.8389 a
-4	-0.0293	0.0062	-0.0355	-1.3550 d	-0.0084	0.0229	-0.0313	-3.0747 a
-3	-0.0431	0.0108	-0.0539	-2.0573 b	-0.0224	0.0204	-0.0428	-4.2043 a
-2	-0.0515	0.0034	-0.0549	-2.0954 b	-0.0289	0.0317	-0.0606	-5.9528 a
-1	-0.0573	0.0132	-0.0705	-2.6908 a	-0.0321	0.0257	-0.0578	-5.6778 a
0	-0.0484	0.0018	-0.0502	-1.9160 C	-0.0234	0.0397	-0.0631	-6.1984 a
1	-0.0545	0.0198	-0.0743	-2.8359 a	-0.0293	0.023	-0.0523	-5.1375 a
2	-0.0549	0.0204	-0.0753	-2.8740 a	-0.0299	0.0228	-0.0527	-5.1768 a
3	-0.0521	0.0241	-0.0762	-2.9084 a	-0.0278	0.0215	-0.0493	-4.8428 a
4	-0.0561	0.0297	-0.0858	-3.2748 a	-0.0328	0.0163	-0.0491	-4.8232 a
5	-0.0602	0.0339	-0.0941	-3.5916 a	-0.0377	0.0157	-0.0534	-5.2456 a
6	-0.0584	0.0398	-0.0982	-3.7481 a	-0.0357	0.0125	-0.0482	-4.7348 a
7	-0.0605	0.045	-0.1055	-4.0267 a	-0.0369	0.0095	-0.0464	-4.5580 a
8	-0.0561	0.0525	-0.1086	-4.1450 a	-0.0331	0.0031	-0.0362	-3.5560 a
9	-0.0570	0.0596	-0.1166	-4.4504 a	-0.0342	0.0008	-0.035	-3.4381 a
10	-0.0712	0.0633	-0.1345	-5.1336 a	-0.0477	-0.0004	-0.0473	-4.6464 a

(note) a: significant at 1% level using two tailed test  
 b: 5%, c:10%, d: 20%  
 t-value about DCAR(difference between merging and merged firms)

the negative cumulative excess return, -6.7% at the Model 1 and -5.7% at the Model 2 and Young-Ho Ra(1994) also presented -10.4% and -13.2% of CAR in the study. In cases of other countries, studies in Japan exhibit negative excess return in both merging firms and merged firms. On the country, merged companies in the research conducted by Dodd(1982), Jensen and Ruback(1983) in the united States gain positive figures from the merger outcome, which is correspond to the result of this study.

Other researches in Korea show negative effects before and after the announcement of M&As even though this study shows positive results. Analyzing the background of this significant difference, first of all, it is mainly caused by changes in market conditions and merger environment as time goes by. In other words, the M&A market conditions before 1990s was favorable to merging companies but unfavorable to merged companies because it was led by the non-autonomous and unilateral seller's market where the large company absorbed related companies. However, as the market has developed the autonomous or competitive merger form based on competitive market principles since 1990, the merger condition also has shown beneficial merger effect to merged firms. Secondly, the merger performance analysis can be various depending on the sample size. The average number of the samples used for the previous studies in Korea was from 40 to 60. Also the merger size of the samples, financial conditions and the different period for analyzing the samples cause diverse results of the merger performance.

#### 4. SUMMARY AND CONCLUSIONS

This paper examined and analyzed the effects of M&A between the merging firms and the merged firms conducted for the period between 1990 and 1997 during which the developed countries' market principles were adopted, and more autonomous and competitive M&A markets were activated. The study also covers an assessment of changes and scales of merger performance, their synergy effects, and a comparative analysis with the results of 1980's similar research.

The major findings through this empirical analysis

are as follows :

First, the performance of mergers completed between January 1990 and December 1997, a period characterized by a more competitive and autonomous merger market, shows that the cumulative average excess return is more positive for merged companies than merging firms.

In the 1980s, due to the non-competitive and non-market driven nature of M&As, a higher merger return for merging companies was realized.

Second, it is found in the analysis of changes and ranges of excess gain in earnings that excess gain in earnings shows positive before the announcement of M&As. This result supports the efficient capital markets that information on mergers is reflected in share price movement, thus contributing toward the maximization of corporate value.

Based on the above empirical results, excess profits from stocks are measured by comparing their prices before and after the mergers and clearly verify that mergers are a business activity which can increase the wealth of stockholders and the value of firms.

For further future research first of all, clear and detailed materials on the sample of merged companies are needed for objective and reliable research results on merger performance.

Second, in Korea, mergers which incorporate market-oriented competitiveness are increasing. Considering the similarity with Japan in terms of culture and business environment, comparative studies of Japanese-style mergers is a necessary step for future research.

Furthermore, after the liberalization of hostile mergers since 1998, a study on M&A, including merged companies' scale, listings, and whether they are conglomerate or not, should be conducted.

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