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HOW DOES INCLUSION IN AN INDEX AFFECT STOCK PRICES?
THE CASE OF CENTRAL AND EASTERN EUROPE

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Abstract

Researches carried out in other capital markets reveal that a stock's inclusion in an index is associated with significant abnormal returns, while this issue has not been widely examined in the region of Central and Eastern Europe (CEE).

The aim of this thesis is to examine whether a stock's inclusion in a blue chip index in the CEE countries yields abnormal returns. In addition, the authors look whether the inclusion or the announcement of inclusion contains information previously unknown to the market. The standard event study methodology was applied using daily trading data from years 2000 to 2006 to answer the research questions. Firstly, the significance of abnormal returns is tested employing two different J-statistics. Secondly, the Information Content Hypothesis is tested using the Patell's Standardized Residual Test.

The results show that significant abnormal returns are present on the announcement day, and investments in these stocks would earn on average 5.1% over the subsequent month. However no clear conclusions can be drawn regarding existence of abnormal returns on the inclusion day. Both events (the announcement of inclusion and the actual inclusion itself) contain new information, which is observable through significant increase in volatilities of the stocks. This effect is stronger for the announcements than for the actual inclusions. In addition, our results show that in both cases volatility starts to increase a few days before the respective event. The findings show that it is possible to earn abnormal returns in the CEE markets when a stock is included in a blue chip index.

Introduction

The fact that a stock's inclusion in an index usually results in a share price increase was observed quite a long time ago. According to strong market hypothesis by Fama (1970), this is an anomaly, as asset prices should already incorporate all public and private information. However, early researches carried out in the US, the UK and other capital markets have found that this effect is statistically significant and exploitation of it results in abnormal profits. In addition, studies have found other effects like increase in trade volume and size after the announcement of a stock's inclusion in an index.

Existence of abnormal returns for stocks added to an index has been studied in the context of Central and Eastern Europe (CEE) to a very limited extent[1]. Exploration of this issue is interesting as results cannot be predicted easily. On the one hand, hedge fund activity in this region is much lower and markets are less efficient, thus suggesting that newly included stocks might yield abnormal returns. On the other hand, there is evidence that a smaller number of funds invest directly in the market index if compared to the US, for example. This fact could lead to smaller or even insignificant change of the included stock's return. By researching this issue in the CEE stock markets we hope to contribute to the existing literature about capital markets in this region as well as provide an empirical ground for investment decisions in cases of stocks' inclusion in an index.

Several explanations have been proposed to explain the empirically observed abnormal returns. One set of authors, including Shleifer (1986) believe that abnormal returns exist due to price pressure coming from downward sloping demand curves of stocks, and stock price increases as index funds reallocate their portfolios to replicate the index. The other set of authors, for example, Denis et al (2003) explain abnormal returns suggesting that stocks' inclusion in an index contains new information previously unknown to the market. In our paper we investigate the effect of stocks' inclusion in an index on returns in the CEE region. The time period chosen is from January 1, 2000 to December 31, 2006. We use data on stock additions to the local blue chip indices of Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovenia, Hungary, Romania and Bulgaria. Our aim is to answer the question whether **stock inclusion in an index in CEE countries results in abnormal returns**. Further we question **whether this effect is due to new information conveyed to the market.**

[1] Hacibedel and Bommel (2006) have studied stock inclusion in the MSCI Emerging Markets Index, however to the best of our knowledge, there has been no studies carried out to research the CEE region separately so far.

In order to answer the proposed research question, we compute abnormal returns of stocks after inclusion in an index. To address the issue of information content, we test the Information Content Hypothesis using Patell's Standardized Residual Test (Patell, 1976). The test helps us to investigate whether a stock's inclusion in an index incorporates any valuable information previously unknown to the market.

The work is organized as follows: Section 1 gives background information about the CEE stock exchanges; Section 2 summarizes previous researches covering this issue, which is then followed by Section 3 outlying the methodology employed. Further Section 4 explains our data set and sampling methods, followed by analysis of empirical results in Section 5. Finally, Section 6 concludes and provides basis for future research.

1. Background

Founded in the first half of 1990s, the CEE stock exchanges are still rather new bourses. Both in terms of absolute market capitalization and turnover as well as in terms of Market capitalization to GDP and Turnover to GDP the CEE exchanges are immature, if compared to Western stock exchanges.

Yet, even coming from the same origin and being approximately the same age, the stock exchanges in Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovenia, Hungary, Romania and Bulgaria differ quite a lot. On the one hand, there are the Baltic exchanges where market capitalization does not exceed 8 billion euros. On the other hand, there are exchanges like Prague and Warsaw stock exchanges where market capitalization reaches 57 and 113 billion euros respectively. Also, the exchanges differ a lot in terms of turnover – it varies from just 88 million euros in Riga Stock Exchange to as much as 86.5 billion euros in Warsaw Stock Exchange.

Table 1: *The main indicators of the CEE and the Western stock exchanges*

EUR, mln	**Capitalization, 2006**	**Turnover, 2006**	**GDP, 2006***	**M cap/GDP**	**Turnover/GDP**
Bulgaria	2,899	414	22,893	0.13	0.02
Estonia	4,578	766	13,074	0.35	0.06
Latvia	2,034	88	16,022	0.13	0.01
Lithuania	7,728	1,607	23,741	0.33	0.07
Poland	113,238	86,545	29,406	3.85	2.94
Hungary	31,690	2,069	89,206	0.36	0.02
Romania	21,415	2,759	107,938	0.20	0.03
Slovakia	4,426	28,738	43,988	0.10	0.65
Slovenia	11,513	801	29,822	0.39	0.03
Czech Republic	57,299	30,644	113,088	0.51	0.27
Germany	855,976	4,329,817	585,560	1.46	7.39
Sweden	458,206	158,473	299,242	1.53	0.53

*estimate for Bulgaria

Although only the Baltic exchanges have unified their activities in a common system, in general, the structure of the CEE bourses is very similar. On all the bourses there is the Main List which is the most prestigious one and listing requirements there are the toughest – companies must have a certain free float (usually 25%), their simple or free-float adjusted market capitalization must be above a certain threshold which, however, varies dramatically – from 4 million EUR on the Baltic exchanges to 50 million EUR on Ljubljana Stock Exchange. In addition, companies often must comply with International Financial Reporting Standards (IFRS) in order to give a more transparent and fair view on their operations. Next, liquidity criteria must be met and average daily turnover over a certain period must be high enough. Many exchanges require that companies willing to be listed on the Main list should have been going concerns for at least 3 years. In addition to the Main List and the Free list[2], where almost no requirements for listing exist, there is the Secondary market where requirements are more relaxed than on the Main List. Market capitalization requirements are lower and companies usually do not have to use IFRS.

All the exchanges (except Budapest Stock Exchange) have at least two equity indices – the broad market index that reflects general price changes of the market and the blue chip index that tracks price changes of the largest and the most liquid companies. For a company to be included in the blue chip index its capitalization, turnover and other criteria over a review period must meet a certain threshold.

2. Review of Literature

This section provides a brief summary of empirical studies that have tackled the topic of relation between stocks' inclusion in an index and their returns.

Many researches have been carried out with respect to the above mentioned issue. However, most of them look at well developed stock markets like the US market and the UK market in Europe. The most widely used indices for this type of research are such well known ones as S&P 500, FTSE etc.

Most of the studies have employed event study methodology to address this issue. The first event study published is that by Dolley in 1933, which addresses the effect of stock splits on stock price. Event studies have been further developed by Ball and Brown (1986) followed by Fama et al (1969). Later different modifications have been developed to address initial imperfections of the models and make the event study methodology applicable in a number of different circumstances. Brown and Warner (1980, 1985) and MacKinlay (1997)

[2] In Ljubljana stock exchange referred to as the Unofficial market.

have discussed violations of the methodology's initial assumptions in case daily data is used. In reality such assumptions as continuous trading, normal distribution of stocks' returns, no clustering of events as well as constant variance before and after the event often do not hold for high frequency data, sometimes they do not hold even for daily data.

Event studies are widely used for analyzing market efficiency and impact on share price of different specific events like announcements of earnings, mergers and acquisitions, stock splits as well as inclusion in or deletion from an index.

Majority of the studies find that a stock's inclusion in an index yields abnormal returns. Studies carried out in the US market report that stocks added to the S&P 500 index experience abnormal returns that average about 3% when the change is announced. Beneish and Whaley (1996) and Lynch and Mendenhall (1997) have found out that the total price effects associated with addition to the S&P500 index since 1989 reach 7.2%. Many of the studies find also changes in the trading volume, for example, see Lynch and Mendenhall (1997). Regarding this issue Harris and Gurel (1986) examine a strategy of buying the newly included stocks the next day following the announcement and selling them at a higher price afterwards for period covering 1973 - 1983. The authors find that trading volume and trading size increases and a decrease in the quoted bid/ask spread of the newly included stocks is also observable. What is more, the trading volume increases permanently, while the effects on trade size and bid/ask spread are only temporary. In general, the post announcement price increase is about 4.4%, and abnormal profit can be earned using the above mentioned strategy. Shleifer (1986) studied additions to the S&P 500 over the period from 1966 to 1983 and found significant positive abnormal returns at the announcement of the inclusion, thus supporting his hypothesis that demand curves for stocks slope down. Jain (1987) found the mean excess return on the announcement day, estimated using the market model, amounting to 3.07%.

According to information gathered by Howard and Chan (2002) several studies have reported significant price effects associated with changes in the composition of market indices, particularly the S&P 500. 'Over the period 1976 to 1988 when Standard and Poor's announced and implemented changes in the index sample simultaneously, additions were associated with an average abnormal return of approximately 3% on the first trading day after the change. The majority of studies found that the price changes were sustained over subsequent trading days. Since October 1989 when Standard and Poor's has generally announced index changes a week in advance, the price response is larger. The results of these US studies appear to be robust to variations in the methodology used.' In addition, various researchers have documented abnormal trading activity after the announcement of index changes. They note that this effect has increased over time which may be related to growth of index funds and activities of risk arbitrageurs.

Studies of smaller markets are carried out in Canada by Masse et al (2000). This article is relevant for our purpose as it reveals the possible differences and obstacles when it comes to comparing relatively less efficient stock markets with well developed ones. As the majority of the previous researches have dealt with the US markets, namely, the S&P 500 Index, these results cannot be directly compared to the CEE markets, which are far less well developed even if compared to Toronto Stock Exchange. Masse et al (2000) test two explanations of stock price adjustments – the Efficient Market Hypothesis and increased demand by institutional purchasers. They find that stock prices respond positively to inclusion, outperforming market by 4.29%. What is more, they find evidence of information leakage – stock prices start adjusting before any announcement of inclusion is made. Their results correspond to those of Shleifer (1986) as they find more support for the increased demand explanation.

In Europe, price adjustments associated with addition to an index have been examined in the UK. Brealey (2000) reported that stocks added to both the FTSE-All Share and the FTSE 100 indices experienced, on average, a positive abnormal return over an 11-day period that included both the announcement and the effective day. However more interesting for our purposes are researches of stock inclusions in indices carried out in emerging markets. This particular area of research is generally underdeveloped in the CEE region. The first study of emerging markets was carried out by Hacibedel and Bommel in 2006. They study returns of emerging market stocks that are included in the MSCI Emerging Markets Index. They report evidence for positive permanent price impacts amounting to 2-3% upon index inclusion. What is more, the authors find that inclusion in the index is not an information free event.

Explanations of Abnormal Returns Provided by Previous Studies

Generally there are three types of hypotheses trying to explain the empirically observed price increase. The first type is referred to as Price Pressure Hypothesis (PPH). Initially developed by Harris and Gurel (1986) it implies that demand curves for securities are perfectly elastic. Since shares can be bought and sold in large blocks at the prevailing market price, any loss of elasticity of the demand curves for stocks added to the index can cause only temporary changes in stock prices and liquidities (volume) (Proper, 1999). That means, this hypothesis predicts a full price reversal afterwards. Shleifer (1986) proposed a hypothesis of downward sloped demand curves, which assumes that demand curves for stocks are not perfectly inelastic, thus there is a permanent shift in price caused by index change. The increased demand for stocks is explained by empirical findings of increased demand coming from index funds, which replicate indices. These funds have to adjust their portfolios after a new stock is included in an index, thus the aggregate demand increases.

The second type of hypotheses assumes that a stock's inclusion in an index contains information, e.g. it is not an information free event. This is called the Information Content Hypothesis (ICH) and it states that the change to the index has no informative value to investors about the stock being added to the index. If the hypothesis is rejected, the event is containing information not known to the market beforehand. The information conveyed to the marked by inclusion in an index is used by analysts to predict higher future earnings and cash flows or reduce the required rate of return (discount rate), thus the value of the firm increases, which is directly observable through increase in stock price. Chen, Noronha, and Singal (2004) name three reasons for changes in expectations about future cash flows steaming from inclusion in an index. Firstly, the Certification Hypothesis says, that inclusion in an index contains positive information about the particular firm, which is not known to general public beforehand. Secondly and thirdly, increased investor awareness results in upward change of expected future cash flows as well as better monitoring and more successful investment decisions. We have planned to research the ICH in the CEE stock markets.

The third type of hypotheses is referred to as Liquidity Hypothesis (LH) and it claims that stock's inclusion in an index results in increased liquidity, because information asymmetry is reduced, thus required returns decrease (Woolridge and Ghosh, 1986).

Empirical results (mostly for the S&P 500) regarding these hypotheses are controversial. Woolridge and Ghosh (1986), Harris and Gurel (1986), Lynch and Mendenhall (1997) find support for the PPH and LH, which assume that there is no information conveyed to the market by stock's inclusion in an index. However Jain (1987), Dhillon and Johnson (1991), Denis et al (2003) conclude that inclusion is not an information free event.

3. Methodology

The research is based on a standard event study methodology. According to MacKinlay (1997), an event study measures the impact of a specific event on the value of a firm using financial market data. This means, that the impact of a particular event is reflected in stock prices. In our study, the event examined is a stock's inclusion in an index in the CEE countries specified above[3].

[3] More detailed definition of the event is stated in Section 4.

In order to construct an event study, the period during which the particular event has impact on stocks return has to be specified. The period is later divided into two parts – the estimation period and the event window (Figure 1). Data from the estimation period is used to calculate normal returns, which are then compared with the actual returns in the event window to notify abnormal returns.

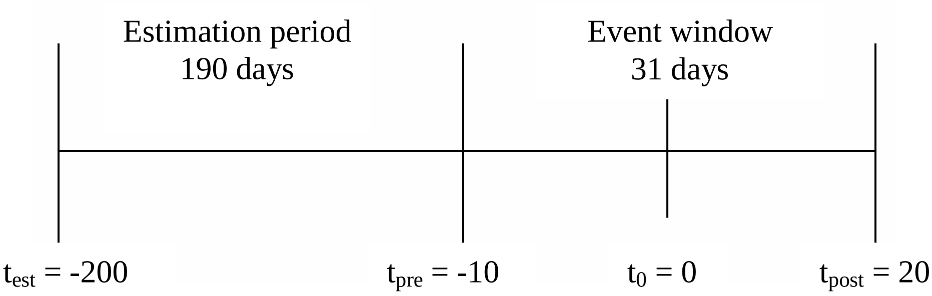

Figure 1: *Timing of the event study*

As seen in Figure 1, we have chosen the estimation period of 190 days and the event window of 31 days. Although in the majority of papers (Kiete and Uloza, 2005; Peterson, 1989) 21-day event period is used, we choose 31-day event window (10 days before and 20 days after the event), as we expect that the CEE markets could be less efficient and react to index changes more slowly. Extension of the event window has been a common practice also in other researches, for example, Dhillon and Johnson (1991) have extended the period even to 61 days. 190 days[4] for estimation period are chosen based on a research done by Kothari and Warner (2007), who find this the most widely used length of estimation period in event studies. In this respect our results are better comparable to the majority of previous works. In addition, 190 days make a time period equal to approximately one year (working days), which is sufficient to capture and iron out any possible seasonality effects on stock prices. t_0 represents the day when the event has occurred. t_{est} is the beginning day of the estimation period. The event window lies between t_{pre} and t_{post}, which are set 10 days before and 20 days after the event has occurred respectively.

Application of the event study methodology requires calculation of abnormal returns in the event window. According to MacKinley (1997*), the abnormal return (AR) is the actual ex post return of the security over the event window minus the normal return of the firm over the event window. The normal return is defined as the expected return without the specific event (e.g. announcement or inclusion) taking place.* For stock *i* and event date *t* the AR is calculated as:

[4] For stocks with no data history of prices for 190 days, fewer days were used. For detailed information see Section 4.

$$AR_{it} = R_{it} - E(R_{it}|X_t)\,, \qquad (1)$$

where AR_{it} are abnormal returns, R_{it} are actual returns and $E(R_{it}|X_t)$ are normal returns. The term X_t is the conditioning information for calculation of normal returns.

Normal returns can be calculated using various models, which can be grouped into two distinct groups – statistical models (like Constant Mean Return model and Market model) and economic models (like CAPM, APT, Fama Three Factor model etc). Statistical models assume that returns are normally and independently distributed. In addition to the previously mentioned statistical assumptions, economic models are based also on economic arguments like investor behavior. Another difference between the models is that the economic models impose a restriction that the intercept (alpha) is zero. The intercept measures the risk adjusted performance of a security. As argued by MacKinlay (1997), employing the Market model for estimation of normal returns is the most appropriate choice between statistical models as it represents a potential improvement over the Constant Mean Return model by removing the portion of return that is related to return of the market portfolio. The Market model assumes linear relationship between the market return and the return of a particular stock.

We have chosen to use a statistical model, particularly the Market model, as it is argued by researchers (for example, Brown and Warner, 1985) to be more applicable in cases of event clustering (announcements of inclusion in an index of several stocks are released on the same day, which is very likely). The Market model assumes that asset returns are normally distributed. According to MacKinlay (1997) for any stock *i* the normal returns can be expressed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (2)$$

$$E[\varepsilon_{it}] = 0 \quad Var[\varepsilon_{it}] = \sigma^2_{\varepsilon t}\,,$$

where R_{it} and R_{mt} are period *t* returns on stock *i* and market portfolio respectively. ε_{it} is the zero mean residual. β_i, α_i and $\sigma^2_{\varepsilon t}$ are the parameters of the model, that have to be estimated, where $\sigma^2_{\varepsilon t}$ represents the variance of residuals ε_{it}.

Market Returns

We have used two different proxies for market returns in the regressions – a broad index and a blue chip index. Usually the broad index is used to approximate market returns, but we have chosen to check results with both types of indices. The reasoning behind this choice lies in the fact that in some stock exchanges (for example, Riga Stock Exchange) the broad index attributes very large weight to one company, which means that even very small changes in price of those stocks have large influence on index returns.

Both types of indices are capitalization-weighted in the CEE stock exchanges. Although Brown and Warner (1985) suggest additionally to use equally-weighted portfolio, we find that composition of such index would be very time consuming on exchanges like Warsaw Stock Exchange where more than 280 companies are listed. Our choice is also supported by researches carried out by Frankfurter (1976) and Dhillon and Johnson (1991), where the authors find no significant differences in results when equally-weighted and value-weighted indices are used as input variables for approximation of market returns. What is more, Frankfurter (1976) argues that using a value-weighted index is still more appropriate as it has the property to reflect better the macro implications of price movements as well as it needs less diversification to work as a proxy for market returns than equally-weighted indices do. In addition, Canina et al (1998) find that using the daily CRSP Equal-Weighted Index to compute excess returns leads to large biases. The difference between compounded daily returns and the CRSP index amounts to 0.43% per month (6% per year). Using an equally-weighted portfolio would distort market returns as, for example, also very illiquid stocks would have to be included, resulting in downward bias of market returns and upward bias of abnormal returns respectively.

Estimation of Model Parameters

According to MacKinlay (1997), under general conditions ordinary least squares (OLS) is a consistent estimation procedure for the Market model parameters. However, in our case several assumptions are violated, thus the model has to be adjusted. Namely, the issue of *thin trading* has to be addressed. This means that stocks are traded infrequently, which is a reality in the CEE markets. Scholes and Williams (1977) have developed a solution, which is applied in our study.

Using the standard OLS regressions, the abnormal returns of each stock can be calculated as:

$$AR_{it} = R_{it} - \hat{\alpha} - \hat{\beta} R_{mt}\,, \qquad (3)$$

where $\hat{\alpha}$ and $\hat{\beta}$ stand for the Market model parameters estimated by regressing individual stock's returns on market returns and they are assumed to be constant for the whole estimation period. AR_{it} represents the abnormal returns of stock *i* at time *t*, which are the residuals. R_{it} and R_{mt} are the actual returns of each stock and market during the event window respectively.

The variance $\hat{\sigma}^2_{\varepsilon t}$ of excess returns according to MacKinlay (1997) is calculated as:

$$\hat{\sigma}_{\varepsilon t}^{2} = \frac{\sum_{t=1}^{T_1} (\hat{\varepsilon}_{it}^{2})}{T_i - 2}, \qquad (4)$$

where T is the number of days in estimation period. In order to calculate the variance of abnormal returns, adjustments have to be made, because $\hat{\alpha}$ and $\hat{\beta}$ are calculated using data from the estimation period, but the variance includes data from the event window. The variance of abnormal returns is then calculated as:

$$\sigma^2 (AR_{it}) = \sigma_{\varepsilon t}^{2} \left(1 + \frac{1}{T} + \frac{(R_{mt} - \overline{R}_m)^2}{\sum_{r=1}^{T} (R_{mr} - \overline{R}_m)^2} \right), \qquad (5)$$

where $\sigma_{\varepsilon t}^{2}$ comes from equation (4) and $\overline{R}_m$ is the average market return during the estimation period, R_{mt} is the market return on day t in the event window and R_{mr} is the market return on day *r* in the estimation period.

Adjustments Due to Thin Trading

As mentioned before, the standard OLS model is not applicable in case *thin trading* exists. To overcome this obstacle, we employ the solution proposed by Scholes and Williams (1977) which involves running the three following OLS regressions:

$$R_{it} = \alpha_{i1} + \beta_{i1} R_{mt} + \varepsilon_{1t} \text{ for t=1,2,…,T}$$

$$R_{it} = \alpha_{i2} + \beta_{i2} R_{mt+1} + \varepsilon_{2t} \text{ for t=1,2,…,T} \qquad (6)$$

$$R_{it} = \alpha_{i3} + \beta_{i3} R_{mt-1} + \varepsilon_{3t} \text{ for t=2,3,…,T}$$

Then the Scholes-Williams beta ($\tilde{\beta}_{iSW}$) is calculated as:

$$\tilde{\beta}_{iSW} = \frac{(\hat{\beta}_{i1} + \hat{\beta}_{i2} + \hat{\beta}_{i3})}{1 + 2\hat{\rho}_m}, \qquad (7)$$

where $\hat{\rho}_m$ is the estimated first order serial correlation of R_{mt} (market returns) from t=2 to t=T-1.

The Scholes-Williams intercept $\tilde{\alpha}_{iSW}$ is calculated as:

$$\tilde{\alpha}_{iSW} = \frac{1}{T-2} \sum_{t=2}^{T-1} R_{it} - \tilde{\beta}_{iSW} \frac{1}{T-2} \sum_{t-2}^{T-1} R_{mt} \qquad (8)$$

As a result, the abnormal return $A\hat{R}_{itSW}$ of any stock *i* is calculated as:

$$A\hat{R}_{itSW} = R_{it} - \tilde{\alpha}_{iSW} - \tilde{\beta}_{iSW} R_{mt} \qquad (9)$$

Testing for Significance of Abnormal Returns

To check whether the abnormal returns in the event window are significant, two different types of J-statistic are employed. First we have applied the orthodox test initially developed by Patell (1976). This is a standardized parametric test, which assumes constant variance of stock returns before and after the event. The statistic is calculated as:

$$J_{iP} = \frac{1}{\sqrt{N}} \sum_{t=1}^{N} \frac{\hat{AR}_{itSW}}{\sigma(AR_{it})} \quad \textit{approx. } N\,(0,1), \tag{10}$$

where N stands for number of observations, $\hat{AR}_{itSW}$ comes from equation (9) and $\sigma(AR_{it})$ comes from equation (5). **The null hypothesis of the test is that abnormal returns during the event window are equal to zero.**

However, several studies (for example, Campbell and Wasley (1993) for Nasdaq stocks and Maynes and Rumsey (1993) for stocks of Toronto Stock Exchange) find that the Patell's test for abnormal returns rejects a true null hypothesis too often leading to upward biased significance of abnormal returns, and it is misleading for thinly traded stocks. To avoid this bias we have tested the significance of abnormal returns using a stricter J-statistic as well, proposed by Boehmer, Musumeci, and Poulsen (1991). This version of testing for abnormal returns is derived from the test developed by Patell (1976). Boehmer, Musumeci, and Poulsen (1991) have developed a standardized cross-sectional test which allows for event-induced changes in abnormal return variance, meaning that the return variances are allowed to differ between the estimation period and the event window. According to Cowan and Sergeant (1996), this test is particularly useful for samples of thinly traded stocks. The test statistic is calculated as:

$$J_t = \frac{\frac{1}{N}\sum_{i=1}^{N} SAR_{it}}{\sqrt{\frac{1}{N(N-1)}\sum_{i=1}^{N}\left(SAR_{it} - \frac{1}{N}\sum_{i=1}^{N} SAR_{it}\right)^2}} \quad \textit{approx. } N(0,1), \tag{11}$$

where $SAR_{it} = \dfrac{\hat{AR}_{it}}{\sigma(AR_{it})}$. (12)

N denotes the number of securities in the sample, and SAR (standardized abnormal returns) are calculated by dividing $\hat{AR}_{it}$ by its standard error. **The null hypothesis of the test is that abnormal returns during the event window are equal to zero**. As the CEE stock markets are considered to be inefficient or semi strong form efficient, we expect to see significant abnormal returns during the event window.

Testing for Information Content in Index Reconstitutions

In order to answer the question whether index reconstitution contains new information, Patell's Standardised Residual Test is used (Patell, 1979). If information content is found in the index reconstitution, view of authors like Denis et al (2003) is confirmed – abnormal returns arise because index addition contains new information for the market.

The Patell's Standardised Residual Test compares price volatility during the estimation period and on the event window. The variance for the estimation period is taken from equation (5). According to Beaver (1968),'information has been defined as a change in expectations about the outcome of the event'. In the case of a stocks inclusion in an index, the event is said to have information content if it results in a change of investors' assessments of the probability distribution of future returns in a way that there is a change in the current equilibrium market price. Based on the reasoning of Beaver (1968), the variability of price changes is likely to be greater when a stock is included in an index (or the announcement of inclusion is published) than at other times. As the direction of price changes cannot be predicted, the author suggests using squared abnormal returns. The mean value of AR squared during the estimation window is simply its variance. If squared abnormal returns on the event day are larger than in the estimation period, there is evidence of information content present, because the stock price has changed to incorporate the previously unknown information.

The relationship between the AR^2 on the event day and the AR^2 (variance) during the estimation period can be expressed as:

$$U_{it} = \frac{AR_{it}^2}{\sigma^2(AR_{it})} \cdot \frac{T_i - 4}{T_i - 2}, \tag{13}$$

where $\sigma^2(AR_{it})$ comes from Equation (5) and *Ti* is the length of estimation period in days.

It assumes that each residual is cross-sectionally independently and normally distributed. Therefore, according to Cowan and Sergeant (1996), each standardized residual follows Student t distribution. According to Patell (1976), the Central Limit Theorem (CLT) can be used to approximate the relationship between abnormal returns on the event day and the average abnormal returns during the estimation period to standardized normal distribution:

$$Z_{U\,i} = \frac{\sum_{i=1}^{N}(U_{ti}-1)}{\left[\sum_{i=1}^{N}\frac{2(T_i-3)}{T_i-6}\right]^{1/2}} \text{ approx. } N(0,1), \tag{14}$$

The null hypothesis tested here is that the variance of abnormal returns does not change around the event date. So, rejection of the null hypothesis would testify that volatility of abnormal returns does increase (or decrease) on the event day, which on its hand leads to a confirmation of ICH – additions to an index do contain new information for the market and share prices adjust on the event day to incorporate the new information.

4. Data and Sampling

To carry out the event study, two data sets are gathered. The first one includes index reconstitution dates and announcement dates while the second data set contains daily closing prices of companies whose shares have been included in the index. Additions to the Baltix index are used for the Baltic stock exchanges, WIG20 index for Warsaw Stock Exchange, BUX index for Budapest Stock Exchange, SBI20 index for Ljubljana Stock Exchange, PX index for Prague Stock Exchange ROTXL index for Bucharest Stock Exchange and SOFIX for Sofia Stock Exchange.

Although the official blue chip index in Ljubljana Stock exchange is SBITOP, we still have chosen to look at additions to SBI20 due to three reasons. Firstly, SBITOP was introduced only on the 21st of March, 2006 and secondly, only 6 stocks constitute the index. Finally, the requirements for inclusions in SBI20 are in line with those of other blue chip indices, thus we consider SBI20 to represent the qualities and requirements of a blue chip index.

PX index for Prague stock exchange is historically derived by merging PX50 and PXZ in 2006. Prior the merger we look at additions to PXZ, which was a blue chip index. The data from Bratislava Stock Exchange was excluded from the sample as there are only 5 stocks in the blue chip index and no additions have been made during the time frame we are interested in. In addition, the stocks are illiquid.

Index Reconstitution Data

Home pages of the CEE stock exchanges and the Bloomberg data terminal are used to gather data on each reconstitution of the local blue chip indices from January 1, 2000 to December 31, 2006. In cases where it is not explicitly stated that a particular index is a blue chip index, we use the local index with the toughest inclusion requirements. The following types of data are gathered:

- Index name;
- Stock ticker;
- Date of index revision (announcement date);
- Date when actual reconstitution comes in force (inclusion date);
- Date of announcement and actual stock inclusion in the Main List on the Baltic stock exchanges;
- Closing prices of stocks in our sample on each day during the estimation window and the event window;
- Closing prices of the respective blue chip indices for each day during the estimation window and the event window.

It takes some time for changes of the index base to come in force, thus, we check for abnormal returns when index is revised (announcement date) as well as when the changes actually come in force (inclusion date). Thus *the event is defined firstly, as the announcement of a stocks inclusion in an index, and secondly, as the actual inclusion itself.*

Data on stock inclusion in the Main List of the Baltic stock exchanges has been added due to specialty of the Baltic States where all companies that are listed on the Main list are included in the Baltix Index. Thus, as soon as a stock is included in the Main List, it becomes clear that it will be incorporated in the index at the next reconstitution. Therefore, we want to check for abnormal returns at this point of time. In the other exchanges, there are no such regulations that moving a stock to the Main list would automatically result in its inclusion in the respective blue chip index. For the other exchanges, inclusion is dependent on such factors as market capitalization, liquidity and free float, irrespective of attribution to a particular list.

Trading Data

Daily closing prices from January 1, 2000 to December 31, 2006 are gathered for all companies that have been added to the local blue chip indices. After elimination of all observations, where no data of stock prices exist at least for 70 days in the estimation period (for instance, in the cases of IPO's) the total sample is reduced to 38 observations for announcements and 40 observations for inclusions. This allows us to make any statistically acceptable conclusions only for the overall aggregated sample for the whole CEE region specified above, and no statistically valid conclusions can be drawn for each of the stock exchanges separately.

Adjustments

The data of closing stock prices is adjusted for dividends and changes in capital structure like stock splits. In case of dividends, the amount of dividend is added back to the stock price on the ex-dividend day. In case of changes in capital structure, the subsequent prices are multiplied by the split ratio in order to adjust them for the split.

5. Analysis of Results

Analysis of results in this section is divided into four subsections. The first two subsections are devoted to analyzing existence and significance of abnormal returns. In the first subsection, abnormal returns around the announcements are discussed, while the second subsection analyzes abnormal returns on the event of the actual inclusion. Subsections 3 and 4 present results of the Patell's Standardized Residual Test. Subsection 3 analyzes information content of the inclusion announcements, while subsection 4 discusses the same issue for the actual inclusions.

Market Reaction to Inclusion Announcements

The abnormal returns around the dates when an announcement on a stock's inclusion in the local blue chip index is made are calculated. Results are divided in two parts: (i) when the same blue chip index is used as the underlying market index and (ii) when the local broad market index is used as the underlying market index. Also, two J-statistics are used to test the significance of the abnormal returns: the orthodox Patell's J-statistic and a more advanced Boehmer's J-statistic which takes into account the event-induced variance. The obtained results are listed in the Appendix 1.

On day -7 before the announcement an abnormal return is exhibited. With blue chip index as the benchmark the abnormal return amounts to 0.70%, while with the broad index it is slightly larger and amounts to 0.77%. This could indicate that the market expects the particular stock to be included in the index, which might be a rather reasonable assumption, because in most of the exchanges the index revision procedure is quite transparent and the list of potential inclusion candidates is short; thus, some market participants might start buying these stocks if they expect that these stocks will be included in the index a few days later.

However, this positive significant abnormal return is offset by two subsequent negative abnormal returns, both statistically significant at 5% significance level, on day -3 and day -2 before the announcement. Taking into account our limited sample size and the fact that the actual announcement dates are not known beforehand, these significant abnormal returns might as well be spurious.

In compliance with our expectations, the announcement day exhibits the largest abnormal return (1.26% with the blue chip index as a benchmark) in the whole event window and this return is also significant at 10% significance level with Boehmer's J-statistic and at 99% significance level with Patell's J-statistic. Also, in the following days after the announcement positive returns are observed, yet they are not statistically significant. On day 4 positive significant abnormal return is observed, yet it is not significant if the blue chip index is used as the benchmark and Boehmer's J-statistic is used to test its significance.

Later on, significant negative abnormal returns appear on days 11, 16, 19, 20 (the latter two are significant just with Boehmer's J-statistic) suggesting that there has been an overreaction to the inclusion announcement and the market tends to mean-revert and correct its mistakes. Although in most of the days positive abnormal returns are not significant, the announcement on inclusion in the local blue chip results on average in 5.1% return over the following month, suggesting that the announcement on inclusion in the local blue chip index is connected with positive effects on the stock price, though statistically insignificant.

Market Reaction to Inclusions

After testing for abnormal returns around the announcement dates the same tests are also performed for the actual index reconstitution dates. The results for the whole sample using the blue chip and the broad indices are presented in Appendix 2.

A negative abnormal return is exhibited on day -5, yet it is significant only when tested with Boehmer's J-statistic and with the blue chip index as a benchmark On day -1 before the inclusion significant abnormal return is exhibited that can be explained either by activity of hedge funds or private arbitrageurs. Although in most of the days around the inclusion date the stocks tend to exhibit large positive returns, they are not significant contrary to our expectations. Probability that this is due to large weight of the newly included stock in the blue chip index is rejected, as the pattern is the same when the broad index is used as a benchmark. However, this could be explained by a strong overall market performance around the blue chip index reconstitution dates.

Information Content of Inclusion Announcements

We have tested the presence of information in announcements of stocks' inclusion in an index using the Patell's methodology provided in Section 3. We have calculated U values for each stock and each day in the event window and obtained the average U values for each day in the event window. According to the theory, U values should deviate around one, thus U-1 should deviate around 0. If there are large significant deviations, it indicates changes in volatility of abnormal returns, thus information content in the announcement of stocks' inclusion in an index (or announcement of moving to the Main list for the Baltic stock exchanges) is present.

The obtained U-1 values are reported for regressions on the blue chip indices and the broad indices separately (see Appendix 3). The average U-1 values over all 31 days are almost the same, 0.283 and 0.281 for blue chip and broad indices respectively. In general, the results for both types of indices are almost identical. In both cases the largest deviation from zero is observed on the announcement day (day 0) and this deviation is significant based on 1% level of confidence, represented by Z statistics. This means that the announcement contains information not known to the market beforehand.

Announcements of stocks' inclusion in an index convey new information to the market 3 days before the announcement and significant (mostly at 1% level) increase of volatilities continues till day 5 after the announcement, with day 1 and day 3 being exceptions. On the announcement day the respective Z values are 15.0 and 15.6 for blue chip and broad indices respectively, which indicates very significant changes in volatility of abnormal returns. As the market starts to react 3 days before the announcement, inclusion in index of these stocks might be anticipated. This is reasonable as decision of a particular stock's inclusion in the blue chip index depends on the stock's capitalization, free float, quality of financial statements (usage of IFRS) and turnover. As the thresholds are known to the market, expectations of a particular stock's inclusion are formed. The increased volatilities before the announcement could arise also due to insider trading, if we assume that some market participants hold the information of a stock's inclusion in an index. What is more, we must also take into account the fact that contrary to the actual inclusion dates, which are known to the market (usually indices in our CEE stock exchanges are revised four times or twice a year on certain dates), the actual date of announcement is not known. The dates of announcements of the new index compositions vary from about a month to about a week before the actual index reconstitution. The significant Z values before the announcement indicate that the market expectations are rather strong even taking into account the uncertainty mentioned above. These Z values might also indicate existence of insider trading by those market participants who know the actual announcement date and the content of the announcement. The results after the announcement are less clear. There are significant Z values also in days 8, 9 and 19. Large significant price movements on these days show that in general market in CEE reacts slowly and inefficiencies exist. However the significant results on day 19 might also be influenced by the effect of the actual inclusion, because there are cases with short time periods between the announcement and the actual inclusion dates present. This results in overlapping of the event windows of announcements and inclusions. The increased volatilities might be subject to some other factors not related to the announcement or the results also may be distorted by the small sample size.

Our results are in line with those of Dhillon and Johnson (1991), which also find information content in stocks' inclusion in an index. We conclude that in the CEE markets, an announcement of a stock's inclusion in the blue-chip index signals the market participants about the quality of the particular company as well as rises expectations of increased liquidity of the stock, thus the stock becomes less risky and its future cash flows are discounted by smaller discount rates, which leads to increased company value (stock price). In addition, companies included in a blue-chip index might receive greater investor interest and increased monitoring, which in turn could lead to better actual performance and increased future cash flows, raising the stock price.

Information Content of Inclusions

After testing for information content of announcements we have performed the same tests also for the actual index reconstitution dates e.g. the dates when a stock is actually included in the index. The results for the whole sample using blue chip and broad indices are presented in Appendix 4.

The average U-1 values for abnormal returns in the event window surrounding the actual event of inclusion are 0.0 (blue chip) and -0.1 (broad), which is close to the expected value of zero under the null hypothesis. However, the largest deviation from zero is not on the actual inclusion day, but on day 19, amounting to 6.7 and 6.2 for the blue chip and the broad indices respectively, exceeding U-1 values on day 0 in both cases. Z values reported in the table reveal that volatility changes significantly around the inclusion date as well.

The results are significant starting from the day before inclusion up to the second day after inclusion, thus there is evidence of information content present. Significant volatility changes are also observable for days 6-10 and 13-20, with some exceptions.

As discussed in the part of Section 5, related to information content of inclusion announcements, the increased investor and analyst interest in the stock results in greater information availability about the company, thus information asymmetry is reduced. This has effect on the risk premium demanded by investors. As the risk premium decreases, the discount rate decreases and as a result we observe price increase. In addition, according to Chen, Noronha and Singal (2004) inclusion in an index may increase the firm's possibilities to attract new capital, which then allows it to grow at a higher rate and achieve better results. However, we cannot draw any conclusions about the relevance of this explanation to the CEE markets as we have no information whether banks or investors are more willing lend to the members of blue-chip indices.

The price increase might also be caused by speculative actions of market participants, but afterwards, activity of investment funds, which often are allowed to invest only in stocks, that are members of an index. However, the activity of investment funds is more likely to be represented by the significant Z values on days 13 to 20, as it takes time for fund managers to make decisions and reallocate their portfolios. This explanation is applicable for the CEE markets, as the history of investment funds is not very old. Another explanation of the observed delay of market participants' activity could be the fact that risk averse investors wait to see the actions of the bigger market participants, which might take place on days -1 to 2. The smaller investors then replicate these actions afterwards, causing volatilities to increase in the later period (days 6 to 20). However, similarly as in the results for testing information content on the announcement dates there might be distortions due to small sample size or other non event related reasons present.

Another part of explaining information content of inclusions is related to management of the companies. As argued by Denis et al (2003), the cost of the managerial reputation is greater for companies included in the S&P 500 Index, thus managers improve their performance and as a result, the actual results of the company improve. This expectation drives stock price upwards and it is very likely in our sample, as we examine inclusions in blue chip indices, which are the most prestigious.

6. Conclusions

The aim of the thesis was to examine how a stock's inclusion in a blue chip index affects its price and whether abnormal profits are present. Next the existence of information content in the announcements and inclusions was tested.

In compliance with findings of earlier research papers and our expectations, we find that stocks in the CEE stock markets exhibit significant positive abnormal returns on the announcement day. Although later on positive returns are observed, they are not statistically significant. Also, despite the fact that abnormal returns are exhibited on day –7 before the announcement we do not consider that this is an evidence of information leakage, because this abnormal return is later 'ironed out'. What is more, we find that on the 4^{th} week after the announcement significant negative abnormal returns are exhibited, suggesting that there has been an overreaction or that demand from the institutional market participants has loosened. Thus, our findings do not coincide with the findings of Masse et al (2000).

Yet, contrary to the findings of most research papers and our expectations, stock prices do not exhibit positive abnormal returns around the inclusion dates. However, taking into account that the reaction on the announcement is rather weak as well and a part of this new information has already been reflected in the stock price, such results are justifiable. Also, this could be explained by a small number of index tracking funds in CEE, as we were able to identify only two funds that track local blue chip indices in Central and Eastern Europe.

Analyzing the presence of information content in the announcements and the actual stock inclusions in an index, we can conclude that both events convey new information to the market, which is proven by significant Z values around the event dates, thus the Information Content Hypothesis is approved. However, contrary to our expectations, the volatilities of stocks start to increase earlier for the announcements than for the actual inclusions.

In general, the increase of volatilities before the announcement date might be subject to insider trading or general market expectations taking into account the fact that the thresholds for inclusion are known to general public. For inclusions, the significantly increased volatilities can be caused by institutional investors like investment funds, when there are no more investment restrictions if a stock is included in an index.

The analysis of results observed after the event reveal that there are less days of significantly increased volatilities for announcements than for inclusions. This leads to additional support for the activity of investment funds, which are not allowed to act after the announcement, but only after the real inclusion. For example, Latvian 2nd pillar pension funds are only allowed to invest in stocks that are listed on the Main List.

The presence of information content shows that the CEE markets included in this research are quite inefficient and do not correspond to the theory of Fama (1970), meaning that stock prices in CEE do not incorporate all information. This finding is in line with other researches carried out in the CEE region, like Kiete and Uloza (2005). Our results regarding the information content are in line also with other researches carried out in the US by Jain (1987), Dhillon and Johnson (1991) and Denis et al (2003).

Implications of Results

Based on our results, investments in companies that will be included in the local blue chip index are profitable, yet the earned returns are lower than forecasted by the market model. Thus, even if the investor has information advantage over other market participants and knows which stocks will be added to the index beforehand, he/she will earn negative abnormal returns over the event window. Therefore, a simple buy-and-hold strategy would outperform strategy where stocks are bought before the announcement on their inclusion in the local blue chip index – an important conclusion for investors who might be 'blinded' by positive absolute, yet negative abnormal returns that have been earned speculating on index reconstitutions. Also, given the small number of new companies added to the local blue chip index, the investor would be able buy these stocks just a couple times a year, at best.

However, the index reconstitution could start affecting stock prices more significantly as the CEE markets become more liquid and the number of index tracking funds increase. On the other hand, it should be noted that growth of stock market capitalization and liquidity could also attract hedge funds that would mitigate the previous effect.

Suggestions for Future Research

Future research could examine existence of abnormal returns not only in cases a stock is included in the blue chip index, but also other market indices. Additionally, estimations of normal returns could be recalculated using economic models instead of statistical, for example, using the model by Fama and French (1993).

The analysis of information content could be further extended by looking more specifically at the exact content a stocks inclusion in the blue chip index provides for market participants. For example, looking at changes in trading volume (liquidity), and, in addition, conducting interviews with investors would reveal whether stock price increases due to decreased discount rate. Investors' opinion on correlation between liquidity changes and required risk premium could be analyzed.

Secondly, interviews with analysts and experts of capital markets could be conducted to understand if the inclusion causes them to change future forecasts of the company and their reasoning behind this. Additional interviews with investors on the issues of monitoring and increased scrutiny could be raised. In addition, opinion on information asymmetry issues could also be included. This would reveal whether the cause of price increase is related to expectations of increase in future cashflows of the particular company.

Thirdly, additional interviews with managers of the included companies could be conducted to explore, whether increased monitoring from investors (if such exists) causes them to work better. In addition, analysis of accounting data on the firm level could accompany these interviews. Another unclear question left is that of managerial reputation, which can only be answered by managers.

Finally, future research could examine reaction of credit providing institutions, because one argument of price increase assumes, that the included companies have better access to funding. The issue if banks are willing to lend more to companies included in the blue chip index could be researched in the CEE countries.

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Appendices

Appendix 1

Table 2: *Results for the test of AR significance on the announcements*

	Blue chip					Broad				
Days	**AR**	**Patell's J-statistic**	**Sign.**	**Boehmer J-statistic**	**Sign.**	**AR**	**Patell's J-statistic**	**Sign.**	**Boehmer J-statistic**	**Sign.**
-10	-0.43%	-1.322		-1.475		-0.46%	-1.430		-1.562	
-9	0.00%	0.328		0.377		0.04%	0.382		0.468	
-8	-0.34%	-0.494		-0.550		-0.39%	-0.662		-0.736	
-7	0.70%	2.056	**	2.119	**	0.77%	2.250	**	2.321	**
-6	-0.25%	-0.447		-0.604		-0.12%	-0.166		-0.234	
-5	-0.45%	-0.710		-0.623		-0.43%	-0.697		-0.632	
-4	-0.10%	-0.254		-0.239		-0.15%	-0.380		-0.369	
-3	-0.68%	-2.018	**	-1.832	*	-0.73%	-2.141	**	-2.108	**
-2	-0.37%	-2.046	**	-1.396		-0.45%	-2.270	**	-1.478	
-1	-0.29%	-1.160		-1.113		-0.27%	-1.125		-1.099	
0	1.26%	3.584	***	1.739	*	1.24%	3.574	***	1.715	*
1	0.43%	1.114		1.233		0.43%	1.162		1.395	
2	0.43%	1.530		0.998		0.32%	1.303		0.829	
3	-0.02%	-0.223		-0.221		0.04%	0.024		0.026	
4	0.48%	1.837	*	1.552		0.51%	1.896	*	1.930	*
5	0.17%	-0.176		-0.121		0.15%	-0.300		-0.210	
6	0.15%	-0.045		-0.049		0.23%	0.181		0.202	
7	0.09%	0.145		0.112		0.08%	0.135		0.109	
8	0.12%	0.410		0.351		0.16%	0.492		0.432	
9	-0.41%	-1.126		-1.006		-0.41%	-1.166		-1.050	
10	-0.08%	-0.034		-0.031		-0.07%	-0.011		-0.011	
11	-0.55%	-1.802	*	-2.233	**	-0.57%	-1.889	*	-2.517	**
12	-0.61%	-1.132		-1.023		-0.60%	-1.113		-1.071	
13	0.38%	0.958		0.856		0.40%	0.970		0.913	
14	0.25%	0.805		0.813		0.28%	0.951		0.988	
15	0.05%	0.412		0.345		0.11%	0.541		0.453	
16	-1.20%	-3.288	***	-4.298	***	-1.17%	-3.214	***	-4.740	***
17	-0.37%	0.170		0.168		-0.23%	0.541		0.570	
18	-0.08%	0.092		0.105		-0.09%	0.092		0.110	
19	-0.40%	-1.558		-2.518	**	-0.41%	-1.576		-2.777	***
20	-0.43%	-1.395		-1.791	*	-0.37%	-1.249		-1.477	

Appendix 1 presents Patell's J-statistic and Boehmer's J-statistic statistics for the full sample of 38 announcements.

The first 6 columns show the particular day in the event window (day 0 represents the inclusion day); average abnormal return on the particular day, Patell's J-statistic and its significance, Boehmer J-statistic and its significance, when the blue chip index was used as a proxy for market returns.

Columns 7 to 12 show the particular day in the event window (day 0 represents the inclusion day); average abnormal return on the particular day, Patell's J-statistic and its significance, Boehmer J-statistic and its significance, when the broad index was used as a proxy for market returns.

*** denotes significance at 1% level,
** denotes significance at 5% level,
* stands for significance at 10% level.

Appendix 2

Table 3: *Results for the test of AR significance on the inclusions*

Blue chip						Broad				
Days	AR	Patell's J-statistic	Sign.	Boehmer J-statistic	Sign.	AR	Patell's J-statistic	Sign.	Boehmer J-statistic	Sign.
-10	-0.51%	-1.155		-1.400		-0.39%	-0.812		-0.975	
-9	0.07%	0.049		0.059		0.15%	0.324		0.397	
-8	-0.34%	-0.325		-0.381		-0.30%	-0.304		-0.376	
-7	-0.07%	0.344		0.327		-0.06%	0.328		0.306	
-6	-0.14%	-0.543		-0.475		-0.23%	-0.746		-0.647	
-5	-0.60%	-1.425		-1.827	*	-0.52%	-1.192		-1.605	
-4	-0.30%	-0.384		-0.464		-0.24%	-0.293		-0.349	
-3	-0.48%	-1.290		-1.343		-0.38%	-1.033		-1.061	
-2	0.21%	-0.076		-0.087		0.22%	0.018		0.021	
-1	0.56%	2.048	**	1.672	*	0.58%	2.041	**	1.689	*
0	-0.45%	-1.386		-1.126		-0.54%	-1.761	*	-1.402	
1	-0.10%	0.107		0.085		0.01%	0.426		0.345	
2	-0.08%	-0.279		-0.375		-0.07%	-0.240		-0.319	
3	0.20%	0.397		0.479		0.12%	0.139		0.168	
4	0.10%	0.763		0.778		0.09%	0.710		0.700	
5	-0.30%	-0.722		-0.693		-0.32%	-0.798		-0.805	
6	-0.16%	-0.231		-0.301		-0.08%	-0.009		-0.012	
7	-0.26%	-0.881		-0.996		-0.30%	-0.976		-1.213	
8	-0.06%	0.230		0.339		-0.10%	0.080		0.118	
9	-0.14%	-0.158		-0.260		-0.08%	-0.036		-0.056	
10	-0.35%	-0.771		-1.340		-0.28%	-0.571		-0.894	
11	-0.16%	-1.296		-1.466		-0.19%	-1.333		-1.557	
12	-0.73%	-1.327		-1.511		-0.68%	-1.266		-1.436	
13	-0.05%	-0.147		-0.198		-0.06%	-0.071		-0.093	
14	-0.20%	0.505		0.526		-0.08%	0.669		0.690	
15	0.18%	-0.193		-0.371		0.22%	-0.022		-0.039	
16	0.08%	0.045		0.067		0.12%	0.086		0.134	
17	-0.44%	-1.524		-1.629		-0.52%	-1.670	*	-1.650	*
18	-0.33%	-0.861		-1.292		-0.34%	-0.891		-1.339	
19	-0.23%	0.144		0.089		-0.23%	0.207		0.131	
20	-0.10%	-0.227		-0.316		-0.13%	-0.234		-0.308	

Appendix 2 presents Patell's J-statistic and Boehmer's J-statistic statistics for the full sample of 40 inclusions.

The first 6 columns show the particular day in the event window (day 0 represents the inclusion day); average abnormal return on the particular day, Patell's J-statistic and its significance, Boehmer J-statistic and its significance, when the blue chip index was used as a proxy for market returns.

Columns 7 to 12 show the particular day in the event window (day 0 represents the inclusion day); average abnormal return on the particular day, Patell's J-statistic and its significance, Boehmer J-statistic and its significance, when the broad index was used as a proxy for market returns.

*** denotes significance at 1% level,
** denotes significance at 5% level,
* stands for significance at 10% level.

Appendix 3

Table 4: *Results for the Patell's Standardized Residual Test of Information Content in the announcements*

Z test announcement

Blue chip				Broad			
Day	**U-1**	**Z**	**Sign.**	**Day**	**U-1**	**Z**	**Sign.**
-10	0,144	0,620		-10	0,213	0,922	
-9	-0,356	-1,537		-9	-0,428	-1,850	*
-8	-0,197	-0,853		-8	-0,179	-0,773	
-7	-0,101	-0,436		-7	-0,067	-0,288	
-6	0,421	1,818	*	-6	0,386	1,668	*
-5	0,181	0,781		-5	0,115	0,497	
-4	0,188	0,813		-4	0,173	0,746	
-3	0,440	1,899	*	-3	0,414	1,788	*
-2	1,409	6,084	***	-2	1,645	7,106	***
-1	0,536	2,314	**	-1	0,538	2,321	**
0	3,482	15,037	***	0	3,601	15,552	***
1	0,000	0,000		1	-0,053	-0,230	
2	1,448	6,253	***	2	1,567	6,766	***
3	-0,253	-1,093		3	-0,251	-1,085	
4	0,753	3,251	***	4	0,724	3,126	***
5	1,362	5,883	***	5	1,357	5,861	***
6	-0,097	-0,417		6	-0,137	-0,593	
7	0,284	1,226		7	0,225	0,971	
8	-0,393	-1,695	*	8	-0,440	-1,898	*
9	-0,677	-2,923	***	9	-0,689	-2,975	***
10	0,020	0,087		10	0,007	0,031	
11	-0,214	-0,925		11	-0,235	-1,014	
12	0,368	1,588		12	0,234	1,009	
13	0,132	0,572		13	0,084	0,364	
14	0,341	1,471		14	0,308	1,330	
15	0,167	0,721		15	0,206	0,888	
16	-0,138	-0,595		16	-0,264	-1,142	
17	-0,314	-1,358		17	-0,237	-1,022	
18	-0,318	-1,373		18	-0,343	-1,480	
19	0,645	2,786	***	19	0,625	2,700	***
20	-0,473	-2,042	**	20	-0,376	-1,623	

Appendix 3 presents U-1 values and Z statistics for the full sample of 38 announcements.

The first 4 columns show the particular day in the event window (day 0 represents the announcement day); U-1 value, Z statistics and significance of the results respectively, where the blue chip index was used as a proxy for market returns.

Columns 5 to 8 show the particular day in the event window (day 0 represents the announcement day); U-1 value, Z statistics and significance of the results respectively, where the broad index was used as a proxy for market returns.

*** denotes significance at 1% level,
** denotes significance at 5% level,
* stands for significance at 10% level.

Appendix 4

Table 5: *Results for the Patell's Standardized Residual Test of Information Content in the inclusions*

Z test inclusion

Blue chip				**Broad**			
Day	**U-1**	**Z**	**Sign.**	**Day**	**U-1**	**Z**	**Sign.**
-10	0,005	-1,375		-10	-0,313	-1,389	
-9	-0,011	-1,444		-9	-0,342	-1,517	
-8	-0,004	-1,109		-8	-0,325	-1,442	
-7	-0,002	0,703		-7	0,203	0,898	
-6	0,010	1,321		-6	0,324	1,437	
-5	0,003	-1,561		-5	-0,424	-1,881	*
-4	0,004	-1,291		-4	-0,272	-1,205	
-3	0,010	-0,299		-3	-0,060	-0,264	
-2	0,041	-1,029		-2	-0,271	-1,201	
-1	0,013	4,517	***	-1	0,980	4,346	***
0	0,090	2,366	**	0	0,623	2,761	***
1	-0,001	2,453	**	1	0,519	2,302	**
2	0,039	-1,717	*	2	-0,372	-1,650	*
3	-0,006	-1,350		3	-0,316	-1,400	
4	0,018	-0,226		4	0,010	0,046	
5	0,034	0,570		5	0,034	0,150	
6	-0,003	-1,760	*	6	-0,417	-1,846	*
7	0,006	-0,746		7	-0,295	-1,308	
8	-0,011	-2,425	**	8	-0,555	-2,460	**
9	-0,017	-2,491	**	9	-0,521	-2,310	**
10	0,000	-2,889	***	10	-0,586	-2,598	***
11	-0,006	-0,894		11	-0,245	-1,085	
12	0,006	-0,766		12	-0,170	-0,752	
13	0,002	-1,920	*	13	-0,405	-1,796	*
14	0,008	0,272		14	0,087	0,385	
15	0,005	-3,127	***	15	-0,661	-2,928	***
16	-0,007	-2,373	**	16	-0,580	-2,569	**
17	-0,006	-0,430		17	0,058	0,258	
18	-0,009	-2,448	**	18	-0,552	-2,448	**
19	0,016	6,670	***	19	1,402	6,213	***
20	-0,009	-2,119	**	20	-0,420	-1,862	*

Appendix 4 presents U-1 values and Z statistics for the full sample of 40 inclusions.

The first 4 columns show the particular day in the event window (day 0 represents the inclusion day); U-1 value, Z statistics and significance of the results respectively, where the blue chip index was used as a proxy for market returns.

Columns 5 to 8 show the particular day in the event window (day 0 represents the inclusion day); U-1 value, Z statistics and significance of the results respectively, where the broad index was used as a proxy for market returns.

*** denotes significance at 1% level,
** denotes significance at 5% level,
* stands for significance at 10% level.

Appendix 5

Table 6: *Input data*

Country	Blue chip index	Members as of 31.12.2006	# of additions	# of announcements on additions
Baltic states	Baltix	30	11	11
Poland	WIG 20	20	11	11
Czech Republic	PX	9	3	3
Hungary	BUX	11	4	2
Slovenia	SBI 20	15	8	8
Romania	ROTXL	10	2	2
Bulgaria	SOFIX	12	1	1

Appendix 5 contains the number of members for each of the blue chip indices at the end of 2006, as well as the number of stock additions and the number of announcements on stock additions in these indices (or their precessedors) over the observation period (from January 1, 2000 to December 31, 2006).