LONG-RUN PERFORMANCE OF SOVEREIGN RATING CHANGES

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ABSTRACT

This paper examines the impact of Sovereign rating changes on the aggregate stock and bond market returns both in emerging and developed countries. Rating downgrades in emerging markets are associated with significant negative wealth effects both in the stock and bond markets. Moreover, the effects of rating downgrades persist up to six-months after the event. In contrast, upgrades in emerging markets convey no information. Rating changes in developed markets have no significant impact on either stock and bond market returns. Rating agencies act pro-cyclically, downgrading countries in bad times and, consequently, contributing to the instability in emerging markets.

JEL Classification: F30; G14; G15
Keywords: Sovereign ratings; Stock markets; Bond markets; Event study

1. INTRODUCTION

This paper studies the long-run performance of Sovereign rating changes on the aggregate stock and bond market in both emerging and developed countries. We analyse separately the market response to upgrades and downgrades in each market and country.

The current study is motivated by the fact that, investors, in particularly fund managers, are increasingly focused on international diversification due to financial market integration. Thus, it is important to understand country risk and to be able to reliably assess the risk of investing in different national markets. The formation of international portfolios requires a range of fundamental inputs for asset allocation decision and for active investment strategies. Furthermore, there are major information events that may affect the top-down choice of the basic allocation of funds to different regions and national markets. The change of Sovereign ratings is one such key event that may trigger substantial recompositions of international portfolios.

Rating agencies have also been pointed out as promoters of financial instability. Their pro-cyclical behavior, upgrading countries in good times and downgrading them in bad times, may have contributed to magnifying the boom-bust pattern in stock markets. Even if rating agencies do not behave pro-cyclically, their announcements may still trigger market movements. This is because many institutional investors can only hold investment grade instruments (i.e. securities with ratings above a certain threshold).

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Thus, changes in ratings, downgrading (upgrading) Sovereign debt below (above) investment grade, may have a drastic impact on prices because these rating changes can potentially affect the pool of investors. Rating changes may also unveil new (private) information about a country and consequently they may fuel rallies or downturns. This effect is likely to be stronger in emerging markets where problems of asymmetric information and transparency are more severe.

Studies of Sovereign rating changes have mostly focused on the effects of ratings on the instruments being rated or on the instruments of the institutions being rated. This is the case of Cantor and Packer (1996), who examine the effects of Sovereign ratings on emerging market bond yield spreads. They conduct an event study using a short-run window (up to 20 days after the event) and find evidence that rating agencies' opinions affect market spreads. A statistically significant government bond yield change in the expected direction follows the announcement of changes in the agencies' Sovereign risk opinions. They also find that the impact of rating announcements on spreads is much stronger for below-investment-grade than for investment-grade Sovereigns. Furthermore, rating announcements that are more fully anticipated have a larger impact than those that are less anticipated.

Sy (2001) studies the relationship between emerging markets Sovereign spreads and ratings on their long-term foreign currency denominate debt ratings. Using panel data he finds that there is a negative association between Sovereign spreads and ratings, which has been strengthened over the years. There is an increasing dispersion of spreads for similar rated countries during crisis. This indicates that there is increasing discrimination between countries during episodes of market turbulence which is not based on credit ratings but on other factors which investors rely on to differentiate between countries.

There is recent literature that examines whether changes in bond ratings affect asset markets other than bonds. There may be various channels of spillover that allow news on one particular market to affect yields of other securities. For example, in the case of the downgrade of Sovereign bonds, stock markets can be adversely affected because governments may raise taxes on firms (and hurt firms' future stream of profits) to neutralize the adverse budget effect of higher interest rates on government bonds triggered by the downgrade.

Dichev and Piotroski (2001) analyze the impact of bond rating changes on individual stocks. They find evidence of significant negative abnormal stock returns following downgrades, especially at subsequent earnings announcements. This suggests that the market does not fully anticipate the predictable future changes in earnings. Stock prices appear to under-react to the ratings change announcement, and continue to drift in the direction of the announcement return for up to one year after the announcement.

Brooks, Faff, Hillier and Hillier (2002) investigate the impact of Sovereign rating changes on the returns of the associated national stock market. This study tries to assess whether and to what extent the key results documented for corporate bond rating changes on individual

stocks, also apply at the aggregate country level. They employ an event study methodology to detect the abnormal returns resulting from an upgrade or downgrade announcement, both on foreign and local currency ratings. There is little evidence of abnormal stock returns behavior following rating upgrades over a short-run event window (up to ten days after the event), while for rating downgrades (only for foreign currency downgrades but not for local currency downgrades) the impact is significantly negative. They also conclude that, irrespective of whether returns are denominated in domestic currencies or US dollars, the wealth impact of a Sovereign rating downgrade holds. Moreover, emerging markets do not appear to be particularly more sensitive to Sovereign rating change than developed countries.

Changes in ratings of assets from one country can trigger contagious movements in other countries. These cross-country contagion effects can be large, as was the case of the spillover effects of the Russian default on developed and developing countries. Rating agencies may contribute to these co-movements in financial markets around the world.

Cross-country and also cross-security spillover effects of rating changes are examined by Kaminsky and Schmukler (2002). Their study contributes to the literature on contagion and international transmission of shocks by examining the effect of domestic vulnerability, as measured by the ratings of credit agencies, on the extent of international spillovers. They conduct an event study to analyze the evolution of a country's bond market spread (i.e. Sovereign bond yield spread relative to the U.S. Treasuries) and stock market spread (domestic stock return relative to the U.S. stock market return) in a short-run window (10 days) around an upgrade or downgrade of an actual rating or outlook.

They find that both rating and outlook changes significantly affect bond and stock markets, with yield spreads increasing and stock returns declining in response to a downgrade. Rating changes also contribute to contagion or spillover effects, with rating changes of bonds of one emerging market triggering changes in both yield spreads and stock returns of other emerging economies. Lastly, their results suggest that rating agencies act pro-cyclically, downgrading countries in bad times and upgrading them in good times. In this sense, rating agencies might add instability to financial markets in emerging economies.

Kräussl (2003) also examines cross-security and cross-country contagious rating effects. His empirical study focuses on the following transmission mechanism of financial contagion in emerging market crises, i.e. a financial crisis in one country can worsen market participants' perception of the economic conditions and prospects in other countries with similar characteristics, and as a consequence set off a widespread fall in international investors' sentiment. Therefore, country-specific events such as a negative Sovereign credit rating announcement may be perceived as a "wake-up call" leading to a general reevaluation of investment conditions and prospects in the whole region, thereby inducing institutional investors to rebalance their portfolios. He analyzes the specific impact of Sovereign rating changes during the financial turmoil in emerging markets in the latter half of the 1990s and finds that Sovereign rating changes in a ground-zero country have a (statistically) significant impact on the financial

markets of other emerging market economies although the spillover effects tend to be regional.

Gande and Parsley (2002) examine the nature of cross-border financial market linkages. They focus on the transmission of news concerning Sovereign credit ratings, to Sovereign bonds issued by other countries. In particular, they concentrate on the spillover of a change in the Sovereign debt rating or the credit outlook of one country, to interest rate spreads on Sovereign debt for other countries. They find evidence of asymmetric spillover effects, i.e., positive ratings events abroad have no discernable impact on Sovereign spreads, whereas negative ratings events abroad are associated with an increase in spreads.

This paper contributes to the literature on Sovereign ratings by examining both the short and long-run effects of rating changes on own country aggregate stock and bond markets. We measure the aggregate stock and bond market impact of Sovereign rating changes using an event study methodology. We examine the evolution of stock market spreads (domestic stock market returns relative to a benchmark) and bond market spreads (Sovereign bond yield spreads relative to a benchmark) following an upgrade or downgrade of an actual Sovereign rating. We include rating changes for both emerging and developed countries, which allows us to study the possibility of different impact across countries based on their degree of economic development.

Event studies can also provide evidence on whether rating agencies act pro-cyclically, downgrading countries during bad times and upgrading them during good times. Event studies can also bring to the forefront whether the actions of rating agencies have sustained or merely transitory effects on financial markets and if these effects are likely to be stronger in emerging markets, where problems of asymmetric information and transparency are more severe.

Our findings should be of great interest to investors and particularly managed investment funds, who are increasingly focused on international diversification, since a change in Sovereign ratings is a key event regarding the asset allocation decision.

Our main results can be summarized as follows. First, we find that rating downgrades have a significantly negative impact on own national aggregate financial markets, especially in emerging markets. Rating changes significantly affect emerging countries' bond and stock markets, with bond yield spreads increasing and stock returns declining considerably in response to a downgrade. The short-run impact of rating changes in developed countries is restricted to bond markets. Thus, while the negative effect of sovereign debt rating downgrades does spill over to other assets markets in emerging countries, this is not the case in developed markets.

Second, in contrast to downgrades, rating upgrades do not have a significant impact on financial markets' subsequent returns. Consequently, our findings largely echo those already documented that upgrades do not have a great wealth impact, while downgrades have significant impact.

Third, we find that, as expected, rating changes affect emerging countries more strongly than developed ones, as these changes reveal more

information about emerging countries. This result is novel in the literature and contrasts with the findings in Brooks et al. (2002) where there is no significant difference between the impact in developed and emerging countries. The conflicting results can be explained by a different sample period and methodology.

Fourth, we study the performance of rating changes over several event windows up to two-year after the rating announcement. This is the first study of the long-run impact of Sovereign rating changes for horizons greater than one-month. We find that the negative wealth impact of a Sovereign rating downgrade persists up to six months after the rating downgrade both in the aggregate stock and bond markets.

Finally, we add to the existent evidence on the role of rating agencies during financial crises, as we find that Sovereign rating downgrades occur after market downturns supporting that rating agencies have a pro-cyclical behavior and, consequently, may contribute to additional financial instability.

The remainder of this paper is organized as follows. Section 2 describes the data. Section 3 presents the methodology used in our analysis. Section 4 presents the empirical. Section 5 concludes.

2. Data Description

The data set consists of stock and bond spreads of the developed and emerging markets. The emerging markets used in our study are Poland, Czech Republic, Hungary, Bulgaria, Turkey, Russia, Brazil, Argentina, Mexico, Peru, Philippines, Venezuela, Chile, Colombia, South Korea, China, Indonesia, Malaysia, Taiwan, Israel and South Africa. The developed markets are Portugal, Spain, Italy, Greece, France, Belgium, The Netherlands, Germany, Austria, Ireland, Finland, Canada, Denmark, New Zealand, Sweden, United Kingdom, Australia, Japan, Norway and Switzerland.

Aggregate stock prices of both developed and emerging markets are collected from Datastream. Stock market price indexes for each country are measured in U.S. dollars. The U.S. stock index is used as the benchmark over which we calculate the spreads.

Bond market spreads for the developed markets are calculated using the ten-year government bond zero coupon rates, collected from Bloomberg. We use zero coupon rates rather than bond yields as they control for different durations caused by different bond cash-flow structures. We focus on the ten-year yields because their liquidity is usually higher than that of other maturities. We use the U.S. Treasuries as the benchmark, reflecting not only the higher liquidity of the U.S. government bond market, but also the perceived reduced risk of U.S. government bonds relative to the bonds of other countries.

We use Sovereign stripped spreads obtained from JP Morgan for the emerging markets. In particular, the yield spread index for each country is given by the Emerging Market Bond Indices (EMBI), the EMBI+ or the EMBI Global, according to their availability.

The EMBI track most traded external-currency-denominated debt instruments in the emerging markets and offer one of the longest and most comprehensive emerging market spread series. There are some differences between each of these indices. The EMBI tracks total returns for U.S. dollar-denominated Brady and Brady-style

bonds. The EMBI+ tracks total returns for U.S. dollar-denominated Brady bonds, loans, Eurobonds, and U.S. dollar-denominated local markets instruments. Alternatively, EMBI Global tracks total returns for U.S. dollar-denominated Brady Bonds, Eurobonds, traded loans, and local market debt instruments issued by Sovereign and quasi-Sovereign entities[1].

We investigate the own-country impact of Sovereign rating changes on the stock and bond market return of countries using the population of all rating change announcements for the period January 1, 1990 through June 6, 2003 by three specialized rating agencies, namely, Standard & Poors, Moodys and Fitch. Table 1 displays the series availability for each country and their time coverage. Table 2 reports the time span of rating change events included in the sample for each country and by rating agency[2].

Table 1- Bond and Stock Market Data Availability

This table displays the availability of stock market index returns and bond yields and spreads for each country and their time coverage.

	Stock Index (USD)		10 year zero coupon rate		EMBI Spreads		EMBI+ Spreads		EMBIG Spreads	
	Initial date	*End date*	*Initial date*	*End date*	*Initial date*	*End date*	*Initial date*	*End date*	*Initial date*	*End date*
Emerging Countries										
Poland	01-03-1994	31-12-2002			**30-11-1994**	**28-06-2002**	31-12-1997	06-06-2003	31-12-1997	06-06-2003
Czech Republic	09-11-1993	31-12-2002								
Hungary	21-06-1991	31-12-2002							**29-01-1999**	**06-06-2003**
Bulgaria					**30-11-1994**	**28-06-2002**	31-12-1997	06-06-2003	31-12-1997	06-06-2003
Turkey	01-01-1990	31-12-2002					**31-12-1997**	**06-06-2003**	31-12-1997	06-06-2003
Russia	20-06-1994	31-12-2002			04-01-1999	28-06-2002	**31-12-1997**	**06-06-2003**	31-12-1997	06-06-2003
Brazil	04-07-1994	31-12-2002			**31-12-1991**	**28-06-2002**	31-12-1997	06-06-2003	31-12-1997	06-06-2003
Argentina	01-01-1990	31-12-2002			**30-04-1993**	**28-06-2002**	31-12-1997	06-06-2003	31-12-1997	06-06-2003
Mexico	01-01-1990	31-12-2002			**31-12-1991**	**28-06-2002**	31-12-1997	06-06-2003	31-12-1997	06-06-2003
Peru	03-01-1994	31-12-2002			30-05-1997	28-06-2002	**31-12-1997**	**06-06-2003**	31-12-1997	06-06-2003
Philippines	01-01-1990	31-12-2002			**31-12-1991**	**30-01-1997**	31-12-1997	06-06-2003	31-12-1997	06-06-2003
Venezuela	02-01-1990	31-12-2002			**31-12-1991**	**28-06-2002**	04-01-1999	06-06-2003	31-12-1997	06-06-2003
Chile	01-01-1990	31-12-2002							**01-06-1999**	**06-06-2003**
Colombia	10-03-1992	31-12-2002							**31-12-1997**	**06-06-2003**
South Korea	01-01-1990	31-12-2002					**30-04-1998**	**06-06-2003**	31-12-1997	06-06-2003
China	26-07-1993	31-12-2002							**31-12-1997**	**06-06-2003**
Indonesia	02-04-1990	31-12-2002								
Malaysia	01-01-1990	31-12-2002							**31-12-1997**	**06-06-2003**
Taiwan	01-01-1990	31-12-2002								
Israel	01-01-1993	31-12-2002								
South Africa	01-01-1990	31-12-2002							**31-12-1997**	**06-06-2003**
Developed Countries										
Portugal	02-01-1990	31-12-2002	11-12-1994	31-12-2002						
Spain	01-01-1990	31-12-2002	09-06-1993	31-12-2002						
Italy	01-01-1990	31-12-2002	28-04-1997	31-12-2002						
Greece	01-01-1990	31-12-2002	10-01-2001	31-12-2002						
Belgium	01-01-1990	31-12-2002	11-12-1994	31-12-2002						
Ireland	01-01-1990	31-12-2002	27-02-1994	31-12-2002						
Finland	01-01-1990	31-12-2002	07-09-1998	31-12-2002						
Canada	01-01-1990	31-12-2002	20-06-1997	31-12-2002						
Japan	01-01-1990	31-12-2002	16-04-1991	31-12-2002						
Benchmark										
United States	01-01-1990	31-12-2002	16-04-1991	31-12-2002						

1- The EMBI indices have several features that are useful for our analysis. They control for floating coupons, unusual features, and principal collateral and rolling interest guarantees. All instruments included in the indices must have a minimum $500 face value and satisfy a liquidity criteria. Thus, the spreads used in our analysis have similar liquidity. All bonds included in the index have a remaining maturity greater than 2.5 years and average maturity of country indices is comparable.

2- Standard & Poors generated the first set of ratings in 1961 and has been a major force in Sovereign ratings since that time. Moody's began rating the creditworthiness of countries in 1974. Fitch entered the market considerably later in 1994. Each agency has a similar coverage of countries and all are relatively active in assessing Sovereign rating.

Table 2- Rating Changes Data Availability

This table displays the rating series availability for each country and their time coverage. Initial date is the date of the first change included in the sample. End date is the date of the last changes included in the sample.

	Sovereign Ratings						Sovereign Ratings					
	Local currency LT Debt						Foreign currency LT Debt					
	Moody's		Standard & Poors		Fitch		Moody's		Standard & Poors		Fitch	
	Initial date	*End date*	*Initial date*	*End date*	*Initial date*	*End date*	*Initial date*	*End date*	*Initial date*	*End date*	*Initial date*	*End date*
Emerging Countries												
Poland							01-06-1995	12-11-2002	01-06-1995	15-05-2000	26-10-1995	19-11-1998
Czech Republic							22-06-1998	12-11-2002	18-07-1994	05-11-1998	10-08-1995	24-11-1997
Hungary							27-12-1993	12-11-2002	20-04-1992	19-12-2000	25-04-1996	29-11-2000
Bulgaria							27-09-1996	19-12-2001	23-11-1998	07-11-2001	17-04-1998	17-04-1998
Turkey							05-05-1992	21-12-2000	28-04-1994	27-04-2001	10-08-1994	25-03-2003
Russia							22-11-1996	17-12-2002	07-10-1996	05-12-2002	07-10-1996	13-05-2003
Brazil							30-11-1994	12-08-2002	30-11-1994	07-02-2002	01-12-1994	21-10-2002
Argentina							15-08-1990	20-12-2001	25-08-1993	06-11-2001	28-05-1997	03-12-2001
Mexico							20-02-1991	06-02-2002	29-07-1992	07-02-2002	30-08-1995	15-01-2002
Peru							05-01-1996	27-03-1998	18-12-1997	01-11-2000	14-10-1999	18-04-2001
Philippines							09-04-1998	09-04-1998	30-06-1993	21-02-1997	08-07-1999	15-03-2001
Venezuela							07-08-1991	20-09-2002	09-02-1990	13-12-2002	15-09-1997	28-06-2002
Chile							29-06-1995	29-06-1995	07-12-1992	11-07-1995	10-11-1994	30-08-1995
Colombia							11-08-1995	11-08-1999	21-06-1993	24-05-2000	19-05-2000	10-01-2002
South Korea							09-04-1998	28-03-2002	03-05-1995	24-07-2002	27-06-1996	27-06-2002
China							10-09-1993	03-12-1998	14-05-1997	21-07-1999	11-12-1997	11-12-1997
Indonesia							21-12-1997	19-03-1998	07-12-1992	05-09-2002	04-06-1997	01-08-2002
Malaysia							12-03-1990	25-09-2002	13-09-1990	20-08-2002	13-08-1998	07-08-2002
Taiwan									07-12-1992	18-12-2002	20-11-2001	20-11-2001
Israel							12-12-1995	06-07-2000	19-01-1993	09-12-1995	24-11-1995	22-10-2001
South Africa							03-10-1994	29-11-2001	03-10-1994	07-05-2003	22-09-1994	02-05-2003
Developed Countries												
Portugal			06-05-1998	15-12-1998	14-07-1998	14-07-1998						
Spain	31-01-1997	13-12-2001	06-05-1998	31-03-1999	14-07-1998	01-09-1999						
Italy	23-11-1993	15-07-2002	06-05-1998	06-05-1998	14-07-1998	17-06-2002						
Greece	28-01-1997	04-11-2002	26-03-1997	13-03-2001	25-10-1999	20-06-2001						
Belgium	27-01-1997	27-01-1997	06-05-1998	06-05-1998	14-07-1998	17-06-2002						
Ireland	04-09-1992	13-02-1997	06-05-1998	03-10-2001	14-07-1998	16-12-1998						
Finland	15-01-1997	15-01-1997	06-05-1998	02-01-2002	14-07-1998	11-11-1999						
Canada	03-05-1993	12-04-1995	04-10-1992	04-10-1992	26-10-1995	26-10-1995						
Japan	03-05-1993	31-05-2002	17-03-1995	15-04-2002	26-10-1995	21-11-2002						

A credit rating represents an assessment of the overall creditworthiness of an obligor in terms of both its capacity and willingness to meet its financial commitments as they fall due. Sovereign credit risk analysis may be divided into two broad components, specifically economic and political risk. Economic risk deals with the government's ability to repay its obligations on time and is a function of both qualitative and quantitative factors, while political risk addresses the Sovereign's willingness to repay its outstanding debt on time. Accordingly, rating agencies provide an evaluation of a country's creditworthiness and convey a rating to that country. Governments generally seek credit ratings to ease their own access (and the access of other issuers domiciled within their borders) to international capital markets, where many investors, particularly U.S. investors, prefer rated securities over unrated securities of apparently similar credit risk. Although the individual agencies' ratings are measured on different scales, there are very broad similarities between them. Table 3 presents the rating scales used by each rating agency in addition to a consolidated rating, which allows a comparison of individual agency ratings.

Table 3- Comparison of Rating Agencies' Credit Rating Measures

This table summarizes the credit rating measures applied by three leading agencies: Standard & Poors (S&P), Moody's and Fitch.

Moody's	S&P	Fitch
Aaa	AAA	AAA
Aa1	AA+	AA+
Aa2	AA	AA
Aa3	AA-	AA-
A1	A+	A+
A2	A	A
A3	A-	A-
Baa1	BBB+	BBB+
Baa2	BBB	BBB
Baa3	BBB-	BBB-
Ba1	BB+	BB+
Ba2	BB	BB
Ba3	BB-	BB-
B1	B+	B+
B2	B	B
B3	B-	B-
Caa1	CCC+	CCC
Caa2	CCC	CC
Caa3	CCC-	C
Ca	CC	DDD
C	SD	DD
	D	D

Table 4 presents a summary of rating agency activity over the period of analysis. For the emerging countries we use the long-term foreign currency ratings and for the developed countries we use long-term local currency ratings. There are no rating changes for France, The Netherlands, Germany, Austria, Denmark, New Zealand, Sweden, United Kingdom, Australia, Norway and Switzerland during the sample period, consequently these countries are not included in the analysis.

Our sample only includes rating upgrades (downgrades) that did not have a subsequent upgrade (downgrade) in the 20 days following the initial change. This prevents events that occur shortly after the initial event influencing our results. There are 182 events between January 1, 1990 and June 6, 2003. Table 4 splits the events in developed and emerging countries. As expected, there are much more rating changes in emerging countries (156 events) than in developed countries (26 events). Table 4 also splits the sample into upgrades and downgrades. There are more positive events (110) than negative events (76). In particular, in the case of emerging countries there are 94 upgrades and 62 downgrades.

Table 5 analyzes whether a rating change is usually followed by another rating change in a twelve-month period after the initial event. We find that for emerging market downgrades, there is a subsequent downgrade less than twelve months after the initial event in 56% of the cases. In the case of emerging markets upgrade, the percentage of subsequent upgrades in a twelve-month period is slightly smaller (49%).

3. METHODOLOGY

We study the dynamic response of financial markets following a rating change using an event study methodology. Event studies can show whether the actions of rating agencies have sustained or merely transitory effects on financial markets. Event studies can also

Table 4- Number of Upgrades and Downgrades by Rating Agency and Country

This table displays the number of changes in ratings of long-term sovereign debt. The sample excludes subsequent rating changes that occur on the twenty days after the previous rating change.

Country	Total Changes	Ratings	
		Upgrades	Downgrades
Poland	6	6	0
Czech Republic	4	2	2
Hungary	10	10	0
Bulgaria	5	5	0
Turkey	10	2	8
Russia	13	7	6
Brazil	10	8	2
Argentina	11	3	8
Mexico	5	5	0
Peru	4	1	3
Philippines	2	2	0
Venezuela	13	2	11
Chile	3	3	0
Colombia	4	1	3
South Korea	14	11	3
China	3	2	1
Indonesia	15	5	10
Malaysia	14	10	4
Taiwan	1	0	1
Israel	4	4	0
South Africa	5	5	0
Sub-total	**156**	**94**	**62**
Portugal	2	2	0
Spain	3	3	0
Italy	2	2	0
Greece	3	3	0
Belgium	2	1	1
Ireland	2	2	0
Finland	3	3	0
Canada	1	0	1
Japan	8	0	8
Sub-total	**26**	**16**	**10**
Total	**182**	**110**	**72**

provide evidence on whether rating agencies act pro-cyclically, downgrading countries during bad times and upgrading them during good times.

Following Kaminski and Schmukler (2002), we examine the impact of rating changes on stock market spreads (domestic stock markets return relative to a benchmark) and bond market spreads (Sovereign bond yield spreads relative to a benchmark) over different horizons around an upgrade or downgrade of an actual rating. Brooks et al. (2002) study the impact of rating changes in stock market returns using abnormal returns derived from the market model. Later, we test the robustness of our stock market results also using abnormal returns calculated using the market model.[3]

Stock market spreads are calculated using U.S. dollar denominated domestic stock returns relative to the U.S. stock market return (benchmark). Daily stock market spreads (abnormal returns) for each event in each country are calculated as follows:

$$AR_{i,t} = R_{i,t} - R_{US,t} \quad (1)$$

where $R_{i,t}$ is the geometric U.S. dollar return on stock index of country i on day t and $R_{US,t}$ is the corresponding geometric return of the U.S. stock market index.

3- The market model allows us to calculate risk-adjusted abnormal returns, which could be of interest especially in emerging countries. However, using the market model requires prior estimation of two parameters (α and β) for each event/country. There is extensive literature that shows there is considerable estimation error associated with estimating betas.

Table 5- Number of Subsequent Upgrades and Downgrades in a One-year Horizon

The table displays the number of changes in ratings of long-term sovereign debt that occur less than one year after the previous rating change of the same sign. The sample excludes subsequent rating changes that occur on the twenty days after the previous rating change.

Country	Ratings	
	Upgrades	Downgrades
Poland	4	0
Czech Republic	0	1
Hungary	8	0
Bulgaria	4	0
Turkey	0	3
Russia	6	5
Brazil	3	1
Argentina	1	6
Mexico	3	0
Peru	0	1
Philippines	0	0
Venezuela	0	5
Chile	1	0
Colombia	0	1
South Korea	8	2
China	0	0
Indonesia	1	7
Malaysia	4	3
Taiwan	0	0
Israel	1	0
South Africa	2	0
Sub-total	**46**	**35**
Portugal	1	0
Spain	1	0
Italy	1	0
Greece	1	0
Belgium	0	0
Ireland	0	0
Finland	1	0
Canada	0	0
Japan	0	6
Sub-total	**5**	**6**
Total	**51**	**41**

Bond market spreads for developed countries are given by the difference between the 10-year zero coupon bond U.S. dollar rate of return of local government debt of each country relatively to the U.S. Treasuries 10-year zero coupon bond rate of return. Daily market bond spreads (abnormal returns) for each event in each developed country are given by:

$$AR_{i,t} = \ln\left(\frac{Y_{i,t}}{Y_{i,t-1}}\right) - \ln\left(\frac{S_{i/US,t}}{S_{i/US,t-1}}\right) - \ln\left(\frac{Y_{US,t}}{Y_{US,t-1}}\right) \quad (2)$$

where $Y_{i,t}$ is the 10-year zero coupon bond yield on market i on day t in local currency, $Y_{US,t}$ is the corresponding 10-year zero coupon yield on the U.S. government bond market on day t, and $S_{i/US,t}$ is the exchange rate of one unit of country i currency for U.S. dollars on day t.

For emerging markets we use the EMBI, which are calculated using U.S. Dollar denominated debt and the U.S. Treasuries as benchmark. Daily market bond spreads are then calculated in the following way:

$$AR_{i,t} = Ln\left(\frac{Spread_{i,t}}{Spread_{i,t-1}}\right) \quad (3)$$

where $Spread_{i,t}$ is the difference between country i government debt yields (U.S. dollar-denominated) and U.S. government debt yields on day t. Notice that given the negative relation between bond yields and prices, a positive (negative) abnormal return represents a negative (positive) rate of return.

In order to capture the effect of an upgrade or downgrade on the evolution of spreads around the time of the event and in the long-run we use five different time horizon windows. Each of these windows starts on the tenth day prior to the event and ends, respectively, one-, three-, six-, twelve-, and twenty-four months after the event.

Of course, other factors which also affect the evolution of spreads might take place at the same time. We do not control for those factors and we assume that on average there is no particular bias in the event studies. We expect that those other factors influence spreads both positively and negatively in a random way.

We use rating changes by the three rating agencies (Moody's, S&P and Fitch) indifferently. To prevent events by the same agency (or by a different agency) that occur shortly before the event we are analyzing) from influencing the cumulative returns in the windows, for our study we take into account only the first upgrade or downgrade that occurs within a window of 20 days.

The impact of rating changes is analyzed using cumulative abnormal return (*CAR*), which is given by the sum of the daily abnormal returns on each event window, i.e.,

$$CAR_i(t_1,t_2)=\sum_{t=t_1}^{t_2} AR_{i,t} \tag{4}$$

where t_1 is the first day of the event window and t_2 is the last day of the event window.

We analyze the impact of rating announcements by taking the average of the *AR* and *CAR* across events:

$$\overline{AR_t}=\frac{1}{N}\sum_{i=1}^{N} AR_{i,t} \tag{5}$$

$$\overline{CAR}(t_1,t_2)=\sum_{t=t_1}^{t_2}\overline{AR_t} \tag{6}$$

where $\overline{AR_t}$ is the average abnormal returns of the events on day t, $\overline{CAR_t}$ is the average cumulative abnormal returns of the events on day t, and N is the number of events.

The statistical significance of the average *AR* and *CAR* is assessed following Boehmer, Musumeci and Poulsen (1991). The t-statistic is calculated by dividing the average event-period abnormal return by its contemporaneous cross-sectional standard error. This cross sectional estimate of the standard deviation is the valid event when there is an event-induced change in the volatility. The estimated variances are estimated as follows:

$$Var(\overline{AR_t})=\frac{1}{N(N-1)}\sum_{i=1}^{N}(AR_{i,t}-\overline{AR_t})^2 \tag{7}$$

$$Var(\overline{CAR}(t_1,t_2))=\sum_{t=t_1}^{t_2} Var(\overline{AR_t}) \tag{8}$$

where $Var(\overline{AR_t})$ is the variance of the average abnormal returns of the events on day t and $Var(\overline{CAR}(t_1,t_2))$ is the variance of the average cumulative abnormal returns of the events on day t.

The t-statistics for the average AR and CAR are given respectively by:

$$t(\overline{AR_t})=\left(\frac{\overline{AR_t}}{\sqrt{Var(\overline{AR_t})}}\right) \tag{9}$$

$$t(\overline{CAR}(t_1,t_2))=\left(\frac{\overline{CAR}(t_1,t_2)}{\sqrt{Var(\overline{CAR}(t_1,t_2))}}\right) \tag{10}$$

which are asymptotically normally distributed with mean zero and variance one.

4. EMPIRICAL RESULTS

This section presents both the short- and long-run impact of credit rating changes on the aggregate stock and bond markets in emerging and developed countries. To capture whether these changes persistently affect the investors' mood, we rely on an event-study methodology. We examine the long-run performance of asset markets around the time of rating changes using several different horizons: one-, three, six-, twelve-, and twenty-four months after the event. If there is more than one event within a 20-day window, we look only at the one that occurred first.

The maximum number of rating changes in the emerging markets (long-term foreign currency denominated debt ratings) examined is 156 (94 upgrades and 62 downgrades) as shown in Table 4. For the developed countries (long-term local currency debt rating changes), the number of rating changes is 26 (16 upgrades and 10 downgrades).

Standard event-study methodology requires linking rating events to abnormal returns. We consider the spreads between the instruments of each country and the benchmark instruments of the reference country (U.S. for both the emerging and the developed markets). For stock markets, we use the difference between each country stock market index return (calculated in U.S. dollars) and the U.S. stock market index returns. For emerging bond markets, we use de EMBI index spreads, which are measured relative to the U.S. Treasuries. For the developed bond markets, we use the spread between the rates of return of 10-year zero coupon bonds (calculated in U.S. dollars).

4.1. Short-Run Performance

Tables 6 displays the short-run stock market reaction to Sovereign rating changes using an event window that starts ten days before the event and ends ten days after the event. Table 6 reports both daily abnormal returns and cumulative abnormal returns calculated as the difference between each stock market returns and the U.S. stock market daily returns. Table 7 presents similar results for the bond market reaction to changes in ratings. Panel A shows the emerging markets' impact while Panel B refers to the impact in developed markets.

Panel A of Table 6 shows that rating downgrades have a significant short-run wealth effect in the emerging stock markets. Average cumulative abnormal returns show a strong negative value in the days leading up to the rating change and also after the rating change. Average CARs are significant at the 5% significance level from eight days before the event up to ten days after the event. Specifically, average abnormal returns show significant decreases prior to the rating change on days -10, -8, -7 and -6, suggesting that information on rating downgrades or information on which rating agencies base their rating decisions is public and has an impact in the market a few days before the event happens. On the day just after the rating change (day 1) average ARs is also significant, denoting the presence of some private information available only to ratings agencies that has, as a consequence of the rating change, come into the public domain.

In contrast, emerging countries' rating upgrades have no significant short-run impact in the country's stock market. Stock market return

Table 6

Short-Run Stock Market Reaction to Rating Changes

This table reports average abnormal returns (AR) and cumulative abnormal returns (CAR) as measures of stock market short-run reaction to rating changes. *, ** and *** denote statistical significance at 10%, 5% and 1% level, respectively. N is the number of available events.

Panel A - Emerging Stock Markets

Event	Upgrades				Downgrades			
Day	AR	t-stat	CAR	t-stat	AR	t-stat	CAR	t-stat
-10	-0.0025	-0.7866	-0.0025	-0.7866	-0.0077	-1.7770 *	-0.0077	-1.7770 *
-9	-0.0009	-0.3276	-0.0034	-0.8105	-0.0073	-1.0486	-0.0151	-1.8305 *
-8	-0.0042	-1.5562	-0.0076	-1.5215	-0.0074	-1.7321 *	-0.0224	-2.4216 **
-7	0.0002	0.0691	-0.0074	-1.2872	-0.0107	-2.1892 **	-0.0332	-3.1646 ***
-6	-0.0049	-1.7592 *	-0.0122	-1.9240 *	-0.0122	-2.1087 **	-0.0454	-3.7896 ***
-5	0.0032	0.9681	-0.0091	-1.2710	0.0021	0.3598	-0.0433	-3.2365 ***
-4	-0.0007	-0.2539	-0.0098	-1.2771	-0.0090	-1.5652	-0.0523	-3.5917 ***
-3	0.0029	1.3453	-0.0068	-0.8584	0.0045	0.9040	-0.0478	-3.1056 ***
-2	0.0020	1.0422	-0.0048	-0.5879	-0.0077	-1.1389	-0.0555	-3.3010 ***
-1	0.0008	0.2367	-0.0041	-0.4626	-0.0101	-1.4410	-0.0656	-3.6013 ***
0	**-0.0008**	**-0.3636**	**-0.0049**	**-0.5378**	**-0.0036**	**-0.6882**	**-0.0692**	**-3.6515 *** **
1	-0.0018	-0.5696	-0.0066	-0.6928	-0.0170	-3.0088 ***	-0.0862	-4.3597 ***
2	-0.0008	-0.4289	-0.0074	-0.7611	-0.0077	-1.3679	-0.0939	-4.5675 ***
3	-0.0040	-1.9109 *	-0.0115	-1.1479	0.0090	1.4692	-0.0849	-3.9598 ***
4	0.0020	0.5325	-0.0095	-0.8876	0.0013	0.2301	-0.0836	-3.7737 ***
5	-0.0010	-0.4157	-0.0105	-0.9567	-0.0069	-1.3028	-0.0906	-3.9735 ***
6	-0.0009	-0.3354	-0.0114	-1.0094	0.0057	1.5625	-0.0849	-3.6780 ***
7	-0.0005	-0.2023	-0.0118	-1.0295	-0.0052	-1.1729	-0.0901	-3.8339 ***
8	0.0014	0.6310	-0.0104	-0.8884	-0.0077	-1.3427	-0.0978	-4.0426 ***
9	-0.0002	-0.1224	-0.0106	-0.8968	-0.0084	-1.6129	-0.1062	-4.2917 ***
10	-0.0012	-0.5273	-0.0118	-0.9824	-0.0016	-0.2974	-0.1078	-4.2595 ***
	N =	89			N =	62		

Panel B - Developed Stock Markets

Event	Upgrades				Downgrades			
Day	AR	t-stat	CAR	t-stat	AR	t-stat	CAR	t-stat
-10	-0.0041	-1.0793	-0.0041	-1.0793	-0.0015	-0.3232	-0.0015	-0.3232
-9	0.0002	0.0422	-0.0039	-0.6750	0.0098	1.7109 *	0.0083	1.1095
-8	0.0004	0.1154	-0.0035	-0.5089	0.0006	0.1023	0.0088	0.9485
-7	-0.0077	-1.6937 *	-0.0112	-1.3654	0.0014	0.2592	0.0102	0.9518
-6	0.0024	1.0482	-0.0088	-1.0267	-0.0008	-0.1700	0.0095	0.8131
-5	0.0039	1.3218	-0.0049	-0.5398	0.0036	1.0246	0.0131	1.0773
-4	0.0047	1.2197	-0.0001	-0.0132	0.0042	1.0495	0.0173	1.3495
-3	0.0057	1.4086	0.0056	0.5247	-0.0071	-1.6506 *	0.0101	0.7497
-2	0.0025	0.7508	0.0081	0.7247	0.0127	3.4572 ***	0.0228	1.6310
-1	0.0022	0.5224	0.0103	0.8629	-0.0019	-0.4424	0.0209	1.4282
0	**-0.0052**	**-1.0057**	**0.0051**	**0.3894**	**0.0068**	**1.6303**	**0.0277**	**1.8196 ***
1	-0.0023	-0.5125	0.0027	0.1982	0.0007	0.1246	0.0284	1.7536 *
2	0.0042	0.9243	0.0069	0.4762	-0.0016	-0.5244	0.0268	1.6258
3	-0.0054	-1.6297	0.0015	0.0995	-0.0008	-0.2314	0.0260	1.5486
4	-0.0038	-0.5494	-0.0023	-0.1425	-0.0017	-0.4265	0.0244	1.4121
5	0.0045	0.9649	0.0022	0.1298	-0.0009	-0.1360	0.0235	1.2690
6	-0.0051	-1.3515	-0.0029	-0.1648	-0.0075	-1.5675	0.0160	0.8366
7	-0.0003	-0.0768	-0.0032	-0.1776	0.0021	0.6352	0.0180	0.9308
8	-0.0029	-0.6552	-0.0061	-0.3285	0.0045	1.0747	0.0225	1.1359
9	-0.0026	-1.0067	-0.0087	-0.4671	-0.0045	-1.1919	0.0180	0.8932
10	0.0066	1.3799	-0.0021	-0.1102	-0.0091	-1.7546 *	0.0089	0.4282
	N =	13			N =	9		

Table 7

Short-Run Bond Market Reaction to Rating Changes

This table reports average abnormal returns (AR) and cumulative abnormal returns (CAR) as measures of bond market short-run reaction to rating changes. *, ** and *** denote statistical significance at 10%, 5% and 1% level, respectively. N is the number of available events.

Panel A - Emerging Bond Markets

Event	Upgrades					Downgrades				
Day	AR	t-stat		CAR	t-stat	AR	t-stat		CAR	t-stat	
-10	-0.0001	-0.0310		-0.0001	-0.0310	0.0131	1.0379		0.0131	1.0379	
-9	0.0012	0.1999		0.0010	0.1445	0.0097	1.5625		0.0228	1.6219	
-8	-0.0029	-0.6296		-0.0019	-0.2214	0.0102	1.4808		0.0330	2.1093	**
-7	-0.0029	-0.6220		-0.0048	-0.4956	-0.0064	-1.0878		0.0266	1.5873	
-6	-0.0070	-1.2962		-0.0118	-1.0602	0.0120	1.6933	*	0.0385	2.1215	**
-5	-0.0022	-0.6205		-0.0140	-1.1996	0.0227	2.3183	**	0.0613	2.9683	***
-4	-0.0010	-0.2050		-0.0150	-1.1895	0.0221	3.1852	***	0.0834	3.8278	***
-3	0.0098	2.4518	**	-0.0052	-0.3905	0.0217	3.3846	***	0.1050	4.6266	***
-2	0.0052	0.8029		0.0000	0.0012	0.0007	0.0871		0.1058	4.3619	***
-1	-0.0056	-1.2654		-0.0056	-0.3621	0.0067	0.7441		0.1125	4.3475	***
0	**-0.0264**	**-3.0897**	***	**-0.0320**	**-1.8171**	*	**0.0154**	**1.6396**		**0.1279**	**4.6460**	***
1	0.0059	1.0427		-0.0261	-1.4100		0.0046	0.4644		0.1325	4.5279	***
2	-0.0018	-0.3789		-0.0279	-1.4600		0.0114	1.5337		0.1439	4.7663	***
3	0.0051	1.0008		-0.0228	-1.1543		0.0085	1.2596		0.1524	4.9264	***
4	-0.0119	-2.4365	**	-0.0347	-1.7063	*	0.0043	0.4574		0.1567	4.8492	***
5	0.0005	0.1227		-0.0343	-1.6515	*	-0.0095	-1.1497		0.1472	4.4146	***
6	-0.0040	-0.6215		-0.0382	-1.7611	*	0.0027	0.4646		0.1499	4.4294	***
7	0.0068	0.5872		-0.0314	-1.2750		-0.0001	-0.0120		0.1498	4.2912	***
8	-0.0015	-0.3047		-0.0329	-1.3099		0.0091	1.0435		0.1589	4.4162	***
9	-0.0082	-1.0108		-0.0410	-1.5571		0.0062	0.7282		0.1651	4.4651	***
10	0.0115	1.3242		-0.0296	-1.0662		-0.0047	-0.6834		0.1604	4.2628	***
	N =	66					N =	41				

Panel B - Developed Bond Markets

Event	Upgrades					Downgrades				
Day	AR	t-stat		CAR	t-stat	AR	t-stat		CAR	t-stat	
-10	-0.0025	-0.5140		-0.0025	-0.5140	0.0075	1.0333		0.0075	1.0333	
-9	-0.0045	-1.6366		-0.0070	-1.2596	0.0318	3.8518	***	0.0393	3.5796	***
-8	-0.0018	-0.7729		-0.0088	-1.4607	-0.0228	-5.1881	***	0.0165	1.3965	
-7	0.0039	0.7801		-0.0049	-0.6266	-0.0351	-5.3312	***	-0.0186	-1.3774	
-6	0.0007	0.2461		-0.0042	-0.5072	0.0265	3.0333	***	0.0079	0.4881	
-5	-0.0031	-1.2887		-0.0074	-0.8490	-0.0163	-2.1272	**	-0.0084	-0.4732	
-4	0.0046	1.1444		-0.0028	-0.2874	0.0291	2.8045	***	0.0207	1.0037	
-3	-0.0005	-0.1237		-0.0033	-0.3128	-0.0248	-2.6853	***	-0.0041	-0.1829	
-2	-0.0034	-1.3946		-0.0066	-0.6209	-0.0024	-0.3905		-0.0065	-0.2772	
-1	-0.0013	-0.4074		-0.0079	-0.7107	0.0010	0.1531		-0.0055	-0.2254	
0	**-0.0081**	**-2.0950**	**	**-0.0160**	**-1.3586**	**0.0267**	**3.0704**	***	**0.0212**	**0.8214**	
1	-0.0003	-0.0704		-0.0163	-1.3176	-0.0130	-2.5985	**	0.0083	0.3139	
2	0.0073	2.5461	**	-0.0090	-0.7076	-0.0036	-0.6514		0.0047	0.1743	
3	-0.0033	-1.2154		-0.0122	-0.9441	0.0376	3.4065	***	0.0423	1.4565	
4	-0.0019	-0.6781		-0.0141	-1.0660	-0.0005	-0.1015		0.0418	1.4224	
5	0.0009	0.2280		-0.0132	-0.9499	0.0028	0.3494		0.0446	1.4642	
6	0.0024	0.7463		-0.0108	-0.7588	0.0207	3.3583	***	0.0654	2.1020	**
7	-0.0009	-0.2480		-0.0117	-0.7960	0.0375	3.7748	***	0.1028	3.1501	***
8	-0.0017	-0.4110		-0.0134	-0.8787	0.0149	3.1318	***	0.1177	3.5689	***
9	0.0013	0.5080		-0.0121	-0.7837	0.0143	1.7261	*	0.1320	3.8818	***
10	0.0031	0.8886		-0.0090	-0.5690	0.0214	2.6538	***	0.1534	4.3886	***
	N =	16					N =	9				

spreads relative to the U.S. stock market index are not statistically significantly around the announcement date. Panel B of Table 6 shows that for developed countries, average abnormal returns are not statistically significant following both rating upgrades and downgrades.

Table 7 reports similar findings in aggregate bond markets. Downgrades have a significant negative return effect (recall that the table reports a positive impact in yields) in emerging markets' bond average CARs, from six days before the event up to ten days after the event. Significant increases in average ARs from day –6 to –3 can be observed. Panel B shows that rating downgrades also have some negative impact in developed markets, with significant average ARs on some days before and after the event. Average CARs are significant at the 5% significance level on day –9 and after the event, from day 6 to 10.

Conversely, there is weak evidence that rating upgrades have an impact on either emerging or developed bond markets, even though there are significant ARs in the emerging markets in the day of the upgrade, as well as on day 4 after the event. In developed markets ARs are only significant on day of the event announcement and on day 2 after the event. CARs are not significant at the conventional significance level in either emerging or developed markets following rating upgrades.

Overall, we find that rating downgrades have a significant negative impact on the performance of the country's stock and bond markets relative to the U.S. market, especially in emerging countries. The impact on developed markets is smaller and significant only in the government bond markets. While the negative effect of sovereign rating downgrade in the bond market does spill over to other assets markets in emerging countries, this does not seem to be the case in developed markets.

This is the first study of the impact of sovereign ratings that finds a significant difference between the effect of rating changes in emerging and developed markets. Brooks et al. (2002) find no significant difference between the effect of rating changes in emerging and developed countries. The conflicting results can be explained by a different sample period and methodology. We study rating changes focusing on the 1990's, while Brooks et al. (2002) consider rating changes starting in 1973. The earlier sample period is characterized by a smaller level of financial integration among developed countries and also by a smaller number of developed countries. Also, some emerging countries had their status raised to developed during the 1990's (e.g. Portugal and Greece). In addition, we directly address this issue by dividing the sample (rating changes) by the country level of development, while Brooks et al. (2002) test for a different impact using a dummy variable for emerging countries in a cross-sectional regression.

4.2. Long-Run Performance

Table 8 and 9 present the long-run impact following rating changes in emerging and developed markets. Table 8 reports stock market index average cumulative abnormal returns for several windows, from one-month to twenty four-months after the event. The event window starts ten days before the rating change announcement and abnormal returns are calculated as the difference between daily returns of the stock market index (calculated in U.S. dollars) and

Table 8

Long-Run Stock Market Reaction to Rating Changes

This table reports cumulative abnormal returns (CAR) as measures of stock market long-run reaction to rating changes. *, ** and *** denote statistical significance at 10%, 5% and 1% level, respectively. N is the number of available events.

Panel A - Emerging Stock Markets

	1 month	3 months	6 months	12 months	24 months
Sovereign upgrades					
CAR	-0.0028	-0.0057	-0.0264	-0.0819	-0.3823
t-statistic	-0.1677	-0.2296	-0.7791	-1.7336 *	-5.0397 ***
N =	89	87	85	81	61
Sovereign downgrades					
CAR	-0.1311	-0.2288	-0.2861	-0.1356	-0.2132
t-statistic	-3.5683 ***	-4.1537 ***	-4.1714 ***	-1.5089	-1.6221
N =	62	61	60	53	42

Panel B - Developed Stock Markets

	1 month	3 months	6 months	12 months	24 months
Sovereign upgrades					
CAR	0.0175	-0.0349	-0.0181	-0.1041	-0.1772
t-statistic	0.5871	-0.7034	-0.2512	-0.8612	-1.0177
N =	13	13	13	10	7
Sovereign downgrades					
CAR	0.0266	-0.0262	-0.0351	-0.1476	-0.1177
t-statistic	0.7650	-0.4435	-0.4309	-1.2116	-0.6134
N =	9	9	8	6	3

Table 9

Long-Run Bond Market Reaction to Rating Changes

This table reports cumulative abnormal returns (CAR) as measures of bond market long-run reaction to rating changes. *, ** and *** denote statistical significance at 10%, 5% and 1% level, respectively. N is the number of available events.

Panel A - Emerging Bond Markets

	1 month	3 months	6 months	12 months	24 months
Sovereign upgrades					
CR	-0.0381	-0.1305	-0.1021	-0.1594	-0.3053
t-statistic	-1.0503	-2.3903 **	-1.4999	-1.3334	-1.1843
N =	66	65	58	54	30
Sovereign downgrades					
CR	0.2482	0.3424	0.3968	0.0366	-0.4150
t-statistic	4.6470 ***	4.4367 ***	3.8196 ***	0.3014	-2.1720 **
N =	41	40	35	31	21

Panel B - Developed Bond Markets

	1 month	3 months	6 months	12 months	24 months
Sovereign upgrades					
CAR	-0.0242	-0.0067	0.0402	0.1374	0.2869
t-statistic	-1.1099	-0.1885	0.7864	1.7145 *	2.3247 **
N =	16	15	12	9	7
Sovereign downgrades					
CAR	0.0332	0.0298	-0.0205	0.1343	0.3711
t-statistic	0.6668	0.3345	-0.1552	0.7073	1.2372
N =	9	8	7	5	2

the U.S. stock market index. Table 9 reports similar information for the government bond market. The bond market abnormal return is given by the difference between the rate of return of 10-year zero coupon bonds between the developed country and the U.S., or in the case of emerging countries, by the rate of return calculated from the EMBI spread relative to the U.S. Treasuries. Panel A refers to the impact in emerging markets while Panel B refers to the impact in developed markets.

Panel A of Table 8 shows evidence that rating upgrades have no significant impact on emerging stock markets, while downgrades have a significant negative impact at the 1% level for the one-, three- and six-month windows. The impact for horizons longer than six-month is still considerably negative, but not significant at the 5% level. In contrast, the long-run results in Panel B of Table 8 supports the short-run finding that there is no significant impact in developed stock markets following rating downgrades and upgrades.

Table 9 presents the government bond market long-run reaction to rating changes. Panel A of Table 9 shows a significant negative return response at the 1% significance level (recall that the table reports a positive yield impact) of emerging bond markets following a rating downgrade until six months after the event. This result is consistent with the negative short-run impact found in emerging bond markets. Rating upgrades have a positive return impact in emerging bond markets. However, the impact is generally not statistically significant, with the exception of the three-month window. This is again consistent with the short-run impact in emerging bond markets.

The results in Panel B of Table 9 for developed countries show that bond markets are not significantly affected either by rating downgrades or upgrades. Recall that rating downgrades present a negative impact in developed government bond markets using a ten-day window around the rating change announcement.

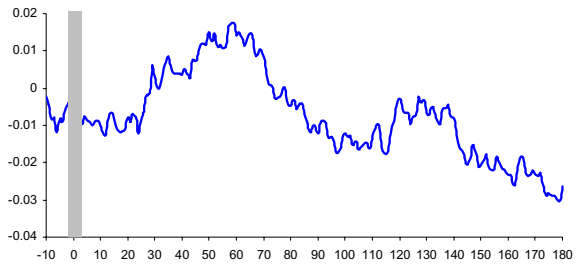
In summary, our results show that upgrades do not have a significant wealth impact either in emerging and developed countries financial markets. In contrast, sovereign debt downgrades have a negative short-run return performance in the sovereign bond markets of developed countries and, especially, emerging countries. While this negative performance spills over to stock markets in emerging countries, the negative performance is only significant in bond markets in the case of developed countries. Furthermore, the short-run performance persists up to six months after the event in both the bond and stock markets of emerging countries.

Figures 1-4 plot the average CAR following upgrades and downgrades during the event window around the rating change announcement. Figure 1 and 2 display the stock market reaction in emerging and developed countries, respectively. Figure 3 and 4 show bond markets response for emerging and developed markets, respectively. Panels A.1 and A.2 plot the average CAR using a six-month window following upgrades and downgrades, respectively. Panels B.1 and B.2 plot the average CAR using a twenty four-month window following upgrades and downgrades, respectively. These figures can shed some light on the hypothesis that rating agencies may cause financial excess by behaving pro-cyclically.

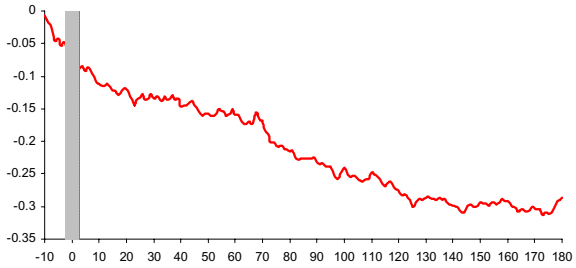
Figure 1
Emerging Stock Markets Reaction

Figures plot the dynamics of stock market spreads in emerging markets when foreign currency sovereign debt ratings change.

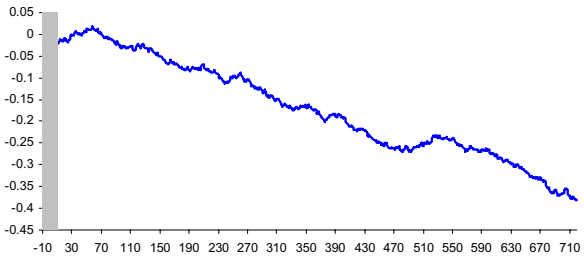
Panel A.1 - Upgrade 6-month



Panel A.2 - Downgrade 6-month



Panel B.1 - Upgrade 24-month



Panel B.2 - Downgrade 24-month

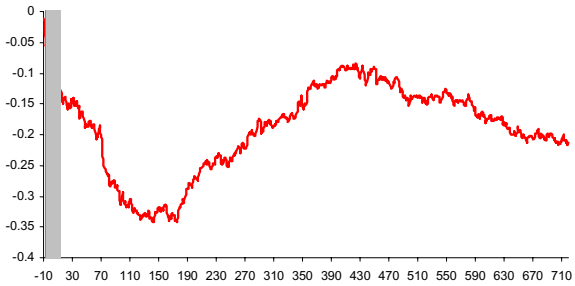
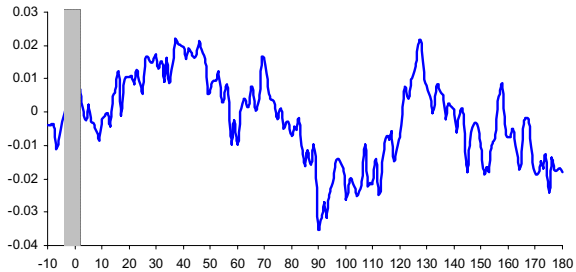


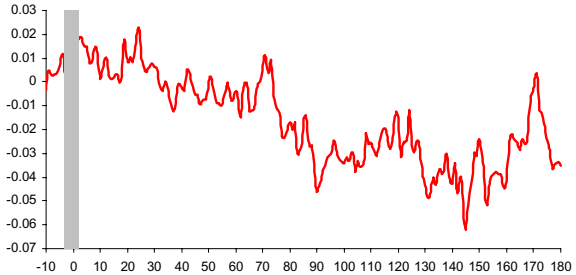
Figure 2
Developed Stock Markets Reaction

Figures plot the dynamics of stock market spreads in developed markets when local currency sovereign debt ratings change.

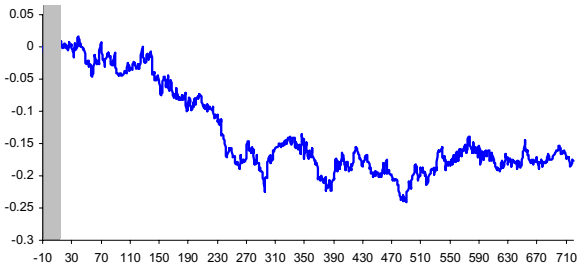
Panel A.1 - Upgrade 6-month



Panel A.2 - Downgrade 6-month



Panel B.1 - Upgrade 24-month



Panel B.2 - Downgrade 24-month

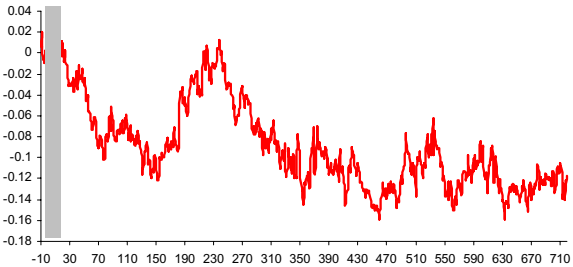
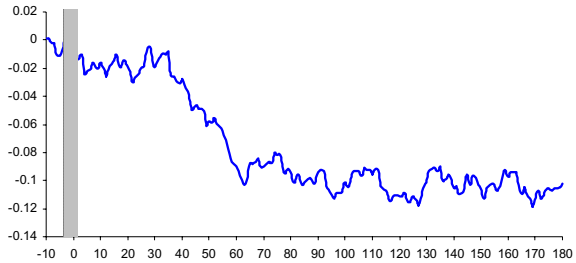


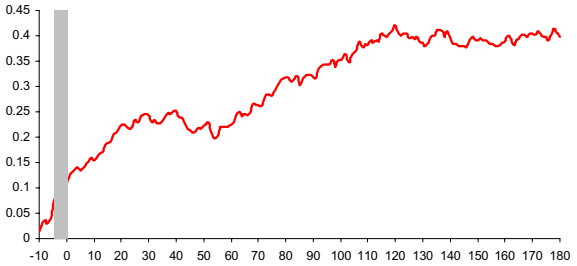
Figure 3
Emerging Bond Markets Reaction

Figures plot the dynamics of bond market spreads in emerging markets when foreign currency sovereign debt ratings change.

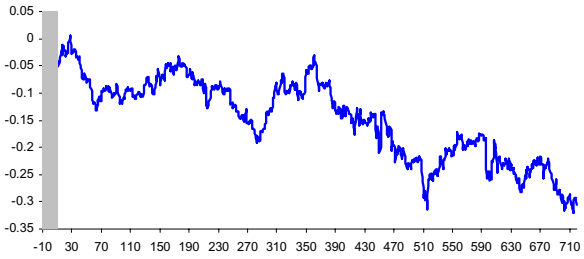
Panel A.1 - Upgrade 6-month



Panel A.2 - Downgrade 6-month



Panel B.1 - Upgrade 24-month



Panel B.2 - Downgrade 24-month

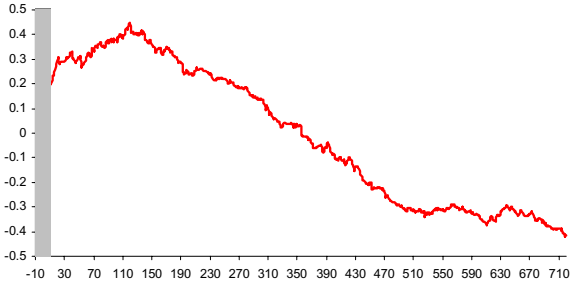
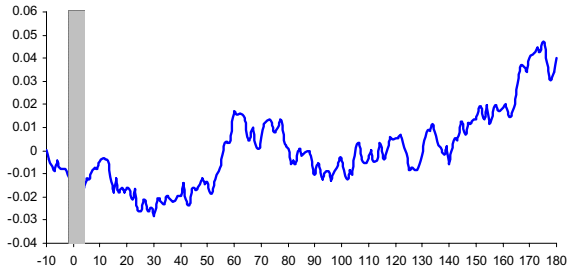


Figure 4
Developed Bond Markets' Reaction

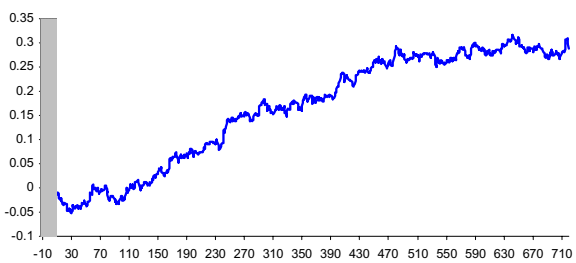
Figures plot the dynamics of bond market spreads in developed markets when local currency sovereign debt ratings change.

Panel A.1 - Upgrade 6-month

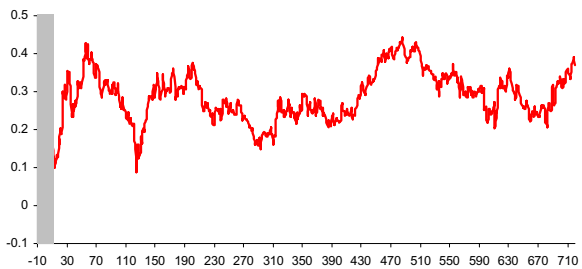


Panel A.2 - Downgrade 6-month

Panel B.1 - Upgrade 24-month



Panel B.2 - Downgrade 24-month



From the evolution of emerging stock and bond markets following rating downgrades, we conclude that rating agencies behave pro-cyclically. Rating agencies decide to downgrade when a country's financial markets are already having a negative performance (during the ten days prior to the rating announcement). We interpret this result as evidence of pro-cyclical behaviour of rating agencies. Alternatively, the behavior of prices in the days preceding rating changes could also reflect an anticipation effect. Market participants anticipate the rating downgrades, and consequently markets incorporate this information in the prices even before the rating announcement.

After the rating downgrade announcement, the negative market reaction persists for six months, both in stock and bond emerging markets. This negative performance persists after twelve and twenty four months following the downgrade in the case of the bond and stock market in emerging countries.

This evidence supports the hypothesis that rating agencies contribute to amplifying the boom-bust pattern in emerging markets, and that downgrades tend to occur when emerging market are already collapsing.

4.3. Robustness Checks

To examine the robustness of our results for the impact of rating changes in emerging stock market performance, we replicate the event study using an alternative model to calculate the abnormal returns. The most common approach in individual stocks event studies is to use the market model; see, for example, Brown and Warner (1980). Daily risk adjusted abnormal stock market returns are calculated using the market model:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{mt}) \quad (11)$$

where R_{it} is the return on the stock market of country i on day t, R_{mt} is the corresponding return on the U.S. stock market index on day t, and α_i and β_i are the market model parameters. Notice that our stock market spreads (difference between country's and US stock market returns) are given by a special case of the market model with $\alpha_i = 0$ and $\beta_i = 1$.

The market model parameters are estimated using weekly stock market returns from the country's with rating change and from the benchmark (U.S.) in the six months prior to the event announcement (beginning 130 days prior to the event and ending 11 days before the event announcement). We use weekly returns (as opposed to daily) to avoid the non-synchronous estimation bias that arises from different trading hours across countries.

Table 10 reports the short-run performance of emerging stock markets following rating changes using risk adjusted abnormal returns. The results show that our main findings are not changed by the use of risk adjusted abnormal returns. Rating downgrades in the emerging markets are associated with statistically significant negative CARs at the 5% level from day -6 until day 10, while rating upgrades do not have any short term impact on stock markets returns.

We also replicate our long-run impact results in emerging stock markets using abnormal returns derived from the market model. Table 11 shows the results that are consistent with our main results using stock market spreads. There is a statistically significant response at the 1% level on emerging stock markets until six-month after a rating downgrade. While downgrades have a negative and persistent effect in emerging stock markets, upgrades do not have a significant effect.

Table 10

Short-Run Emerging Stock Market Reaction to Rating Changes: Market Model

This table reports average abnormal returns (AR) and cumulative abnormal returns (CAR) as measures of the emerging stock market short-run reaction to rating changes. Abnormal returns are derived from the market model. *, ** and *** denote statistical significance at 10%, 5% and 1% level, respectively. N is the number of available events.

Event	Upgrades				Downgrades			
Day	AR	t-stat	CAR	t-stat	AR	t-stat	CAR	t-stat
-10	-0.0029	-0.8633	-0.0029	-0.8633	-0.0108	-0.9340	-0.0108	-0.9340
-9	-0.0017	-0.6616	-0.0046	-1.0876	-0.0094	-0.7847	-0.0202	-1.2135
-8	-0.0040	-1.4469	-0.0086	-1.7021 *	-0.0112	-0.8947	-0.0315	-1.5076
-7	-0.0002	-0.0522	-0.0087	-1.4992	-0.0139	-1.1190	-0.0454	-1.8679 *
-6	-0.0049	-1.7267 *	-0.0136	-2.1014 **	-0.0148	-1.1379	-0.0602	-2.1839 **
-5	0.0037	0.9360	-0.0099	-1.3007	-0.0040	-0.3017	-0.0642	-2.0996 **
-4	-0.0002	-0.0742	-0.0101	-1.2200	-0.0114	-0.9092	-0.0756	-2.2875 **
-3	0.0012	0.5142	-0.0090	-1.0407	-0.0002	-0.0171	-0.0758	-2.1264 **
-2	0.0019	0.7942	-0.0070	-0.7828	-0.0112	-0.8432	-0.0870	-2.2869 **
-1	0.0007	0.1992	-0.0063	-0.6555	-0.0130	-0.9334	-0.0999	-2.4684 **
0	**-0.0029**	**-1.3498**	**-0.0092**	**-0.9374**	**-0.0077**	**-0.6396**	**-0.1076**	**-2.5484 ** **
1	-0.0025	-0.7728	-0.0117	-1.1302	-0.0203	-1.5351	-0.1279	-2.8911 ***
2	0.0030	1.2259	-0.0087	-0.8152	-0.0131	-1.0467	-0.1410	-3.0668 ***
3	-0.0037	-1.4174	-0.0124	-1.1287	0.0058	0.4351	-0.1352	-2.8263 ***
4	0.0014	0.3160	-0.0110	-0.9294	-0.0011	-0.0787	-0.1363	-2.7408 ***
5	-0.0020	-0.6392	-0.0130	-1.0627	-0.0080	-0.6203	-0.1443	-2.8086 ***
6	0.0001	0.0166	-0.0129	-1.0275	0.0006	0.0494	-0.1437	-2.7124 ***
7	-0.0019	-0.7785	-0.0149	-1.1578	-0.0050	-0.4012	-0.1487	-2.7320 ***
8	-0.0004	-0.1580	-0.0153	-1.1648	-0.0119	-0.8983	-0.1607	-2.8671 ***
9	-0.0010	-0.4772	-0.0163	-1.2235	-0.0124	-0.9776	-0.1731	-3.0122 ***
10	0.0001	0.0456	-0.0162	-1.1970	-0.0083	-0.6924	-0.1814	-3.0901 ***
	N =	85			N =	61		

Table 11

Long-Run Emerging Stock Market Reaction to Rating Changes: Market Model

This table reports cumulative abnormal returns (CAR) as measures of the emerging stock market long-run reaction to rating changes. Abnormal returns are derived from the market model. *, ** and *** denote statistical significance at 10%, 5% and 1% level. N is the number of available events.

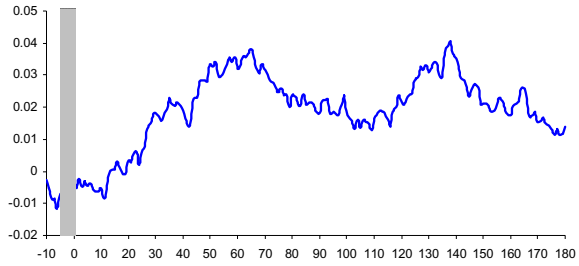
	1 month	3 months	6 months	12 months	24 months
Sovereign upgrades					
CAR	-0.0044	-0.0023	0.0140	0.0730	0.4051
t-statistic	-0.2305	-0.0819	0.3488	1.2541 *	4.1653 ***
N =	85	83	81	77	57
Sovereign downgrades					
CAR	-0.2690	-0.5727	-1.0520	-0.0453	-1.2472
t-statistic	-3.2692 ***	-4.4117 ***	-5.9051 ***	-0.1796	-2.8285 ***
N =	61	60	59	52	41

Figure 5 shows stock markets' response to foreign currency debt ratings change, using cumulative abnormal derived from the market model, for the emerging countries.

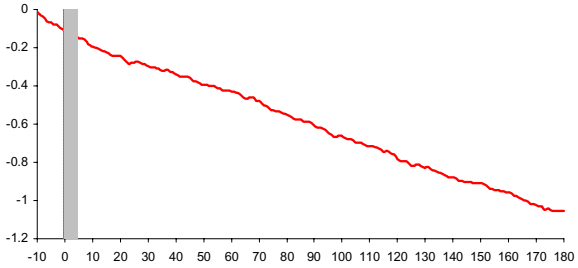
Figure 5
Emerging Stock Markets Reaction: Market Model

Figures plot the dynamics of stock market spreads in emerging markets when foreign currency sovereign debt ratings change. Abnormal returns are derived from the market model.

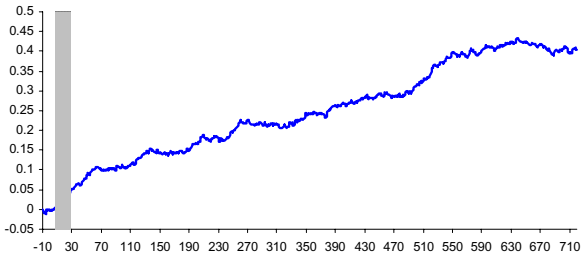
Panel A.1 - Upgrade 6-month



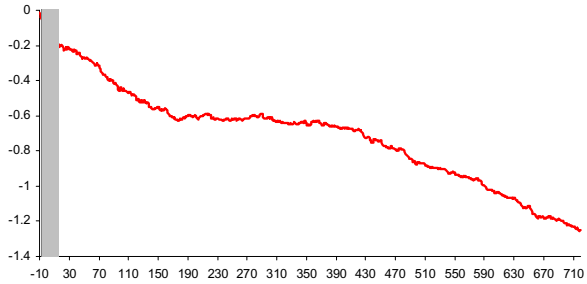
Panel A.2 - Downgrade 6-month



Panel B.1 - Upgrade 24-month



Panel B.2 - Downgrade 24-month



5. CONCLUSION

Financial integration has made investors, and particularly fund managers, increasingly interested in international diversification. The formation of international portfolios requires a range of fundamental inputs in the asset allocation decision. In particular, a change in Sovereign ratings is one such key event that may trigger substantial recomposition of international portfolios.

This paper contributes to the literature on the effects of credit ratings on financial markets by examining the impact of Sovereign rating changes on the country's bond and stock markets. This is the first study to examine not only the short-run impact of rating changes, but also to analyze the long-run impact in both developed and emerging financial markets.

Sovereign ratings' downgrades convey information about subsequent financial market returns, in contrast with upgrades that have no information. Government bond market spreads relative to the benchmark (U.S.) are significantly negative affected by rating downgrades, especially in emerging markets. While this negative performance spills over to stock markets in the case of emerging countries, in the case of

developed markets only the government bond market is affected. Moreover, we find that the effects of rating downgrades in both stock and bond emerging markets persist up to six months after the event. In fact, the effect in the developed countries is felt only in the bond markets and in the days around a downgrade.

Finally, we find that rating agencies act procyclically, downgrading countries in bad times. In this sense, rating agencies might add instability to financial markets in emerging economies. Rating agencies provide bad news at bad times and, just reinforce investors' expectations.

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