SEASONAL ANOMALIES: HALLOWEEN EFFECT AND JANUARY EFFECT

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Contents

Abstract:

This study investigates the existence of Halloween Effect and January Effect by using monthly stock indices (January 2000 – December 2018) of four developed countries: The United Kingdom, United States of America, Canada, Australia and one developing country India. Findings suggest that positive Halloween effect and January effect is not significantly present during November-April in these five large stock markets; trading volumes and interest rate do not lead to significant rise in stock prices during winter; higher returns in summer is associated with higher risks and 3 out of 5 indices have slightly (not significantly) higher returns during November through April before the financial crisis. While after the crisis of 2008, all 5 countries generate low returns from November through April. Moreover, following the important findings regarding the calendar anomalies in our study, its' implications for investors are discussed too.

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Introduction:

The Stock Exchange world is in a sort of twilight state at the moment. The potential buyers seem to have "sold in May and gone away" …. Financial Times, May 30, 1964, p. 2 (Bouman & Jacobsen, 2002)[1]

The above statement has led many researchers to investigate the unpredictable nature of the stock market which makes difficult for investors to outperform the market. In the finance literature, many seasonal anomalies have been documented suggesting that it is possible to beat the market as there exists some predictability in the stock pattern during particular seasons of a year.

The Calendar anomalies in the stock markets have intrigued the researchers for over 50 years. Fama's Efficient Market Hypothesis at least in its weak form has been violated by the stock market seasonal anomalies. Halloween effect is the most persistent seasonal anomaly which piqued the interest of economists from the very early days of trading. Halloween anomaly provides predictable movements in equity prices that allow the investors to earn more than average profits from November to April. Among other seasonal anomalies January effect, Monday effect, and Wednesday effect also show stock returns' predictability.

January Effect suggests that stock prices increase during January. This effect is based on tax-loss selling which implies that stock prices of firms which have declined in previous months will decline more due to the selling of shares by owners to realize their capital gains, but, at the beginning of new year stock prices will increase in the absence of any selling pressure (Thaler, 1987). Besides this tax-loss harvesting, stock repurchases and positive investor sentiment e.g., some investors believe that January is the best month to start a new investment are other explanations for the increase in prices at January (Chen, 2019).

This paper aims to re-examine whether Halloween and January anomaly still exists in stock markets of developed and large developing countries like Australia, Canada, UK, USA, and India in the recent time (January 2000 – December 2018).

1. Literature Review:

Many researchers have supported the existence of Halloween and January anomalies while many have criticized and questioned the existence of these anomalies in the stock market. Our study wishes to reinvestigate this phenomenon based on previous literatures on Halloween effect and January effect.

One of the famous seasonal anomalies in the stock market is Halloween effect first proposed by Bouman and Jacobsen (2002) who analyzed the monthly returns of the stock market of 37 countries between from January 1970 to August 1998 in both developed and developing economy (Carrazedo, Curto and Oliveira, 2016). They relate the Halloween effect to a change in risk aversion for investors due to vacations (Carrazedo, Curto and Oliveira, 2016). Their study follows by a saying, "Sell in May Go away" which implies stock returns should be lower from May to October than November to April.

Later, Kamstra, Kramer, and Levi (2003) argue that a similar change in risk aversion may be caused by Seasonal Affective Disorder (SAD) and in their study they argue, weather affects stock returns through the changes in investors' moods which resulted in a controversial debate. They related the seasonal nature of the stock market to the effect of SAD and

[1] This statement is also mentioned in Bouman & Jacobsen (2002) study in Introduction (page-1).

remarked that SAD is a medical condition where the shortness of the days leads to depression for many people by increasing risk aversion, leading to seasonal stock market returns that depend on the daylight length. Based on this, stock returns during the summer should be lower and become relatively higher during the winter months, when days start becoming longer. Weather affects the stock returns through the changes of investors' moods based on the length of the day is the essence of their study. This paper also documents price seasonality and its relationship with the Halloween effect in commodities (Carrazedo, Curto and Oliveira, 2016).

Maberly and Pierce (2004) re-examined the Halloween effect for the U.S. stock market from April 1982 to April 2003. They mentioned that Bouman and Jacobsen (2002)'s paper showing significant Halloween effect for the U.S. stock returns is driven by two outliers – the "crash" in world stock market during October 1987 and in August 1998 when the Long-Term Capital Management hedge fund collapsed and found that the Halloween effect disappeared after an outlier adjustment.

However, their study was specifically criticized by Witte who reported that, in their study, the authors identified the two outliers without formalizing criteria and dealt them unsatisfactorily to come to conclusion that the four biggest outliers[2], apart from October 1987 and August 1998, all work against finding a Halloween indicator (Witte, 2010). Also, after using three robust regression methods to estimate the Halloween effect within the same timeframe, he suggested that outliers do not drive Bouman and Jacobsen (2002) results.

Cao and Wei (2005) relate the seasonal effect to changes in investors' behavior inflicted by temperature changes, Hong and Yu (2009) provide additional evidence of a link between vacation behavior and a summer effect in stock returns - all of these studies rely on a general and market-wide behavioral explanation, since the anomaly has been found to be a market-wide phenomenon (Jacobsen and Visaltanachoti, 2009).

Jacobsen & Visaltanachoti (2009), states that the U.S equity market performs better during winter months rather than summer period and the Halloween effect differs across sectors and industries which can improve risk-return trade-off by using sector rotation (Jacobsen and Visaltanachoti, 2009).

Stock price return's seasonality and its relationship with the Halloween effect have been also recorded in commodities (Carrazedo, Curto and Oliveira, 2016). For example, Baur (2013) analyses that recurring annual events produce a seasonal effect on gold prices, September and November are the only months which shows positive and statistically significant changes in the gold prices (Carrazedo, Curto and Oliveira, 2016). This anomaly can be explained with hedging demand by investors anticipating the "Halloween effect" in the stock market, wedding season gold jewelry demand in India and negative investor sentiment due to shorter daylight time (Carrazedo, Curto and Oliveira, 2016).

Doeswijk (2008) provided evidence that the abnormal returns from the Halloween strategy are, economically significant and seasonal pattern could be the result of an optimism cycle hypothesis which assumes, investors think in calendar years rather than 12-month rolling

[2] The four biggest outliers that would have been augmented the Halloween Effect of Bouman & Jacobsen Study (2002) were dealt in an unsatisfactory manner by Maberly and Pierce, 2004 (Witte, 2010).

periods, so the perceived outlook for the economy and earnings varies during the year (Carrazedo, Curto and Oliveira, 2016).

Lloyd, Zhang, and Rydin (2017) uses stock market returns (2007-2015) and confirms the existence of Halloween effect anomaly after the 2008 financial crisis and suggests that the Halloween effect can be observed in 34 out of the 35 countries by using a seasonal dummy regression model.

The examination of the January effect over the time 1802-2004 on U.S value-weighted and equity weighted index provide evidence of high stock prices in January (Haug and Hirschey, 2005). However, Patel, 2015 has examined the presence of the January effect in international stock returns from January 1997 - December 2014 and concluded that the January effect no longer exists in the recent time.

Daily seasonality has been also identified in several equity markets. For example, Lucey and Tully, (2006) examine the extent and determinants of daily seasonality on the Dublin stock exchange. Although they found a daily seasonal effect, this pattern is unusual in that it is midweek, contrary to previous research (Carrazedo, Curto and Oliveira, 2016). The source of this mid-week seasonality seems to differ between financial and other firms. Financial firms appear to react to macroeconomic news and non-financial to firm-specific news, albeit weakly. There is no support for microstructural hypotheses of daily seasonality (Carrazedo, Curto and Oliveira, 2016).

Extending the prior research[3], this paper revisits the Halloween effect and January effect to investigate whether these anomalies can be observed in the four developed countries USA, UK, Australia and Canada and one developing country India over the period January 2000-December 2018. This study contributes to the previous literature in several different ways. First, we examine the existence of Halloween anomaly from January 2000 - December 2018 in the five largest stock exchanges in the world as a whole and for every single country separately and come to conclusive evidence that in these countries there are no positive high stock returns from November to April in the recent time-period.

Secondly, sell in May effect in disguise of January effect and only January effect have been examined globally and country-by-country as well and the result shows that in January the securities do not generate high returns across these five countries. Thirdly, effects of two most important macroeconomic variables - trading volumes and interest rates' effects on stock markets have been analysed which shows that only interest rate has negatively statistically significant effects on stock prices during the winter season in USA and Canada.

Another possible explanation for the Halloween anomaly is higher risk profile during November–April leads to a higher return (Bouman & Jacobsen, 2002) has been analysed in this paper. The result shows that the risk from May-October is slightly higher than November-April which leads to high returns in summer. Lastly, this study shows that in these countries before and after the financial crisis of 2008 positive Halloween indicator is not significantly present. Further, our study suggests, what trading strategies should be adopted

[3] The specific objective of this paper is to re-investigate the Halloween and January anomaly based on the two most important papers on Seasonal anomalies by Bouman & Jacobsen (2002) and Lloyd, Zhang, and Rydin (2017).

by the investors at the recent time-frame in these five indices according to the results obtained in our paper.

The rest of this paper is organized as follows. Section 2 describes the data and methodology, Section 3 presents the empirical results, section 4 discusses other possible explanations for Halloween puzzle such as risk and financial crisis. Following the discussion in Section 5, we conclude in Section 6.

2. Data & Methodology:

2.1. Database:

In this study for investigation purpose, the monthly stock returns of large market-cap weighted indices of 5 countries (local currencies) have been collected. These countries[4] include four developed countries: United Kingdom (FTSE 100), United States (S&P 500), Canada (S&P TSX), Australia (ASX 200) and one developing country India (NIFTY 500). Further, monthly data of two most important macroeconomic variables trading volumes and interest rates have been collected to analyse their effects on the stock markets' returns during November through April and May through October.

The main objective of these study is: does Bouman & Jacobsen's (2002) Sell in May Effect or Halloween indicator consistently persist in these five largest stock markets of the world over the period[5] January 2000 – December 2018? Similarly, does January effect leads to the increase in equity prices during January at these stock markets?

The dependent and independent variables considered in this study are described in details at the Table-1 below:

[4] The two important research papers on Halloween anomaly - Bouman & Jacobsen (2002) does not include India and Lloyd, Zhang and Rydin (2017) does not include both the UK and India in their studies. Both these previous papers produced different results in different time-periods. The main reason for choosing these five countries for our study are to reinvestigate whether USA (S&P 500), UK (FTSE 100), Australia (ASX 200) and Canada (S&P Composite TSX) which belong among the world's largest stock markets and developed economy and India which (NIFTY 500) belongs to one of the largest stock exchanges among the fastest-growing developing countries in the world exhibit Halloween effect and January effect as well during the period January 2000-December 2018.

[5] The main reasons for considering period January 2000 – December 2018 in this study are:
This time-period includes the worst financial crisis of 2008. The effects of Halloween effect and January effect are reported before and during the crisis – 2000-2008 (for 8 years) and after the crisis (for 10 years) in the largest developed and developing countries' stock markets. From the year of 2000, the economic and political situations of the developed and developing countries have changed significantly, especially for a developing country like India, the economic development has been drastic since past 20 years which has led India to emerge as one of the fastest-growing economies in the world. Further, this particular time frame also includes more development and involvement of technology (Machine learning and algorithms for high volume electronic trading, digital media) in Finance which leads to changes in the stock market drastically and might provide different results from the previous studies for seasonal anomalies across these five largest stock markets in the world.

Table 1: Description of Variables (January 2000-December 2018)

Variables	Variable definitions
AIR	Average Index Returns for each month in each country (**dependent variable**) to investigate Halloween effect and January Effect across the five countries
Country	Australia, Canada, India, United Kingdom, United States of America
C_id	Country ID e.g., 1,2,3.4,5 for Pooled data analysis
M	Months from Jan 2000 – Dec 2018 e.g., Jan, Feb, Mar..... (**independent variable**)
Month_id	For pooled data analysis purpose in STATA id's have been created for each month, e.g. for country Australia Jan= 1, Feb =2 and so on.
H1	Halloween indicator which includes the dummy variable H1=1 (November-April) otherwise H1=0 (May - October) (**independent dummy variable**)
H1adj	Adjusted Halloween Dummy Variable which represents Halloween effect in disguise of January effect. It assigns value 1 from November- April, except January and May-October, is assigned 0 (**independent dummy variable**).
Jan	Dummy Variable created to capture the January Effect where it takes value 1 for month January, otherwise 0 for all other months of each country (**independent dummy variable**)
ATV	Average Trading Volume Returns for each month in each country (**independent macroeconomic variable 1**)
AIT	Average Interest Rates of each month in each country (**independent macroeconomic variable 2**)
Sources[6]:	Bloomberg Terminals, Tradingeconomics.com, Yahoo Finance, data.oecd.org.

2.2. Methodology:

This research has followed a combined new methodology based on the two main academic articles on Halloween Effect by Bouman and Jacobsen (2002) and Lloyd, Zhang and Rydin (2017).

Bouman and Jacobsen (2002) have used data of 37 countries from 1970 - 1998. To determine the sell in may effect on stock prices using a dummy regression model that includes a seasonal dummy variable for the months (November-April) of the Halloween indicator. From November through April dummy is assigned a value of 1 and May through October assigned a value of 0. Lloyd, Zhang, and Rydin (2017) conducted a pooled analysis on the stock market (2007-2015) and confirms the existence of Halloween effect anomaly after the

[6] In table-1, data source for the variables *AIR* - calculated from monthly index returns of each five countries' indices (ASX 200 (Australia), S&P Composite TSX (Canada), NIFTY 500 (India), FTSE 100 (UK) and S&P 500 (USA) respectively), *Country*, *M* (January 2000-December 2018), *Average Trading Volumes* (*ATV*-calculated from monthly trading volumes of each five countries' Market-cap weighted indices) is Bloomberg Terminal, Yahoo Finance and Trading Economics. *Average Interest Rates* (*AIT*-calculated from monthly interested rates from every five countries' MSCI indices) for USA, India, UK are collected from Bloomberg and for Canada and Australia data.oecd.org are used. For Pooled data analysis, STATA is the main statistical software has been used in this research. Besides STATA, for empirical analysis SPSS and Advance Excel is used too.

Variables *C_id* and *Month_id* is created for pooled data analysis purpose in STATA. The dummy variables *H1, H1adj*, and *Jan* have been created to re-examine the Halloween Effect, Adjusted Halloween Effect and January effect based on the methodology of Bouman & Jacobsen (2002) study.

2008 financial crisis and suggests that Halloween effect can be observed in 34 out of the 35 countries by using a seasonal dummy regression model.

Based on the above two article's methodology, this study introduces a following Halloween dummy regression model using pooled data (Johnston and DiNardo, 1997) across the five countries a whole and country-by-country and tend to capture the Halloween effect during the winter months (November-April):

$r_{it} = \mu_i + \alpha_{1i} H1_t + \varepsilon_{it}$ ----------(1)

where r_{it} represents the stock market index returns of a given country i for a specific month t. The variable μ_i shows the y-intercept for that country, while α_{1i} is the coefficient of Halloween indicator to be estimated. $H1_t$ is the Halloween dummy variable which assigns value 1 during the winter months (November-April) and 0 during the summer months (May-October). If the coefficient α_i is statistically significant, then the Halloween effect is present.

Secondly, this study considers the regression equation (2) to examine the presence of the January effect and adjusted Halloween effect:

$r_{it} = \mu_i + \alpha_{1i} H1_t^{adj} + \alpha_{2i} Jan_t + \varepsilon_{it}$ ---------- (2)

In above regression equation (2), α_{1i} and α_{2i} are the coefficients of $H1_t^{adj}$ (Adjusted Halloween dummy in disguise of January effect)[7] and Jan_t (January Effect dummy with no Halloween Effect) respectively. Here, Jan_t assigns the value 1 when returns fall in January and 0 otherwise (February – December) to capture January effect only. $H1_t^{adj}$ assigns value 1 for months November-April except January. January is assigned value 0 to capture Halloween anomaly in disguise of January effect.

Thirdly, the effects of Trading Volumes and Interest Rates on the stock markets of the five countries as a whole and country-by-country is examined. Here, the data set has been divided into winter (November-April) and summer (May-Oct) over the year 2000-2018 to run the two regression equations below:

$r_{it} = \mu_i + \beta_{1i} X_{1t} + \beta_{2i} X_{2t} + \varepsilon_{it}$; winter months (November-April) ---------- (3)

$r_{it} = \mu_i + \gamma_{1i} X_{1t} + \gamma_{2i} X_{2t} + \varepsilon_{it}$; summer months (May-October) ---------- (4).

Here, β_{1i}, β_{2i} from equation (3) and γ_{1i}, γ_{2i} from equation (4) are the coefficients of trading volume and interest rates to be estimated during winter and summer seasons respectively[8]. If coefficient β_i and γ_i are statistically significant, then change in average monthly trading volumes and average monthly interest rates affect the stock prices during winter and summer periods respectively.

[7] According to Bouman & Jacobsen (2002) study, since many researchers have argued that January generates positive high returns, so the Halloween effect or Sell in May effect could be the January effect in disguise. To re-examine this hypothesis, our study also includes the Adjusted Halloween Dummy in disguise of January Effect in line with the previous research by Bouman & Jacobsen (2002).

[8] r_{it} represents the stock market index returns of a given country i for a specific month t. The variable μ_i shows the y-intercept for that country in regression equations 3 and 4.

This study uses pooled regression analysis (The Fixed Effect Model[9]) to examine the existence of Halloween anomalies and January effect; effects of average trading volumes and interest rates on the equity markets globally as well as for each country. Further, ADF test (Dickey and Fuller, 1979) and White Test procedure (White, 1980) have been performed to check the stationarity and heteroscedasticity respectively in the pooled data set[10].

3. Empirical Results:

3.1. Halloween Effect or "Sell in May and Go away":

Figure 1 presents the average returns during November– April, and May-October for each country. According to Figure 1 and Table- 2, generally there are very less differences in returns between the two half-year periods. Figure 1 shows, that in all five countries, average monthly summer returns are slightly higher or almost the same as the average monthly returns of winter. Out of the four developed economies, in the USA during winter the stock returns increase only by 0.76%. For the United Kingdom, Canada and Australia index returns decrease in winter by .01%, 1.15%, and 0.37% respectively. Lastly, for developing economy India, winter and summer returns are almost same, the index returns during winter increase by only 0.018%.

Table-2: Returns in Summer (May-October) and Winter (November-December)

Country	Summer	Winter	Difference[11]
USA	1500.32	1511.75	11.42
UK	5810.20	5809.81	-0.39
Australia	4629.01	4611.76	-17.25
Canada	11826.73	11690.28	-136.4
India	10.59	10.60	0.002

Table-3 below reports the statistical results of Halloween indicator and January effect. It shows that average monthly index returns during November to April is not significantly higher than the average monthly returns from May to October. It implies that across these five countries Halloween effect is not statistically significant. In Table-3, the country-by-country analysis shows that only in Canada there is a presence of statistically significant and negatively correlated Halloween indicator[12] during winter. This refers that during winter months in Canada the stock prices fall significantly instead of rising. While in Australia, India, USA, and UK change in stock prices are so small between winter and summer seasons that positive Halloween effect does not exist.

[9] The fixed effects model (within regression) has been used here because it refers to regression model under pooled analysis under which the group means are fixed (non-random) and data can be grouped by several observed factors. This model provides variability within the subjects in the model, associations of the unobserved or omitted variables with the observed ones in the data set, and controls or partial out the effects of time-invariant variables with time-invariant effects (Williams, 2018).

[10] The Augmented Dicky Fuller test with p-value=0.0000 <0.05 level of statistical significance, implies to reject the Null hypothesis and conclude that Panels are stationary. The White test procedure shows that the Prob > χ^2 =0.0114<0.05, so here we accept the Alternative Hypothesis that there is an unrestricted presence of Heteroscedasticity in the data set but it's very low (χ^2 =6.40)

[11] Table-2: Column 4 represents the difference between monthly returns of winter and summer seasons over the period January 2000-December 2018.

[12] In Canada the p-value is 0.044 for Halloween dummy with negative co-efficient -136.45 which states that during winter the stock prices fall by 136.45 Canadian Dollar instead of increasing. The negative t-value -2.31 implies very low Halloween indicator.

Table-3: Pooled and Country-by-Country Halloween and January Dummy Regression Model
(January 2000- December 2018)

MARKET	N	Mean	Standard Deviation	α_1 (co-efficient of Halloween Dummy regression equation-1)	α_2 (co-efficient of January Dummy without Halloween Effect from regression equation-2)	t-values of Halloween effect (no-January Effect)	t-values of Adjusted Halloween Dummy with the January Effect	t-values of January effect (no Halloween effect)	P-VALUE (Halloween indicator)	P-Value of Adjusted Halloween Dummy with the January Effect	P-VALUE of January Effect (with no Halloween Effect)
A. POOLED ANALYSIS (FIXED EFFECT MODEL)											
GLOBAL	60	5535.72	3444.19	-46.36	-306.3	-1.96	-1.91	**-3.21**	0.056	0.088	**0.011***
B. COUNTRY-BY-COUNTRY ANALYSIS											
AUSTRALIA	12	4620.38	47.7	-3.39	-101.4	-0.12	-0.02	-2.25	0.91	0.987	0.051
CANADA	12	11758.51	120.94	-136.4	-306.3	**-2.31**	-1.91	**-3.21**	**0.044***	0.088	**0.011***
INDIA	12	3983.66	155.83	-79.74	-219.4	-0.88	-0.54	-1.29	0.401	0.601	0.231
UK	12	5810.01	49.59	0.39	-45.58	0.01	0.3	-0.81	0.99	0.769	0.44
USA	12	1506.03	20.22	-11.42	-39.51	-0.98	-0.51	-1.95	0.352	0.621	0.083

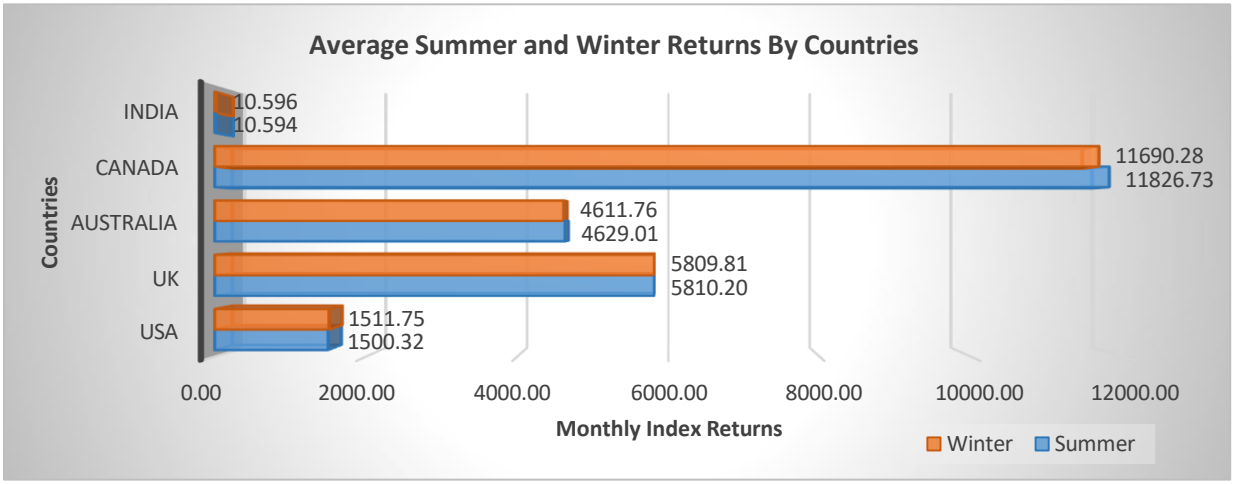
*NOTES: Summary results for Market-Cap weighted indices of five countries as a whole and country-by-country. No. of Observations, Monthly mean returns and monthly standard deviations of each country and statistical regression results are reported[13]. Here, * implies statistically significant at 0.05 level of significance.*

[13] α_1 refers to the co-efficient of Halloween Dummy in regression equation (1). Besides, the t-values of Halloween dummy of equation (1), Adjusted Halloween dummy without the January effect and January dummy of the regression equation (2) are presented in the above table. The confidence interval here is 95%. So, if the p-value>0.05, then we accept the H_0: There is no statistically significant presence of Halloween effect in the market.

3.1a. Monthly Returns: Breaking down of results according to the two seasons of each country:

From figure-1, it is visible that the average monthly returns in the developed countries from November to April is 0.6% less than summer returns. The winter returns in developing economy India is only 0.01% higher than summer. Though the USA, and India exhibit small average increase[14] in index returns during November and December but the overall returns in winter tend to be same or slightly higher than the summer months across India, Australia, USA, and the UK. However, our study shows that only in Canada the Halloween indicator is statistically negatively significant and it generates significantly higher summer stock returns.

Figure-1: Average Summer (May-October) and Winter (November-April) Returns by Countries



3.1b. Implications for investors:

This paper explains that Halloween anomaly is not positively and significantly present at least in the stock markets of the above four countries. Here, investors have already incorporated the Halloween phenomenon in their information set and as a consequence, this effect is becoming less and less noticeable in the recent time frame and the near future at the large stock markets.

In case of Canada however, since there is a presence of negative Halloween effect which leads to increase in average stock prices during summer by 1.17%, so investors can take advantage of this anomaly by taking a *winter short strategy* which suggests of taking a long position from May-October and shorting the stock market during winter months to earn higher profit over the traditional Buy & Hold strategy[i] and the Halloween strategy[ii] as well (Lloyd, Zhang, and Rydin, 2017)[15]. For the other four countries where summer and winter

[14] In case of USA and India, the monthly average stock prices are highest in November and December which leads to approx. 1.13% and 3.24% higher stock prices than October to November and December respectively over the year January 2000-December 2018.

[15] Lloyd, Zhang and Rydin, (2017) introduces an aggressive summer short trading strategy that generates more profit than traditional Buy-and-Hold strategy which is overtime profitable but comes with an opportunity cost during summer and Halloween Strategy is more profitable than B&H strategy but still comes with an opportunity cost as there could be alternatives that offer a better return than government treasury bonds. Therefore, shorting of stocks in summer while going long in winter is the best solution proposed by Lloyd, Zhang, and Rydin, (2017) for an investor to capture the rising market in winter months and the falling stock market in the summer. However, our study shows that only in Canada the Halloween indicator is present negatively. Hence, the S&P TSX Composite index face the opposite situation (high return in summer and low

generate almost similar returns, it would be extremely difficult to determine the winning trading strategy there.

3.2. January Effect and Halloween Effect in disguise of the January Effect:

The results regarding the January effect and Halloween effect in disguise of January Effect are reported in Table – 3 of columns 8, 9 and 11, 12 respectively. Table-3 presents that January effect is negatively statistically significant[16] in Canada[17]. The other four countries - the UK, USA, India and Australia[18] also exhibit negatively significant January effect as a whole. However, the Adjusted Halloween dummy is statistically insignificant globally. In case of country-by-country analysis, Halloween effect in disguise of January anomaly does not exist in any of these five countries.

3.2b. Implications for investors:

This study shows that January effect is becoming increasingly less prominent during the recent time because too many people have already accounted for this anomaly so this anomaly is priced into the security prices in the large stock exchanges. In Canada and Australia, it might be possible that January effect is so small, that the transaction cost[19] needed to exploit this profit actually makes it unprofitable and instead lead to negative average returns during January. Though investors might consider reducing the transaction costs to improve their return but it would be extremely difficult to beat the market as an effect of January anomaly in developed stock markets (Chen, 2019).

However, if investors include small-cap firms to their portfolio, especially if these stocks have faced a rough 2018, then by selling these losing securities in late December may be more beneficial and then seek to buy back them in January, which might drive the January effect hit (Moore, 2019).

3.3. Trading Volume and Interest Rate:

Is the difference in returns between November–April and May- October caused due to shifts in either interest rates or shifts in trading volume? This question is answered by analysing the

return in winter). Thus, this study suggests that Canada should go short during winter and in long position during May-October (opposite of summer short strategy).

[16] The coefficient of Jan dummy variable is -306.3 and t-value is -3.21 which implies that in January, already low stock prices might decrease further by 306.3 points. Hence, the average stock price in January falls rather than increasing across the five countries.

[17] In Canada, the Jan Dummy variable is negatively correlated to stock prices and statistically significant (p-value=0.011<0.05 so it accepts the alternative hypothesis) which implies that during January there is significant fall in security prices instead of increasing.

[18] In case of Australia, only after dropping the Adjusted Halloween dummy from regression equation (2), the January dummy variable without any Halloween effect becomes negatively statistically significant (p-value=0.034<0.05), which implies that the null hypothesis is rejected and there is negative correlation with the stock prices (coefficient of Jan dummy = -101.26). So, January effect is present in Canada but it leads to falling in stock price in January by 101.26 points instead of rise in stock returns. Note, that this might be a cause of exaggerating the size of the January effect and also might underestimate the "true" size of the Halloween effect.

[19] An ex-Director from the Vanguard Group, Burton Malkiel, the author of "A Random Walk Down Wall Street," has criticized the January effect, stating that seasonal anomalies such as it doesn't provide investors with any reliable opportunities (Chen, 2019). He also suggests that the January effect is so small that the transaction costs needed to exploit it essentially make it unprofitable (Chen, 2019). It's also been suggested that too many people have already accounted for the January effect so that this effect becomes priced into the equity market, nullifying it all together (Chen, 2019). This might be an important reason for negatively significant January effect in Canada and Australia across the five countries globally.

effects of average trading volumes and average interest rates during the winter and summer months separately across the five countries and for each country too. Table-4[20] shows that there are no statistically significant effects of average trading volumes on the stock returns during November-April as well as in the May-October period[21]. From November to April interest rate has statistically significant and negatively correlated with stock prices globally and in the USA and Canada in country-by-country analysis[22]. So, interest rates might have an economically significant effect on stock returns in winter. But, From May to October the change in interest rates across all countries and each country separately has no statistically significant effect on stock prices.

4. Other possible explanations for the Halloween Puzzle:

4.1. Risk[23]:

Higher the risk, higher the return leads to an important question: are the differences between the higher returns during the period November–April a compensation for higher risk in winter and lower returns associated with lower risk in summer? Here, the answer is likely to be yes. Risk is measured by the standard deviation. High standard deviation means high risk (Bouman & Jacobsen, 2002).

TABLE-5: Risk And Return (January 2000 – December 2018)

	November-April (Winter)			May-October (Summer)	
COUNTRIES	**MEAN**	**STANDARD DEVIATION**	**COUNTRIES**	**MEAN**	**STANDARD DEVIATION**
AUSTRALIA	46.12	9.93	AUSTRALIA	46.29	10.19
CANADA	116.90	27.90	CANADA	118.27	28.19
INDIA	39.44	25.32	INDIA	40.24	26.60
UK	58.10	9.74	UK	58.098	9.98
USA	15.0	5.0	USA	15.1	5.3

Notes: Risk and associated index return in the period November–April and in the period May–October measured by the annualized standard deviation (in percent) and annualized mean (in percent) respectively. All results are based on the market capitalization weighted indices of five countries.

In Table-5 we illustrate the average annualized returns associated with the annual standard deviations in two sub-periods. Table-5 reports that there is not much greater difference in the percentage of annualized risk between November-April and May-October period. The standard deviation in the summer season is slightly higher for all five indices. Hence, summer

[20] See Appendix-1.

[21] In the case of the USA, the data for trading volumes are almost similar from January 2000 to December 2018 which leads to the Multicollinearity problem. Therefore, in Table-4, the p-values, and t-values of average trading volume for the USA during winter and summer season are omitted (not reported).

[22] In November and December, the average interest rate in the USA are the lowest that is 1.65%-1.66% (negative t-values in Table-4 imply low-interest rates) might lead to a small increase in the stock prices. Otherwise, the average interest rates from January to April varies between 1.72%-1.81% in the USA.
In case of Canada, the average interest rates during the winter months particularly in November, December, March, and April are low (varies between 2% to 2.05%) and cause only a slight increase in the average winter stock prices which remain less than the average summer stock prices.

[23] Bouman & Jacobsen, 2002 study *Risk* factor (Pg-1626, Section-C) for Halloween puzzle has been re-examined in this study.

generates an average high return associated with higher risk level. Thus, the high risk might lead to a higher positive return in these countries.

4.1 a. Monthly Returns and Risks[24]:

An interesting question comes in our mind: whether the stock returns are more or less evenly spread over the months in all countries or they can be attributable to any specific months. Are the higher returns during summer a result of over-performance of one particular month or not?

To answer this question, the monthly average returns are computed and reported in Figure-2 (see Appendix-2). The results indicate that March generates the highest return followed by February and May during winter but the average returns of winter are lower than summer. Because October produces the highest average returns followed by June, May, September, August, and July. So, the average monthly returns during all the summer months are significantly higher (2.48%) than the winter months.

Next, Table-6 (see Appendix-3) shows October is the best month to generate the highest return associated with the second-lowest risk profile. However, the average risks of summer are higher than average risks during winter (November-April) because during summer at least four out of six months (May, June, July, August) exhibit higher risks. Again, March exhibits a high risk in the winter period, so it generates a comparatively higher return. But the overall average risk of winter months is 1.12% lower than the summer months. Therefore, one particular month does not lead to high returns alone but on an average high-risk profile lead to higher returns during summer in these five countries.

4.1 b. Implications for investors:

Following the analysis, an investor could take a long position on the period of six months, as the best strategy to invest during May-October and then short the securities from November to April. By taking such a trading strategy, an investor could benefit from the best six-months' stock returns of the year.

4.2. Financial Crisis effect:

The financial crisis of 2007-2008, was a severe worldwide economic crisis which started in 2007 with a huge crisis in the subprime mortgage market in the USA and leads to worldwide banking crisis including the collapse of the investment bank Lehman Brothers in September 2008. The Table-7 (Appendix-4) shows that after the crisis, though the annual stock market returns difference between winter and summer became very less or almost non-existent, however, in Canada and Australia, stock market situation remains almost similar before and after the 2008 crisis. Canada and Australia exhibit higher annual summer returns both before and after the financial crisis. For India, UK and USA average annual winter returns are slightly higher than the summer before the crisis but after the crisis, summer returns became higher (or almost similar) to winter stock prices[25].

[24] Monthly Returns and Risks factor for Halloween puzzle from Carrazedo, Curto and Oliveira (2016) study (pg-495, section 3.4.2) has been re-examined in this paper.

[25] From 2000-2008, India, UK and USA have 4.71%, 0.65%, and 0.25% higher winter returns than summer respectively. However, after the crisis, the summer returns become slightly higher than winter for India (4.08%), the UK (0.49%) and USA (1.39%) as reported in Table-7. which implies that before and after the crisis, there is not a significant big difference between summer and winter stock prices. Hence, these countries do not exhibit positive Halloween anomaly.

5. Discussion:

The Halloween effect sparked controversy among the scholars continuously by challenging the validity and explanations of its occurrence. Bouman & Jacobsen (2002) study have found significant positive Halloween effect (1970-1998) in 36 out of 37 countries including[26] Canada, UK, and USA, Halloween effect in disguise of January effect in 14 out of 20 countries where Halloween effect was previously present and positive January effect in 20 countries out of 37 including the United Kingdom and Canada. Lloyd, Zhang, and Rydin (2017) study shows that fewer than half of the original countries studied by Bouman & Jacobsen (2002) maintain the claim of statistical significance of Halloween Effect[27].

However, our study has found that Halloween effect, adjusted Halloween anomaly in disguise of January effect are not present globally but Canada exhibit negatively significant Halloween indicator implying low returns in winter months than summer. Similarly, January anomaly does not lead to significant-high returns in January across the five countries. January effect is no more visible in these five countries' stock markets which supports the study of Patel. J (2015) study.

Bouman & Jacobsen (2002) study rejected the idea of trading volumes and interest rates effects on stock prices in the winter period. However, our study though rejects the trading volume effect but shows that shifts in interest rate (negative correlation with stock prices) might lead to slight changes in stock prices during winter in the USA and Canada particularly.

In line with the previous research of Bouman & Jacobsen (2002) study, which explains that returns across the 37 countries differ considerably between winter and summer period but the annual standard deviation remains fairly constant and indicates that higher returns were not necessarily compensation for higher risk during November-April (1970-1998) but our study shows that higher returns in summer are associated high risks in these five countries.

Again, Carrazedo, Curto, and Oliveira (2016) study have shown that high winter period return is not a result of higher or lower-than-usual returns in one particular month. However, this study in line with the previous research indicates that high or low returns do not always depend on higher or lower stock returns and risk in one particular month, but, it depends on the overall average high or low returns associated with average high or low-risk levels during summer and winter periods respectively.

Lloyd, Zhang, and Rydin (2017) study refers that the Halloween effect is present after the financial crisis of 2008. However, our study produces a different result. These five stock indices before or after the 2008 crisis do not exhibit positively high stock prices in winter than summer. Even before the crisis also these countries do not exhibit significantly high stock prices in winter than summer.

However, our study suffers some limitations. Due to limited availability of data and time, this study is not able to re-examine the other possible factors that could be responsible for

[26] Bouman & Jacobsen (2002) study shows that in Australia Sell in May Go Away effect is not present and India was not included in their study.

[27] In Lloyd, Zhang, and Rydin, 2017 study Australia, Canada, USA are not statistically significant and India and the UK are not included.

Halloween puzzle such as *Sector-specific anomaly*, *data mining*, *Vacations*, *News*[28]. Our study investigates the main factors in general responsible for Halloween puzzle based on previous research. Moreover, there is an ongoing discussion in previous studies, whether the Halloween trading strategy offers a significantly higher equity return than a Buy and Hold trading strategy throughout the whole year. Trading strategies are not computed or re-examined in this study. But, this paper suggests the appropriate winning trading strategy based on the previous researches by Lloyd, Zhang, and Rydin (2017) and Carrazedo, Curto and Oliveira (2016) that should be adopted by the investors of the five countries according to the obtained results in this paper.

6. Conclusion:

Based on the old market saying "Sell in May Go away" this study provides a new explanation of the Halloween anomaly. We reinvestigate the largely developed and developing stock markets of Australia, Canada, UK, USA, and India. The result indicates that positive Halloween effect and January effect are non-existent from 2000-2018 and becoming extinct in the near future. Further, the study confirms that higher returns are associated with higher risk levels but it does not confirm that one particular month is responsible for such high or low returns. The summer season produces high returns due to average high positive security prices from May to October.

Lastly, trading volumes have no significant effect on stock prices during winter. Though interest rates are significant and negatively correlated with the stock prices globally and for USA and Canada separately as well, however, the small amount of change in stock prices due to very small shift in interest rate during winter does not significantly lead to high equity returns in these five countries. This study also suggests a "winter short strategy"[29] for Canada. Since Halloween effect is negatively significant there so by taking a long position on the securities during summer and going short on winter would be an appropriate winning trading strategy for the Canadian stock market.

More research on this subject is required because the fast-changing trading environment such as introduction of high electronic algorithm trading, political environment, changing economic condition of developing countries, corruption among institutional investors, digital news and social media, difference between large and small investor's sentiment might lead to vast changes in the stock market and consequentially seasonal anomalies becoming less and less visible at least in the large developed and developing economies. So, research on the calendar anomalies and appropriate trading strategies will provide investors the insights in how to approach the seasonal movements in the equity markets of developed and large developing countries.

[28] Bouman & Jacobsen (2002) study includes Sectors, Vacation length and News and data mining as other possible explanations for the Halloween Puzzle.

[29] Our study suggests the winning trading strategy based on the summer short strategy by Lloyd, Zhang, and, Rydin (2017) as explained earlier.

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Appendices:

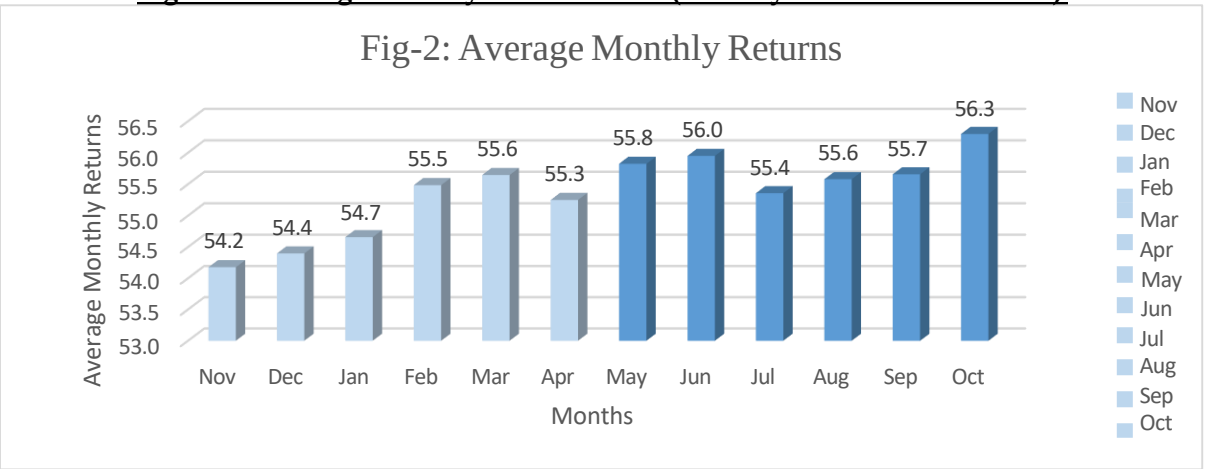
Appendix-1

Table-4: Effects of Trading Volumes and Interest Rates on Stock Prices (January 2000 – December 2018)						
Pooled analysis and country-by-country analysis during winter months						
A. Pooled analysis (Fixed Effect Model)						
Country	**Number of observations**	**Number of groups**	**t-value of trading Volumes**	**t-value of Interest Rates**	**p-value of Trading Volumes**	**p-value of Interest Rates**
Global	30	5	1.06	-3.72	0.3	**0.001***
B. Country-by-Country analysis						
Australia	6	1	-0.19	-2.08	0.865	0.129
Canada	6	1	2.51	-6.88	0.087	**0.006***
India	6	1	-0.11	-1.77	0.918	0.175
UK	6	1	-0.23	-0.54	0.835	0.624
USA	6	1	-	-4.43	-	**0.011***
Pooled analysis and Country-by-Country analysis during summer months						
C. Pooled analysis (Fixed Effect Model)						
Global	30	5	1.1	-0.42	0.281	0.681
D. Country-by-Country analysis						
Australia	6	1	0.17	-1.02	0.878	0.384
Canada	6	1	-3.44	-1.36	0.652	0.403
India	6	1	-2.34	-0.56	0.101	0.615
UK	6	1	0.1	-1.96	0.924	0.145
USA	6	1	-	-0.13	-	0.9

*Notes: Table-4: The effects of average monthly trading volumes and interest rates have been reported. By using the regression equations (3) and (4) respectively along with all the five countries' market indices and also country-by-country as well the result shows that the statistical level of significance considered here is 0.05. If the p-value<0.05, then we reject the H0: There is a significant effect of change in trading volumes and interest rates on the stock returns during the winter months (equation 3) and summer months (equation 4). Here, * implies statistically significant at 0.05 level of significance.*

Appendix-2

Figure-2: Average Monthly Stock Returns (January 2000-December 2018)



Note: The above figure-2 reports the average monthly returns (in percent) per month based on 5 large market-cap-weighted stock indices of five countries Australia, Canada, India, UK and USA from January 2000 to December 2018.

Appendix-3

Table-6: Rankings of Months according to the Standard Deviations of Five Indices as a Whole

Table-6: Rankings of Months according to Standard Deviations		
Rank	**Months**	**STD**
1	Aug	38.84
2	May	38.71
3	Jul	38.57
4	Jun	38.47
5	Apr	38.38
6	Mar	38.08
7	Sep	38.05
8	Dec	38.01
9	Feb	37.94
10	Nov	37.85
11	Oct	37.71
12	Jan	37.53

Note: Table-6 represents the months in descending order of risk (measured by the average standard deviation of the monthly stock returns) based on four large developed countries like Australia, Canada, UK and USA, and one largely developing economy India's stock indices from January 2000 to December 2018. The related monthly average standard deviations (in percent) for each month are reported on column-3 of the table-6.

Appendix-4

Table-7: Differences Between Average Annual Winter and Average Annual Summer Returns before & during and after the Financial Crisis of 2008

Country	Time-Period	Average Winter Annual Returns	Average Summer Annual Returns	Percentage Change in Annual Returns from Winter to Summer
Australia	**2000-2008**	4102.95	4135.90	-0.80
	2009-2018	5069.69	5072.80	-0.06
Canada	**2000-2008**	9469.23	9562.55	-0.99
	2009-2018	13431.43	13519.71	-0.66
India	**2000-2008**	1953.23	1861.28	4.71
	2009-2018	5735.29	5969.56	-4.08
UK	**2000-2008**	5339.00	5304.36	0.65
	2009-2018	6234.28	6264.71	-0.49
USA	**2000-2008**	1214.35	1211.28	0.25
	2009-2018	1757.69	1782.17	-1.39

Notes: Average Annual Stock Returns for five stock indices are reported above to analyse the returns before and after the financial crisis of 2008. Column:5 represents the percentage increase or decrease in stock prices from winter (November-April) to Summer (May- October) seasons over the period January 2000-December 2018.

[i] Traditional Buy & Hold Strategy is a passive investment strategy where investors buy stocks and hold them for a longer period regardless of the fluctuations in the stock market. This kind of investment strategy holds the market portfolio throughout the whole investment period.

[ii] Halloween Strategy or Sell in May Go Away is an investment strategy based on the theory that securities perform better from November to April (winter) than they do between May to October (summer). In this strategy stocks are preferred to be sold at the beginning of May and hold the equities from November to April. Halloween strategy depends on the belief that it's better to avoid holding stocks during the summer months.