Impact of Political News on the Baltic State Stock Markets

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Abstract

This paper studies the link between political news releases, and the returns and volatilities in the stock markets of Riga, Tallinn and Vilnius. Political news releases are viewed as proxies for political risk. The results indicate that political news events regarding domestic and foreign, excluding Russia, political issues led, on average, to lower uncertainty in the stock markets of Riga and Tallinn in 2001-2003. At the same time, political risk from Russia increased the volatility of the stock market in Tallinn. We found that there is only a weak relationship between political risks of different origins and the stock market volatility in the Baltic states in 2004-2007. In addition, we found a significant Monday effect, consistent with the trading behavior of institutional investors.

Key Words: Public information arrival, political risk, volatility, multivariate GARCH
JEL Classification: C32, G10, G14, G15

1 Introduction

The question of what drives asset price movements has been a subject of interest in many empirical studies. One of the well-established empirical facts is the link between public information and changes in asset prices. To this end, we intend to examine the importance of different publicly available news releases for the stock market movements in the Baltic States. More specifically, we look at the number of political news headlines during a day, as a proxy for the information flow.

It is commonly held that stock prices equal present discounted values of rationally forecasted future dividends. If news announcements affect either expectations about future dividends or discount rates, or both, the news affects the daily stock price movements (McQueen and Roley, 1993). Consequently, as new information arrives, investors adjust their expectations about the market conditions, which, in turn, should be reflected in the equilibrium asset prices. Equity prices should increase if a news announcement leads to an upward revision of investors' expectations and vice versa (Tan and Gannon, 2002). Thus, asset prices in equilibrium may reflect ex ante premia for political risk.[1] The volatility is also related to the rate of information flow to the market (Ross, 1989). The brief description of the theoretical models of the effects of the public news releases is provided by Äijö (2008). In general, the information arrival can increase the volatility level of the market due to more information faced by investors, their divergent interpretations of the news, or higher market uncertainty if news is considered as bad or are highly unexpected. The information arrival can also lower the level of volatility due to a reduced degree of market uncertainty followed by the news announcement, or if news is considered as good. That is, depending on the state of the economy and given the diverse scope and nature of political news, there is a possibility that "no news is good news". In this paper, we empirically study the average impact of different political news on stock market returns and risks in the Baltic States. So far, we are not aware of any scientific study that analyzes the effect of political events on the asset price movements in Baltic stock markets.

The underlying motivation for our analysis is, in part, the fact that emerging and transition markets are particularly sensitive to political factors and events (e.g., Bailey and Chung, 1995; Durnev et al., 2004; Goriaev and Zabotkin, 2006). The impact of different political events on the behavior of the Baltic stock markets is of special interest

[1] Howell and Chaddick (1994) define political risk as the "possibility that political decisions, events, or conditions in a country, including those that might be referred to as social, will affect the business environment such that investors will loose money or have a reduced profit margin".

not only because of the abundance of political events, but also due to the history and recent development of the markets. Despite their small sizes, the emerging Baltic stock markets developed well in recent years, both in term of returns, market capitalization, and increasing accessibility to international investors. Obviously, an interesting issue is whether the origin of political risk (i.e. political events) matters for investors' perception of a market risk. In particular, we are interested in studying whether the political risk (i.e. political events) related to Russia as well as to the domestic and other foreign, excluding Russia, political issues have different impacts on the stock markets in the Baltic states. Pajuste et al. (2000) found that European risk factors are becoming increasingly important in Central and Eastern European emerging stock markets, with the preparations for joining the EMU, among other things. The Baltic states joined the EU and NATO in spring 2004, and it is reasonable to assume that general economic and political developments related to, for example, the admission into the EU, could have implications for investors' perception of market risk. In a similar way, given the economic and historical ties between Russia and the Baltic states, it is likely that political confrontations between the countries may affect the expectations about future economic activity, and should, therefore, be reflected in the stock market prices.

In this paper, the news variables do not cover all the sources of information flow, but account for the political risk only. Mateus (2004) noted that not only political changes, but also economic spillovers from Russia have an important role in the explanation of returns in the EU accession counties, including the three Baltic states. Earlier studies (e.g., Brännäs and Soultanaeva, 2006; Brännäs et al., 2007; Pajuste, 2002) found that, given tighter economic and political links with Russia, as well as the geographic proximity, the Baltic states are influenced by the stock market performance in Russia. Including the Russian stock market index (RTS) as an explanatory variable in return and volatility expressions allows us to study whether there are any spillovers from the Russian stock market, after taking the political news events into account.

Most of the prior research used scheduled macroeconomic, firm specific, and/or other economic news announcements as proxies for public information. Many studies found significant relationships between different news announcements and equity, interest rate, or foreign exchange markets (e.g., Kalev et al., 2004; Ederington and Lee, 1993; Andersen and Bollerslev, 1998; Chang and Taylor, 2003) in both intraday and daily data. Mitchell and Mulherin (1994) found that the flow of public information, measured as the daily number of headlines released by Dow Jones, is only weakly correlated with the volatility of several

US indices. Using intraday data, Berry and Howe (1994) found no significant relationship between public information and price volatility. They referred to public information as firm/industry specific, macroeconomic, and political news releases relevant to the US market. Several papers also studied the importance of political news for the performance of financial markets. For example, Chan et al. (2001) studied the impact of salient political and economics news on the volatility of the stock exchange of Hong Kong, whereas Chan and Wei (1996) focused on the impact of political news only. Kaminsky and Schumukler (1999) found that during the Asian crises political news, including political events and talks, and international agreements, had significant impact on the changes in the stock market prices in some Asian countries. In addition, they found that not only local news, but also news of foreign origin mattered for the stock market movements. For Eastern European markets, Goriaev and Zabotkin (2006) found that major economic and political news events had impact on the stock prices of the Russian stock market, where political risk factors mattered the most until a certain level of corporate governance was reached.

We employ a multivariate time series model designed to catch the impact of news on returns and volatility. The conditional mean or return follows a vector ARMA process allowing for news effects, while the model for conditional variance or risk is based on the GJR model of Glosten, Jagannathan and Runkle (1993). In the univariate framework the GJR model is an extended version of the GARCH model of Bollerslev (1986) and it is able to capture asymmetric effects of positive and negative shocks on volatility. Hoti, Chan and McAleer (2002) extended the GJR model to a multivariate framework in order to incorporate volatility spillovers across markets. In this paper, we use the multivariate GJR model of Hoti et al. (2002, 2005) to capture the impact of political news. The model allows us to study whether news affecting the market risk in one of the Baltic states have any impact on the market risks in the other two countries. Accounting for volatility links is important for portfolio management decisions, since the risk exposure of an international portfolio depends on the cross-market correlations of volatility changes, see also Fleming, Kirby and Ostdiek (1998). Notably, extensions of this type introduce additional parameters into an already richly parameterized model. Kroner and Ng (1998), De Goeij and Marquering (2005) and others discussed ways of parameterizing, in particular, the volatility functions for models to be estimable. To allow for news impact, we have to be restrictive in terms of correlation structure, lag lengths, and spillover effects.

The remainder of the paper is organized as follows. Section 2 provides background information on the news data and stock market data. Section 3 describes the employed econometric model and presents the estimation technique. Section 4 gives the empirical results. The major findings are summarized in the final section.

2 Data

In this paper we use publicly available political news announcements as the proxy for public information. Although this proxy yields an imperfect treatment of the information available to market participants, it provides a reasonably broad, observable variable, that allows us to address the question about the impact of political risk on the studied stock markets. Daily news announcements are collected from the Russian News and Information Agency "RIA Novosti" available online at http://rian.ru/politics/. To get as broad a news database as possible, news were collected from the Russian language version of the web site (Politics section), generating a sample period from October 16, 2001 to October 1, 2007. News in English and other languages are available as well, but for a shorter time period. News are not observable during a period from November 3 to December 31, 2003. Instead of elaboration on modelling the missing data period, the total sample period is divided into two subperiods.

The following criteria were imposed in selecting the political news. We collect all the news with a clear reference to, at least, one of the Baltic states in the headline, to start with. In general, political news in the database include (i) agreements, (ii) political events and conflict, (iii) talks and statements about current and future policy actions and political conflicts. As we intend to study the impact of political risk of different origins, in the second step, we separate the political news in the initial database into two categories. First, we select the political news related to Russia and Baltic states. The main recent controversies were related to such issues as signing the border treaties, advocating the rights of the Russian-speaking population in the Baltic states, and the political and economic arrangements related to the EU and NATO enlargement to the Baltic states. The most recent news releases cover the political crisis over Estonia's relocation of a Soviet war memorial, and the pipeline agreement between a German gas company and Russia's natural gas monopoly Gazprom on transporting Russian gas to Germany via the Baltic Sea, i.e. bypassing the Baltic states. Second, we consider news related to each one of the Baltic states (i.e. domestic political activity), relations between Baltic States, EU/NATO and other countries, excluding Russia. That is, we create two news variables that allow us to study whether political news related to Russia has different impact on the Baltic stock markets compared to domestic or other foreign, excluding Russia, news events. Given the nature of political news, we do not attempt to classify political news events into "good" and "bad". The adjustment of the stock market prices to new information usually depends not only on the content of the news, but also the investors interpretation of the news, as well as on the extent to which investors are caught by surprise (e.g., Kim, 2003). In this paper, we examine the average response of the markets to different types of political news, without assigning any valuations to the specific political news events.

To avoid the double counting of news, if a chain of news headlines, regarding exactly the same issue, event, or statement, appeared on consecutive days, or several times within a day, only the first-day-headline in the sequence of news is considered a news event. One potential weakness in our analysis is that while we avoid the double counting of news headlines, we loose information about the importance of different news stories. However, Mitchell and Mulherin (1994) showed that using the total number of Dow Jones stories as a proxy for importance of public information did not improve the results. In addition, our criteria are based on the assumption that investors only react to new information and that news already known to investors are priced in the market.

In a final step, the news releases are transformed into count data variables, to facilitate estimation of the impact of news on all three markets. For each Baltic state the variables take a value of 1, when there is one headline, 2 if there are two news announcements during a day, and so on. In a similar way, if there is one news release related to two or all three of Baltic states at the same time, the news variable for the particular countries takes on a value of 1. That is, rather than using dummy variables, we use a daily news count. In this way we are able to assess whether a greater number of news announcements, i.e. more information faced by investors, induces greater return variability.

2.1 Description of the News Data

In this section we study the news variables. Table 1 reports the number of news headlines in each category for both weekdays and weekends. The lowest number of news is found for Vilnius. We find also that weekend news accounts for 8-11 percent of all news. Earlier studies (e.g., Beriment and Kiymaz, 2001, 2003; Ederington and Lee, 1993; Edmonds and Kutan, 2002; Kalev et al., 2004; Kim, 2003) found significant day-of-the-week effects, with the lowest return and the highest volatility on Mondays. We will therefore account for a Monday effect in our estimations.

Table 2 reports some basic statistics for the news variables. The average number of news varies between 0.23 and 0.37 depending on news category and country. The maximum

Table 1: Descriptive statistics for daily news series. Based on political news for the whole sample period, excluding missing observations ($T = 1512$).

	Number of headlines		Weekend	Frequency of days with no news	
News category	Weekdays	Weekends	ratio(%)	Weekdays(%)	Weekends(%)
Riga vs Moscow	518	47	8.3	73.6	97.8
Riga	436	40	8.4	75.7	97.7
Tallinn vs Moscow	511	60	10.5	75.2	97.3
Tallinn	554	70	11.2	73.4	96.5
Vilnius vs Moscow	352	35	9.0	81.9	98.1
Vilnius	358	43	10.7	81.0	97.4

number of news headlines varies between 4 and 5 for Riga and Vilnius, while it is more than twice as high for Tallinn. The peak of 13 news headlines regarding Tallinn and Russia relations (as well as 9 for other Tallinn related news) coincides with the political crisis over the relocation of a Soviet war memorial, late April and early May, 2007.

The Spearman correlations between news categories is reported in Table 3. We find the highest correlation coefficient within each news category. For example, the correlations between Moscow related news in Baltic states range between 24 and 29 percent. In a similar way, the correlation between other domestic or foreign (excluding Russia) news is about 25 percent for Riga vs Tallinn, Riga vs Vilnius, and Tallinn vs Vilnius. These results can be explained by an overlap in the news headlines, in the sense that the same issue, as for example admission to NATO or EU, or regarding Russian minorities in the Baltic States, may be brought up simultaneously for all three Baltic States. In addition, news about political relations within the Baltic States, are likely to have an impact on the correlation between news categories. Another explanation, is the possibility of spillover effects of news (Janssen, 2004). That is, the political conflicts between, for example, Moscow and Tallinn, could affect the political activity between Moscow and other Baltic States as well.

2.2 Stock Index Data

The stock index data used are capitalization weighted daily stock price indices of the Estonian (Tallinn, TALSE), Latvian (Riga, RIGSE), Lithuanian (Vilnius, VILSE), and Russian (Moscow, RTS) stock markets. All prices are in Euro. The dataset covers October

Table 2: Descriptive statistics for daily news series. Based on political news for the whole sample period, excluding missing observations ($T = 1512$).

News category	Mean	St.Dev.	Max	Skewness	Kurtosis	LB^1_{10}	LB^2_{10}
Riga vs Moscow	0.342	0.649	5	2.243	6.350	18.87	249.45
Riga	0.288	0.564	4	2.228	5.900	10.81	109.88
Tallinn vs Moscow	0.338	0.803	13	6.237	69.986	11.93	801.13
Tallinn	0.366	0.769	9	4.117	31.080	20.33	602.73
Vilnius vs Moscow	0.233	0.564	4	3.057	11.648	31.14	151.29
Vilnius	0.237	0.544	4	2.751	9.440	22.19	197.07

Note: LB^1_{10} and LB^2_{10} are the Ljung-Box statistic evaluated at 10 lags for the first (T=535) and second (T=977) sample periods, respectively.

Table 3: Spearman correlation between news catogories. Based on political news for the whole sample period, excluding weekends and missing observations ($T = 1512$).

News category	Riga vs Moscow	Riga	Tallinn vs Moscow	Tallinn	Vilnius vs Moscow	Vilnius
Riga vs Moscow	1.000					
Riga	0.031	1.000				
Tallinn vs Moscow	<u>0.290</u>	<u>0.054</u>	1.000			
Tallinn	0.045	<u>0.258</u>	<u>0.111</u>	1.000		
Vilnius vs Moscow	<u>0.245</u>	<u>0.065</u>	<u>0.237</u>	0.027	1.000	
Vilnius	<u>0.067</u>	<u>0.256</u>	0.045	<u>0.247</u>	<u>0.101</u>	1.000

Note: Underlining is used to indicate significant correlations.

Table 4: Descriptive statistics for daily return series.

Exchange	Mean	St.Dev.	Min/Max	Skewness	Kurtosis	LB_{10}	T
Riga	0.07	1.09	-7.86/6.97	-0.30	12.30	17.92	1554
Tallinn	0.13	0.92	-5.87/7.18	-0.06	10.80	68.91	1554
Vilnius	0.14	1.01	-13.52/11.87	-0.33	40.83	73.22	1554
Moscow	0.12	1.69	-9.91/17.71	1.43	17.91	40.61	1554

Note: LB_{10} is the Ljung-Box statistic evaluated at 10 lags.

16, 2001 to October 1, 2007, for a total of $T = 1555$ observations.

Due to differences in holidays, the country series have different shares of days for which index stock price are not observable. Linear interpolation was used to fill the gaps for all series. The resulting series are then throughout for a common trading week. All returns are calculated as $y_t = 100 \cdot \ln(I_t/I_{t-1})$, where I_t is the daily price index. Table 4 reports descriptive statistics for the daily returns. The Ljung-Box statistics for 10 lags (LB_{10}) indicate significant serial correlation. The large excess kurtoses indicate leptokurtic densities.

3 Model and Estimation

The primary purpose of this paper is to model the relationship between asset return and volatility movements and news arrival. To account for the news effect we expand the asymmetric VARMA-GARCH (or VARMA-AGARCH) model of Hoti et al. (2002, 2005). The model is a multivariate generalization of the asymmetric GARCH (or GJR) model of Glosten et al. (1993), that takes into account asymmetries in financial data. Consider the following specification for the return:

$$\mathbf{y}_t = \mathbf{a}_0 + \sum_{i=1}^{p} \mathbf{A}_i \mathbf{y}_{t-i} + \sum_{j=1}^{r} \mathbf{B}_j \mathbf{d}_{jt} + \mathbf{B}_m \mathbf{d}_{mt} + \sum_{i=0}^{s} \mathbf{C}_i \mathbf{x}_{t-i} + \mathbf{u}_t + \sum_{i=1}^{q} \mathbf{F}_i \mathbf{u}_{t-i} \quad (1)$$

where $\{\mathbf{y}_t\}$ is a $N \times 1$ weakly stationary time series sequence, and $\{\mathbf{x}_t\}$ denotes a sequence of exogenous variables that may affect the process $\{\mathbf{y}_t\}$. In this paper $\mathbf{x}_t$ represents return at time t in the RTS index. The $\mathbf{d}_{jt}$ is a $N \times 1$ vector of variables for news category j = 1, 2. In the empirical study, the variable $\mathbf{d}_{1,t}$, represents news related to Russia, and $\mathbf{d}_{2,t}$ includes domestic and/or other foreign, excluding Russia, news events. The $\mathbf{d}_{mt}$ is a dummy variable to capture a possible Monday effect, i.e. the elements of $\mathbf{d}_{mt}$ variable takes on a value of 1 for Mondays and zero otherwise. The $\mathbf{a}_0$ is a vector of constants, $\mathbf{A}_i$, $\mathbf{B}_j$, $\mathbf{B}_m$, and $\mathbf{C}_i$ are diagonal matrices of dimension $N \times N$. Equation (1) incorporates effects across equations, and hence spillovers in returns, through off-diagonal elements in $\mathbf{F}_i$.

Further, $\{\mathbf{u}_t\}$ is a stochastic $N \times 1$ vector process such that $E\mathbf{u}_t = \mathbf{0}$. The $\mathbf{u}_t$ is conditionally heteroskedastic and generated by

$$\mathbf{u}_t = \mathbf{H}_t^* \boldsymbol{\varepsilon}_t \tag{2}$$

where $\{\boldsymbol{\varepsilon}_t\}$ is an i.i.d. discrete time, vector error process with $E\boldsymbol{\varepsilon}_t\boldsymbol{\varepsilon}_t' = \mathbf{I}$ and $V(\mathbf{u}_t|\mathcal{F}_{t-1}) = \mathbf{H}_t^*\mathbf{H}_t^{*\prime} \equiv \mathbf{H}_t$, where $\mathcal{F}_t$ denotes the past information up through time t. To specify $\mathbf{H}_t$ various alternative asymmetric models are possible (De Goeij and Marquering, 2005; Hoti et al., 2002). We specify the conditional variance model as $\mathbf{h}_t$ =diag($\mathbf{H}_t$), and treat off-diagonal elements of $\mathbf{H}_t$ as time-invariant. The model for conditional variances is given by

$$\mathbf{h}_t = \mathbf{g}_0 + \mathbf{G}_1\mathbf{h}_{t-1} + \sum_{j=1}^{P} \mathbf{V}_j\mathbf{d}_{jt} + \mathbf{V}_m\mathbf{d}_{mt} + \sum_{i=0}^{R} \mathbf{W}_i\mathbf{z}_{t-i} + \left(\sum_{i=1}^{S} \mathbf{K}_i + \sum_{i=1}^{Q} \mathbf{K}_i^{-}\mathbf{I}_{t-i} \right) \mathbf{u}_{t-i}^2 \tag{3}$$

from which the corresponding $\mathbf{H}_t$ matrix can be obtained. The $\mathbf{g}_0$ is a vector of constants, $\mathbf{G}_1$, $\mathbf{V}_j$, $\mathbf{V}_m$, and $\mathbf{W}_i$ are diagonal $N \times N$ matrices, while $\mathbf{K}_i$, $\mathbf{K}_i^{-}$ are $N \times N$ matrices with typical elements k_{ij} and k_{ij}^{-}, respectively, for $i, j = 1, ..., N$. The $\mathbf{h}_t = (h_{1t}, ..., h_{Nt})'$ and $\mathbf{u}_t = (u_{1t}, ..., u_{Nt})'$. The vector $\mathbf{u}_t^2$ has elements u_{it}^2 $(i = 1, ..., N)$. The $\mathbf{z}_t$ series entering the conditional variance function is the Moscow stock market (RTS) moving variance series for a window length of 10 observations. Equation (3) incorporates multivariate effects across equations, and hence spillovers in volatility through off-diagonal elements in $\mathbf{K}_i$ and $\mathbf{K}_i^{-}$. Thus, h_{it} contains past information from u_{it}^2 and u_{jt}^2 for $i, j = 1, ..., N$, $i \neq j$, but not from $u_{it}u_{jt}$. Hoti et al. (2002) define h_{it} to contain past information from u_{it}, u_{jt}, h_{it} and h_{jt} for $i, j = 1, ..., N$, $i \neq j$. The indicator variable $\mathbf{I}_t = diag(I_{it}, ..., I_{nt})$ is a $N \times N$ matrix with

$$I_{it} = \begin{cases} 1, & \text{if } u_{it} \leqslant 0 \\ 0, & \text{otherwise} \end{cases}$$

This threshold term is designed to capture the asymmetric nature of volatility responses to positive and negative shocks to the market. In the empirical results section, the variable u_{it}^2 captures the impact of both positive and negative shocks, while the variable $u_{it}^{2,-} = I_{it}u_{it}$

captures the volatility responses to negative shocks only. The conditional correlations among the elements of $\{\mathbf{u}_t\}$ can be calculated as $\rho_{ij,t} = \mathbf{H}_{ij,t} / \left(\mathbf{H}_{i,t}\mathbf{H}_{j,t}\right)^{1/2}$.

3.1 Empirical Modelling Strategy

The assessment of the relationship between news arrival and asset price movements is done in three steps. First, we estimate univariate ARMA-GJR models for each Baltic stock exchange containing specifications for both mean return and conditional variance. Thus, we implicitly assume that there is no interactions between the series. Second, we consider the expansion to non-diagonal matrices in the volatility expression. Third, we expand to a multivariate specification and include explanatory variables both in the conditional mean and conditional variance functions. This allows us to test whether news contributes significantly to the return and volatility dynamics. Note that given the overlapping periods of market trading activity in the Baltic and Russian stock markets, we allow empirically for Moscow effects (x_t and z_t variables) within a day, and lags beyond one day (see also Koch and Koch, 1991). In each step we employ the AIC criterion to find a parsimonious parametrization. To make the estimation of (3) feasible, we have to reduce number of parameters by being restrictive in terms of correlation structure, lag length and spillover effects. For this purpose, h_{it} depends only on u_{it-1}^2, u_{jt-1}^2 and h_{it-1}.

3.2 Estimation

Given a multivariate normality assumption on $\{\boldsymbol{\varepsilon}_t\}$ the prediction error

$$\mathbf{y}_t - E(\mathbf{y}_t|\mathcal{F}_{t-1}) = \mathbf{u}_t = \mathbf{H}_t^* \boldsymbol{\varepsilon}_t \tag{4}$$

is i.i.d. $N(\mathbf{0}, \mathbf{H}_t)$. Here, $\mathbf{H}_t$ is the conditional variance expression. Given observations up through time T, the log-likelihood function takes the form

$$\ln L \propto -\frac{1}{2}\sum_{t=s}^{T} \ln|\mathbf{H}_t| - \frac{1}{2}\sum_{t=s}^{T} \mathbf{u}_t' \mathbf{H}_t^{-1} \mathbf{u}_t \tag{5}$$

where $s = \max(p, r, s, q, P, R, S, Q) + 1$. For practical estimation the RATS 6.0 package is employed, using robust covariance matrices throughout.

4 Results

The empirical results are presented in Tables 5-6, for the first and second sample periods, respectively. We start with discussing the results for the first sample period, covering

October 16, 2001 to November 3, 2003, presented in Table 5.

Looking at the conditional mean equation, we find that news related to domestic and foreign, excluding Russia, political issues has negative impact on returns in Riga, as indicated by the parameter estimate for the news variable $d_{2,t}$. This indicates that these news are considered as unfavorable by the investors on the stock market of Riga. Alternatively, it is possible that given the short time series no relevant positive news has hit the market, or that the market has been anticipating only negative news. There is no significant impact of either the Moscow related news variable ($d_{1,t}$) nor the other political news variable ($d_{2,t}$) on returns in the stock markets of Tallinn and Vilnius. Although our measure of political news does not appear to be significant for the market returns in the stock markets of Tallinn and Vilnius, it does not necessary mean that political news is not a significant variable, in part because we made no attempt to separate news into good and bad. We also find that the RTS index (x_{t-1}) has a small, but positive impact on the returns in Tallinn. This implies that the information priced on the Russian stock market, will have an effect on the stock market prices in Tallinn, despite the insignificant impact of political news related to Russia. The parameter values for the d_{mt} variable indicates that the returns on Mondays are lower than the mean return across all weekdays combined. The largest weekend-effect is found for the stock markets of Riga and Vilnius. The negative weekend effect is consistent with earlier studies (e.g., Berument and Kiymaz, 2001; Chang et al., 1998; Kim, 2003). Sias and Starks (1995) argued that the weekend effect is primarily driven by institutional investors (and/or discretionary liquidity traders), and it will therefore be stronger on markets dominated by the informed institutional investors. For the Baltic stock markets the institutional investors outweigh individual investors with up to 90 percent of the market value (OMX Guide to Baltic markets, 2007).

Turning to conditional volatility, we find that domestic and foreign, excluding Russia, political news events lower the risk in the stock exchanges of Riga and Tallinn. That is, the market participants' perception of news, regarding relations between the Baltic states, EU, NATO and other western countries or institutions, seems to be towards reduced uncertainty on the markets in Tallinn and Riga. This is consistent with theoretical models (e.g., Äijö, 2008), suggesting that if there is some uncertainty before the actual announcement, the volatility will decrease as the news release resolves the uncertainty of market investors. Alternatively, as standard market microstructure models suggest, higher trading volumes reduce price volatility. Consequently, it is possible that the these types of news generates higher liquidity, by increasing trading volumes. With more liquid markets, the price impact of liquidity trades is reduced, and price volatility falls. Political news events related to Russia seem to have a risk-increasing impact on the volatility in Tallinn. This could be due to, for instance, investors' divergent interpretations of the news or that news is unexpected. In addition, we find significant volatility spillovers from Vilnius to Tallinn. A positive shock in Vilnius, lowers the volatility in Tallinn, whereas a negative shock increases the risk in Tallinn. The conditional covariances are significantly estimated as $H_{12,t} = 0.086$ (s.e. $= 0.037$), $H_{13,t} = 0.062$ (0.032) and $H_{23,t} = 0.122$ (0.030). The resulting time-varying correlations between $\{\mathbf{y}_t\}$ variables are positive throughout and vary between 0.01 and 0.5.

The results for the second sample period, covering January 1, 2004 to October 1, 2007 are presented in Table 6. For the conditional return function, we note that there is a negative weekend-effect on returns in the stock markets of Riga and Tallinn. Moscow related political news events lower the returns in Riga. However, the effect is smaller than that in earlier years (the first sample period). There is no impact of either Moscow related political news ($d_{1,t}$) nor other political news ($d_{2,t}$) on returns in the stock markets of Tallinn and Vilnius.

The results for the conditional volatility function indicate that there is a positive Monday-effect on the stock markets of Riga and Vilnius, implying that the market uncertainty increases on Mondays. Similar results were found by Kiymaz and Berument (2003) for the stock markets of Germany and Japan. French and Roll (1986) suggested that, given that more public information arrives during normal business hours, variances for days following an exchange holiday are larger than for other days, due to the trading strategies of informed traders. The market risk in Riga is slightly lower on days when political news related to Moscow is released. Despite the abundance of political events during the second sample period, there seems to be little or no impact of the political news variables on returns and volatility in Tallinn. McQueen and Roley (1993) suggested that the response coefficient may be biased towards zero, if some type of news is considered good in some states of the economy and bad in others. For Tallinn, we also find that there is an asymmetric impact of own positive and negative shock, where positive shocks have larger impact on the volatility. This is consistent with findings of Brännäs and Soultanaeva (2006) and Brännäs et al. (2007). In addition, we find significant volatility spillovers from Riga to Vilnius. The conditional covariances for the second sample period are $\mathbf{H}_{t,1,2} = 0.054$ (s.e. $= 0.018$), $\mathbf{H}_{t,1,3} = 0.049$ (0.026) and $\mathbf{H}_{t,2,3} = 0.048$ (0.016).

Overall, the volatility persistence is quite low for all three stock markets, for both sample periods. Kalev et al. (2004) and Janssen (2004) found that the inclusion of news variables leads to a substantial reduction in volatility persistence, partly due to a serial correlation pattern in the rate of information arrival. However, for the Baltic stock markets the volatility persistence is quite low, even in models with no news variables.[2] The volatility and return spillovers from the Russian stock market (parameter values for x_t and z_t variables) are small and insignificantly estimated, except in the case of Tallinn during 2001-2003. Accounting for within a day spillovers from the Russian stock markets did not improve the results.

The log-likelihood value increases significantly (the LR test rejects the null hypothesis at the 5 percent level) when news variables and the Monday dummy are included in return and volatility expressions. To assess the specification of the final models, we calculate the time series of standardized residuals and their squares, for both sample periods. Summary statistics of the standardized residuals and their squares are presented in Tables 5-6. If the models are correctly specified we expect the standardized residuals to be close to being i.i.d. distributed. We find no significant autocorrelations of standardized residuals and squared standardized residuals, as indicated by the Ljung-Box statistics.

In our study we, did not account for possible pre-announcement effect of news. Given that the studied markets are dominated by informed institutional investors, it is possible that market participants trade on the information (i.e. rumors) before the actual announcements of news. To scrutinize the possibility for the pre-announcement effect on the Baltic stock markets, we run a regression of stock returns on lagged returns and leads of news variables.[3] The findings indicate that there is no significant pre-announcement effect of political news in the stock markets under study, except for Vilnius, in the case of news related to Russia, in 2004-2007. Chan et al. (2001) also found that political news has no impact on trading on pre-event day. They suggested that the nature of political events makes it more difficult for investors to interpret the content of political events. Therefore, the investors are more likely to wait until the actual announcement before resuming active trading of stocks.

[2] The estimation results for the models with no news are available on request.

[3] We run a regression of form $y_{i,t} = \alpha_0 + \alpha_1 y_{i,t-1} + \beta_{1,i} d_{1,i,t+1} + \beta_{2,i} d_{2,i,t+1} + \varepsilon_t$, where the index i stand for stock markets in Riga, Tallinn and Vilnius. The regression results are available on request.

Table 5: Parameter estimates for the joint conditional return and risk functions, for the first sample period ($T = 535$), covering October 16, 2001 to November 3, 2003 (robust standard errors in parentheses).

	Return		
Variable	Riga, $y_{t,1}$	Tallinn, $y_{t,2}$	Vilnius, $y_{t,3}$
y_{t-1}	-0.121 (0.060)	0.240 (0.053)	0.113 (0.050)
y_{t-2}			0.092 (0.051)
x_{t-1}	0.044 (0.028)	0.053 (0.022)	0.021 (0.021)
d_{mt}	-0.189 (0.097)	-0.022 (0.094)	-0.203 (0.085)
$d_{1,t}$	-0.115 (0.074)	0.152 (0.105)	-0.008 (0.049)
$d_{2,t}$	-0.136 (0.067)	-0.042 (0.052)	0.089 (0.063)
Constant	0.161 (0.059)	0.088 (0.049)	0.146 (0.050)
	Risk		
	Riga, $h_{t,1}$	Tallinn, $h_{t,2}$	Vilnius, $h_{t,3}$
$u_{1,t-1}^2$	0.248 (0.076)		
$u_{1,t-1}^{2,-}$	0.118 (0.080)		
$u_{2,t-1}^2$		0.226 (0.061)	
$u_{2,t-1}^{2,-}$		-0.007 (0.075)	
$u_{3,t-1}^2$		-0.095 (0.025)	0.187 (0.057)
$u_{3,t-1}^{2,-}$		0.268 (0.076)	-0.007 (0.063)
h_{t-1}	0.615 (0.039)	0.503 (0.078)	0.702 (0.072)
z_{t-1}	0.001 (0.007)	0.012 (0.010)	0.000 (0.002)
d_{mt}	-0.118 (0.118)	-0.078 (0.100)	-0.097 (0.108)
$d_{1,t}$	0.085 (0.058)	0.199 (0.093)	-0.005 (0.023)
$d_{2,t}$	-0.150 (0.059)	-0.191 (0.046)	-0.017 (0.042)
Constant	0.209 (0.051)	0.260 (0.052)	0.108 (0.040)
LB_{10}, LB_{10}^2	12.46 6.79	9.89 15.14	9.42 9.52
Skew, Kurt	0.22 3.69	0.04 1.55	-0.04 1.12

Note: LB_{10} and LB_{10}^2 is the Ljung-Box statistic for standardized residuals and their squares at lag 10. Kurtosis is the excess kurtosis of standardized residuals.

Table 6: Parameter estimates for the joint conditional return and risk functions for the second sample period ($T = 977$), covering January 1, 2004 to October 1, 2007 (robust standard errors in parentheses).

	Return		
Variable	Riga, $y_{t,1}$	Tallinn, $y_{t,2}$	Vilnius, $y_{t,3}$
y_{t-1}	-0.039 (0.037)	0.214 (0.034)	0.179 (0.042)
y_{t-2}			0.063 (0.039)
x_{t-1}	0.023 (0.016)	-0.007 (0.009)	0.005 (0.018)
d_{mt}	-0.123 (0.080)	-0.105 (0.047)	0.006 (0.078)
$d_{1,t}$	-0.075 (0.036)	0.002 (0.023)	-0.023 (0.061)
$d_{2,t}$	0.075 (0.051)	-0.021 (0.030)	0.001 (0.047)
Constant	0.146 (0.043)	0.079 (0.025)	0.129 (0.034)
	Risk		
	Riga, $h_{t,1}$	Tallinn, $h_{t,2}$	Vilnius, $h_{t,3}$
$u^2_{1,t-1}$	0.064 (0.015)		0.025 (0.010)
$u^{2,-}_{1,t-1}$	0.099 (0.025)		
$u^2_{2,t-1}$		0.287 (0.041)	
$u^{2,-}_{2,t-1}$		-0.158 (0.036)	
$u^2_{3,t-1}$			0.174 (0.036)
$u^{2,-}_{3,t-1}$			-0.002 (0.042)
h_{t-1}	0.799 (0.015)	0.806 (0.019)	0.763 (0.028)
z_{t-1}	0.000 (0.001)	-0.000 (0.000)	0.004 (0.002)
d_{mt}	0.180 (0.075)	0.008 (0.030)	0.245 (0.059)
$d_{1,t}$	-0.027 (0.011)	-0.008 (0.008)	0.033 (0.026)
$d_{2,t}$	-0.009 (0.021)	0.018 (0.010)	-0.020 (0.018)
Constant	0.062 (0.020)	0.015 (0.007)	-0.002 (0.015)
LB_{10},LB^2_{10}	15.80 17.01	12.59 3.57	12.10 10.80
Skew, Kurt	0.43 4.36	0.86 11.96	1.16 14.99

Note: LB_{10} and LB^2_{10} is the Ljung-Box statistic for standardized residuals and their squares at lag 10. Kurtosis is the excess kurtosis of standardized residuals.

5 Concluding Remarks

This paper has studied the impact of public information on the stock market returns and volatility in Riga, Tallinn and Vilnius. We adopted political news announcements as a proxy for public information. Under the assumption of efficient markets each new information arrival will establish a new price equilibrium (e.g., Kalev et al., 2004). That is, the market participants rely on all available information in forming their expectations of risk and return in the stock markets. Earlier studies (e.g., Durnev et al., 2004) showed that political factors are more important in emerging and transition economies, such as the three Baltic States, than in developed economies. Political news events can therefore reflect a country's political risk, that can have an impact on the stock markets. The asset market in equilibrium should yield risk premiums due to exposure to such risks, if the effects of political events do not vanish in well-diversified portfolios (Bailey and Chung, 1995). Therefore, understanding what drives asset prices is crucial for the analysis of the value of financial assets, and for various investment and risk management decisions. The main question of interest is whether the political news related to Russia has a different impact than news related to domestic and other foreign, excluding Russia, political events.

Using a sample of index returns in the three Baltic states, our study revealed that domestic and foreign, excluding Russia, political news lowered the risk in the stock markets of Riga and Tallinn during years 2001-2003. During the same period political news related to Russia had a risk-increasing effect on the stock market of Tallinn. Political news had a much smaller impact on the stock market of Riga and Tallinn in 2004-2007. Vilnius does not seem to be affected by political news in either sample period. The overall findings suggest that the sensitivity of the Baltic stock markets to political events decreased over time. Goriaev and Zabotkin (2006) found that the relative importance of different risk factors for the Russian stock market varied over time, where political risk became less important after a certain level of market development is passed. In addition, the Baltic states entered as EU and NATO members during the spring 2004, which coincides with the second sample periods. The lower sensitivity to political risk factors during the second sample period, could therefore reflect the investors view on the general economic, financial conditions and political stability of the Baltic countries, after the admission into the EU/NATO.

Our results also indicate that, despite common characteristics, there are substantial differences among Baltic stock markets, with respect to market adjustments to political news. This could be explained by the quality of information, and investors' perceptual biases, regarding political news related to each one of the Baltic states. That is, the stock market movements depend not only on the rate of information arrival, but also on differences in investors' opinions and interpretations of news announcements (Kalev et al., 2004). Furthermore, the displayed differences in sensitivity to political risks may be caused by the industry composition, ownership and trade structure (e.g., Pajuste et al., 2000). Bailey and Chung (1995) noted, for instance, that firms whose cash flows are especially sensitive to general economic conditions may be exposed to political risks. In addition, they argued that industries involved in international transactions are relatively more exposed to political changes.

Consistent with earlier studies (e.g., Berument and Kiymaz, 2001, 2003; Chang et al., 1998; Kim, 2003) we find that the Monday return is on average lower than returns across all other weekdays. The volatility is, on other hand, higher on the days following the exchange holiday. Given the fact that institutional investors represent about 90 percent of the market value of the stock markets in Riga Tallinn and Vilnius, this is consistent with the idea that Monday effect is primarily driven by the trading behavior of informed institutional investors (e.g., French and Roll, 1986; Sias and Starks, 1995).

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References

Andersen TG, Bollerslev T. 1998. Deutsche Mark-Dollar Volatility: Intraday Activity Patterns, Macroeconomic Announcements, and Longer Run Dependences. *Journal of Finance* 53: 219-265

Bailey W, Chung YP. 1995. Exchange Rate Fluctuations, Political Risk, and Stock Returns: Some Evidence from an Emerging Market. *Journal of Financial and Quantitative Analysis* 30: 541-561.

Berument H, Kiymaz H. 2001. The Day of the Week Effect on the Stock Market Volatility. *Journal of Economics and Finance* 25: 181-193.

Berry TD, Howe KM. 1994. Public Information Arrival. *Journal of Finance* 49: 1331-1346.

Bollerslev T. 1986. Generalised Autoregressive Conditional Heteroskedasticity. *Journal of Econometrics* 31: 307-327.

Brännäs K, De Gooijer JG, Lönnbark C, Soultanaeva A. 2007. Simultaneity and Asymmetry of Returns and Volatilities in the Emerging Baltic State Stock Exchanges. Umeå Economic Studies 725, Umeå University.

Brännäs K, Soultanaeva A. 2006. Influence of News in Moscow and New York on Returns and Risks of the Baltic State Stock Indices. Umeå Economic Studies 696, Umeå University.

Chan Y, Chui A, Kwok C. 2001. The Impact of Salient Political and Economic News on the Trading Activity. *Pacific-Basin Finance Journal* 9: 195-217.

Chan Y, Wei KCJ. 1996. Political Risk and Stock Price Volatility: The Case of Hong Kong. *Pacific-Basin Finance Journal* 4: 259-275.

Chang EC, Pinegar JM, Ravichandran R. 1998. US Day-of-the-Week Effects and Asymmetric Responses to Macroeconomic News. *Journal of Banking and Finance* 22: 513-534.

Chang Y, Taylor SJ. 2003. Information Arrival and Intraday Exchange Rate Volatility. *International Financial Markets, Institutions and Money* 13: 85-112.

De Goeij P, Marquering W. 2005. The Generalized Asymmetric Dynamic Covariance Model. *Finance Research Letters* 2: 67-74.

Durnev A, Li K, Morck R, Yeung B. 2004. Capital Markets and Capital Allocation: Implications for Economies in Transition. *Economics of Transition* 12: 593-634.

Edmonds RG, Kutan AM. 2002. Is Public Information Really Irrelevant in Explaining Asset Returns. *Economics Letters* 76: 223-229.

Ederington LH, Lee JH. 1993. How Markets Process Information: News Releases and Volatility. *Journal of Finance* 48: 1161-1191.

Fleming J, Kirby C, Ostdiek B. 1998. Information and Volatility Linkages in the Stock, Bond and Money Markets. *Journal of Financial Economics* 49: 111-137.

French KR, Roll R. 1986. Stock Return Variances: The Arrival of Information and the Reaction of Traders. *Journal of Financial Economics* 17: 5-26.

Glosten LR, Jaganathan R, Runkle DE. 1993. On the Relation between the Expected Value and the Volatility of the Nominal Excess Return on Stocks. *Journal of Finance* 48: 1779-1801.

Goriaev A, Zabotkin A. 2006. Risks of Investing in the Russian Stock Market: Lessons of the First Decade. *Emerging Markets Review* 7: 380-397.

Hoti S, Chan F, McAleer M. 2002. Structure and Asymptotic Theory for Multivariate Asymmetric Volatility: Empirical Evidence for Country Risk Ratings. in: Paper Presented to the Australasian Meeting of the Econometric Society, Brisbane, Australia.

Hoti S, McAleer M, Chan F. 2005. Modelling the Spillover Effects in the Volatility of Atmospheric Carbon Dioxide Concentrations. *Mathematics and Computers in Simulation* 69: 46–56.

Howell LD, Chaddick B. 1994. Models of Political Risk for Foreign Investment and Trade: An Assessment of Three Approaches. *Columbia Journal of World Business* 29: 70-91.

Janssen G. 2004. Public Information Arrival and Volatility Persistence in Financial Markets. *European Journal of Finance* 10: 177-197.

Kalev PS, Liu W-M, Pham PK, Jarnecic E. 2004. Public Infromation Arrival and Volatility of Intraday Stock Returns *Journal of Banking and Finance* 28: 1441-1467.

Kaminsky G, Schmukler SL. 1999. What Triggers Market Jitters? A Chronicle of the Asian Crisis. *Journal of International Money and Finance* 18: 537-560.

Kim SJ. 2003. The Spillovers Effects of US and Japanese Public Information News in Advanced Asia-Pacific Stock Markets. *Pacific-Basin Finance Journal* 11: 611-630.

Kiymaz, H, Berument H. 2003. The Day of the Week Effect on Stock Market Volatility and Volume: International Evidence. *Review of Financial Economics* 12: 363-380.

Koch PD, Koch TW. 1991. Evolution in Dynamic Linkages Across Daily National Stock Indexes. *Journal of International Money and Finance* 10: 231-251.

Kroner KF, Ng VK. 1998. Modeling Asymmetric Comovements of Asset Returns. *Review of Financial Studies* 11, 817-844.

Mateus T. 2004. The Risk and Predictability of Equity Returns of the EU Accession

Countries. *Emerging Markets Review* 5: 241-266.

McQueen G, Roley VV. 1993. Stock Prices, News, and Business Conditions. *Review of Financial Studies* 6: 683-707.

Mitchell ML, Mulherin JH. 1994. The Impact of Public Information on the Stock Market. *Journal of Finance* 49: 923-950.

Pajuste A. 2002. Corporate Governance and Stock Market Performance in Central and Eastern Europe: A Study of Nine Countries, 1994-2001. Center for the Study of Economic and Social Change in Europe: Working Paper No.22, University College London.

Pajuste A, Kepitis G, Högfeldt P. 2000. Risk Factors and Predictability of Stock Returns in Central and Eastern Europe. *Emerging Markets Quarterly* Summer: 7-24.

Ross SA. 1989. Information and Volatility: The No-Arbitrage Martingale Approach to Timing and Resolution Irrelevancy. *Journal of Finance* 44: 1-17.

Sias RW, Starks LT. 1995. The Day-of-the-Week Anomaly: The Role of Institutional Investors. *Financial Analysist Journal* 51: 58-67.

Tan OG, Gannon GL. 2002. "Infromation Effect" of Economic News: SPI Futures. *International Review of Financial Analysis* 11: 467-489.

Äijö J. 2008. Impact of US and UK Macroeconomic News Announcements on the Return Distribution Implied by FTSE-100 Index Options. *International Review of Financial Analysis* 17: 242-258.