

## **DO WE IDENTIFY SYNERGIES IN PUBLIC MERGERS/ACQUISITIONS: BEFORE AND DURING THE ECONOMIC CRISIS**

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**Abstract:** The aim of mergers and acquisitions is to create wealth for the shareholders and usually this is accomplished through synergistic expectations. However the evaluation and identification of synergies in mergers and acquisitions is one of the important issues in Corporate Finance. In this paper it is tested the markets reaction to a sample of 61 mergers/acquisitions in the European pharmaceutical sector, realized between end 2004 and beginning 2010- prior and during the economic crisis. In the study it has been analyzed the impact of the announcement of the deal on the stock price evolution of the acquiring companies for which it was used the event study technique. The results show the differences between the markets reaction before the economic crisis and after the economic crisis.

**JEL classification: C12, G15, G34**

**Key words: mergers and acquisitions, synergies, valuation, public offers**

### **1. INTRODUCTION**

Why mergers and acquisitions occur has been a subject of interest for the past decades. Several reasons have been provided and economists looked for reasons, such as synergies through creation of market power, opportunities of diversification, better corporate governance, to achieve growth, efficiency through economy of scales or other types of synergies.

The research studies tried to identify the drivers for the mergers and acquisitions, over the last decades. The studies have been performed on different periods of time trying to identify regulatory changes such as antitrust legislations or later on deregulation of the markets; industrial and technological shocks, or even managerial behavior etc. However one of the main drivers remains the expectation of synergistic gains and effects. The synergy remains a central motivation for all mergers and acquisitions and that is the expected combined effect of the two companies involved in the acquisition process which should result into a new entity which expected to provide synergistic gain and further on match market expectations. Empirical researches on mergers and acquisitions over the last century have proven that in many cases the effect of these operations is that of additional value and wealth increase for both target and acquiring company (however in a smaller extent).

Thus the markets reaction and expectation of the synergistic gain becomes very important and can be a driver for us to asses if the acquisition process can provide or not synergies. This research paper is trying to evaluate the markets reaction and

expectations after a merger or acquisition announcement for the acquiring company. Through the empirical made study based on a recent sample of public deals end 2004 and beginning 2010 I shall try to provide additional evidence to support the existence of positive market expectations, however it has become an issue if these synergies are expected in the same extent in periods of economic boom and also during recession. Having seen the decrease of merger and acquisition operations during the recession, it has become important to evaluate weather one of the reasons has not been the markets decreasing expectations that such operations can still deliver synergies, which as already stated have been proved as one of the operations main expectations.

## 2. OBJECTIVES

Synergies have been given a very important role by the finance literature, and this has been initiated by Penrose who has started its researches ref. to the synergy notion, back in 1959 and considered the synergistic hypothesis the basis for a company growth.

If synergy is perceived to exist in mergers and acquisitions, the market value of the combined firms, after a merger announcement, should be greater than the individual sum of the market values of the bidding firms involved and target firms, prior to that same announcement (Andrade et al, 2001).

Additional reserches have been made having as interest the synergies and their impact on mergers and acquisitions along with people expectations. Thus Sirower (1997) defines synergies as an increase in competitiveness and the result of the two companies combined cash flows, above the independent results of the two companies. In a similar context Bhide (1993) examined the motives behind 77 mergers and acquisitions in 1985 and 1986 and reported that operating synergy was the primary motive in one-third of these takeovers.

More important is that studies of stock returns around merger announcements generally conclude that the value of the combined firm does increase in most mergers and acquisitions and that the increase is significant.

Bradley, Desai, and Kim (1988) examined a sample of 236 inter-firms tender offers between 1963 and 1984 and reported that the combined value of the target and bidder firms increased 7.48%, on average, on the announcement of the merger. This result has to be interpreted with caution, however, since the increase in the value of the combined firm after a merger is also consistent with a number of other hypotheses explaining acquisitions, including under valuation and a change in corporate control. However, in the same context Berkovitch and Narayan (1993) show those synergies are one of the main reasons in takeovers.

One of the most recent studies and approaches of synergies and their role was made by Aswarth Damodaran (2005) who through an empirical study wanted to show how much value synergies produce but also which is the price for these synergies. But his conclusion was not as encouraging as those of its predecessors, because he underlines that although synergies are much expected and looked for, only in a few cases they are delivered, or they can cover the price paid for the acquired company. In a similar attempt Moeller and Schlingemann (2004) studied 4430 acquisitions between 1985 and 1995 into cross border and domestic acquisitions and conclude that U.S. acquirers overpay more in cross border acquisitions and have lower stock price and operating performance in the post-acquisition period. They attribute this to acquirers

who over estimating the value of synergy in cross border mergers and acquisitions or they underestimate the difficulty of delivering the synergies.

Reviewing the evidence, it is clear that markets think that there is potential for synergy at the time of mergers but it is also clear that only a small proportion of mergers deliver substantial synergy. But there is no reserch referring to the impact of recession on the market synergistic expectations, the only available data is the reduced number of mergers and acquisitions during recession period however there has not been analyzed the effect on synergies or if synergistic expectations differ during economical increase and during recessions.

### 3. METHODOLOGY

One method which can be used to evaluate the synergies effect is on a forward-looking basis, by looking at market reactions to acquisition announcements and gauging what the expected synergy value is and who gets the gains. In this paper it is analyzed the market reaction to the merger and acquisition announcements it has been used the event study technique to analyze the effect of announcements (that had as target public European companies in the pharmaceutical sectors listed on the European capital markets) on stock prices of acquiring firms.

For each announcement, there have been determined the exact issuing date. In all cases, the date of the event, was considered the date of the first official announcement of the deal. The abnormal return was daily measured during the window event,  $(T1 + 1, T2]$ , being composed of twenty days before the event, the date of the event, and 60 days after the event. Abnormal return has been determined as the difference between the actual return and the normal return.

To calculate the normal return I have taken the market model, a model which relates the return of any given stock with the return of the relevant index return. For any share "i", the market model is:

$$R_{it} = \alpha_i + \beta_i \times R_{mt} + \varepsilon_{it} \quad (1)$$

$$E(\varepsilon_{it}) = 0 \quad \text{var}(\varepsilon_{it}) = \sigma^2 \varepsilon_{it} \quad (2)$$

where  $R_{it}$  and  $R_{mt}$  are the returns of the  $t$  period on the share  $I$  (of the acquiring firm) and the market portfolio while  $\varepsilon_{it}$  is the zero mean disturbance term.  $\alpha_i$ ,  $\beta_i$  and  $\sigma^2 \varepsilon_{it}$  are the market model parameters. The benefits resulting from the use of market model will depend on the  $R^2$  of the market model regression.

The used estimation period,  $(T0, T1]$ , where  $t$  got values for determining the parameters of the model market, is of max 236 working days before the event window. By eliminating that part of the return which is due to the variation of the market return, the variance of the abnormal return is reduced; this causes an increased ability to detect the effects of events.

If  $\overline{AR}_{it}$ ,  $t = T1 + 1, \dots, T2$ , is the sample of  $L2$  abnormal returns for the company  $i$  in the window event, then:

$$\overline{AR}_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i \times R_{mt} \quad (3)$$

The abnormal return is the error term of the market model calculated on an out of the sample basis. Under the null hypothesis  $H_0$  the distribution of the sample abnormal return for a given observation in the event window is:

$$\overline{AR}_{it} \sim N(0, \sigma^2(\overline{AR}_{it})) \quad (4)$$

To determine if the announcement had an impact at the level of every day of the event window, we conducted the t-test that has supposed the calculation of  $\theta_1$  statistics.

#### **4. ANALYSES**

##### ***4.1. Database and sample description***

The sample is made of 61 successful tender offers occurring over the period 12.2004-01.2010. The primary data base consisted of 184 public operations (all of them being European pharmaceutical companies acquisitions) available on Merger Market ([www.mergermarket.com](http://www.mergermarket.com)) From the 184 operations 160 have taken place before the economic crisis and 24 during the economic crisis The hostile acquisitions have been excluded from the initial data and all deals have been successfully finalized. The 184 transactions lead to an average of 2.96 transactions during one month while before the crisis the average grows to 3.5 transactions per months and only 1.4 transactions per months during the crisis.

For the heterogeneity of the research have been taken into account only the recommended (R) deals where both the target and the bidder are European (EU member states) companies.

However the final sample was reduced to only 61 companies (buyers) out of which 53 transactions before the crisis during economic boom and only 8 transactions during the crisis. The reduction of the sample is due to the fact that:

although the offer was public, it involved the buyer as being listed and delisted afterwards (during the event window), thus being difficult to conclude with our research.

we noted several multiple successive acquisitions mainly before the crisis period when the merger and acquisition activity was very important especially in the pharmaceutical sector. This made impossible a clear differentiation of one particular synergistic impact from one acquisition or merger due to the important frequency of the events which did not allow to observe the market reaction without interfering with another operation.

Historical data was no longer available for some of the companies within the initial sample because meanwhile they have become a target for someone else or they were not listed during our observance period (1 year before the announcement)

All companies which were subsidiaries of other non-European companies (eg: several Indian companies have been active on the European pharmaceutical market during that period) have been excluded from the final sample, because they were not listed on the eurioean or similar stock exchange, thus could have affected the final results.

Some buyers were SPVs held by investment funds and all investments funds (buyers) have been excluded from the sample in order to keep its omogeneity (only companies acting in the pharma sector and not investment companies)

The main markets where these companies were traded are Nordic Stock Exchange, London Stock Exchange, Deutsche Borse AG, Vienner Borse, Borsa Italiana and as a exception for one UK based company, namely Astra Zeneca have been used data from New York Stock Exchange.

An important part of the sample is represented by the market index, implying a correlation between each company and a significant index (for all companies have been

identified the indexes they were part of and after several regressions it was chosen the most statically significant index, thus the markets evolution was correlated with the stock price evolution)

As an example I can give the hungarian company Gedeon Richter, for which the only available data was on the Deutche Borse but for the regression I noted that there was a better correlation with the Hungarian staock exchange index BUX than with the DAX index, as the local index capped better the markets evolution. Thus the Rsquare is much better in the regression using the BUX index.

**Table no.1**  
**Regression based on DAX index**

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.329679
R Square	0.108688
Adjusted R Square	0.104813
Standard Error	0.016989
Observations	232

**Table no. 2**  
**Regression based on BUX index**

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.519552
R Square	0.269934
Adjusted R Square	0.26676
Standard Error	0.015376
Observations	232

The used prices of shares were the closing prices. In the analysis there have been taken as approximation for the market portfolio several index (either the sectors index, or one index in which the company analysed was part, or the general market index) corelated with each company: Bel 20, FTSE, FTAS, FTSEMIB, DAX, MDAX, ATX, Euronext 100, Index Next 150, Cac Mid 100.

#### **4.2. Results**

In order to compare the effects prior to the crisis period and after the crisis period there have been made 3 estimations, one containing the entire sample of 61 announcements, followed by another two one containing an estimation based on the 53 companies sample (before the crisis) and the second based on the 8 companies sample (during the crisis). The results from the 3 estimations have been compared in order to see the differences and how the market reacted to the announcements and if it expected or not any synergies positive or negative.

Thus the t test completion with all the 61 announcements included in the studied sample for each of the 81 days of the event window, led to the determination of 4 days (4 days before the event and the rest after that date) where the null hypothesis H0 stating that the information had no impact is strongly rejected. Adjusting the price of shares to reflect the new public information on purchases and takeover public offers is carried out and although expected to have a positive impact in the day of the announcement, this did not happened however it turned into a positive impact in the 6th day showing the markets expectancy. If a positive impact in the announcemnt day could have been argued by some as being also influenced by the control premiums the evolution in day 6 can be only the result of expected synergies. However the markets expectations seem to become negative in days 13 and 23 and a furter assesment could be done only based on a longer observance period.

**Table no. 3. Statistics  $\theta_1$  in the days that the information had an impact for the entire sample n=61**

Event day	AR	CAR	Standard error	Sample dimension (n=61) $\theta_1$
23	-0.68%	-1.93%	0.0034	-2.0286
13	-0.81%	-1.06%	0.0031	-2.6291
6	0.91%	0.72%	0.0032	2.7984
-4	0.60%	-1.63%	0.003	2.027

Note: the level of significance is 5%.

**Table no. 4. Statistics  $\theta_1$  in the days that the information had an impact and day of the announcement**

	day -4	day 0	day 6	day 13	day 23
Mean	0.6%	1.2%	0.9%	-0.8%	-0.7%
Median	0.1%	0.5%	0.4%	-0.8%	-0.4%
Maximum	9%	21%	11%	3%	3%
Minimum	-4%	-15%	-4%	-9%	-13%
Std. Dev.	2.3%	5.4%	2.5%	2.4%	2.6%
Skewness	1.25	1.25	1.27	-1.14	-2.52
Kurtosis	5.06	8.84	5.88	5.30	11.78
t STAT	2.02687674	1.763182	2.798257	-	-2.02864

(\*) for day "0" the mean is not statistically significant different from 0 for 95% confidence level; it is statistically significant for the other 4 days

The results after analysing the 53 companies sample before the crisis (end of year 2004 – beginning of Q3 2008).

Exactly as for the 61 sample the same methodology was applied in order to see if the economic environment has played a role in determining the synergistic expectations before the crisis. Thus we note 4 days where the null hypothesis  $H_0$  stating that the information had no impact is strongly rejected. However only two days are identical with the first sample while out of the remaining 2 days, 1 is close to the results of the initial sample (23rd day vs now 27th day) but the 39th day appears for the first time.

**Table no. 5. Statistics  $\theta_1$  in the days that the information had an impact for the entire sample n=53**

Event day	AR	CAR	Standard error	Sample dimension (n=53) $\theta_1$
39	0.86%	-1.54%	0.0033	2.5782
27	-1.23%	-2.68%	0.0060	-2.0265
13	-0.77%	-1.76%	0.0034	-2.2443

6	0.93%	0.03%	0.0035	2.6483
0*	1.15%	-0.52%	0.0078	1.4731
-4*	0.61%	-1.72%	0.0032	1.8941
(*) for day "0" and "-4" the mean is not statistically significant different from 0 for 95% confidence level; it is statistically significant for the other 4 days				

The results after analysing the 8 companies sample during the crisis (Q3 2008 – beginning of Q1 2010) show only two days when the market reacted and for both days the expectations have been negative. Thus in this case we note 2 days where the null hypothesis H0 stating that the information had no impact is strongly rejected.

**Table no. 6. Statistics  $\theta_1$  in the days that the information had an impact for the entire sample n=8**

Event day	AR	CAR	Standard error	Sample dimension (n=8) $\theta_1$
39	-1.51%	-5.78%	0.0054	-2.7785
15	-1.13%	0.81%	0.0045	-2.5392

Note: the level of significance is 5%.

Although it might seem that the obtained data are not correlated in fact after a more thorough analysis it is noted that in both samples before and during the crisis appears a market expectation of synergies while in the total sample it disappears, but the reason for which day 39 is not statistically significant in the total sample is because the effects before the crisis and after the crisis are opposite, thus if the market expects positive synergies before the crisis ( $\theta_1 = 2.57$ ) during the crisis the market expects negative synergies ( $\theta_1 = -2.77$ ) thus the effect in the final complete sample is neutral. This clearly shows how the market expectations are influenced by the economical environment.

The 27th day appears to have a negative synergistic expectation only before the crisis while having no other influence in the other two samples. It is noted that the value for the 27th day in the case of the entire sample (n=61) is very close to become statistically significant (-1.93) at a 5% significance level however the sample is influenced by the evolution during the crisis and does not pass the significance level.

The day 13th it is statistically significant in 2 samples before crisis and the entire sample (n=61) while in the sample for the analyzed companies during the crisis we note a very close significant day, namely 15th which clearly shows that the market had expectations around these dates 13th-15th before and during the crisis.

The 6th day which showed clear positive synergistic expectations in the total sample n=61 reappears to be significant and showing positive synergistic expectations also in the sample before the crisis. The fact that the sample containing companies during the crisis does not identify as statistically significant the 6th day, shows clearly that during the economic recession although markets remain focused on the idea of synergies they are not positive expectations but appears to have only negative synergistic expectations.

Day 4 before the announcement becomes significant only in the entire sample due to the increasing number of observations otherwise it is very close to the significance level also in the sample before crisis being 1.89 vs the level of 2 however we note the very close ARs 0.6% or the n=61 sample and 0.61% for the n=53 sample.

## 5. CONCLUSIONS

This study confirms the results of previous empirical researches on the effectiveness of the expected synergies in the short term, however it becomes very difficult to demonstrate this on the long term. Moreover it is clearly noted that the economic environment evolution has a clear influence on the synergistic expectations, thus in an increasing and competitive economical environment markets are more sensible to synergies and do even have positive expectations while during a recession period although the markets keep the synergistic expectations they are fewer and only negative thus being influenced by the environment (when the mergers and acquisitions market decline has started, along with a degradation of the companies results)

In a previous study Resceanu (2010), made on a sample of 45 companies during 2004-2007, period previous to the crisis it was noted synergistic expectations from the market in 6 days including the day of the announcement thus emphasizing once more the positive impact of the synergies during economic stability.

The study is important due to the unprecedented wave of mergers and acquisitions that have transformed the whole pharmaceutical industry and influenced the evolution of the entire sector from sales to new medicine discovery led to the creation of conglomerates with important power, but nevertheless there are also a certain number of failures which showed that the theory is not always applicable in practice.

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