



## Sovereign credit ratings, market volatility, and financial gains

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## ABSTRACT

The reaction of EU bond and equity market volatilities to sovereign rating announcements (Standard & Poor's, Moody's, and Fitch) is investigated using a panel of daily stock market and sovereign bond returns. The parametric volatilities are defined using EGARCH specifications. The estimation results show that upgrades do not have significant effects on volatility, but downgrades increase stock and bond market volatility. Contagion is present, and sovereign rating announcements create interdependence among European financial markets with upgrades (downgrades) in one country leading to a decrease (increase) in volatility in other countries. The empirical results show also a financial gain and risk (value-at-risk) reduction for portfolio returns when taking into account sovereign credit ratings' information for volatility modelling, with financial gains decreasing with higher risk aversion.

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## 1. Introduction

In the last few years, we have seen the importance of credit rating agencies (Standard and Poor's, Moody's, and Fitch) and their crucial task in providing information on which investors base their decisions. These agencies often had a more important role than the one played by governments. After the 2008–2009 financial and economic crisis, volatility in financial markets has increased markedly in several European Union (EU) countries, notably in the euro area, both in the sovereign debt market and in the equity market segment. While policymakers have looked at rating agencies as a possible source contributing to the increase in financial markets volatility, so far the literature does not seem to have tackled the link with the second moments of those financial variables. Indeed, such volatility may exacerbate the level of financial instability and its unpredictability, since high volatility levels are associated with higher risk perception of market participants. Moreover, such increased volatility and perceived risk can have similar unwarranted effects regarding macroeconomic uncertainty by amplifying output volatility.

The purpose of the present paper is to study the volatility of stock market and sovereign bond market returns in EU countries, notably before and during the 2008–2009 economic and financial crisis. We focus on the role of sovereign credit rating announcements of upgrades and downgrades. Our daily dataset covers the period from January 1995 until October 2011.

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Our contributions encompass the following aspects: (i) we analyse whether countries with higher credit ratings exhibit less volatility than lower rating countries; (ii) we look at differences in the effects of positive versus negative announcements; (iii) we assess whether volatility in some countries reacts to rating announcements of other countries (contagion), and whether there are asymmetries in the transmission of these spillover effects; and (iv) we evaluate the economic significance of the impact of rating announcements on volatility, by quantifying the financial gain and the risk reduction of a portfolio of stocks or bonds that consider this information.

Our analysis is complementary to several areas in finance, particularly on the effects of credit rating announcements on sovereign yields and CDS spreads, and bond and stock market volatility.

Several authors have analysed the effects of credit rating announcements. Krüssl (2005) uses daily sovereign ratings of long-term foreign currency debt from Standard and Poor's and Moody's. For the period between 1997 and 2000, he reports that sovereign rating changes and credit outlooks have a relevant effect on the size and volatility of lending in emerging markets, notably for the case of downgrades and negative outlooks. Also for emerging markets, Reisen and Maltzan (1999) find a significant effect on the government bond yield spread when a country is reviewed for a downgrade.

One of the recurrent conclusions of such studies is that only negative credit rating announcements have significant impacts on yields and CDS spreads; see Reisen and Maltzan (1999), Norden and Weber (2004), Hull et al. (2004), and Krüssl (2005). Micu et al. (2006) perform a similar analysis of the relationship between rating announcements and corporate CDS spreads.

Several other papers analyse contagion after announcements. Ismailescu and Kazemi (2010) assess the effect of sovereign rating announcements on sovereign CDS spreads and possible spillover effects. Using daily observations from 2001 to 2009 for 22 emerging markets, they find that positive events have a greater impact on CDS markets in the two-day period surrounding the event, being then more likely to spill over to other countries. Moreover, they report that a positive credit rating event is more relevant for emerging markets and that markets tend to anticipate negative events. Spillover effects were also reported in Gande and Parsley (2005), Arezki et al. (2011) and Afonso et al. (2012b).

The literature on the effects of rating announcements on volatility is relatively scarcer. Heinke (2006), for corporate bond spreads, and Reisen and Maltzan (1998), for sovereign bond yield spreads, have addressed the relevance of rating events for the historical spread volatility. Heinke (2006) reports that for German eurobonds from international issuers, credit ratings tend to rank the risk of each bond in accordance with the respective bond spread volatility. Moreover, spread volatility increases significantly with lower ratings. Reisen and Maltzan (1998) compute the historical volatility of sovereign bond yield spreads as an average over a window of 30 days. They report a significant change in the level of volatility for bond yield spreads and for real stock market returns when a rating event occurs, with volatility increasing (decreasing) with rating downgrades (upgrades).

Two other papers have analysed the effects of sovereign ratings on stock market volatility. Hooper et al. (2008) use data from 42 countries over the period 1995–2003 and find that upgrades reduce volatility and downgrades increase volatility, but to different extents. Ferreira and Gama (2007) analyse 29 countries over the period 1989–2003 and find similar results. Additionally, they report an asymmetric spillover effect of rating announcement on other countries.

Other studies have focused on the effect of macroeconomic news on bond yields and stock market volatilities. Jones et al. (1998) investigate the reaction of daily Treasury bond prices to the release of US macroeconomic news (employment and producer price index). They study whether the non-autocorrelated new announcements give rise to autocorrelated volatility. They find that announcement-day volatility does not persist, consistent with the immediate incorporation of information into prices. They also find a risk premium on these release dates.

Using a GARCH model, Christiansen (2007) reports a strong statistical evidence of volatility spillover from the US and aggregate European bond markets. For EMU countries, US volatility spillover effects are rather weak whereas for Europe the volatility spillover effects are strong. Gallo and Otranto (2008) identify the transmission mechanisms of volatility between markets within a Markov Switching bivariate model where the state of one variable feeds into the transition probability of the state of the other. They estimate the model on the weekly high–low range of five Asian markets. Their empirical results show plausible market characterisations over the long run with a spillover from Hong Kong to Korea and Thailand.

Billio and Caporin (2010) model the contemporaneous relationships among Asian and American stock markets using a simultaneous equation system with GARCH errors that captures variance spillovers. Using the fitted residuals, they analyse the correlation matrix over rolling windows, which allows a graphical analysis and the development of a statistical test of correlation movements. Their results show evidence of contagion between Asian and American stock markets, and they identified mean relations and variance spillovers. Finally, Engle et al. (2012) use a new class of asymmetric volatility multiplicative error models to study interrelations of equity market volatility in eight East Asian countries before, during, and after the Asian currency crisis. They report that the dynamic propagation of volatility shocks occurs through a network of interdependences, with Hong Kong having a major role as a net creator of volatility.

We add to this literature in two dimensions. First, we focus on the current Euro Area crisis, which provides a different set of countries with distinct characteristics from the previous studies. Understanding contagion effects during the current crisis is of foremost importance for policy makers and market participants. Second, we propose a novel methodology to quantify the economic significance of the rating information for volatility, rather than simply looking at the magnitude of regression coefficients or goodness-of-fit measures. We use the classical mean–variance portfolio choice approach to evaluate the financial gain and the risk reduction of an investor that uses the rating announcement information when making the forecast of time-varying volatility.

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