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CHANGES IN SHARE PRICES AS A RESPONSE TO EARNINGS FORECASTS REGARDING FUTURE REAL PROFITS

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Abstract

One of the analytical methods in financial economics is an event study. The event study allows to measure influence of some information (for example: changes at the board of directors, merger notices, and other) on value of companies. According to the event study method the abnormal change of price is measured, which is caused by disclosing the information. The aim of this study is to measure the influence of disclosing initial earnings forecasts on share prices as well as examination of the relationships between abnormal returns and prospective profits of companies. Each new, additional piece of information has influence on share price, however, it should still be the object of investigations how investors connect each piece of information with share prices.

Key words: evaluation of share prices, earnings forecasts, event study
JEL classification: G12, G14

1. Introduction

One of the methods of analysis applied in financial economics is an event study. The event study method allows to measure influence of some events or disclosing pieces of information on company's value. These events could be: the analysts' opinions, changes at the board of directors, dividend announcements, mergers and acquisitions notices, earnings forecasts and many others. If it is assumed that the event has some influence on share price and the firm's value, then that event will cause a different share price in comparison to situation if the event did not happen. Share prices change all the time, so the change of the price means nothing. However, if the change of price is lower or greater, comparing to the situation if the event did not happen, then it can be found that the event had some influence on the share price and the firm's value. In order to measure those abnormal returns it is necessary to assume that the market is efficient. It is assumed that the share prices fully reflect all accessible information [Fama, 1970]. In such case, the piece of information regarding the event will also be immediately reflected by share price of the company, which the event concerns. The measurement of the influence of event on the share price can be done by measuring the abnormal return rate, which is the difference between the rate of return which is the result of the event, and the rate of return, which would appear if nothing happened.

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The aim of this study is to measure the influence of disclosing earnings forecasts on a share price as well as examine the correlation between abnormal returns and future profits of a company. This will make possible further work over questions of relationships among real profits and the achievements of companies, the investors' reactions and the share prices.

It is generally accepted that the share price reflects discounted future profits on the investment [Miller, 1961; King, 1966, 139]. Therefore, having the additional information as earnings forecasts, investors should better estimate the value of shares, taking into account prospective profits. Regarding this, the analysis of correlation will be conducted between abnormal returns in relation to revealing the earnings forecast and future, real profits. There are hypotheses that the announced earnings forecasts have significant influence on share prices and that there are no connections between present changes in share prices, regarding the disclosing earnings forecasts and the real future profits of companies. These hypotheses will be checked.

Only initial forecasts are examined without revisions of prior forecasts. Publication of these forecasts is entirely voluntary, so companies do this to improve their image in investors' eyes: to boast a good result or to calm down the investors that rumoured loss will not be so large. Therefore, on average, the expected result of such forecast is positive reaction to the disclosure of earnings forecast. There is a lot of research in this area in the world but in Poland there is still need for more. It is very likely that the behaviour of Polish capital market is similar to different countries with more developed capital markets and there are similar processes both in Poland and other countries. Another hypothesis that can be made is that initial earnings forecast disclosure has positive effect for company's share price.

2. Earnings forecasts disclosures and the changes in share prices

The analysis of influence of some event on firm value can be done by examining abnormal returns of given share. It is important for conducting the analysis to assume that market is efficient. The definition of efficient market says, that share prices fully reflect all accessible information [Fama, 1970]. The efficiency of market can be present in three forms:

- weak efficiency of market, which occurs when prices reflect only the information on historical share prices,
- semi-strong efficiency of market, which occurs when prices reflect all publicly accessible information, such as: dividend payment announcements, earnings forecasts and so on,
- strong efficiency, which occurs when the market prices are set under the influence of historical and public information but also under the influence of private information and confidential one, which is accessed by some group of investors.

If the efficiency of market is present in the weak form, the analysis of historical data will not enable an investor to receive abnormal returns. If the efficiency of market is present in the semi-strong form, the analysis of historical data, as well as generally accessible information will not help the investor to get extraordinary profits. And finally, if the efficiency of market is present in the strong form, the knowledge about confidential data will not provide abnormal returns. The analysis of Fama points out that there are weak as well as semi-strong forms of efficiency on markets, however, he does not say about efficiency in the strong form [Fama, 1970, 414-6; Fama, 1991].

Market efficiency is a very important assumption because if the market is efficient, the prices fully reflect all essential, accessible information. In such case, announcing new, essential information will be immediately shown in share prices. Then, based on share price behaviour, it is possible to check how important the event is.

The event study method consists in calculating "normal" rates of return of a share, which should exist if no extraordinary event occurs and then comparing "normal" rates of return of a share to real ones. The comparison of "normal" returns to real ones gives the "abnormal returns". To get "normal" rates of return it is necessary to have a model which allows to count them. Such models can be divided into two main categories: statistical and economic. Statistical models take into account the behaviour of rates of return of a share, however, they do not consider any economic relations. Meanwhile, economic models take into account investors' behaviour, however, they are not based on statistical relations so closely [MacKinlay, 1997, 17]. More precisely - in economic models there are economic restrictions imposed on statistical relations. Basic statistical models are: Constant Mean Return Model and Market Model, and basic economic models are: Capital Asset Pricing Model (CAPM) as well as Arbitrage Pricing Theory (APT) [MacKinlay, 1997, 17-19]. The most popular model in event study analyses is the Market Model. Rate of return of a company's share *i* on a day *t* can be expressed:

$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$, where:

R_{it} – return for the share of firm *i* on day *t*;

R_{mt} – return for the market portfolio on day *t*;

α - the intercept term;

β - the systematic risk of share *i*;

ε - the error term.

After estimation the equation with the ordinary least squares method (OLS), we have the formula for abnormal return:

$AR_{it} = R_{it} - (a_i + b_i R_{mt})$, where:

a, b – parameter estimates obtained from the regression of R_{it} and R_{mt} over period (*T*) preceding the event [McWilliams, 1997, 628],

and summing abnormal returns for appropriate number of days gives cumulative abnormal return:

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \text{ , where:}$$

τ_1 - initial day of event window, τ_2 - final day of event window [MacKinlay, 1997, 21].

The event study method enables the assessment of influence of different events on the value of a company. Those events can be: mergers and acquisitions notices, changes of dividend policy or split announcements [Fama, 1969]. Very frequent use of event study is the use connected with financial results of companies. The influence of earnings announcements is researched in studies of Beaver, Dontoh and Ronen, or Bamber and Cheon [Beaver, 1968], [Dontoh, 1993], [Bamber, 1995]. Bamber and Cheon claim that there is reverse relation between share prices and trading volume, which is connected with earnings announcements. What can weaken the above mentioned statement, is the fact that one fourth of examined shares behaved differently as well as the fact that the observed relation was not very strong [Bamber, 1995]. Other papers relating to the influence of earnings announce-

ments are studies of Beaver, Dontoh and Ronen, or Grundy and McNichols: [Beaver, 1968], [Dontoh, 1993], [Grundy, 1989].

One of the applications of the event study method is to check influence of earnings forecasts on share prices. This examines whether earnings forecasts have information content. If that new information has information content, the forecast obviously influences share price. Patell states, that on average, earnings forecasts are accompanied by growth of share prices [Patell, 1976]. Pownall, Wasley and Waymire study the information content of earnings forecasts and the influence of different types of earnings forecasts on the change in share prices. Conclusions resulting from their analyses are as follows: earnings forecasts have information content. Secondly, earnings forecasts are less informative than earnings announcements. And thirdly, interim earnings forecasts are more informative than annual forecasts [Pownall, 1993]. McNichols also dealt with the matter of information content of earnings forecasts. His analysis showed that forecasts announced by managers have information content and possess the information which investors did not know earlier. However, on the other hand, investors do not entirely trust the forecasts that managers announced [McNichols, 1989]. Liu and Ziebart analyse to what extent market over- or underreact to earnings forecasts. The authors in their analysis showed that markets overreact to an earnings forecast disclosure. They notice that in 60 days from the date of disclosing earnings forecasts the situation turns and the share prices follow in opposite direction ,when the forecast was announced [Liu, 1999]. Gurgul analyses earnings forecasts in division on profit growth forecasts and profit fall forecasts (in relation to the previous year or to a previous forecast). The research showed that there is significant positive reaction to the growth of profits and negative reaction to the fall of profits, while the reaction to the profit falls is stronger than the reaction to the profit growths [Gurgul, 2006].

So far, the conducted analyses often employ the event study method and their main aim is to check whether earnings forecasts have information content indeed, and if they influence the investors' behaviour, and in this way - share prices. Presented below is the analysis of influence of earnings forecasts on share prices for companies which announced earnings forecasts in year 2004.

3. Analysis description

The analysis is based on earnings forecasts of companies listed on Warsaw Stock Exchange, which were published in 2004 and they concerned just that year. These are only initial forecasts for year 2004 of given company that are analysed. Forecasts revisions are not included. Disclosing these earnings forecasts is entirely voluntary, so if companies announce them, they want to achieve some short- or long-term advantages.

Table no. 1 – Estimated values of parameters of Market Model for analysed companies

Firm	a_i	p-value	b_i	p-value	R^2
Ampli	0.682	0.12	1.165*	0.027	0.033
Amator	-0.012	0.967	0.309	0.148	0.014
Boryszew	0.977*	0,004	1.124*	0.000	0.12
Boryszew GK	0.510*	0.045	0.847*	0.000	0.094
CSS	0.082	0.529	0.540*	0.000	0.18
Elektrobudowa	0.245	0.278	0.717*	0.000	0.114
Farmacol	-0.341	0.461	0.619	0.069	0.022

Impel	0.084	0.784	0.111	0.660	0.007
Impexmetal	0.146	0.408	0.574*	0.003	0.058
Indykpol	0.706*	0.045	-0.261	0.326	0.007
Inter Groclin	0.320	0.084	0.226	0.099	0.018
KrakChemia	0.594*	0.049	0.839*	0.000	0.089
LPP	0.276	0.180	0.424*	0.005	0.051
MCI	0.552	0.094	2.295*	0.000	0.249
Novita	0.127	0.709	0.377	0.278	0.008
Paged	0.642*	0.017	0.568*	0.006	0.051
Prochem	0.636*	0.012	0.268	0.383	0.005
Relpol	0.181	0.357	0.771*	0.000	0.164
Sanok	0.396	0.067	0.629*	0.000	0.097
Stalprofil	0.327	0.158	0.815*	0.000	0.108
Swarzędz	0.754*	0.040	1.411*	0.000	0.121
TIM	0.587	0.138	0.904*	0.005	0.053
Tras Tychy	0.128	0.585	0.861*	0.000	0.099
Wandalex	0.241	0.537	0.310	0.277	0.008

Source: own compilation.

There were used also real financial results of years 2004-2008 of companies which published earnings forecasts in 2004. The earnings forecasts come from: Money.pl [www.money.pl] and GPWInfoStrefa.pl [www.gpwinfostrefa.pl], while the financial results of companies come from: Onet.pl [gielda.onet.pl] and Wp.pl [gielda.wp.pl]. The method of analysis is the CAR method (cumulative abnormal returns) based on the Market Model firstly (table no. 1), and next the behaviour of real financial results of companies in years 2004-2008 was investigated. Among 30 earnings forecasts for year 2004, 4 companies revealed only revenue forecasts without profit forecasts, additionally, one of these companies withdrew the forecast in short time. Another 2 companies published forecasts shortly after entry on stock exchange, making it impossible to estimate the necessary parameters to calculate the CAR. Therefore, the analysis concerns 24 forecasts, including 2 forecasts concerning Boryszew company. One of them concerns Boryszew company itself and the next one, from different month, the Boryszew Group.

The CAR analysis was conducted for the chosen 24 forecasts, basing on Market Model, for which parameters were estimated by the ordinary least squares method (OLS) (table no. 1). For every forecast there were conducted 3 CAR analyses; event windows were established for days:

- from -2 to +2,
- from -5 to +5,
- from -10 to +10.

The event windows of cases were settled as symmetrical round the day of event, because the information on prepared forecast could leak out from company earlier. For examining the price reaction for different width of windows, there were examined 3 widths of windows: 5-day window [-2, + 2], 11-day window [-5, + 5], and 21-day window [-10, + 10].

Having counted cumulative abnormal returns for individual companies, the average CAR for the whole sample was checked whether it differs from zero significantly, or whether the forecasts did not influence share prices on average. It was also examined whether

there is correlation between the CAR of individual companies and future, real financial results.

4. Cumulative abnormal returns for disclosing earnings forecasts

There were analysed 24 earnings forecasts announced in 2004 and relating to this year (table no. 2). The cumulative abnormal returns have values from -9.1 percent to 14.4 percent for CAR +-2; from -21.8 percent to 36.9 percent for CAR +-5; and from -34.5 percent to 40.9 percent for the CAR +-10 days.

Table no. 2 – Cumulative abnormal returns for different event windows and real future financial results

Firm	CAR +-2	CAR +-5	CAR +-10	2004 Profit above forecast	Number of years with profits above 2004 profit forecast (max 4: 2005-2008)
Ampli	13.192	36.907	35.294	-	2
Apator	10.740	19.009	19.453	+	4
Boryszew	5.506	18.869	10.131	+	0
Boryszew GK	0.169	2.116	-1.800	+	1
CSS	-0.851	-0.391	1.582	-	3
Elektrobudowa	-2.390	8.905	-6.732	+	4
Farmacol	9.540	15.033	22.641	+	3
Impel	0.670	13.817	3.824	+	4
Impexmetal	1.848	-0.080	0.617	+	3
Indykpol	11.197	43.441	40.877	-	2
Inter Groclin	2.420	-1.003	-1.929	-	0
KrakChemia	-5.939	7.894	4.467	-	0
LPP	-1.687	-3.675	-6.980	-	2
MCI	-5.008	-10.819	-11.193	-	4
Novita	14.444	17.103	10.779	+	3
Paged	-5.105	18.427	9.363	+	2
Prochem	3.758	-10.742	-21.622	+	3
Relpol	5.270	5.324	12.218	-	0
Sanok	3.730	-2.079	-11.705	-	1
Stalprofil	2.696	0.970	-16.614	+	0
Swarzędz	-9.146	-4.461	-34.489	-	1
TIM	7.202	11.079	-5.354	+	4
Tras Tychy	-2.897	-21.805	-26.140	-	1
Wandalex	8.790	30.063	24.933	+	2

Source: own compilation.

The analysis has two aims:

1) to check whether earnings forecast disclosure influenced share price;

2) to check whether there exists a correlation between investors' reaction to forecast disclosure and future, real profits.

Test related to point 1 was conducted, and null hypothesis states that the average cumulative abnormal return equals zero (table no. 3).

Table no. 3 – Test of mean value with reference value 0

CAR	Mean	Standard deviation	p-value
CAR +-2	2.84	6.4	0.040
CAR +-5	8.08	15.3	0.016
CAR +-10	2.15	18.4	0.573

Source: own compilation.

The result of the test conducted compels to reject null hypothesis that the average CAR value equals zero for CAR +-2 as well as the CAR +-5. However, for event window of +-10 days the counted average value of CAR does not differ from zero significantly. On the above test basis it can be claimed that for event windows of +-2 days as well as +-5 days, the reaction to earnings forecast disclosures was statistically significant and it was about 2.8 percent for window +-2 days and 8.1 percent for event window of +-5 days. So, on average, the share of companies which disclosed financial forecast gained several percent, in relation to price which they would reach without this information.

The above presented analysis shows the shareholders' (and in this way the share prices') reaction to earnings forecasts. However, these forecasts may not come true. Fifth column in table no. 2 shows whether real results were better or worse than the forecast. The plus sign means that real profit was better than anticipated, the minus sign means that real profit was worse than expected. Basing on table no. 2 it can be seen that 11 forecasts (almost half) in 24 were exaggerated because companies did not reach the announced aims. For that reason, market participants anticipating poor results could "punish" companies, selling them and making their share prices go down. The analysis of relations between achievement of the aim and the positive CAR value or non reaching the aim and the negative CAR value showed that for CAR +-2 in 17 cases out of 24 (that is over 2/3) there was consistence between signs of the CAR and the signs in column fifth. For CAR +-5 that consistence occurred 18 times, while for CAR +-10 only 14. Table no. 4 contains the matrix of correlation with coefficients of correlation among the variables: CAR +-2, CAR +-5, CAR +-10 and variable 2004 Profit above forecast. Analysis in table no. 4 takes into account only signs of the above mentioned variables, that is relation between positive or negative values of variables occurrence (significant coefficients of correlation are marked with an asterisk; $p = 0.05$). Both, the coefficient of linear correlation and the coefficient of Spearman rank correlation have identical values and show that there is significant correlation among CAR +-2; CAR +-5 and the variable Profit 2004 above the forecast. Therefore, in 5-day and 11-day event window (+-2 and +-5) cumulative abnormal returns reflect the fact of possibility of non achieving presumed aim. Investors assess forecasts for given year correctly.

Table no. 4 – Correlation between CARs and real earnings

Variable	CAR +-2	CAR +-5	CAR +-10
2004 Profit above forecast (Pearson's linear correlation)	0.414*	0.500*	0.161
2004 Profit above forecast (Spearman rank correlation)	0.414*	0.500*	0.161

Source: own compilation.

The above analysis shows that the market participants are able to estimate the forecasts in context of given year results. However, it is generally accepted that the share price reflects the discounted value of the stream of future incomes from that share, which means

that the price at certain time is a function of the set of sequences of payoffs and capitalization rates. In case the stream of future incomes is uncertain it is assumed that market participants discount anticipated payoffs at anticipated capitalization rates. If these expectations change, the share price also changes [King, 1966]. Hence, the reaction to the announcement of earnings forecast may be the reaction to the relation between the forecast and all future profits. The aim of a company should be continuous profit enlargement and, thanks to that also dividend; the models of share prices are based on such assumption [Gordon, 1962]. That is why the analysis of relation between cumulative abnormal returns as a reaction to announcing earnings forecasts and companies' earnings in next years was conducted (table no. 5 and 6). More precisely, the relation between the CARs and number of years (from 2005 to 2008) is analysed, in which the financial result of given company was above the 2004 forecast (max. 4 - column sixth, table no. 2).

Table no. 5 – Linear correlation matrix for CAR variables and number of years when profits were above 2004 forecast

Variable	CAR +-2	CAR +-5	CAR +-10	Profits above 2004 forecast
CAR +-2	1	0.65*	0.7*	0.17
CAR +-5	0.65*	1	0.89*	0.11
CAR +-10	0.7*	0.89*	1	0.11
Profits above 2004 forecast	0.17	0.11	0.11	1

Source: own compilation.

The analysis of correlation (the linear correlation as well as the Spearman's) shows that the variables CAR +-2, CAR +-5, as well as CAR +-10 are correlated to one another, however, they are not correlated with sixth, last column (statistically significant values are marked with an asterisk) (table no. 5, table no. 6).

Table no. 6 – Spearman rank correlation matrix for CAR variables and number of years when profits were above 2004 forecast

Variable	CAR +-2	CAR +-5	CAR +-10	Profits above forecast
CAR +-2	1	0.63*	0.63*	0.14
CAR +-5	0.63*	1	0.88*	0.13
CAR +-10	0.63*	0.88*	1	0.07
Profits above forecast	0.14	0.13	0.07	1

Source: own compilation.

Therefore, market agents do not pay attention to, or they foresee mistakenly, the future condition of a company. It does not influence the current share price. It can be also explained as follows: the next years' earnings expectations were already discounted in share prices and publication of the forecast did not change those expectations. Hence, there were not any abnormal returns as a result of relation between the earnings forecast and real, future financial results for many years.

5. Conclusions

The event study method is a widely used method of assessing influence of different events on share prices. Many earlier research works checked the behaviour of prices in response to splits, firms' connections, earnings announcements or earnings forecasts. This research except quantification of the strength of reaction also checked whether cumulative abnormal returns showed significance of some events at all.

Basing on the research in present study it can be maintained, that the publication of earnings forecasts has influence on price in short period surrounding the date of publication of the forecast. Only initial forecasts were taken into account without revisions of prior forecasts. As that forecasts are voluntary, the anticipated result of analysis was positive influence of them on the evaluation of shares because companies announcing these voluntary forecasts wanted to achieve some aims. Similarly to the research conducted on developed markets, the earnings forecasts disclosures done by Polish companies listed on Warsaw Stock Exchange have information content. In 5-day window surrounding the date of publication the additional total growth of share price was about 2.8 percent, in 11-day window surrounding the date of publication of forecast the additional total growth of share price was about 8 percent. In 21-day period window the total effect of publication of forecast was about 2 percent, however, statistical analysis showed it was not significantly different from zero. Therefore, the publication of an earnings forecast has positive, though a short-lived influence on share prices. In context of earlier research the present analysis is consistent with Gurgul [Gurgul, 2006] that forecasts of improving financial results have positive influence on share prices. It means that announcing earnings forecasts is advantageous to companies' share prices.

It can be also stated that investors estimate the reality of forecasts rightly because there is significant correlation among positive or negative reaction on publication of earnings forecast, and then achieving by a company the announced result. However, it was not noticed that there is a relationship between reaction to forecast and better or worse results over the forecast in the next years. It can mean that investors do not take into account the relationship between earnings forecasts and the next years' results, or that according with generally accepted models of share prices, the information related to the future profits is already discounted in a share price, so it does not cause the abnormal returns. The presented analysis is the first approximation to the analysis of relations among information content of earnings forecasts' abnormal returns and achievements and results of companies. These relations as well as models which describe them will be the object of further research.

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