

SOVEREIGN CREDIT RATING ANNOUNCEMENTS AND BALTIC STOCK MARKETS

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Abstract. *This study examines whether sovereign credit rating announcements convey price relevant information to investors in Baltic stock markets, and tests the degree of anticipation and price reaction. Event study methodology is employed to test for the price impact of sovereign credit rating announcements by Moody's, S&P, and Fitch. This enables to analyse whether there is an anticipation of the forthcoming announcement in a particular market, a price impact on the announcement day, and a possible delayed reaction. Results indicate that there is an asymmetric reaction: the price impact of negative events is several times larger than that of positive events. Moreover, although some types of rating announcements are anticipated, there is still a significant price impact on the announcement day. The impact differs across the three Baltic stock markets, and depends on the credit rating agency issuing the announcement. The main conclusion is that sovereign credit rating announcements contain pricing relevant news in addition to information already in a public domain.*

Key words: *OMX Baltic stock markets, sovereign credit ratings, event study*

1. Introduction

Sovereign credit ratings are widely used measures of the creditworthiness of a particular country's government. Changes in credit ratings, whether real or potential, indicate not only that the credit risk of the government increases or decreases, but also that the macroeconomic environment changes, and thus it may have an impact on the performance of the companies which operate in that country. One possible approach to examine the effect of the sovereign credit rating announcements is to investigate their impact on stock prices.

Over the last decade, 2000 to 2009, the three Baltic countries (Estonia, Latvia, and Lithuania) experienced a period of rapid economic growth (earning them a nickname "Baltic Tigers") and then a subsequent contraction under conditions of the global financial crisis. The former period was marked by a succession of credit rating upgrades, while in the latter period credit rating agencies were issuing frequent negative announcements, including both negative reviews and rating downgrades.

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The focus of this paper is to examine the price impact of sovereign credit rating announcements on the stock markets of Estonia, Latvia, and Lithuania. I examine both real rating changes (upgrades and downgrades) as well as other types of rating announcements, which indicate a possible rating change in a short to medium term. The latter group includes positive and negative outlooks or watches. Announcements from all three major credit rating agencies are included, namely, Moody's Investor Services (henceforth Moody's), Standard & Poor's (S&P), and Fitch Ratings (Fitch). The method to test for the significance of ratings announcements to the stock markets follows a conventional event study framework.

The majority of event studies examining the price impact of credit rating announcements focus on corporate stock and bond markets, and use corporate credit ratings. Norden & Weber (2004) provide a summary of such literature, their data samples and main results.

Research on sovereign credit ratings can be divided into two categories: studies which analyse the determinants of sovereign credit ratings (e.g., Cantor & Packer, 1996; Afonso, 2003; Mora, 2005), and studies examining the price impact of rating announcements. The latter group usually focuses on the sovereign bond market (Larrain *et al.*, 1997; Reisen & von Maltzan, 1999; Gaillard, 2007).

This paper contributes to studies which focus on the relationship between sovereign credit rating announcements and stock markets in emerging countries. Previous literature in this area includes Kaminsky & Schmukler (2002), Brooks *et al.* (2004), and Pukthuanthong-Le *et al.* (2007).

Kaminsky & Schmukler (2002) focus on cross-country and cross-security contagion. They analyse both local and foreign currency rating changes and reviews by Moody's, S&P and Fitch for 16 emerging market countries that either underwent a crisis or suffered spillover effects during January 1990 – June 2000. Kaminsky & Schmukler (2002) estimate panel regressions using daily variables, therefore do not include any country "fundamentals" (macrovariables). They find that rating changes significantly affect both bond and stock markets, the former to a greater extent. Moreover, rating reviews also seem to have pricing relevant information. Their findings suggest that contagion effects are stronger during crises, especially at a regional level and for non-transparent economies.

Brooks *et al.* (2004) analyse the price impact of the sovereign credit rating changes on the national stock markets. Their sample includes rating changes (i.e. only upgrades and downgrades, not rating reviews) from four rating agencies: Moody's, S&P, Fitch IBCA and Thomson (now part of Fitch) and spans 1973–2001. They undertake an event study using three approaches to abnormal returns: a market model, a mean-adjusted method, and simply using raw returns. The estimation period spans [-120; 21] days around a rating event, while the testing period is [-10; 10] days. As a robustness test, they regress event day's abnormal return on a number of variables, including agency dummies, an indication of whether the country is developed or emerging market, and control for multiple events and split ratings. Consistent with previous studies on

corporate markets, Brooks *et al.* (2004) find that only downgrades seem to have a price impact.

Pukthuanthong-Le *et al.* (2007) analyse the price impact of sovereign ratings announcements by Moody's and S&P on stock and bond markets. The sample includes rating changes and reviews for 34 countries during 1990-2000. They utilize a market model with a world stock index and U.S. Treasury bond returns as benchmarks for stock and bond markets, respectively. Event window spans [-45;45] days, the significance of CAARs (cumulative average abnormal returns) is tested over different length intervals surrounding rating announcement days. Findings suggest an asymmetrical response: equity and bond prices react to downgrades but not upgrades. Furthermore, sovereign bond yields anticipate rating downgrades. Rating reviews, both positive and negative, do not seem to have an impact on a country's stock market, but exhibit both an anticipation and a price reaction in sovereign bond markets.

Based on the previous literature, the first hypothesis of this study is that there is an asymmetrical effect: stock markets exhibit a stronger reaction to negative events (downgrades and negative reviews) than to positive events (upgrades and positive outlooks). The second hypothesis, based on a regional effect, is that the price reaction is qualitatively similar across all three Baltic markets. The third hypothesis is that the results are qualitatively similar across all three credit rating agencies (Moody's, S&P, and Fitch).

The contribution of the paper is testing the price impact of sovereign credit rating announcements on the stock market indices in three Baltic countries. The focus is on the indices in a window of [-20; 10] business days around the announcement, which enables to analyse whether the stock markets anticipate a rating event, to test the price impact on the announcement day and for a potential delayed reaction up to two weeks afterwards.

Results indicate that there is an asymmetric effect: the price impact of downgrades is much higher than that of upgrades. Moreover, while some types of sovereign rating announcements are anticipated and reflected in stock market indices, the largest price impact occurs on the announcement day. Finally, the price impact differs by country and also depends on which credit rating agency issues an announcement.

The remainder of this paper is organized as follows. Section 2 provides a brief explanation of sovereign credit ratings. Section 3 presents an event study framework employed in an empirical analysis. The data used in the paper is described in section 4, while section 5 provides an analysis of the results of the price impact of sovereign credit rating announcements. Concluding comments are given in section 6.

2. Credit Ratings

Sovereign credit ratings are important indicators of a government's default probability and are widely used as measures of the credit risk of both a security and its issuer. The three main international credit rating agencies are Moody's, Standard & Poor's (S&P),

and Fitch. These agencies use similar rating scales and methodologies, and their ratings are largely comparable. Rating agencies operate in an effective oligopoly: Moody's and S&P hold approximately 80% of the market share, with Fitch controlling another 15% (Blaurock, 2007). While rating agencies state that their ratings are simply intended to provide an independent opinion on credit quality, they are in effect very influential and widely used by participants in financial markets. Gonzalez *et al.* (2004, p.8) note that markets tend to view credit ratings "as benchmarks or creditworthiness standards".

Rating agencies provide both long- and short-term ratings. Separate credit ratings are assigned for obligations denominated in local and foreign currency. In addition to ratings, agencies also provide indicators of possible rating changes. There are two types of such indicators: rating outlooks and rating watches. Outlooks provide information of a possible rating change in a medium term. Rating watches are short-term indicators, and are usually event-driven. Both outlooks and watches can be positive (indicating a potential upgrade of a credit rating), negative (worsening conditions indicating a possible downgrade), stable (indicating that a change in a rating in either direction is unlikely in a short or medium term), and "evolving" or "developing" (assigned when a direction of a rating change is uncertain).

While credit ratings indicate future default probability, they are not *absolute* measures of credit risk. Instead, they provide an ordinal ranking, i.e. information on *relative* creditworthiness. All major rating agencies employ similar rating scales, which consist of 20 or more notches (see Table 1 below).

TABLE 1. Rating scales used by Moody's, S&P, and Fitch

Moody's	S&P	Fitch	Description
Aaa	AAA	AAA	Highest credit quality, minimum credit risk
Aa1, Aa2, Aa3	AA+, AA, AA-	AA+, AA, AA-	Very high credit quality, very low credit risk
A1, A2, A3	A+, A, A-	A+, A, A-	High credit quality (upper-medium grade)
Baa1, Baa2, Baa3	BBB+, BBB, BBB-	BBB+, BBB, BBB-	Good credit quality, currently low credit risk
Ba1, Ba2, Ba3	BB+, BB, BB-	BB+, BB, BB-	Speculative elements, issuer faces major uncertainties and adverse conditions
B1, B2, B3	B+, B, B-	B+, B, B-	High credit risk, but issuer still able to meet its financial commitments
Caa1, Caa2, Caa3	CCC+, CCC, CCC-	CCC	Issuer currently vulnerable, default likely
Ca	CC	CC	Issuer currently highly vulnerable, near default
C	R, SD, D	C, RD, D	Lowest rating, typically in default on some (SD, RD) or all of its financial obligations

Such ordinal ranking allows comparisons among rating categories. For example, it is expected that defaults within category B will occur with a lower frequency than defaults within CCC+.

Ratings AAA (Aaa) through BBB- (Baa3)¹ belong to the so-called investment-grade category, while those below BBB- are called speculative or non-investment grade ratings. Rating agencies utilize modifiers to distinguish among relative creditworthiness within rating classes: Fitch and S&P use + and -, while Moody's employ numerical modifiers 1, 2, and 3.

Moody's, S&P, and Fitch each rate more than 100 countries. Sovereign credit ratings comprise issuer default ratings, government bond ratings, and "country ceilings". A "country ceiling" is a credit rating reflecting the government's ability to interfere on the repayment ability of other institutions under its jurisdiction.

Data used in this paper comprises sovereign long-term issuer ratings in foreign currency. Sovereign credit ratings differ considerably from those assigned to corporates in relation to the notion of credit risk (Gonzalez *et al.*, 2004). Unlike for corporate issuers, the likelihood of default for sovereigns depends not only on their financial ability, but also on the "willingness to pay". In practice financial capacity and willingness to pay are usually connected. However, since governments' creditors have a limited legal enforcement power, a sovereign may selectively default on some of its obligations, while continuing to honour payments on its remaining debt obligations.

All agencies report that their models for determining credit ratings include variables reflecting a country's macroeconomic performance, public finance, external debt, monetary policy, and political risk.

3. Event Study Framework

An event study methodology is a common framework used to test the effect of the occurrence of a particular event on prices in financial markets.²

The first step in an event study is to precisely define an event and to select an appropriate testing window, i.e. an interval around the event (including the event date) during which price movements will be examined. The event day is denoted as day 0, and other days are aligned accordingly in "event time". The events being studied in this paper are sovereign credit rating announcements by Moody's, S&P, and Fitch, which include both rating changes and reviews (outlooks or watches). Since credit ratings tend to be "sticky", i.e. credit rating agencies have a policy of not changing them frequently, it is possible to expect that the stock markets will be anticipating rating announcements, particularly changes to sovereign credit ratings. Despite the anticipation, there may still be a significant reaction on the announcement day. However, if stock markets are semi-strong form efficient in a sense that new information is instantaneously incorporated in stock prices, there should not be any significant abnormal returns after the event.

¹ Henceforth I will use ratings expressed in Fitch and S&P scale when referring to ratings by all agencies.

² See MacKinlay (1997) for a thorough review of the main methods used in event studies. He notes that the first such study was published in 1933. Major improvements in methodology took place in the 1960s and 1980s.

All rating announcements are aligned in event-time, and the testing window used is of [-20; 10] business days, sub-dividing it into four intervals: [-20; -11], [-10; -1] event day 0, and [1; 10]. This enables us to test the impact of rating announcements including an anticipation up to a month in advance, and a delayed reaction up two weeks after the event.

In order to examine the effect of an event, a measure of abnormal return must be chosen. In order to calculate it, one needs to select a proxy for a “normal return”, which is customarily some benchmark return, such as a market index. Abnormal returns can then be calculated using a number of different approaches. The market-model-adjusted method (or “market model”) is the most common approach. A body of literature has found that the market model is usually the most powerful, and in that sense the most reliable.³ It models the security’s returns as a linear function of the market return:

Equation 1. Market-model-adjusted returns

$$E[R_{it}] = \alpha_i + \beta_i \times R_{mt}$$

where $E[R_{it}]$ is the expected return of the Baltic stock markets at time t , and R_{mt} is the return on *MSCI EM Small Country* index at time t .

This method requires an estimation period over which a regression is estimated, and such period ideally should not include the testing window. The estimation period chosen in this paper consists of 100 days before the testing window, i.e. [-140; -21].

Regression results give estimates of coefficients α_i and β_i . These are then used to compute expected returns over the testing period. The abnormal stock returns are then calculated as follows:

Equation 2. Abnormal stock market returns

$$AR_{i,t} = R_{i,t} - E[R_{i,t}]$$

where $AR_{i,t}$ – abnormal stock market return for country i on day t ;

$R_{i,t}$ – stock market return for country i on day t ;

$E[R_{i,t}]$ – expected return on stock market return for country i on day t .

The null hypothesis is that there are no abnormal stock market returns, i.e. that $AR_{i,t}$ equals zero.

Given the small size of the sample in this study (see section IV for details), standard cross-sectional t -tests may not be appropriate. Moreover, the size of the sub-samples by country and by rating agency is in most cases too small to employ the bootstrap approach. Therefore, the statistical significance of abnormal returns is estimated for each event individually, by calculating t -statistics treating each event as a clinical study.

If abnormal returns are statistically significant, I expect a positive sign for positive events, and a negative sign for negative ones.

³ For the review and comparison of different models employed in event studies see Armitage (1995) and MacKinlay (1997).

4. Data

Data used in this paper is daily in frequency and spans the period from January 2000 to June 2009. It consists of Baltic stock market indices, *MSCI EM SmallCap* index as a proxy for benchmark returns, and sovereign credit rating announcements.

This study employs the *OMX Baltic All-Share* index data for three Baltic countries: OMX Tallinn, OMX Riga, and OMX Vilnius. These indices are value-weighted and include the shares listed on both main and secondary lists of the Baltic stock exchanges. As of September 2009, the capitalization for all three Baltic stock markets was 6.5 billion EUR. Tallin, Riga, and Vilnius stock markets had the capitalization of 1.8, 1.2, and 3.5 billion EUR, respectively.

As a proxy for emerging market stock returns, *MSCI Emerging Markets SmallCap* index is used. This index covers more than 20 emerging markets and includes securities of companies with market capitalization between \$200 million and \$1.5 billion.

Sovereign credit rating announcement data is collected from all three major credit rating agencies: Moody's, S&P, and Fitch. It consists of both rating changes, i.e. upgrades or downgrades, and changes in the outlook. The latter include outlooks and watches, as well as rating revisions up or down to a stable outlook. I collectively refer to this group of rating announcements as either positive or negative reviews. During the sample period (January 2000 – June 2009), the three agencies made 57 rating announcements concerning sovereign credit ratings of Estonia, Latvia, and Lithuania. Fitch, Moody's, and S&P each made 33, 13, and 11 announcements, respectively.

The breakdown of the sample by country and by event type is provided in the table below:

TABLE 2. Sovereign credit rating announcements

	Upgrades	Positive reviews	Downgrades	Negative reviews	Total
Estonia	5	6	2	5	18
Latvia	3	2	7	5	17
Lithuania	10	5	4	3	22
	18	13	13	13	57

The distribution of events by country is quite even: there are 18 announcements concerning sovereign credit rating of Estonia, 17 for Latvia, and 22 for Lithuania. During the sample period there were slightly more positive rating announcements (31) than negative ones (26).

5. Empirical Analysis

The price impact of sovereign rating announcements and the extent to which Baltic stock markets are anticipating them can first be evaluated by examining cumulative abnormal returns (CARs). Figure 1 shows average CARs for negative events.

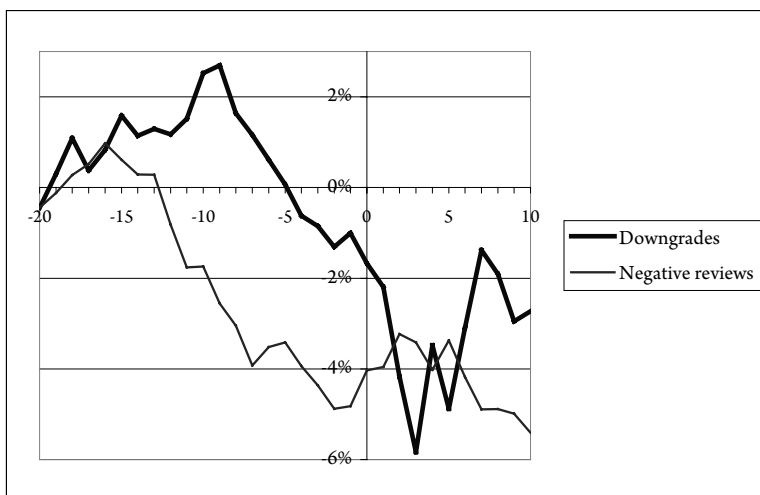


FIGURE 1. Cumulative abnormal returns for negative events

It seems that Baltic stock markets are not anticipating downgrades well in advance, since CARs are actually increasing during the $[-20; -10]$ window before the announcement. However, CARs start to decline two weeks before the downgrade. There is also a drop on the event day, and a sharp decline two days after the announcement. The pattern for negative reviews is slightly different: declining CARs indicate that Baltic stock markets seem to be anticipating them as much as three weeks in advance, but there is no reaction on the event day, and no trend for CARs after the negative announcement.

Figure 2 shows the pattern of CARs for each country, focusing on downgrades.

CARs for Latvia do not seem to have a trend, indicating that downgrades of Latvia's government by credit rating agencies do not seem to have a price impact on Latvia's stock

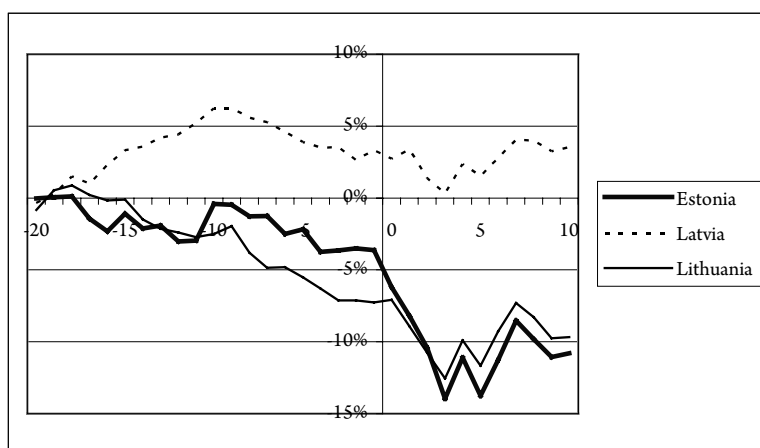


FIGURE 2. Cumulative abnormal returns for downgrades, breakdown by country

market. The picture for Estonia and Lithuania, however, is quite different: declining CARs indicate that both markets are anticipating a negative event two to three weeks in advance, but the largest price impact occurs on the announcement of a downgrade and on the days immediately following it.

I now turn to a more rigorous analysis by examining coefficients of daily mean abnormal returns (ARs) in different testing intervals. Results on the stock markets' price reaction to the sovereign credit rating announcements are given in the table below.

TABLE 3. **Abnormal returns by event type**

	Mean daily ARs			
	[-20; -11]	[-10; -1]	day 0	[1; 10]
Upgrades	-0.017%	-0.056%	0.065%	-0.030%
Positive reviews	-0.119%	-0.137%	0.249%	0.087%
Downgrades	0.152%	-0.252%	-0.666%	-0.106%
Negative reviews	-0.176%	-0.306%	0.787%	-0.138%

Note: Testing intervals represent business days w.r.t. an announcement day. Mean daily abnormal returns (ARs) are calculated as an arithmetic average of individual events' ARs which are significant at the 5% level.

Results are compatible with the asymmetry hypothesis: the price impact of negative announcements is larger than that of positive ones. Abnormal returns associated with upgrades (0.065%) are ten times smaller in absolute value than those associated with downgrades (-0.666%).

Positive events are not anticipated, since mean daily ARs are actually negative during the month preceding the announcement. Baltic stock markets seem to be anticipating downgrades, as evidenced by daily ARs of -0.252% during the [-10; -1] window. In addition, there is a delayed reaction one week following the announcement. Negative reviews do not have the expected negative price impact on the announcement day 0, as ARs are actually positive at 0.787%. However, they are anticipated during the month preceding the announcement: daily ARs are -0.2% during the [-20; -11] window, and -0.3% in two weeks before the event. Moreover, there seems to be a delayed reaction during the two weeks following the announcement, with daily ARs of -0.14%.

The second hypothesis is that the price impact is qualitatively similar across all three Baltic countries. In order to test it, the analysis is conducted for each country separately. Results are presented in Table 4.

Results indicate that the price impact differs by country. Upgrades seem to have the strongest effect on Latvia's stock market: abnormal returns are 0.41% on the announcement day. Stock markets in Estonia and Latvia react to positive reviews, with ARs of

TABLE 4. Abnormal returns by event type and country

		Mean daily ARs			
		[-20; -11]	[-10; -1]	day 0	[1; 10]
Upgrades	Estonia	-0.042%	-0.120%	-0.103%	-0.009%
	Latvia	0.006%	0.197%	0.410%	0.056%
	Lithuania	-0.009%	-0.075%	0.080%	-0.057%
Positive reviews	Estonia	-0.235%	-0.165%	0.312%	-0.314%
	Latvia	-0.023%	-0.178%	0.378%	1.008%
	Lithuania	-0.037%	-0.078%	0.095%	0.015%
Downgrades	Estonia	-0.296%	-0.067%	-2.575%	-0.460%
	Latvia	0.522%	-0.190%	-0.603%	0.082%
	Lithuania	-0.273%	-0.454%	0.178%	-0.258%
Negative reviews	Estonia	-0.109%	-0.263%	0.225%	0.361%
	Latvia	-0.451%	-0.380%	1.527%	-0.287%
	Lithuania	0.790%	-0.098%	-1.045%	-0.537%

Note: Testing intervals represent business days w.r.t. an announcement day. Mean daily abnormal returns (ARs) are calculated as an arithmetic average of individual events' ARs which are significant at the 5% level.

0.3%, and 0.4%, respectively. However, positive sovereign credit rating events do not seem to have a strong price impact on Lithuania's stock market.

Downgrades have the strongest impact on Estonia's stock market, with ARs of -2.6% on the announcement day. Respective coefficient for Lithuania is puzzlingly positive, as are ARs of negative reviews for Estonia and Latvia. Lithuania's stock market seems to have a strong reaction to negative reviews, with ARs of -1.0%.

The anticipation of rating reviews is qualitatively similar across all three Baltic countries. The anticipation of rating changes, however, is different. Upgrades do not seem to be anticipated in Estonia and Lithuania, since mean daily ARs before the announcement are actually negative. Upgrades for Latvia, however, are anticipated up to two weeks in advance, with daily ARs of 0.2%. Downgrades are anticipated in all countries. In Estonia this effect is the strongest during the [-20; -11] window, while in Latvia it happens two weeks before the event. Downgrades of Lithuania are anticipated up to a month in advance, and the effect is the strongest during the two weeks preceding the announcement, with daily ARs of -0.454%.

The third hypothesis of the study is that the price impact is qualitatively similar across all three rating agencies. It is tested by conducting a separate analysis for each rating agency. Due to small sample sizes, the analysis focuses on positive versus negative events, without further dividing them into rating changes and reviews. Results are given in Table 5.

The strongest reaction to positive events is associated with announcements made by Moody's: ARs of 0.5% on the event day. Similar statistics for Fitch is 0.2%, while that for S&P is puzzlingly negative. Examining ARs associated with negative events, it

TABLE 5. Abnormal returns by event type and rating agency

		Mean daily ARs			
		[-20; -11]	[-10; -1]	day 0	[1; 10]
Positive events	Moody's	0.089%	0.091%	0.469%	0.181%
	S&P	-0.293%	-0.146%	-0.389%	-0.035%
	Fitch	-0.031%	-0.147%	0.237%	-0.019%
Negative events	Moody's	0.604%	-0.021%	-0.391%	0.102%
	S&P	0.191%	0.300%	-0.149%	-0.688%
	Fitch	-0.236%	-0.431%	-0.050%	-0.174%

Note: Testing intervals represent business days w.r.t. an announcement day. Mean daily abnormal returns (ARs) are calculated as an arithmetic average of individual events' ARs which are significant at the 5% level.

seems that Baltic stock markets exhibit the strongest reaction to such announcements by Moody's: ARs of -0.4% on the event day.

Positive rating announcements by S&P and Fitch do not seem to be anticipated, while those of Moody's only slightly so. However, there is a delayed reaction to positive events by Moody's, since mean daily ARs during the [1; 10] are 0.2%. Anticipation of negative events is qualitatively different across the rating agencies. Negative announcements by Moody's are only slightly anticipated in two weeks preceding the event; those by S&P do not seem to be anticipated. Negative announcements by Fitch, however, are anticipated during the [-20; -11] and [-10; -1] windows with daily ARs of -0.236% and -0.431%, respectively. In addition, there is a delayed reaction to negative rating announcements by S&P and Fitch: daily ARs in two weeks following the event are -0.7% and -0.2%, respectively.

6. Concluding Comments

This paper examines the price impact of Moody's, S&P, and Fitch sovereign credit rating announcements, including both rating changes and reviews, on the stock market indices of Estonia, Latvia, and Lithuania, utilizing standard event study methodology.

Empirical analysis indicates that there is an asymmetric reaction: the price impact of negative events tends to be larger than that of positive events. Results do not seem to support the hypothesis that the reaction is qualitatively similar across all three Baltic markets. The announcement of upgrades has the largest impact on Latvia's stock market, while downgrades affect Estonia's stock market most. The price impact of negative reviews is the strongest in Lithuania's stock market.

The hypothesis that the price impact is qualitatively similar across all three credit rating agencies is not supported by empirical evidence: Baltic stock markets exhibit the strongest price reaction to sovereign credit rating announcements by Moody's.

The main conclusion is that although some types of rating announcements are anticipated by the Baltic stock markets, there is still a significant price impact on the

announcement day. It indicates that sovereign credit rating announcements contain pricing relevant news in addition to information already in a public domain.

Future research on this topic could analyse the main determinants of abnormal returns by conducting a regression analysis, controlling for rating changes that were preceded by rating reviews, or by similar events by another agency. In addition, it would be interesting to examine potential contagion effects: whether sovereign credit rating announcements for one country have a price impact on other Baltic stock markets.

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