The Effect of Sovereign Credit Rating Announcements on Emerging Bond and Stock Markets: New Evidences

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Abstract

This paper examines the impact of sovereign credit rating changes on emerging market economies. The motivation behind previous research in this area has been to evaluate the relevance of bond ratings for efficiency of financial markets; in particular, do rating agencies have superior information and/or analytical skills and hence can their announcements influence excess bond and equity returns? Reisen, & von Maltzan (1999), among others, argue that the sovereign ratings might be able to trigger pronounced boom-bust cycles in emerging market lending. The goal of this research is to evaluate the relevance of credit rating agencies for efficiency of financial markets in transition economies; in particular, do changes in sovereign ratings convey valuable information only to local market participants, or do they trigger contagious fluctuations in other markets, thus attributing to their financial instability. For that reason we study country-specific (or domestic) and cross-country (or foreign) spillover effects of rating changes. To capture the dynamic effects around the time of changes in ratings, we use the technique of event studies. We do find evidence that rating changes of sovereign bonds in one country trigger significant changes in yield spreads and stock market returns in other (neighboring) countries (the so-called cross-country contagion effect). In line with previous research the spillover effects of rating changes (downgrades in our case) are found to be stronger at the regional level.

Introduction

In this paper we examine the impact of sovereign credit rating changes on bond and stock market returns in transition economies. Given the growing relevance of capital markets as a major source of funding for emerging market economies, the importance of credit rating agencies in providing standardized assessments of credit risk associated with emerging market investment, has continued to grow. Standard & Poor's defines a credit rating as "a current opinion of the creditworthiness of an obligor with respect to a specific financial obligation, a special class of financial obligations, or a specific financial program" (Martell, 2005, p.2). A sovereign credit rating, then, reflect the rating agency's opinion on the ability and willingness of sovereign governments to serve their outstanding financial obligations in full and on time - it is basically an estimate of the probability of default and/or likelihood of repayment.

The motivation behind previous research in this area has been to evaluate the relevance of bond ratings for the efficiency of capital markets; in particular, do rating agencies have superior information and/or analytical skills and hence can their announcements influence excess bond and equity returns? Earlier literature in the 1970s and 1980s finds mixed evidence on this effect. For example, Weinstein (1977) and Wakeman (1978) do not find significant abnormal returns. Pinches, & Singleton (1978) affirm that the information content of bond rating changes is very small, while other similar research (Grier, & Katz, 1976; Holthausen, & Leftwich, 1986; Ingram, Brooks, & Copeland, 1983; Katz, 1974; Wansley, & Clauretie, 1985) finds evidence of abnormal returns, associated in particular with downgrades and additions to the credit watch list. These conflicting results were due to the differences in bond market coverage, frequency of observations (daily or monthly), contamination with news, and different sample periods.

Given the poor quality of much bond price data, where thin trading is a particular problem, most of the previous studies have focused on the impact of rating changes on stock market returns. Griffen, & Sanvincente (1992), using monthly data, were among the first to find evidence of significant negative stock price reaction to rating downgrades, while finding no evidence of significant reaction to rating upgrades. Holthausen, & Leftwich (1986) used daily data to study the stock price reaction to credit rating changes. The main contribution of their work was to establish that rating downgrades by Moody's and Standard & Poor's provide information to markets and impose costs to the firms by reducing their stock prices. No significant stock market reaction for rating upgrades was found. Subsequently, many papers confirmed the findings of Holthausen, & Leftwich (1986) under different specifications and conditions (Goh, & Ederington, 1993, 1999; Hand, Holthausen, & Leftwich, 1992).

Although most studies consider a rating downgrade to be bad news, not all researchers agree that downgrades are bad news for shareholders. An argument initially put forth by Zaima, & McCarthy (1988) explains why we might observe positive stock price reaction to rating downgrades.[a] They propose two competing hypotheses about the effect of rating changes: the information content hypothesis and wealth redistribution hypothesis. The former suggests that securities of downgraded firms should decline in value while those of upgraded firms should increase; the latter suggests that rating downgrades should lead to a reduction in bondholder wealth and a corresponding wealth transfer to shareholders. More recently, Goh, & Ederington (1999) find that the equity market reacts much more negatively to bond rating downgrades to and within the speculative (below-investment) bond category than to downgrades within the investment-grade category. The market reaction is also stronger if the firm experiences negative pre-downgraded abnormal returns.

Research on the effects of sovereign rating changes flourished in the 1990s. For example, Cantor, & Packer (1996) look at the determinants of sovereign credit ratings using rating changes announced by Moody's and Standard & Poor's. Their analysis shows that sovereign ratings effectively summarize and supplement the information contained in macroeconomic indicators and are, therefore, strongly correlated with market-determined credit spreads. The informational content of credit rating announcements has also been investigated for some non-US markets (Barron, Clare, & Thomas, 1997 for the UK market; Elayan, Hsu, & Meyer, 2003 for the New Zealand market; Matolcsy, & Lianto, 1995 for the Australian market). Kaminsky, & Schmukler (2002) look at the effects of ratings and outlook changes on bond and stock returns in emerging markets. Using a panel data specification they find that the effects of rating and outlook changes are stronger during crises, in nontransparent

economies, and in neighboring countries. Upgrades tend to take place during market rallies, whereas downgrades occur during downturns, providing support to the idea that credit rating agencies contribute to the instability of emerging financial markets.[b]

An interesting question, widely discussed in the research literature, is whether the credit rating agencies can add, i.e. intensify or attenuate, to the dynamics of financial crisis in emerging markers. As Ferri, Liu, & Stiglitz (1999) suggest, their pro-cyclical behavior (upgrading countries in good times and downgrading them in bad times) may have magnified the boom-bust pattern in stock markets. During the boom, early rating downgrades would help to dampen euphoric expectations and reduce private short-term capital flows which have been repeatedly seen to fuel credit booms and financial vulnerability in the capital-importing countries. By contrast, if sovereign rating changes have no market impact, they would be unable to smooth boom-bust cycles.[c]

Reisen, & von Maltzan (1999) also argue that the sovereign ratings might be able to trigger pronounce boom-bust cycles in emerging market lending. The proponents of this boom-bust cycle theory argue that the upgrading of the Asian countries in the midd-1990s already proved the existence of a vicious cycle, albeit in the opposite direction. This means that capital inflows led to higher ratings, which, in turn, triggered more capital inflows. Market participants raised criticism that the credit rating agencies were not only lax in foreseeing the vulnerabilities of East-Asian countries that eventually succumbed to crisis but that they have also responded too slowly to negative developments (Kräussl, 2003). This means that they were downgrading the debtor countries only after the onset of the crisis, thereby exacerbating market price movements and increasing instability.

The rest of the paper is organized as follows. The next section presents a literature review of current empirical studies in the field, while section 3 discusses the institutional features of rating agencies. Section 4 details the research methodology used to study the impact of credit rating changes and section 4 presents our empirical results. Some concluding remarks are offered in the final section.

Recent Empirical Studies

In examining the relationships between changes in sovereign credit rating assigned by different rating agencies and the changes in bond yield spreads and stock market returns, somewhat mixed results were obtained by a number of recent empirical studies which tried to shed light on this issue using event studies and cross-sectional analyses. The findings of this extensive research are summarized below.

A major group of studies focuses on bond spread impact of credit rating announcements in both developing and developed countries. Using a sample of 49 countries rated by both Moody's and Standard & Poor's, Cantor, & Packer (1996) find evidence that the rating agencies' opinions independently affect market spreads. The event study analysis they used shows that the announcement of changes in agencies' sovereign risk opinions are followed by statistically significant bond yield movements in the expected direction. Surprisingly, they find that the impact of rating announcement on spreads is much stronger for below-investment-grade than for investment-grade sovereign ratings.

Reisen, & von Maltzan (1999) undertake an event study similar to that of Cantor and Packer (1996). They also find that the largest announcement effects are observed in emerging markets sovereign bond spreads. However, in sharp contrast to the results of Cantor, & Packer (1996), they find that a significant change in the yield spreads in the expected direction occurs in the announcement period of 30 days before and after the rating event only when a possible downgrade is implemented. Reisen, & von Maltzan (1999) argue that, in principle, sovereign credit ratings might be able to help attenuate boom-bust cycles in emerging market lending.

A study by Larrain, Reisen, & von Maltzan (1997) tries to answer the question of whether the sovereign credit rating industry leads or lags the financial markets with respect to sovereign risk. They argue that the mutual interaction between sovereign yields spreads and ratings can be explained by the nature of sovereign risk, the information content of sovereign risk ratings, and the industrial organization of the rating industry. In line with the previous research they find a highly significant announcement effect when emerging-market sovereign bonds are put on review with a negative outlook. These findings also imply that the sovereign rating industry has the potential to help dampen excessive private capital inflows into the emerging markets with negative rating announcements.

Rating agencies have recently come under scrutiny as promoters of financial excesses. Both academics and practitioners often argue that sovereign credit ratings are responsible for pronounced boom-bust cycles in emerging markets. A number of research papers tries to address this issue. For example, Kräussl (2003) finds evidence that abrupt downgrades by rating agencies do not necessarily intensify a financial crisis, which is in contrast with the views of the proponents of the boom-bust cycles theory; moreover, they can help to end the financial market turmoil more quickly. On the contrary, a cautious, gradual downgrading of the sovereign credit rating (as in the case of Mexico during the Mexican Peso crisis of 1994/95) can intensify the financial crisis. Finally, he asserts that if credit rating agencies act with foresight, an initial downgrade will not cause a bust-phase and an initial upgrade will not cause a boom-phase in emerging marker lending.

Amato, & Furfine (2004) also address the question of whether rating agencies are excessively procyclical in their assignment of ratings. Utilizing annual data on all US firms rated by Standard & Poor's, they find that ratings do not generally exhibit excess sensitivity to the business cycle, which is consistent with the normative view that ratings should have a long-term perspective. In addition, their study documents that previously reported findings of a secular tightening of ratings standards are not robust to a more complete accounting of systematic changes in measures of business and financial risk. A recent study by Joo, & Pruitt (2006) investigates the impact of bond rating changes during periods of significant economic instability. Using the Korean financial crisis in 1997/98 as an example of financial market turmoil in the 1990s, they find that changes in Korean bond ratings during the financial crisis resulted in much stronger changes in stock prices than rating changes of identical magnitude announced either before or after the crisis.

Existing research literature also tries to differentiate between the informational content of sovereign rating changes announced by different rating agencies. For example, using a sample of 160 rating changes announced by Moody's and Standard & Poor's, Martell (2005) finds that for sovereigns, Moody's ratings are considered to be less informative by the local stock markets as compared to Standard & Poor's ratings. Cumulative abnormal returns (CARs) of stock indices also show that investors react only to rating announcements made by Standard & Poor's. When studying the cross sectional variations of the abnormal returns of individual firms associated with sovereign credit rating changes, he finds that larger firms experience larger stock price drops after a sovereign credit downgrade. Furthermore, local firms located in more developed emerging countries experience smaller stock price reductions following sovereign credit downgrades.

A recent study by Güttler, & Wahrenburg (2007) investigates biases in credit ratings and lead-lag relationships for near-to-default issuers with multiple ratings by Moody's and Standard & Poor's. Based on defaults from 1994 to 2004 they find evidence that Moody's seems to adjust its ratings to increasing default risk in a timelier manner than Standard & Poor's. Also, credit ratings by the two US-based agencies are not subject to any home preference. The evidence shows that, given a downgrade (upgrade) by the first rating agency, subsequent downgrades (upgrades) by the second rating agency are of greater magnitude in the short term. Rating changes by the second rating agency are significantly more likely after downgrades than after upgrades by the first rating agency.

Norden, & Weber (2004) analyze the response of stock and credit default swap (CDS) markets to rating announcements made by the three major rating agencies (Moody's, Standard & Poor's and Fitch) during the period 2000-2002. Applying event study methodology, they examine whether and how strongly these markets respond to rating announcements in terms of abnormal returns and adjusted CDS spread changes. The evidence shows that both stock and credit default swap (CDS) markets not only anticipate rating downgrades, but also react to reviews for downgrades announced by all three agencies. The combined analysis of different rating events within and across agencies reveals that reviews for downgrade by Standard & Poor's and Moody's exhibit the largest impact on both markets.[d]

Consistent with evidence pertaining to firm credit rating changes, Brooks, Faff, Hillier, & Hillier (2004) find that a downgrade impacts negatively on both the domestic stock market and the dollar value of the country's currency. An interesting finding is that, of the four credit rating agencies examined, only Standard & Poor's and Fitch rating downgrades result in significant market falls. They find no evidence that emerging markets are particularly sensitive to rating changes or that markets react more severely to multiple rating changes.

To investigate whether capital markets consider that credit ratings convey any information beyond what is publicly available, Pukthuanthong-Le, Elayan, & Rose (2007) use a comprehensive database of 34 countries, covering the major regions in the world over the period 1990-2000. The evidence shows that rating agencies do provide financial markets with new tradable information. Specifically, they affect not only the instrument being rated (bonds) but also stocks. They find evidence, only for bond market returns, that a positive impact is significant when the economic outlook is upgraded, and that outlook changes appear to be at least as important as rating changes. In addition, downgraded ratings and economic outlooks occur mainly during bond market downturns, raising a possibility that rating agencies may exacerbate a bond bear market. The study shows that only downgrades have a discernible impact on equity and bond returns, and the effects of rating announcement are significantly asymmetric.

Similarly, Hooper, Hume, & Kim (2008) examine the impact of sovereign rating changes on international financial markets using a comprehensive database of 42 countries, covering the major regions in the world over the period 1995-2003. In general, they find that rating agencies provide stock and foreign exchange markets with new tradable information. Specifically, rating upgrades (downgrades) significantly increased (decreased) US dollar-denominated stock market returns and decreased (increased) volatility. In addition, the results show significant asymmetric effects of rating announcements. The market responses - both return and volatility - are more pronounced in the cases of downgrades, foreign currency debt, emerging market debt, and during crisis periods.

At firm level, Creighton, Gower, & Richards (2007) find that bond and stock prices move in the 'expected' direction following both positive and negative rating announcements, although the movements are relatively small. Announcement effects are found to be larger for small firms, for downgrades from investment to speculative grade, and where agencies have not previously indicated the rating is under review. Overall, the results of this study suggest that agencies are not generally viewed as consistently having access to important information that is not already in the public domain.[e]

Whether changes in the ratings of sovereign debt in one country trigger contagious fluctuation in market returns in other countries is another question of strong academic interest. Ferreira, & Gama (2007) find that sovereign debt rating and credit outlook changes in one country have an asymmetric and economically significant effect on the stock market returns of other countries over the period 1989-2003. There is a negative reaction of 51 basis points (two-day return spread vis-à-vis the US) to a credit rating downgrade of one notch in a common information spillover around the world. Upgrades, however, have no significant impact on return spreads of countries abroad. Closeness (e.g., geographic proximity) and emerging market status amplify the effect of a spillover.[f]

In a similar study, Li, Jeon, Cho, & Chiang (2008) investigate the significance of changes in sovereign credit ratings for both domestic and cross-country stock market returns of five Asian countries during the period from January 1990 to March 2003. Using the changes in sovereign credit ratings announced by Standard & Poor's, they find that stock returns in the Asian countries are affected by sovereign rating changes in their own country and in other Asian countries. The credit rating agencies do not show strong evidence of pro-market-performance behavior during the 1997 Asian financial crisis. However, the contagion effect was found to exist in the sense that rating changes in one country affect stock market returns in other crisis-hit countries, which suggests that sovereign credit rating changes functioned as an additional channel of international financial contagion during the 1997 Asian financial crisis.

A number of recent papers focus on the effects of credit rating announcements on financial markets outside the US. For example, using data for stock prices of Japanese firms listed on the Tokyo Stock Exchange over the period from the mid-1980s to 2003, Li, Shin, & Moore (2006) investigate whether these stocks react more strongly to changes in credit ratings of global rating agencies than of local agencies. The study finds that global agencies are more influential than the two major local rating agencies (Japan Rating and Investment Information, and Japan Credit Rating Agency), for rating downgrades. The conclusion is that, for credit rating downgrades, global rating agencies are more influential than local ones, even in the local market. Consistent with previous research, they find that upgrades are benign events, and this holds true for global as well as local agencies.[g]

Poon, & Chan (2008) examines the certification effect of initial rating announcements and the signaling effect of rating downgrade announcements in China using a pooled time-series cross-sectional rating data of 170 companies, listed on the Shanghai and Shenzhen Stock Exchanges from January 2002 to July 2006. The empirical evidence supports the hypothesis of an asymmetric certification effect.[h] Consistent with the existing literature, they find some negative signaling effects in the rating downgrade sub-sample. Overall, although there are some qualitative arguments that credit ratings in China do not have information content, this empirical study suggest otherwise; when a normally positively biased rating agency gives a low rating, it is valuable news to market participants.

A recent study by Suba?i (2008) investigates the effects of sovereign credit rating and outlook changes on Turkish stock market returns, the TL/USD and TL/EUR exchange rates, and their volatility. He finds that sovereign rating downgrades have very little effect on stock returns while upgrades do not induce a significant market impact. Furthermore, the sovereign rating downgrades lead to lower stock volatility in post-event periods, while upgrades have mixed effects on it. When analyzing the sovereign credit rating impact on TL/USD and TL/EUR exchange rates, he finds that downgrades cause the exchange rates to depreciate and increase their volatility, while upgrades have mixed effects on both their levels and volatilities.

This paper contributes to the existing research literature examining whether changes in ratings of assets from one country trigger contagious fluctuations in other (neighboring) countries, as well as whether changes in ratings of one type of security affect other asset markets. These two possible spillover effects of credit ratings are important to analyze for several reasons (see Kaminsky, & Schmukler, 2002). First, cross-country contagion effects can be large, as spillover effects of the Russian default in 1998 on industrial and developing economies showed. Rating agencies may contribute to this co-movement in financial markets around the world. Second, news about one type of security can affect yields of other securities, through various channels. For example, stock markets can be adversely affected by the downgrading of sovereign bonds because governments may raise taxes on firms (reducing those firms' future stream of profits) to neutralize the adverse budget effect of higher interest rates on government bonds triggered by the downgrade. These cross-asset effects can be large, heightening financial instability.

To shed some light on these effects we examine the country-specific (or domestic) and cross-country (or foreign) spillover effects of rating changes. The current paper is unique in considering the impact of sovereign credit rating changes on bond and stock market returns using daily data for a set of transition economies. To investigate the size and duration of the market impact we use press releases of three leading rating agencies, Moody's, Standard & Poor's, and Fitch, over the period 1998-2007. The objective of our study is to evaluate the relevance of credit rating agencies for efficiency of financial markets in transition economies; in particular, whether changes in sovereign ratings convey valuable information only to local market participants, or they are able to trigger contagious fluctuations in other (neighboring) countries, thus attributing to their financial instability.

Institutional Features of Rating Agencies

Three major international agencies, Moody's, Standard & Poor's, and Fitch, rate debt. These agencies assign ratings to different types of borrowers and financial instruments. Over the past 80 years in which Moody's and Standard & Poor's have been rating bonds, these ratings have become quite important to the issuer of debt securities, the investment public, and the government agencies concerned with the regulation of institutional investors.

Like other ratings, sovereign ratings are assessment of the likelihood that a borrower will default on his obligation. The rating agencies interpret their ratings as forward-looking indications of the relative risk that the debt issuer will not have the ability and willingness to make full and timely payment of principle and interest over the life of particular rated instruments (Standard & Poor's, 1998). The two major rating agencies, Moody's and Standard & Poor's, which cover approximately 80 percent of all sovereign ratings, argue they do not regard their ratings as providing either a prediction of the timing of default or an indication of the absolute level of risk associated with a particular obligation. Moreover, the agencies declare that an issuer credit rating is not a recommendation to purchase, sell, or hold the financial obligation issued by a borrower, as it does not comment on market price or suitability for a particular investor.

In assessing the liquidity and solvency of sovereigns, rating agencies have focused on a number of factors. Standard & Poor's, for example, divides the factors that influence the determination of overall sovereign rating into eight broad categories: political risk, income and economic structure, economic growth prospects, fiscal flexibility, public debt burden, price stability, balance of payment flexibility, and external debt and liquidity (Kräussl, 2003). Each category relates to two key aspects of credit risk, i.e., economic and political risk. Economic risk addresses the government's ability to repay its obligations on time, and is ? function of both quantitative and qualitative factors, while political risk addresses the sovereign's willingness to repay the debt.[i]

For their ratings the agencies used an ordinary scale. Standard & Poor's scale, for example, ranges from AAA (the highest) through BBB, which is still investment-grade, and then all the way down to D, which reflects the potential default of an obligation. Similarly, Moody's scale ranges from Aaa through Baa down to C (see Table 1). Fitch ratings range from AAA through BBB to C. Ratings is also subject to refinements by adding pluses or minuses, or additional numbers. Sovereign credit ratings are often divided into two broad categories: investment-grade and speculative-grade. Investment-grade issues are usually considered to be acceptable investments to institutional investors.

In recent years, the two leading rating agencies, Standard & Poor's and Moody's, have supplemented their sovereign credit ratings with outlooks and watches respectively, designed to indicated the agencies' prospective on factors that might prompt a rating review over the next 6 to 24 months. Such reviews are denoted as positive, implying that the rating may be raised, stable, and negative, implying that the rating can be lowered. Although, an outlook is not necessarily a precursor of rating change, a large proportion of changes in outlooks are followed by a change in ratings.[j]

For example, between 1990 and 2000, 78 percent of changes in Standard & Poor's outlooks were followed by changes in ratings. Rating changes followed outlook changes 69 percent of the time at Moody's and 50 percent of the time at Fitch. The time interval between changes in outlook and changes in rating varies across agencies. Most of the changes in rating occurred within two months for Moody's and Fitch. For Standard & Poor's most of the upgrades took place five or more months after the change in outlook was announced.

Moody's, Standard & Poor's, and Fitch upgrade or downgrade a particular country or group of countries within a very short time period. For example, all three agencies downgraded the East Asian countries immediately following the start of the crisis in July 1997; all three simultaneously upgraded the same countries once the crisis faded. The number of upgrades and downgrades rose after the Mexican crisis. Downgrades increased considerably after the devaluation of the Thai baht, the Korean crisis, and the Russian default, with a peak of 25 downgrades in December 1997.[k] After November 1998, the sovereign rating of the countries in our sample was regularly upgraded, but a number of downgrades also occurred, especially in the case of Russia, Slovakia, and Romania (see Table 2).

Data Set and Methodology

This paper studies the impact of sovereign credit rating changes on bond and stock markets in transition economies. We use a sample of nine countries: Bulgaria, Latvia, the Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, and Slovenia. The observation period is from 1998, when emerging markets ratings started to gain momentum, to the end of 2007. The rating history has been obtained directly from the three leading rating agencies, which cover more than 80% of sovereign ratings. The data set includes 260 changes in credit ratings (197 upgrades and 63 downgrades) of the sovereign debt in the sample countries (see Table 2). All of these changes were changes in implemented sovereign ratings. Countries with currency collapses during the 1990s - such as Bulgaria, Romania, and Russia - had experienced most credit rating changes. For example, the credit rating of long-term foreign currency-denominated debt of Bulgaria was upgraded 19 times over the period 1998 - 2007 (see Table 3).

In line with previous research the bond market impact of sovereign rating changes is measured by movements in dollar bond yield spread (the differential between the yield of dollar-denominated sovereign bonds and the yield of comparable U.S. Treasury bonds.) Since they are not subject to currency risk, dollar bond spreads can be assumed to reflect primarily country risk premia on government bonds of the same maturity. In order to construct a reliable and comparable dataset on bond spreads, we calculate the yield spread as the difference between the most actively traded 10-year global dollar-denominated bond yields for each country in the sample and the benchmark (10-year U.S. Treasury bonds) yields.[1]

Similarly, the stock market impact is measured by movements in stock spreads (national stock market indices relative to the S&P Europe 350 index). The stock market price index for each country is measured in U.S. dollars to be able to compare returns across countries in the same unit of account. Returns in dollars are the ones relevant for international investors. Data on local stock market indices, S&P Europe 350 index (used as a benchmark), and credit rating changes are obtained from national stock exchange databases, S&P's Emerging markets database and the three leading rating agencies' web sites respectively.

The methodology used in previous research focused on the contemporaneous effect of rating changes on bond spreads and stock market returns. In this paper we study country-specific (or domestic) and cross-country (or foreign) spillover effects of rating changes. We hypothesize that changes in ratings of sovereign debt in one country trigger contagious fluctuation in market returns in other economies. To capture the dynamic effects around the time of changes in credit ratings, we use the technique of event studies. Event studies can provide evidence on whether rating agencies act procyclically, downgrading countries during bad times and upgrading them during good times. They can also help determine whether the actions of rating agencies have sustained or merely transitory effects on financial markets.

We follow the standard event study methodology by Brown, & Warner (1985). This methodology has been successfully applied to a wide variety of events, for example, mergers and acquisitions, and cross listing of shares in new markets. A common feature of those applications is the fact that the event being the focus of the study is rarely a "sudden" occurrence. Usually, news about a merger or a cross listing of shares is leaked, or even publicly announced prior to them taking place. In this paper we are interested in market return reaction when news of a sovereign rating change is made public. Of course, other events that affect bond and stock market spreads may take place at the same time. Following Kaminsky, & Schmukler (2002) we do not control for those factors and assume that on average there is no particular bias in the event studies. That is, we expect that other factors influence spreads both positively and negatively in a random way. If, however, rating changes are serially correlated, the event studies will be biased. To control for this effect, we work with "clean events," that is, upgrades and downgrades that do not overlap during the 20-day window. In this manner, we ensure that we are studying the effect of only one upgrade or downgrade in each event.

Event Study: Empirical Results

As explained in the previous section the event study examines the dynamic response of financial markets around the time of an important event. The event study methodology can also be used to test the hypothesis that rating agencies behave procyclically, upgrading countries in good times and downgrading them during crises. In this paper we examine the behavior of bond and stock markets around the time of rating changes (20-day window before and after changes). We look only at "clean" events, examining thus 76 domestic-country rating changes (64 upgrades and 12 downgrades) and 184 foreign-country rating changes (133 upgrades and 51 downgrades).[m] Standard event study methodology (see e.g., Hand, Holthausen, & Leftwich, 1992) requires the linking of rating events to abnormal returns, that is, the difference between model-generated returns and actual returns.

Event studies are by definition joint tests of hypotheses. To be able to measure the abnormal returns, one has to define what a normal return is, that is, making an assumption on return-generating process. More often than not, the market model is used to compute normal returns. The null hypothesis of event studies is that there should not be significant abnormal average returns if the event is uncorrelated with the stock return. We compute the abnormal returns (ARs) according to the following specification:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}), \tag{1}$$

where R_{it} is the return on local stock market index i on day t; R_{mt} is the return on the S&P Europe 350 index on day t; and αi, and βi are market-model parameters generated from a 100-day estimation period beginning 120 days through 21 days before the sovereign rating change. All returns are denominated in US dollars. We then compute the significance of the average abnormal return for each date in the estimation window using the test statistic. The statistic is computed as the ratio of the mean abnormal return to the estimated standard deviation from the time series of mean abnormal returns. Note that t-statistics reported in Tables 4 and 5 are only for the time windows around each event (in this case, day 0) in the sample. The test statistic for daily abnormal returns and bond yield spreads is reported in Appendices A and B.

Using data for 260 credit rating changes from nine transition economies we compute the mean change of yield spreads and cumulative abnormal returns (CARs) around the rating change announcement. Tables 4 and 5 present the results for various time windows: two pre-announcement periods: (-20, -11) and (-10, -1), the announcement period: (0, +1), and two post-announcement periods: (+2, +10) and (+11, +20), together with the respective t-statistics.[n] Using a more recent observation period implies that our country sample represents relatively more observations on financial markets in transition economies compared to other similar studies focusing on emerging markets.

In line with previous research we find no significant effect of credit rating announcements on stock market returns in case of rating upgrades. The cumulative abnormal returns (CARs) for domestic- and foreign-country upgrades are statistically insignificant for both pre- and

post-announcement periods, except for the announcement period [0; +1] in case of domestic-country rating changes (see Table 4). For the sample of country rating downgrades we observe significant negative impact on stock market returns: both pre-announcement and the announcement CARs are statistically significant at the usual level of significance. There seems to be evidence of news leaking to the market a few days before the actual announcement, which is consistent with anecdotal evidence that rating changes more often than not are 'telegraphed' to the market days in advance. This could explain the fact that daily abnormal returns within the pre-announcement period [-10; -1] are statistically significant, both for domestic-country upgrades and downgrades (see Appendix A1, Panel A and B). In case of foreign-country rating announcements, only downgrades lead to statistically significant stock price reaction. The 10-day CAR for rating downgrades is - 2.19 per cent (*t*-stat of - 3.011), while the 2-day CAR is - 0.72 per cent (*t*-stat of - 1.861). Similarly, a statistically significant effect is found for domestic-country downgrades (see Table 4). Figures 1 and 2 illustrate the stock price reaction to both domestic-country and foreign-country rating upgrades and downgrades. They support our hypothesis that stock prices move in the 'expected' direction following both positive and negative rating announcements.

The evidence also suggests that the announcement effect of rating upgrades on bond yield spreads is weak, being statistically significant only in the pre-announcement period [-10, -1], for both cases of domestic- and foreign-country rating changes (see Table 5). As expected, the effect is much stronger in the case of rating downgrades. The cumulative mean change in yield spread for the [-20; -11] period is 0.034 per cent (*t*-stat of 1.983), while for the [-10; -1] period is 0.029 per cent (*t*-stat of 2.159), in the case of domestic-country rating changes. A similar, statistically significant, effect is observed for foreign-country downgrades. In both cases of sovereign rating downgrades we find no evidence of significant effects in the post-announcement periods. This result is also supported by the fact that cumulative mean changes on a daily basis are statistically significant only for the pre-announcement periods (see Appendix B1 and B2). Figures 3 and 4 illustrate the bond yield reaction to both domestic-country and foreign-country rating upgrades and downgrades.

The observed patterns (see Figures 1 through 4) seem to support the hypothesis that rating agencies may have exacerbated the boom-bust pattern in emerging markets (that is, upgrades tend to occur when emerging markets are rallying and downgrades when emerging markets are collapsing). For example, in the case of domestic-country rating changes the bond yield spreads declined by as much as 0.75 percentage points in the 10 days before the upgrades, and stock market spreads increased by as much as 1.47 per cent. In the case of sovereign rating downgrades the effects are significant in the days leading up to rating downgrades, with the bond yield spreads increasing by as much as 2.46 percentage points and the stock market returns decreasing by only 0.49 per cent. In line with previous research the rating announcement effect on bond and stock market returns is found to be weak within the post-announcement periods. This result can be explained by the fact that most of the countries in the sample have already been put on a rating agency's watch list.

Similar results hold for changes in foreign-country ratings. They support our hypothesis that upgrades of other countries' sovereign debt may trigger important declines in bond yield spreads and significant increases in stock market prices. As expected, foreign-country downgrades are followed by increases in the bond yield spreads and declines in the local stock market return relative to the benchmark return. The evidence also shows that changes in bond and stock market returns in this case are smaller; domestic-country rating announcements have larger effects on financial markets in transition economies than foreign-country rating changes. Relative to domestic-country changes, only foreign-country downgrades seem to have stronger effects on bond yield spreads, as if market participants had anticipated these negative changes to a larger extent than similar changes in domestic-country ratings. Overall, the event study results suggest important spillover effects of changes in sovereign ratings, with financial markets in transition economies jointly rallying or collapsing following rating changes.

In line with Kaminsky, & Schmukler (2002) our results could also be interpreted as indicating that rating agencies are behaving procyclically. Rating agencies decide to upgrade (downgrade) a country when the prices of its financial instruments go up (down). Alternatively, the behavior of prices in the days preceding rating and outlook changes could reflect an anticipation effect. Market participants anticipate, to some extent, the behavior of rating and outlook changes, so markets discount those events. Our findings also support Ferreira, & Gama (2007) who find that sovereign debt rating and credit outlook changes of one country have an asymmetric and economically significant effect on the stock market returns of other countries. Closeness (e.g., geographic proximity) and emerging market status amplify the effect of a spillover. We find similar effects for transition economies.

Conclusions

Most of the research on the effects of credit rating changes on financial markets has focused on quantifying the effects of these changes on sovereign risk, as measured by the bond yield spread and stock market return relative to an appropriate benchmark in industrial countries. We extend the previous research findings through testing the hypothesis about the effects of changes in sovereign debt ratings on financial markets in transition economies. In our study we used event study methodology to test the impact of sovereign rating changes on bond and stock market returns for a combination of ratings by three leading agencies: Moody's, Standard & Poor's and Fitch. The data set we assembled enabled us to test the spillover effects across countries, and to provide a more complete description of the relation between credit ratings and emerging market behavior.

We draw a number of conclusions about the effect of credit rating changes on financial markets in transition economies. First, changes in ratings significantly affect bond and stock markets in these economies, with bond yield spreads increasing and stock market returns declining significantly in response to a domestic-country downgrade. As in previous empirical studies we find no evidence that the effect of domestic-country upgrades on bond and stock spreads is statistically significant. Second, rating changes contribute to contagion or spillover effects, with rating changes of sovereign bonds in one emerging market triggering changes in bond yield spreads and stock market returns in other emerging markets (cross-country contagion effect). We find that the spillover effects of rating changes (downgrades in this case) seem to be stronger at the regional level.

Third, our results seem to support the hypothesis that rating agencies may have exacerbated the boom-bust patter in emerging market economies. Domestic-country rating upgrades do take place following market rallies, whereas downgrades occur after market downturns. This evidence is consistent with the general notion that rating agencies may be contributing to the instability of financial markets in developing countries. Rating agencies provide bad news in bad times and good news in good times, reinforcing investors' expectations. Rigobon (1997), among others, notes that this type of news is not very informative to investors, so markets do not react very strongly (and quickly) to it. Fourth, we find

evidence that the rating agencies' opinions independently affect market spreads. Event study analysis broadly confirms this qualitative conclusion: it shows that announcement of changes in agencies' sovereign ratings are followed by bond and stock spread movements in the expected direction that are statistically significant.

Our results are relevant for domestic and foreign investors, firms operating in transition economies and respective regulators. For example, local regulators can better assess the risk faced by the firms they are supposed to regulate. Further, a better understanding of how the cross-country contagion effects impact local firms and investors can help them engage in a more efficient way to lower their cost of capital - both locally and abroad. To do so, an analysis of the cross section variation of the abnormal returns of individual firms associated with sovereign debt rating changes will be needed.

Several potential extensions to this research would improve the understanding of the effects of sovereign ratings on emerging market economies. It would be interesting to study whether different rating agencies affect financial markets differently. To achieve this, we may need to collect more data to run tests that are statistically meaningful for each rating agency. Another important issue to focus on could be the macroeconomic factors that play an important role in determining a country rating. We may also investigate the effect of sovereign rating changes on individual firm stock prices to find out whether local firms of different sizes experience the same or different stock price reaction. Regarding the procyclicality of rating upgrades and downgrades, it would be interesting to understand how rating agencies behave beyond the 20-day window analyzed here. This would be a step further in our research.

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Appendix A1: Stock market reaction to credit rating announcements

Panel A. Domestic-country upgrades   **Panel B.** Domestic-country downgrades

Event day	Abnormal return	Cumulative abnormal return	*t*-statistics	Event day	Abnormal return	Cumulative abnormal return	*t*-statistics
-10	-1,02310	-1,39694	**-3,13273**	-10	-0,43521	1,89790	-0,56322
-9	-0,31673	-1,71368	-0,59327	-9	-0,46955	1,42835	-0,88262
-8	0,33704	-1,37664	**2,36468**	-8	0,18830	1,61664	0,23570
-7	0,15117	-1,22547	0,68944	-7	-0,70462	0,91202	-0,67430
-6	-0,18776	-1,41323	-0,73787	-6	0,53861	1,45063	1,12079
-5	0,62324	-0,79000	**2,68963**	-5	-0,90407	0,54656	**-1,72275**
-4	0,38848	-0,40152	**1,84289**	-4	-0,03153	0,51503	-0,06589
-3	0,38488	-0,01664	**1,70015**	-3	-1,09988	-0,58484	**-1,75751**
-2	-0,80445	-0,82109	**-3,23123**	-2	-0,22644	-0,81129	-0,23899
-1	0,44717	-0,37392	**1,89297**	-1	0,15903	-0,65226	-0,23218
0	0,60344	0,22953	**2,20225**	0	-0,64895	-1,30121	-1,05797
1	0,42923	0,65876	**1,74692**	1	-0,19569	-1,49690	-0,25349
2	0,00733	0,66609	0,02714	2	-0,14551	-1,64241	-0,33422
3	-0,28455	0,38154	-0,56897	3	-0,76071	-2,40312	-0,85698
4	0,12358	0,50513	0,51125	4	-1,24442	-3,64754	-0,91684
5	0,58375	1,08887	**2,01684**	5	0,41003	-3,23751	0,73868
6	0,56460	1,65347	1,27010	6	-0,28222	-3,51973	-0,31066
7	-0,61117	1,04230	-1,05701	7	-0,34944	-3,86917	-0,27966
8	-0,15807	0,88423	-0,56428	8	0,25129	-3,61788	0,57053
9	-0,10992	0,77432	-0,37647	9	-0,14384	-3,76173	-0,22259
10	0,56027	1,33458	1,64191	10	-1,17269	-4,93442	-1,66471

Total number of events: 64   Total number of events: 12

Appendix A2: Stock market reaction to credit rating announcements

Panel A. Foreign-country upgrades   **Panel B.** Foreign-country downgrades

Event day	Abnormal return	Cumulative abnormal return	*t*-statistics	Event day	Abnormal return	Cumulative abnormal return	*t*-statistics
-10	-0,03834	-0,03957	-0,16047	-10	0,12661	0,28327	0,41813
-9	0,07781	0,03824	0,22712	-9	-0,09273	0,19054	-0,36465
-8	0,16578	0,20402	0,87229	-8	-0,03821	0,15232	-0,11734
-7	-0,00080	0,20323	-0,00299	-7	-0,21235	-0,06003	-0,92092
-6	0,04870	0,25192	0,24020	-6	-0,27977	-0,33979	-1,06149
-5	0,09080	0,34273	0,48308	-5	-0,14514	-0,48493	-0,47659
-4	-0,18216	0,16057	-0,88631	-4	-0,33529	-0,82023	-1,59441
-3	-0,00388	0,15669	-0,01710	-3	-0,29317	-1,11340	-0,96250
-2	-0,19342	-0,03673	-0,69811	-2	-0,75612	-1,86952	**-2,96130**
-1	0,05631	0,01958	0,30243	-1	-0,16766	-2,03718	-0,85660
0	0,01337	0,03294	0,08906	0	-0,58706	-2,62424	**-3,21031**
1	0,03460	0,06754	0,27363	1	-0,13443	-2,75867	-0,42779
2	0,02971	0,09724	0,22725	2	-0,07745	-2,83612	-0,27278
3	0,03159	0,12883	0,28654	3	-0,54066	-3,37678	-1,53596
4	0,23147	0,36030	1,46374	4	-0,15208	-3,52886	-0,47476
5	0,00759	0,36789	0,02748	5	0,03026	-3,49860	0,12663
6	0,18961	0,55750	0,83369	6	0,29114	-3,20747	1,04756
7	0,02947	0,58697	0,19349	7	-0,62919	-3,83666	**-1,94418**
8	0,05779	0,64476	0,47054	8	0,21615	-3,62050	0,99593
9	0,05507	0,69983	0,09309	9	-0,45055	-4,07105	**-1,80942**
10	-0,04899	0,65085	-0,23758	10	0,40762	-3,66343	1,58623

Total number of events: 133   Total number of events: 51

Appendix B1: Bond market reaction to credit rating announcements

Panel A. Domestic-country upgrades   **Panel B.** Domestic-country downgrades

Event day	Mean yield change	Cumulative mean change	*t*-statistics	Event day	Mean yield change	Cumulative mean change	*t*-statistics
-10	0,01084	-0,03545	0,36592	-10	0,00628	0,04050	0,25338
-9	-0,01380	-0,04924	**-1,74398**	-9	0,00903	0,04953	0,26195
-8	-0,00877	-0,05801	-1,38648	-8	0,00846	0,05799	**3,44260**
-7	-0,00572	-0,06374	-0,90437	-7	-0,00336	0,05464	-0,43834
-6	-0,00062	-0,06436	-0,06774	-6	-0,01458	0,04005	**-2,12159**
-5	-0,00031	-0,06467	-0,04083	-5	0,00715	0,04720	0,86704
-4	-0,00627	-0,07094	-0,90347	-4	-0,00367	0,04354	-0,19918
-3	-0,02139	-0,09233	**-1,80992**	-3	-0,00482	0,03872	-0,96578
-2	0,01446	-0,07786	1,38435	-2	0,01133	0,05005	**1,87063**
-1	0,00339	-0,07448	0,37119	-1	0,01283	0,06288	1,15520
0	-0,02830	-0,10278	**-2,04613**	0	0,00753	0,07042	0,19731
1	-0,00044	-0,10322	-0,04359	1	0,02412	0,09453	0,36352
2	-0,00804	-0,11127	-0,27180	2	-0,00215	0,09239	0,12545
3	-0,00273	-0,11400	-0,32943	3	0,00283	0,09521	0,21883
4	-0,02106	-0,13505	**-1,99065**	4	-0,01117	0,08405	1,05626
5	0,00936	-0,12569	0,76598	5	0,02943	0,11348	1,48349
6	0,00315	-0,12254	0,23044	6	0,00742	0,12090	0,61042
7	-0,00742	-0,12996	-0,79129	7	0,00800	0,12890	**1,90120**
8	-0,01518	-0,14513	-1,53332	8	0,00315	0,13205	0,13809
9	0,01587	-0,12927	0,98719	9	0,01139	0,14344	1,64785
10	0,02005	-0,10922	1,12183	10	-0,01433	0,12910	-0,79166

Total number of events: 64   Total number of events: 12

Appendix B2: Bond market reaction to credit rating announcements

Panel A. Foreign-country upgrades   **Panel B.** Foreign-country downgrades

Event day	Mean yield change	Cumulative mean change	*t*-statistics	Event day	Mean yield change	Cumulative mean change	*t*-statistics
-10	0,01215	-0,01929	0,27436	-10	-0,08776	0,25502	-0,55065
-9	0,00091	-0,01838	0,13569	-9	0,06396	0,31898	1,37754
-8	0,00300	-0,01538	0,44762	-8	0,01986	0,33884	0,43584
-7	-0,00582	-0,02120	-0,52014	-7	0,05642	0,39526	**1,71633**
-6	0,00181	-0,01939	0,15478	-6	0,04919	0,44445	1,11995
-5	-0,00083	-0,02022	-0,06933	-5	-0,04107	0,40338	-1,37651
-4	-0,00584	-0,02606	-0,26665	-4	0,07464	0,47802	1,55484
-3	-0,00112	-0,02718	-0,09993	-3	0,06422	0,54224	**1,81032**
-2	-0,00510	-0,03228	-0,40532	-2	0,01948	0,56172	0,43828
-1	-0,01994	-0,05222	-0,74279	-1	0,01908	0,58080	0,44880
0	0,00344	-0,04878	0,32205	0	0,09797	0,67877	1,51278
1	-0,00975	-0,05853	-0,66468	1	-0,00623	0,67254	0,09163
2	-0,00087	-0,05940	-0,08772	2	0,03656	0,70910	0,77208
3	-0,00233	-0,06173	-0,18675	3	0,06677	0,77587	1,14433
4	0,00800	-0,05373	0,79768	4	-0,03955	0,73633	-0,47261
5	-0,00372	-0,05745	-0,41460	5	0,01746	0,75379	0,30468
6	-0,02674	-0,08419	-1,58613	6	-0,01893	0,73486	0,35094
7	-0,00160	-0,08579	-0,21665	7	-0,09693	0,63793	**1,73029**
8	-0,01279	-0,09857	-1,47490	8	-0,00158	0,63634	-0,04044
9	0,00505	-0,09352	0,55775	9	-0,00471	0,63163	-0,08113
10	0,00707	-0,08645	0,80721	10	-0,00832	0,62331	-0,09535

Total number of events: 133   Total number of events: 51

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Table 1: Rating scale of the three leading rating agencies: Moody's, Standard and Poor's and Fitch IBCA

Moody's			Standard and Poor's			Fitch IBCA		
Rating	Number	Outlook	Rating	Number	Outlook	Rating	Number	Outlook
Aaa	8	Positive	AAA	8	Positive	AAA	8	Positive
Aa1	7,33	Negative	AA+	7,33	Negative	AA+	7,33	Negative
Aa2	7	Stable	AA	7	Stable	AA	7	Stable
Aa3	6,66		AA-	6,66		AA-	6,66	
A1	6,33		A+	6,33		A+	6,33	
A2	6		A	6		A	6	
A3	5,66		A-	5,66		A-	5,66	
Baa1	5,33		BBB+	5,33		BBB+	5,33	
Baa2	5		BBB	5		BBB	5	
Baa3	4,66		BBB-	4,66		BBB-	4,66	
Ba`1	4,33		BB+	4,33		BB+	4,33	
Ba2	4		BB	4		BB	4	
Ba3	3,66		BB-	3,66		BB-	3,66	
B1	3,33		B+	3,33		B+	3,33	
B2	3		B	3		B	3	
B3	2,66		B-	2,66		B-	2,66	
Caa1	2,33		CCC+	2,33		CCC+	2,33	
Caa2	2		CCC	2		CCC	2	
Caa3	1,66		CCC-	1,66		CCC-	1,66	
Ca	1,33		CC	1,33		CC	1,33	
C	1		D	1		C	1	

Source: Rating Agencies' websites.

Table 2: Number of clear events by countries and agencies: upgrades and downgrades, 1998-2007

Countries	Moody's		Standard & Poor's		Fitch		Total events	
	Upgrade	Downgrade	Upgrade	Downgrade	Upgrade	Downgrade	Upgrade	Downgrade
Bulgaria	8		7		8		23	0
Czech Republic	4	1	5	2	4	1	13	4
Hungary	8	1	6	2	7	2	21	5
Latvia	3		4		6	1	13	1
Poland	5	1	8	3	7	1	20	5
Romania	7	3	9	4	9	5	25	12
Russia	13	7	14	9	12	8	39	24
Slovakia	8	4	9	3	9	3	26	10
Slovenia	5		6	1	6	1	17	2
Sub-total	61	17	68	24	68	22		
Total							197	63

Source: Author calculations.

Table 3: Number of sovereign credit rating changes over the period 1998-2007: The case of Bulgaria

Number of Credit Rating Changes						
	Foreign Currency-Denominated			Domestic Currency		
	Period		Changes	Period		Changes
	from	to		from	to	
Standard and Poor's	11.23.98	11.26.07	7	11.23.98	11.26.07	6
Moody's	02.20.98	02.23.07	4	02.20.98	02.23.07	3
Japan Credit Rating Agency	10.04.02	06.27.07	3	10.04.02	06.27.07	2
Fitch IBCA	04.17.98	06.26.07	5	04.17.98	06.26.07	4
Total			19			15

Note: All of the changes represent upgrades of the Bulgaria's sovereign credit rating.

Table 4: Stock price response to sovereign debt upgrades and downgrades: domestic and foreign

Cumulative abnormal returns (CARs) and the t-statistics (in parenthesis) are shown for various announcement windows. Day 0 is the date of a rating change (upgrade or downgrade) announced by Moody's, Standard & Poor's, and Fitch. The event study methodology uses "clear events", that is, upgrades and downgrades that do not overlap during the 20-day window. The sample includes 260 changes in credit ratings, 197 upgrades and 63 downgrades, from nine transition economies. The rating changes are those reported by Moody's, Standard & Poor's and Fitch, for the period 1998-2007. Stock market price indices for each country are measured in U.S. dollars to be able to compare returns across countries in the same unit of account. The event study reports both country-specific (domestic) and cross-country (foreign) effects of rating changes.

	Domestic-country rating changes		Foreign-country rating changes	
	Upgrades	Downgrades	Upgrades	Downgrades
	CARs, %	CARs, %	CARs, %	CARs, %
Announcement windows	(*t*-stat.)	(*t*-stat.)	(*t*-stat.)	(*t*-stat.)
-20 to -11	-0.374	-2.333	-0.001	-0.157
	(-0.480)	(-2.189)**	(-0.002)	(-0.257)
-10 to -1	0.001	-2.985	0.021	-2.194
	(0.001)	(-0.911)	(0.026)	(-3.011)***
0 to +1	1.033	-0.845	0.048	-0.721
	(2.517)**	(-1.785)*	(0.214)	(-1.861)*
+2 to +10	0.676	-3.438	0.583	-0.905
	(0.873)	(-1.159)	(1.283)	(-1.510)
+11 to +20	0.043	-4.673	1.298	-2.266
	(0.095)	(-0.885)	(1.634)	(-0.764)

Note: Significance at the 1, 5 and 10 per cent level is denoted by, and, based on two-tailed tests. Significance levels for spread changes are determined with reference to the standard deviation of changes in the estimation window.

Table 5: Bond yield spread response to sovereign debt upgrades and downgrades: domestic and foreign

Mean change of bond yield spreads and the t-statistics (in parenthesis) are shown for various announcement windows. Day 0 is the date of a rating change (upgrade or downgrade) announced by Moody's, Standard & Poor's, and Fitch. The event study methodology uses "clear events", that is, upgrades and downgrades that do not overlap during the 20-day windows. The sample includes 260 changes in credit ratings, 197 upgrades and 63 downgrades, from nine transition economies. The rating changes are those reported by Moody's, Standard & Poor's and Fitch, for the period 1998-2007. For all countries in the sample the yield spread is calculated as the difference between the 10-year global dollar-denominated bonds yield in these countries and the benchmark yield (the yield of 10-year U.S. Treasury bonds). The event study reports both country-specific (domestic) and cross-country (foreign) effects of rating changes.

	Domestic-country rating changes		Foreign-country rating changes	
	Upgrades	Downgrades	Upgrades	Downgrades
	Mean, %	Mean, %	Mean, %	Mean, %
Announcement windows	(*t*-stat.)	(*t*-stat.)	(*t*-stat.)	(*t*-stat.)
-20 to -11	-0.046	0.034	-0.031	0.043
	(-1.590)	(1.983)*	(-0.894)	(2.215)**
-10 to -1	-0.028	0.029	-0.021	0.038
	(-4.076)***	(2.159)**	(-2.102)**	(4.350)***
0 to +1	-0.029	0.032	-0.006	0.092
	(-1.605)	(0.705)	(-0.293)	(1.056)
+2 to +10	-0.006	0.035	-0.028	-0.049
	(-0.111)	(0.835)	(-0.924)	(-0.329)
+11 to +20	-0.035	-0.011	0.014	0.034
	(-1.758)*	(-0.549)	(0.985)	(0.460)

Note: Significance at the 1, 5 and 10 per cent level is denoted by, and, based on two-tailed tests. Significance levels for spread changes are determined with reference to the standard deviation of changes in the estimation window.

Figure 1: Event studies of stock market return: Domestic-country upgrades (Panel A) and downgrades (Panel B)
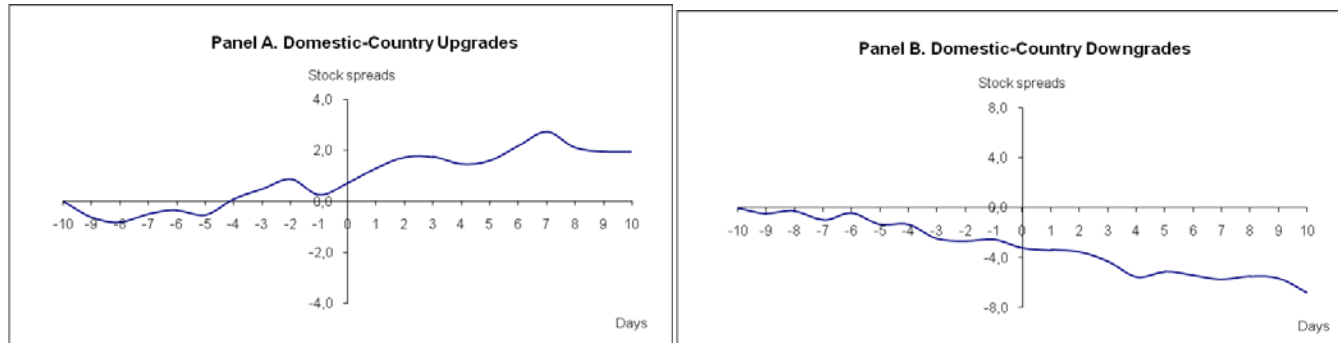
Figure 2: Event studies of stock market return: Foreign-country upgrades (Panel A) and downgrades (Panel B)
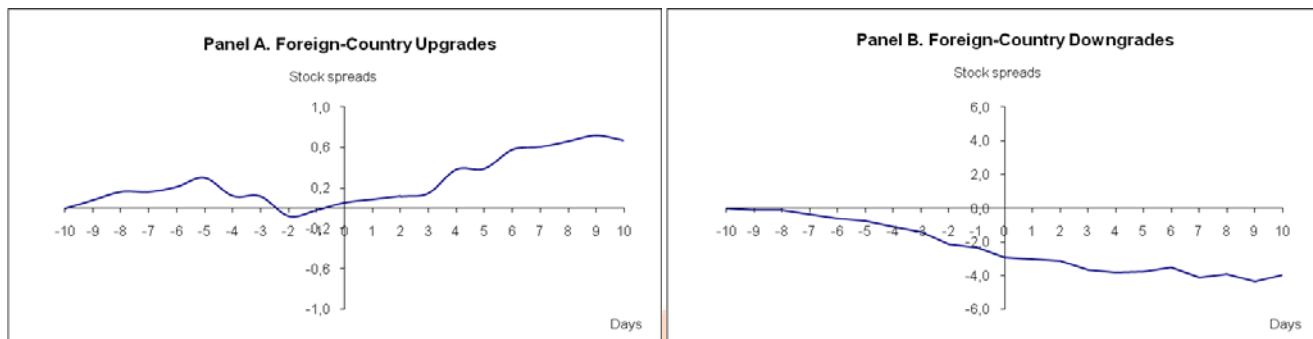
Source: Author's calculations.
Note: Figures display stock market spreads normalized to 0 on day -10

Figure 3: Event studies of bond yield spread: Domestic upgrades (Panel A) and downgrades (Panel B)
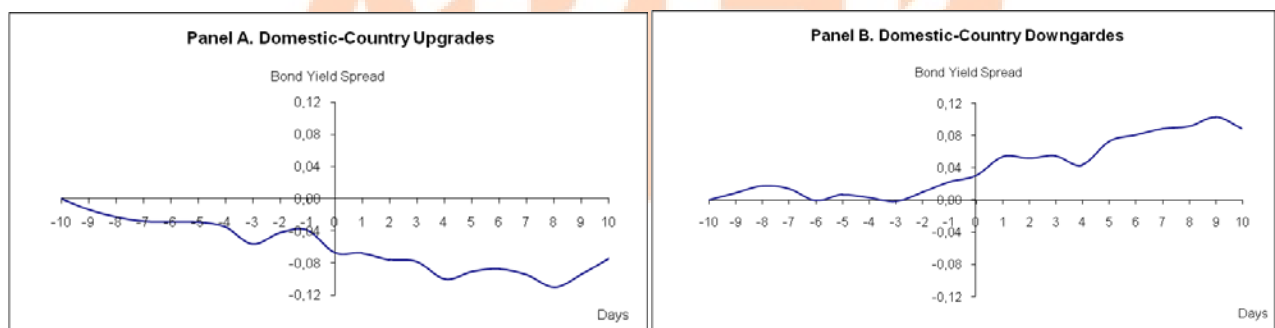
Figure 4: Event studies of bond yield spread: Foreign upgrades (Panel A) and downgrades (Panel B)
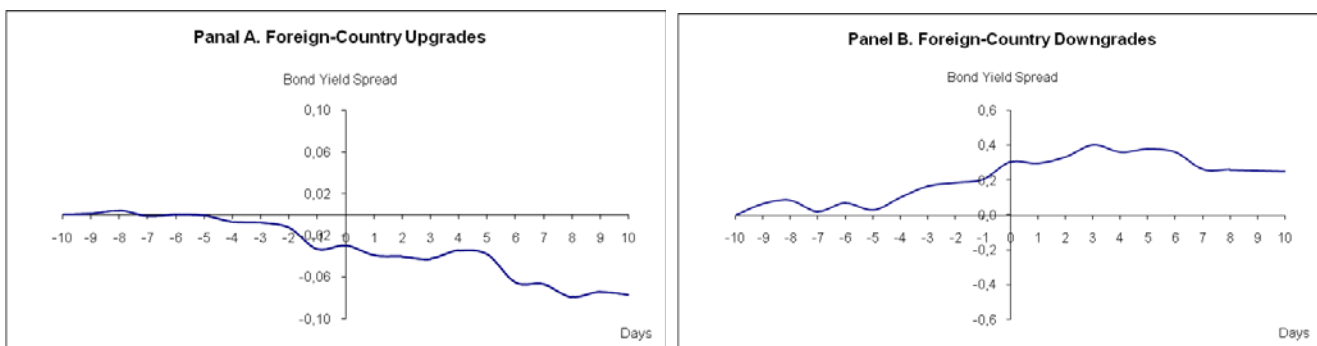
Source: Author's calculations.
Note: Figures display bond market spreads normalized to 0 on day -10

[a]The argument is based on the Merton model for firm value. In this case equity holders hold an option of the value of the firm with an exercise price equal to the par value of the firm's debt; therefore an increase in the variance of the firm's cash flows would trigger a downgrade and would redistribute wealth from bondholders to stockholders.

[b]Other studies have focused on ratings of banks and nonfinancial firms. Using bank-level data from emerging markets, Richards, & Deddouche (2003) finds a strong effect of bank ratings on bank stock prices.

[c]Rating changes may also reveal new (private) information about a country, fueling rallies or downturns. This effect is likely to be stronger in emerging markets, where problems of asymmetric information and transparency are more severe. Changes in sovereign ratings may also act as a wake-up call, with upgrades or downgrades in one country affecting other, similar economies.

[d]Sy (2002) uses a panel data estimation of a simple univariate model of sovereign spreads in emerging markets to analyze statistically significant differences between actual spreads and ratings-based spreads. When such deviations are significant, the finding is that 'excessively high' spreads are on average followed by episodes of spread tightening one month later rather than credit downgrades. In contrast, observations with 'excessively low' spreads are on average followed by rating upgrades three months later rather than episodes of spread widening. The study also illustrates how significant disagreements between market and rating agencies' views can be used as a signal that further technical and sovereign analysis is warranted.

[e]Chan, Edwards, & Walter (2009) classify credit rating agencies into two groups: subscribing and non-subscribing. They find that the information content of non-subscribing credit agencies is very low, whereas positive excess returns exist up to eight months after the announcement of credit upgrades from the subscription-only agencies. These results support the hypothesis proposed in Grossman, & Stiglitz (1980) that investors who spend resources on information acquisition should receive compensation for their information advantage, or there would be no incentive for such activity.

[f]They also find evidence that downgrade spillover effects at the industry level are more pronounced in traded goods and small industries.

[g]Behr, & Güttler (2008) investigate whether the stock market reacts to unsolicited ratings for a sample of 238 Japanese firms rated by S&P's between January 1996 and December 2005. They find evidence that the stock market reaction to the assignment of an initial unsolicited rating is negative and particularly accentuated for small Japanese firms. The results imply that unsolicited ratings convey new information to the stock market and that investors react to this information. Although unsolicited ratings are based on publicly available information only, the stock market seems to be inefficient in processing this information for Japanese companies included in the sample.

[h]The event study analysis they used shows that the mean cumulative abnormal returns (CARs) over all event windows for speculative-grade initial rating announcements are negative and statistically significant. In contrast, the initial investment-grade credit ratings in both Shanghai and Shenzhen Stock Exchanges do not exhibit significant mean CARs.

[i]Despite the fact that all major credit rating agencies list the relevant economic and political factors that underline their sovereign ratings, they supply no information about the weights they assign to each factor and the role of non-quantifiable criteria such as political stability and policy consensus. The rating agencies emphasize that they do not use a specific formula to combine their evaluations of the political and economic factors to derive the overall rating.

[j]When Moody's puts a country on a watchlist, Standard & Poor's assigns a country with a positive or negative outlook and Fitch announces a positive or negative ratingwatch for a country. This paper reports only the implemented rating assignments, although the effect of outlook/watchlist changes is somewhat incorporated in the observed stock and bond market responses.

[k]The rating changes on Asian emerging markets observed during the period between July 1997 and November 1998 were, collectively, the largest and most abrupt downgrades in the modern history of sovereign credit rating. Across all agencies, the so-called rating crisis, which denotes a downgrade of three rating notches or more in long-term foreign currency debt, had been observed (Kräussl, 2003).

[l]A similar study by Kaminsky, & Schmukler (2002) uses bond yield spreads obtained from JP Morgan's Emerging Markets Bond Index (EMBI). The securities included in the EMBI index are Brady bonds, which are traded internationally in highly liquid markets. The EMBI spreads are commonly used as measures of country premia, country risk, or default risk. When the probability of a sovereign default increases, bond prices decrease and yield spreads increase.

[m]If there are simultaneous changes in the sovereign ratings of more than one country for a specific event (upgrade or downgrade) this event (respectively, observation) is excluded from the dataset. If there is more than one event (upgrade or downgrade) within the 20-day window for a specific country all events except the first one (first rating change) are excluded from the data to avoid contagious effect.

[n]Other relevant information (e.g., z-statistics, the number of positive-negative spreads) is also available upon request.