THE APPLICATION OF THE EVENT STUDY TO THE ANALYSIS OF THE PUBLIC INFORMATION IMPACT ON THE CORPORATE BOND PRICES

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Abstract
This paper reflects on the characteristics of the event study analysis as a method for investigating the impact of the public information on the corporate bonds prices. There are certain aspects of the event study methodology presented and the application of the method to research on the corporate debt market is shown. The empirical part of the paper analyses the reaction of the financial instruments traded on the Catalyst market on the several events that concern the financial condition of the issuer.
Keywords: *corporate bonds, informational efficiency, event study, Catalyst market.*

1. Introduction

Every day a lot of information is supplied to the financial markets worldwide. The information concerns financial condition of the issuers, their macroeconomic environments and geopolitical events. The information is provided to market participants by different channels and can have smaller or bigger impact on the prices of the financial instruments that are traded on both regulated and OTC market. Hence, in the recent years, researchers have paid notable attention to the strength and direction of the impact of the public information on the financial instruments prices, important from issuers and investors' perspective.

Scientific research on the Polish capital market that aimed to quantify the impact of various information and events on the market prices was focused mainly on the equity market. Among the literature concerning this subject there can be found: Jajuga (2000), Czekaj (2001), Frąckowiak (2001), Gruszczyński (2002), Gurgul and Majdosz (2005) and Gurgul (2006). Much poorer is domestic literature focused on the corporate bond market and its

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reaction to the public information. That fact is not surprising taking into account that no sooner than in the 2009 Warsaw Stock Exchange established the Catalyst market – the trading platform dedicated for debt financial instruments. Before the Catalyst was set up, the regulated market had been dominated by the government bonds, while corporate bonds had accounted for a small percentage of the total amount of the bonds traded on the Warsaw Stock Exchange.

One of the most popular scientific methods used for identifying the impact of the information on the market prices is the event study analysis. The aim of this article is to present the application of the event study for investigating the reaction of corporate bonds prices on the public information appearing on the market and to verify the impact of the certain events on the prices of financial instruments traded on the Catalyst market.

The first part of this article starts with the efficient market theory and presents the methodology of the event study analysis. The second part, based on the review of the foreign literature, indicates the areas of event study applications to the research on corporate debt market. The last part focuses on the empirical verification of the impact of certain events on the prices of corporate bonds traded on the Polish debt market.

2. Informational efficiency of the financial markets

While discussing the significance of the information on the capital markets and its influence on the prices of financial instruments it is worth to start with the rational expectation hypothesis. That concept was presented for the first time in 1961 in the article „Rational expectations and the theory of price movements" (Muth, 1961). J. F. Muth, having investigated the possibilities of market prices forecasting, concluded that market participants formulate their expectations based on all available information. Then, they make investment decisions that are reflected in the changes in prices of financial instrument. That dependency results in the fact that all significant (from the forecasting's perspective) information appearing on the market is immediately incorporated into the prices.

The assumption that expectations are formulated in the rational way found its application in one of the hypotheses that tries to explain the process of market prices' behaviour – the efficient market hypothesis (Ziarko-Siwek, 2005). In the literature the notion of the financial market efficiency is not unambiguous. There can be found at least three different meanings. These are (Czekaj, 2001):

- funding efficiency
- transactional efficiency

- informational efficiency.

Funding efficiency occurs when the market ensures inflow of the capital to those companies that are able to invest it in the most profitable way. It means that only the best investment projects are run in the market's economy scale. The market is transactionally efficient when its mechanism allows to buy and sell instruments immediately and without any constraints. Moreover, the competition of the financial intermediaries leads to the low transactional costs. However, from this article subject's perspective, the key concept of the market efficiency is the third one – the informational efficiency.

It is considered that the research on the information efficiency began with the publication of the article of E. F. Fama in 1970 „Efficient Capital Market: A Review of Theory and Empirical Work" (Fama, 1970). E. F. Fama defined a market as efficient if and only if prices of financial instruments always fully reflect all available information. Apart from that, according to E. F. Fama, prices of financial instruments are affected not only by the historical information but also by the events that are expected to happen in the future based on the current market status.

Since „Efficient Capital Market…" was published, a lot of articles concerning informational efficiency of the financial markets have been published worldwide. There can be also found in the literature many definitions of the informationally efficient market. Most of these refer to the definition proposed by E. F. Fama. What is worth mentioning and concluding of all other definitions that can be found in the foreign and domestic literature is the one given by J. Czekaj: „ *(…) the market is informationally efficient if it ensures quick transfer of the information to all of market participants so the information is fully and immediately reflected in the prices of financial instruments. Hence, market prices always fully reflect the real value of the instruments*" (Czekaj, 2001).

With respect to the definitions given above, the empirical verification of the efficient market hypothesis should imply the need of answering three following questions:

1) How quickly is new information provided to the market participants ?
2) Do prices of the financial instruments incorporate all information that appear on the market ?
3) How quick is the reaction of the market prices to the new information ?

It must be emphasized that the concept of the information is wide and not unambiguous. Changes in market prices, official company's announcement, press release or news provided by the information agencies – these all can convey a content important from issuers or investor's perspective. Moreover, significant information might concern not only the company itself but also its macroeconomic environment.

E. F. Fama (1970) classified informational efficiency subjected to the type of the information that is reflected in market prices. He pointed out:

- weak efficiency
- semi – strong efficiency
- strong efficiency.

The market is weakly efficient if prices incorporate information that concerns historical trades. Semi – strong effectiveness means that apart from the historical information prices of the instruments reflect all public information available on the market (e.g. information that concerns financial condition of a company). Finally, the strong efficiency assumes that prices reflect not only public information but also the confidential one.

Each of these three hypotheses owns specific tools of its verification. Presentation of all of these methods exceeds the scope of this article, however, taking into account the aim of this paper, tools for semi – strong hypothesis verification are crucial. These allow to investigate whether and how quick the market prices react to the public information coming to the market from the companies directly and from their further surrounding. Moreover, these methods allow the researchers to quantify the strength and the direction of the information impact.

The literature presents several methods of testing the semi – strong effectiveness. Among these, the event study methodology can be found. An event study can be used to check the significance of the reaction of market prices to the certain events. The only requirement is to specify exact dates of the events (dates of the public announcements) and to gather long enough time series of the financial instruments prices.

Each research that uses event study methodology consists of four basic steps (Gurgul, 2006):

1) identification of the event and the research sample
2) specification of the time frameworks
3) setting the relation between the returns from the financial instrument and the market portfolio
4) estimation of the event effect based on the research sample.

The first step aims to identify a significant, from market participants' perspective, information that concerns certain actions that have already been undertaken or planned by the company. No less important is identification of a date when the information was announced to the public. What needs to be emphasized, these actions can concern the company directly or other market participants (e.g. competitors or the government). According to the event study methodology, not all information can be the subject of the research. Fulfilment of the specific conditions is crucial. These are given by D. Tabak and F.Dunbar (1999):

1) the information must be unambiguous and precise
2) it is possible to specify the exact moment when the information was announced to the public audience
3) market participants cannot anticipate the information before it has been announced
4) at the moment of its announcement the information cannot be disturbed by any other news that can impact significantly the prices of financial instruments.

The crucial step in the event study analysis is specification of its time frameworks. There are two notions that concern this step: an event window and an estimation window. An event window is defined as a time period in which the response of the market prices to the information announcements is tested. In line with the efficient market hypothesis prices of financial instruments should react to the news immediately and without a delay. That would suggest choosing rather short event windows. In the practice, however, taking into account market deficiencies and possible delays in the prices reactions, lengths of event windows are very different. These are set from a few minutes (on the most liquid markets) up to the few months after the information has been announced.

It is often emphasized by the researchers that the choice of the event window's length is significant. Too long time periods involve a risk that results of the analysis are influenced by the disturbing events. On the other hand, too short an event window might not fully cover reactions of the prices. H. Gurgul (2006) gives a guideline on how the event window should be set: *„(…) it should be long enough to allow the effect of the event to be reflected entirely in the market prices*".

Not less important than an event window is an estimation window. This is a time period based on that the parameters to the respective models are estimated. These models are used further to generate the expected returns of the financial instruments in the event window. An estimation window is usually followed by the event window and its length is between a few weeks and a few months. What is important, the estimation window must not intersect with the period in which an impact of the event on the market prices is expected.

The third step of the event study analysis is setting the relation between the returns from the financial instrument and the market portfolio. By using parameters obtained from the analysis of the estimation window it is possible to specify the expected returns that would be observed in the event window if the event had not occurred. In order to specify the impact of the given event, the difference between real and theoretical returns in the event window is tested. Verification of the statistical significance of this difference is the fourth and the last step of the event study analysis.

3. Application of the event study analysis to the research on the corporate bond markets

The foreign literature that concerns the event study analysis and its application to the research on the corporate bond markets is very rich (specific literature references are provided in the further parts of this paper). There can be found articles that present results of the research done for well developed and liquid markets and for the emerging markets. Moreover, the catalogue of the events and information that lie in the scope of the researchers' interest is very broad. H. Gurgul (2006), having emphasized the wide application of the event study analysis, notices that one of the reasons for the popularity of this method is the fact that it requires only long enough time series of the prices and these are available for the researchers without any constraints. H. Gurgul also mentions that application of the event study does not require access to the periodical financial reports published by the company. That decreases the costs of the research. Moreover, results are independent of the other external factors e.g. accounting systems used by the issuers.

We can identify two types of the events which impact on the market prices was investigated by the foreign researchers:

- events that concern the internal situation of the issuer
- macroeconomic events that concern the entire market.

With respect to the first type of events, there can be found a lot of papers investigating the impact of the earnings announcements on the corporate bonds market prices. Most of the research that were reviewed by the author confirm the statistical significance of the changes in the corporate bond prices as a response to the announcement of the company's profit gained within particular period. T. Roxen and X. Zhou (2009) indicate that corporate bonds prices fully anticipate the information about the issuer's earnings within half an hour after it has been announced. M. L. DeFond and J. Zhang (2011), having investigated the differences between the impact of the information about earnings below and above the forecast, concluded that within one day after the announcement date there can be observed a significant prices reaction to the profits lower that were expected.

Among events in the scope of the researchers' interest there are also new debt issues. However, in this case the results are not unambiguous in terms of direction of the information impact. R. Kolodny and D. R. Suhler (1988) indicate the significant and positive reaction of the corporate bond prices while A. Akhigbe, J. C. Easterwood and R. Pettit (1997) confirm the statistical significance of decreases in the instruments prices – both results obtained for one day perspective after the announcement date.

There is also lack of the clear conclusion on the impact of the new equity offerings. A. Kalay and A. Shimrat (1987) investigated the reaction of bond prices within time period starting two days before and ending one day after the announcement date and they observed the significant decrease in the corporate bonds prices. Similar results were presented by W. B. Elliot, A. K. Prevost and R. P. Rao (2002), who investigated the reaction of the short term bonds. For the long term instruments the reaction was significantly positive however.

A significant number of papers concern the impact of the dividend payout announcements and share repurchases. Research results on both events are not unambiguous. Usually, researchers tend to analyse separately the impact of the increase and decrease of the dividend rate. J. R. Woolridge (1983) and G. Handjinicolau and A. Kalay (1984) indicate the significant decrease in the corporate bond prices just a few days after the information about the decrease in the dividend ratio has been announced. The opposite reaction was observed by U. Dhilloh and H. Johnson (1994) – they both proved the statistical significance of the increase in the bond market prices after announcement of positive change in the dividend rate.

The results of the research on the share repurchases are more consistent. There can be mentioned papers by L. Y. Danna (1981) and W. F. Macwell and C. P. Stephens (2003). They observed the significant decrease in the bonds prices on the same day when the repurchase program was announced.

Mergers and acquisitions are another events that were investigated by researchers in terms of the impact on the bond prices. Similarly to the previous examples, there is a lack of the common conclusion on how corporate bond prices react to these announcements. C. E. Eger (1983) notices that there exist positive abnormal returns from the acquirer's bonds within one month after the announcement. On the other hand, M. T. Billet, T. H. D. King and D. C. Mauer (2004) show statistically significant decreases in the bond returns that can be observed even before the acquisitions has been announced to the public. The lack of the significant impact was proved by P. Asquith and E. Kim (1982) and M. Walker (1994). They analysed the reaction of the acquirer's bond prices one month before and after the announcement respectively.

Apart from the events that refer to the internal situation of the issuer there are many articles that concern the impact of the macroeconomic factors on the bond market prices. Worth mentioning is the paper by C. Ying (2006) who investigated the reaction of the corporate bond prices to the announcements of changes in twenty one different macroeconomic metrics. C. Ying analysed the reactions of the corporate bond prices within 50 minutes after the announcements and he concluded with the significant reaction of the thirteen metrics, e.g. consumer price index, change in nonfarm payrolls and trade balance.

Examples that have been given so far do not obviously cover the whole catalogue of the events that can be investigated in terms of their impact on the market prices. Also, it needs to be emphasized that all results that were mentioned with respect to the research done on US market can also be a subject of the research on the Polish corporate bond market. The key point here is, however, the access to the databases of the information announcements and the ability to precise specification of the announcement date.

According to the Polish law, the issuers of the financial instruments traded on the organized market are obliged to publish all information that concerns financial condition of the company and events that can influence the investment risk. The complete catalogue of the current and periodical reports is included in the Regulation of the Minister of Finance of 19th February 2009 establishing the responsibilities of the issuers in terms of the current and periodical reports and conditions under which reports published in line with the law of non – EU members are acknowledged as equivalent. Additionally, information that is given to the investors must be authentic, reliable and completed. Moreover, current and periodical reports must be prepared in the way that allows to asses the impact of the information on the economic and financial condition of the issuer.

For the companies whose bonds are traded on the organized market the scope, form, place and the frequency of the public announcements are specified by the regulations of this organized market. Issuers of the instruments traded on the Catalyst market are obliged to publish information in form of the current and periodical reports. According to the Catalyst Market Rules "*The issuer is obliged to publish current reports in case of any circumstances or events that can have a significant impact on its financial or economic condition, mainly on the ability to meet obligations that result from the debt financial instruments that were authorized by the Catalyst"*. Additionally, "*the current report must be published immediately, no later than 24 hours after the circumstances occurred or the issuer found out about it"*. With respect to the periodical reports, Catalyst Market Rules state that *"the issuer is obliged to publish periodical reports annually"*.

In practice, the issuers of the corporate bonds traded on Catalyst market fulfil their informational obligations using Stock Exchange Announcement System: ESPI and EBI (for regulated and alternative markets respectively).

4. The examples of event study application to the research on the corporate bonds prices reaction on Catalyst market

To verify the possible areas of event study application to research on Polish debt market, the impact of certain events that concern financial condition of

companies on the bonds market prices was measured. Events and research sample were identified using announcements published by the issuers in the EBI system. The following events were identified: violation of the public announcement obligations by the issuer, violation of the financial metrics maintenance agreed in the issuance letter, delays in the coupon payments or bond repurchase, bank accounts execution and voluntary submission to the execution process. The events are various but all of them can imply the deterioration of the company's financial conditions or problems with paying off a debt. Moreover, they have negative reputational impact. Similar research (based on the global sample) was done by B. Imbierowicz and M. Wahrenburg (2013). Instead of analyzing particular announcements separately, they classified all information into several groups and verified the total effect of the each group on the bonds prices[1].

The research sample consisted of the announcements published between 1 January 2001 and 30 April 2014. The sampling process started with the identification of all of the announcements informing about negative events listed in the previous paragraph (violation of the public announcement obligations by the issuer, delays in the coupon payments or bond repurchase etc.). There were 62 announcements identified that were published by 28 companies. Because of the fact that several companies had issued more than one bond series traded on the market, the final sample consisted of 71 events. There were few events that had to be excluded from the sample. Among these there were announcements that were exposed to the influence of other disturbing events (it means that several significant reports were published by the issuer on the same or relatively close days.). Moreover, some announcements related to the illiquid instruments were excluded. The reason was that due to the lack of the liquidity the result of statistical tests would be unreliable. In the end, events concerning convertible bonds were excluded. Because of some additional rights incorporated into these instruments, convertible bonds could potentially disturb the research results.

The final sample consisted of 46 events and was identified based on the 28 announcements published by the 18 companies. (majority of these companies had issued more than one bond series). All events included in the final sample are presented in Table 1.

1 Announcements were grouped based on the events' classification that is used for the rating grading provided by the Moody's agency.

Table 1. Companies and events included into the final research sample

Companies	Events	Announcement Day
Admiral Boats S.A.	Violation of the public announcement obligations by the issuer	22/06/2012 (18:27) 18/10/2012 (20:11) 22/04/2014 (20:49)
Budostal – 5 S.A.	Delays in the bond repurchase	30/12/2011 (20:02)
Digate S.A.	Violation of the public announcement obligations by the issuer	04/04/2013 (13:25)
e – Kancelaria Grupa Prawno – Finansowa S.A.	Violation of the public announcement obligations by the issuer	02/08/2012 (15:38) 08/08/2012 (20:57)
East Pictures S.A.	Violation of the public announcement obligations by the issuer	25/06/2012 (23:05)
East Pictures S.A.	Delays in the coupon payments	02/07/2013 (17:41) 30/09/2013 (10:39)
Instalexport S.A.	Delays in the coupon payments	22/04/2014 (14:34)
Jedynka S.A.	Delays in the coupon payments	05/04/2013 (15:50)
Marka S.A.	Violation of the financial metrics maintenance agreed in the issuance letter	12/06/2013 (10:32) 14/08/2013 (8:38) 14/11/2013 (9:03)
Milmex Systemy Komputerowe Sp. z .o.o.	Delays in the coupon payments	31/05/2013 (13:11)
Milmex Systemy Komputerowe Sp. z .o.o.	Delays in the bond repurchase	30/08/2013 (9:49)
Orzeł S.A.	Delays in the coupon payments	20/11/2013 (23:27)
Orzeł S.A.	Bank accounts execution	08/04/2014 (21:43)
Przedsiębiorstwo Produkcyjno – Usługowo – Handlowe VIG Sp. z o.o.	Delays in the coupon payments	31/01/2014 (09:13)
Religa Development S.A.	Violation of the public announcement obligations by the issuer	08/06/2012 (13:30)
Rodan Systems S.A.	Violation of the public announcement obligations by the issuer	01/02/2013 (15:49)
TimberOne S.A.	Delays in the coupon payments	09/01/2013 (15:30)
Trust S.A.	Delays in the coupon payments	05/12/2012 (13:12) 03/06/2013 (16:20)
Uboat Line S.A.	Violation of the public announcement obligations by the issuer	10/07/2013 (10:47)
Voxel S.A.	Voluntary submission to the execution process	24/09/2012 (15:12)
Widok Energia S.A.	Violation of the public announcement obligations by the issuer	18/06/2012 (22:21)

Source: Based on the EBI Stock Exchange Announcement System. Retrieved from: www.gpwcatalyst.pl.

In the next stage of the analysis there was a time framework specified. The event window covered 26 days, in the symbolical notation [-5,+20]. That means that the prices were observed starting from the five days before the information had been published up to the twenty days after the announcement. There were two reasons for such a length of the event window. Firstly, because of the specificity of the considered announcements, it could be expected that some investors might have anticipated information before it was published.

Secondly, due to the lack of the detailed research on the informational efficiency of Polish corporate bond market and hence the lack of the references in the research results, there was a risk that short event window would have resulted in the omission of the statistically significant prices reactions.

The estimation window was set for 40 days ([-45, -6]). Such a time horizon was in line with typical lengths used in the literature. As an event day we specified the day when the information was announced to the public. It was also assumed that in case the report was published after 5 p.m., the event actually happened on the next business day.

Daily bond returns, according to the methodology presented in the reference literature (Bessembinder et al., 2008), were calculated as follows:

$$BR_{i,t} = \frac{(P_{i,t} - P_{i,t-1}) + (AI_{i,t} - AI_{i,t-1)}}{P_{i,t-1} + AI_{i,t-1}}, \quad (1)$$

where $P_{i,t}$ means a clear price of the i-th bond on the day t and $AI_{i,t}$ represents the coupon interest accrued on the day t.

To calculate the abnormal bond returns the formula proposed by G. Handjinicolaou and A. Kalay (1984)[2] was used. The basic assumption here is that there exists a constant premium that can be gained by the investment in the corporate bonds above the return from the government bonds with the same time to maturity. The premium calculated for the i – th bond on day t can be calculated by the formula below:

$$PBR_{i,t} = BR_{i,t} - TR_{i,t}, \quad (2)$$

Where $TR_{i,t}$ means the return from the government bond with the maturity date the same as the i – th corporate bond.

It must be emphasized that to apply the formula (2), it was required to identify, for each corporate bond included in the research sample, a respective government bond with the same (in practise similar) time to maturity. This step was feasible thanks to the sufficient liquidity of the government debt instruments traded on the Catalyst and a variety of these instruments with respect to the maturity dates. Eventually, there were used daily returns of zero coupon bonds calculated based on the data gathered from the archive available on the Catalyst market website.

2 The original name of the model is „*Mean – Adjusted Model*".

The next step of the analysis was a calculation of the average premium in the estimation window for each bond using formula (3)

$$\mathrm{EBR_i} = \left(\sum_{t=t_0}^{t_0+T-1} PBR_t \right) \frac{1}{T}, \qquad (3)$$

where t_0 means the oldest observation in the estimation window and T is the length of the estimation window.

Abnormal bond returns ($ABR_{i,t}$) in the event windows were calculated with the formula (4).

$$\mathrm{ABR_{i,t}} = \mathrm{PBR_{i,t}} - \mathrm{EBR_i} \qquad (4)$$

To check the impact of the events in scope on the corporate bond prices, there were two statistical tests used: t-student test and non-parametric sign test.

To verify the announcements effects by the t-student test there was an estimator used proposed by the H. Gurgul (2006). Using formula (5) there were abnormal bond returns calculated for each day t in the event day.

$$\overline{ABR_t} = \frac{\sum_{i=1}^{N} ABR_{i,t}}{N}, \qquad (5)$$

where N means the number of events included in the final sample (N=46). To calculate the standard deviation of the abnormal bond returns, formula (6) was used.

$$\widehat{\sigma_{\overline{ABR_t}}} = \sqrt{\frac{1}{T-1} \sum_{t=t_0}^{t_0+T-1} \left(\overline{ABR_t} - \overline{\overline{ABR}} \right)^2}, \qquad (6)$$

where $\overline{\overline{ABR_t}}$ was calculated in line with the formula (7).

$$\overline{\overline{\mathrm{ABR_t}}} = \frac{1}{T}\sum_{t=t_0}^{t_0+T-1}\overline{ABR_t} \qquad (7)$$

The test statistics, described by the ratio of (5) and (6), is a variable of a Student's t - distribution with the N-1 degrees of freedom. What is verified by the test (in a sense of falsification), is a null hypothesis claiming that the average abnormal bond return on the day t in the event window differs insignificantly from zero (H_0: $\overline{\mathrm{ABR}}_t = 0$)

To verify the results obtained from the t- test there was a non-parametric sign test applied. The null hypothesis that was tested was H_0:p≥0,5, where *p* means the probability of the negative abnormal bond returns occurrence. The alternative hypothesis was H_0:p<0,5 (Campbell, Lo, MacKinlay, 1997). The test statistics for the day t in the event window is expressed by the formula (8):

$$\theta_t = \left[\frac{N^+}{N} - 0.5\right]\frac{\sqrt{N}}{0.5}, \qquad (8)$$

where N^+ is the number of the observations for which the abnormal bond returns on day t were positive. Estimator (8) is standard normally distributed.

Both tests results are presented in Table 2. It shows statistics for the particular days within the event window and respective p-values for each day (the lowest significance levels for which the null hypothesis stating no meaningful price reaction can be rejected).

It can be spotted that for the days prior the announcement day the p-values are very high. Hence, for any reasonable significance level[3] the null hypothesis cannot be rejected. This conclusion is common for both tests used in the research. Any value of the estimator calculated for the period [t_0– 5, t_0– 1] is statistically insignificant. However, depends on the type of the test, the results are different for the period following the announcement day.

Sign test, for the significance levels higher than 0,071, indicates the meaningful decrease in the corporate bond prices on the announcement day. These results are not confirmed by the t-test. The t- test statistics and respective p-value calculated for t_0 would allow to reject the null hypothesis only for the high significance level α = 0.827.

3 The most frequently used in significance levels are α = 0.05 or α = 0.1 (Campbell, Lo, MacKinlay, 1997)

The results of parametric and non-parametric tests are more consistent for the period that follows the announcement day. T-test, for the significance level $\alpha = 0.134$, indicates the meaningful reaction of the prices on the sixth day after the information has been published. On the other hand, the sign test, for $\alpha = 0.119$, confirms existence of the statistically meaningful decreases in the bond prices on the fourth day. However, statistical powers of the test, defined as 1-α, are not big.

Table 2. Statistical tests results in the event window

Date	Estimator t	p-value	Estimator	p -value
$t_0 - 5$	-0.168	0.867	0.295	0.615
$t_0 - 4$	-0.014	0.989	0	0.5
$t_0 - 3$	-0.140	0.889	0.589	0.722
$t_0 - 2$	-0.201	0.841	-1.179	0.119
$t_0 - 1$	-0.172	0.864	-0.294	0.385
t_0	-0.220	0.827	**-1.474***	**0.071**
$t_0 + 1$	-0.176	0.861	1.474	0.929
$t_0 + 2$	-0.186	0.853	-0.589	0.278
$t_0 + 3$	-0.143	0.887	0.589	0.722
$t_0 + 4$	-0.348	0.729	**-1.179***	**0.119**
$t_0 + 5$	-0.873	0.387	0.589	0.722
$t_0 + 6$	**-1.527***	**0.134**	0	0.5
$t_0 + 7$	-0.136	0.892	0.589	0.722
$t_0 + 8$	-0.180	0.858	-0.589	0.278
$t_0 + 9$	-0.139	0.890	0.294	0.615
$t_0 + 10$	-0.202	0.841	-0.589	0.278
$t_0 + 11$	-0.224	0.824	0.149	0.557
$t_0 + 12$	-0.147	0.884	0.149	0.557
$t_0 + 13$	-0.191	0.849	-0.745	0.228
$t_0 + 14$	0.544	0.589	0.745	0.772
$t_0 + 15$	-0.171	0.865	0.302	0.618
$t_0 + 16$	-0.260	0.796	-0.904	0.184
$t_0 + 17$	-0.211	0.834	0.302	0.618
$t_0 + 18$	-0.178	0.859	0.603	0.726
$t_0 + 19$	-0.748	0.458	0	0.5
$t_0 + 20$	-0.159	0.874	0.603	0.726

Source: Author's calculations performed in the R statistical application.

Both tests, for the significance levels set relatively high, prove that there are days when the corporate bond market reacts significantly to the information that concerns the deterioration of the company's financial condition or imply such a deterioration is probable to happen in a future. Tests results are not unambiguous however. The differences can result from the methodological

background. H. Gurgul (2006) emphasizes that t – statistics requires the assumption that average abnormal bond returns are independently normally distributed. In the case of the strong autocorrelation, the value of the t – statistics can be overestimated. Hence, non-parametric tests that do not require such assumption are often used in practice to verify results obtained from the parametric tests.

5. Conclusion

For many years the impact of information announcements on the financial instruments prices has been very popular area of the economic research. The research has usually been connected with the question about the types of the information that are important enough so investors undertake certain actions that are reflected in the changes of market prices. One of the tools that allows to answer these questions is the event study analysis.

The method, despite its long history, is not only still valid but also constantly developed, mainly thanks to the latest numerical computing techniques and better access to the market data. What also proves the importance of the even study analysis, is the rich literature on that topic and a lot of research that has been done so far.

The event study was applied to check the impact of certain announcements on the corporate bond prices traded on Catalyst market. The research, done in line with the event study methodology, confirmed the existence of significant, although delayed reaction of the debt instruments prices to the information appearing on the market. Unfortunately, the results obtained from the parametric and non-parametric tests are not consistent with respect to the time and the strength of the prices reaction. The reason for these discrepancies can be found in the methodology. As an example of problematic cases we can give the length of the event window and the estimation window, the algorithm used to calculate abnormal bond returns or types of test applied to verify research hypothesis.

The results obtained in the empirical part of the article, although they do not allow us to conclude on the information efficiency of the Polish corporate bond market, point at the potential on this research area and prove its purposefulness. Because of the specificity of the relatively young Catalyst market, further research will involve taking into consideration a number of important factors. One of them is a poor liquidity of the corporate bond market that might have meaningful impact on the size and variety of the research sample. The second important factor is the lack of the rating grades assigned to the instruments traded on the Catalyst. This fact limits the possibility to plan the research based on the foreign research frameworks. It is also worth

to mention the subject of taxation, especially the calculation of the capital income tax with respect to the corporate bond returns.

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