

“Normal and reverse stock splits in the V4 countries”

AUTHORS	Manuela Raisová Martin Užík Christian M. Hoffmeister
ARTICLE INFO	Manuela Raisová, Martin Užík and Christian M. Hoffmeister (2016). Normal and reverse stock splits in the V4 countries. <i>Investment Management and Financial Innovations</i> , 13(4), 95-105. doi: 10.21511/imfi.13(4).2016.08
DOI	http://dx.doi.org/10.21511/imfi.13(4).2016.08
RELEASED ON	Thursday, 15 December 2016
JOURNAL	"Investment Management and Financial Innovations"
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

0



NUMBER OF FIGURES

0



NUMBER OF TABLES

0

© The author(s) 2026. This publication is an open access article.

Manuela Raisová (Slovakia), Martin Užík (Germany), Christian M. Hoffmeister (Slovakia)

Normal and reverse stock splits in the V4 countries

Abstract

The economic crisis has forced managers of joint stock companies to look for short-term solutions for the sharp changes in stock prices of their companies. Even the companies of the V4 countries are not the exception. The authors have focused on those companies where have been used either reverse stock split or stock split. They analyzed the effects of the reverse stock split or stock splits on the abnormal returns of stocks. In this paper, the authors analyzed a dataset from 1993 until 2015 with 124 reverse stock splits and 184 stock splits in total focused on the stock market in V4. Based on their own research they conclude that when reverse stock splits were used stock returns significantly decreased one day around the announcement date. They conclude that managers of a company might use this instrument to move the stock price back to the optimal trading range outside of the penny stock area. In the case of stock splits, the authors concluded that the use of this tool results in a significant increase in the returns of a stock after the announcement date. However, the results are in contrast to some former studies which found no positive effect on the returns caused by stock splits. The authors conclude that managers of a company might use this instrument to transport information content of future (positive) performance of a company to the traders.

Keywords: Vysegrad group countries, normal stock split, reverse stock split, abnormal returns.

JEL Classification: G11, G23, G32.

Introduction

The economic crisis over the years has revealed several problems (Wyplosz, 2010). In terms of the macro level, it is primarily a problem of growth of government debt (Sau, 2015; Escudero, 2015), inefficiencies in production and instability in the financial system of the country. On the micro level the problem is evident by artificially increased value of companies in conflict between the needs of employees and the requirements of employers (Merkevičius et al., 2015) and in the area of the financial operations of firms (Šoltés, 2014). Wide-ranging implications of the crisis were also reflected in the deepening problem of financing and financial management of small and medium-sized enterprises as well as large enterprises irrespective of the form of business. (Andrejovská – Bánociová, 2014). As reported by Mura-Buleca (2012), currently, most of SMEs are not able to enter into the regular capital market to obtain direct financing. However, in order to ensure investment projects and increase performance of business, they have to find new way of financing. But stock markets were hit by the crisis, respectively, companies that are listed on stock exchanges. Primarily, we are not talking about situation where there is an announcement of change of any rating from rating agencies (see Užík – Šoltés, 2009). We are talking about the situation when the stock prices of many companies have dropped significantly and even reached the level from which it is impossible to restore the original

value of the shares in the short term. Already in the past it was shown that the use of reverse split stock may be the appropriate solution to the problem with low investment attraction. As reported by Kiang et al. (2009), after the bursting tech bubble in 2000, the stock prices of many companies have declined. This was one of the reasons why many companies used the reverse stock split as a tool through which they tried to re-establish the trust of its shareholders and attract new investors (Kiang et al., 2009). As reported by Chung and Yang (2015), research has confirmed that investors investing in stocks of private companies prefer holdings of shares with a higher share price and greater market capitalization, with stable payout policy, with better management actions and a higher pay-for-performance sensitivity (Chung – Yang, 2015). While stock splits were examined theoretically and empirically in the English-speaking world since the middle of the 20th century (Fama et al., 1969), the scientific interest in Germany was growing with the reduction of the minimum nominal share value from DM 50 to DM 5 in 1994 (Zweites Finanzmarktförderungsgesetz, 1994) and, finally, to € 1 on 1.1.1999 (Kaserer and Muhl, 1998).

In this paper, we analyze announced and completed stock splits and reverse stock splits in the V4 countries. We focus on the associated reactions of the capital markets to these processes. We show that changes in stock prices are, using both instruments, statistically significant.

1. Review of the scientific literature

Our article is dedicated to two contradictory procedures on transactions with stocks of the company. In the first part, we analyze the first tool - normal stock splits and, then, we analyze the impact of using this tool to abnormal return. We will

© Manuela Raisová, Martin Užík, Christian M. Hoffmeister, 2016.

Manuela Raisová, Assistant professor, Faculty of Economics, Technical University of Košice, Košice, Slovakia.

Martin Užík, Professor., Dr., Berlin School of Economics and Law, Hochschule für Wirtschaft und Recht Berlin, Berlin, Germany

Christian M. Hoffmeister, Dipl. Econ., Faculty of Economics, Technical University of Košice, Košice, Slovakia.

investigate reasons, which could explain the utility of stock splits. After the presentation of the motives for the implementation of a stock split we review our hypotheses by an empirical study we carried out. In the second part, we analyze the second tool, which is a reverse stock splits. As with normal stock splits, also here we focus on the analysis of the impact of using this tool to create abnormal return.

Scientific investigation of stock splits is performed for decades and most of the literature comes from the USA. Studies from the USA, like they are described in the paper of Fama et al. (1969), are not applicable one-to-one to the German capital market. This is caused by different framing of stock types, regulations and practice of the market for example. The hypotheses of the US literature, however, can be adapted basically to the research of stock splits on the German capital market (Harrison, 2000).

1.1. Normal stock splits

1.1.1. Share price marketing and the definition of normal stock splits

There are two options for a company to increase its number of shares: it can either implement an increase of the capital stock from the company's own resources or realize a decrease of the share amount (Harrison, 2000). For explanation: a single nominal share has a nominal value x . The sum of all single value shares with a minimum value of 1 € is equal to the share capital of the company, which is at least an amount of 50 000 € ("§ 6 AktG", "§ 8 AktG"). The procedure of a nominal value reduction with the related issue of new shares in the matching exchange ratio is referred to as "stock split". This action has no direct effect on the value of the related company (Li, Stork and Zou, 2011).

A stock split is not connected with a corporate action: the share capital of a corporation is divided into " n " shares with the nominal value " x ". The exchange of " $2n$ " new shares for " n " old shares and reducing the nominal value to " $\frac{1}{2}x$ ", the share capital stays the same. The same applies to the share price and, consequently, to the market value of the company's equity (defined as share price multiplied by number of shares). This implies that the number of shares does not affect the market value of the company, except of having liquidity considerations. The number of shares does not affect current and future cash flows (Harrison, 2000; Li et al., 2011).

The procedure of a stock split is connected with some additional costs. Typical costs accompanying the decision of the company about stock split are connected to the announcement, disclosure requirements and the pure exchange process of old shares for new shares. These costs are called

transaction costs. The average cost of a share split is amounted to 0.67 per 1000 GE of market capitalization (Harrison, 2000). These costs are borne by the shareholder. This raises the question why a company should announce the implementation of a stock split, if that only causes costs, but has no effect to future cash flows.

1.1.2 Motives for stock splits

Optimal trading range hypothesis

Brennan and Copeland (1988) found that a share price could be determined, which reflects private information of the management on the future prospects of the company (Brennan and Copeland, 1988). We assume that the transaction costs are a decreasing function of the share price and the company size. That means, if the share price is higher or the company is bigger, the transactions costs are lower (Brennan and Copeland, 1988). Thus, the stockholders or investors must be interested in high share prices. This thesis is in contrast to the meaning that an optimal share price range exists, which is observable by share prices of comparable stock companies (Baker and Gallagher, 1980).

Relevance of the tick size

Studies from Germany and from the US prove the relevance of rate independently tick size, the institutional smallest possible change of the share price. In the United States, the tick size is defined by 0.125 USD and in Germany it is 0.5 DAX –Index points.

Angel described stock splits as an instrument to conduct the share price in the range of share prices, where the relative tick size of the share is optimal. Absolutely bigger tick sizes would have advantages, because they reduce negotiations by lower possibilities of price position and, therefore, also the transaction costs (Angel, 1997).

Influence on liquidity and volatility.

An improvement of the liquidity after the stock splits seems evidently, because the shares can be traded easier with the lower stock price. However, Copeland came to the result that the liquidity decreases after a stock split permanently. Copeland explained that by an increasing spread, relatively to the share price (Copeland, 1979). Lakonishok and Lev (1987) found no permanent change in the trading volume caused by stock splits (Lakonishok-Lev, 1987).

As opposed to this, Maloney and Mulherin observed a bigger number of shareholders, a higher dollar volume and, thus, a higher liquidity (Maloney - Mulherin, 1992). Also a newer study from Lin et al.

points out that the liquidity after stock splits increased significantly and thereby declined the costs of equity, because investors demand lower liquidity premiums facing reduced risks (Lin et al., 2009). Hence, the empirical research of the post-split development of stock market liquidity is discordant. A more detailed empirical analysis of the stock market liquidity is not the emphasis of this paper.

A general qualitative statement of changes in volatility after the split announcement can't be attributed to each investor. Risk-averse investor refuses increase of volatility, while risk-taker investor welcomes it (Harrison, 2000). In the context of the empirical study, also the volatility is observed for the analysis of the abnormal returns.

Signalling

Even in the study by Fama et al. (1969), authors concluded that the announcement of a stock split could bring information from company management about future earnings growth and, thus, also could signal a rise in prices (Fama et al., 1969). The very announcement is considered as a signal of future price increases and this fact in itself supports the growth in demand. As a result, market reaction may occur, if the market reacts at all, during the announcement day or shortly thereafter. This approach was also supported by other authors, such as Ikenberry, Rankine and Stice (1996).

Chen et al. (2011) found not only that stock splits have an information content, which could be profitable, they also showed that versed and competent trader could decide between splits with and without useful content. This confirms the earlier result that stock splits can carry positive information about the future performance of a stock (Chen, Nguyen and Singal, 2011).

Whether this market reaction happens and whether it results in abnormal returns is examined in the following. The thus obtained positive abnormal returns are considered as beneficial for investors (under *ceteris paribus*).

1.2 Reverse stock splits

1.2.1 Definition and implementation of reverse stock splits.

Reverse stock split is the opposite process of stock split. Instead of increasing the number of shares, this procedure causes a reduction of the number of shares. The number of shares is decreasing in the addition to the chosen exchange ration and the value of each single new share has increased by the same ratio. Typical exchange ratios are 1 to 2, 1 to 5 and 1 to 10. While the company value stays the

same, this implements a rise of the stock price. The aim is to move the stock price after the reverse stock split to a more comfortable price level. Thus, the exchange ratio is depended either of the depth of the downfall before or the target price of the stock which should be achieved. This can happen either with different ratios or with several repetitions. The exchange rate of 1 to 5, for example, means that a shareholder gets one new stock for 5 old ones. This merging itself does not change anything considering the share-ownership ratio or the total assets of the incorporated company. Important to mention is that the company's equity is unaffected. Every reverse stock split has to be agreed by the annual general meeting of shareholders (Lojewski, 2015).

Companies often use this method after the stock price has fallen to a considerable amount and a period of recovery does not seem as prospect. As Baker and Gallagher described, a price range for stocks exists, which is preferred by the most investors (Baker-Gallagher, 1980). Especially stocks with very low prices, so-called "penny-stocks", might scare investors of trading these shares. By implementing a reverse stock split, the affected company can "heal" itself. On the other hand, implementation of the reverse stock split of an incorporate company is often a warning signal regarding the future development of the company (Lojewski, 2015). In general, companies implementing reverse splits send a signal to the investment community, which may indicate two basic situations. The first situation is that reverse splits can be a desperate step of the sinking company to increase the low price of its shares to more respecting commercial space, especially if there is a threat of decommissioning due to excessively low prices. The second situation may be that a company with stable financial fundamentals can use "reverse splits" to shift the value of company's low-priced stocks closer to the value of the shares of similar companies in the market, thereby attracting a wider range of potential shareholders. (Peterson -Peterson, 1992; VAFE, 2001)

At par value old shares of a company are retracted and replaced by new shares with a correspondingly higher nominal value. For individual shares, the process is easier. After the statute of the stock company has been changed in accordance with the merger resolution by the annual general meeting of shareholders, the number of shares is reduced in the adopted ratio. As a result, the shareholders have fewer shares, however, without changing their share of the company after completion of campaign. Stock charts, as they are provided by financial service providers on the Internet or journals are automatically adjusted to inform the investors

correctly about the chart development. The stock charts are presented as if it had always been the newly agreed number of shares. Serious charts, however, should contain an indication of the reverse stock split. The share price changes with effect in relation to the agreed ratio. During the following trading day, the stock price is determined immediately and strictly by supply and demand and changes accordingly. Basically, the stock can be used with the same ISIN or WKN (Wertpapierkennnummer is German stock identification number) (Lojewski, 2015).

Reverse stock splits caused a sensation for banks after the financial crisis. In 2012, the Annual General Meeting of the Royal Bank of Scotland decided to accomplish a reverse stock split by the split ratio of 1 to 10 (Neville, 2012). The German Commerzbank implemented this method in 2013, also with the same exchange ratio of 1 to 10 (Weisbach, 2013). Earlier, the price of the Commerzbank stock had almost collapsed beneath EUR 1. The Commerzbank was supported in accordance with the bank-rescue fund, because it was heavily hit by the financial crisis, and, hence, it needed new fresh capital for further remediation measures. New capital should have been acquired by issuing new shares. Without the reverse split before, this transaction could have been impossible, because, according to the German Stock Cooperation Act, a minimum share price for emitted shares of EUR 1 is required. At that time, the stock price of Commerzbank was threatened to fall beneath this limit.

1.2.2 Motives for using reverse stock splits

The reasons of companies and their managers to apply reverse stock splits overlap to a certain degree with those of normal stock splits. The argument to raise the stock price through this process in a more attractive price level is also used here as a justification. The absolute price level of a share may affect the investor regarding the size and the quality of a company and, thus, it is an important representing factor for purchase or sale decision-making processes. In this case, a company would choose the reverse stock split as an instrument to maintain or improve their external image for the purpose of the shareholders (Woolridge and Chambers, 1983). Share prices, which are too low, may damage the market attractiveness. These shares are classified as speculative and appear for potential investors as too risky. In this context, shares of the same type, but with a higher price, are accepted by banks and investment firms as collateral for loans much better than in the case of shares with a lower level of price (Peterson and Peterson, 1992). A stock is considered as attractive when it is listed in key

systems for stock exchange. To get listed in the National Market System in the United States, for example, a minimum bid-price of USD 5 per share is requested for the first time quotation. Reverse stock splits are also used to decrease the number of shareholders and to accomplish a “going private” process. Company managers can so easily circumvent the costs of the public transmission of shares by announcement of the reverse stock split. This motive has emerged, in particular, in the case of company restructurings (Peterson and Peterson, 1992). Moreover, fewer investors reduce the costs associated with servicing of investors.

Lamoureux and Poon (1987) found an average increase of the number of shareholders caused by stock splits at around 34.7%. In contrast to that, they discovered a reduction of shareholders number after a reverse stock split by only 1.9% (Lamoureux and Poon, 1987). This appears surprisingly, since a reverse split should have exactly the opposite effect and, secondly, the argument of reducing the shareholders is not accurate. There is also the possibility that a reverse stock split reflects the pessimism of the company in the case that its share did not reach the desired price level. If the management has an optimistic future attitude, it will not waste a lot of energy with raising the stock price artificially. In this case, an announcement of a reverse stock split is interpreted as the negative information (Peterson and Peterson, 1992).

Whether reverse stock splits are good, bad or even without any further importance for investors will be the subject of further discussion. Reverse splits can be neutral or perhaps even positive in an individual case, if they are accomplished to standardized types of shares. Even reverse stock splits used only for aesthetic reasons can have positive impact for investors, who ventured investing into a penny stock. Similar to the theory of normal stock splits, even there should be no effect caused by reverse stock splits. However, empirical tests showed that these types of abnormalities occur repeatedly (Dravid, 1987).

Reduction of the share price and margin change

Since an announcement of a reverse stock split is often interpreted by investors as negative information, the most common market reaction is the reduction of the market share price (Woolridge and Chambers, 1983). That means that the share price does not increase about the whole split factor, but about a fraction of it. Some market participants use this fact and pursue the strategy of the short-selling. This means they are selling a share speculating that the stock price will develop

negatively. At the same time, they oblige to repurchase the stock at a later date.

In the period after a reverse stock split both a reduction of the return, as well as a decrease of the related volatility has been recorded (Woolridge and Chambers, 1983). If the economic data of a company have been good in the past, a reverse split should not have a negative influence on the future yields. But since a negative development was empirically found, it has to be assumed that there are other factors responsible for this effect. Important to mention here are the higher prices, the reduced number of investors and also the psychological attitude of investors who do not see a positive development in the near future.

Transaction costs and liquidity

The level of transaction costs decreases after a reverse stock split, as these costs (e.g. brokerage fees) depend indirectly proportional from share price. This is also consistent with the research of Melnick and Ofer (1978) who found an inverse relationship between the trading volume and transaction costs. This cost saving has a lifting effect on the liquidity of a stock (Ofer and Melnick, 1978).

In the literature the bid-ask spread is very often used as a measure of liquidity. In this point, the opposite as for normal stock splits applies. After Han (1995) the relative bid-ask spread of the splitted stock decreased significantly while in parallel the volume of trading increased. Another option to measure the liquidity of a stock is based on the number of trading days without turnover prior to and after the reverse split. The concept behind is that trading days without turnover develop inversely to liquidity, i.e., the more trading days, without turnover, the less liquid is the stock. Han (1995) examined this hypothesis and showed a significant decrease of the trading days without turnover after a reverse stock split. (Han, 1995)

2. Research methodology

The study contains both descriptive and normative analysis. In the descriptive section we analyze the number of stock splits and reverse stock splits a year and selected exchange ratios. We also seek to explain why the number of realized stock splits is so unstable in selected years. The analysis covers all stock splits and reverse stock splits that have taken place on the stock exchanges of the V4 countries since June 1st, 1993. We have included a total of 184 cases of normal stock splits and 124 cases of reverse stocks splits to our calculations. Polish companies have announced 156 normal stock splits and 119 reverse stock splits, the Czech

companies announced 12 normal stock splits and one Czech company announced reverse stock splits, 15 Hungarian companies announced normal stock splits and 4 companies announced reverse stock splits and only one company in Slovakia announced normal stock split. Neither of Slovak companies announced reverse stock splits. The source of all the data is Bloomberg. Prices that we counted are from Datastream.

Our normative analysis focuses on abnormal returns achieved around the date of the stock split and reverse stock splits. To determine the expected reference rate of return, we used the following model. In order to determine the abnormal excess returns, the reference rate of return is calculated according to the market model. The market model is based on the work of Markowitz (1959). It assumes a linear coherence between the return from commercial papers and market portfolio.

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}, \quad (1)$$

whereby ε = noise

$R_{m,t}$ = market return at day t .

The parameters alpha and beta are determined with the OLS method in the context of this study. The estimation period ends one day prior to the beginning of the event period in order to avoid any overlapping. Central within the observation is the day of announcement. The event period comprises 13 trading days around the day of announcement. As the estimation period for the determination of the market model's parameters, a period of 522 to 13 trading days prior to the event period is used (for general remarks on the market model and the determination of the length of estimation period, see Wulff, 2001, p. 116. The Stoxx-EURO 600 Index is used for the determination of the return from the market portfolio.

To calculate the excess returns, we used this model. The difference between the effectively realized and the theoretically anticipated return of a share expresses the excess return. In an information-efficient market and under the condition of concurrent validity of the model consulted in order to determine the expected return, there don't exist systematic deviations of these two return figures.

$$E(AR_{i,t}) = 0, \quad (2)$$

whereby the excess return is calculated as follows:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (3)$$

$AR_{i,t}$ = abnormal return of the share i at day t

$R_{i,t}$ = observe return of the share i on the stock exchange on the day t

$E(R_{i,t})$ = expected return of the share i at day t

In literature, the additive, as well as the multiplicative conjunction of the excess returns and the determination of buy-and-hold excess returns are used for the determination of cumulated excess returns (empirical studies mainly use the additive determination procedure, for the calculation of cumulative excess returns, cf. Mitchell and Stafford, 2000).

The additive approach of determination of cumulated excess returns traces back to the work of Fama et al. (1969) and is determined as follows:

$$CAR_{i,\tau,L} = \sum_{t=\tau}^{\tau+L} AR_{i,t} \quad (4)$$

The multiplicative conjunction of the excess returns was produced by Ball and Brown (1968). The result of a cumulated multiplicative compression of excess returns is captured in an abnormal-performance-index (API). In the present study, it is resorted to

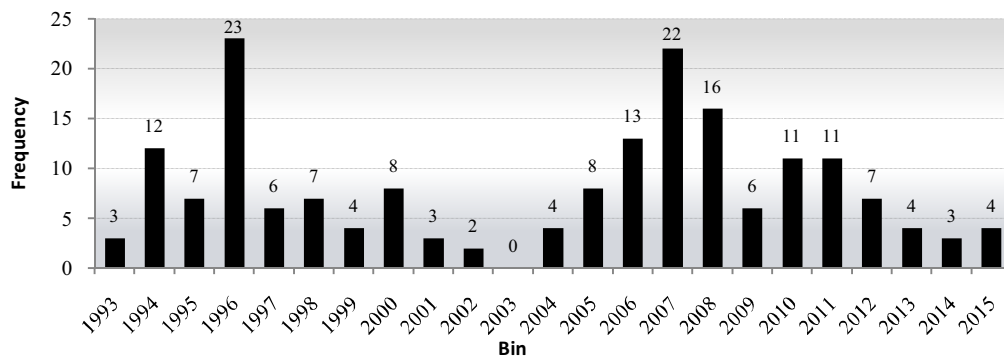
the additive capture of the cumulated excess rates. (see Wulff, 2001, p. 134)

In addition to the daily abnormal returns the cumulative abnormal returns are calculated and illustrated to show possible trends in the share price development.

3. Results

3.1 Descriptive analysis - verification of hypotheses based on stock splits carried out in V4.

Figure 1 shows the number of announcements and explanations of the normal stock splits from June 1st, 1993 to October 17th, 2015. Clearly visible is the increase in 1996 and 2007, which can be explained by the bullish markets and good economic development in the Euro zone, where many companies split their stocks. The subsequent economic downturn, caused by the economic crisis, has brought a marked decline in the number of normal stock splits. However, the company, then, reacted to short-term economic recovery, the number of normal stock splits increased in the short term, but since 2011, their number has declined.

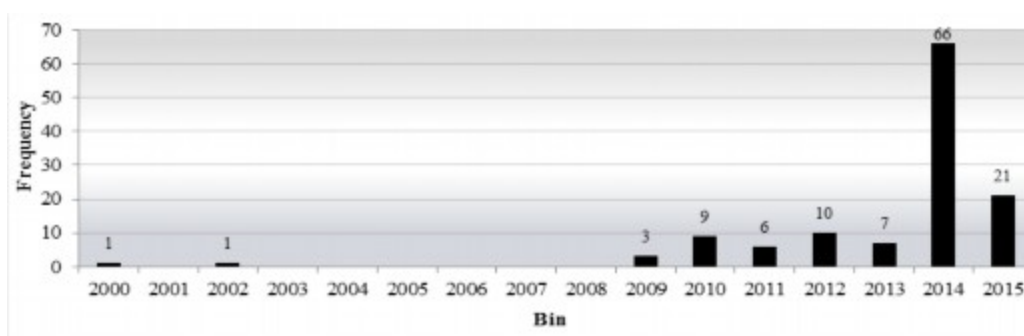


Source: Data-set from Bloomberg.

Fig. 1. Number of normal stock splits in V4 since 1993 to 2015

Figure 2 shows the number of announcements and explanations of the reverse stock splits from June 1st, 1993 to October 17th, 2015. As shown in the Figure 2, the largest number of reverse stock split was implemented in 2014. We attributed this to the

fact that at the end of the second wave of economic crisis, companies tried to restore the confidence of their investors and re-start their business by using the reverse stock split.



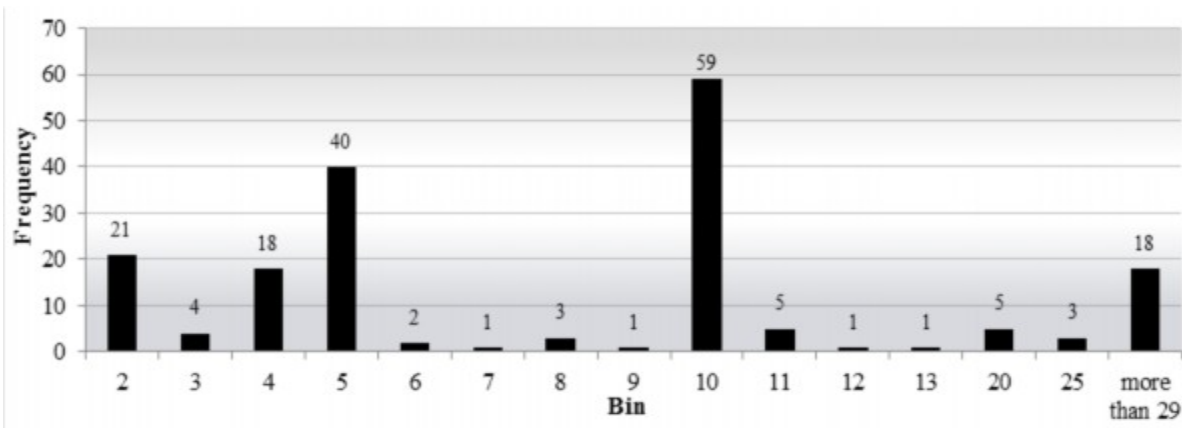
Source: Data-set from Bloomberg.

Fig. 2. Number of reverse stock splits in V4 since 1993 to 2015

Forward normal and reverse stock splits according to swap rate

The exchange ratio 10 to 1 dominates among the analyzed normal stock splits exchange ratios. (Figure 3). Nearly every third share split was carried out in such proportion (32.07% of total normal stock splits). The second and the third most used exchange

ratio was 5 to 1 and 2 to 1. Next in the order were 4 to 1 and more than 29 to 1. These data can be interpreted in this way that many companies prefer a higher exchange ratio with the consequence of less frequent splits. Thus the signalling effect can be implemented more often (Chen et al., 2011).

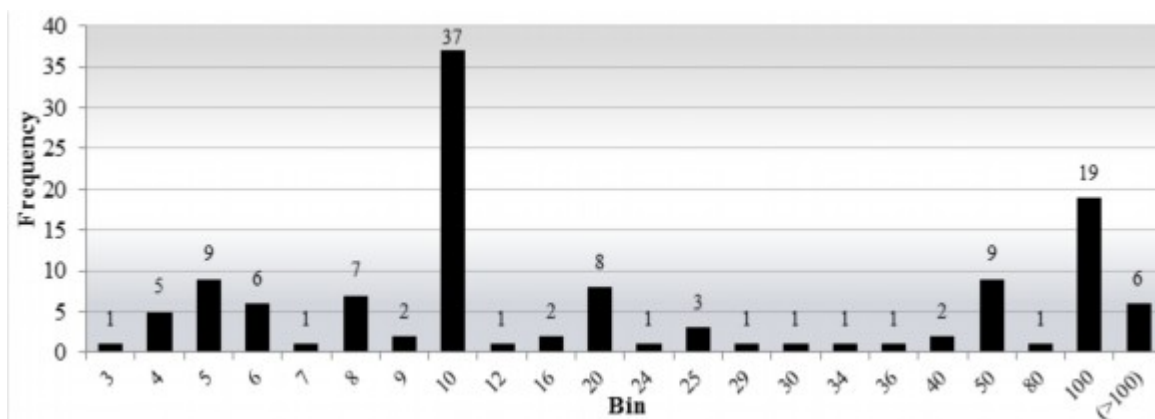


Source: Data-set from Bloomberg.

Fig. 3. Number of stock splits according to swap rate (Histogram)

The exchange ratio of 1 to 10 dominates with almost 30% of all reverse stock splits (Fig. 4). The second most common ratio used was 1 to 100 followed by 1

to 50 and the ratios of 1 to 5, or 1 to 20. Next in order were those with low exchange ratio as 1 to 8, or 1 to 6.



Source: Data-set from Bloomberg.

Fig. 4: Number of reverse stock splits according to swap rate (Histogram)

3.2. Normative analysis - Analysis of the capital market reaction to the announcement of the normal stock splits and the reverse stock splits in the V4 countries

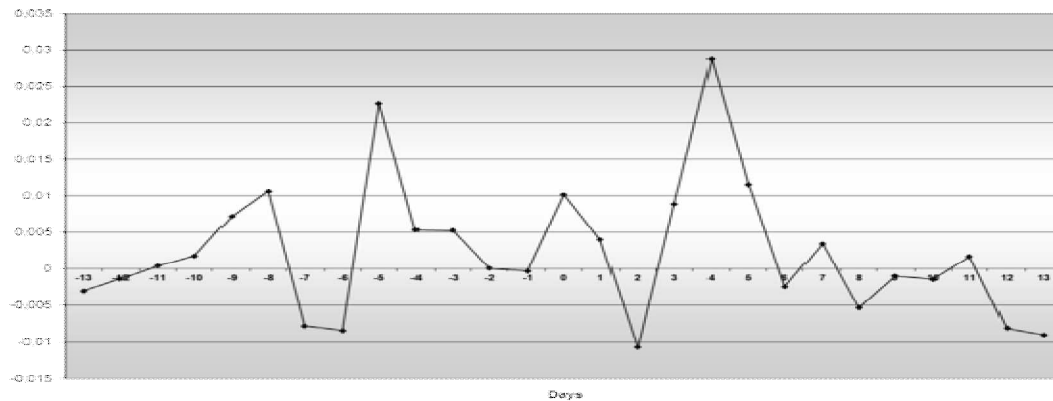
The difference between the actual return and the estimated normal return of a stock is called, abnormal return (Harrison, 2000). In the following investigation abnormal returns are calculated by determining the historical daily closing prices for periods of 13 days prior and after the normal stock split or reverse stock split announcement, of which the estimated normal returns are deducted in this 26-day period plus the announced day.

Outcomes of the analysis of the capital market reactions to announced normal stock splits

There have been 184 cases of announced normal stock splits of companies listed on the stock exchanges in the V4 countries. This sample is the basis for this study. Only 68 cases out of a total of 184 operations brought sufficient data for empirical analysis. The examination of the capital market reactions is made in a time frame of 13 days around the day of the announcement. The examination's focus is on the excess return that is determined by the difference between the anticipated and the realized return. The average

abnormal returns in the market model show a positive deviation on the announcement day and the day after (up to 1 %). Subsequently, a higher

volatility of the abnormal returns can be noticed (Fig. 5).

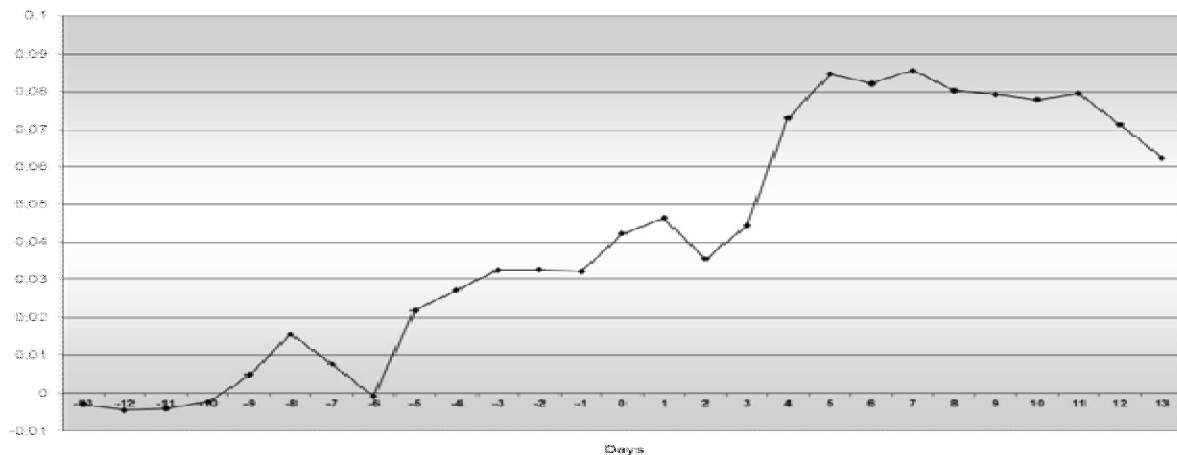


Source: Data-set from Bloomberg

Fig. 5. Abnormal returns in the market model (normal stock splits)

The analysis of the abnormal excess returns shows only for one day the significant return in the period. (the 7th day before announcement - significant

deflection at 10% level) Therefore, the analysis of the cumulated abnormal excess returns must be discussed.



Source: Data-set from Bloomberg.

Fig. 6. Cumulated abnormal returns in the market model (normal stock splits)

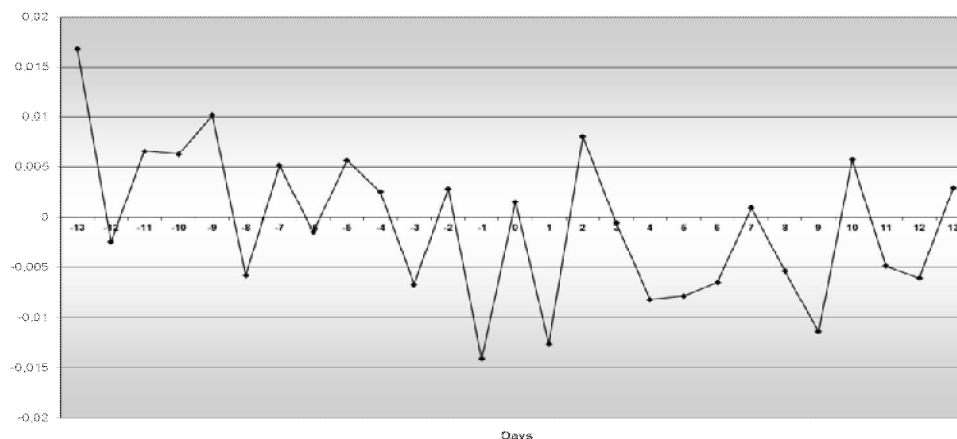
The observation of the cumulated excess returns shows a positive signal on the capital markets with respect to announcements of stock splits (Fig. 6) In the examination period of 13 days around the moment of announcement an overall return of 6% could have been realized. However, this value is statistically not significant. On a safety level of 90%, there could be noted a return of 8.2% in a time frame of ten days around the day of announcement.

For the company value, the announcement is evaluated positively considering the horizon in a timeframe of five days around the day of announcement with cumulated abnormal returns of more than 8.5% (significant deflection at 1% level). The relatively high abnormal returns on the announcement day can be considered as indication for the signalling theory (Chen et al., 2011).

Outcomes of the analysis of the capital market reactions to announced reverse stock splits

There have been 124 cases of announced reverse stock splits of companies listed on the stock exchanges in the V4 countries. This sample is the basis for this study. Only 105 cases out of a total of 124 operations brought sufficient data for empirical analysis. The examination of the capital market reactions is made in a time frame of 13 days around the day of the announcement. The examination's focus is on the excess return that is determined by the difference between the anticipated and the realized return. The average abnormal returns, in our case showed no reaction on the announcement day. One day around the reverse stock splits announcement we see the average negative reaction - 1.4% (day before reverse split announcement) and - 1.3% (day after reverse split announcement).

Subsequently, a higher volatility of the abnormal returns can be noticed (Fig.7).

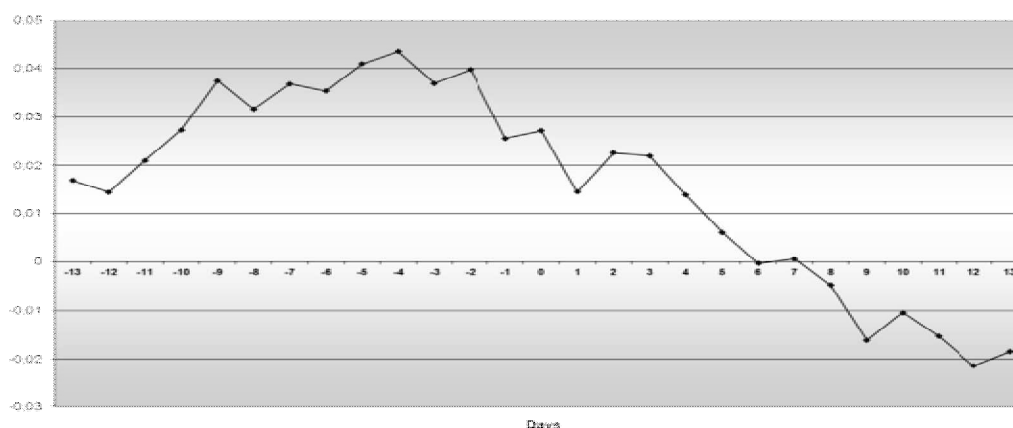


Source: Data-set from Bloomberg.

Fig. 7. Abnormal returns in the market model (reverse stock splits)

The analysis of the abnormal excess returns shows on the one day before (significant deflection at 10% level with negative average return of -1.4%), one day after (significant deflection at 5% level with negative average return of -1.3%) and ninth day

after (significant deflection at 5% level with negative average return of -1.14%) reverse stock split announcement significant return in the period (Fig. 7). Therefore, the analysis of the cumulated abnormal excess returns must be discussed.



Source: Data-set from Bloomberg.

Fig. 8. Cumulated abnormal returns in the market model (reverse stock splits)

The observation of the cumulated excess returns shows a negative signal on the capital markets with respect to announcements of reverse stock splits. In the examination period of 13 days around the moment of announcement, an overall return of -1.85% could have been realized. However, this value is statistically not significant.

Conclusions

The empirical study has shown that split announcements were followed by average positive abnormal returns. The cumulative abnormal return 13 days around the announcement with 6% could be realized. The high significance (1% level) in a time frame of 5 days around the day of announcement shows the potential for event driven investment strategies. The average return in this specific case is 8.5%. The empirically common found result that the

volatility of the stock increases after the split announcement could be confirmed by the shown curves of the abnormal returns. Other factors and aspects, which could be effected by a stock split, like the liquidity of a stock e.g., require for further research in the field of stock splits. In summary, it can be emphasized that Central Europe as a region is very attractive from both the market's perspective due to the expected growth rates and the framework conditions as well as from the perspective of Western European investors

Concerning the application of reverse stock splits is true that the management of companies with shares with low prices have only one a short-term instrument to increase the share price. This instrument is the reverse stock split. The empirical study has shown that reverse split announcements

were followed by average negative abnormal returns one day around the announcement. This capital market reaction was significant. In the time frame of 13 days around the announcement of reverse stock split, the sample lost on average 1.85%

performance. These results are supported by the literature (see Yang and Chung, 2015; Crutchley and Swidler, 2015), where analogue effects was approved.

References

1. Angel, J. J. (1997). Tick Size, Share Prices, and Stock Splits. *The Journal of Finance*, 52(2), pp.655–681.
2. Banociova, A. and Andrejovska, A., 2013. *Payment discipline in business environment*. [pdf] Available at: <http://ac.els-cdn.com/S2212567114005814/1-s2.0-S2212567114005814-main.pdf?_tid=d74eb730-f0d8-11e5-a50c-00000aacb362&acdnat=1458725162_01655469121d870e75571917919d2339> [Accessed 2 March 2016]
3. Baker, H. K. and Gallagher, P. L., 1980. Management's View of Stock Splits. *Financial Management*, 9(2), pp. 73–77.
4. Ball, R. and Brown, P., 1968. An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research*, 6(2), pp. 159 - 178.
5. Brennan, M. J. and Copeland, T. E., 1988. Stock splits, stock prices, and transaction costs. *Journal of Financial Economics*, 22(1), pp. 83–101.
6. Chen, H., Nguyen, H. H. and Singal, V., 2011. The information content of stock splits. *Journal of Banking & Finance*, 35(9), pp. 2454–2467.
7. Copeland, T. E., 1979. Liquidity Changes Following Stock Splits. *The Journal of Finance*, 34(1), pp. 115–141.
8. Crutchley, C. E. and Swidler, S., 2015. Multiple reverse stock splits (investors beware!). *Journal of Economics and Finance*, 39(2), pp. 357–369.
9. Dravid, A. R., 1987. A Note on the Behavior of Stock Returns around Ex-Dates of Stock Distributions. *The Journal of Finance*, 42(1), pp.163–168.
10. Escudero, C. M., 2015. Lessons from the Financial Crisis to the Budgetary Stability and Control of the Public Sector. *Revista Espanola De Derecho Constitucional*, 35(105), pp. 51 – 76.
11. Fama, E. F., Fisher, L., Jensen, M. C., and Roll, R., 1969. The Adjustment of Stock Prices to New Information. *International Economic Review*, 10(1), pp. 1–21.
12. Gesetz über den Wertpapierhandel und zur Änderung börsenrechtlicher und wertpapierrechtlicher Vorschriften (Zweites Finanzmarktförderungsgesetz). (1994a). *Bundesgesetzblatt Teil I*, (48), 1749.
13. Gesetz über den Wertpapierhandel und zur Änderung börsenrechtlicher und wertpapierrechtlicher Vorschriften (Zweites Finanzmarktförderungsgesetz). (1994b). *Bundesgesetzblatt Teil I*, (48), 1749.
14. Han, K. C., 1995. The Effects of Reverse Splits on the Liquidity of the Stock. *The Journal of Financial and Quantitative Analysis*, 30(1), pp. 159–169.
15. Harrison, D. A., 2000. *Zur Vorteilhaftigkeit von Aktiensplits: eine empirische Untersuchung der Nennbetragsherabsetzungen in Deutschland*. Frankfurt am Main : Lang.
16. Ikenberry, D. L., Rankine, G. and Stice, E. K., 1996. What Do Stock Splits Really Signal? *Journal of Financial and Quantitative Analysis*, 31(03), pp. 357–375.
17. Kaserer, C. and Mohl, H. P., 1998. Die Einführung der 5-DM-Aktie-Ein Testfall für die Untersuchung der Mikrostruktur von Aktienmärkten. *Kredit Und Kapital*, (31), pp. 413–459.
18. Kiang, M. Y., Ammermann, P., Fisher, D. M., Fisher, S. A. and Chi, R. T., 2009. Do reverse stock splits indicate future poor stock performance?. *Expert Systems With Applications*, 36(2), pp. 3191–3198.
19. Lakonishok, J. and Lev, B., 1987. Stock Splits and Stock Dividends: Why, Who, and When. *The Journal of Finance*, 42(4), pp. 913–932.
20. Lamoureux, C. G. and Poon, P., 1987. The Market Reaction to Stock Splits. *The Journal of Finance*, 42(5), pp. 1347–1370.
21. Lin, J. C., et al., 2009. Stock splits, trading continuity, and the cost of equity capital. *Journal of Financial Economics*, 93(3), pp. 474–489.
22. Li, X., Stork, P. A. and Zou, L., 2011. An Empirical Note on US Stock Split Announcements, 2000–2009. *SSRN Electronic Journal*.
23. Lojewski, A., 2015. Reverse Split gut oderschlecht? [online] Available at: <<http://www.finanz-content.de/aktienzusammenlegung.html>> [Accessed 15 March 2016]
24. Maloney, M. T. and Mulherin, J. H., 1992. The Effects of Splitting on the Ex: A Microstructure Reconciliation. *Financial Management*, 21(4), pp. 44–59.
25. Markowitz, H. M., 1959: *Portfolio Selection – Efficient Diversification of Investments*. London: John Wiley & Sons
26. Merkevičius, J., Davidavičienė, V., Raudeliūnienė, J. and Buleca, J., 2015. Virtual organization: Specifics of creation of personnel management system. *E+M Ekonomie and Management*, 18(4), pp. 200 – 210.
27. Mitchell, M. L. and Stafford, E., 2000. Managerial Decisions and Long-Term Stock Price Performance. *Journal of Business*, 73(3), pp. 287 - 329.

28. Mura, L. and Buleca, J., 2012. *Evaluation of Financing Possibilities of Small and Medium Industrial Enterprises*. [pdf] Available at: < http://ac.els-cdn.com/S2212567112001438/1-s2.0-S2212567112001438-main.pdf?_tid=6c9e146c-f0d8-11e5-9b84-00000aabb0f27&acdnat=1458724983_38f2034f2645ce0d368e933fd889708a > [Accessed 2 March 2016]
29. Neville, S., 2012. RBS shares up 1,000% but don't be fooled. *The Guardian*. [online] Available at: <<http://www.theguardian.com/business/marketforceslive/2012/jun/06/rbs-consolidation-shareprice-jump>> [Accessed 9 February 2016]
30. Ofer, A. R. and Melnick, A., 1978. Price Deregulation in the Brokerage Industry: An Empirical Analysis. *The Bell Journal of Economics*, 9(2), pp. 633–641.
31. Peterson, D. R. and Peterson, P. P., 1992. A Further Understanding of Stock Distributions: The Case of Reverse Stock Splits. *Journal of Financial Research*, 15(3), pp. 189–205.
32. Sau, L., 2015. Debt deflation worries: a restatement. *Review Of Keynesian Economics*, 3(3), pp. 279-294.
33. Šoltés, M., 2014. *Using option strategies in trading*. [pdf] Available at: <http://ac.els-cdn.com/S1877042813055845/1-s2.0-S1877042813055845-main.pdf?_tid=258b6d22-f0d8-11e5-84eb-00000aacb35f&acdnat=1458724863_9025db7bbfa5846a894b231f2e264fbc> [Accessed 2 March 2016]
34. Užik, M. and Šoltés, V., 2009. The Effect Of Rating Changes On The Value Of A Company Listed In The Capital Market. *E & M Ekonomie A Management*, 12(1), pp. 49-56.
35. Weisbach, A. (2013, April 23). Commerzbank Sinks to Record as Executes Share Split. [online] Available at: <<http://www.bloomberg.com/news/articles/2013-04-23/commerzbank-sinks-to-record-as-executes-share-split>> [Accessed 9 February 2016]
36. Woolridge, J. R. and Chambers, D. R., 1983. Reverse Splits and Shareholder Wealth. *Financial Management*, 12(3), pp. 5–15.
37. Wulff, Ch., 2001. *Kapitalmarktreaktionen auf Nennwertumstellungen*. [e-book] Springer FachmedienWeisbaden. Available through: < <https://books.google.sk/> > [Accessed 15 February 2016]
38. Wyplosz, C., 2010. *The Eurozone in the Current Crisis*. [pdf] Available at: < <http://www.adb.org/sites/default/files/publication/156062/adbi-wp207.pdf> > [Accessed 27 February 2016]
39. Yang, S. and Chung, K. H., 2015. Reverse Stock Splits, Institutional Holdings, and Share Value. *Financial Management*, 44(1), pp. 177 – 216.
40. Zweites Finanzmarktförderungsgesetz, 1994. Database on German and European Economic Law. [online] Available at: <http://www.kapitalmarktrecht-im-internet.eu/en/Areas%20of%20Law/Company_Law/Omnibus_Acts/7/2._FFG.htm> [Accessed 12 March 2016]
41. § 6 AktG. (n.d.). [online] Available at: <<http://dejure.org/gesetze/AktG/6.html> > [Accessed 18 January 2016]
42. § 8 AktG. (n.d.). [online] Available at: < <http://dejure.org/gesetze/AktG/8.html> > [Accessed 18 January 2016]

Appendix

Table no. 1. Statistics for normal stock splits

	N	Mean	Standard Deviation	Standard Error of the Mean
+/- 13 Days	68	0.0624	0.31046	0.03765
+/- 10 Days	68	0.0819	0.26355	0.03196
+/- 5 Days	68	0.0855	0.24136	0.02927
+/- 2 Days	68	0.0032	0.14126	0.01713
announced day	68	0.0101	0.05827	0.00707

Table no. 2. Statistics for reverse stock splits

	Test Value = 0					
	T	df	Sig. (2-side)	Average Difference	95% Confidence Interval	
+/- 13 Days	1.689	67	0.102	0.06244	-0.0127	0.1376
+/- 10 Days	2.564	67	0.013**	0.08193	0.0181	0.1457
+/- 5 Days	2.920	67	0.005***	0.08547	0.0270	0.1439
+/- 2 Days	0.184	67	0.854	0.00316	-0.0310	0.0374
announced day	1.431	67	0.157	0.01012	-0.0040	0.0242

Source: own calculations

	N	Mean	Standard Deviation	Standard Error of the Mean
+/- 13 Days	105	-0.0185	0.41872	0.04086
+/- 10 Days	105	-0.0315	0.40866	0.03988
+/- 5 Days	105	-0.0292	0.24604	0.02401
+/- 2 Days	105	-0.0143	0.15927	0.01554
announced day	105	0.0015	0.06913	0.00675

	Test Value = 0					
	T	df	Sig. (2-side)	Average Difference	95% Confidence Interval	
+/- 13 Days	-0.452	104	0.653	-0.01845	-0.0995	0.0626
+/- 10 Days	-0.790	104	0.431	-0.03149	-0.1106	0.0476
+/- 5 Days	-1.217	104	0.226	-0.02923	-0.0768	0.0184
+/- 2 Days	-0.919	104	0.360	-0.01429	-0.0451	0.0165
announced day	0.229	104	0.820	0.00154	-0.0118	0.0149