NHH

FIN11

TRADING AND MARKET MICROSTRUCTURE

Term Paper Fall Semester 2016

New Evidence for the January Effect: A Market Size Question

Date:

December, 19th 2016

Teacher:

Klaus Reiner Schenk-Hoppé

Students:

Fabrizio Casartelli, Hans Kristian Holen,

Florian Reusch, Alberto Visonà

Abstract

The aim of this paper is to analyse whether the January Effect is still present nowadays. It starts with a brief explanation of what the January Effect is and a short review of the previous literature on the subject.

The attention is then moved on the United States Stock Market, looking at the New York Stock Exchange and S&P500 Indexes, to see the disappearance of the Effect in the last few years and the possible reasons for this change.

In the second part of the paper, the focus of the analysis is put on the German Stock Market. The analysis of the returns of the DAX and the SDAX indexes shows an evidence of the presence of the January Effect, especially when looking at the *small cap* companies.

In the end, a possible set of reasons for the vanishing of the January Effect in the biggest Stock Markets is discussed.

Index

1 Introduction to the January Effect 4

2 General Drivers of the January Effect 4

3 Data for the NYSE, S&P500, DAX and SDAX 6

4 The January Effect on the New York Stock Exchange and the S&P500 7

4.1 Historical Findings and Research 7

4.2 Results for the S&P500 8

4.2.1 Observations between 1980 and 1989 8

4.2.2 Observations between 1990 and 2015 9

4.3 Results for the New York Stock Exchange 10

4.3.1 Observations between 1975 and 1989 10

4.3.2 Observations between 1990 and 2000 11

4.3.3 Observations between 2000 and 2015 11

4.4 Discussion 12

5 The January Effect on German Stock Markets 15

5.1 Data 15

5.2 Results for the SDAX 15

5.2.1 Observations between 1996 and 2015 16

5.2.2 Observations between 1997 and 2015 18

5.3 Results for the DAX 20

5.3.1 Observations between 1996 and 2015 20

5.3.2 Observations between 1971 and 1986 21

5.4 Discussion 21

5.5 Conclusion for the German Indexes 23

6 Reasons why the January Effect disappeared 23

7 References 26

1 Introduction to the January Effect

The January Effect is a calendar anomaly saying that small cap stocks returns in January are especially strong. The anomaly has been documented many times and academically investigated. January returns seemed strong in the past, but in the last several years they became weaker, therefore this anomaly is starting to look more like the result of data mining than a real market anomaly.

Wachtel (1942) 'Certain Observations on Seasonal Movements in Stock Prices' was the first research article that document the January Effect. He wrote that the Dow Jones Industrial Average index showed bullish tendencies from December to January. More precisely, from the 15 years he examined, 11 of these years showed significant bullish movements and 4 years showed relatively insignificant bearish movements.

Rozeff and Kinney (1976) 'Capital market seasonality: The case of stock returns' reported evidence of a seasonal pattern in stock market returns using an equally-weighted index of New York Stock Exchange prices. From 1904-74, the average stock market return during the month of January was 3.48 percent, compared with a monthly return of 0.42 percent during the remaining 11 months of the year. Thus, January returns appeared to be more than eight times higher than returns during a typical month. Because the equally-weighted NYSE index represents a simple average of the stock prices for all listed companies, the Rozeff and Kinney (1976) methodology gives smaller companies greater relative influence than would be true in value-weighted indices where large firms dominate. Subsequent research by Reinganum (1983) 'The Anomalous Stock Market Behavior of Small Firms in January: Empirical Evidence for Tax-Loss Effects' and Roll (1983) 'On Computing Mean Returns and the Small Firm Premium', among others, confirms the fact that this January Effect is a small cap phenomenon.

2 General Drivers of the January Effect

Since the first documentation, two important explanations for the January Effect have been most frequently studied: the tax-loss selling hypothesis (Wachtel, 1942) 'Certain Observations on Seasonal Movements in Stock Prices' and the window dressing hypothesis (Haugen and Lakonishok, 1988) 'The Incredible January Effect: The Stock Market's Unsolved Mystery',

though there have been many others. Wachtel suggests the tax-loss selling hypothesis as a cause, as an aid to make a selective group of stocks, which might also show the same results he found.

The tax-loss selling strategy entails the selling of stocks that have experienced recent decline in price to realize capital losses to take advantage of tax benefits before the end of the tax year. This would cause stock prices to go down at the end of the year. After the tax year-end, the price pressure is relieved and the prices go up again. Gultekin and Gultekin (1983) 'Stock Market Seasonality: International Evidence' looked at the seasonal pattern in 16 countries and found that the January Effect was present in 15 of those countries. In addition, in some countries the effect was even more clearly visible than in the United States. The international evidence is a fundamental starting point to analyse the rationale behind the January Effect. Indeed, there are many evidences that shows how the January Effect is present also in countries where the fiscal year does not end on December 31. In Japan, no capital gain tax or loss offsets exist. Canada had not capital gains before 1972, but had experienced January Effect in the year before the introduction of capital gains. Last, Great Britain and Australia experience January Effect even though their fiscal year begin on April 1 and July 1 respectively. It is worth noticing that those two countries experience a similar effect in the first month of their financial year, namely April and July, showing that even though the January Effect cannot be solely explained by tax considerations, taxes play a fundamental role in the seasonal movements of stock prices.

Another cause for the January Effect could be window dressing. Window dressing is a strategy used by mutual fund and other portfolio managers near the year or quarter end to improve the appearance of a fund's performance before presenting it to clients or shareholders. To window dress, the fund manager sells stocks with large losses and purchases high-flying stocks near the end of the quarter. These securities are then reported as part of the fund's holdings.

For this hypothesis to be a plausible cause for the January Effect, the assumption is made that reports of portfolio holdings are at calendar year ends.

3 Data for the NYSE, S&P500, DAX and SDAX

We will consider the returns of the NYSE, S&P500, DAX as well as the SDAX. Our data analysis for these indexes is conducted by using monthly, daily and weekly returns. Since the aim of the analysis is focused on the returns for the indexes, the currency of each index had no importance.

The time span we take under consideration was 1975 until 2015 for the NYSE, 1988 until 2015 for the SDAX and 1970 until 2015 for the DAX. The current year is not taken into consideration as it is not still concluded and it could bias our results.

We got our data from the Bloomberg terminal as well as from DataStream. However, some problems in the download and the export to data sheet process might incur. Therefore, a check was made to be sure that the correct data were downloaded and no mistakes were made.

The second step of the primary analysis is a visual inspection of the data, to check if there were anomalies in the returns. Therefore, we plot the January returns to find periods were significantly high excess returns could have been.

The visual inspection of data is useful to check if there are abnormal values or outliers. Besides it wouldn't be rational to obtain regressions without having an overview about the developments of the course. The reason of this is obvious and has its seeds in the very well-known financial crisis that hit the world economy after the bankruptcy of Lehman Brothers. The question we faced was how to deal with the data from 2008 and 2009. We decided to take out those two years from our analysis, to avoid biased results.

If for instance, we are considering an economic calm period such the one of the Great Moderation, then there would not be any doubt in dumping a year with a crisis from the analysis. In a period of economic stability, a crisis is just an exceptional event which does not support the detection of the January Effect drivers. However, the first years of the 21. century were characterized by a continuous cycle of crises. Concerning the Dot-com Bubble of 2000, the Financial Crisis of 2008, the Euro Crisis of 2009-2010, the following Sovereign Debt Crisis in 2012 in Mediterranean European Countries and the recent drawback of the Chinese stock market in 2015. We have to keep these factors into mind, to avoid drawing wrong conclusions from biased data.

4 The January Effect on the New York Stock Exchange and the S&P500

The New York Stock Exchange is the largest stock market by market capitalization of its listed companies in the world – Kiersz A. (2014) 'The NYSE makes stock exchanges around the world look tiny' – and we consider it as a very important part of our research. The daily trading volume of the NYSE was estimated of around 170 billion Dollar in 2013 and it comprehends a lot of different segments. Hence, there is a high variety of listed companies and a huge number of trades conducted every day. Therefore, we assume that less coincidences will sophisticate our data. This results in less fluctuations and will not affect the NYSE as much as exchanges with fewer listed companies. For instance, Oslo Stock Exchange rely much on the oil price, hence the index is dependent on its price and outlook. Because of its size, the NYSE can be considered as a benchmark index, that can affect other markets by its fluctuations.

4.1 Historical Findings and Research

There has been a lot of research to observe whether there is a seasonal pattern in January at the NYSE. Rozeff and Kinney (1976) found January anomalies for the NYSE. They used empirical methods on the data from 1904-1974, based on NYSE stock prices. Their results show an average return of 3.5% in January compared to an average of 0.5% for the rest of the months. However, this study was only based on the average price per stock. That means that big stocks traded with a high frequency and small stocks traded with a low frequency were weighted equally regardless of their capitalisation. In other words, the results were not based on the changes in the total market value, but on the changes of the single stock prices.

R. Banz and M. Reinganum (1981) showed that small firms tend to have higher returns on average than bigger ones. Hence, the total market increase would not be as significant as obtained in their studies from 1976. However, there was no reason to reject the January Effect.

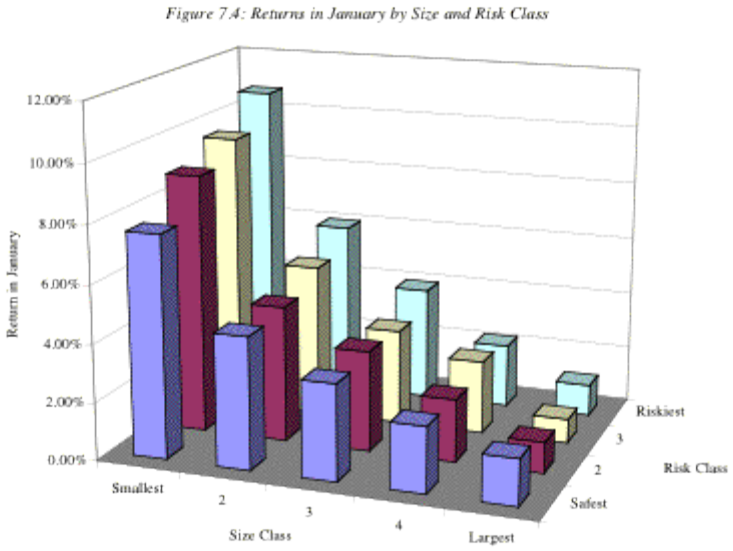


Figure 1: Illustration of the returns in January compared to the firms size

4.2 Results for the S&P500

We will observe the S&P500 from the year 1980 until 2015. We will use a time series regression with the dummy variable *dm1* for the January returns. The α is the slope of the regression and ε_i displays the unobservable error term. We considered subperiods of the whole period between 1980 until 2015. This is necessary to avoid a compensation between the different subperiods and find periods with significantly higher January returns.

Model 1:

$$return_{month} = \alpha + \beta_{jan} dm1 + \varepsilon_i$$

4.2.1 Observations between 1980 and 1989

```
Model 2: OLS, using observations 1980:01-1989:12 (T = 120)
Dependent variable: S_and_P_retuns_19801989

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const      0.00802689    0.00424349    1.892    0.0610   *
  dm1        0.0318255     0.0146999     2.165    0.0324   **
```

We find that the returns in January were around 3.18% higher than the returns in the remaining months. This means that we observe significant excess returns over the period from 1980 until 1989. This implies that we have a January Effect in this period.

By considering the S&P500 between the years 1990 and 2015 we can clearly see that the trend changed. The January performance is not significantly higher than the average returns of the remaining months. Besides, 12 out of 25 Januaries in this period are negative. We excluded the years 2008 and 2009, to avoid drawing wrong conclusions from biased data.

4.2.2 Observations between 1990 and 2015

```
Model 1: OLS, using observations 1990:01-2000:12 (T = 132)
Dependent variable: S_P_returns_19902000

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const      0.00947881    0.00358161   2.647     0.0091   ***
  dm1        0.00138467    0.0124071    0.1116    0.9113

Model 2: OLS, using observations 2001:01-2007:12 (T = 84)
Dependent variable: S_P500_return_20012007

             coefficient    std. error   t-ratio    p-value
  ----------------------------------------------------------
  const       0.00295785    0.00456149    0.6484    0.5185
  dm1        -0.000371119   0.0158015    -0.02349   0.9813

Model 2: OLS, using observations 2010:01-2015:12 (T = 72)
Dependent variable: S_P500_return_20102015

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const       0.00810368   0.00484681    1.672    0.0990   *
  dm1        -0.00258983   0.0167898    -0.1543   0.8779
```

The three regression outputs show that in the period from 1990 until 2015 there are no significant excess returns in January with respect to the other months. This implies that the January Effect disappeared in the S&P500 after the year 1990.

4.3 Results for the New York Stock Exchange

For the observations on the NYSE we consider 4 different time periods. We take the returns from 1975-1989, 1990-2000, 2000-2007 and 2010-2015. Thereby, we exclude 2008 and 2009, because of the Financial and Euro Crisis can bias our results.

We performed a regression for the period between 1975 until 1989 and considered the returns of January as a dummy variable called *dm1*. There are significantly higher returns in January over this period. The performance was negative just few times. However, these negative returns have only a negligible influence compared to the positive returns.

Model 1:

$$return_{month} = \alpha + \beta_{jan} dm1 + \varepsilon_i$$

4.3.1 Observations between 1975 and 1989

```
Model 2: OLS, using observations 1975:01-1989:12 (T = 180)
Dependent variable: returns_NYSE_19751989

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const      0.00820900    0.00353099    2.325    0.0212  **
  dm1        0.0271226     0.0122317     2.217    0.0279  **
```

The regression output shows that the average returns in January are around 2.71% higher than the average returns of the remaining months. Our result is significant at a 5% level. Therefore, we can conclude that there is a significant January Effect between 1975 and 1989.

4.3.2 Observations between 1990 and 2000

```
Model 1: OLS, using observations 1990:01-2000:12 (T = 132)
Dependent variable: return_NYSE_19902000

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const       0.0103599    0.00340939    3.039    0.0029  ***
  dm1        -0.00503349   0.0118105    -0.4262   0.6707
```

For the period of 1990 until 2000 we cannot find significantly results for excess returns in January. The regression output shows a high p-value for our dummy variable. Hence, we have to reject the hypothesis that there is a January Effect in this time period.

4.3.3 Observations between 2000 and 2015

```
Model 1: OLS, using observations 2000:01-2007:12 (T = 96)
Dependent variable: return_NYSE_20002007

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const       0.00496733   0.00387342    1.282    0.2029
  dm1        -0.00818370   0.0134179    -0.6099   0.5434

Model 1: OLS, using observations 2010:01-2015:12 (T = 72)
Dependent variable: return_NYSE_20102015

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const       0.00594854   0.00500879    1.188    0.2390
  dm1        -0.00409974   0.0173510    -0.2363   0.8139
```

The regression output shows that we cannot observe significant excess returns in January between 2000 and 2015. This implies that there was no January Effect between 2000 and 2015 at the NYSE.

In the period 1990-2015 we have not found any evidence for a January Effect. The results we get from the NYSE are comparable with the results from the S&P500. Since the 1970's there

is a clear tendency of a decreasing significance in the January Effect. The question on whether this effect also holds for small cap indexes is still unanswered. We will observe this question later.

4.4 Discussion

Since we found a significant January Effect in the time period between 1975 and 1989, we use these data for a further analysis of the NYSE.

Based on our findings we will observe the correlation between December and January. We find the highest correlation in the data from 1975-1989. By observing the correlation between December and January, we can clearly see that there is a fixed pattern, with only a few outliers. The years that stand out are three years in a strike, happening two times, 1975-1977 and 1985-1987. We excluded these years to get a significant regression, that helps to understand how the January returns are correlated with the December returns. Important to mention is that we do not conclude that the January performance is predictable based on the December performance. However, we find that a positive December performance implies a higher January performance in the following year for most of our observations.

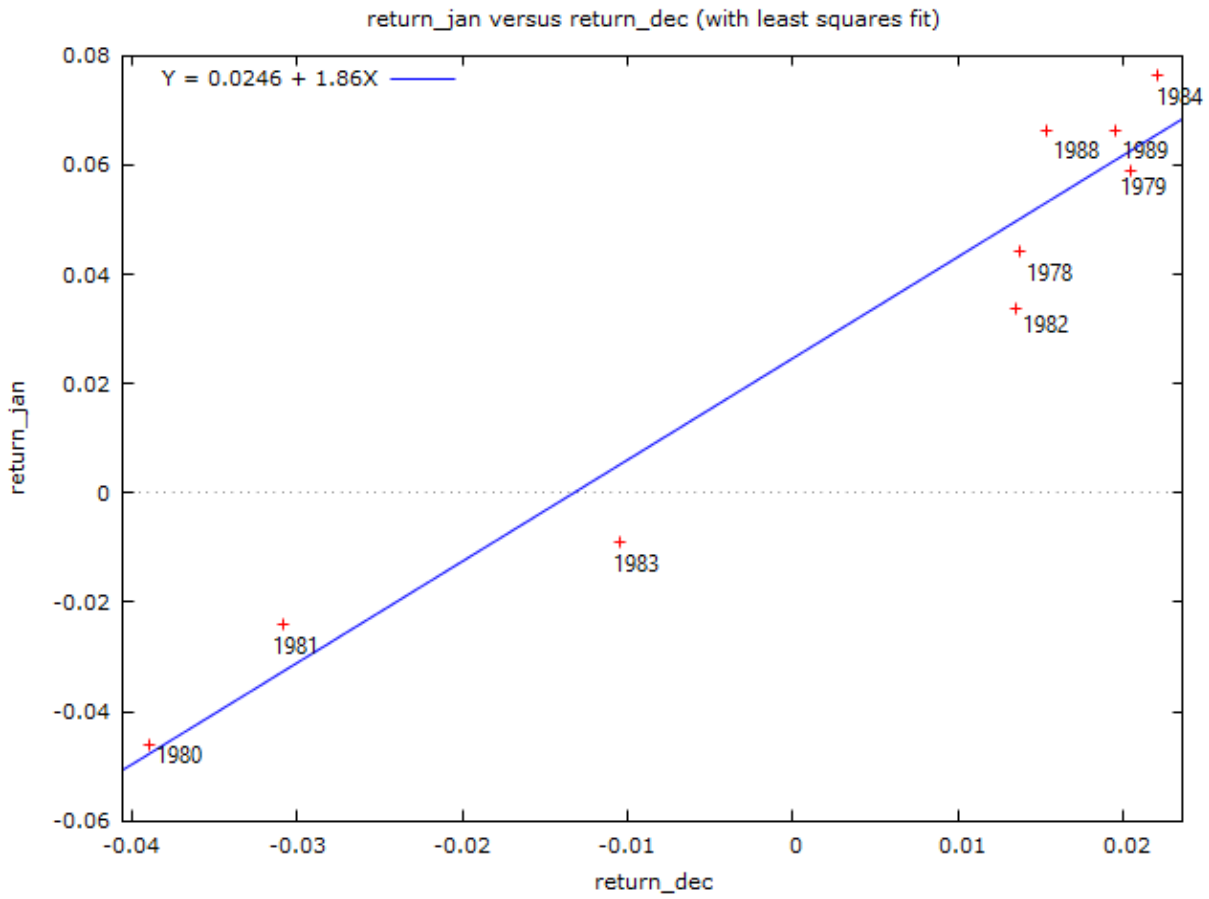


Figure 2: Correlation between the January and December Returns of the NYSE (with Least Squares Fit)

For example, in January 1975 OPEC decided to raise the oil price by 10% - K. Amadeo (2016) 'Opec oil embargo: causes and effects of the crisis'. We can assume that this price increase was considered as sustainable by investors. Hence, the profitability of oil companies increased and attracted investments in oil stocks. The NYSE lists 24 of the biggest oil companies in the world. The dependence on these firms can explain the increase of the excess returns in January. At the same time, these are the three first years after the Vietnam war. In the short term, the end of the war could have had a positive psychological impact on the stock markets. These are two examples of what may have moved the stock prices Shane (2016) 'Impact of war on stock markets'. Even though the correlation seems to be accurate and reasonable.

We use daily data from NYSE, between 1975 and 1989, to plot how the cumulated stock returns changed through January. For a better implication of the development, we sorted the data to give an implication on how the returns are distributed over the month.

Model 2:

$$\sum returns_{jan}(days)$$

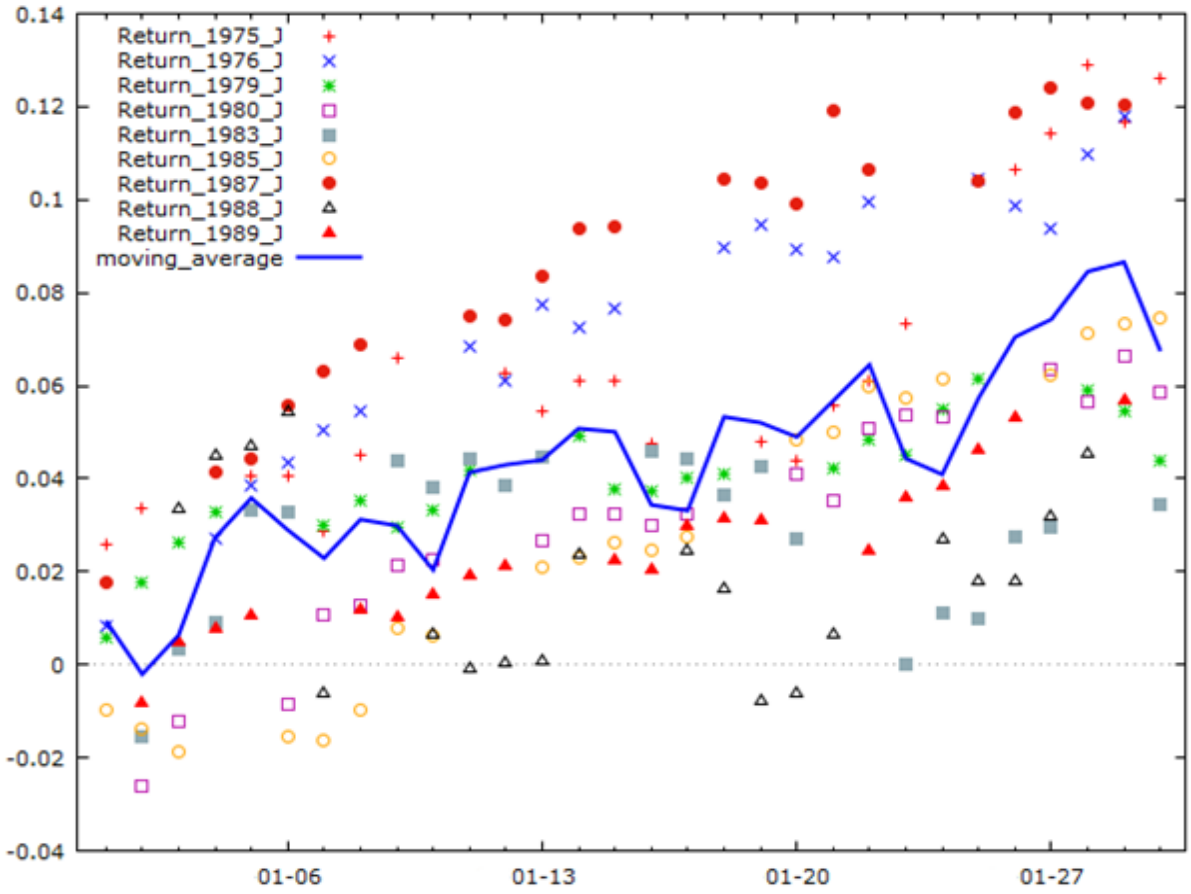


Figure 3: Distribution of the January Returns at the NYSE

There is no clear pattern showing how the stock prices move through January. However, it is noticeable that the January performance is very volatile. Nevertheless, we can clearly see that there is a positive trend in January. The only anomaly we could notice is that the growth in the first six days and the last six days seems to be higher than the growth of the remaining days in January.

5 The January Effect on German Stock Markets

5.1 Data

To observe whether the January Effect is still present in Germany and affects the German share price developments, we collected data of the DAX and SDAX. Thereby we wanted to check whether the January Effect affects these two indexes in the same way or if there are significantly differences. We collected daily, weekly and monthly data to examine different drivers that would imply a still existing January Effect.

The DAX is the most import benchmark index for the German economy. It contains the 30 largest companies. For our investigation, we took the DAX performance index to avoid referring to biased that has nothing to do with the January Effect.

The SDAX is a small cap index that consists of 50 companies that belong to the 110 largest companies after the DAX in Germany. We took it under consideration to investigate if the January Effect is a small firm phenomena.

5.2 Results for the SDAX

The fist investigation to observe the January Effect was based on monthly data. Therefore, we created a time series model that observes, whether the January returns are relatively higher than the average return of the remaining months.

Model 1:

$$return_{month} = \alpha + \beta_{jan} dm1 + \varepsilon_i$$

The coefficient β_{jan} measures the difference relative between the average return in January and the average returns of the remaining months. *Dm1* is a dummy variable takes the value 1 for a January return and 0 for all other months. The ε_i is the unobservable error term and α displays the slope of our regression. Therefore, in the first run we tested whether there is a significantly difference between January returns and the remaining monthly returns. With this procedure, we

tried to find time periods where a January Effect could have existed. With these results, we could test these time periods more precisely for anomalies later.

Starting with the SDAX we found that between 1996 and 2015 there were significantly high returns in January. Only the years 2008 and 2009 had strongly negative returns. This is due to the reason that Germany was strongly affected by the financial - and euro – crisis. Therefore, we excluded the data of these two years to avoid biased results.

5.2.1 Observations between 1996 and 2015

```
Model 1: OLS, using observations 1996:01-2007:12 (T = 144)
Dependent variable: return_sdax_19972007

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const      0.00429916    0.00399765    1.075    0.2840
  dm1        0.0363535     0.0138483     2.625    0.0096   ***

Model 2: OLS, using observations 2010:01-2015:12 (T = 72)
Dependent variable: return_sdax_20102015

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const       0.0107917    0.00504635    2.139    0.0360   **
  dm1         0.0389862    0.0174811     2.230    0.0289   **
```

The outputs imply that the January returns of the SDAX between 1996 and 2007 were around 3.64 % higher than the returns of the remaining months. This result is significant at a 1% level. For the time period between 2010 and 2015 we find 3.90 % higher returns with a 5% significance level.

In the next step, we will observe the cumulated distribution of the January returns between 1996 and 2015 based on the daily data. We will examine how the January returns are distributed and whether we find regularities between the underlying years. Thereby two different patterns occurred.

Model 2:

$$\sum returns_{jan}(days)$$

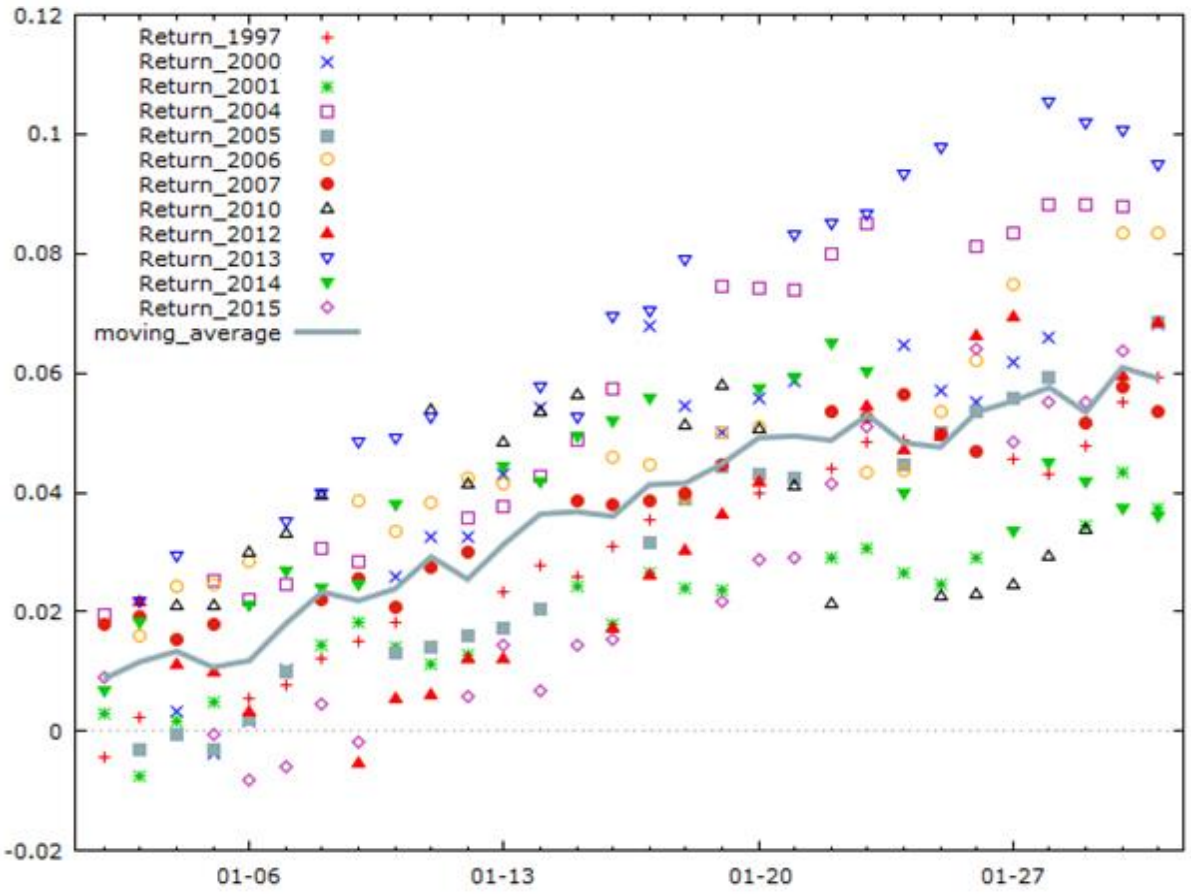


Figure 4: Distribution of the January Returns in the SDAX

In figure 3 we plotted the January returns between 1997 and 2015 that followed a similar distribution. Therefore, we calculated an average that can give an intuition how the returns develop over an average January. However, it seems to be that the data is heteroscedastic. There is a continuously growth in the January returns over the whole month. However, the returns seem to grow fastest in the first 5 trading days. Therefore, our findings differ from Donald Keim (1983) who observed in his research article 'Size-Related Anomalies and Stock Return Seasonality Further Empirical Evidence' that for small cap companies the excess returns in January are temporally concentrated. For the last 10 days, the growth of the returns begins to flatten. Besides, the dispersion between the years is increasing over the month, because the

difference between good and bad performing months is greatest at the end of the month. The graph cannot point out to an anomaly in January, like an extreme fast increase of the returns in the first days of January.

The last step of our investigation contained weekly data, to observe weekly anomalies during the year. We created another regression model to test whether there are significantly high returns in the beginning of the year and negative ones at the end of December.

Thereby we created the following regression model:

Model 3:

$$return_{week} = \alpha + \beta_{week2}\, dm2 + \beta_{week51} dm51 + \varepsilon_i$$

The coefficient β_{week2} measures the relative difference between the return of week two and the remaining weeks. *Dm2* is a dummy variable that takes on the value 1 if the return is from week 2 and the value 0 if not. β_{week51} measures the relative difference between the return of week 51 and the remaining weeks. The ε_i is the unobservable error term.

5.2.2 Observations between 1997 and 2015

```
Model 6: OLS, using observations 1-574
Dependent variable: return_sdax_19972007

             coefficient   std. error    t-ratio   p-value
  ---------------------------------------------------------
  const       0.00154225   0.000823252    1.873    0.0615  *
  week2       0.0128781    0.00563893     2.284    0.0228  **
  week52     -0.00998310   0.00588443    -1.697    0.0903  *
```

```
Model 3: OLS, using observations 1-313
Dependent variable: return_sdax_20102015

            coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const       0.00294100   0.00127731    2.302    0.0220  **
  week2       0.0139816    0.00904702    1.545    0.1233
  week51     -0.0159493    0.00904702   -1.763    0.0789  *
  week52      0.0163661    0.00904702    1.809    0.0714  *
```

The first output implies that the SDAX had between 1997 and 2007 1.29% higher returns in the second week than the average weekly return. This result is significant at a 5% level. On the other hand, we can say that there are around 1% lower returns in the last week of the year. This result supports the tax loss selling hypothesis obtained by (Wachtel, 1942) 'Certain Observations on Seasonal Movements in Stock Prices' and (Branch, 1977) 'A Tax Loss Trading Rule'. We will refer to this point later in the discussion. The results of the second output are worthwhile. On the one hand, it also implies that we have 1.40% higher returns in week two but on the other hand, the output implies that the average return of week 52 was positive. From the standpoint of the tax loss selling hypothesis we should expect that this week is also negative. One reason for this positive coefficient, could be the differing number of days of the 52nd week over the years. Hence, in some years the 52nd is located at the beginning of January. Therefore, the new fiscal year has already started and investors start buying the stocks they sold in week 51.

To sum up the findings we found that the January Effect was still existent between 1997 and 2005. We found some evidences that can help to interpret the drivers that cause the January Effect in this index. To test whether this effect is only existent in small cap indexes we will consider the DAX as our benchmark index.

5.3 Results for the DAX

We tested the DAX with the same Methodology. However, we got different results from our tests.

Model 1:

$$return_{month} = \alpha + \beta_{jan} dm1 + \varepsilon_i$$

5.3.1 Observations between 1996 and 2015

```
Model 2: OLS, using observations 1996:01-2007:12 (T = 144)
Dependent variable: return_sdax_19962007

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const      0.00986196    0.00579664   1.701     0.0911   *
  dm1        0.0153837     0.0200801    0.7661    0.4449
```

```
Model 4: OLS, using observations 2010:01-2015:12 (T = 72)
Dependent variable: return_dax_20102015

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const      0.00818279    0.00631710   1.295     0.1995
  dm1        0.0162423     0.0218831    0.7422    0.4604
```

We cannot find a significant result that points out that there are significantly higher average returns in January. Therefore, the results imply that there was no January Effect in this time period.

5.3.2 Observations between 1971 and 1986

```
Model 2: OLS, using observations 1971:01-1986:12 (T = 192)
Dependent variable: return_dax_1971_1986

             coefficient   std. error   t-ratio   p-value
  ---------------------------------------------------------
  const      0.00458666    0.00350211    1.310    0.1919
  dm1        0.0314756     0.0121316     2.595    0.0102   **
```

The following regression output points out that there were around 3.15% higher returns in January between 1971 and 1986. This result is significant at a 5% level. It is mentionable that for this time period the observed index was not the DAX, but the index of the "German Börsen-Zeitung". The DAX replaced this index in 1988. Hence, we find that there was a January Effect for the DAX. However, it disappeared after 1986.

5.4 Discussion

We found that only the SDAX had significant excess returns in January. It seems to be that the January Effect is still present in the SDAX but disappeared in the large cap index DAX. We also observed that there are excess returns in the second week of the year and significantly lower returns in the last week of the year. These findings can be explained by two arguments.

On the one hand, mutual fund managers tend to buy stocks at the end of the year to add equities to the portfolio that performed well over the previous period. This explanation is called window dressing hypothesis (Ng and Wang, 2004) and was observed in the article 'Institutional Trading and the Turn of the Year Effect'. The findings imply that window dressing can increase the demand for these stocks. This is consistent with the following correlation of the SDAX returns.

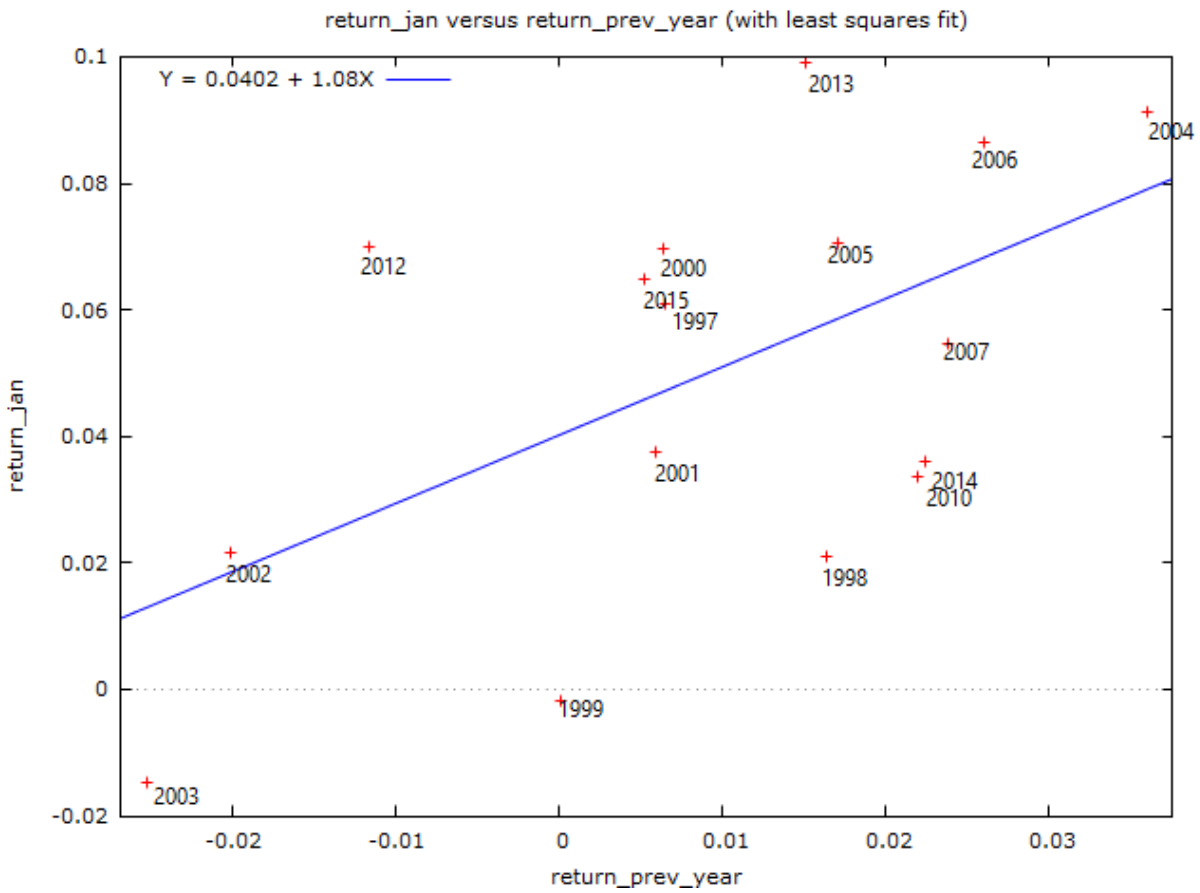


Figure 5: Correlation between the January and December Returns in the SDAX (With Least Squares Fit)

The graph shows that there was a positive correlation between the returns of the previous period and the excess returns in January in period of 1997 until 2015. We excluded the years 2008, 2009 and 2011 to get a significant regression. This finding supports the explanation of the window dressing behaviour of mutual fund managers. Therefore, we can expect that this issue had a strong influence on the SDAX in the observed time period. We can also relate that the previous year's average return can be used as a rough predictor for the January excess returns.

On the other hand, this correlation stands in contrast with another explanation for the January Effect. Stocks prices of firms that declined over a period tend to decrease further at the end of the period. This is due to the reason that stock owners want to compensate their tax duties with capital losses. Therefore, shareholders tend to sell their stocks at the end of the period. This leads to a decrease in the stock price. This explanation is called tax-loss selling hypothesis observed by Wachtel in 1942 in the article 'Certain Observations on Seasonal Movements in Stock Prices' and later observed by Branch (1977) 'A Tax Loss Trading Rule'. This could be

reasonable, because the German tax rate for capital gains is 25%. Therefore, stock holders would have a large incentive to sell stocks to realize a loss and compensate taxes thereby.

It is questionable why the January Effect disappeared for the DAX after 1986. One explanation could be covered by Mehdian and Perry (2002) 'Anomalies in US Equity Markets: a re-examination of the January Effect'. They observed the Dow Jones, NYSE as well as the S&P 500. The results implied that the January Effect was present until the year 1987, but disappeared in the following time period. Medhdian and Perry assumed that the stock market crash could have been a driver that caused the disappearance of the January Effect.

5.5 Conclusion for the German Indexes

After investigating the January excess returns we can say that there was a January Effect since 1997 until 2015. Nevertheless, it seems that this effect only affects small cap indexes as well as small companies. We also found an evidence that supports the argument of the tax loss selling hypothesis. Lastly we also found a high likelihood that the window dressing hypothesis is another driver of the January excess returns for the SDAX.

6 Reasons why the January Effect disappeared

In "Anomalies in US equity markets: a re-examination of the January Effect" it is documented that US equity returns in three major stock indexes (Dow Jones Composite, New York Stock Exchange and S&P 500) are not structurally stable over time and there is a significant structural break around the 1987 stock market crash. Evidence is also found that while January stock returns are significantly positive from 1964 to 1998, they are statistically insignificant after 1987. The results reveal no significant support for the January Effect in the post-crash era in US equity markets.

It is found that a significantly positive January Effect existed in all three stock market indexes (DJCOMP, NYSE, and SP500) over the period 1964-1998, consistent with previous literature on stock market anomalies. However, it is documented that the estimated parameters in equations testing for monthly seasonal effects are not structurally stable over the full sample

period and there is a statistically significant intertemporal break around the time of the 1987 stock market crash.
The January Effect is then examined separately in the pre-crash period and post-crash periods. In the pre-crash period, evidence of the January Effect is found in each of the three stock market indexes. In the post-crash period, however, January returns are found to be positive but statistically insignificant, indicating that the January Effect does not exist in the post-crash period.

The findings, in general, indicate that the January Effect can no longer be considered as one of the several well-documented seasonal anomalies in the US stock market. Since seasonal anomalies represent unexploited profit opportunities and violate market efficiency, the disappearance of the January Effect may imply that US stock markets are gradually becoming more `weakly efficient' in the post-crash period. The absence of a January Effect in the post-crash era may be due to the significant growth in the derivative markets for equities and increased trading by institutional investors who process information faster and at lower transaction costs

Another important paper related closely to the subject "The declining January Effect: evidences from the U.S. equity markets".
The January Effect exhibits a pronounced declining trend for both large and small firm stock indices since 1988, and the effect is disappearing for the Russell indices. The declining trend also appears in the Dow 30 since 1930. The generally strong real GDP growth and in stock market return may partially explain the declining January Effect in recent years. While the trend is upward for the Dow 30 and the S&P 500, during the post-war period through 1987, this is because of the extremely high January returns in 1975, 1976, and 1987. Contradictory to previous studies, the anomaly is more apparent with large firm stock indices, which may indicate that January Effect is not related to firm size.

The effect is weaker during periods of higher real GDP growth and stronger during periods of lower real GDP growth. The anomaly is less apparent for years with higher inflation, and more apparent for years with lower inflation. The contribution of January return to the year's return is relatively insignificant for good market years, and relatively significant for poor market years. Higher January return is positively related to market volatility and the relation may not be linear. The expected values of the three macroeconomic factors have more significant impacts on the

anomaly than do the actual values, which is further evidence that investors price stocks based on their expectations.

The declining January Effect may represent a trend toward market efficiency. More experienced and knowledgeable investors, and advances in information technology (such as greater quantity, better quality, and lower cost of information, and faster communication and order execution) should make the market more efficient. In fact, developed markets are more efficient than less developed and emerging markets.

7 References

Amadeo K., August 2016. 'Opec oil embargo: causes and effects of the crisis', *The Balance*, [Online]. Available from: https://www.thebalance.com/opec-oil-embargo-causes-and-effects-of-the-crisis-3305806

Banz R., March 1981, 'The Relationship between Return and Market Value of Common Stocks', *Journal of Financial Economics*, 9 (1), pp. 3-18, Elsevier B.V. [Online]. Available from: http://www.sciencedirect.com/science/article/pii/0304405X81900180

Branch B., April 1977. 'A Tax Loss Trading Rule', *The Journal of Business,* 50 (2), pp. 198-207, The University of Chicago Press [Online]. Available from: http://www.jstor.org/stable/2352153?seq=1#page_scan_tab_contents

Fink, J., December 2013, January Effect and 52-Week Highs/Lows: How to Beat the S&P 500, [Online]. Available from: http://www.investingdaily.com/19089/january-effect-and-52-week-highslows-how-to-beat-the-sp-500/

Gu A., August 2003. 'The declining January Effect: Evidences from the US equity Markets', *The Quarterly Review of Economics and Finance*, 43 (2), pp. 395-404, Elsevier Inc. [Online]. Available from: http://www.sciencedirect.com/science/article/pii/S1062976902001606

Gultekin M. & Gultekin N., December 1983. 'Stock Market Seasonality: International Evidence', *Journal of Financial Economics*, 12 (4), pp. 469-481, Elsevier B.V. [Online]. Available from: http://www.sciencedirect.com/science/article/pii/0304405X83900442

Haugen, R. & Lakonishok J., 1988. *The Incredible January Effect: The Stock Market's Unsolved Mystery*. 1st Ed.: McGraw-Hill Professional Publishing [e-book version]. Available from: https://www.goodreads.com/book/show/2982207-the-incredible-january-effect

Henry, J., Febuary 2012, Is there really a January effect in equity markets? [Online] Available from: http://perspectives.pictet.com/2012/02/02/is-there-really-a-january-effect-in-equity-markets/

Keim D., June 1982. 'Size-Related Anomalies and Stock Return Seasonality Further Empirical Evidence', *Journal of Financial Economics*, 12, pp. 13-32, North Holland [Online]. Available from:

http://www.business.unr.edu/faculty/liuc/files/RUC/ResearchMethod/Keim_JanEffect_1982.pdf

Kiersz A., November 2014. 'The NYSE makes stock exchanges around the world look tiny', *Business insider*, [Online]. Available from: http://www.businessinsider.com/global-stock-market-capitalization-chart-2014-11?IR=T

Mehdian S. & Perry M., 2002. 'Anomalies in US Equity Markets: a re-examination of the January Effect', *Applied Finacial Economics*, 12 (2), pp. 141-145, Taylor & Francis [Online]. Available from: https://www.researchgate.net/publication/24070514_Anomalies_in_US_Equity_Markets_A_Re-examination_of_the_January_Effect

Ng L. & Wang Q., November 2004. 'Institutional Trading and the Turn of the Year Effect', *Journal of Financial Economics*, 74 (2), pp 343-366, Elsevier B.V. [Online]. Available from: http://www.sciencedirect.com/science/article/pii/S0304405X04000741

Norges Bank Investment Management, 2012, NBIM Discussion Note: The Value Effect [Online] Available from: https://www.nbim.no/globalassets/documents/dicussion-paper/2012/discussionnote_16-12_4korr.pdf

Reinganum M. & June 1983. 'The Anomalous Stock Market Behavior of Small Firms in January: Empirical Evidence for Tax-Loss Effects', *The Journal of Business*, 60 (2), pp. 281-295, The University of Chicago Press [Online]. Available from: https://www.jstor.org/stable/2352814?seq=1#page_scan_tab_contents

Roll R., June 1983. 'On Computing Mean Returns and the Small Firm Premium', *Journal of Financial Economics*, 12, pp. 371-386, North-Holland [Online]. Available from: http://psc.ky.gov/pscecf/2012-00221/rateintervention@ag.ky.gov/10252012f/Roll_-_On_Computing_Mean_Returns.pdf

Rozeff M. & Kinney W., October 1976. 'Capital market seasonality: The case of stock returns', *Journal of Financial Economics*, 3 (4), pp. 379-402, Elsevier B.V. [Online]. Available from: http://www.sciencedirect.com/science/article/pii/0304405X76900283

Shane T., December 2016. 'Impact of wars on stock markets', *Smedley Financial*, Smedley Financial Services Inc. [Online] Available from: http://smedleyfinancial.com/wp/impact-of-war-on-stock-markets/

Wachtel S., April 1942. ‘Certain Observations on Seasonal Movements in Stock Prices’, *The Journal of Business of the University of Chicago*, 15 (2), pp. 184-193, The University of Chicago Press [Online]. Available from: http://www.jstor.org/stable/2350013?seq=1#page_scan_tab_contents