THE OCCURRENCE OF STOCK MARKET ANOMALIES ON THE WARSAW STOCK EXCHANGE AS A SIGN OF INEFFICIENCY OF THE POLISH EQUITY MARKET

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Abstract

The efficient market hypothesis, despite being the basis of modern economy, remains one of the most controversial and contested concepts. Efficient markets, i.e. markets which reflect available information in asset prices, can exist under the assumption that humans are rational individuals – „homo economicus". On the other hand, behavioural economics takes a different approach and presents the decision maker as an individual who makes cognitive errors and employs simplifications and heuristics. Accepting or rejecting the existence of efficient markets has far-reaching implications for stock market investors. If the market immediately reflects available information in prices, then they should not be able to achieve above-average returns. However, history shows that many investors have significantly multiplied their capital and outperformed the market. Strategies that enable above-average returns are called „stock market anomalies" to indicate their clash with classical assumptions of economics. Over the years, there have been many studies of both market efficiency itself and the occurrence of calendar effects. This article aims to broaden the knowledge of the Polish equity market and examine its efficiency over the last 10 years. On the basis of a study of efficiency performed using various tools, the author was able to demonstrate the presence of some anomalies cited in literature on the subject. However, due to their instability over time and low repeatability with respect to various stock indices, the author was unable to unequivocally reject the efficiency of the Polish equity market.

Keywords: equity market, market efficiency, stock market anomalies.

1. Introduction

The financial market attracts a large number of participants each day, as it offers investors the opportunity to increase their capital. Shares, which are traded on a segment called the equity market, enjoy the highest popularity. Capital holders

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can invest their funds either passively or actively. The passive approach assumes no complex investment strategy and limiting of returns to the market level. However, some participants are not satisfied with this outcome and implement their own strategies to achieve better results.

For many years economists have been wondering whether it is possible to „win" against the market. For this reason, researchers often make attempts to verify the existence of strategies that would provide better long-term performance than market levels outlined by stock indices (Levy, 1967, Jegadeesh, Titman, 1999, Rouwenhorst, 1999, Wójtowicz, 2011, Pawłowska, 2015). The problem begins with the efficient market hypothesis proposed by Fama (Fama, 1965). It assumes that information flowing to market participants shapes asset price movements. These movements are the basis on which investors make decisions to buy or sell, which in turn shapes price levels. According to this approach, an efficient market is a market which reacts to information, so that assets are always correctly priced. This leads to the conclusion that outperforming the market should not be possible in the long term.

Although the debate has been going on for over 100 years, the scientific community has failed to reach a common and clear position on whether the efficient market hypothesis is correct (Keim D.B., 1983, Slutzky, 1937, Czekaj, Woś, Żarnowski, 2001, Czekaj, 2014). It is primarily contradicted by poor representation in market practice. In the past, there have been many investors who made history through fortunes won on the stock market. To reveal the truth about market efficiency, researchers and market practitioners conduct analyses of stock market anomalies, i.e. the states of deviation from the aforementioned hypothesis. They typically manifest as periods when returns significantly diverge from the average levels or as investment strategies which lead to significant profits.

This article aims to examine the efficiency aspect of the Polish equity market in the last decade. For this purpose, calendar anomalies were examined using various approaches. The first approach was a tabular comparison of mean values broken down by day of the week, week of the month and month of the year. The second approach was based on statistical tests. The final approach utilised econometric models. Analysis conducted in this manner presents a broader picture of the market and makes it possible to draw conclusions on the basis of multiple verifications of anomalies. The study aims to answer the question posed by the author: can the Polish equity market between 2010 and 2019 be considered efficient?

2. The efficient market hypothesis and behavioural finance

Despite the fact that Fama is called the father of the efficient market hypothesis, the concept itself dates back much further, to the year 1900 to be precise, when Bachelier, and later Regnault, began to draw similar conclusions (Ciołek, 2015). These conclusions faced opposition even back then, well before behavioural finance

was defined, e.g. from Slutsky (Slutsky, 1937). Nevertheless, Fama's 1965 article is considered the beginning of this approach, as he was the first to use the term „market efficiency". However, he cited many previous works in defining the term (Ciołek, 2015).

The first assumption of Fama's theory states that historical prices have no effect on the current value of assets. This assumption is the foundation of his hypothesis, but even at this early stage he already faces many opponents, as it is contested by proponents of technical analysis, for whom such an approach would ruin the validity of all their tools. The second assumption states that price changes represent a specific probability distribution. Fama initially assumed that it would be a normal distribution, but over time Mandelbrot's research showed that overlong tails and concentration around the central value pose a problem (Ciołek, 2015).However, the efficient market hypothesis does not assume that markets can only be either completely efficient or completely inefficient. Its author characterised three levels of efficiency, wherein each higher form encompasses the lower levels. This approach was pioneered by Roberts and later adopted by Fama in his next article, at which point he began to distinguish weak form efficiency, semi-strong form efficiency and strong form efficiency. The lowest form of efficiency assumes no relationship between past prices and current changes. Semi-strong form efficiency excludes the effect of current data on price movements. This applies to financial reports and information from the markets and from the environment. The highest form of efficiency refers to the lack of impact of confidential and unavailable information on prices. Aware of how hard strong form efficiency is to verify, Fama believed that markets would most often be characterised by weak or semi-strong form efficiency.

The fiercest opponents of the efficient market hypothesis include not just investors and proponents of technical and fundamental analysis, but also people who lean towards the behavioural finance approach. The greatest difference presented by this view is the exclusion of complete rationality of investors. The utility theory, popular in economics, gained an alternative in the form of the prospect theory created by Kahneman and Tversky (Kahneman, Tversky, 1979). The new approach assumed that humans do not always make the choice that is the best for themselves, understood as maximisation of benefits. Instead, the proposed version stated that decisions made are relative and depend on perspective. Another very important argument is presented by research on decision-making situations. Many studies have proved the existence of various types of heuristics that people commonly use to simplify their analytical processes. The most commonly cited distortions in decision rationality are the influence of emotions and cognitive bias errors (Zielonka, 2019). The final element indicating the lack of rationality of investors is herd behaviour, which manifests itself as bubbles and sudden drops that occasionally occur on stock markets (Szyszka, 2009).

Behavioural finance is a perfect complement to classical economic theory. It explains the behaviour of people in risk situations using aspects of psychology and sociology. However, it also leads to contradictions with foundations of other economic theories. Accepting the behavioural approach would mean that the market is incapable of pricing assets in a perfect manner.

3. Stock market anomalies

Over time, the behavioural finance community came to use the term „stock market anomalies" to describe situations characterised by deviations from the efficient market hypothesis. The simplest – and most popularised – stock market anomalies are calendar effects. These are periods characterised by returns that are much higher or much lower compared to the average level. They can take the form of month of the year effects, day of the week effects or even hour of the day effects. Month of the year effects are most often related to the turn of the fiscal year and stem from tax optimisations made by investors (Keim D.B., 1983). Others are related to investor sentiment, as, like all humans, investors are statistically more optimistic during the holiday season and more pessimistic in autumn (Bogdański, 2017). Anomaly studies have also repeatedly shown that there is a significant difference between the first and the second half of the month in terms of recoveries (Ariel, 1987). With respect to day of the week effects, the highest deviations are observed on Fridays and Mondays, which mainly stems from the fact that stock exchanges are closed on weekends (French, 1980, Rogalski, 1984). Unfortunately, looking at the conducted studies, one can find both those which support the existence of calendar effects and those which deny it.

Other examples of anomalies are strategies which make it possible to outperform the market. Many studies indicate that they include momentum and contrarian investing (Levy, 1967, Jegadeesh, Titman, 1999, Rouwenhorst, 1999). These are two opposing approaches: momentum stresses the market's tendency to maintain its trend, which means that investors should invest in those assets which were characterised by the largest increases in the previous periods; contrarian investing, in turn, emphasises frequent trend reversals, which implies that investors should invest in assets which were characterised by the largest declines. These strategies were examined in the long, medium and short term. Researchers often came to contradictory conclusions, where sometimes these strategies seemed to work, and other times seemed to make completely no sense (Wójtowicz, 2011, Pawłowska, 2015).

Yet another approach to stock market anomalies is to deny Fama's basic axiom concerning the lowest form of efficiency. The idea is to prove that past prices affect current price movements. The most common approach in this case is to show autocorrelation of returns over time (Ślepaczuk, 2006). All anomalies listed until this point contradict weak form efficiency. The last of the most popular anomaly groups

concerns the semi-strong form. These are anomalies related to financial ratios and performance. In their case, studies of investor strategies most often take into account those based on the P/E and P/BV ratios, i.e. price-earnings and price-book value (Czekaj, Woś, Żarnowski, 2001).

Unfortunately, despite having continued for years, attempts to prove whether the efficient market hypothesis is correct remain unsuccessful. This stems from the fact that anomalies are not stable over time. For this reason, some try to resolve the conflict by modifying the current approach. One example is the adaptive market hypothesis proposed as a compromise by Wen-Chuan Lo (Lo, 2005). His approach assumes that the market tends towards increasing efficiency, as under unchanging conditions, its participants learn to correctly analyse and assess information. However, market environment changes over time due to its dynamic nature. This in turn leads to renewed inefficiency until investors re-adapt their analyses and decision-making processes. He thus addresses the main flaws of Eugene Fama's approach, and also explains why anomalies occur in an unstable manner.

The issue of information efficiency of financial markets has been present for over 100 years and is yet to be fully resolved. In recent years, the debate has been joined by advocates of behavioural finance. Elements of psychology and sociology are being increasingly used in economics to refine the picture of reality presented by models.

4. Description of the research method

The conducted market analysis covered the period of stock market quotations between the start of 2010 and the end of 2019 (04.01.2010 – 30.12.2019). Data used in the study comprised daily time frame data in the form of closing prices of indices listed on the Warsaw Stock Exchange. To obtain a complete and generalised picture of the market, the analysis utilised quotations of 4 indices: WIG, WIG20, mWIG40 and sWIG80. To examine price movements, time series of stock market quotations were converted to series of logarithmic rates of return. The author believes that the period selected for analysis is highly representative of the Polish market. There were no extreme situations on the stock market during the examined decade.

Once the data was prepared for analysis, it was broken down by day of the week, week of the month and month of the year. Then, it was compared to the mean level for the entire decade, which was 0.01%. The next steps involved checking of statistical tests of normality and autocorrelation and building of econometric models.

5. Analysis of efficiency of the Polish equity market between 2010 and 2019

The most consistent results with respect to examined indices were obtained for week of the month analysis. In all cases, the highest rates were achieved in weeks 5

and 6, while the lowest in weeks 1 and 2. As regards month of the year analysis, January stood out the most. It was the month that saw the highest returns on as many as three markets. As for the lowest rates, they were noted in May for WIG and WIG20 and in June for mWIG40 and sWIG80. The day of the week breakdown proved very interesting. There was an inconsistency between indices with respect to the first day of the week. For the WIG and WIG20 indices, Monday was the best day for investors, but at the same time it was also the worst day for other indices. The only consistency was the low rates of return for WIG and WIG20 at the end of the week, on Thursday and Friday.

The initial analysis of returns was followed by an analysis involving statistical tests. First, the Kolmogorov-Smirnov test was performed to check whether the distribution of index returns approximates a normal distribution. Unfortunately, the normality test indicates rejection of the null hypothesis that the distribution of the variables is similar to a normal distribution. Nevertheless, looking at the distribution histogram shown in Figure 4.1. it is clear that the distribution is very close to a normal distribution and deviates from it only slightly. This is standard behaviour in equity market price analyses: overly wide distribution tails and concentration around the mean value have been mentioned in studies since the dawn of the topic of stock market efficiency. Despite the fact that test results do not confirm this, the author decided to assume that the studied series are characterised by a normal distribution due to high similarity of histograms.

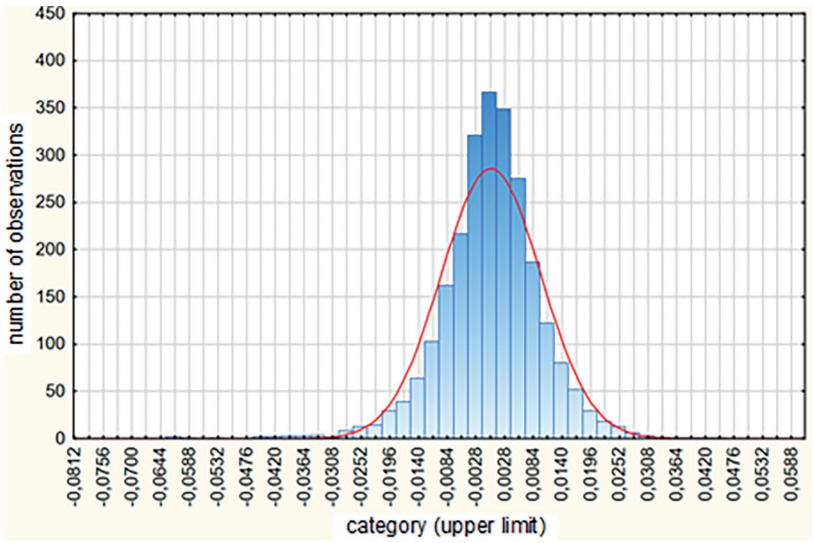

Figure 4.1. Histogram of WIG return rates and a normal distribution curve
Source: own work

The next stage of the study involved testing for partial autocorrelation of the series. The Ljung-Box statistic was used for this purpose. Partial autocorrelations up to the 5th order were analysed, as this makes it possible to observe relationships within a single week of stock market quotations. Test results are shown in Table 4.1. For the WIG index, the 1st and 2nd order correlations proved statistically significant. This is the only index for which two autocorrelations were significant. For the WIG20 index, only the 2nd order autocorrelation is significant, while for the mWIG40 and sWIG80 indices, the same is true for the 1st order autocorrelation. No higher order autocorrelations were observed for any index.

Table 4.1. The Ljung-Box test values

order of partial autocorrelation		WIG	WIG20	mWIG40	sWIG80
1	Q	**0,0782**	0,0363	**0,1386**	**0,2139**
	p-value	**<1%**	>10%	**<1%**	**<1%**
2	Q	**–0,0566**	**–0,0634**	–0,0340	0,0022
	p-value	<1%	**<1%**	>10%	>10%
3	Q	–0,0187	–0,0194	–0,0164	–0,0009
	p-value	>10%	>10%	>10%	>10%
4	Q	–0,0323	–0,0262	–0,0239	–0,0081
	p-value	>10%	>10%	>10%	>10%
5	Q	–0,0120	–0,0229	–0,0179	0,0384
	p-value	>10%	>10%	>10%	>10%

Source: own work

The last performed statistical test was the mean value test. Its purpose was to check whether the mean value for any of the examined sub-periods was statistically different from the mean value for a given index for the entire studied period. Unfortunately, for the WIG, WIG20 and mWIG40 indices, no day, week or month deviates statistically from the mean index level, indicating the absence of any anomalies. A different situation was noted only with respect to the sWIG80 small cap index. For that index, mean values on Friday, in weeks 5 and 6 and in January, February and June were statistically different at a significance level of 1%. Week 2 of the month also proved statistically different at a significance level of 5%. Examining the mean value for sWIG80 indicates the same periods which were previously identified during the initial comparison of mean values in the first part of the study.

Table 4.2. Model parameters and statistics

WIG (days a week)				WIG20 (days a week)				mWIG40 (days a week)				sWIG80 (days a week)			
	parameter	t-student	p-value		parameter	t-student	p-value		parameter	t-student	p-value		parameter	t-student	p-value
Monday	0,0005	1,1780	>10%	Monday	0,0007	1,3150	>10%	Monday	0,0000	0,0519	>10%	Monday	-0,0006	-1,8530	**<10%**
Tuesday	0,0004	0,8082	>10%	Tuesday	0,0002	0,2973	>10%	Tuesday	0,0005	1,3370	>10%	Tuesday	-0,0003	-0,9770	>10%
Wednesday	0,0003	0,7075	>10%	Wednesday	0,0002	0,3847	>10%	Wednesday	0,0003	0,8033	>10%	Wednesday	-0,0001	-0,3283	>10%
Thursday	-0,0003	-0,6468	>10%	Thursday	-0,0006	-1,2040	>10%	Thursday	-0,0001	-0,3306	>10%	Thursday	0,0001	0,2636	>10%
Friday	-0,0002	-0,5347	>10%	Friday	-0,0007	-1,3560	>10%	Friday	0,0001	0,2105	>10%	Friday	0,0010	3,2170	**<1%**
WIG (t-1)	0,0824	4,1160	**<1%**	WIG20 (t-1)	0,0386	1,9260	**<10%**	mWIG40 (t-1)	0,1385	6,9780	**<1%**	sWIG80 (t-1)	0,2154	11,0100	**<1%**
WIG (t-2)	-0,0559	-2,7890	**<1%**	WIG20 (t-2)	-0,0622	-3,1070	**<1%**								
residual tests				residual tests				residual tests				residual tests			
	conclusion		p-value		conclusion		p-value		conclusion		p-value		conclusion		p-value
heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%
1st order autocorrelation	no autocorrelation		**>10%**	1st order autocorrelation	no autocorrelation		**>10%**	1st order autocorrelation	no autocorrelation		**>5%**	1st order autocorrelation	no autocorrelation		**>10%**
WIG (weeks a month)				WIG20 (weeks a month)				mWIG40 (weeks a month)				sWIG80 (weeks a month)			
	parameter	t-student	p-value		parameter	t-student	p-value		parameter	t-student	p-value		parameter	t-student	p-value
1st week	-0,0003	-0,4947	>10%	1st week	-0,0003	-0,3995	>10%	1st week	-0,0006	-0,9986	>10%	1st week	-0,0006	-1,1930	>10%
2nd week	-0,0004	-1,1120	>10%	2nd week	-0,0006	-1,3260	>10%	2nd week	-0,0001	-0,3742	>10%	2nd week	-0,0007	-2,3560	**<5%**
3rd week	0,0004	0,9186	>10%	3rd week	0,0001	0,3137	>10%	3rd week	0,0002	0,6172	>10%	3rd week	0,0003	0,9458	>10%
4th week	0,0000	0,0247	>10%	4th week	-0,0002	-0,3791	>10%	4th week	0,0001	0,3165	>10%	4th week	-0,0002	-0,6866	>10%
5th week	0,0008	1,8570	**<10%**	5th week	0,0006	1,0710	>10%	5th week	0,0008	2,0080	**<5%**	5th week	0,0010	3,0420	**<1%**
6th week	0,0012	0,7169	>10%	6th week	0,0011	0,5593	>10%	6th week	0,0009	0,5747	>10%	6th week	0,0017	1,3970	>10%
WIG (t-1)	0,0816	4,0770	**<1%**	WIG20 (t-1)	0,0380	1,8980	**<10%**	mWIG40 (t-1)	0,1382	6,9620	**<1%**	sWIG80 (t-1)	0,2076	10,5900	**<1%**
WIG (t-2)	-0,0571	-2,8450	**<1%**	WIG20 (t-2)	-0,0639	-3,1830	**<1%**								
residual tests				residual tests				residual tests				residual tests			
	conclusion		p-value		conclusion		p-value		conclusion		p-value		conclusion		p-value
heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%
1st order autocorrelation	no autocorrelation		**>10%**	1st order autocorrelation	no autocorrelation		**>10%**	1st order autocorrelation	no autocorrelation		**>10%**	1st order autocorrelation	no autocorrelation		**>10%**
WIG (months of the year)				WIG20 (months of the year)				mWIG40 (months of the year)				sWIG80 (months of the year)			
	parameter	t-student	p-value		parameter	t-student	p-value		parameter	t-student	p-value		parameter	t-student	p-value
January	0,0007	0,9945	>10%	January	0,0004	0,5094	>10%	January	0,0009	1,4710	>10%	January	0,0013	2,6140	**<1%**
February	0,0003	0,4167	>10%	February	0,0000	-0,0067	>10%	February	0,0007	1,1620	>10%	February	0,0010	1,9460	**<10%**
March	0,0004	0,5595	>10%	March	0,0004	0,5027	>10%	March	0,0004	0,6117	>10%	March	0,0003	0,7056	>10%
April	0,0005	0,7178	>10%	April	0,0007	0,8472	>10%	April	0,0001	0,1295	>10%	April	-0,0002	-0,4635	>10%
May	-0,0009	-1,2930	>10%	May	-0,0014	-1,6900	**<10%**	May	-0,0005	-0,7122	>10%	May	-0,0005	-1,0800	>10%
June	-0,0005	-0,7436	>10%	June	-0,0009	-1,0980	>10%	June	-0,0006	-1,0170	>10%	June	-0,0010	-1,9930	**<5%**
July	0,0006	0,9687	>10%	July	0,0003	0,3759	>10%	July	0,0003	0,4925	>10%	July	-0,0001	-0,2622	>10%
August	0,0000	-0,0307	>10%	August	-0,0001	-0,1875	>10%	August	-0,0002	-0,3444	>10%	August	-0,0003	-0,7007	>10%
September	0,0002	0,2563	>10%	September	-0,0004	-0,4653	>10%	September	0,0004	0,6510	>10%	September	-0,0001	-0,2833	>10%
October	0,0006	0,9217	>10%	October	0,0007	0,8911	>10%	October	0,0004	0,7295	>10%	October	0,0002	0,4714	>10%
November	-0,0003	-0,4359	>10%	November	-0,0004	-0,5108	>10%	November	-0,0001	-0,1374	>10%	November	-0,0003	-0,6637	>10%
December	0,0000	-0,0379	>10%	December	-0,0001	-0,0833	>10%	December	0,0001	0,1653	>10%	December	0,0001	0,2070	>10%
WIG (t-1)	0,0800	3,9890	**<1%**	WIG20 (t-1)	0,0357	1,7800	**<10%**	mWIG40 (t-1)	0,1357	6,8180	**<1%**	sWIG80 (t-1)	0,2051	10,4300	**<1%**
WIG (t-2)	-0,0586	-2,9250	**<1%**	WIG20 (t-2)	-0,0656	-3,2750	**<1%**								
residual tests				residual tests				residual tests				residual tests			
	conclusion		p-value		conclusion		p-value		conclusion		p-value		conclusion		p-value
heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%	heteroscedasticity	heteroscedasticity		<1%
1st order autocorrelation	no autocorrelation		**>10%**	1st order autocorrelation	no autocorrelation		**>10%**	1st order autocorrelation	no autocorrelation		**>5%**	1st order autocorrelation	no autocorrelation		**>10%**

Source: own work

The last element of the study was an attempt to estimate the econometric models in the form of linear regression. The daily interest rate for a given index, which was an endogenous variable, was to be explained using 0–1 binary variables for a given day of the week, week of the month and month of the year. Previous period rates were additional exogenous variables in the models. Periods were selected on the basis of significant autocorrelations revealed in earlier stages. Model results are presented in Table 4.2. The first models were built for the WIG index. For the day of the week and month of the year model, no 0–1 variable was statistically significant. A statistically significant parameter was obtained only for week 5 of the month, but only at a significance level of 10%. For WIG20, only one 0–1 parameter among all models – the month of May – proved statistically significant. Similarly, for the mWIG40 index, also only one binary variable – week 5 – was statistically significant. This parameter was significant at a significance level of 5%, better than in case of the WIG index. The small cap index, much like for the mean value test, surprises with significance of multiple days of the week, weeks of the month and months of the year, which was not observed for other indices. Parameters for Friday, week 5 and January were significant at a significance level of 1%. Week 2 and June were significant at a significance level of 5%, while Monday and February were significant at a significance level of 10%. Higher returns are noted for the following periods: Friday, week 5 and January and February. Looking at all models, it is important to note that while there was no autocorrelation of the 1st order error term, the lack of homoscedasticity presents a major problem. Heteroscedasticity of the error term was seen in all 12 models, meaning that they did not fully meet the assumptions of the least squares method. This situation is quite surprising, as this problem is not common in financial data analyses.

6. Summary

Taking into account the entire study, two main conclusions can be drawn. Anomalies are more common with respect to the small cap index and basically concern only this index; the only anomaly which occurs for several indices is higher week 5 returns. Thus, only the sWIG80 index can be deemed inefficient over the last decade. Comparing the study to similar studies dealing with the same topic, it is clear that results vary depending on the examined period, time frame as well as companies and indices. It is also important to keep in mind the errors that the results are subject to due to the simplifying assumption of a normal distribution and the issue of heteroscedasticity of model residuals. The author believes that his research has failed to show that any anomaly was occurring on the Polish equity market in a consistent and clear manner during the studied period. Looking at the Polish market between 2010 and 2019 as a whole, there is no reason to question its weak form efficiency.

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WYSTĘPOWANIE ANOMALII GIEŁDOWYCH NA GPW W WARSZAWIE JAKO PRZEJAW NIEEFEKTYWNOŚCI POLSKIEGO RYNKU KAPITAŁOWEGO

Streszczenie

Hipoteza rynku efektywnego, mimo bycia bazą dzisiejszej ekonomii, nadal jest jedną z najbardziej kontrowersyjnych i poddawanych w wątpliwość koncepcją. Rynki efektywne, czyli odzwierciedlające dostępne informacje w cenie aktywów, mogą istnieć za sprawą założenia, że człowiek to jednostka racjonalna – „homo economicus". Odmienne podejście prezentuje jednak ekonomia behawioralna, prezentująca decydenta jako jednostkę obarczoną błędami poznawczymi, która stosuje uproszczenia i heurystyki. Przyjęcie lub odrzucenie istnienia efektywnych rynków ma daleko idące skutki dla inwestorów giełdowych. Jeśli rynek w sposób natychmiastowy odzwierciedla w cenie dostępne informacje to nie powinni być oni w stanie osiągać ponadprzeciętnych stóp zwrotu. Historia pokazuje jednak, że niejeden inwestor znacznie pomnożył swój kapitał i osiągnął wyniki lepsze niż rynek. Strategie pozwalające osiągać ponadprzeciętne zyski nazywane są „anomaliami giełdowymi", co ma wskazywać na ich sprzeczność z klasycznymi założeniami ekonomii. Na przestrzeni lat prowadzono wiele badań zarówno samej efektywności rynków jak i występowania efektów kalendarzowych.

Artykuł ten ma poszerzyć wiedzę na temat polskiego rynku kapitałowego i przebadać jego efektywność na przestrzeni ostatnich 10 lat. Na podstawie badania efektywności przy pomocy różnych narzędzi udało się autorowi wykazać występowanie, niektórych, przytaczanych w literaturze przedmiotu, anomalii. Z powodu ich niestabilności w czasie i niskiej powtarzalności na różnych indeksach giełdowych nie doszedł on do jednoznacznego wniosku odrzucającego efektywność polskiego rynku kapitałowego.

Słowa kluczowe: rynek kapitałowy, efektywność rynku, anomalie giełdowe.