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The "Magic Action" of Stock Splits: Evidence from the Warsaw Stock Exchange 2003–2017

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Abstract

Purpose: Many researchers claim that split has a positive effect on stock returns. However, if we observe more closely, we notice that this is only an accounting procedure. Therefore, the question arises as to whether stock prices should change. To answer this problem, we checked the market reaction to the division of shares on the Warsaw Stock Exchange.

Methodology: To verify our hypotheses, we used the event study analysis. Based on the Sharpe market model, we assumed that the price of the asset determines systematic risk and specific risk.

Findings: On the basis of conducted analyses, we found a positive market reaction to the first split information, while the announcement of General Meeting of Shareholders (GMS) resolutions generated a price correction. Moreover, split events initially caused an increase in abnormal returns. The research results are consistent with the efficient market hypothesis.

Research limitations: The sample size does not give an opportunity to check the impact of economic cycles. During the last 15 years, we found only 75 events of splits without any disruption event.

Originality: Analysis of three dates: information about the planned general meeting of shareholders regarding the split, publication of decisions taken at the general meeting, and the day of the split.

Keywords: stock split, general meeting of shareholders, event study, capital markets, market stock reaction

JEL: G12, G28, G14, G40

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Introduction

A stock split is a procedure consisting in increasing the number of stocks in trading with a simultaneous proportional reduction in the nominal value of each share. The split mechanism is simple, although it depends on the legal regulations adopted in a given country. A company divides its existing shares (classic split) or issues additional shares for each one (quasi split) while maintaining the current proportions of shareholder holdings (Grudziński, 2006). As a result, there is no change in the amount of equity in the accounting entries. The shareholding structure does not change after the shares are divided: each shareholder continues to hold the same share in the enterprise after such an operation. This treatment is conducted to improve the liquidity of trading in shares of a given company, as the share price should be included in the so-called optimal price range for shares (Gurgul, 2006). Since split changes only the number of shares, not cashflows or company funds, it should not cause abnormal income rates. However, Fama (1969) and Nguyen and Singal (2011) indicate the occurrence of a market reaction. The aim of the research is to verify whether there are abnormal return rates on the Warsaw Stock Exchange (WSE) as a result of a split. The above study analyzes events beginning from 2003, which is from the beginning of the largest development after the economic transition of both the WSE and Polish economy. The main contribution of the study is evidence in the discussion on the occurrence of market and information efficiency in emerging markets. Moreover, the results of the research can be used by investors to build investment strategies.

Literature Review

This trend includes one of the first split studies conducted by Fama (1969), who analyzed the phenomenon on the basis of monthly return rates. Fama concluded that in the audited period, there was no visible reaction of the stock chart on the split, only on the related dividend. Honghui, Nguyen, and Singal (2011) show that breakdown information is usually associated with a significantly positive abnormal rate of return. This view is also supported by Ikenberry, Rankine, and Stice (1996), Fernando, Krishna-Murthy, and Spindt (1999). Desai, Nimalendran, and Venkataraman (1998) and Schultz (2000) argue that the split results in the realignment of investors' willingness to share trading increases.

Another explanation of the impact of the split on share prices is the hypothesis about the change of subject indicators of the enterprise (Słoński and Rudnicki, 2011), in which the number of shares is included, such as profit per share. The division of shares

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is also included in the so-called signaling instruments (McNichols and Dravid, 1990; Nayak and Prabhala, 2001; Mamcarz, 2011). Signaling instruments are used by management boards of companies to reduce the level of information asymmetry that occurs in the investor-management relationship. An important question remains whether investors react to the moment of the division of shares. Another point could be whether the reaction is taken into account on the occasion of the announcement of the willingness to divide by the company. Finally, the third day that can be distinguished, i.e. the day of adopting a split resolution. The problem is even more complicated because business practice knows an opposite phenomenon: the combination of shares.

Grinblatt et al. (1984), Powell (1994), and Brennan and Hughes (1991) argue that after the announcement of the willingness to split, market analysts increase interest in the company by making more quotes. If valuation shows that the company was undervalued, this will cause the costs associated with the split of shares to be covered in large part by the increase in share prices.

Another explanation for the split may be the desire to increase the company's value by the planned issue of shares and obtain more funds in this way (D'Mello, Tawatnuntachai, and Yaman, 2003). Going a bit further, Guo, Liu, and Song (2008) combine the split event with the event of taking over another company on the market, thus obtaining two further factors for the increase in the value of shares. Brennan and Hughes (1991) verify the relationship between the frequency of splits and business cycles to show that share divisions are more often made in the context of business expansion than its contraction.

The expected and unexpected splits are distinguished by Hwang, Keswani, and Shackleton (2007) as they compare the impact of splits on the market. These authors find that information about the split is not absorbed immediately in the share price, but it takes several months. For expected splits, the resulting rates are 150% higher than the one for unexpected events.

Pilotte and Manuel (1996) reflect on the impact of a split on the price of stocks, but only such that are repeated. These authors say that the market reacts to the next split based on the financial data that accompanied the previous one. These researchers consider two moments of announcements: about willingness to split and about earnings.

Hwang, Keswani, and Shackleton (2007) mention the market efficiency paradigm. Referring to the hypothesis about the information effectiveness by Fama (1965), who states that every significant information about the company is immediately reflected in the

price of its shares. However, the split event is not new information, so it should not trigger a price change. In line with this view, Karim and Sarkar (2016) argue that after the split market share price breaks, because split companies are usually overvalued.

Hu et al. (2017) study the real determinants of information on the share split announcement. They observe it through the prism of the Neoclassical Efficiency Hypothesis and the Market Driven Theory. The researchers find that companies are more likely to make decisions about share divisions in the bull market than in the bear market. Moreover, the bull market has higher abnormal returns when investor moods are positive.

Another important research trend is focused on "resplit" (reverse split) or the merging of shares (Robinson, 2007). This treatment is conducted to improve company image among investors, reduce transaction costs, and maintain the minimum share price so as not to be delisted. In her study, Robinson indicates that a reverse split is associated with negative reception. Investors misunderstand the merging of shares because, in their opinion, this informs about bad forecasts for profits in the future. Robinson shows that there is real information about the forecast, along with the negative expectations of profits. The information reveals that there is a negative correlation of information about the merging of shares and future profit, which shows a tendency to decline.

Four studies on splits have so far been conducted for the Polish market, but their main problem is to grasp the early period of the operation. Gurgul (2006) studied the years 1995–2005, during which he identifies 17 split shares. However, there were problems with the isolation of the split announcement for six events. Ultimately, the 11-element sample was analyzed for the split announcement and 17 for the price effect. Buczek (2005) analyzes two cases of splits and three quasi-splits from 2003–2004. In both analyses of the post-split period appears a correction, and there is an increase in prices on the day of the split. The behavior of the chart before the division is different. Gurgul only finds an increase in prices before and on the day of the announcement, while rates do not increase in the split window. However, Buczek shows the rates to rise steadily since the announcement of the split. The comparison of the pre-split period should be emphasized as theoretically different conclusions; however, this may only be due to different types of data presentation. Despite these differences in results, splits trigger price movement. Gurgul does not obtain satisfactory statistical significance, while Buczek's sample size prevents its verification.

Słoński and Rudnicki's (2011) study splits on the Warsaw Stock Exchange in 2000–2010. Their analysis focuses only on the day of the split. They show an increase in prices before the split date and a subsequent correction around day four in two out of three

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models they elaborate. A similar analysis is conducted by Pasierbek (2017), who indicates that the changes in prices on day 0 and day 1, being statistically significant, decreased. Further depreciation lasted until day 5 after the day of the split, while CAR in the window < 0; 5 > was -5.93%. The release of information on the split resulted in higher prices, as investors may perceive this as information about the company's good financial standing, along with the hope for future growth.

Data, Hypothesis Development, and Methodology

The analysis will be conducted on the basis of companies listed on the stock exchange, which split shares in the period from January 1, 2003, to December 31, 2017. The analysis was conducted within three dates of the first information about the planned general meeting of shareholders regarding the split, the publication of the decisions made on the general meeting of shareholders, and the day of the split. This is a distinctive feature of the presented study from other articles (Gurgul, 2006; Buczek, 2005; Słoński, Rudnicki, 2010; Pasierbek, 2017). According to Fama's hypothesis, the announcement about the planned event should trigger a market reaction, and we find two such dates in the case of the scrutinized event. After cleaning the sample from events interfering with the study and the precise determination of all three dates, we analyzed 75 companies.

Assuming that the split is accompanied by increased interest of analysts (Grinblatt, 1984; Powell, 1994; Brennan and Hughes, 1991), many authors argue that the willingness of investors to share trading increases as a result of the split and the realization of price (Fernando et al., 1999; Desai et al., 1998; Schultz, 2000). Thus, we propose three hypotheses:

Hypothesis 1: Information about the planned general meeting of shareholders regarding the split resulted in an increase in prices on the Warsaw Stock Exchange as compared to the MSCI index.

Hypothesis 2: Information about decisions taken at the general meeting resulted in an increase in company prices compared to the MSCI index.

Hypothesis 3: The split resulted in the rise in company prices compared to the MSCI index.

The verification of hypotheses was conducted with event analysis. As part of this analysis, an estimation of abnormal income rates was made with the Sharpe market model, which assumes that the price of the asset determines systematic risk and specific risk. We used the ordinary least squares method to estimate model parameters. We

employed the method of least squares to estimate model parameters and t-test used to test hypotheses. The MSCI index of emerging markets was adopted as a benchmark. Despite Poland's classification as a mature market, we selected this index because, for the vast majority of the analyzed period, the Polish market was treated as an advance emerging economy (FTSE Rusell 2017). The last research about the WSE shows that it is resistant to basic anomalies in the shaping of market income rates (Podgórski, 2018a; Podgórski, 2018b). The length of the estimation window is 250 days, which is the approximation of the financial year. In our research estimation window starts at 310 before the event and ends at 60 before. This window arrangement eliminated the eventual possibility of the market to wait for the event. On the other hand, the event window covers a period of 21 days from ten days before to ten days after the incident.

The distinguishing feature of the presented study from other (Gurgul, 2006; Buczek, 2005; Słoński and Rudnicki, 2010 and Pasierbek, 2017) is the analysis around three dates. The first model verifies the information about the planned general meeting of shareholders regarding the split. The second model is analogous to the Gurgul's (2006) and Buczek's (2005) studies of the publication of decisions taken at the general meeting. The third model is analogous to the studies of Słoński and Rudnicki (2010) and Pasierbek (2017),[3] as it considers the day of the split.

Results

Table 1 presents the results of the analysis of the first information on the planned general meeting regarding the split. As expected, the market accepted this information as positive, thus generating abnormally positive rates of return. Although the first statistically significant 5% increase in prices appeared on day -1 by 1.8%, which may be the result of market expectations after the information about the planned split. Meanwhile, a significant increase of 2.23% at the statistical significance level of 1%. The entire upward trend continued until the seventh cumulative abnormal income in windows after the event day $< 0; 1 >$, $< 0; 2 >$, and $< 0; 5 >$ are statistically significant and have 3.99%, 4.06%, and over 6.5%, respectively. On days 8, 9, and 10, correction of 2.5 percentage points appeared. We should note that the continuation of the upward trend in the first days after the event may be the result of analysts' increased interest

[3] The most important differences between the current article and Pasierbek's article are: 1) Pasierbek study includes only the split, while the current analysis foregrounds the three dates of announcement of the decision on the General Meeting of Shareholders, the announcement of the decision on the split from the General Meeting of Shareholders, and the split itself; 2) while the current analysis of only splits, the stepson test also included resplits, which could cause distortions in results; 3) while the current analysis focuses on the 2003–2017 period, Pasierbek's study scrutinized the 2011–2016 period; 4) the current study omits the division of companies by industry, while Pasierbek's study included it for information; 5) the current study develops the literature review.

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in the company. To summarize, there are indications in favor of the first hypothesis in whose light the provision of information about the planned general meeting resulted in an increase in the quotations of companies. However, the occurrence of reaction already on day -1 is to the disadvantage of the hypothesis about the efficiency of information on capital markets. Table 1 below presents the results of the estimation of market models based on the ordinary least squares method. The models were estimated on the basis of the listings from 250, preceding the events by 60 days. The MSCI Emerging Market index was used as a benchmark.

Table 1. The results of the market model estimation for the day of announcement of the general meeting of shareholders regarding the planned split

Day	Empirical Return Rate	Estimated Return Rate	Abnormal Return Rate	p-value	
-10	-0.2416%	-0.0415%	-0.2001%	0.7597	
-9	-0.2022%	-0.2025%	0.0003%	0.9997	
-8	0.7227%	-0.0289%	0.7516%	0.4969	
-7	1.1620%	0.0497%	1.1123%	0.1306	
-6	-0.4766%	0.0378%	-0.5144%	0.5355	
-5	-0.2011%	-0.0103%	-0.1908%	0.7656	
-4	0.8120%	-0.2317%	1.0436%	0.2544	
-3	0.3651%	0.2191%	0.1460%	0.8392	
-2	0.1549%	0.0917%	0.0632%	0.9255	
-1	1.8079%	0.0016%	1.8063%	0.0254	**
0	2.3717%	0.1379%	2.2338%	0.0041	***
1	1.9497%	0.1863%	1.7634%	0.0381	**
2	0.0543%	-0.0151%	0.0694%	0.9374	
3	1.3658%	0.1583%	1.2075%	0.1146	
4	0.1687%	0.0660%	0.1027%	0.8890	
5	1.2218%	0.0555%	1.1662%	0.2185	
6	0.1099%	-0.0315%	0.1414%	0.8574	
7	1.2743%	-0.0420%	1.3163%	0.1089	
8	-0.9137%	0.2082%	-1.1218%	0.1404	

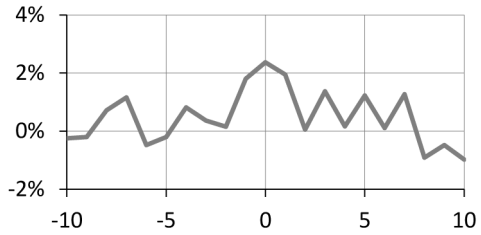
9	-0.4783%	0.0243%	-0.5025%	0.3835	
10	-0.9747%	-0.0305%	-0.9442%	0.1051	

Window	CAR	
< -10;-1 >	4.0180%	
< -5;-1 >	2.8683%	
< -2;-1 >	1.8695%	*
< 0 >	2.2338%	***

Window	CAR	
< 0;1 >	3.9972%	***
< 0;2 >	4.0666%	**
< 0;5 >	6.5430%	**
< 0;10 >	5.4320%	**

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.
Source: own elaboration.

Figure 1. Empirical Return Rate



Source: own elaboration.

Figure 2. Estimated Return Rate

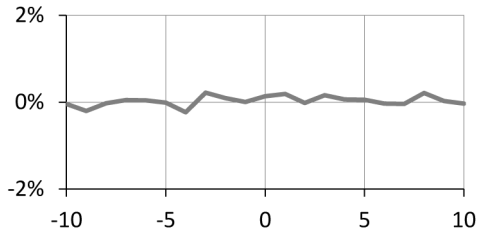
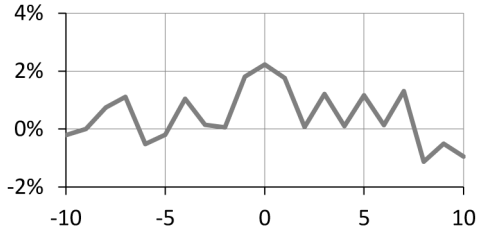
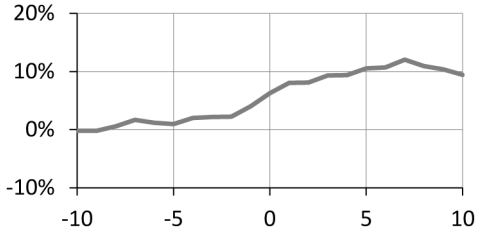


Figure 3. Abnormal Return Rate



Source: own elaboration.

Figure 4. Cumulated Abnormal Return Rate



The analysis of results presented in Table 2 indicates the lack of a statistically significant response on the day of the general meeting of shareholders. On the first day, the correction of abnormal rates of return is visible by 1.63 percentage points, with a p-value equal to 2.17%. This indicates that the decisions disappointed the market, or the market reevaluated the return rates. All the more so, for 30 days passed since

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the information about the planned split decision. The correction of abnormal income rates in the window < 0; 10 > equals 3.96% and is statistically significant at 5%. The analysis of individual cumulated abnormal return rates indicates their rise to day 0 and – after this period – shows the previously mentioned adjustment. These arguments preclude hypothesis 2, which states that information about decisions made at the general meeting results in an increase in company prices compared to the MSCI Emerging market. Table 2 presents the results of the estimation of market models based on the ordinary least squares method. The models were estimated on the basis of listings from 250 preceding events by 60 days. The MSCI Emerging Market index was used as a benchmark.

Table 2. The results of market model estimation for the day of announcement of the resolutions of the general meeting of shareholders regarding the planned split

Day	Empirical Return Rate	Estimated Return Rate	Abnormal Return Rate	p-value	
-10	0.4167%	0.0656%	0.3512%	0.6794	
-9	0.7009%	0.0298%	0.6711%	0.3302	
-8	1.1918%	0.1054%	1.0864%	0.1790	
-7	0.1500%	0.1283%	0.0217%	0.9781	
-6	0.3383%	0.1106%	0.2277%	0.7561	
-5	0.3584%	0.0332%	0.3251%	0.6413	
-4	-1.3982%	0.0010%	-1.3992%	0.0871	*
-3	0.5204%	0.0929%	0.4275%	0.5334	
-2	-0.1084%	-0.0640%	-0.0444%	0.9226	
-1	0.8101%	0.0761%	0.7340%	0.3188	
0	0.6008%	-0.0122%	0.6131%	0.4210	
1	-1.5237%	0.1103%	-1.6340%	0.0217	**
2	-0.8545%	0.0279%	-0.8824%	0.1020	
3	0.1251%	0.1558%	-0.0306%	0.9569	
4	-0.0170%	-0.1068%	0.0898%	0.8627	
5	-0.1038%	0.0451%	-0.1489%	0.7774	
6	0.5978%	0.0886%	0.5092%	0.3204	
7	0.4604%	0.0775%	0.3829%	0.5442	

8	-1.3933%	0.0755%	-1.4688%	0.1081	
9	-0.7143%	-0.0990%	-0.6154%	0.1556	
10	-0.6866%	0.0903%	-0.7768%	0.0784	*

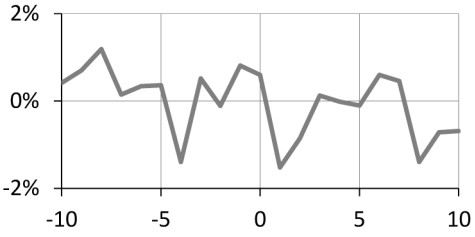
Window	CAR	
< -10;-1 >	2.4011%	
< -5;-1 >	0.0430%	
< -2;-1 >	0.6896%	
< 0 >	0.6131%	

Window	CAR	
< 0;1 >	-1.0210%	
< 0;2 >	-0.2693%	
< 0;5 >	-1.9931%	
< 0;10 >	-3.9621%	**

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

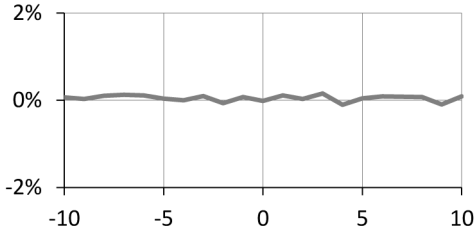
Source: own elaboration.

Figure 5. Empirical Return Rate



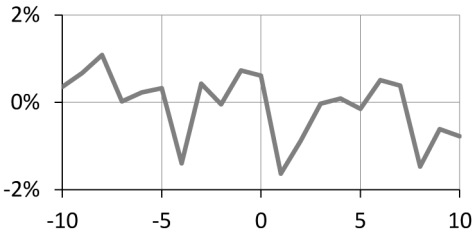
Source: own elaboration.

Figure 6. Estimated Return Rate



Source: own elaboration.

Figure 7. Abnormal Return Rate



Source: own elaboration.

Figure 8. Cumulated Abnormal Return Rate

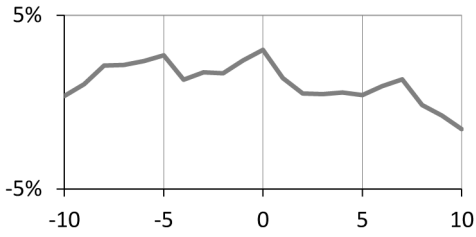


Table 3 presents the results of the analysis in the period of -10 to 10 days after the day of shares split. On day -3, the abnormal rate of income amounted to 2.34%, with a statistical significance of 0.5%. On day 1, there was a correction of abnormal income rates of -1.92% with a statistical significance of 0.9%. Another correction of prices

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occurred on day 5. What is important from the viewpoint hypothesis 3 are cumulative abnormal income rates in windows < -10; -1 >, < -5; -1 > and < 0; 2 >, which are 4.99%, 3.6% and 3.28%, respectively; in each case holding statistical significance of 5%. In line with Figure 12, there is an increase in income rates; however, in the vast majority of companies from the sample, it is the result of changes in the stock on day -3, thus indicating the market was discounted by the information on the planned split before day 0. This may prove hypothesis 3; however, the hypothesis about capital market information efficiency has been challenged. All the more due to the subsequent price correction. Table 3 presents the results of the estimation of market models based on the ordinary least squares method. The models were estimated on the basis of listings from 250 preceding events by 60 days. The MSCI Emerging Market index was used as a benchmark.

Table 3. Results of market model estimation for the day of the split

Day	Empirical Return Rate	Estimated Return Rate	Abnormal Return Rate	p-value	
-10	0.3943%	0.0778%	0.3166%	0.5033	
-9	0.1266%	0.0453%	0.0813%	0.9090	
-8	1.0112%	0.1880%	0.8232%	0.2341	
-7	-0.2678%	0.1284%	-0.3962%	0.5339	
-6	0.7266%	0.1598%	0.5668%	0.3883	
-5	0.2928%	0.0546%	0.2382%	0.6753	
-4	0.7995%	0.0658%	0.7337%	0.4091	
-3	2.4090%	0.0723%	2.3367%	0.0050	***
-2	-0.0799%	0.0207%	-0.1006%	0.9025	
-1	0.4792%	0.0888%	0.3903%	0.4925	
0	1.6936%	0.0744%	1.6193%	0.2650	
1	-1.8970%	0.0211%	-1.9181%	0.0091	***
2	1.6141%	-0.0418%	1.6559%	0.2623	
3	0.7642%	0.0140%	0.7503%	0.4334	
4	0.4393%	0.0954%	0.3439%	0.7064	
5	-1.6053%	-0.0732%	-1.5321%	0.0641	*
6	-0.9098%	0.0517%	-0.9615%	0.3548	

7	-0.1472%	0.0481%	-0.1953%	0.8487	
8	-0.7348%	0.1360%	-0.8709%	0.4022	
9	0.3628%	0.2075%	0.1553%	0.8526	
10	0.0962%	0.0028%	0.0934%	0.9073	

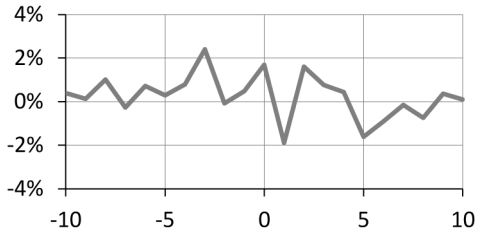
Window	CAR	
< -10;-1 >	4.9900%	**
< -5;-1 >	3.5983%	**
< -2;-1 >	0.2897%	
< 0 >	1.6193%	

Window	CAR	
< 0;1 >	-0.2989%	
< 0;2 >	3.2752%	**
< 0;5 >	0.9192%	
< 0;10 >	-0.8599%	

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Source: own elaboration.

Figure 9. Empirical Return Rate



Source: own elaboration.

Figure 10. Estimated Return Rate

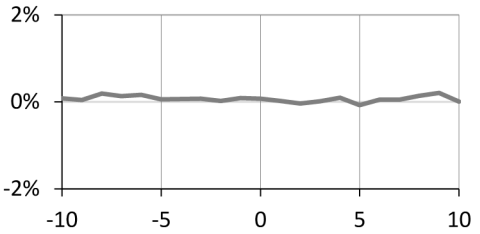
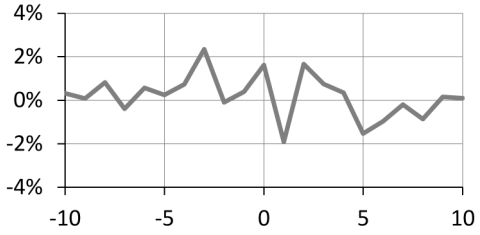
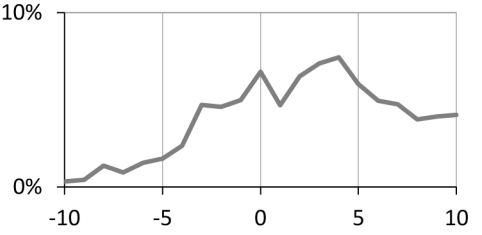


Figure 11. Abnormal Return Rate



Source: own elaboration.

Figure 12. Cumulated Abnormal Return Rate



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Conclusions

The results of the research indicate positive market reactions to splits. Hypothesis 1 assumed that there is a positive relationship between the announcement of information about the planned split – through draft resolutions of the General Meeting of Shareholders – and the increase in prices. On day -1 there was the first statistically significant increase of 1.8%, and the substantial increase on day 0 was 2.23%, with a statistical significance level of 1%. The upward trend continued until day 7. This may mean that the increase in interest in the company associated with splits provided positive information. The increase of abnormal returns rates (AR) can be explained in addition; the division has a positive effect on the liquidity of securities.

On the first day after the GMS, prices fell by 1.63%, with 2.17% statistical significance. Statistical significance is also characteristic of cumulated abnormal returns rates (CAR) in window $< 0; 10 >$ of -3.96%. Cumulated abnormal rates of return show an increase on day 0, though later there appears a correction. This may indicate that in the earlier period, the information was already discounted. Therefore, hypothesis 2 should be rejected. It is possible that this is the result of exhausting the split effect on the day the general meeting of shareholders is announced.

Hypothesis 3 assumed that share prices increase with the split. The first statistically significant reaction occurred on day -3, when the abnormal income rate was 2.34%. On day 1, there was a correction of abnormal rates of return, which amounted to -1.92%. However, the cumulated rates of return showed – with statistical significance – upward trends in windows relevant for the hypothesis. The market split information was discounted on day -3, because CAR values are primarily dictated by the change on day -3. The positive CAR provides arguments in the discussion that the breakdown into future returns and the number of transactions might have played a role, but this should be verified in the turnover study. A major limitation of the research is the sample size, which is the main reason why we cannot examine the effect of the economic cycle that has aa strong impact on market overreaction on stock prices (Wnuczak, 2016). The next limitation is the lack of verification of the split effect on turnover due to missing data. Following that limitation, the next research should take into account changes in turnover. It is also worth considering whether the way of market reaction to each of the three events is only the specificity of the Polish market or also of other stock exchanges in the region.

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