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Short-Term Price Reaction to Filing for Bankruptcy and Restructuring Proceedings—The Case of Poland

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Abstract: This study aims to check market reaction to filing for bankruptcy and restructuring proceedings and to verify the short-term effect of a price reversal in the Polish market in the years 2004–2019. The research was conducted by dividing the analysed companies according to the procedure (bankruptcy and restructuring) and market (the main market and the NewConnect market). The research methodology used in the study is the event analysis method (AR, CAR, AAR and CAAR rates were used in the research), with a few statistical tests (*T*-test, Generalized rank *Z* Test, Generalized rank *T*-Test, Patell or Standardized Residual Test, Kolari and Pynnönen adjusted Patell or Standardized Residual Test). It was found that share prices in the Polish share market react quickly to public information about filing an application for bankruptcy or restructuring. For all analysed companies, the mean rate of return on the event day was equal to −14%, and on the next day, it was −3%. Regardless of the type of share market and the form of proceedings, the reversal effect was not confirmed in the short term. It was found that cumulative above-average rates of return fall more strongly for companies listed on the less liquid Newconnect market (−23.6%), and when information on the filing for bankruptcy proceedings is provided (−28.5%), as opposed to the main market (−19.1%) and restructuring proceedings (−17%). The cumulative average rate of return for all analysed companies in the research period (−2, +10 days) was equal to −20.6%.

Keywords: bankruptcy; behavioural finance; price reaction; event analysis; market efficiency

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1. Introduction

For many years, views on rationality and human imperfections in the investment process have clashed. Discussions are underway on the validity of the efficient market hypothesis and the adjustment of prices to emerging information (Fama 1965a, 1965b, 1970; Fama and Thaler 2016). This theory is most associated with Fama (1965a, 1965b, 1970). It must be admitted, however, that its origins date back to 1900 when Bachelier (1900) came up with random walk theory as the basis of the efficient market hypothesis. Samuelson (Delcey 2019) also worked on this concept around the same time period as Fama. In 1970, Fama (1970) proposed an extended version of the market efficiency theory distinguishing three forms of it, i.e., weak (historical information is reflected in the price), semi-strong (both historical and publicly available information is reflected in the price) and strong (the price reflects all information, both publicly available and available to selected groups, e.g., investors, the management board). Since the appearance of the above proposal, many studies have been carried out in various countries on the assessment of the efficiency of markets in terms of the above-mentioned three forms. Market efficiency was hardly reported in the strong form. The results confirming the existence of the first form of stock market efficiency were obtained most often, while those confirming the second form were less frequent (Chan et al. 1997; Borges 2010). For some stock markets, especially those less developed, such as African countries, even weak market efficiency was not recorded (Mlambo and Biekpe 2007; Kelikume et al. 2020). In Poland, which is the focus of this

paper, a rather weak form of equity market efficiency was pointed out. Only in individual periods and articles, the semi-strong form was shown (Prusak 2015, p. 64).

At the same time, several studies have emerged showing deviations from the mainstream theories. One of the key areas of growing interest is behavioural finance which examines, among other things, all kinds of anomalies in the capital market (e.g., calendar, fundamental and technical anomalies) constituting the foundations of numerous investment strategies (Reinganum 1981; Keim 1983; Dimson 1988; Latif et al. 2011; Jacobs 2015; Engelberg et al. 2018). Psychology has become increasingly important in the study of investment behaviour. The precursors of this type of research include Dreman (1982), Howe (1986), De Bondt (2000) and De Bondt and Thaler (1985), who initiated and developed the theory of price overreaction and underreaction to the news. It shows that prices react too intensively (overreaction) or only slightly (underreaction) to certain information (Dreman and Lufkin 2000; De Bondt and Thaler 1985). As this theory was developed, the impact of an increasing number of different events, both positive and negative, on stock prices, was analysed. Negative events include the publication of information on the initiation of business bankruptcy proceedings. In these types of cases, the so-called reversal effect was observed, i.e., after initial significant drops in prices, the market began to rebound and the prices started to rise (Schatzberg and Reiber 1992, pp. 3–4). The occurrence of such an effect may constitute the basis for the development of an investment strategy that allows for earning money in the event that information about the initiation of bankruptcy proceedings is announced. So far, little research in this field has been carried out and it mainly concerned the USA market and the reorganisation procedure (so called Chapter 11).

This prompted the authors of this publication to research the reaction of share prices to the publication of information on corporate bankruptcy or restructuring in the Polish capital market. Poland is still regarded as an emerging market by many organisations, although FTSE Russell Group (Poland Promoted to Developed Market Status by FTSE Russell 2018), for example, reclassified it in 2018 to developed markets. It is worth mentioning that in terms of capitalisation, Poland is characterised as the largest capital market outside Russia among the post-communist countries of Central and Eastern Europe (FESE Statistics 2020). As part of the ongoing research, the following questions were proposed.

(1) How have share prices/rates of return reacted to the public disclosure of information on the initiation of bankruptcy and/or restructuring proceedings? Was this reaction quick or did it take time? A quick reaction of prices to this information may testify to market efficiency in a semi-strong form.
(2) Based on the analyses carried out, is there the so-called reversal effect?
(3) Are there any differences between abnormal return rates in the case of companies that have entered bankruptcy and restructuring proceedings? As information about the initiation of restructuring proceedings is considered less negative, we expect that the negative effect will be weaker than in the case of bankruptcy proceedings.
(4) Are there any differences in share price reaction to information on bankruptcy or restructuring between the companies listed on more and less liquid markets (Warsaw Stock Exchange—WSE and NewConnect, respectively)?

The research period is 2004–2019, which was dictated by the availability of data and the introduction of the ESPI system (Electronic System for Information Transmission) generating the information. Event analysis was used as the research method.

Besides the introduction, the article structure is as follows. The second part outlines the theoretical background that constitutes the introduction to our research. The next section presents the methodology. The results of the research are included in Section 4. The last part discusses the findings and implications of our research.

2. Theoretical Background

The concept of event study has been known in finance for about 50 years and it is still reported in the literature worldwide. Fama et al. (1969) are considered the forerunners of this method for assessing the impact of different events on stock prices, having first

presented it in their paper "The Adjustment of Stock Prices to New Information". The method has evolved and constantly improved, and it had been used to analyse the impact of an increasing number of events (Binder 1998; Corrado 2011).

A lot of research has been conducted on price response to positive, negative and fake news. Among other issues, the impact of such events as fake news (Clarke et al. 2019), the publication of stock market recommendations (Liu et al. 1990), information on mergers (Rosen 2006; Keown and Pinkerton 1981), earnings (De Bondt 2000), stock splits (Gulen and Hwang 2012), dividends (Michaely et al. 1995), corporate strategy, customers and partners, products and services, management changes, legal developments (Neuhierl et al. 2013), unexpected deaths of senior corporate executives (Johnson et al. 1985), corporate governance news (Brogi and Lagasio 2018), regulatory changes (Lamdin 2001), new share issues (Barclay and Litzenberger 1988), the occurrence of price shocks (Zawadowski et al. 2006), news about the R&D process (Perez-Rodriguez and Valcarcel 2012), COVID-19 outbreak (Pandey and Kumari 2021), fraud announcements (Sharma and Verma 2020), political events (Aktas and Oncu 2006) or information about the publication of macroeconomic data (Hanousek et al. 2009) were analysed. In Poland, several studies using event analysis have also been carried out to evaluate, among other issues, the reaction of stock prices or stock indices to information concerning forecasted and achieved profits, dividend policy, analysts' opinions, changes in stock index composition (Gurgul 2019), departure of a key person in the enterprise (Bielicki 2013), stock splits (Fiszeder and Mstowska 2011), changes of the reference rate (Filipowicz 2013) and the macroeconomic situation in the United States; (Będowska-Sójka 2010; Suliga and Wójtowicz 2013). Such effects were often examined in the ultra-short, short and long-term (Kothari and Warner 2007; Yang 2013).

One of the negative events whose impact on share prices and rates of return has so far been studied very rarely is the information on the application for bankruptcy or restructuring proceedings in a company. Clark and Weinstein (1983) and Schatzberg and Reiber (1992) noted the short-term stock price reversal effect after the notification of the submission of an application for restructuring under US Chapter 11. Namely, after significant price decreases during the application submission period, a positive abnormal return rate was generated. This means that investors reacted too vigorously to negative information (overreaction) in the first days following the announcement, but their expectations as to the value of shares improved over time. A similar effect was noted by Datta and Iskandar-Datta (1995) and Dawkins et al. (2007). Rose-Green and Dawkins (2000) proved that, at the time of the submission of the petitions, the prices of the companies in which bankruptcy proceedings were initiated were falling more sharply than those in which the rehabilitation proceedings were commenced. In addition, Chen and Church (1996) concluded that at the moment of notifying the public of the bankruptcy petition, companies that received going-concern opinions achieved less negative rates of return than companies that did not receive such opinions. Coelho and Taffler (2008) examined how the application for a Chapter 11 procedure affects the 12-month rate of return on shares (long-term effect). It turned out that after 12 months, the average abnormal return rate was −28%. The authors also verified how the rates of return behave in reaction to the provision of information on the initiation of rehabilitation proceedings under Chapter 11 for strategic and non-strategic reasons. No significant differences were found between the period of filing the petition and the period preceding it. One of the few studies conducted in a market outside the USA concerned Malaysia. It showed that the notification about the bankruptcy of a company generates a negative abnormal return in the short term. What is more, re-emerged firms experience significantly less negative abnormal returns compared to delisted firms. It is also worth mentioning that in the event of announcing information about the poor financial condition, financially distressed companies which are non-politically connected lose more than those that are politically connected (Ahmad et al. 2016; Ahmad et al. 2018). It can be noted, with some exceptions, that the studies conducted so far concerned the USA and the resolution procedure (Chapter 11). Most of them were carried out relatively long ago. To the authors' knowledge, no similar research has yet been conducted on the European stock markets, let alone among European post-communist countries.

In Poland, bankruptcy law was considered dead in the period after World War II until the late 1980s. During the transition period, the laws and regulations concerning bankruptcy and sanation proceedings that were in force until 1 October 2003 were those introduced in 1934 (Regulation of the President of the Republic of Poland of 24 October 1934a, Bankruptcy Law and Regulation of the President of the Republic of Poland of 24 October 1934b, Law on composition proceedings). In 2003, a new bankruptcy and reorganisation law (Bankruptcy and Restructuring Act of 28 February 2003) was introduced which, with minor amendments, remained in force until the end of 2015. The law provided for three basic procedures, i.e., liquidation and arrangement for insolvent companies, as well as resolution for entities at risk of insolvency. However, due to numerous limitations, the latter had been very rarely used in practice. In 2016, a new restructuring law (the Restructuring Act of 15 May 2015) was introduced. It identifies four main corporate recovery paths, i.e., sanation, accelerated arrangement proceedings, arrangement and arrangement approval procedures. They differ in particular in terms of the degree of involvement of the court in the restructuring procedures as well as in their complexity. The 2003 law is still in force in a modified form, and it mainly regulates the execution of liquidation bankruptcy proceedings. As it is presented in Table 1, from 2005 to 2019, the number of bankruptcies ranged from 348 to 793. Between 2005 and 2015, a relatively small number of bankruptcy proceedings, with the possibility to make an arrangement, were observed. It was only from 2016 onwards, as a result of the introduction of the new law, that the number of resolution proceedings began to increase.

Table 1. Bankruptcies and restructurings in Poland in 2005–2019.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bankruptcy (liquidation) proceedings (business activities)	793	576	377	348	572	538	616	711	703	701	650	530	537	558	574
Bankruptcy proceedings with the possibility to make an arrangement	n/a	n/a	70	63	119	117	107	166	180	122	91	26	0	0	0
Restructuring proceedings	-	-	-	-	-	-	-	-	-	-	-	204	348	417	445

Source: (Coface Report 2013, 2009, 2019).

Taking into account the legal form of business activity, the largest number of bankruptcy and restructuring proceedings is recorded for limited liability companies as it is presented on Table 2. Joint-stock companies have the third highest value. It should be remembered that only a small proportion of joint-stock companies are listed on the stock exchange. However, these are generally larger businesses and their bankruptcy generates tremendous losses both for their owners and other stakeholders.

Table 2. Bankruptcies and restructurings in Poland by legal forms—the year 2019.

Legal Form	Number of Bankruptcies and Restructurings
Limited liability company	486
Sole proprietorship	366
Join-stock company	**73**
Limited partnership	38
General partnership	30
Cooperative	14
Others	12
Sum	1019

Source: (Coface Report 2019).

3. Research Methodology

From among the current reports available on Polish Press Agency websites (PAP—Polish Press Agency n.d.), disclosed by public companies in the period from 6 December 2004 to 31 December 2019, those containing information on filing an application for liquidation bankruptcy or initiating restructuring proceedings were selected (this group includes companies which have initiated the following proceedings: sanation, accelerated arrangement proceedings, arrangement and arrangement approval procedures under the Restructuring Law introduced in Poland on 1 January 2016). Observations for which disruptive events occurred during the assumed period of analysis, before and after the core event, were excluded. Events for companies whose market price on the date of publication of the notification about the event was less than or equal to 0.10 PLN were also omitted (penny stocks were excluded because even a small change in their price could lead to significant changes in results). The analysis covered the companies listed in the main Polish stock market (WSE) and the market for smaller companies (NewConnect), characterised by much lower liquidity. All quotations for the surveyed companies and the benchmark were obtained from the Infostrefa website (Infostrefa n.d.). The calculations were performed based on daily closing prices, using logarithmic rates of return, calculated as follows:

$$R_{i,t} = \ln\left(\frac{CP_{i,t}}{CP_{i,t-1}}\right)$$

where:

$R_{i,t}$—the rate of return for company "i" on day "t",
$CP_{i,t}$—the closing price for company "i" on day "t",
$CP_{i,t-1}$—the closing price for company "i" on day "$t-1$".

The structure of the test sample is shown in Table 3.

Table 3. Test sample structure.

CONTENT	Liquidation Bankruptcy Proceedings	Restructuring Proceedings	Total
Listed on the WSE	23	46	69
Listed on NewConnect	10	25	35
Total	33	71	104

Source: Own calculations.

The event analysis was used as a research method to analyse rates of return. The calculations were carried out in the R software environment, using the "EventStudy" package by Schimmer et al. (2015). The model used for calculating AR (abnormal return) rates is a market-based one (the rates of return from the WIG index or the NewConnect index respectively were used as the regressor) and can be represented by the following formula:

$$R_{i,t} = \alpha_i + \beta_i \times R_{m,t} + \varepsilon_{i,t}$$

where:

$R_{m,t}$—the rate of return for the WIG or NewConnect index on day "t",
$\varepsilon_{i,t}$—the random component,
α_i, β_i—the estimated market-based model parameters.

Hence, the value of AR rate in the test window was ultimately determined as:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i \times R_{m,t})$$

Moreover, it was assumed that the length of the estimation window is 120 observations and that the latest of the observations taken into account is carried out seven days before the event. On the one hand, the period is long enough to enable determination

of the relationship between the company in question and the wider market in a reliable way, while on the other hand, the risk-free rate of return, i.e., the αi parameter, can be assumed to be constant over this period. For long (several-year) estimation windows, this assumption of a risk-free rate of return stability cannot be met and the market model is then replaced by another method, e.g., GARCH or EGARCH models. The estimation window of 120 observations made it possible to rule out any disruptive events. The test window was set as lasting from the second day before the event until the tenth day following it. In Figure 1, there is a graphical representation of the conducted research.

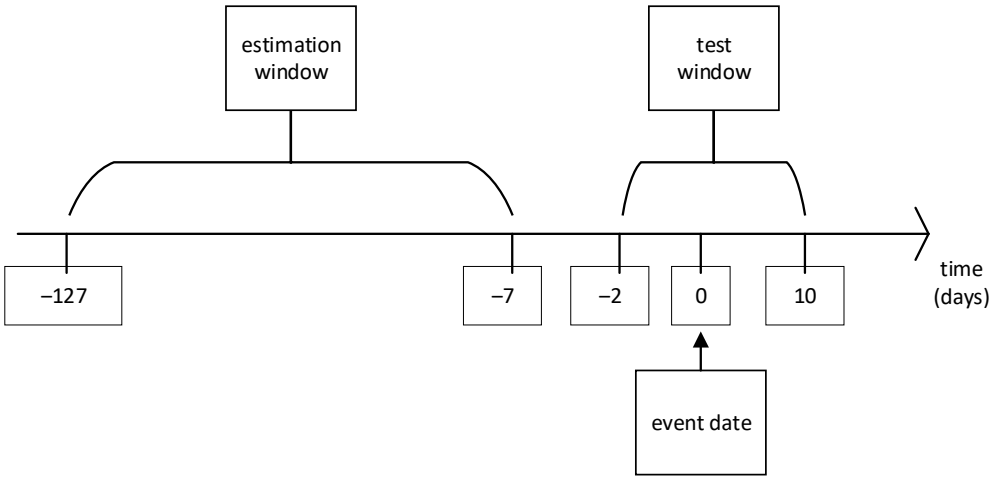

Figure 1. Graphical presentation of the conducted research. Source: Own calculations.

What is more, if the event was announced after the stock exchange was closed, the event date was established as the next working day. The changes in the working hours of the Warsaw Stock Exchange in the research period were also included. In the research period, the working hours of WSE were changed four times.

In the present study, in addition to the *AR* rate, the *AAR*, *CAR* and *CAAR* rates calculated according to the methodology presented in the study by Schimmer et al. (2015) were also used to test the impact of the publication of notification on filing an application for bankruptcy or restructuring. Formulas used to calculate the above rates are presented below:

$$AAR = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$$

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{i,t}$$

$$CAAR = \frac{1}{N}\sum_{i=1}^{N} CAR(t_1, t_2)$$

where:

AAR—average abnormal return,
N—number of analysed events in each group (for example 33 for liquidation bankruptcy proceedings),
CAR—cumulative abnormal return,
t_1—the beginning of the research window (in this study—always two days before the event),
t_2—the ending of the research window (in this study—always ten days after the event),
CAAR—cumulative average abnormal return.

Moreover, the analysis was conducted for three variants, taking into account: (1) all observations; as well as observations divided into (2) liquidation and restructuring

proceedings and (3) companies listed on the Warsaw Stock Exchange and companies listed on NewConnect.

The rates and research methods used in each variant, together with their literature sources, are presented in Table 4.

Table 4. The tools used depending on the test option.

Testing Option	Rates Used	Test Methods Used	Source for the Test
(1)	*AR*, *CAR*	1. *T*-test 2. Descriptive statistics	1. Gurgul (2019).
(2) & (3)	*AAR*, *CAAR*	1. Corrado rank test (Rank Z).[1] 2. Generalized rank *Z* Test (Gen. rank Z). 3. Generalized rank *T*-Test (Gen. rank T). **4. Patell or Standardized Residual Test (Patell Z).** **5. Kolari and Pynnönen adjusted Patell or Standardized Residual Test (Adj. Patell Z).**	1. Corrado and Zivney (1992). 2. and 3. Kolari and Pynnönen (2011). 4. Patell (1976). 5. Kolari and Pynnönen (2010).

[1] Parametric tests are in bold. The abbreviated names of the tests are given in brackets—they are used in the further part of the paper. Source: Own calculations.

In general, in event studies methodology, it can be said that the following pair of hypotheses is tested:

$$H_0 : \mu = 0$$

$$H_1 : \mu \neq 0$$

where μ is a symbol of the rate used. In the null hypothesis (H_0), it is assumed that an abnormal rate of return does not exist in the test window, and in the alternative hypothesis (H_1), the presence of statistically significant *AR*, *AAR*, *CAR* or *CAAR* during the test window is suggested.

4. Research Results

Table 5 shows the aggregated averaged results for all analysed cases. On the basis of the determined data, it can be concluded that on average, the highest decrease in the average rate of return was observed on the day of the event and the first day after the event. What is more, on those days, the variability of rates of return also increased significantly, which is evidenced by a significant increase in standard deviation (which is why the standard deviation from the estimation window was used in the conducted statistical tests). It can be noted that investors' reaction to an event is immediate, and the stock prices plummet on the same day due to the announcement of such information. What is also interesting is the fact that two days before the event, AR(-2) average value is almost equal to the average value one day after event AR(1). In the days following AR(5), the negative mean rate of return continues, and the mean rate of return greater than zero occurs at the end of the test window. However, on the last day of test window AR(10), the value is once again below zero. What is important is the fact that the absolute value of positive returns is definitely smaller than the absolute value of negative returns.

The last two columns show the number of companies whose rates of return were statistically significant and lower or higher than the rate of return calculated based on the estimated model. These are not all negative or positive rates of return, but only those for which statistical significance was confirmed by the *T*-test at a significance level of $\alpha = 0.05$.

The last line in Table 5 also presents descriptive statistics for CAR. The average drop in price for all tested events cumulated over the test window period is equal to 20.6%. The median value for that measure is almost 15% below zero, the dominant is multiple and the standard deviation is almost two-times higher than the mean value.

The values of the test statistics, for the tests carried out for AAR, are shown in Table 6, which takes into account separately the applications for restructuring proceedings (71

cases) and the applications for liquidation bankruptcy proceedings (33 cases). In addition, Figure 2 shows the average rates of return on the analysed days. In order to highlight statistically significant results (additionally marked "***" for $\alpha = 0.01$, "**" for $\alpha = 0.05$ and "*" for $\alpha = 0.1$).

Table 5. Selected statistics determined based on all observations (Option 1).

	Mean	Median	Mode	Standard Deviation	Kurtosis	Skewness	Lower [1]	Higher [2]
AR(−2)	−2.7%	−0.2%	0.5%	9.5%	8.0	−2.3	13	3
AR(−1)	−1.1%	0.3%	−0.1%	12.5%	16.7	−2.8	11	7
AR(0)	**−14.0%**	**−5.2%**	**2.1%**	**20.9%**	**5.1**	**−1.9**	**39**	**1**
AR(1)	**−3.0%**	**0.2%**	**0.5%**	**29.0%**	**23.5**	**2.2**	**20**	**11**
AR(2)	−0.6%	0.0%	−1.1%	11.5%	6.3	0.4	10	8
AR(3)	−0.1%	0.2%	0.4%	10.2%	3.6	0.3	6	8
AR(4)	−0.9%	0.1%	5.0%	11.0%	2.7	−0.4	9	11
AR(5)	−0.7%	0.2%	0.8%	10.9%	20.4	−2.9	9	8
AR(6)	1.0%	0.4%	0.0%	10.3%	27.3	3.9	5	7
AR(7)	0.2%	0.3%	0.6%	10.1%	3.3	0.1	5	13
AR(8)	0.4%	0.2%	1.4%	8.2%	3.7	0.8	6	8
AR(9)	2.1%	0.6%	0.4%	7.9%	6.6	2.0	3	9
AR(10)	−1.1%	0.2%	0.5%	10.7%	41.1	−5.1	3	6
CAR	−20.6%	−14.7%	Multi.	45.6%	5.0	0.1	27	5

[1] Higher—no. of events for which AR or CAR is a statistically significant result higher than the market result, level of significance $\alpha = 0.05$. [2] Lower—no. of events for which AR or CAR is a statistically significant result lower than the market result, level of significance $\alpha = 0.05$. Source: Own calculations.

Table 6. Values of test statistics for the performed test (Option 2).

	Test	AAR (−2)	AAR (−1)	AAR (0)	AAR (1)	AAR (2)	AAR (3)	AAR (4)	AAR (5)	AAR (6)	AAR (7)	AAR (8)	AAR (9)	AAR (10)
Restructuring	Patell Z	**−3.20 (***)**	**−2.13 (**)**	**−21.3 (***)**	1.32	0.06	−0.72	−1.24	−1.19	1.32	1.30	−0.58	2.03 (**)	**−1.89 (*)**
	Rank Z	−1.45	0.32	**−5.60 (***)**	−0.43	−0.10	−1.29	−0.79	0.50	0.33	0.08	−0.94	0.25	−0.42
	Adj. Patell Z	**−3.20 (***)**	**−2.13 (**)**	**−21.3 (***)**	1.32	0.05	−0.72	−1.24	−1.19	1.32	1.30	−0.58	2.03 (**)	**−1.88 (*)**
	Gen. Rank Z	**−2.16 (**)**	−0.29	**−6.20 (***)**	−1.48	−1.21	**−1.91 (*)**	−1.48	−0.51	−0.51	−0.91	**−1.88 (*)**	−0.43	−1.19
	Gen. Rank T	**−1.87 (*)**	−0.25	**−5.38 (***)**	−1.27	−1.04	−1.65	−1.28	−0.44	−0.44	−0.79	−1.63	−0.37	−1.03
Bankruptcy	Patell Z	**−4.92 (***)**	−0.25	**−13.5 (***)**	**−8.46 (***)**	−0.44	1.85 (**)	0.15	−0.97	0.92	0.09	2.89 (**)	5.29 (**)	−0.66
	Rank Z	−1.22	−0.39	**−3.81 (***)**	−0.50	**−1.69 (*)**	0.17	−0.11	−0.86	0.71	−0.12	1.23	1.76 (**)	−0.84
	Adj. Patell Z	**−4.92 (***)**	−0.25	**−13.5 (***)**	**−8.45 (***)**	−0.43	1.85 (**)	0.15	−0.97	0.92	0.09	2.89 (**)	5.28 (**)	−0.65
	Gen. Rank Z	**−2.00 (**)**	−0.51	**−4.18 (***)**	**−1.67 (*)**	**−1.67 (*)**	−0.16	−0.74	−1.09	0.87	−0.52	0.95	1.37	−1.34
	Gen. Rank T	**−1.79 (*)**	−0.45	**−3.73 (***)**	−1.49	−1.49	−0.14	−0.66	−0.97	0.77	−0.47	0.85	1.22	−1.19

The test results in which the obtained rates of return are lower than those estimated based on the determined models are marked in bold, whereas results higher than such estimates are underlined. (*), (**) and (***) denote statistical significance respectively on 10%, 5% and 1%. Source: Own calculations.

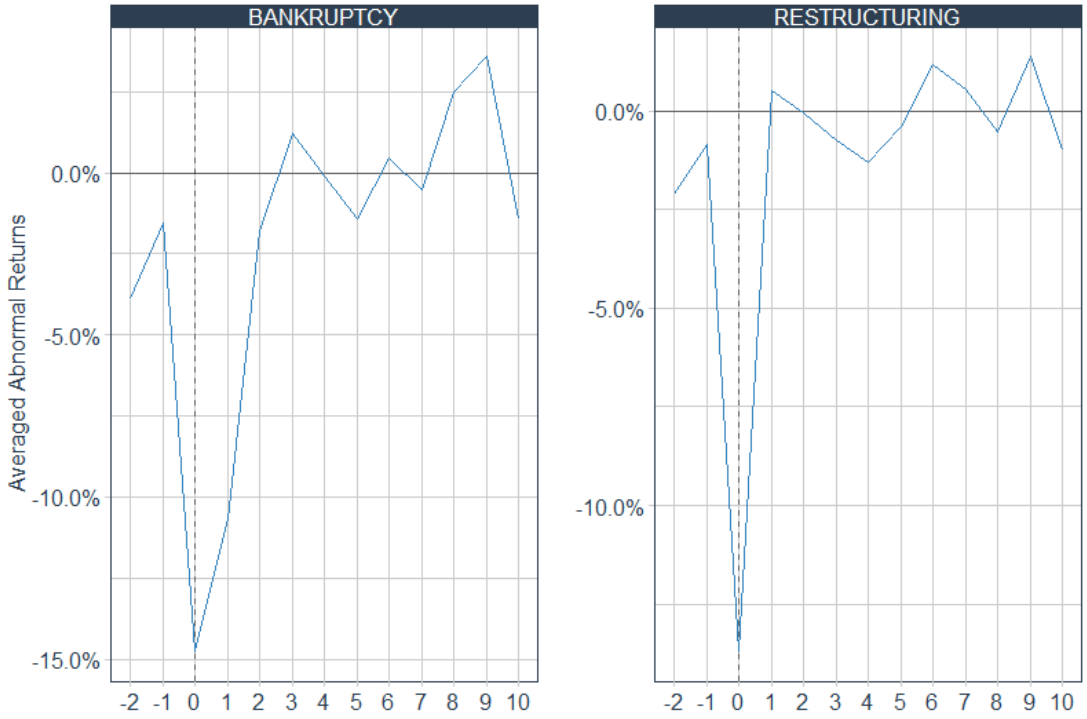

Figure 2. Average rates of return in the test window depending on the type of application submitted. Source: Own calculations.

All the tests used show statistically significant, at the highest tested α level, abnormal rate of return on the day of announcing the information. The division into restructuring or bankruptcy procedure is not an important factor that can produce various results at the event date. Four in five tests also yield statistically significant values at day (-2). That indicates that investors anticipate future bad news. However, on that day, the results are not as unambiguous as at the event date. For bankruptcy procedure, it can also be noted that a statistically significant negative rate of return occurred one day after the event (this is showed by three used tests). An explanation for that can be the fact that, for some companies, information about that procedure was announced at the end of the working hours of the WSE, and the reaction was postponed to the day after the event.

Table 7 presents the values of obtained test statistics, with the examined cases divided into those from the WSE market (MM—69 cases) and those from the NewConnect market (NC—35 cases).

The way of highlighting the test results is analogous to Table 6 and the average rates of return for this division are shown in Figure 3. However, there are a few differences that can also be noticed about these two analyses. First of all, for the NewConnect market, no such strong negative effect can be observed two days before the event. On the main market, abnormal negative rates of return were more clear. Second, for NewConnect, the statistically significant declines continue on the seventh and tenth day after the event date, whereas on the main market, a small positive reaction on those days can be observed. It can therefore be said that investors from the main market are more convinced that the announced information can produce a positive effect in the long term. The situation with the NC market can be also connected with the lower liquidity of that market, so the reaction from investors is seen as more nervous.

Table 7. The values of test statistics for the performed test (Option 3).

	Test	AAR (−2)	AAR (−1)	AAR (0)	AAR (1)	AAR (2)	AAR (3)	AAR (4)	AAR (5)	AAR (6)	AAR (7)	AAR (8)	AAR (9)	AAR (10)
MM	Patell Z	**−5.19 (***)**	**−2.52 (**)**	**−23.9 (***)**	−1.22	−0.06	0.60	−0.66	−0.38	0.23	2.89 (***)	1.85 (*)	4.50 (***)	0.09
	Rank Z	**−2.18 (**)**	−0.19	**−5.99 (***)**	−0.25	−0.84	−0.88	−0.56	−0.09	−0.10	0.47	0.06	0.96	−0.45
	Adj. Patell Z	**−5.18 (***)**	**−2.51 (**)**	**−23.8 (***)**	−1.22	−0.06	0.60	−0.66	−0.38	0.23	2.88 (***)	1.84 (*)	4.49 (***)	0.09
	Gen. Rank Z	**−2.71 (***)**	−0.42	**−6.55 (***)**	−0.9	−1.42	−1.42	−1.16	−0.73	−0.58	0.13	−0.18	0.72	−0.9
	Gen. Rank T	**−2.36 (**)**	−0.37	**−5.72 (***)**	−0.78	−1.24	−1.24	−1.01	−0.64	−0.51	0.12	−0.16	0.63	−0.79
NC	Patell Z	**−2.04 (**)**	0.26	**−10.0 (***)**	**−4.62 (***)**	−0.27	−0.08	−0.68	**−2.10 (**)**	2.44 (**)	**−2.12 (**)**	−0.61	1.7 (*)	**−3.45 (***)**
	Rank Z	0.01	0.47	**−3.36 (***)**	−0.88	−0.56	−0.52	−0.50	0.08	1.55	−0.84	−0.39	0.67	−0.88
	Adj. Patell Z	**−2.05 (**)**	0.26	**−10.0 (***)**	**−4.62 (***)**	−0.27	−0.08	−0.68	**−2.11 (**)**	2.44 (**)	**−2.12 (**)**	−0.61	1.70 (*)	**−3.45 (***)**
	Gen. Rank Z	−1.02	−0.10	**−3.64 (***)**	**−2.29 (**)**	−1.40	−0.92	−1.24	−0.86	−0.20	**−2.01 (**)**	−0.28	0.67	**−1.98 (**)**
	Gen. Rank T	−1.01	−0.11	**−3.60 (***)**	**−2.26 (**)**	−1.38	−0.91	−1.23	−0.85	−0.2	**−1.98 (*)**	−0.27	0.66	**−1.96 (*)**

The test results in which the obtained rates of return are lower than those estimated based on the determined models are marked in bold, whereas results higher than such estimates are underlined. (*), (**) and (***) denote statistical significance respectively on 10%, 5% and 1%. Source: Own calculations.

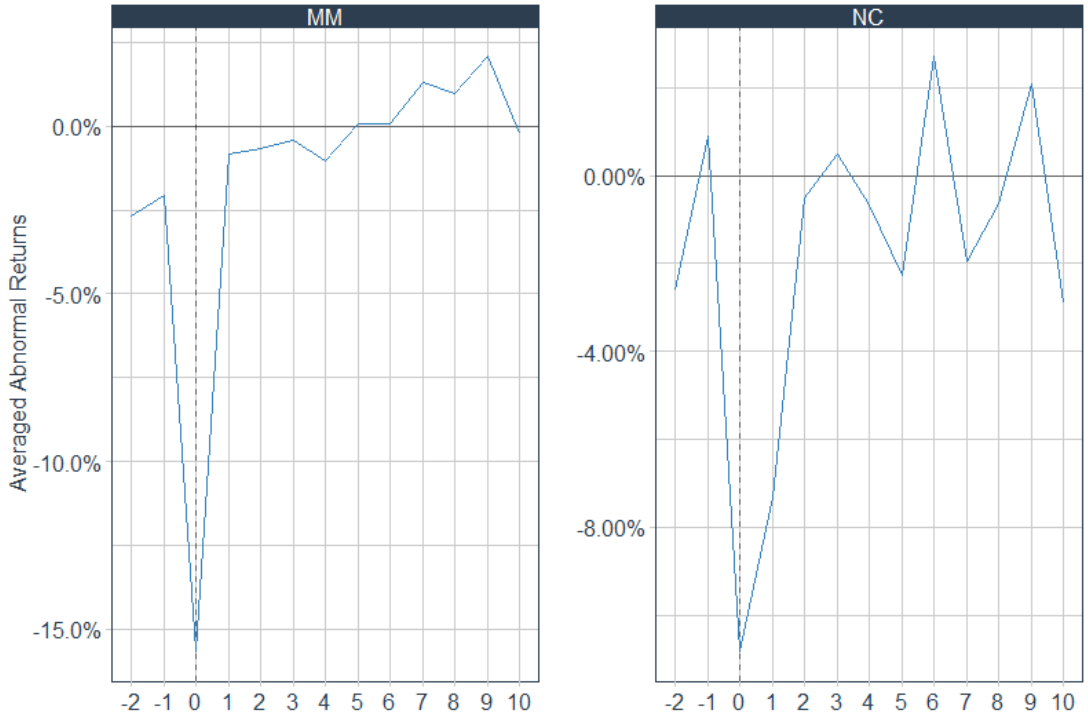

Figure 3. Average rates of return in the test window depending on the analysed market. Source: Own calculations.

Table 8 presents CAAR values for each analysed group of companies and statistical test values.

Based on data presented in Table 8, it can be said that on the Polish stock market, restructuring or bankruptcy procedure on average causes an abnormal negative cumulative rate of return. This decline reaches a level of almost 20% in each group in the tested window but it is much higher for bankruptcy procedures. The used tests show (with only two

exceptions for bankruptcy and NewConnect market) that this regularity is very strong at $\alpha = 0.01$.

Table 8. The values of test statistics for the performed test (Option 2 & 3).

Grouping Variable	CAAR Value	Number of CARs Considered	Patell Z	Rank Z	Adj. Patell Z	Gen. Rank Z	Gen. Rank T
RESTRUCTURING	−17.0%	71	−7.278 (***)	−2.65 (***)	−6.513 (***)	−4.049 (***)	−4.669 (***)
BANKRUPTCY	−28.5%	33	−5.006 (***)	−1.569	−4.551 (***)	−2.435 (**)	−2.726 (***)
MM	−19.1%	69	−6.579 (***)	−2.783 (***)	−6.179 (***)	−3.883 (***)	−4.443 (***)
NC	−23.6%	35	−5.989 (***)	−1.425	−5.86 (***)	−2.853 (***)	−2.889 (***)

(*), (**) and (***) denote statistical significance respectively on 10%, 5% and 1%. Source: Own calculations.

5. Conclusions

All the conducted tests confirm the statistical significance of the occurrence of above-average negative rates of return on the date of the event of applying for bankruptcy or restructuring. The type of application—filing for bankruptcy or restructuring—does not matter in this respect, although, in the latter case, the scale of price falls is smaller. This signifies a strong and quick reaction of investors to such information. This strong and quick reaction is the basis for stating that our findings support the presence of a semi-strong form of market efficiency in the capital market in Poland. So all the findings connected with that theory can be applied to Poland. This is a conclusion for our first research question.

A quite similar situation (strong and quick reaction) occurs on the day after the event but only for bankruptcy and the NewConnect market. Here not all of the used tests showed statistically significant values. It can be noticed that for those groups, price drops continue on the following day. This is a very practical conclusion for investors because the prices of stocks for those kinds of proceedings are falling for more than one day. Investors can search for an extra rate of return by applying the short selling strategy.

An analogous situation occurs if we take into account the division of the surveyed companies into those listed on the WSE and the NC market. On the WSE market, however, above-average falls are greater than those in the NC market on the event date, and one day after the event, the situation is reversed. Strong negative returns are also recorded on the seventh or tenth day after the event but only for companies quoted on the NewConnect market. Moreover, it was observed that companies from the NC market are characterised by higher volatility of return rates in the test window before and after the event than those listed in the main market of the WSE. The authors of the study relate this situation to the lower liquidity of this market and the greater impact of individual transactions on share prices. What is important, statistically significant above-average positive rates of return, if observed, appear not earlier than six days after the event. This does not apply, however, to companies that filed for bankruptcy. Moreover, in the case of positive rates, not all tests produce the same results, so there is no statistically significant regularity here. The fact is that above-average positive interest rates were observed in the last days of the test, but their scale is low. Therefore, answering the second research question formulated in the introduction, it can be stated that the occurrence of the reversal effect in the Polish stock market was not confirmed.

Based on our results, it can be finally said that we have observed differences between abnormal return rates for companies that have entered bankruptcy and restructuring proceedings. For less negative restructuring proceedings, the price fall is lower than in the case of bankruptcy proceedings (research question number three). For investors and

companies, it is better when restructuring proceedings are adopted rather than bankruptcy proceedings. We also prove the existence of differences in share price reaction between companies listed on more (weaker effect) and less (stronger effect) liquid markets. This is our main finding for research question number four.

Besides, our paper provides much empirical and theoretical information about prices for companies during the analysed proceedings, and further research can be conducted for a better understanding of such events. For example, it can be observed that two days before announcing the analysed information, an abnormal negative rate of return also occurs. It is very tempting to associate such a result with insider trading but we do not find any proof of it and this should be a subject of further research. The second aspect which should be investigated in further research is related to the time when information occurs—during the session or outside the session. For such research, more accurate data are needed; for example, minutes or even shorter intervals. As part of the continuation of the study, the authors intend to verify the intraday effects of providing information on the announcement of bankruptcy or the introduction of legal restructuring proceedings. Moreover, in the case of restructuring proceedings, it is worth examining the long-term effect of changes in share prices. In this case, the psychological effect will play a less important role and the effectiveness of the sanation processes will be much more significant. The use of corporate bankruptcy prediction models (More information on corporate bankruptcy prediction models with a focus on Poland and other Visegrad countries can be found, among others, in: Prusak (2018, 2019); Kliestik et al. (2018); Vochozka et al. (2020).) to develop investment strategies based on short selling stocks of companies characterised by a high risk of insolvency is also worth consideration.

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