THE JANUARY EFFECT. THE BEHAVIOUR OF SECTOR INDICES OF THE WARSAW STOCK EXCHANGE

Bartłomiej Lisicki

ABSTRACT

The hypothesis of the financial market information efficiency indicates immediate adjustment of instrument prices resulting from the availability of new information. However, there are examples of anomalies when information flowing from the market is not the only price-making factor. One of them is the January effect, as seen on the global stock exchange.
In the present paper, the effect will be discussed in relation to the Warsaw Stock Exchange. As part of the survey, the sector indices of the stock exchange were compared cross-sectionally. Using the event study methodology, the January abnormal returns for the selected industry indices were calculated for each year between 2005 and 2017. The results of the study indicated the occurrence of a statistically significant January effect in the case of two indices: WIG-construction and WIG-IT.

KEYWORDS:

Financial market. Stock exchange indices. January effect. Event studies. Efficient Market Hypothesis.

JEL CLASSIFICATION:

G11, G14.

INTRODUCTION

One of the main theories about the financial market is the Efficient Market Hypothesis (EMH). It was created by Eugene Fama [1970]. According to this theory, an effective financial market is one in which "prices always fully reflect available information". Fama also formulated certain conditions that allowed the market to be considered effective. They include:

- widespread availability of information,
- removal of transaction costs,

- unidirectional (affecting the price of assets) investors' behaviour caused by new information.

Depending on the form of market information efficiency adopted (on a scale from weak, semi-strong, to strong), investors are not able to achieve above-average profits using technical analysis, fundamental analysis or historical data analysis. However, in the literature there may be found numerous cases of stock exchange anomalies which indicate that rates of return do not necessarily have to be based entirely on market information, as assumed by the Fama hypothesis [Beladi, Chao, Hu, 2016]. One of them is the so-called "January effect" which is counted among calendar anomalies. It involves buying shares (which reflects the increase in prices) caused by the massive replenishment of investment portfolios, especially by institutional investors at the beginning of the calendar year. The process is connected to the last year's sale of shares of some companies whose valuations brought losses for investors [Klock, Bacon, 2014]. After the new year, managers purchase issuers' shares which they consider to be undervalued. The significant demand generated in the process increases the valuation of some companies [Lewandowska, 2017].

The aim of this study is to examine the rates of return on the Warsaw Stock Exchange (WSE) as recorded for sector indices each January between 2005 and 2017. It is assumed that there is a positive abnormal returns in the first month of the year in individual industries listed on the WSE. This surplus may be credited to the January effect. To analyse the problem, the event study method will be utilized [Fama, Fisher, Jensen, Roll, 1969].

THEORETICAL BACKGROUND

The January effect is undoubtedly one of the most abundantly described calendar anomalies of the global stock exchanges. It was first mentioned over 70 years ago. Sydney B. Wachtel [1942] observed this phenomena in the years 1927-1942 by studying the behaviour of companies grouped in the Dow Jones Industrial Average. The discussion about the January effect flared up again in the 1970s as a result of Kinney and Rozef's [1976] studies confirming Wachtel's earlier conclusions. The authors explained the phenomena with respect to tax changes (lowering the tax base by selling items that showed a loss) [Reinganum, 1983]. Another explanation of this anomaly indicated the occurrence of the so-called window dressing attributed to the managers of securities portfolios [Haugen & Lakonishok, 1988]. At the end of the year, the managers sold unprofitable items in order to present their portfolio to investors as more attractive. In January, however, they completed

their portfolios with less known and riskier companies hoping to gain exceptionally high profit.

Initially, it was believed that the January effect is negatively correlated with the size of the companies, i.e. smaller enterprises were much more sensitive to its occurrence. [Keim, 1983]. Observation, however, ruled out this hypothesis. Gu [2003] revealed that the anomaly concerns the blue-chip companies.

What is extremely important is that the occurrence of the first-month effect was noticed not only on the American stock exchange or other mature financial markets. It also exists on less developed world markets such as Turkey [Eyuboglu & Eyuboglu, 2016], Macedonia [Svrtinov et al., 2017], Romania [Murgea, 2015] Pakistan [Ullah & Ullah, 2016] or Taiwan [Shiu, Lee, Gleason, 2014].

This effect has not escaped the attention of Polish researchers, resulting in the works by Tarczyński [1997], Szyszka [2003], and recently Marianowska et al. [2016], and Lizińska [2017]. Each of the authors tried to present the anomaly in the original approach and using different methods. The present study is to check the occurrence of the January effect in sectoral terms on the Warsaw Stock Exchange as this problem was not yet approached in the previous research. In addition, the methodology of event study, not used in this type of examinations, will be utilized in the research.

1 OBJECTIVE AND METHODOLOGY

As was previously stated, the subject of this study is to see how quoted seasonal anomaly affects the rate of return achieved in individual sector indices of the Warsaw Stock Exchange.

For this purpose, the methodology of surplus (additional upside) rates of return was used (the method known as the event study was first introduced fifty years ago by Fama). The method is used to assess investors' reactions to various types of price-generating information flowing to the financial market. On the other hand, it allows assessing the efficiency of the market.

The event study consists of several stages that condition its correct implementation. McWilliams & Siegel [1997] list the following stages:

- defining the event (arrival of new information, occurrence of a certain phenomenon),
- reviewing economic theories justifying the reaction to the indicated event,

- selecting groups of companies (including indices), in which the impact of the event will be examined,
- determining the event window in which the abnormal return will be analysed and the estimation window for calculating the expected return,
- approximating the abnormal return (by comparing the actual rate with the estimated one),
- testing its significance with parametric and non-parametric tests,
- summarising the results and formulating the conclusions.

In reference to the presented analysis, the January effect, widely described in the literature, will be tested as having an impact on the excess rate of return. Numerous conclusions obtained from publications, both foreign and domestic, give rise to the assumption that the calendar anomaly actually occurs at the beginning of the year. It can be concluded, with some degree of simplification, that the calculated rates of return from the first month of each of the analysed years constitute the window of the event.

The calculated rates of return from individual sector indices of the Warsaw Stock Exchange from 2005-2017 were used for the study. Importantly, not all industry indices were traded throughout the study period. The exact periods of their appearance on the WSE are presented in Table 1, with the base date being the day preceding the first listing of a particular index.

Table 1 Sector indices of the Warsaw Stock Exchange (as of 15/01/2018) with their base date

Index	Base date of index
WIG-banking	31.12.1998
WIG-construction	31.12.1998
WIG-chemicals	19.09.2008
WIG-energy	31.12.2009
WIG-mining	31.12.2010
WIG-IT	31.12.1998
WIG-pharmaceuticals	30.12.2016
WIG-media	31.12.2004
WIG-automobiles&parts	30.12.2016
WIG-real estate	15.06.2007
WIG-clothes	30.12.2016
WIG-oil&gas	31.12.2005
WIG-food	31.12.1998
WIG-telecom	31.12.1998

Source: https://www.gpw.pl/indeksy (access: 15.01.2018)

To calculate the abnormal return in individual event windows, it was necessary to estimate the so-called expected return. It reflects the level of the additional rate which should occur in "normal" conditions on the financial market, i.e. those in which there is no anomaly (in our case there is no January effect).

In this example, Sharpe's [1963] simplified model was used to calculate the expected return. According to this model, the rate of return of a given company (i.e. the sector index) is closely related to the broad-market index (WIG). Developing the expected return from the index *i* in the period *t* is presented in the following formula:

$$E(Rit) = \beta_i R_m + \alpha_i + e_i$$

Where:

β_i, α_i - model parameters,

R_m - the market rate of return equated with the return rate of the WIG index,

e_i - a random component whose expected value is 0.

The expected rate of return was estimated using the Sharpe's model, whose parameters were calculated using the monthly rates of return for the eleven remaining months of the year *t* (estimation window is located after the event window). Consequently, the expected return was used to calculate abnormal returns for particular indices in each (possible) year of the analysed period 2005-2017. In the simplest terms, they represent the difference between the actual and expected rate of return in the period *t* from the index *i*. This is presented in the following formula:

$$AR_{it} = R_{it} - E(R_{it})$$

where:

AR_{it} is an additional (abnormal) rate of return from the index *i* in the period *t*,

R_{it} is the actual rate of return from the index *i* in the period *t*,

$E(R_{it})$ is the expected rate of return from the index *i* in the period *t*.

The additional rates of return estimated in the analysed period were subjected to the non-parametric Wilcoxon matched-pairs test, which indicated the significance of the differences between the estimated rate of return of the index *i* in the period *t*, calculated using the Sharpe's model, and the actually recorded historical rate. The test values for individual observations, when the null hypothesis (that the medians of tested rates are equal) was false, suggest that there are statistically significant differences between the January rates of return

for the given sector indexes. On the other hand, observing positive statistically significant differences may imply the occurrence of the January effect in a given sector.

2 RESULTS AND DISCUSSION

This section presents abnormal returns achieved by Polish sector indices in the first months of the years 2005-2017. The relevant summary can be found in table 2. Next, their values were subjected to the aforementioned Wilcoxon test in order to check the statistical significance of the differences between the expected and the real rate.

In the present study the value of additional returns was not calculated for indices that debuted on the WSE at the beginning of 2017 (among those there were the following: WIG-pharmaceuticals, WIG-automobiles&parts, WIG-clothes). Not including them in the test resulted from the fact that the only possible window of events was too narrow due to their late debut. The estimated additional rates of return from one period would give a misleading information about the possible occurrence of the January effect.

Table 2 The upward trend of the percentage of rates of return estimated for selected sector indices of the WSE in January of each year 2005-2017.

Index/ year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
WIG-banking	-0,72	-2,00	3,25	-0,20	-2,17	2,32	-1,65	0,28	-4,44	5,39	-2,96	0,80	3,75
WIG-construction	-2,67	6,76	13,9	5,05	1,67	5,68	-0,11	10,5	7,43	5,75	2,60	-2,41	6,79
WIG-chemicals	-	-	-	-	-5,56	-1,32	21,3	7,30	-0,87	-10,6	6,31	6,13	14,8
WIG-energy	-	-	-	-	-	0,77	0,29	-8,99	-0,75	3,03	-1,05	10,1	-3,23
WIG-mining	-	-	-	-	-	-	-	10,7	4,54	-4,78	-2,38	-10,5	9,74
WIG-IT	0,28	3,78	10,7	0,72	4,65	-1,07	2,29	-3,93	3,36	0,03	1,91	1,25	4,31
WIG-media	1,48	-1,45	4,06	-2,79	1,11	-0,03	-0,64	-3,99	-1,30	2,39	2,62	3,54	5,00
WIG-real estate	-	-	-	3,36	4,95	-6,47	-4,57	9,45	-1,11	1,15	-6,13	-2,05	0,30
WIG-oil&gas	-	-0,43	-7,88	-7,38	-4,12	1,13	4,66	-8,47	3,62	-5,89	0,57	-0,67	-18,8

WIG-food	3,34	3,40	-3,86	-0,76	8,92	1,90	6,69	-1,24	6,20	1,88	-1,12	-8,84	18,2
WIG-telecom	3,36	-4,51	-1,93	6,28	6,26	0,61	1,30	-1,14	2,07	5,09	4,97	4,47	-1,20

- the selected index was not listed

Source: own elaboration.

Analysing the levels of abnormal returns in subsequent Januaries and in particular sector indices, their highest values were recorded for WIG-construction. Only three indications in thirteen periods had a negative sign indicating a lower real rate of return than the expected one. The situation was similar in the case of the WIG-IT (two negative values) and WIG-telecom's indexes (four negative values), with the exception that abnormal rates were lower than those calculated in the previous index. Significant differences between real and expected rates (expressed in terms of additional rates) were also observed in the WIG-chemicals, WIG-mining, WIG-oil&gas and WIG-food's indices. In their case, however, there was a strong differentiation of the sign of additional rates of return, which made it impossible to state explicitly the occurrence of the January effect for these sectors. It was especially noticeable in the case of WIG-oil&gas, which recorded the lowest average excess rate in January in each of the analysed periods.

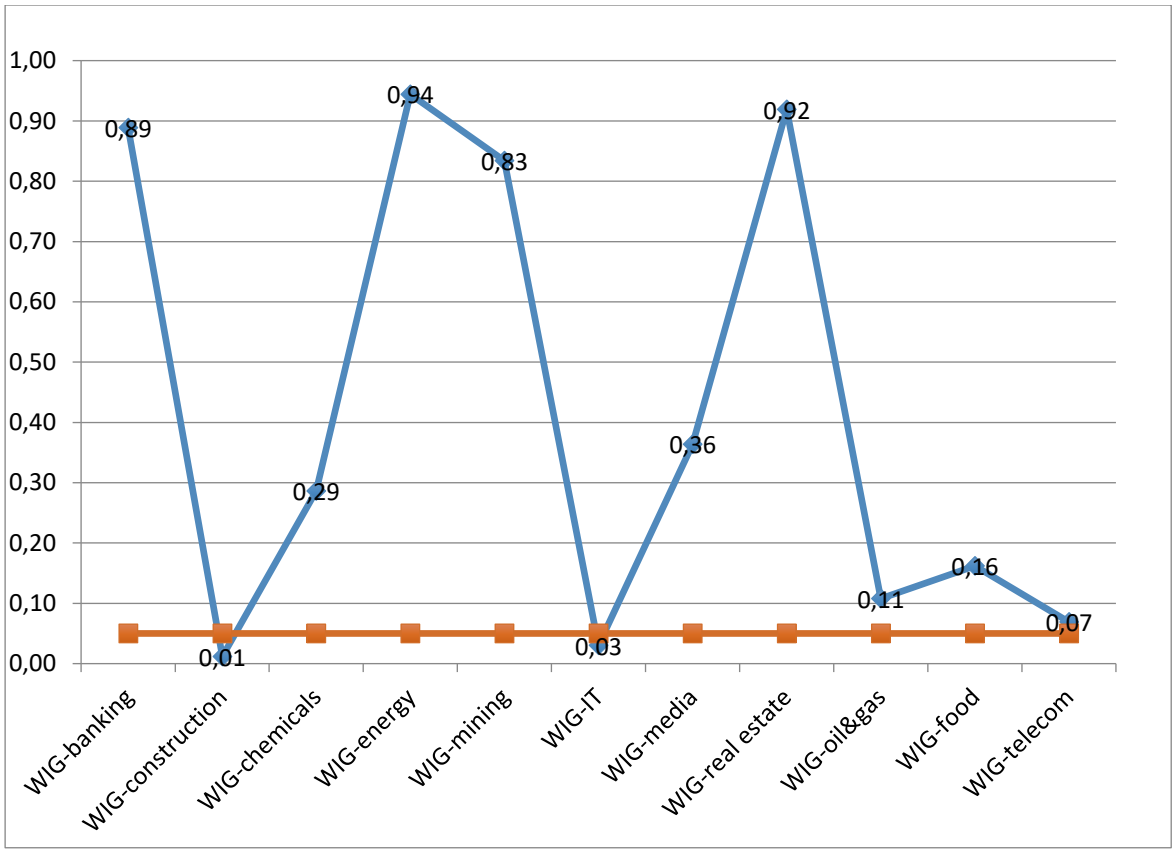
In order to determine the significance of the obtained results, it was necessary to conduct a statistical test. The Wilcoxon matched-pairs test was selected for this purpose. After comparing the previous sectoral rates of return with expected rates, the test in question has indicated cases in which the differences between those rates were statistically significant (on the significance level $p = 0.05$, the orange line on the graph). Studying these differences was to indicate which of the sector indices was the most sensitive to the occurrence of the first-month effect. Test statistics for individual sub-indices are shown in Chart 1.

As can be seen in the first chart, the calculated abnormal returns for only two indices were statistically significant. These indexes are WIG-construction and WIG-IT. Especially the first one deserved attention. The obtained values of additional return rates were statistically significant even when $p = 0.01$.

In addition, the sum of negative ranks in the test for both mentioned indexes significantly exceeded the sum of negative ranks, which additionally indicated definitely higher values of real rates of return in January compared to the expected rates estimated with the Sharpe's model. However, the January effect can be perceived as a calendar anomaly of statistically

significant impact on achieving above-average rates of return from quotations of WIG-construction and WIG-IT indexes.

Chart 1 Significance levels of the bilateral Wilcoxon matched-pairs test for selected sector indices of the Warsaw Stock Exchange in 2005-2017 (the value of statistics *p*)



Source: own elaboration.

CONCLUSION

The purpose of this article was to examine the occurrence of the January effect in the sector indices on the Warsaw Stock Exchange. The hypothesis formulated at the beginning of the research about the existence of positive excess rates in the first month of the year was partly positively verified. In the two sector indices (WIG-construction and WIG-IT), in the period 2005-2017, there were statistically significant positive return rates. If we recall the importance of the first-month effect on global trading floors, investing capital in companies listed in these indices may, in subsequent years, bring higher profits than investments in other branches of the Warsaw Stock Exchange.

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CONTACT

M.Ec. Bartłomiej Lisicki
University of Economics in Katowice
Faculty of Finance and Insurance
1 Maja 50, 40-487 Katowice, Poland
bartlomiej.lisicki@edu.uekat.pl