



KAMILA AGNIESZKA PUCHALSKA

***Examination
of the Calendar Anomalies:
Evidence from the
Johannesburg Stock Exchange***

Tutor: Błażej Podgórski, PhD

Kamila Agnieszka Puchalska – Master of Finance and Accounting (English Track) with double specialisation: Financial Markets and International Banking. Research interests are related to finance and accounting, such as institutional banking and financial markets, especially related to subjects such as market development and investments.

1. Introduction

Nowadays, the functioning of the financial markets is marked by the irrational phenomenon that strives to create market inefficiency. This conclusion has been examined over many years and has never been properly explained. The phenomenon creates so called anomalies resulting from risk-adjusted behaviours of investors. However, not only the investors' behaviour counts, but also market characteristics such as a country's policies or its geographical location. All these aspects may influence to a creation of a calendar anomaly, such as the January Effect, presenting a paradox in empirical finance form years.

As the world development continues, its complexity creates different types of anomalies that may arise based on a country's specificity. Moreover, in the fast-changing world, the new group of advanced emerging economies has been formed and continue to shift dynamically. The advanced emerging markets are newly created group of countries that should be distinguished from the larger group of all emerging markets by the greater country's development status. These markets are called differently starting from "Less developed countries" through "developing" and "rapidly developing economies" finishing to "advanced emerging markets".

The reason for this examination of the existence of the January Effect, is that there is a lack of deeper studies into the advanced emerging markets. The January Effect anomaly was already examined in the past and claims to be present on developed markets. Nevertheless, the January Effect has never been measured on the advanced emerging markets that is why this article focuses on one of them such as the Johannesburg Stock Exchange. Any political and economic impacts were not measured in this study, as only stock returns were taken into account in this examination.

2. Creation of anomalies

In empirical finance, it has been shown how stock returns create seasonality patterns. These deviations show the inefficiency of the market and are also called anomalies (Sanaullah et al., 2012) as they abandon the regularity or routine (George and Mcgoun, 2001) and are difficult to predict as their nature makes them possible to disappear, appear or reappear (Schwert, 2003). Any type of anomaly is tested to examine its presence about market inefficiency. Investors are searching for irregularities to make abnormal returns thus they search calendar anomalies called seasonality (Ahsan and Sarkar, 2013).

The anomalies such as the January Effect and other anomalies are the proof of market inefficiency as they contradict the Efficient Market Hypothesis (Guo and Wang, 2007). The January Effect shows higher returns at the beginning of the year and according to previous studies it is proven to be present on mature stock exchanges. The January Effect is not the only one that could be observed as producing superior returns for shares in specific periods of a year. For instance, the weekend effect or the first half of the month effect; daily frequencies called the day-of-the-week effect; as well as any macroeconomic announcements; whereas in a monthly frequency the January Effect dominates.

In one of the papers of Bekaert and Harvey (2002) findings stated greater inefficiency on the emerging markets by identification of three features such as higher correlation for emerging markets measured by (Harvey, 1995), greater leakage of public information creating information flux inconsistency (Bhattacharya, Utpal, Daouk, Hazem, Jorgenson, Brian and Kehr and Carl-Heinrich, 2000) and finally cross-sectional trading strategies generate significant returns (Rouwenhorst, 1999; Van der Hart, Slagter and Van Dijk, 2003). One recent study by Griffin, Kelly, and Nardari (2010) claims that the efficiency of the emerging market is nearly equal, which is contrary to the results of any previous studies.

3. The January Effect

The January Effect is often referred to the tax-loss harvesting, which was analysed by Roll (1983), Reinganum (1983) and Ross (1976). Moreover, the anchor heuristics appear when an investor makes their decisions in order to bring the balance of liquidity on the market. Contrary to this Elfakhani, Lockwood and Zaher (1998) who stated that the January Effect exists only in the large stocks' portfolios, Grundy and Martin (2001) showed that small firms make substantial losses due to the short selling of losing portfolios. Jegadeesh and Titman (1993) and Grundy and Martin (2001) state that the losses experienced in January lead consistently to monetary losses. Moreover, the role of bonuses in the Asian-Pacific countries shows the importance of the possible investors' behaviour and the irrationality or over-optimism that could be achieved.

The first factor that influences the creation of the January Effect is tax exposure. In light of tax exposure, many researches underlined the importance of tax imposition or else the usual advantage of unfavourable stocks surprisingly achieving superior performance than the average, especially in the month of January. The market indicators could be used to improve and develop the market

consistency of strategy and later on the theory should be implied in order to understand how it covers the hypothesis itself.

The first case with tax loss harvesting was measured in 1942 by Wachtel testing the tax loss selling hypothesis (Jones, Pearce and Wilson, 1987). Reingaum and Roll studied the disinvestment of funds that are invested in cheaper stocks in order to lower the taxable income (Beyer, Garcia-Feijoo and Jensen, 2013). Lately, Dbouk, Jamali and Kryzanowski studied in 2013 that the seasonality effect is linked with the tax loss selling and a reversal effect are created to be the determinants of the seasonality effect being in line with an important role of tax harvesting also for corporate bonds (Kryzanowski, Dbouk and Jamali, 2013).

However, there were some other researchers such as Jones, Pearce, and Wilson (1987) who dismissed the tax loss hypothesis just after the taxation was introduced based on their non-statistically significant changes in the effect. In addition to that, Apenbrink, Jones, and Lee (1991) found similar conclusions to Jones, Pearce and Wilson, however they were based on return of stocks from the Cowles Industrial Index, an examination based on the effect before and after tax introduction in 1917.

Subsequently, some other examinations concluded by Seyhun (1988) included the risk of insider trading and macroeconomic seasonality that caused this anomaly (Hui and Chan, 2015). Others claim that the January anomaly is not always driven by the tax loss, but also shows that the lack of taxation does not eliminate the January Effect, which was studied by Balaban in 1995, as the January Effect drives though a huge number of sales with losses that were proceeded in December (Stancu and Geambaşu, 2012). Finally, another study of Jegadeesh (2012) shows evidence of first-order serial correlation on monthly returns based on the predictability of the stock returns.

The second factor that influences the January Effect is a company's size. The January Effect has also been investigated as influenced not only by the tax issues, but also by the size of a firm (Jones, Pearce and Wilson, 1987). The first firm's size anomaly was documented by Banz (1981) who measured small firm returns in comparison with large firm returns. Banz found that a small firm had higher returns than any other size of firm regardless of adjusting returns for estimated betas. However, these two: tax loss harvesting and the company size, seem to correlate somehow together (Dbouk, Jamali and Kryzanowski, 2013).

The January Effect and the firm's size implication may come from the small size firm effect, which is measured based on the two criteria: capitalization and volume of traded shares. For instance, investing in small cap-companies generates higher returns than investing in large cap-companies. This phenomenon was

studied in 1988 by Fama and French concluding their support to the Efficient Market Hypothesis and claiming misleading assumption of the Capital Asset Pricing Model theory. It has been stated that the risk is less dependent on the correlation between the company and the market (Degutis and Novickytė, 2014).

Whereas many researchers have shown the significance of the January Effect such as Rozeff and Kinney (1976), others such as Keim (1983), Reinganum (1983) and Roll (1983) supported the existence of the effect mostly for the small size stock in the US (Rozeff and Kinney, 1976; Keim, 1983; Reinganum, 1983; and Roll, 1983). However, Keim measured the abnormal returns rising up to even half of the annual “size effect”. Concerning the size, others such as Roll or Lakonishok and Smidt agreed on the research.

Moreover, the risk mismeasurement hypothesis was suggested in 1986 by Rogalski and Tinic stating that the smaller firms usually have higher risk in January. These evidences were supported by others claiming that the January Effect for small size firms still exists, also when Rathinasamy and Mantripragada (1996) adjusted with Treynor and Shape risk measure in their results (Chen and Chien, 2011).

Subsequently, Johnson (1991) found that small firms grow faster than the mature large firms in the expansion phase with poorer performance with the contraction phase coming from higher financial leverage and from lower productivity. Moreover, they found that the company’s size is more important during the bull on the market rather than bear. Furthermore, Bhardwaj and Brooks (1993) used the bullish and bearish trend on the market with the condition of company’s size using a dual-beta market model where the January seasonality was found. These evidences were supported by the research of Kim and Burnie (2002) who claimed that small size companies experience anomalies in their expansion phase, with no significance in the contraction phase, although the size effect is supported by the evidence to exist in the month of January for both phases of the economic cycle (Chen and Chien, 2011).

Another evidence that the company’s size matter is the hypothesis introduced by Elfakhani and Zaher (1998) that focuses on less advertised (publicized) companies that are more sensitive to the negative information flux. Moreover, if these companies possess less specialized analysts, they should expect to have a neglect effect. The neglect effect is about the gradual market information adjustment related to an unexpected flux of news that is coming to the market. In this case, the inform investors performed abnormal returns as they possess more information than others. Moreover, in the research of Grundy and Martin (2001) the results showed substantial losses for small firms due to the short selling of losing portfolios (Yao, 2011). Finally, Elfakhani and Zaher (1998) stated

in their research that the January Effect exists only in the case of the large stocks' portfolios (Chen and Chien, 2011).

Finally, the firm's size effect is present also with the tax loss harvesting hypothesis that was firstly proposed by Dyl in 1977. Dyl suggests that investors sell their underperforming stock before the end of a year in order to obtain tax savings from deducting losses from the capital gains realized during the year. The selling in December is followed by the buying pressure in January as individuals only sell stock for the reasons of tax purposes where the most affected stocks are these of smaller issues (Chen and Chien, 2011). Jegadeesh and Titman (1993) and Grundy and Martin (2001) state that the losses experienced in January lead consistently to monetary losses.

4. Methodology of the study

The literature review shows empirical evidence for the occurrence of the January Effect. However, there is a lack of research based on advanced emerging markets and especially in such a dynamically changing world. Most of the research was conducted more than ten years ago and cannot be up-to-date in their conclusions without covering world advanced emerging economies such as the Johannesburg Stock Exchange. The data was based on the listed companies' stock returns from the Johannesburg Stock Exchange that is presented below.

Table 1 contains number of listed companies analysed in this study through the examination period.

Table 1. Listed companies on the Johannesburg Stock Exchange

| Years | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Listed companies | 71 | 75 | 81 | 85 | 89 | 91 | 93 | 96 | 100 | 100 | 105 | 112 | 118 | 124 | 127 | 135 | 141 | 147 | 152 | 158 | 163 | 164 |

Source: own preparation.

In this study two hypotheses were measuring firstly the existence of the January Effect on the Johannesburg Stock Exchange and secondly the occurrence of a possible stable effect of this anomaly on the analysed markets. The first hypothesis measured the existence of a January anomaly in the stock prices returns. The second hypothesis measured if the anomaly pattern is repetitive and if it may create a stable investment strategy. The both hypotheses describing this phenomenon are shown below.

Hypothesis 1: The January Effect exists on the Johannesburg Stock Exchange

Hypothesis 2: Occurrence of a stable investment strategy based on the January Effect

The measurement of this effect was conducted by application of parametric tests of mean using t-test and Satterthwaite-Welch as well as non-parametric tests of median using the Wilcoxon-Mann Whitney, Kruskal-Wallis and van der Waerden tests. The effect is measured using the method based on the average and median stock returns assuring that the data involves new development in statistics and the evidence of conventional statistics behaviour. The examination was divided into three parts presented in the tables: cumulative mean and median returns for a specific month during twenty years of the examined period; cumulative results for January per each year examined along with the average returns of other months for each year of the analysis; and finally the differences between mean and median stock returns of a given month and a January mean and median stock return in individual months for each year of the period analysed.

The calculation of a stock return was based on the various variants of the calculation of measured return rates such as simple rate of return and continuously compounded rate. This study applied the method of stock returns, which is derived from the percentage of the composite. For this equation, the assumption of the number of capitalizations strives to infinity using the natural logarithm. This method proves to use many beneficial facts, where these terms are used in financial mathematics and its usage is highly utilised in the financial markets. In the end, it is important to expel outliers as they may distort the occurrence of anomalies by skewing the data outcomes.

5. Test description and data sample

Focusing on the advanced emerging markets, they are characterized by having a lower level of liquidity and market capitalization, smaller institutional investments and higher volatility, similarly to the emerging markets. The palette of different characteristics produces a unique combination of effects and interesting tests results (Blume and Stambaugh, 1983). The emerging markets provide an excellent comparison for tax loss harvesting, especially in terms of the January Effect anomaly for countries such as South Africa from emerging markets and the US from developed markets that include the end of fiscal year in the period of March-April which show the possible impact in this study conclusions.

The test was performed based on the Johannesburg Stock Exchange stock returns from the last twenty years. It has been performed using a time-series statistical analysis on data with equity stock returns from December 1996 until January 2017. Only the first days of the months were taken into this analysis as a representative value of stock return for a specific month. The analysis is based on the stock prices taken from the Thomson Reuters Eikon database. The number

of companies taken into the analysis varies from 71 companies in December 1996 up to 164 companies in January 2017. However, scarce data and analysis of the market itself may be problematic, especially because the African countries are not popular among the advanced emerging markets group.

The Johannesburg Stock Exchange is the largest and the oldest stock exchange in Africa and the 19th largest stock exchange in the world based on the capitalisation. The market capitalization in March 2017 was around 847 million ZAR. Formed in 1887, the first electronic trading started in 1996 with 164 companies listed at present. Nowadays, the market is separated into two listings: the Main Board that includes well established companies such as JSE's Top 40 stocks, exchange-traded notes, exchange-traded funds and warrants; and the AltX that includes only small or medium enterprises.

6. The January Effect on the Johannesburg Stock Exchange

The analysis of the Johannesburg Stock Exchange is performed using the methodology described above. Firstly, the data tests mean and median monthly returns in cumulative results for all years during the analysed period (Table 2). Subsequently, it analyses the differences between mean and median in the month of January as compared to the cumulative average from the other months (Table 3). And finally, the data analyses the rates of return in January versus the difference between the mean stock returns of a given month and a January mean stock return in individual years (Table 4) the difference between the median stock returns of a given month and a January median stock return in individual years (Table 5).

The above results show the tests of statistical significance for mean and median average return rate on the equity market of South Africa. The table 2 shows that mean and median average return rate in the month of January at the level of 2.51% was one of the highest in comparison with the other months in the analysed period of the last twenty years. The results in the table 2 are significant at low significance levels, meaning that most of the months are significant on the level of 1%, and only one month is not statistically significant, namely November.

The mean stock return and median stock return are positive and have the highest value compared to other months in the period of the last twenty years. Most of the months include positive values of mean and median stock returns, however, only June and July record negative mean stock return and only June for median stock return. The results of this part support the hypothesis 1 claiming that the January Effect exists on the South African market. The existence of the hypothesis 2 is examined in the coming parts of the analysis.

Table 2 compares mean and median return rates recorded in January to mean and median return rates for each of the remaining months of the year analysed.

Table 2. Tests for mean and median monthly returns in cumulative results for all years of analysis on the Johannesburg Stock Exchange

| Tests of statistical significance between different means | | | | Tests of statistical significance between different median | | | |
|--------------------------------------------------------------|----------------------|------------|------------|---------------------------------------------------------------|-----------|------------|------------|
| Month | Mean stock return | T-test | S-W T-test | Median stock return | W/M-W | K-W | vDW |
| January | 2.51% | | | 2.34% | | | |
| February | 0.81% | 6.064*** | 6.022*** | 0.56% | 7.010*** | 49.146*** | 44.369*** |
| March | 1.07% | -5.396*** | -5.376*** | 0.86% | 6.312*** | 39.835*** | 34.757*** |
| April | 1.31% | -4.651*** | -4.645*** | 1.21% | 4.756*** | 22.624*** | 22.588*** |
| May | 1.93% | -2.296** | -2.295** | 1.43% | 3.321*** | 11.032*** | 7.538*** |
| June | -0.34% | -10.882*** | -10.857*** | -0.56% | 12.232*** | 149.629*** | 131.133*** |
| July | -0.30% | -11.223*** | -11.227*** | 0,00% | 11.527*** | 132.879*** | 131.133*** |
| August | 1.53% | -3.791*** | -3.785*** | 1.69% | 3.170*** | 10.050*** | 12.596*** |
| September | 1.35% | -4.499*** | -4.493*** | 1.18% | 4.534*** | 20.554*** | 20.342*** |
| October | 0.07% | -9.641*** | -9.637*** | 0.11% | 9.816*** | 96.347*** | 96.349*** |
| November | 2.21% | -1.173 | -1.171 | 2.32% | 0.287 | 0.082 | 0.674 |
| December | 0.30% | -8.291*** | -8.269*** | 0.47% | 8.176*** | 66.848*** | 67.736*** |
| Feb-Dec | 0.90% | -5.071** | -5.067** | 0.84% | 6.468* | 54.457* | 51.747** |

***, **, * denote respectively 1%, 5% and 10% statistical significance levels for means for the t-test and S-W T-test as the Satterthwaite-Welch t-test, and for median for the W/M-W as Wilcoxon-Mann Whitney test, K-W as Kruskal-Wallis, vDW as van der Waerden test

Source: own preparation.

In order to see the results for the January Effect in a more detailed way, the table 3 below presents the results based on the analysis of each year.

The second part of a more detailed analysis in table 3 shows that most of the results are not as significant as in table 2. Only the years 2000 and 2016 are significant at the level of 1%, whereas 1998, 2006, 2011 and 2013 at the level of 5% and 2004 and 2015 at the level of 10%. The significance of the t-test, the Satterthwaite-Welch t-test and also the Wilcoxon-Mann Whitney, Kruskal-Wallis and van der Waerden tests do not have a clear significance arrangement between different years. Nearly every second year has shown insignificance of the results.

Table 3 compares mean and median return rates recorded in January to analogous measures of average returns distribution from the remaining months of the year.

Table 3. Tests for rates of return in January versus the average for the remaining months in individual years on the Johannesburg Stock Exchange

| Year | Month | Mean stock return | T-test | S-W T-test | MEDIAN STOCK RETURN | W/M-W | K-W | vDW |
|------|---------|-------------------|-------------|-------------|---------------------|------------|-------------|------------|
| 2017 | January | 2,37% | | | 2,27% | | | |
| 2016 | January | -5,25% | 4,635 *** | 4,6233 *** | -5,90% | 5,9774 *** | 41,361 *** | 36,861 *** |
| | Feb-Dec | 0,05% | | | -0,36% | | | |
| 2015 | January | 1,99% | -1,6627 * | -1,6689 * | 1,41% | 3,851 | 2,5677 | 18,863 |
| | Feb-Dec | -0,37% | | | 0,19% | | | |
| 2014 | January | 2,19% | -1,5981 | -1,6 | 1,74% | 2,335 | 1,256 | 9,183 |
| | Feb-Dec | 0,92% | | | 0,65% | | | |
| 2013 | January | 4,91% | -2,8257 ** | -2,8254 ** | 4,87% | 4,6656 ** | 25,2331 ** | 23,9839 ** |
| | Feb-Dec | 1,11% | | | 1,77% | | | |
| 2012 | January | 2,01% | -0,5682 | -0,5688 | 1,66% | 1,9294 | 6,6894 | 5,821 |
| | Feb-Dec | 1,67% | | | 1,67% | | | |
| 2011 | January | 3,11% | -4,45 ** | -4,13 ** | 2,63% | 4,498 ** | 24,632 ** | 22,4414 ** |
| | Feb-Dec | 0,24% | | | 0,18% | | | |
| 2010 | January | 2,71% | -1,5987 | -1,5979 | 2,47% | 3,8646 | 2,2613 | 18,284 |
| | Feb-Dec | 1,41% | | | 1,13% | | | |
| 2009 | January | 6,84% | -3,979 | -3,8917 | 7,32% | 3,9327 | 22,4212 | 2,1992 |
| | Feb-Dec | 2,09% | | | 1,69% | | | |
| 2008 | January | -2,11% | -0,9873 | -0,9721 | -2,00% | 3,6643 | 19,662 | 16,989 |
| | Feb-Dec | 3,21% | | | -3,41% | | | |
| 2007 | January | 4,70% | -3,9497 | -3,9957 | 4,76% | 4,254 | 27,4168 | 25,255 |
| | Feb-Dec | 1,28% | | | 1,45% | | | |
| 2006 | January | 8,04% | -6,5453 ** | 6,5413 ** | 7,68% | 5,9844 ** | 45,648 ** | 41,888 ** |
| | Feb-Dec | 2,52% | | | 2,25% | | | |
| 2005 | January | 3,86% | -1,5897 | -1,5897 | 4,44% | 2,8265 | 12,8153 | 11,271 |
| | Feb-Dec | 2,30% | | | 1,85% | | | |
| 2004 | January | 6,76% | -4,3839 * | -4,3841 * | 6,25% | 4,2544 | 24,746 | 24,3549 * |
| | Feb-Dec | 2,50% | | | 2,79% | | | |
| 2003 | January | -1,68% | 2,827 | 2,841 | -1,61% | 3,9939 * | 22,3738 * | 2,7864 |
| | Feb-Dec | 1,61% | | | 1,44% | | | |
| 2002 | January | 3,10% | -1,2667 | -1,2641 | 1,82% | 1,8977 | 4,9471 | 5,2927 |
| | Feb-Dec | 1,15% | | | 0,92% | | | |
| 2001 | January | 5,62% | -2,8712 | -2,865 | 6,45% | 3,72 | 16,823 | 14,7215 |
| | Feb-Dec | 1,66% | | | 1,44% | | | |
| 2000 | January | 9,82% | -6,9439 *** | -6,9167 *** | 1,18% | 6,5163 *** | 45,9711 *** | 4,7215 *** |
| | Feb-Dec | -1,19% | | | -0,91% | | | |

| Year | Month | Mean stock return | T-test | S-W T-test | MEDIAN STOCK RETURN | W/M-W | K-W | vdW |
|------|---------|-------------------|-----------|------------|---------------------|-----------|----------|------------|
| 1999 | January | 0,60% | 0,9138 | 0,9152 | 1,13% | 2,3239 | 6,4521 | 6,7444 |
| | Feb-Dec | 2,72% | | | 2,56% | | | |
| 1998 | January | -3,89% | 1,1421 ** | 1,195 * | -2,18% | 3,5827 ** | 15,72 ** | 13,9939 ** |
| | Feb-Dec | -1,45% | | | -1,86% | | | |
| 1997 | January | 0,00% | 0,6873 | 0,696 | -1,86% | 2,1381 | 6,1442 | 5,7894 |
| | Feb-Dec | -0,19% | | | 0,60% | | | |

**, **, * denote respectively 1%, 5% and 10% statistical significance levels for means for the t-test and S-W T-test as the Satterthwaite-Welch t-test, and for median for the W/M-W as Wilcoxon-Mann Whitney test, K-W as Kruskal-Wallis, vdW as van der Waerden test

Source: own preparation.

Moreover, the January Effect is present six times in the table for mean stock returns and four times for the median stock returns, supporting the existence of the January Effect of hypothesis 1. January had abnormal returns in comparison with other months every two years from 2011 until 2015. The effect supported the hypothesis 1 and it could be taken as a stable investment strategy, here supporting the hypothesis 2.

Generally, the large number of the institutional investors in African countries differentiate between each other and could explain more about the calendar anomalies. The creation of such an anomaly could justify and provide important information about the role of possible institutional features such as return behaviour. This study could support the existence of the effect improving market performance and the microstructure of securities trading (Alagidede, 2013).

Moreover, knowing the fact that the liberation of the financial market in South Africa happened in 1995, the flux of opportunities from foreign investors should be visible in the stock returns. Even though previous studies discovered that in recent years, the South Africa market exercises the pre-holiday effect and the day-of-the week effect, the January Effect has not been so visible. From this reason, the analysis has been performed based on a different time frame and a more detailed sample that comes into the last step of this study (Ndako, 2013).

The last step of the analysis is based on the mean and median stock returns. This part shows exactly the mean stock returns (Table 4) for each month and year during the period analysed and also median stock returns (Table 5) for each month and year analysed.

Table 4 presents the difference between a given month and a January mean return rates in individual months and years and the results of the statistical significance tests of mean return rates in January compared to the remaining months.

Table 4. Tests for mean rates of return in January versus differences between the rates of return for given month and the mean rate of return in January in individual years on the Johannesburg Stock Exchange

| | Tests for mean monthly returns in individual years | | | | | | | | | | | | |
|------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------|------------|------------|------------|-----------|-----------|------------|------------|------------|-----------|--------------|
| | Mean return | Differences of mean monthly returns in individual years between given month vs. January mean return | | | | | | | | | | | |
| | January | February | March | April | May | June | July | August | September | October | November | December | December N-1 |
| 2017 | 2.37%*** | | | | | | | | | | | | |
| 2016 | -5.25% | 3.38%*** | 8.12%*** | 10.41%*** | 8.60%*** | 3.28%*** | 5.82%*** | 8.96%*** | 2.59%** | 5.47%*** | 3.99%*** | 3.19%*** | -7.42%*** |
| 2015 | 1.99%** | 1.74%* | 0.13% | -4.55%*** | 1.38%* | -5.47%*** | -3.95%*** | -1.93%* | -5.56%*** | -2.96%*** | 2.65%*** | -7.42%*** | -1.70%*** |
| 2014 | 2.19%*** | -5.69%*** | 0.36% | 0.56% | 1.01% | -1.20%* | -0.44% | -1.84%*** | -0.37% | -5.04%*** | 0.41% | -1.70%*** | -6.38%*** |
| 2013 | 4.91%*** | -3.72%*** | -4.94%*** | -3.00%*** | -6.02%*** | -4.64%*** | -4.92%*** | -2.87%*** | -3.12%*** | -1.15% | -1.01% | -6.38%*** | 0.14% |
| 2012 | 2.01% | 2.54%*** | 0.18% | -0.26% | -1.09%* | -4.66%*** | 0.40% | 0.42% | 0.08% | -1.06% | -0.48% | 0.14% | -0.91% |
| 2011 | 3.11%*** | -6.77%*** | -2.53%*** | -1.59%*** | -2.25%*** | -2.30%*** | -3.90%*** | -3.07%*** | -4.33%*** | -4.65%*** | 0.71% | -0.91% | -1.79%*** |
| 2010 | 2.71%* | -4.72%*** | 0.15% | 1.82%** | -1.36%* | -6.52%*** | -4.85%*** | 4.05%*** | -3.95%*** | 2.28%*** | 0.57% | -1.79%*** | -5.58%*** |
| 2009 | 6.84%*** | -10.89%*** | -12.44%*** | -1.08% | -1.99% | -1.68% | -7.18%*** | 0.77% | -4.07%*** | -3.62%*** | -4.49%*** | -5.58%*** | -1.97% |
| 2008 | -2.11% | -8.36%*** | 6.61%*** | -2.30%** | 2.24%** | -0.65% | -6.10%*** | 0.52% | 7.72%*** | -3.16%*** | -6.66%*** | -1.97% | -8.30%*** |
| 2007 | 4.70% | 0.30% | -5.85%*** | 0.83% | 2.07%** | -2.99%*** | -8.59%*** | -8.19%*** | -2.27%** | -3.79%*** | -0.79% | -8.30%*** | -3.31%*** |
| 2006 | 8.04%*** | 1.79%** | -7.26%*** | -3.24%*** | -6.94%*** | -13.48%*** | -9.02%*** | -8.75%*** | -1.23% | -7.60%*** | -1.66%*** | -3.31%*** | -1.79%* |
| 2005 | 3.86%*** | -3.57%*** | 0.00% | -5.90%*** | -5.83%*** | 1.39% | -1.29% | 4.44%*** | -0.80% | 0.00% | -4.91%*** | -1.79%* | 1.06% |
| 2004 | 6.76%*** | -5.44%*** | -5.11%*** | -5.80%*** | -7.94%*** | -8.46%*** | -6.05%*** | -5.19%*** | -1.12% | -0.99% | -1.83%* | 1.06% | 4.54%*** |
| 2003 | -1.68%*** | -0.50% | -1.62% | -4.92%*** | 1.91% | 10.85%*** | 3.31%*** | 6.32%*** | 6.79%*** | -0.77% | 10.22%*** | 4.54%*** | 1.60% |
| 2002 | 3.10%*** | -4.53%*** | -2.24% | -2.95%* | 1.98% | 1.14% | -6.96%*** | -8.67%*** | 0.85% | -3.19%** | 1.54% | 1.60% | 0.73% |
| 2001 | 5.62%*** | 2.76%* | -8.29%*** | -10.61%*** | -0.11% | -2.15% | -1.86% | -6.97%*** | -2.28%* | -12.53%*** | -2.30%* | 0.73% | -13.3%*** |
| 2000 | 9.82%* | -5.64%*** | -15.35%*** | -13.84%*** | -15.06%*** | -11.74%*** | -6.43%*** | -8.98%*** | -3.64%** | -12.32%*** | -14.83%*** | -13.3%*** | 6.13%*** |
| 1999 | 0.60%*** | 6.04%*** | 3.37%* | 7.50%*** | 5.02%*** | -6.55%*** | 5.26%*** | -1.45% | -3.14%* | -1.70% | 0.00% | 6.13%*** | -4.70%*** |
| 1998 | -3.89% | 8.73%*** | 8.60%*** | 8.03%*** | 9.46%*** | -2.31% | -5.37%*** | 1.85% | -13.38%*** | 4.47%** | 11.4%*** | -4.70%** | -6.34%*** |
| 1997 | 0.00%*** | 2.70%*** | 4.87%*** | 1.73%** | 0.20% | -2.20% | 2.29%** | 4.09%*** | -1.15% | -3.82%*** | -4.45%*** | -6.34%*** | |

***, **, * denote respectively 1%, 5% and 10% statistical significance levels for the t-Satterthwaite-Welch test
December n-1 is a December of the previous year

Source: own preparation.

Table 5. Tests for median rates of return in January versus differences between the rates of return for given month and the median rate of return in January in individual years on the Johannesburg Stock Exchange

| | | Tests for median monthly returns in individual years | | | | | | | | | | | |
|---------------|---------|---------------------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|-----------|-----------|------------|------------|------------|--------------|
| | | Differences of median monthly returns in individual years between given month vs. January median return | | | | | | | | | | | |
| Median return | January | February | March | April | May | June | July | August | September | October | November | December | December N-1 |
| | 2017 | 2.27%*** | | | | | | | | | | | |
| | 2016 | -5.90% | 3.03%*** | 7.61%*** | 10.22%*** | 8.09%*** | 5.24%*** | 8.97%*** | 3.01%*** | 0.00%*** | 5.09%*** | 3.95%*** | -6.11%*** |
| | 2015 | 1.41%* | 2.69%** | -0.14% | -3.79%*** | 1.95%** | -5.12%*** | -0.75% | -5.67%*** | -0.81%** | 2.83%*** | -6.11%*** | -1.49%*** |
| | 2014 | 1.74%*** | -6.70%*** | 0.23% | 1.00% | 1.26% | -1.21%* | 0.05% | -1.74%*** | -3.69%*** | 0.77% | -1.49%*** | -6.71%*** |
| | 2013 | 4.87%*** | -3.36%*** | -4.27%*** | -3.04%*** | -5.65%*** | -4.87%*** | -3.56%*** | 0.00%*** | -1.26% | -1.41% | -6.71%*** | 0.38% |
| | 2012 | 1.66% | 2.24%*** | 0.84% | -0.05% | -1.31%* | -3.23%*** | 1.35% | 1.13% | -0.98%* | -0.95% | 0.38% | -1.27%* |
| | 2011 | 2.63%*** | -5.89%*** | -2.50%*** | -1.37%** | -2.22%*** | -1.75%*** | -2.54%*** | -3.59%*** | -3.90%*** | 1.11% | -1.27%* | -2.47%*** |
| | 2010 | 2.47%* | -3.98%*** | -0.46% | 1.33%*** | -1.55%* | -7.09%*** | 4.94%*** | -3.74%*** | 2.10%*** | 0.21% | -2.47%*** | -6.41%*** |
| | 2009 | 7.32%*** | -12.12%*** | -13.98%*** | -2.24% | -1.94% | -3.04% | -0.18% | -4.59%*** | -5.04%*** | -5.55%*** | -6.41%*** | -0.62% |
| | 2008 | -2.00% | -10.65%*** | 5.28%*** | -2.26%*** | 0.36% | -1.26% | 2.00% | 7.41%*** | -2.60%*** | -5.97%*** | -0.62% | -7.74%*** |
| | 2007 | 4.76% | 0.98% | -5.91%*** | 0.57% | 1.93%** | -3.84%*** | -7.94%*** | -2.50%*** | -3.65%*** | -0.74% | -7.74%*** | -2.65%*** |
| | 2006 | 7.68%*** | 1.74%** | -6.52%*** | -3.73%*** | -7.03%*** | -13.51%*** | -9.90%*** | -1.21%* | -7.77%*** | -0.88%* | -2.65%*** | -2.64%** |
| | 2005 | 4.44%*** | -5.04%*** | -0.86% | -7.52%*** | -6.50%*** | -0.49% | -2.26% | 3.60%*** | -0.72% | -5.00%*** | -2.64%** | 2.03% |
| | 2004 | 6.25%*** | -4.43%*** | -4.40%*** | -5.96%*** | -6.25%*** | -7.67%*** | -5.84%*** | -0.52% | -0.42% | 0.21% | 2.03% | 3.60%*** |
| | 2003 | -1.61%*** | -0.40% | -1.13% | -4.30%*** | 1.61% | 9.20%*** | 3.94%*** | 4.92%*** | -1.54% | 11.15%*** | 3.60%*** | 2.21% |
| | 2002 | 1.82%** | -3.70%** | -1.48% | -1.08% | 2.44% | 1.40% | -5.80%*** | 1.55% | -2.23% | 2.27%* | 2.21% | -2.37% |
| | 2001 | 6.45%*** | 0.66% | -8.89%*** | -10.21%*** | -0.95% | -4.69%* | -1.89% | -4.54%** | -12.91%*** | -2.95%* | -2.37% | -12.56%*** |
| | 2000 | 10.18%** | -6.18%*** | -15.21%*** | -13.08%*** | -14.26%*** | -13.15%*** | -6.00%*** | -4.50%*** | -12.84%*** | -15.34%*** | -12.56%*** | 6.24%*** |
| | 1999 | 1.13%*** | 4.90%*** | 1.12% | 7.11%*** | 3.29%** | -7.09%*** | 5.58%*** | -1.52% | -1.95% | 0.00% | 6.24%*** | -6.33%*** |
| | 1998 | -2.18% | 5.65%*** | 8.79%*** | 4.97%*** | 6.21%*** | -4.83%** | 1.76% | -17.3%*** | 2.18%* | 11.87%*** | -6.33%*** | -2.69%*** |
| | 1997 | -1.86%*** | 3.16%*** | 6.94%*** | 1.86%** | 1.76% | -0.12% | 5.39%*** | 5.00%*** | -0.53% | -2.47%* | -2.69%*** | |

***, **, * mean respectively 1%, 5% and 10% statistical significance for the Wilcoxon-Mann Whitney U-Test
 December n-1 is a December of the previous year

Source: own preparation.

Table 5 presents the difference between a given month and a January median return rates in individual months and years and the results of the statistical significance tests of median return rates in January compared to the remaining months.

The tables 4 and 5 confirm the results obtained from the previous parts of the analysis based on the table 2. Generally, the results are statistically significant in both tables 4 and 5 with most of the data significant at 1%. From table 4, the existence of the January Effect is explained by lower mean returns from other months, supporting hypothesis 1 and 2. Months such as January, September and November are characterized by the highest returns for the last twenty years.

Subsequently, higher returns in the month of January were more present between the first half of the last twenty years of the analysis. The highest amount of positive mean stock returns over all other months were for the years of 2004, 2012 and 2014 and for mean 2004, 2009 and 2012. The same applies to the lowest values, which are present in 2000, 2008 and 2016 and for median in 1997, 2000, 2008 and 2016 among all the months.

Moreover, the highest mean stock return for the whole period of analysis were in February, August and November. These were the months with the highest mean stock returns, where January was the month with the highest return twice in this period and the lowest ones occurred in February, June and December. In term of median stock returns, January, February, May and November were the months with the highest median stock returns and also February, June and December had three, four and three times respectively the lowest median stock returns for the analysed period.

However, the anomaly cannot be explained by the tax loss hypothesis, as the fiscal year end starts in April, we can see that it may relate to the theory given by the behavioural analysis researchers. It is probable that the market over there is subject to positive investments as an opening of a new year, more assigned to investors' optimism. Moreover, the year-end bonuses are very irregular. It means that one year the bonus may be applicable, when another year it may not be. This fact is not connected with the January Effect that is measured.

Other monthly anomalies apart from the January Effect that exist on the South African market are the January-February effect, the December-January Effect and the December effect. The January-February effect was present only once in the South African market in the year 2006, as well as the December-January Effect, which was appeared in 2000. Finally, the February effect was detected in the year 2012 and 2015 as well as the December effect in 2002, 2003 and 2005.

7. Conclusion

To conclude the study, the measurement of the January Effect on the advanced emerging markets may support the existence of this calendar anomaly as it was in the case of the Johannesburg Stock Exchange. In order to prove the existence of the calendar anomalies such as the January Effect, many factors are taken in account and unfortunately not all of them could support the existence of this calendar anomaly. In this study, the Johannesburg Stock Exchange was a great example of an African country that is a part of these dynamically shifting markets. The latest innovation and interest in Africa's investment could be a great factor to investigate the presence of the January Effect in this market.

The Johannesburg Stock Exchange is characterised by abnormal stock returns in the month of January based on the monthly results. This fact supports hypothesis 1 with regards to the comparison of the cumulative stock returns with other months, monthly stock returns with cumulative stock returns with other months as well as with each month a year separately. Moreover, in the light of this examination, hypothesis 2 is also supported. The January Effect's abnormal returns could create a stable and systematic pattern of greater investors' gains usually appearing every second year presented in this paper.

The full comprehension of this effect could be reached by analysing the reasons and the sources of such calendar anomalies, therefore the market efficiency and behavioural finance theories should be also analysed to complete the analysis of the study. Subsequent to this, the formation of the anomaly itself contradicts the market efficiency theories and underlines the influence of the investors' irrational behaviour. In this study, the fiscal year end was excluded to create this effect, however it could relate to interconnection of the investments between various countries and its fiscal policies. This aspect could be also analysed from the cultural, political and economic level in order to fully understand the January Effect formation within the Johannesburg Stock exchange, as well as possibility of its formation within the other advanced emerging markets.

Bibliography

- Ahsan, A. and Sarkar, A. (2013). Does January Effect Exist in Bangladesh? *International Journal of Business and Management*, 8(7).
- Balaban, E. (1995). *January Effect, yes! What about Mark Twain effect?* The Central Bank of the Republic of Turkey, Research Department, Discussion Paper No: 9509: 6–9.
- Banz, R. (1981). The relationship between return and market value of common stocks. *The Journal of Financial Economics*, 9(1): 3–18.

- Bekaert, G. and Harvey, C. (2002). *Research in emerging markets finance: looking to the future*. Columbia University, New York; National Bureau of Economic Research, Cambridge; Duke University, Durham, 7–8.
- Beyer, S., Garcia-Feijoo L. and Jensen, G. (2013). Can you capitalize on the turn-of-the-year effect? *Applied Financial Economics*, 23(18): 1457–1468.
- Bhardwaj, R. and Brooks, L. (1993). Dual Betas from Bull and Bear Markets: Reversal of the Size Effects. *Journal of Financial Research*, 16(4): 269–283.
- Bhattacharya, U., Daouk, H., Jorgenson, B. and Kehr, C.-H. (2000). When an event is not an event: The curious case of an emerging market. *Journal of Financial Economics*, 55(1): 69–101.
- Blume, M. and Stambaugh, R. (1983). Biases in computed returns: An application to the size effect. *Journal of Financial Economics*, 12(3): 387–404.
- Cheng Chen, T. and Chen Chien, C. (2010). *Size effect in January and cultural influences in an emerging stock market: The perspective of behavioral finance*. Momentum, contrarian, and the January seasonality Yaqiong Yao Department of Finance, The University of Melbourne.
- Degutis, A. and Novickytė, L. (2014). The efficient market hypothesis: A Critical review of literature and methodology. *Ekonomika*, 93(2).
- Dyl, E. (1977). Capital Gains Taxation and Year-End Stock Market Behavior. *Journal of Finance*, 32: 165–175.
- Elfakhani, S., Lockwood, L. and Zaher, T. (1998). Small Firm and Value Effects in the Canadian Stock Market. *The Journal of Financial Research*, 21(3): 277–291.
- Fama, E. and French, K. (1988). Permanent and temporary components of stock prices. *Journal of Political Economy*, 96(2): 246–273.
- George, M. and Mcgoun, E. (2001). Anomalies in Finance: What Are They and What are They Good For? *International Review of Financial Analysis*, 10: 22.
- Grundy, B. and Martin, S. (2001). Understanding the nature of the risks and the source of the rewards to momentum investing. *Review of Financial Studies*, 14: 29–78.
- Guo, S. and Wang, Z. (2007). *Market efficiency anomalies: A study of seasonality effect on the Chinese stock exchange*, Master thesis, Umea University, Umea School of Business.
- Harvey, C. (1995). *Predictable risk and Returns in Emerging Markets*. Columbia University, New York; National Bureau of Economic Research, Cambridge. *The Review of Financial Studies*, 774–796.
- Hui, E. and Chan, K. (2015). *Testing calendar effects on global securitized real estate markets by Shiryayev-Zhou index*. Department of Building and Real Estate, The Hong Kong Polytechnic University.
- Jegadeesh, N. (2012). Evidence of Predictable Behavior of Security Returns. *The Journal of Finance*, 45: 1540–6261.
- Jegadeesh, N and Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *Journal of Finance*, 48(1): 65–91.
- Johnson, S. (1991). Small firms and the UK labour market: prospects for the 1990s. In: J. Curran and R. Blackburn (eds.) *Paths of Enterprise: The future of the small business*. London: Routledge.
- Jones, S., Lee, W. and Apenbrink, R. (1991). New evidence on the January Effect before Personal Income Taxes. *Journal of Finance*, 46(5): 1909–1924.

- Jones, C., Pearce, D. and Wilson, J. (1987). Can Tax-Loss Selling Explain the January Effect? A Note. *The Journal of Finance*, 42: 453–461.
- Keim, D. (1983). Size-Related Anomalies and Stock Return Seasonality. *Journal of Financial Economics*, 12: 13–32.
- Kelly, P., Griffin, J. and Nardari, F. (2010). Do Market Efficiency Measures Yield Correct Inferences? A Comparison of Developed and Emerging Markets. *Review of Financial Studies*, 23(8): 3225–3277.
- Kim, M. and Burnie, D. (2002). The firm size effect and economic cycle. *The Journal of Financial Research*, 21(1): 111–124.
- Kryzanowski, L., Dbouk, W. and Jamali, I. (2013). The January effect for individual corporate bonds. *Department of Finance, Accounting & Managerial Economics*, 30: 69–77.
- Rathinasamy, R. and Mantripragada, K. (1996). The January Size Effect Revisited: Is it a case of risk mismeasurement? *Journal of Financial and Strategic Decisions*, 9: 9–14.
- Reinganum, M. (1983). The Anomalous Stock Market Behavior of Small Firms in January: Empirical Tests for Tax-Loss Selling Effects. *Journal of Financial Economics*, 12: 89–104.
- Rogalski, R. and Tinic, S. (1986). The January Size Effect: Anomaly or Risk Mismeasurement? *Financial Analysts Journal*, 7: 63–70.
- Roll, R. (1983). Vas ist Das: The Turn of the Year Effect and the Return Premia of Small Firms. *Journal of Portfolio Management*, 9: 18–28.
- Ross, S. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory*, 13(3): 341–360.
- Rouwenhorst, G. (1999). Local Return Factors and Turnover in Emerging Stock Markets. *The Journal of Finance*, 54(4): 1439–1464.
- Rozeff, M. and Kinney, W. (1976). Capital Market Seasonality: The Case of Stock Returns. *Journal of Financial Economics*, 3: 379–402.
- Sanauallah, A., Shah, S., Ather, M., Ali, E. and Aslam, R. (2012). How Behavioral Aspects Affect Market Efficiency-Evidence from KSE 100 Index. *Global Journal of Management and Business Research*, 12(10): 25–32.
- Schwert, G. (2003). Anomalies and Market Efficiency. Chapter 15 of *Handbook of the Economics and Finance*, 1: 939–974.
- Seyhun, H. (1988). The January Effect and Aggregate Insider Trading. *The Journal of Finance*, 43(1): 129–141.
- Stancu, I. and Geambaşu, L. (2012). Return seasonality – January effect. Study case: the Bucharest Stock Exchange. *Economic Computation & Economic Cybernetics Studies & Research*, 46(1): 45–64.
- Van der Hart, J., Slagter, E. and Van Dijk, D. (2003). Stock selection strategies in emerging markets. *Journal of Empirical Finance*, 10: 105–132.
- Wachtel, S. (1942). *Certain observations on the seasonal movement in stock prices*. *Journal of Business*, 15(2): 184–193.

