
**BLACK FRIDAY AND OTHER EFFECTS -
ARE THEY STILL SUSTAINABLE IN FINANCIAL MARKETS?**

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Received 15 October 2019; accepted 9 April 2020; published 30 June 2020

Abstract. Investment in the modern world is growing (according to EUROSTAT, the annual growth rate for non-professional investors in Europe is 3% between 2016 and 2018) and both professional and non-professional investors are becoming market participants. For these reasons the sustainability of financial markets effects are becoming very important and widely discussed topic. According to Khan (2011), the ability to use calendar effects properly can bring profits. In order to understand calendar effects behavioral finance theory plays an important role. It explains the factors behind investor behavior that cause markets to have effects like black Friday, January, weekend, Halloween and many other. Calendar effects sustainability are one of the most widely discussed topics in the financial market literature because their analysis is able to explain changes in returns. This research analyzed US financial market based on S&P 500 index changes. In examined 2009-2018 period black Friday effect is no longer sustainable. Meanwhile January and Halloween effects were sustainable. Obtained results further more confirm importance of examining calendar effects and approves ideas of behavioral finance theory authors.

Keywords: calendar effects, black Friday effect, January effect, Halloween effect, weekend effect, market anomalies, financial markets sustainability

Reference to this paper should be made as follows: Dailydytė, I., Bužienė, I. 2020. Black Friday and other effects - are they still sustainable in financial markets, *Journal of Security and Sustainability Issues*, 9(3), 1243-1255. [http://doi.org/10.9770/jssi.2020.9.4\(11\)](http://doi.org/10.9770/jssi.2020.9.4(11))

JEL Classifications: D53

1. Introduction

Financial markets are one of the most popular investment direction not only in Europe but also worldwide. Investment decisions depend on many aspects such as: selected type of investment, position of financial market now and in the future, expected returns. These days it is no longer offered to rely on past performance to make right decisions for the future. Past behavior is no longer sustainable. Despite these factors the actions of investors are becoming increasingly important in financial markets. One of the main ideas of classical financial theory according to Fama (1965) "The Behavior of Stock-Market Prices" announce that investors and their decisions in financial markets are rational. According to that stock prices cannot be defined or predicted. However classical financial theory was not able to explain why sudden and periodic stock price deviations exists. Theory of financial behavior (also known as behavioral finance) is being increasingly studied these days. This theory contrary to Fama (1965) states that decisions made by investors are not rational and often affected more by psychological aspects than economic (Ritter, 2003). This theory examines and explains various markets deviations, seasonality and causes of calendar effects. There are few calendar effects on the financial market but most popular is black Friday, Halloween, weekend, January effects.

The purpose of this paper is to analyze black Friday and other calendar effects and determine whether calendar effects are still sustainable on the financial markets.

2. Literature review

In financial theory the key ideas of leading authors combine the notions of investor rationality and market efficiency. Modern portfolio theory brings up the main idea that investors are rational and market is efficient (Markovitz, 1952). These ideas were also agreed and reiterated by Modigliani, an Italian-American economist along with another American economist Miller (1961). The efficient market hypothesis developed by Fama (1970) states that prices fully reflect all available information in the market. In other words - the market is efficient because investors accept all available information, prices are directly influenced by it so future prices cannot be predicted. Based on these ideas it can be concluded that authors believe - prices tendency cannot be influenced by calendar effects, seasonality or other market anomalies. Stock price fluctuations and anomalies have allowed another discipline behavioral finance to develop. Behavioral finance unlike classical financial theory is able to explain the causes of such phenomena.

Behavioral finance - is stated the opposite of classic financial theory. Statman (2014) described behavioral finance as a solid structure that combines certain parts of standard finance replacing them with others and adding “bridges” between theory, evidence and practice. Other definitions of this theory also exist: Shiller (2003) defines behavioral finance as a broader perspective that includes psychology and sociology. No matter how we formulate the definition of behavioral finance it will combine all authors ideas that classical financial theory was not able to explain certain market anomalies and that investors behavior is not always rational. Behavior finance takes into account more factors that determine investment decisions than classical theory. Most important factors are given in Table 1.

Table 1. Psychological factors influencing decision making

	Fisher (2014)	Byrne, Utkus (2013)	Jurevičienė, Jermakova (2012)
Cognitive/ heuristic	Representativeness Availability Anchoring Affect heuristic Mental accounting	Anchoring Representativeness Availability Conservatism	Tendency to focus on recent experience Tendency to trust your knowledge Optimism
Emotional	Glass half empty/half full Aversion to sure loss	-	Fear Love A sense of generality Greed

Source: compiled by the authors based on the authors mentioned in the table

Information in the Table 1 shows that factors such as representativeness, availability, conservatism/tendency to focus on recent experience, fear/aversion to sure loss are discussed by more than one author, so it can be assumed that their importance in decision making is much greater.

Pompian (2012) presents the following segments of psychological factors that influence decisions:

- **Cognitive/heuristic.** According to Pompian they are divided into two categories: belief perseverance - propensity to adhere to one already existing or recently accepted unreasonable/illogical belief. According to author another category relates to how people illogically/irrationally handle information when making various financial decisions.
- **Emotional.** According to Pompian those are mostly decisive of impulses, intuitions so they are much more difficult to control than cognitive. Often, emotional factors are easier to adapt than trying to correct them.

Market anomalies and their classification. Lithuanian dictionary introduce the concept of anomaly as – “*anomaly - irregularity, deviation from the norm*” however the term anomaly itself is associated with Kuhn (1970). In his view the established paradigm shifts with an increasing number of anomalies and cannot explain why anomalies occur. Market anomalies can be understood as empirical results that are completely inconsistent with existing pricing theories (Schwert, 2002). Tversky and Kahneman (1986) anomaly describe the as: - “*a deviation from current paradigms that are too widespread to be ignored, too systematic to be dismissed as accidental error and too fundamental to be applied in the relaxation of the normative system*” (*The Journal of Business*, 59(4), p.251-278). It is noticeable that ideas of Kuhn, Tversky and Kahneman, Schwert are based on deviations from the existing, well-established situation. Tversky and Kahneman also emphasize an important feature of anomalies – systematics. Anomalies are sustainable in many areas including and financial markets. Market anomalies are mostly influenced by investors psychological factors such as mood, desire to be like others or be different than others, social factors and many others discussed earlier. According to Avramov et al (2015) anomalies reflect persistent behavioral trends in financial markets. Anomalies are fundamentally contrary to the efficient market hypothesis and the hypothesis itself cannot explain the cause of such anomalies. Behavioral finance which can explain market anomalies sustainability is currently rapidly expanding field attracting more and more researchers to understand not only the anomalies themselves but also how they can be sustainably used for profit. Investors can use anomalies for profit to get statistically reliable and “positively rated risk” returns (Khan, 2011).

In the scientific literature about market anomalies can be studied by many authors (Schwert, 2002; Cao and Wei, 2005; Latif et al 2011; Dzhaharov and Ziemba, 2011; Masood et al., 2019; Masood et al., 2020; Chehabeddine, Tvaronavičienė, 2020) agree on sustainable anomalies which can be divided into:

1. Calendar effects (January/turn of the year, weekend, Friday/Black Friday, pre-holiday, Halloween, etc.)
2. Fundamental effects (value, size, momentum effect, etc.)
3. Technical effects (moving averages, short-term price drift, etc.)

To sum up anomalies are perceived as a deviation from the norm (Lithuanian dictionary) and their sustainability is noticeable in many areas. The existence of market anomalies is greatly influenced by psychological factors which are examined by authors such as Fisher (2014); Byrne and Utkus (2013); Jurevičienė and Jermakova (2012) and others. Analyzing anomalies and using it properly can help to make a profit Khan (2011). There are three major types of market anomalies but most sustainable analyzed anomalies are calendar effects/calendar anomalies because their analysis is able to explain changes in returns. According to Khan (2011) ability to use calendar effects properly can bring profits, therefore calendar effects will be examined widely.

3. Black Friday and other effects - calendar market anomalies

In Nawaz and Mirza (2012) review about calendar anomalies authors described them as irregular manifestation of stock returns that recur over a given calendar period. Calendar anomalies/calendar effects are different stock market behavior occurring over a certain calendar period, with a perennial tendency (Burton and Shah, 2013). Average changes in market index prices depend on day, month and year so researchers increasingly analyze the sustainability of these anomalies in stock markets. Analyzing and understanding calendar effects can be the key to find the right investment time. Many authors have tried to observe these calendar anomalies which already been observed over the time on different global stock exchanges. Nawaz and Mirza (2012) highlighted weekend, month, January and holiday effects. Those effects were also emphasized by Dzbabarov and Ziemba (2011); Chinko and Avci (2009) and others.

In Burton and Shah (2013) book already discussed calendar effects are analyzed and additionally emphasized pre-holiday effect. Garg, Bodla and Chhabra (2010) examine Friday effect. Dzbabarov and Ziemba (2011) analyzed market anomalies in 1993-2009. During this period authors noticed that anomalies in the market are still sustainable and the same as before, only change during this period is change in stock prices. In authors opinion effects such as January, month, holiday have high forecasting accuracy and it create value. A lot of the literature highlighted very similar effects so in this paper some of the most common and some of the less studied

but very important effects will be highlighted:

- Black Friday/Friday effect
- January effect/turn of the year
- Weekend effect
- Halloween effect

Black Friday effect. Historically, Black Friday on financial market has the opposite meaning than these days and is not associated with retails. Black Friday - 1869 September 24th stock market disaster. On this day, after a long period of speculation the gold value has plummeted and market has fallen tremendously (Wimmer, 1975 „*The gold crisis of 1869*“). These days concept of “Black Friday” is more commonly used in retail when after US Thanksgiving day supermarkets offered various discounts on goods and services. However Black Friday (or simply Friday) anomaly is also sustainable in financial markets, when market returns are higher than usual on this day. Black Friday trends are really important for possibility to get a higher profits (Lenkkeri et al, 2006). Traders applied discounts may affect their stock prices so investors analyze market during this time, observing the retail sector as well. There are opinions that strong Black Friday can predict a good upcoming holiday season and of course higher returns during that period. Caporale (2017) examined the sustainability of this effect in the markets (stock prices, FOREX, etc.). According to a survey this anomaly in the stock market is not strong but FOREX and gold markets are strongly reacting to this calendar day. Garg et al (2010) noticed that Friday is the last day before the weekend when investors tend to buy more shares than usual so this day returns are significantly higher compared to other days. However, there are some markets where this effect is no longer sustainable - Nawaz and Mirza (2012) state that in Singapore and Kuwait stock markets this effect is not noticed.

January/turn of the year effect. One of the most common effects found in literature is January effect. In 1976 Kinney carried out first empirical research and proved that January effect in US financial market exists. This stock market anomaly has its own explanation: “*as goes January, so goes the year*” (Coopera et al, 2006). January and other calendar effects sustainability prove that efficient market hypothesis is not entirely correct in practice. January distinguished by a significant change in returns, however Burton and Shah (2013) believe that January effect is quite different from others. According to the authors, tax aspect plays an important role here. Losses on shares sale can benefit the taxpayer when the taxable income is reduced due to the loss. These sales usually occur at the end of the year, causing stock prices to fall even further. In January the number of these sales decrease so stocks are recovering (Burton and Shah, 2013). This idea is also expressed by Roll (1983). Dzhabarov and Ziemba (2011) research proves that this effect not only exists in financial market but is as significant sustainable as ever.

Weekend effect. Burton and Shah (2013) describe weekend effect as the idea that investment returns are unusually low at the beginning of the week and unusually high at the end of the week. Weekend effect is another anomaly proving that market participants are not completely rational. This effect is explained through several prisms. One is that companies have a tendency to report bad news on Fridays before the market closes, so on Monday the stock reacts to it and their prices fall (Kamara, 1997). Moosa and Ramiah (2017) also think that weekend effect can be understood through investor mood - comparing Monday to Friday. Important calendar anomalies are analyzed in different markets: Sutheebanjard and Premchaiswadi (2010) analyze the sustainability of this effect in Thailand stock market during 2005-2009 period and noticed its existence. Of course many before mentioned authors examine the sustainability of this effect: Burton and Shah (2013) noticed this effect existence in US stock market and higher Fridays profitability since 1952. Nawaz and Mirza (2012) in literature review about calendar anomalies, highlighted that weekend effect is one of the most popular anomalies.

Halloween effect. The Halloween effect is based on the idea that investment returns are higher between October 31st. (Halloween) and May 1st. This theory states that it would be wise for investors to buy shares from November till April. Halloween effect is based on the idea - *sell in May and go away*, which would mean that it is expedient to sell in May because the value of the shares is higher (Dzhabarov and Ziemba , 2010). This effect is still widely studied in different countries markets: Carrazedo, Curto and Oliveira (2016) analyzed Hallow-

een effect in Europe and noticed that strategy *sell in May and go away* is completely reliable trading strategy. Empirical results show that it works every two out of three calendar years and can be applied to more than 95% of the sample (Carrazedo et al, 2016). This effect is still sustainable today. Bouman and Jacobsen (2002) believe that this effect may be influenced by summer holidays. They affect market liquidity - as investors are disinclined to risk during the summer period, which directly determines the difference in returns between different seasons. Jacobsen and Zhang (2014) research has proven that Halloween effect sustainable in 86 of 108 countries, authors noticed that this market anomaly has only intensified over last 50 years. However, there are authors who take the opposite view: according to Dichtl and Drobetz (2015) research Halloween effect is no longer sustainable and the strategy *sell in May go away* no longer give free returns.

To sum up calendar effects are widely studied by many authors: Dichtl and Drobetz (2015); Jacobsen and Zhang (2014); Burton and Shah (2013); Dzhubarov and Ziemba (2011), etc. Over the time authors noticed that most sustainable calendar effects in markets are Black Friday/Friday, January/turn of the year, Halloween and weekend effects. Although research shows that these effects still sustainable in financial markets (Dzbabarov and Ziemba, 2011), analyzing individual anomaly some researches deny their existence (Dichtl and Drobetz, 2015, Nawaz and Mirza, 2012), that is why this topic is still widely researched.

4. Research methodology

The main purpose of this research is to determine if calendar effects like: Black Friday, January/turn of the year, weekend, Halloween are noticeable and sustainable in US financial market. In order to determine it S&P 500 index data of 2009-2018 period were analyzed (data is taken from official Nasdaq webpage). Main research methods are statistical data analysis, graphical representation (using MS Excel).

Daily changes. Daily changes are important for examining Black Friday effect. They are calculated from the difference between shares value at the beginning of the day and at the end of the day, which is available online. From available data daily average changes were calculated for each day of the week (averages for each Monday, Tuesday, etc. changes from 2009 till 2018). Results show the tendency of different days of the week for the whole period. The received averages are used to calculate overall average for each day (Table 2), average of X is calculated using the formula -

$$\bar{X} = \frac{\sum_i^n X_i}{n}$$

Table 2. Calculation of daily changes

	Monday	Tuesday	Wednesday	Thursday	Friday
2009	X Monday average 2009	X Tuesday average 2009	X Wednesday average 2009	X Thursday average 2009	X Friday average 2009
2010	X Monday average 2010	X Tuesday average 2010	X Wednesday average 2010	X Thursday average 2010	X Friday average 2010
...	-	-	-	-	-
2018	X Monday average 2018	X Tuesday average 2018	X Wednesday average 2018	X Thursday average 2018	X Friday average 2018
2009-2018 averages	X Mondays average 2009-2018	X Tuesdays average 2009-2018	X Wednesdays average 2009-2018	X Thursdays average 2009-2018	X Fridays average 2009-2018

Source: compiled by the authors based on statistical formulas

Weekly changes. Weekly changes are necessary in order to determine January/turn of the year effect sustainability in the US financial markets. They are calculated as the difference between Friday and Monday index values. Average changes (averages) are calculated as an average of week-day (Monday-Friday) value changes comparing to previous day (see Table 3).

Table 3. Calculation of weekly changes

	1st. week	2nd. week	...	52nd. week
2009	X average 2009 1st week (Monday change+ Tuesday change +...+Friday change)/5	X average 2009 2nd week (Monday change+Tuesday change +...+Friday change)/5	-	X average 2009 52nd week (Monday change+ Tuesday change +...+Friday change)/5
2010	X average 2010 1st week (Monday change+ Tuesday change +...+Friday change)/5	X average 2010 2nd week (Monday change+ Tuesday change +...+Friday change)/5	-	X average 2010 52nd week (Monday change+ Tuesday change +...+Friday change)/5
...	-	-	-	-
2018	X average 2018 1st week (Monday change+ Tuesday change +...+Friday change)/5	X average 2018 2nd week (Monday change+ Tuesday change +...+Friday change)/5	-	X average 2018 52nd week (Monday change+ Tuesday change +...+Friday change)/5
2009-2018 averages for individual weeks	X average 2009-2018 1st week (2009 1st.week average+ 2010 1st.week average.+...+2018 1st. week average)/10	X average 2009-2018 2 nd. week (2009 2nd.. week average+ 2010 2nd. week average.+...+2018 2nd.week average)/10	-	X average 2009-2018 52 nd. week (2009 52nd.. week average+ 2010 52nd.week average.+...+2018 52nd. week average)/10

Source: compiled by the authors based on statistical formulas

Monthly changes. Monthly changes allow to evaluate whether Halloween effect on the US financial market exists or not. They are calculated as the difference between last and first day of the month. Every day index change is aggregated into months and calculated as total monthly change using the formula of averages (*Table 4*).

Table 4. Calculation of monthly changes

	January	February	...	December
2009	X average of 2009 (January 1st.+January 2nd.+... +January 31st.)/31	X average of 2009 (February 1st.+February 2nd.+... February 29th.)/28	-	X average of 2009 (December 1st.+December 2nd. +...+December 31st.)/31
2010	X average of 2010 (January 1st.+ January 2nd.+...+January 31st.)/31	X average of 2010 (February 1st.+February 2nd.+... February 29th.)/28	-	X average of 2010 (December 1st.+ December 2nd.+...+December 31st.)/31
...			-	
2018	X average of 2018 (January 1st.+ January 2nd.+...+January 31st.)/31	X average of 2018 (February 1st.+February 2nd.+... February 29th.)/28	-	X average of 2018 (December 1st.+ December 2nd.+...+December 31st.)/31
2009-2018 monthly changes	X average 2009-2018 (January 2009 average+January 2010 average+...+January 2018 average)/10	X average 2009-2018 (February 2009 average+February 2010 avera ge+...+February 2018 average)/10	-	X average 2009-2018 (December 2009 average+ December 2010 average+...+ December 2018 average)/10

Source: compiled by the authors based on statistical formulas

Using MS Excel's STDEV function standard deviations for the relevant periods (weekly, months) have been calculated which show the dispersion of the averages obtained over the observation period around the average. This will help to estimate the riskiness of investing in different periods. Results of index changes over the time will be expressed as a percentage to facilitate the interpretation of the resulting data. All S&P 500 index changes will help to find out does calendar effects exist and are they sustainable in the US financial markets.

5. Research results

After reviewing literature about calendar effects, this section will provide the results obtained by examining trends in the S&P 500 index. S&P 500 (SPX) index values and changes are calculated as the difference between current and the previous trading day.

Black Friday effect. For this effect analysis daily changes were examined. They show index changes for different days of the week and their averages. This allows to notice the difference between days of the week, compare index changes on a regular Friday and other days of the week with index changes on a Black Friday. 2009-2018 period was examined - Black Friday date fluctuated between November 23rd-28th. Different days changes shown in the Table 5.

Table 5. Index daily average changes for 2009-2018

Days	Years										
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2009-2018
Mondays	1,98	2,09	1,17	0,39	-1,15	-1,22	-0,81	0,24	-0,06	-0,67	0,20
Tuesdays	-0,91	-0,56	-2,69	1,10	0,88	1,71	0,00	0,89	1,93	-3,58	-0,12
Wednesdays	2,46	2,46	3,42	-0,46	2,38	0,57	-1,64	1,53	0,56	-0,87	1,04
Thursdays	1,27	0,12	-2,61	1,39	-0,48	2,53	4,41	0,95	0,50	-1,05	0,70
Fridays	0,24	-1,22	0,95	0,46	2,77	-1,64	-0,68	-0,80	-0,14	2,18	0,21
Black Friday change	-13,98	-4,76	-2,74	18,12	-2,88	-7,22	1,29	7,08	0,00	-0,80	-0,59

Source: compiled by the authors based on obtained results

From the Table 5 results, days with the highest returns for analyzed period are Wednesdays and Thursdays, when change in returns was higher than the other days. Average change on Wednesday is 3.5 times bigger than total index change on Monday, Tuesday and Friday combined. Meanwhile, Thursday's change is 2.4 times bigger. Based on overall averages for the entire period Friday and Monday index changes were similar about ~ 0.2. Tuesdays mostly had negative returns. Only 30% of the total period Black Friday gave a positive return. Black Friday, November 23rd, 2012 had an unusually positive 18.12 change - 17.65 points higher than average for that year Fridays returns. Based on Table 5 data another table with percentage day index change was made which makes it easier to see which days of the week were most profitable.

Table 6. Daily Profitability 2009-2018 (Percent)

	Profitable	Unprofitable
Mondays	50%	50%
Tuesdays	60%	40%
Wednesdays	70%	30%
Thursdays	70%	30%
Fridays	50%	50%
Black Friday change	40%	60%

Source: compiled by the authors based on obtained results

Data in Table 6 shows that during 2009-2018 period changes in the US S&P 500 stock index were profitable on Tuesdays, Wednesdays and Thursdays, while Monday and Friday index changes showed the same profitability and unprofitability. Black Friday did not reveal - 60% of the index change was negative and the overall average index change for all Black Fridays was - 0.59. However, in 2012 and 2016 Black Friday return changes were unusually large, so cannot be assert that Black Friday effect have disappeared. Data in a Table 5 shows tendency - the index change is unusually large every 3 years (2015 change is positive but not unusual). This research results confirm the argument that Black Friday effect still exist. However, it is statistical significance and impact on US financial markets should be proven by larger data sample research.

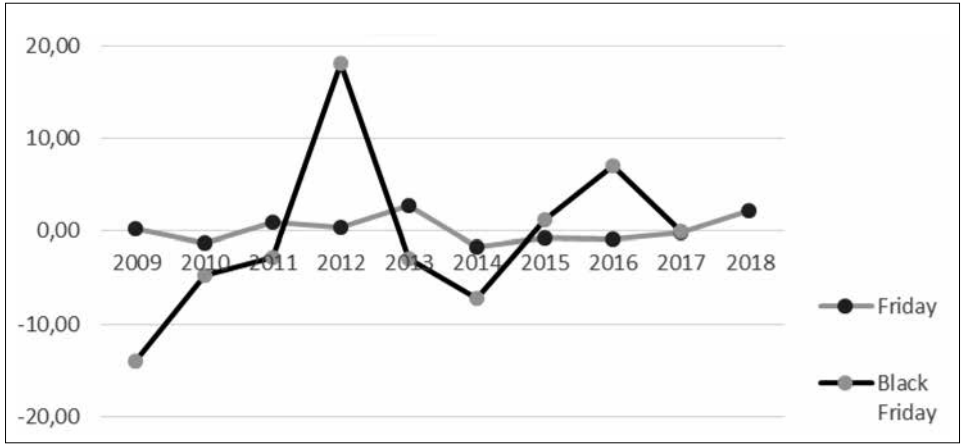


Figure 1. Friday and Black Friday tendency 2009-2018

Source: compiled by the authors based on obtained results

As shown in Figure 1, Fridays have a tendency - from 2009 index changes are decreasing, after year they are increasing and it repeats until 2017. Fridays trend is strong in 2010-2016 period, but in 2017-2018 period change was positive. Does Friday tendency recur cannot be determined from Figure 1. Until 2012 index change is increasing, later in 2014 it significantly decrease and in 2016 again a significant positive change in the index is observed. To confirm this trend larger sample needs to be considered. Analyzing only Black Friday data changes, Black Friday has no trend over the analyzed period. Index changes only 4 times were positive of which 2 times was unusually high. Based on obtained data, the sustainability of the Black Friday effect cannot be confirmed - Black Friday did not occur in the US during the analyzed period of 2009-2018.

January/turn of the year effect. To verify January/turn of the year effect weekly S&P 500 index was observed. Changes were examined in order to confirm or deny that January returns are higher than those in December. Observed weekly changes allowed broader data analysis and more accurate testing of the effect. Weekly changes calculation was described in the research methodology. Data shows that December index values were mostly negative and especially returns of the last weeks of December. Index change for the last week of December (whole analyzed period) was - 109,63. Average index changes in December were - 31.48 while in January 2.71. Weekly changes already show that January changes are positive and return is higher than in December. Big difference is seen between the last week and the first week of the year - index change is 103.45.

Table 7. January and December weekly profitability 2009-2018 (%)

	January		December	
	Profitable	Unprofitable	Profitable	Unprofitable
First week	70%	30%	50%	50%
Second week	60%	40%	50%	50%
Week three	50%	50%	70%	30%
Week four	60%	40%	20%	80%
Average one week profitability	60%	40%	47%	53%

Source: compiled by the authors based on obtained results

Table 7 data shows that in January 3 of 4 weeks are profitable and weekly profitability overall reaches 60%. December results are opposite - 3 out of 4 weeks are showing negative returns. In order to enhance the accuracy of the weekly changes profitability, average weekly profitability were calculated. According to the data of January between 2009 and 2018 period, index changes were mostly negative and amounted to about - 0.35. However, in December average weekly changes over the whole period were - 0.76 and it is 2 times lower than in January.

Average changes expressed as a percentage are given in the following table:

Table 8. January and December average weekly changes 2009-2018 (%)

	January		December	
	Profitable	Unprofitable	Profitable	Unprofitable
First week	70%	30%	40%	60%
Second week	50%	50%	30%	70%
Week three	40%	60%	80%	30%
Week four	50%	50%	40%	60%
Average one week change	53%	47%	47%	53%

Source: compiled by the authors based on obtained results

Differences between data in Table 7 and Table 8 are visible. First January week showed a positive index change. 2 out of 4 weeks portability was 50% and one week was unprofitable. Third week of December was the most profitable of the entire period, while remaining three weeks were unprofitable. January data also show that week three has a negative profitability but it is not significant because, overall January profitability (all 4 weeks) is positive and confirms the trends observed in Table 7. To confirm obtained results, standard deviations of analyzed data were calculated. The last 3 years weekly index have higher than average standard deviations 10,32; 11,14; 11,76. However, these standard deviations reflect investment risk associated with negative returns. This only further confirms the sustainability of January/turn of the year effect in the analyzed 2009-2018 period in the US financial market.

Halloween effect. For this effect analysis monthly S&P 500 index changes were selected in order to see if returns from November to April are higher than returns from May to October. Monthly index changes show that index change during the Halloween period is 12.8, while in non-Halloween period change is 9.41. Most profitable months were March, July and November. Two of these months belong to Halloween period. Profitable and unprofitable monthly changes are expressed as percentage in the following data:

Table 9. 2009-2018 months profitability 2009-2018

	January	February	March	April	May	June	July	August	September	October	November	December
Profitable	50%	70%	70%	70%	60%	30%	80%	50%	60%	70%	90%	80%
Unprofitable	50%	30%	30%	30%	40%	70%	20%	50%	40%	30%	10%	20%

Source: compiled by the authors based on obtained results

5 out of 6 months of Halloween period (November-April) are profitable. 4 out of 6 months of non- Halloween period (May-October) are also profitable. To enhance reliability of obtained results the average monthly changes were calculated. November - April and May - October average changes over the whole period were negative. Biggest index change is recorded in July and does not belong to the Halloween effect. However, overall Halloween period average was 48% higher than in May - October and this confirms sustainability of the effect again.

Table 10. Monthly average changes in percentage 2009-2018

	January	February	March	April	May	June	July	August	September	October	November	December
Profitable	50%	70%	50%	70%	60%	30%	80%	50%	60%	70%	90%	80%
Unprofitable	50%	30%	50%	30%	40%	70%	20%	50%	40%	30%	10%	20%

Source: compiled by the authors based on obtained results

Table 10 data shows that November – April has 4 profitable and 2 neutral months (November is the most profitable of the whole period). In contrast, May – October has 4 profitable months and 1 neutral month (profitability and unprofitability are 50%). June is the most unprofitable month of all years. Halloween period profitability (for all months combined) is 68% and May to October 58%, so this further confirms Halloween effect. Standard deviations also confirms the Halloween effect: monthly standard deviations are high and associated with positive returns. Average maximum standard deviation for the whole period is being recorded in February 12,64. Considering non-Halloween period, during the 2009-2018 highest standard deviations are observed in June (11,47) and August(11,84), but they are associated with negative returns, so investment risk during this period is high. All obtained data allows to state that in 2009 - 2018 period in US financial markets Halloween effect were sustainable.

Research results disprove the sustainability of Black Friday effect but do not prove that effect disappeared because returns change due to this effect was unusually large for 2 periods. While Black Friday effect on US financial market was not sustainable, the January/turn of the year and Halloween effects were active. In January, 3 weeks were mostly profitable, while December had 3 unprofitable weeks. Weekly changes and weekly average changes showed different results, but overall January profitability for the whole period was higher than December. Halloween effect in the US was most sustainable, because 5 out of 6 Halloween months were profitable. The results obtained from average index changes further more confirmed the effect: 68% November to April were profitable in analyzed 2009 - 2018 period. Two of the three examined calendar effects in the US financial markets occurred and were sustainable in analyzed 2009-2019 period.

Conclusions

Classical financial theory, which states that investors are rational and make decisions based on all available information in the market (Markovitz, 1952) could not explain the origin of recurring trends in financial markets and did not reflect the real market situation. This led to emergence a new and still developing discipline - behavioral finance. It combines classical financial theory with other sciences: psychology, sociology (Shiller, 2003) and examining the factors that determine anomalies in financial markets. In order to explain the anomalies in the market authors usually analyze psychological factors that determine investors decisions. Byrne and Utkus (2013); Jurevičienė and Jermakova (2012) defined these factors as biases for which investors deviate from the classical financial theory paradigm. Pompian (2012) divided biases into cognitive/heuristic and emotional.

Market anomalies are usually grouped into calendar (January/turn of the year, weekend, Friday/Black Friday, Halloween, etc.), fundamental (value, size, momentum, etc.) and technical (moving averages, short - term price drift, etc.). Most commonly sustainable calendar effects in financial markets are Black Friday, January/turn of the year, Weekend, Halloween. These effects were examined by authors: Nawaz and Mirza (2012), Dzbabarov and Ziemba (2011); Chinko and Avci (2009).

This research examines the US financial market S&P 500 index in order to confirm or deny that Black Friday, January/turn of the year and Halloween effects are sustainable in the market. Changes in daily S&P 500 index and average changes results used for Black Friday did not confirm the existence of this effect in 2009-2018 period. According to the research results, these January/turn of the year and Halloween effects in the US financial markets were significant and sustainable in analyzed 2009 - 2018 period, so investors based on this and other authors analyzes, can gain a deeper understanding of index changes and trends in financial markets and use it to make profitable investment decisions.

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