



Central and Eastern European Share Markets and the Halloween Effect

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ARTICLE INFO

Received February 21, 2016
Received in revised March 10, 2016
Accepted June 13, 2016
Available online June 15, 2016

JEL classification:

G01, G14, G15

DOI:

10.14254/1800-5845.2016/12-1/4

Keywords:

Central and Eastern Europe (CEE),
financial crisis,
Halloween effect,
seasonal anomaly,
stock market

ABSTRACT

The Halloween effect is one of the best known share market calendar anomalies. It is based on the phenomenon when the summer period (May – October) returns tend to be lower compared to the winter period (November – April) returns. This paper investigates the presence of the Halloween effect on share markets of 12 CEE countries. The results show that although the Halloween effect pattern can be found in the majority of the CEE share markets, it is statistically significant only in the case of Poland and Ukraine. The data also show that the Halloween effect tends to be stronger on mature share markets of Germany and the USA than on the CEE share markets as a group, however there can be found some exceptions, such as the Ukrainian, Russian and Estonian share markets. In most of the cases, the Halloween effect grew stronger after the global financial crisis of 2008 although there are some exceptions such as the Lithuanian and Russian share markets.

1. INTRODUCTION

It is a known fact that various seasonal anomalies occur on the financial markets. Although their existence is in a direct contradiction to the efficient markets theory (Fama, 1965), some of the seasonal anomalies can be tracked several centuries back. One of the best known seasonal anomalies is the Halloween effect. The Halloween effect is based on the phenomenon when winter period returns (November to April) are higher than summer period returns (May – October). The Halloween effect is also known as “Sell in May and go away” or “Sell in May and come back after Halloween”. Various researchers came to conclusion that a Halloween effect based investment strategy may generate abnormal returns (see Literature Review).

Although the Central and Eastern Europe (CEE) region share markets keep on developing, they are still relatively young. Some of the CEE countries are members of the European Union or even members of the European Monetary Union but they are still perceived as emerging markets. A lot of attention has been paid to the development of the CEE financial markets but only relatively small attention has been paid to the CEE share markets regarding seasonal anomalies. This paper is focused on the investigation of the CEE share markets for the presence of the Halloween effect. It also compares the strength of the Halloween effect in the CEE region to the strength of the Halloween effect on mature share markets of Germany and the USA and it analyses the impacts of the 2008 global financial crisis on the Halloween effect pattern in these countries.

2. LITERATURE REVIEW

The Halloween effect is one of the best known calendar anomalies, along with the January effect or the Monday effect. A lot of attention has been paid to the calendar anomalies on financial markets, as these anomalies can be used to generate abnormal returns. For example Lakonishok and Smidt (1988) analysed 90 years of Dow Jones Industrial Average data and they discovered persistently anomalous returns around the turn of the week, turn of the month, turn of the year and around holidays. Zhang and Jacobsen (2013) investigated more than 300 years of data from the UK share market and they concluded that various seasonal anomalies can be found over particular time periods, however the strength of the anomalies varies significantly. Dzhabarov and Ziemba (2010) investigated the presence of the January effect, the Halloween effect, the Holiday effect, and the Turn-of-the-month effect, focusing on the small-cap share index Russell 2000 and large-cap share index S&P 500 over the 1993 – 2009 time period. They concluded that the seasonal patterns were stronger in small-cap shares. Gebka, Hudson and Atanasova (2015) came to conclusion that seasonal anomalies in combination with technical analysis are able to generate significant returns with low risk.

Some of the authors focused directly on the Halloween effect. For example Bouman and Jacobsen (2002) concluded that the Halloween effect is present on share markets of 36 countries. The results of Bouman and Jacobsen were later confirmed by Andrade, Chcaochharia and Fuerst (2013) who claimed that share returns tend to be about 10 percentage points higher during the November – April than during the May – October period. On the other hand Maberly and Pierce (2004) concluded that the results of Bouman and Jacobsen were driven by the October 1987 crash and by the collapse of the Long-Term Capital Management hedge fund and that after adjusting data for these two events, the anomaly is not statistically significant for the U.S. markets. Lean (2011) confirmed the presence of the Halloween effect on share markets in Malaysia, China, India, Japan and Singapore. On the other hand it is important to note also the research of Dichtl and Drobetz (2014) who concluded that a trading strategy based on the Halloween effect is unable to outperform significantly.

Although most of the authors agree that the Halloween effect does exist or at least did exist at a certain historical period, it is still unknown what is causing its existence. Lucey and Zhao (2008) suppose that the existence of the Halloween effect is related to the existence of the January effect. Hong and Yu (2008) assume that the Halloween effect is caused by the summer vacation period. The investors go for a Holiday and the trading activity falls down. According to Cao and Wei (2005), the Halloween effect is weather related, as investors tend to be more aggressive when the weather is colder and more apathetic when the weather is hot. But in the opinion of Jacobsen and Marquering (2008), it is premature to link the Halloween effect to the weather induced mood changes of investors. Another factor that may have an impact on the Halloween effect pattern is the amount of daylight. Kamstra, Kramer and Levi (2003) came to conclusion that the seasonal affective disorder (SAD) has an important impact on share market

returns, as the share markets tend to perform better during the periods of lower amount of daylight (autumn and winter).

Relatively lot of attention has been paid to economies and share markets of the CEE countries lately. For example Tzeng and Tay (2014) analysed the mechanism of transmission of the U.S. subprime crisis and the European sovereign debt crisis to emerging markets, some of the CEE countries included. Tendera-Wlaszczuk and Szymanski (2015) analysed the economic policies of the Visegrad Group countries. Silaghi and Alexa (2015) investigated the sources of economic growth of selected CEE countries over the 1993 – 2008 time period. Belas et al. (2014, 2015, 2015), Sobekova-Majkova et al. (2014), Abrham et al. (2015) and Ekes and Koloszar (2014) studied the environment in the SME segment of selected CEE countries. Also Harumova and Janisova (2014) focused on the healthiness of some of the CEE region companies. Wang, Jiang, Chang and Su (2015) investigated whether the Taylor rule is valid for the CEE countries. Alexy, Ochotnický and Kacer (2014) analysed the sovereign credit ratings of Slovakia, Czech Republic, Poland and Hungary. Palankai (2015) analysed the perspectives of adoption of the Euro currency in Central Europe. Reboredo, Tiwari and Albulescu (2015) examined the dependence structure between Czech, Hungarian, Polish and Romanian share markets. Galloppo, Paimanova and Aliano (2015) focused on the transparency and efficiency of the Eastern European share markets. Fedorova and Saleem (2010) analysed the relations between Polish, Hungarian, Russian and Czech share and currency markets. Bota and Ormos (2014) analysed the weak-form efficiency of the CEE share markets.

On the other hand only a limited attention has been paid to seasonal anomalies on CEE share markets. Norvaisiene, Stankeviciene and Lakstutiene (2015) investigated the presence of seasonal anomalies on Estonian, Latvian and Lithuanian share markets. Sander and Veiderpass (2013) focused on share markets of the Baltic countries as well and they discovered a strong turn-of-the-year effect. Oprea (2014) analysed four Romanian share indices over the 1998 – 2014 time period and he found no evidence of the Halloween effect. The authors investigating the presence of seasonal anomalies in the CEE region tend to focus on a relatively low number of countries. The aim of this paper is to fill this gap.

3. DATA AND METHODOLOGY

As mentioned above, the aim of this paper is to investigate the presence of the Halloween effect on share markets of 12 countries from the CEE region. Although not all of the CEE region countries are included, due to the lack of relevant data, countries covered by this paper generate the vast majority of the CEE region GDP as well as the vast majority of the CEE region share market trading volume. The share markets are represented by the benchmark share indices: BET (Romania), BUX (Hungary), CROBEX (Croatia), OMX Riga (Latvia), OMX Tallinn (Estonia), OMX Vilnius (Lithuania), PX (Czech Republic), RTS (Russia), SAX (Slovakia), SOFIX (Bulgaria), UX (Ukraine), WIG 20 (Poland). The time periods analysed vary significantly (table 1), as the age of the indices differ. The index values were gained from Quandl and Stooq databases.

Table 1: Basic statistics

country	share index	period analysed	number of years
Romania	BET	V. 1998 - IV. 2015	17
Hungary	BUX	V. 1991 - IV. 2015	24
Croatia	CROBEX	V. 1998 - IV. 2015	17
Latvia	OMX Riga	V. 2000 - IV. 2015	15

Estonia	OMX Tallinn	V. 2000 - IV. 2015	15
Lithuania	OMX Vilnius	V. 2000 - IV. 2015	15
Czech Republic	PX	V. 1994 - IV. 2015	21
Russia	RTS	V. 1996 - IV. 2015	19
Slovakia	SAX	V. 1996 - IV. 2015	19
Bulgaria	SOFIX	V. 2002 - IV. 2015	13
Ukraine	UX	V. 1998 - IV. 2015	17
Poland	WIG 20	V. 1994 - IV. 2015	21

Source: Own processing

As the Halloween effect is based on the assumption that the summer period returns are lower than the winter period returns, every year (12 consecutive months) is divided into two halves. The summer period lasts from May 1 of year x to October 31 of year x . The winter period lasts from November 1 of year x to April 30 of year $x+1$. As a result, returns for particular time periods are calculated using following formulas:

$$r_{sx} = \frac{PO_x - PA_x}{PA_x} \quad (1)$$

$$r_{wx} = \frac{PA_{x+1} - PO_x}{PO_x} \quad (2)$$

Where: r_s is return for the summer period, r_w is return for the winter period, x represents the calendar year, PO_x is October closing price in year x and PA_x is April closing price in year x .

If there is a Halloween effect present on a particular share market, the average winter period returns must be higher than the average summer period returns. To evaluate whether the differences between summer period and winter period returns are statistically significant, the Two-sample t-tests and Wilcoxon rank sum tests are performed. The Shapiro-Wilk test is used to determine whether the returns come from a normally distributed population. It means whether the parametric Two-sample t-test or the non-parametric Wilcoxon rank sum test is more appropriate for the given dataset. The F-test is used to determine whether the summer and winter period returns have equal variances and whether the Two-sample t-test for equal variances or the Two-sample t-test for unequal variances should be used.

This paper investigates whether there is a statistically significant Halloween effect on the CEE share markets and how it compares to the Halloween effect pattern on the mature share markets of Germany (DAX) and the USA (Dow Jones Industrial Average – DJIA). It also investigates whether the Halloween effect pattern has changed after the global financial crisis of 2008 and whether the impact of the crisis has been similar to the mature markets. For this purpose, two 6-year long time periods are analysed. The pre-crisis period lasts from May 2002 to April 2008 and the post-crisis period lasts from May 2009 to April 2015. The pre-crisis and post-crisis percentage of Halloween effect years and the pre-crisis and post-crisis differences between average summer period and winter period returns are compared to evaluate whether the pattern has changed.

4. RESULTS AND DISCUSSION

The data show that there are huge differences between particular CEE share markets. All of the share indices except of BET, OMX Riga and SAX recorded higher winter period returns during more than 50% of years over the investigated time period. At the same time, all of the share indices except of OMX Riga and SOFIX recorded higher average winter than summer period returns. On the other hand in most of the cases, the differences between summer and winter period results are not statistically significant. Table 2 shows results of the parametric Two-sample t-tests and non-parametric Wilcoxon rank sum tests. Result of the more appropriate test for each dataset, based on the results of the Shapiro-Wilk tests, is written in bold. The Halloween effect is statistically significant only in the case of Ukraine (UX) and Poland (WIG 20), at the 5% level of significance. On the other hand it is important to note that in the case of some other countries, e.g. Estonia (OMX Tallinn) or Croatia (CROBEX), the percentage of Halloween effect years as well as the differences between average summer period and winter period returns are high and it is able to assume that the tests were unable to confirm the statistical significance only due to the relatively short time periods and low volumes of data.

Table 2: Halloween effect in the CEE region

	average summer period returns	average winter period returns	% of Halloween effect years	Two-sample t-test (two-tailed p-values)	Wilcoxon rank sum test (two-tailed p-values)
BET	9.29%	13.38%	47.06%	0.682530	0.876825
BUX	4.23%	14.13%	58.33%	0.179422	0.148915
CROBEX	-2.18%	10.68%	76.47%	0.089467	0.094818
OMX Riga	7.18%	4.59%	46.67%	0.692047	0.851934
OMX Tallinn	1.37%	15.48%	73.33%	0.102072	0.092984
OMX Vilnius	7.32%	9.68%	66.67%	0.810181	0.633364
PX	-2.09%	6.16%	66.67%	0.124195	0.115896
RTS	3.08%	25.93%	68.42%	0.083091	0.156792
SAX	1.57%	2.67%	47.37%	0.869976	0.693486
SOFIX	12.85%	7.42%	61.54%	0.660404	0.590258
UX	-2.82%	35.31%	82.35%	0.012384	0.021993
WIG 20	-2.69%	10.70%	71.43%	0.033496	0.037954

Source: Own calculations

Data captured by Table 3 show the comparison between the Halloween effect in the CEE region and Halloween effect on mature share markets of Germany and the USA. The presence of the Halloween effect on the German and U.S. share market is investigated over various time periods, so that it can be directly compared to the results from the particular CEE share markets over the same time periods. The results confirm the findings of Swagerman and Novakovic (2010) that the Halloween effect is stronger in developed than in emerging markets. For DAX and DJIA, the Halloween effect was statistically significant over the 1991 – 2015, 1994 – 2015 and 1996 – 2015 time periods. For DAX, the Halloween effect was statistically significant also

during the 1998 – 2015 time period. Regarding the CEE region, the Halloween effect was statistically significant only in the case of UX and WIG 20, as mentioned above. Over the shorter time periods, the Halloween effect didn't prove to be statistically significant.

Table 3: Halloween effect in the CEE region – comparison with Germany and the USA

		average summer period re- turns	average winter pe- riod returns	% of Hallow- een effect years	statistically significant
BUX	1991 - 2015	4.23%	14.13%	58.33%	no
DAX		-0.05%	10.83%	75.00%	yes
DJIA		1.23%	7.49%	75.00%	yes
PX	1994 - 2015	-2.09%	6.16%	66.67%	no
WIG 20		-2.69%	10.70%	71.43%	yes
DAX		-0.62%	11.08%	76.19%	yes
DJIA		0.94%	7.81%	76.19%	yes
RTS	1996 - 2015	3.08%	25.93%	68.42%	no
SAX		1.57%	2.67%	47.37%	no
DAX		-0.67%	11.57%	73.68%	yes
DJIA		0.19%	7.18%	73.68%	yes
BET	1998 - 2015	9.29%	13.38%	47.06%	no
CROBEX		-2.18%	10.68%	76.47%	no
UX		-2.82%	35.31%	82.35%	yes
DAX		-1.65%	9.09%	70.59%	yes
DJIA		-0.64%	5.78%	70.59%	no
OMX Riga	2000 - 2015	7.18%	4.59%	46.67%	no
OMX Tallinn		1.37%	15.48%	73.33%	no
OMX Vilnius		7.32%	9.68%	66.67%	no
DAX		-1.46%	6.99%	66.67%	no
DJIA		-0.34%	4.85%	66.67%	no
SOFIX	2002 - 2015	12.85%	7.42%	61.54%	no
DAX		0.75%	8.13%	69.23%	no
DJIA		0.63%	5.02%	69.23%	no

Source: Own calculations

The global financial crisis was a major milestone in the development of global financial markets. Vast fiscal and monetary measures were adopted by governments and central banks around the World to cope with the crisis. The measures have had a major impact on the post-crisis development of financial markets, share markets included. Therefore it is able to assume that also the seasonal anomalies have been affected. Table 4 shows the average summer and

winter period returns and percentage of Halloween effect years during a 6-year pre-crisis period (May 2002 – April 2008) and a 6-year post-crisis period (May 2009 – April 2015). First of all, it is important to note that the statistical tests haven't proven the statistical significance of the Halloween effect in any one of the cases. But this fact can be attributed to the very short time periods and low number of data points.

Table 4: Halloween effect before and after the global financial crisis of 2008

	% of Halloween effect years		average returns			
	2002 - 2007	2009 - 2014	2002 - 2007		2009 - 2014	
			summer	winter	summer	winter
BET	16.67%	50.00%	24.57%	11.14%	5.42%	13.10%
BUX	50.00%	50.00%	7.68%	10.93%	5.64%	7.78%
CROBEX	66.67%	66.67%	11.38%	11.36%	-0.27%	3.64%
OMX Riga	50.00%	66.67%	8.04%	10.27%	6.74%	6.22%
OMX Tallinn	66.67%	66.67%	7.56%	16.51%	6.84%	16.51%
OMX Vilnius	66.67%	50.00%	14.27%	18.55%	16.58%	6.07%
PX	66.67%	50.00%	9.99%	13.98%	-0.10%	4.26%
RTS	66.67%	50.00%	11.60%	22.69%	4.80%	2.99%
SAX	33.33%	66.67%	12.17%	17.34%	-5.22%	0.83%
SOFIX	33.33%	83.33%	37.31%	11.64%	-0.01%	8.99%
UX	83.33%	50.00%	14.27%	48.00%	-4.49%	23.43%
WIG 20	50.00%	50.00%	11.05%	5.82%	4.24%	2.49%
CEE average	54.17%	58.33%	14.16%	16.52%	3.35%	8.03%
DAX	66.67%	66.67%	2.75%	5.79%	3.59%	12.56%
DJIA	66.67%	66.67%	2.23%	2.67%	3.66%	10.27%

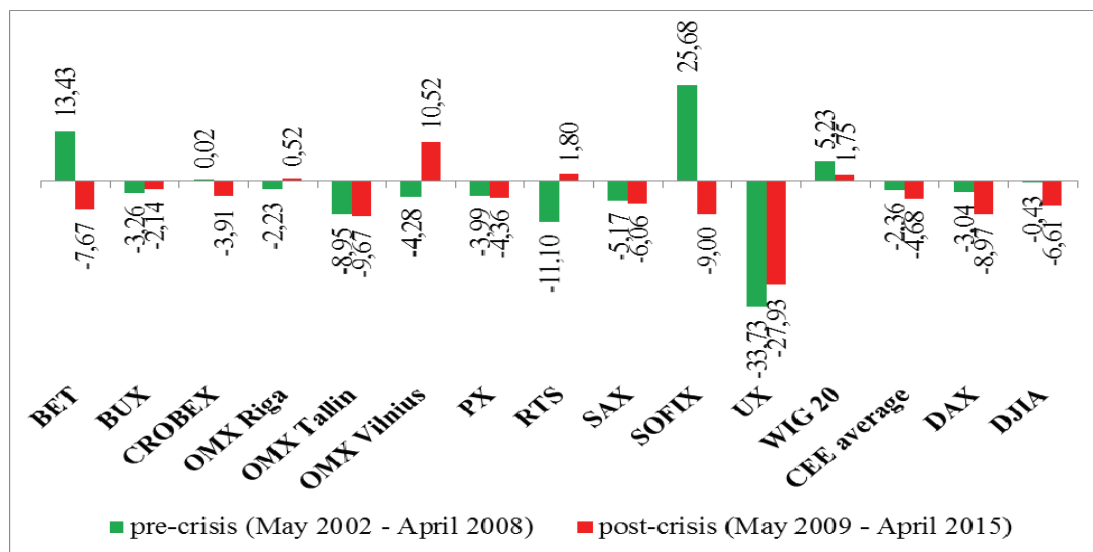
Source: Own calculations

Data in Table 4 also show that the impacts of the 2008 crisis were different country to country. For example the percentage of Halloween effect years increased rapidly in Romania (BET), Slovakia (SAX) and Bulgaria (SOFIX) after the crisis. A meaningful decline could be seen in the case of Ukraine (UX). Overall, the percentage of Halloween effect years increased in 4 cases, it declined in 4 cases and in 4 cases it remained unchanged. The average percentage of Halloween effect years for the CEE countries increased from 54.17% to 58.33%. In the case of DAX and DJIA it remained unchanged at 66.67%.

The average summer period and winter period returns for the pre-crisis and post-crisis periods are captured by Table 4 as well. Figure 1 shows the pre-crisis and post-crisis differences (in percentage points) between average summer period and winter period returns. A negative number means that winter period returns were higher than summer period returns and vice versa. It is able to see again that the development is very different country to country. For example in Romania (BET), the average summer period returns were higher than average winter period returns by 13.43 percentage points during the pre-crisis period and they were by 7.67 percentage points lower during the post-crisis period. On the other hand in Russia (RTS) a

strong Halloween effect (-11.1 percentage points) reversed completely (to 1.8 percentage points). During the pre-crisis period, average summer period returns beaten the average winter period returns in the case of Romania (BET), Croatia (CROBEX), Bulgaria (SOFIX) and Poland (WIG 20). The same claim is valid also for the 2009 – 2015 period but this time for Latvia (OMX Riga), Lithuania (OMX Vilnius), Russia (RTS) and Poland (WIG 20). Overall, the average difference between summer and winter period returns increased from -2.36 to -4.68 percentage points for the 12 CEE share markets. Regarding DAX and DJIA, the Halloween effect strengthened as well, given the growth of the difference between average summer and winter period returns from -3.04 to -8.97 and from -0.43 to -6.61 percentage points respectively.

Figure 1. Pre-crisis and after-crisis differences between average summer and winter period returns (in percentage points)



Source: Own processing

Based on the abovementioned data, it is able to conclude that the Halloween effect pattern strengthened after the global financial crisis. It is in a partial contradiction with Dichtl and Drobetz (2015) who claimed that the Halloween effect weakened or completely disappeared in recent years. Although the Halloween effect was weaker during the 2002 – 2008 period than during the whole longer-term period in most of the cases, its strength increased again during the 2009 – 2015 period. This finding is in line with findings of Zhang and Jacobsen (2013) who investigated more than 300 years of the UK share market data concluding that the strength of the seasonal anomalies changes over time significantly.

5. CONCLUSION

The emerging share markets of the CEE region have come a long way since their inception in the 90's. This paper focused on the investigation of presence of the Halloween effect on CEE share markets. It is able to conclude that the Halloween effect pattern could be seen on various CEE share markets since their inception during the 90's, however the statistical tests show that only in the case of Poland and Ukraine we can talk about a statistically significant Halloween effect. The comparison of the Halloween effect on the emerging CEE share markets and on the

mature German and U.S. share markets shows that it is possible to come to a generalised conclusion that the Halloween effect is stronger on the mature markets. However it is important to note that there are huge differences between particular CEE share markets and in the case of countries such as Ukraine, Russia or Estonia, the differences between average summer period and winter period returns are far bigger compared to Germany or the USA.

The analysis also shows that the global financial crisis of 2008 had a mixed impact on the Halloween effect pattern in the CEE region. In general, it can be said that the Halloween effect was stronger during the 6-year post-crisis period than during the 6-year pre-crisis period. But once again, huge differences between particular countries can be observed. The biggest extremes can be seen in the case of Romania where the Halloween effect appeared after the crisis and in Russia where a strong pre-crisis Halloween effect disappeared after the crisis. Comparing the impacts of the crisis on the whole CEE group to the impacts of the crisis on the German and U.S. share markets it can be said that the crisis resulted into a stronger Halloween effect in all of the three cases, although the Halloween effect pattern was more positively affected in the case Germany and the USA.

This paper shows that the Halloween effect can be found also on share markets of the CEE region. It also confirms findings of Zhang and Jacobsen (2013) that the strength of seasonal anomalies changes over time. Also the finding of Swagerman and Novakovic (2010), that the Halloween effect is stronger in developed than in emerging markets, is valid for most of the CEE region share markets.

Acknowledgement

This contribution is the result of the project implementation VEGA (1/0124/14) "The role of financial institutions and capital market in solving problems of the debt crisis in Europe".

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