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JANUARY EFFECT AT THE CZECH CAPITAL MARKET

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Abstract. In the course of the investment process it is necessary to examine a large number of stocks (stock groups) within wide categories of financial assets. The main objective is to find stocks that are not rated correctly at the given moment, appearing thus from the buyer's point of view as interesting to buy. To make such an analysis there is a wide scope of approaches. One of them is the efficient market theory. The main aim of this article is the application of methods of efficient market tests on the Prague stock exchange in the period of 2007-2010. In this article the authors aim at verifying the existence of the 'January effect' at the Czech capital market, particularly in the conditions of the Prague Stock Exchange. The primary data used herein were obtained from official lists of prices of the Prague Stock Exchange.

JEL classification: G14, C12.
Keywords: Capital market, stock exchange, prediction, January effect, weekend effect, verification.
Reikšminiai žodžiai: kapitalo rinka, vertybinių popierių birža, sausio efektas, savaitgalio efektas, patikrinimas.

1. Efficient Market Theory

The first references about the efficient market hypothesis can be found in articles by Bachlier from 1900. His work also explained the theory of random processes of commodity prices, being entirely original but in its time it was not given too much attention. Furthermore, it appeared in an empiric survey carried out by Cowles in 1937. However, Samuelson was the first to outline the concept of the modern hypothesis of efficient market (Samuelson, 1973)

A comprehensive theory of efficient markets was formulated for the first time by Eugene Fama in the 60s and 70s of the previous century, summarising the theory known until then and above all, the empiric results available. He then implanted the definition of efficient capital markets in the simplest form into the general framework

of efficient market in economic terms, i.e. a market where prices 'fully' reflect all the information available (Fama, 1991).

1. Fama´s concept was followed by many renowned financial economists such as R. A. Brealey, S. C. Myers, J. C. Francis or R. A. Haugen, who defines the efficient market as a place where stock prices reflect all the information that is possible to know and that is significant (Haugen , 1996). Fama himself later used a more general definition deeper set into economic terms where prices reflect the information available to the extent that the limit benefit produced by usage of the information is equal to the cost of acquisition thereof (Fama, 1991). Malkiel defines capital markets as efficient if buyers are not able to achieve excessive returns without accepting excessive risk (Malkiel, 2003)

2. Basic Assumptions

The efficient market theory is currently the most significant stream in economics. The theory says that the stock market is efficient and price-creating information is contained therein nearly immediately (relevant information spreads in 30 seconds as maximum). This is the reason why business strategies fail because the price is always objective and adjusts to its internal value, and price movements are affected only by unexpected information, hence the price changes unexpectedly, too.

Efficient market assumptions are:

- There is a huge number of rational buyers at the stock market continuously analysing and trading.
- Buyers have got sufficient information that is true, cheap and current.
- Buyers respond to new information accurately and quickly.
- Transaction costs are low.
- The market is near-money.
- None of the participants is in any monopolistic or exclusive position.
- Quality infrastructure and legal market regulation.

According to the efficiency power we distinguish three basic forms:

1) Weak efficiency form – the price contains historical information and therefore price predicting based on the previous price curve is not possible, which casts doubts on the technical analysis.
2) Semi-strong form – the price contains historical and current public information, which casts doubts on the fundamental analysis, too.
3) Strong efficiency form – the price contains any and all information, including non-public one.

Many researches dealing with the efficient market theory have been carried out but only the weak and semi-strong efficiency forms were confirmed. It was confirmed that there is non-public information accessible to elect professionals only who thus achieve above-average revenues. This fact is also confirmed by Liu Yongxin in his study of 2009 (Liu, 2009).

The efficient market hypothesis (EMH) has been applied to many other markets. Very little research has been done on electricity market efficiency testing. In their paper 'The Efficient Market Hypothesis and Electricity Market Efficiency Test' the authors analyse the characteristics of an electricity market, comparing with other markets, and propose a testing approach for electricity market efficiency assessment (Zhe, 2005).

The efficient markets hypothesis (EMH) states that at any time, the price of a security fully captures all known information about that stock, so the price behaves like a random walk in time, except when there are changes in information. The authors of the 'Back propagation as a test of the efficient markets hypothesis' test whether a non-linear statistical method, error back propagation, can do better than chance in forecasting stock trends. The paper presents some research on the application of artificial neural networks to economic modeling (Tsibouris, 1992).

Efficiency tests are divided in the same groups as the forms thereof. Therefore, Fama in his later work again introduced three groups, but with modified names, giving a better description of the testing procedure (Fama, 1991). The new test groups are revenue prediction tests (for the weak form), case studies (for the semi-strong form) and private information tests (for the strong form). In order to examine the semi-strong form of efficient capital markets we must first of all check the basic assumption whether the markets are at least weakly efficient.

3. Revenue Prediction Tests

This group of tests includes a large number of testing procedures. They may be divided into two main groups, which, it needs to be noted, are very closely linked with each other. The first group contains tests of fair game and random walk, including randomness tests, run test, variance ratio test and examination of series correlations. The other contains anomalies, i.e. regularities in the development of stock returns difficult to be explained in economic terms.

One of the anomalies is the January Effect when the returns of the first days of January and the whole month of January in total tend to be significantly higher, compared to the other months. Another of the anomalies is the Weekend Effect when Monday revenues tend to be significantly different, compared to the other days. Parallel to the Weekend Effect is the National Holiday Effect when the returns of the day following the day off (nontrading) tend to be different.

4. Market Anomalies

Market anomalies are specific features in the stock behaviour that cannot be simply explained on the statistical basis, and sometimes they are difficult to explain on the economic basis as well. A frequent solution of such problems is an approach explaining

anomalies on the basis of specific features in the behaviour of economic players. It is really hard to explain in economic terms why the stock should trade more on Wednesday than on any other day.

Most of the studies accomplished so far primarily document the situation on the American market. Papers examining the efficiency level in other countries appear only sporadically and if they do, they usually refer to highly developed countries, such as Great Britain, Germany or Japan. Notwithstanding that fact, there is a study dedicated to the Czech capital market, testing the efficiency thereof, namely the one by J. Filáček, M. Kapička and M. Vošvrda of 1998. The authors came to the conclusion that the Czech capital market does not even reach the weak form of efficiency based on their testing of 1995-1997.(Filáček, 1998)

In our previous article (Luhan, 2011) we drew up an analysis of one of the effects mentioned above – the 'Weekend Effect'.

The Day-of-the-Week Effect was confirmed in the analysed stock, although not in a clear way. Unlike the world markets, where in most cases there was a significant negative return on Monday, on the Czech stock market we observed a significantly higher return on Monday and significantly lower return on Friday if we examine only average returns per day.

However, if we study the anomaly in more detail and try to find the reason of it, we will first come to the conclusion that lower Friday returns can be caused by a psychological effect. This effect shows that in the Czech Republic the buyers' working activity on the last days of the week is not as high as on the other days.

The Day-of-the-Week Effect shows itself on different days in each of the years studied, in some cases it is not present at all. Using an investment strategy based on the observed anomalies, the buyer would not reach any excessive return in the next year.

5. January effect

The January effect is one of the most observed and studied anomalies. It would be more appropriately called 'The effect of months during a year', but the name based on the first month of a year has become established and is used mainly because it is the month of January that shows the highest returns on world markets, compared to other months.

According to the so-called 'tax-selling' hypothesis, the January effect can be attributed to the sell-off of loss-making securities at the end of a year prompted by investors who seek to create tax-losses to avoid paying the capital gains tax (Chan,1986; Jones & Lee & Apenbrink, 1991). This hypothesis has its proponents as well as opponents.

Jones, Lee & Apenbrink (1991) tested the hypothesis on the Cowles Industrial Index before and after 1917, when a personal income tax was introduced. The conclusion they arrived at was that whereas the January effect was not significant for the period before 1917, it proved significant for the latter period, thus the January effect was related to income taxation.

Bhardwaj &Brooks (1992) come to the conclusion that the January effect is more an effect of low-priced securities whose higher returns are, however, absorbed by transaction fees and thus cannot be used for investment strategies.

Ritter (1988) focuses on a detailed study of development in particular months and concludes that January does bring higher yields, and they are significantly higher during the first days.

6. Methodology and data

The January Effect will be examined in the years 2007–2010 by using official lists of prices. For our research we have chosen a package of stocks traded on the main Prague Stock Exchange market including stocks of the following companies in the period from 2007 to 2010:

1. AAA Auto Group N.V. (AAA)
2. Central European Media Enterprises Ltd. (CETV)
3. Česká zbrojovka, a.s. (ČESKÁ ZBROJOVKA)
4. ČEZ, a.s. (ČEZ)
5. ECM Real Estate Investments A.G. (ECM)
6. Erste Group Bank AG (ERSTE GROUP BANK)
7. Jihomoravská plynárenská, a.s. (JM PLYNÁRENSKÁ)
8. Komerční banka, a.s. (KOMERČNÍ BANKA)
9. New World Resources N.V. (NWR)
10. Orco Property Group S.A. (ORCO)
11. Pegas Nonwovens SA (PEGAS NONWOVENS)
12. Pražská plynárenská, a.s. (PRAŽSKÁ PLYNÁREN.)
13. Setuza, a.s. (SETUZA)
14. Telefónica O2 Czech Republic,a.s. (TELEFÓNICA O2 C.R.)
15. Unipetrol, a.s. (UNIPETROL)
16. VGP NV (VGP)
17. Vienna Insurance Group (VIG)
18. Zentiva N.V. (ZENTIVA).

Returns achieved on a given day are examined on the basis of average returns and only in the main Prague Stock Exchange market, which will make it possible for us to avoid any inconsistency with insufficient liquidity as its influence particularly on small and less traded stocks may be essential.

For each stock we have identified the average, standard deviation, number of observations, plus t-statistics testing the hypothesis that the average return of the month is the same as the one of the other months.

Returns were monitored both separately for each year of the survey and in aggregate for the entire period of four years. An overview of the results is summarised in the tables below.

Table 1. Summary of results (*Source: Own processing*)

2007						
Month	**Average return**	**SD**	**N**	**t-statistics**	**hypothesis H_0 ($\alpha = 0.05$)**	**hypothesis H_0 ($\alpha = 0.01$)**
January	0,2049	1,0571	330	3,4057	rejected	rejected
February	-0,0706	1,5139	314	-1,1987	accepted	accepted
March	0,2754	1,4249	308	3,388	accepted	accepted
April	0,0896	1,5908	325	0,8211	accepted	accepted
May	0,0627	1,2944	312	0,5879	accepted	accepted
June	0,057	0,9043	310	0,7182	accepted	accepted
July	-0,1893	1,5306	315	-2,6877	rejected	rejected
August	0,0113	1,8875	330	-0,1249	accepted	accepted
September	-0,0258	1,2155	320	-0,7876	accepted	accepted
October	0,1101	1,371	310	1,2165	accepted	accepted
November	-0,3103	1,7234	325	-3,8055	rejected	rejected
December	0,0636	1,5199	325	0,5227	accepted	accepted
2008						
Month	**Average return**	**SD**	**N**	**t-statistics**	**hypothesis H_0 ($\alpha = 0.05$)**	**hypothesis H_0 ($\alpha = 0.01$)**
January	-0,6873	2,7924	315	-2,7395	rejected	rejected
February	-0,0084	1,8898	302	2,8463	rejected	rejected
March	-0,2594	2,1619	308	0,2902	accepted	accepted
April	0,009	1,5369	325	3,8536	rejected	rejected
May	0,2353	2,1538	315	4,7418	rejected	rejected
June	-0,5069	2,0881	325	-2,0226	rejected	accepted
July	-0,204	2,828	330	0,6179	accepted	accepted
August	0,032	1,6946	315	3,7035	rejected	rejected
September	-0,8412	5,5603	330	-1,9567	accepted	accepted
October	-1,3092	8,7552	315	-2,2491	rejected	accepted
November	-0,1818	5,8766	320	0,3665	accepted	accepted
December	0,2159	3,1246	310	3,123	rejected	rejected
2009						
Month	**Average return**	**SD**	**N**	**t-statistics**	**hypothesis H_0 ($\alpha = 0.05$)**	**hypothesis H_0 ($\alpha = 0.01$)**
January	-0,2521	2,9568	325	-3,943	rejected	rejected
February	-1,1442	3,8887	308	-7,3105	rejected	rejected

March	0,8325	6,1936	312	1,5302	accepted	accepted
April	0,9573	3,804	330	3,2123	rejected	rejected
May	0,271	5,4572	315	-0,2474	accepted	accepted
June	-0,0224	2,5278	325	-1,3777	accepted	accepted
July	0,6487	2,8815	330	3,3979	rejected	rejected
August	0,7213	3,8724	330	2,8999	rejected	rejected
September	0,1229	2,6343	315	-0,2335	accepted	accepted
October	-0,1699	2,4342	310	-2,561	rejected	accepted
November	-0,0927	1,8823	315	-2,5441	rejected	accepted
December	-0,0167	1,557	330	-2,1811	rejected	accepted
2010						
Month	**Average return**	**SD**	**N**	**t-statistics**	**hypothesis H_0 ($\alpha = 0.05$)**	**hypothesis H_0 ($\alpha = 0.01$)**
January	0,2542	1,8633	320	2,2025	rejected	accepted
February	-0,1566	1,9919	312	-1,9396	accepted	accepted
March	0,3436	1,5067	325	3,9112	rejected	rejected
April	0,4454	2,3657	330	3,3632	rejected	rejected
May	-0,4502	3,5155	325	-2,7857	rejected	rejected
June	-0,403	2,4539	315	-3,526	rejected	rejected
July	0,1809	1,9944	312	1,3237	accepted	accepted
August	-0,1341	2,0702	310	-1,652	accepted	accepted
September	0,301	2,3059	330	2,2089	rejected	accepted
October	-0,0181	1,8125	315	-0,6623	accepted	accepted
November	-0,2713	1,8255	305	-3,2903	rejected	rejected
December	0,4354	2,1325	312	3,537	rejected	rejected
2007–2010						
Month	**Average return**	**SD**	**N**	**t-statistics**	**hypothesis H_0 ($\alpha = 0.05$)**	**hypothesis H_0 ($\alpha = 0.01$)**
January	-0,1419	2,3483	1290	-1,9376	accepted	accepted
February	-0,3295	2,5162	1236	-4,6288	rejected	rejected
March	0,2932	3,436	1253	3,5853	rejected	rejected
April	0,3597	2,4934	1310	6,1051	rejected	rejected
May	0,0277	3,3478	1267	0,621	accepted	accepted
June	-0,2367	2,1118	1275	-3,8907	rejected	rejected
July	0,0836	2,4489	1287	1,7487	accepted	accepted

August	0,1354	2,4738	1285	2,549	rejected	accepted
September	-0,1245	3,4281	1295	-1,1302	accepted	accepted
October	-0,3442	4,76	1250	-2,5797	rejected	accepted
November	-0,2214	3,2324	1265	-2,3477	rejected	accepted
December	0,1888	2,1977	1277	3,807	rejected	rejected

Critical region limit for α = 0,05	-1,9634	1,9634
Critical region limit for α = 0,01	-2,5829	2,5829

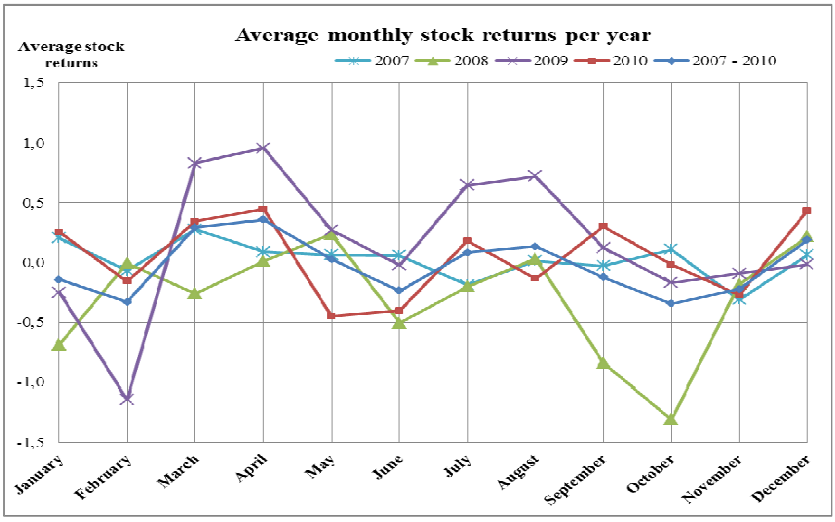

Fig. 1. Average monthly stock returns per year (*Source: Own processing*)

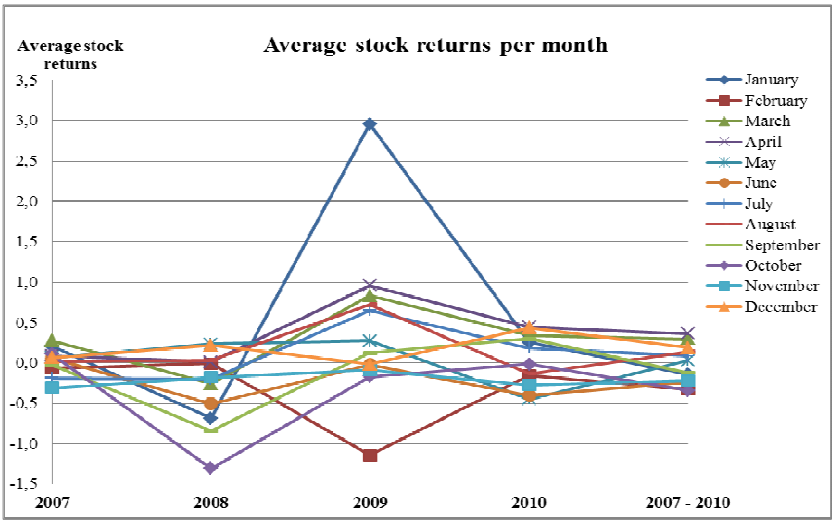

Fig. 2. Average stock returns per month (*Source: Own processing*)

It is apparent from the overall results in the tables that in 2007, before the financial crisis started, the Czech market showed both the January effect and changes occurring at the beginning of holiday period, i.e. lower returns in June and July. January returns are, on the other hand, the highest of the whole year. 2007 can be seen as a typical year matching the hypotheses.

The approaching economic crisis is already reflected in the returns of 2008, so other effects than the January effect can be observed. January returns on shares are negative due to the emerging economic crisis, which became more noticeable towards the end of 2008 with the lowest returns in October. It can also be noted that most returns are negative, so the hypothesis cannot be accepted if return values are positive. Year 2008 is an atypical year in which the January effect cannot be observed.

The beginning of 2009 is still marked by the economic crisis, January returns are still negative and the January effect does not occur. Due to enormous negative returns in the first two months and at the end of 2009 the hypotheses with higher positive average returns are rejected. February saw the lowest returns, while April saw the highest returns. The hypothesis, however, must be rejected in both cases. Year 2009 is characterized by low returns or big differences in returns during particular months.

January 2010 saw a positive return again, one of the highest during the year, while summer months regarded as holiday months saw the biggest drop. In this respect, year 2010 shows signs of working normally but is still partly affected by the economic crisis.

Generally, the lowest returns were observed in all months of 2008. As stated above, this can be attributed to the economic crisis, which started on the financial markets. The highest returns of 2009 were observed in April.

Conclusion

The January effect has not been confirmed in all of the examined periods. If we look at each of the years, it is obvious that only in 2007, we can observe the January effect and further the so-called 'holiday' effect, which may be evoked for example by the summer vacations.

In other years 2008-2010 we do not observe the January effect, sometimes just a 'holiday' effect. This is due to the economic crisis, which began to emerge since 2008 as the financial crisis. But it is important to watch over the changes of the average stock returns each year and find a trend within them. It is possible that time will relocate the January effect on our markets, and this will happen when the economic crisis is over and the financial markets once again start to behave in a more standard fashion.

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SAUSIO EFEKTAS ČEKIJOS KAPITALO RINKOJE

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Santrauka. Investicijų procese būtina ištirti didelį akcijų skaičių finansinių aktyvų kategorijose. Pagrindinis tikslas yra rasti akcijas, kurios pirkėjo požiūriu esamu metu nėra korektiškai

įvertintos. Tam naudojami skirtingi požiūriai, tarp jų veiksmingų rinkų teorija. Šiame straipsnyje veiksmingų rinkų teorijos metodai taikomi Prahos vertybinių popierių biržoje 2007–2010 m. ir tikrinamas vad. sausio efekto pasireiškimas.

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