The Impact of ESMA Regulatory Identifiers on the Quality of Ratings

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Abstract

This paper investigates the impact of the introduction of ESMA credit rating identifiers from April 2012. These identifiers form part of the disclosure requirements placed upon rating agencies under a new EU regulatory regime. Using a rich dataset of sovereign rating actions from Fitch, Moody's and S&P originating from 69 countries for the period 2007-2014, we investigate whether rating quality has changed as a consequence of the new disclosures. The main measure utilised is the link between rating actions and bond yields. We find that the ESMA requirement for identifiers has no discernible effect on the quality of ratings. These findings add to emerging doubts about the effectiveness of recent regulatory interventions in the rating industry.

Keywords: Rating agency regulation, ESMA identifiers, Quality of ratings.

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1. INTRODUCTION

The recent financial crisis brought widespread criticism of the credit rating agencies (CRAs) for their role in its instigation and the subsequent deteriorating economic conditions. During both the sub-prime crisis and the European debt crisis, concerns were raised that the credit rating industry is flawed and that the pre-existing regulation exacerbated the problem by hardwiring ratings into banking and securities regulations (e.g. Hau et al. 2013).

In December 2009, the European Commission (EC) released new laws relating to CRAs.[1] Amongst other requirements, CRAs operating in Europe became obliged to be registered or certified by the European Securities and Markets Authority (ESMA) before performing rating activities (ESMA, 2013). Since April 2012, ESMA requires CRAs to reveal which ratings originate in the EU and which are issued outside the EU but are endorsed. To distinguish between them, the identifiers "EU" and "EE" are assigned. The former case relates to ratings where the lead analyst is based in the EU or within a branch of the EU legal entity. Endorsement (Article 4.3 of EU CRA Regulation) is aimed at CRAs whose ratings are systemically important for the financial stability of the EU (Alcubilla and Pozo, 2011). For the ratings to be classed as endorsed ("EE"), the analyst must be located in a jurisdiction which has a comparable regulatory regime to that of the EU (EC, 2011).

Attaining information and measuring creditworthiness is costly and time consuming for investors, therefore many entrust this task to the CRAs. However, recent evidence shows that poor quality ratings can aggravate a crisis and might lead to cliff effects (Manso, 2013). Despite regulatory efforts aimed at maintaining high quality ratings, relatively little is known about the determinants of ratings quality. Possible determinants of ratings quality include CRAs' incentives, rating-contingent regulation, complexity of rated assets, reputational concerns of CRAs and competition between them (Hau et al. 2013). According to Becker and

1. Formerly known as CRA I Regulation.

Milbourn (2011), the quality of ratings rests on their ability to communicate information to market participants by predicting default and to maintain a stable meaning of risk classification. Low quality ratings might harm the information diffusion of ratings unless all market participants are well informed (sophisticated). Not all investors are able to extract the correct information from the ratings, when interpreting them. This lessens the value of ratings paradoxically to those investors who should be making risk assessments and decisions based on them. As a result, the benefits for the financial system derived from ratings are reduced (Boot et al. 2006; Bolton et al. 2012). Additionally, low quality ratings complicate regulations and make contracting with ratings more difficult. Finally, ratings quality is at the centre of the policy agenda since it is closely related to banking regulation.

The aim of this study is to assess whether ESMA's requirement for identifiers (from April 2012) led to changes in the quality of ratings assigned by CRAs. We question whether the market works better, in the sense that ratings are more aligned with bond yields. Did the overall quality of ratings improve or not? The quality of ratings refers to the information content which surfaces through the ability of ratings to explain bond yields. For instance, when ratings accurately reflect the risk of an issuer, and therefore correlate highly with its bond yields, they have the power to protect the investor by reducing information asymmetries. The main research question is: *Does the quality of ratings (captured by their informativeness) change after the introduction of ESMA identifiers?*

The closely related literature on ratings quality measures the effect of a market entrant on the rest of the CRA industry (Kisgen and Strahan, 2010; Becker and Milbourn, 2011; Bongaerts et al., 2012; Doherty et al., 2012). Our paper considers the effect of regulatory disclosure requirements (i.e. identifiers) applied to the incumbent CRAs. It is important to investigate the effect of disclosure rules because ESMA's endorsement rules could add credibility to CRAs' opinions. The outcomes of such actions are imperative for future policies and regulations and ensuring that their effect is not contradictory or unanticipated. For instance, Dimitrov et al. (2015) suggest that the US Dodd-Frank Act had an adverse effect on the quality of ratings due to the reputation effect. Following that new regulation, CRAs release lower ratings, publish downgrades with lower information content and are more prone to give false signals.

This novel study is the first attempt to assess the impact of the recent EU CRA regulation in relation to ESMA identifiers. It examines the direct feedback of regulatory authorization on ratings quality. This contrasts with Kisgen and Strahan (2010) who study the price impact of regulation. Assessing the impact of recent regulatory initiatives on the quality of ratings adds to the debate about the influence of CRA regulation in a wider sphere (see Bongaerts et al., 2012; Doherty et al., 2012; Dimitrov et al., 2015). Most of the prior related research addresses time periods prior to the recent EU regulatory regime.[2] Our attention on the quality of sovereign ratings is of importance for practitioners and governments alike because sovereign ratings influence government funding as well as having a strong effect on ratings in other asset classes including banks and corporates.

The structure of this paper is as follows. Sections 2 and 3 introduce the background of the EU CRA Regulation regime along with a summary of the relevant academic literature. Section 4 presents the data and descriptive statistics then Section 5 describes the methodology. Section 6 reports empirical results and Section 7 concludes the study.

2. For instance, Bongaerts et al., (2012) explore a sample between 2002 and 2008. Becker and Milbourn (2011) utilize a sample from 1995 to 2006 while Kisgen and Strahan (2010) use the period between 2001 and 2005. Our data sample comprises sovereign ratings from Fitch, Moody's and S&P originating from 69 countries and covers the period between Sept 2007- Sept 2014.

2. RECENT REGULATORY DEVELOPMENTS

2.1. Disclosure rules

The recent EU regulatory initiatives aim at reducing conflicts of interest, overreliance on ratings and spillover effects, increasing independence and soundness of rating processes and improving quality of rating methodologies and ratings (ECB, 2012). To influence the quality of ratings, ESMA requires CRAs to be registered as a regulated agency in the EU to be able to endorse ratings (into the EU) which are originated outside the EU. To meet the equivalence regime, endorsed ratings must be assigned in a jurisdiction which operates a regulatory regime for CRAs which is "at least as stringent as the relevant EU rules" (EC, 2011).

The interpretation of the endorsement rules caused debates between national authorities, CRAs themselves and the EC (Alcubilla and Pozo, 2011). The views split since market participants and leading CRAs deduce that requirements should rest on the *conduct* of the third country CRAs' operations whereas the EC provides that requirements should be formed around the *legislation* of that jurisdiction. A joint declaration was submitted to the EU Council in 2010 where concerned countries[3] demanded clarification and updating of the regulation. There were fears that few countries might be considered equivalently stringent relative to the EU regulation and therefore a high number of ratings would be withdrawn since they could not be used for regulatory purposes. In effect this would lead to the amplification of the regulatory capital held by financial firms as fewer ratings would be available for standardised approach calculations and securitization purposes. Further, limited endorsement of foreign ratings could impede market liquidity within Europe and lead to intensification of risk in the market. In response to these issues, ESMA published its final guidance on the subject in May 2011, which confirmed the earlier interpretation (ESMA, 2011a).

3. Declaration submitted by: UK, Spain, the Netherlands, Sweden, Austria, Finland, Hungary and Ireland. EU Council 2344th meeting in Brussels (8, 10, 13 December) 2010.

The endorsement permits CRAs which operate and are registered in the EU to authorise ratings of entities which are part of their own groups and which operate outside the EU. Both the ratings assigned in the EU as well as ratings from non-EU countries but endorsed based on the equivalence regime can be used for regulatory purposes (e.g. by banks).

The equivalence tests conducted by ESMA, announced before April 30 2012, concluded that ratings originating from Argentina, Australia, Brazil, Canada, Hong Kong, Japan, Mexico, Singapore and the United States fulfil this requirement. Since that date, market participants in the EU (e.g. banks calculating capital adequacy positions) are forbidden from using ratings originating from unrecognised jurisdictions for regulatory purposes.

2.2. The objective of identifiers

Steven Maijoor (ESMA chair) commented that endorsing ratings from third countries enables supervisory integration of the CRAs. Greater co-operation between outside supervisors benefits the functioning of financial markets and protects investors in the EU (ESMA, 2011b). According to the EC, a CRA in a third country needs to conform to supervisory customs in the EU. Identifiers help to achieve this by disseminating information amongst investors. The regulators try to ensure that, in the current framework, "users of ratings in the EU benefit from equivalent protections in terms of a CRA's integrity, transparency, good governance and reliability" (ESMA, 2011c).

When assessing the equivalence of third countries, the rules incorporate all provisions of the CRAs EU Regulation.[4] The equivalence in quality of ratings and methodologies (enabled through the identifiers) helps to protect the stability of financial markets. High quality ratings lead to improved efficiency of capital markets and improve transparency and competition (ESMA, 2011c). For example, inflated ratings might result in undercapitalisation of

4. (i) extent of regulatory and supervisory framework; (ii) corporate governance; (iii) conflict of interest; (iv) organisational constraints; (v) quality of methodologies and ratings; (vi) disclosure rules; (vii) supervision and enforcement rules.

concerned entities and pose a stability threat to the system. On the other hand, ratings which overestimate the risk and are too stringent, might enforce excessive capital constraints on banks or other issuers, inducing costs on the entire economy.

3. RELEVANT RATING LITERATURE

Although credit ratings play a vital role in financial markets and the literature on credit ratings is voluminous, research which specifically investigates ratings quality is surprisingly limited. The first relevant stream of prior literature concentrates on the information content of ratings which is approached by considering the association between credit ratings (or their changes) and bond yields (or their changes) (Hand et al., 1992; Ederington and Goh, 1998; Becker and Milbourn, 2011). This often takes the form of natural experiments (Kliger and Sarig, 2000; Jorion et al., 2005; Tang, 2009). Other studies focus on the effect of ratings on the supply of debt capital with the use of leverage (instead of cost of capital) as a dependent variable (Faulkender and Peterson, 2006; Kisgen, 2006, 2009; Sufi, 2009). According to Kisgen (2006), around the time when a new rating is to be published, companies are found to reduce their leverage. Moreover, subsequent to a downgrade, a firm is more likely to reduce its leverage in the hope of regaining its previous rating (Kisgen, 2009). The strongest effect can be observed around the investment/speculative threshold.

Kisgen and Strahan (2010) differs because they investigate the regulatory influence of various levels of ratings, and not the impact of having a rating, on bond yields. Using the certification of Dominion Bond Rating Service (DBRS) for regulatory purposes in 2003, the authors establish that rating-contingent regulation influences a firm's cost of debt capital (bond yields). The natural experiment finds the effect to be asymmetric, namely only better ratings of the newly certified CRA in contrast to the other CRAs correspond to a decline in firms' cost of capital. Moreover, the results also support Bongaerts et al. (2012) who state that ratings by Fitch are important mainly due to regulatory reasons as they are known to "break the tie" between Moody's and S&P when they differ. Both studies find results to be stronger around the investment-grade cut-off where the impact of regulatory restraint is the most binding. Purda et al. (2015) relates to these studies with regards to reliability of ratings and their use in regulations. These authors find that attaining an additional rating from a regulated CRA alters the required yield on firms' bonds.

Similarly to these studies, the impact of regulation on the rating industry is mainly examined by looking at the effect of entry of a regulated CRA and the corresponding effect of increased competition on the rest of the CRA industry (Becker and Milbourn, 2011; Doherty et al., 2012; Bongaerts et al., 2012). Faure-Grimaud et al. (2009) suggest that competition amongst CRAs might result in reduced information revelation to the market. In Becker and Milbourn (2011), the quality of ratings is defined as the ability of ratings to transmit reliable information to market participants and their ability to categorise the risk of a rated product. The latter relates to the fact that rating classifications are durable and do not change frequently. Classification is especially important for regulations since they require stable interpretations of ratings when they are used in contracts and capital requirements. For this reason, ratings higher than they should otherwise be, are considered to be a lower quality of ratings. The quality of ratings is measured in terms of their informativeness, in three ways: (i) the rating levels[5]; (ii) correlation between ratings and market implied yields[6] and (iii) default rates compared against the current ratings or investment grade dummy variables.[7]

Bolton et al. (2012), Bar-Isaac and Shapiro (2013) and Dimitrov et al. (2015) confirm that the overall quality of ratings drops with increased competition. Bolton et al. (2012) conclude that increased competition between CRAs might lead to increased rating shopping and as a result a decreased wealth effect. They find that when more naïve investors are present the

5. Where any rating inflation conveys decreasing rating quality.
6. Where higher correlations are expected to signal higher quality of ratings and vice versa.
7. To verify whether the ratings are good predictors of default.

countercyclical quality of ratings is reinforced. This is based on the notion that the reputation costs are not significant therefore the incentives to provide high quality ratings diminish. In contrast with these studies, Doherty et al (2012) study the insurance market (not bond market) and find that the new entrant CRA chooses higher standards than the incumbent company. Unlike in Becker and Milbourn (2011), who observe transition in competition from two to three agencies, they capture the conversion from monopoly to duopoly. These authors proxy ratings quality (informativeness) using the insurer's probability of default calculated with a discrete-time hazard model. They conclude that increased competition results in improved precision of default rate estimates.

In other papers, the default rate probability is referred to as rating accuracy (Cantor and Mann, 2007; Kiff et al., 2012). The existing proxies of accuracy include different market-based measures of default risk, investment-grade default rates, or average rating levels prior to default (Altman and Rijken, 2004; Löffler 2004). Since CRAs face a dilemma whereby greater accuracy is at the expense of rating stability, they apply additional credit warnings such as outlook and watch status (Hamilton and Cantor, 2004). Bannier and Hirsch (2010) find that the introduction of the watchlist instrument by Moody's in 1991 improved the informativeness to market participants. This is because the rating changes of entities placed on the watchlist reveal different information to the market than do direct rating changes of issuers not subject to watchlist status. The study supplements literature on the responses of CRAs to regulatory pressures similarly to Cheng and Neamtiu (2009). They find that CRAs increase the timeliness and accuracy of ratings in response to the threat to their market power.

The related literature on the effect of regulation which does not constitute a competition aspect is very scarce. Lemmon and Roberts (2010) use bond market data to measure the impact of intensifying regulation imposed by NAIC[8] in 1990 and coinciding restrictions on

8. National Association of Insurance Companies (NAIC).

saving and loan investment on the distribution of financing and investment. They find that a shock in supply of credit (i.e., contraction) strongly affects firms' financing and investment. Moreover, Ellul et al. (2011) conclude that insurance companies which are strongly constrained by regulation are more likely to fire-sale bonds which fall below investment grade. These authors stress that this causes the prices of bonds to plummet below their fundamental value which sheds light on the possible effect of regulatory pressures on market imbalances. A theoretical paper by Opp et al. (2013) suggests that ratings-contingent regulation diminishes the incentives of CRAs for information provision. The framework integrates the applicability of ratings for regulatory purposes and its effect on rating quality. Namely, there is known to exist a threshold level of regulatory gain beyond which the regulatory arbitrage brings in the same advantage as delegated information attainment by the CRA. When issuers receive favourable rating treatment and its economic advantage is higher than that of obtaining information, regulation causes the collapse of the information provision process and leads to ratings inflation. Similarly to Mathis et al. (2009) and Skreta and Veldkamp (2009), the study suggests that it might be cost-effective for CRAs to release lower-quality ratings instead of dealing with complicated bank structures. This is especially important since ratings are found to shape prices via the channel of regulation independent of the actual risk they signal to the market (Ashcraft et al., 2011; Kisgen and Strahan, 2010).

Inflated ratings might be conflicting with the reputational concerns of CRAs (Cantor and Packer, 1995). However, it has been documented that the incentive to release high-quality ratings drops when the economy is booming, thereby suggesting counter cyclicality in ratings quality (Bar-Isaac and Shapiro, 2013; Hau et al., 2013; Opp et al., 2013). Hau et al. (2013) find that bank characteristics can influence bank ratings quality.

4. DESIGN OF THE STUDY

Changes in the quality of ratings are assessed in the 'before' and 'after' sense with the introduction of ESMA identifiers in April 2012. The beginning of the sample period (Sept 2007) is chosen as it does not coincide with any major regulatory change in Europe nor the U.S.[9]

We use sovereign ratings by three main rating agencies (Fitch, Moody's and S&P) to explore if there is variation in the way they rate the same bonds (i.e. bond rating) depending on the location of the analyst. For example (at the time of writing), Moody's rates the sovereign bonds of Belarus, Croatia, Romania, Russia, Serbia, Slovakia and Ukraine outside the EU (EE identifier) whereas S&P rates them within the EU (EU identifier). Using corporate data would not provide this setting as numerous corporate ratings of Moody's are originated in the EU. Additionally, Williams et al. (2015) suggest that each of the three CRAs makes a unique contribution through their varying rating policies and models.

We investigate whether regulation affected sovereigns (EU registered vs EU endorsed) from both groups to a different extent. Specifically, are EU originated ratings of higher or lower quality in comparison to EU endorsed ratings? The categorical variable (identifier*) EE (EU)* and the interaction between the binary variable Δ*Rating* with *EE (EU)* in Eq.1b attempt to answer this question. The interaction is the key variable reflecting patterns of the rating levels in areas where it might have more pronounced impact with those where it is less influential. To rule out the concern that other issues might have changed over time and influenced the outcome, global time-varying risk factor covariates $(X_{i,t})$ are included.

9. For example, in the aftermath of the Credit Rating Reform Act (September 2006), in June 2007 operative stipulations including registration and supervision were introduced by the SEC. During this time, ten CRAs were registered as NRSROs (Alcubilla and Del Pozo, 2012).

4.1. Data sources

The bond characteristics and pricing data are accessed using Bloomberg L.P. The selection criteria includes publicly placed, unsecured, straight bonds with fixed coupon issued by sovereigns with remaining maturity between 1 to 30 years issued in US dollars. We exclude structured notes, inflation-linked notes, hybrid or dual-currency bonds as well as restructured debt.

All bonds meeting this criteria worldwide result in 812 bonds where 763 have the pricing information available (historical data such as YTM). There are 494 non-US bonds. The availability of bond data predetermined the sovereigns for which rating data was collected. The initial sample included 86 sovereigns. Since we used US Treasury bonds as a benchmark for the sovereign credit spread we exclude the few rating events for the United States in the sample.

Bond spreads, presented in basis points, are calculated by taking the difference between the yield to maturity of the sovereign bond subject to the rating action and subtracting the yield to maturity of the comparable US benchmark bond. Herein we refer to rating action data as credit ratings together with outlook and watch status represented in the 58 point CCR scale (see Section 4.1.1). To decide on the choice of the benchmark bond to be matched to each sovereign bond we choose the bond with the closest remaining maturity and coupon amount.

The long term foreign currency rating information is gathered from the three CRAs' publications. The rating action data is matched with the bond data based on the rating events. Multiple bonds are often observed on the day of the rating action. Unlike Gande and Parsley (2005) who observe one particular bond for each sovereign throughout their sample period, we sample the bond with the highest issue amount per sovereign on the particular rating event date. This enables us to minimise risk of discarding too many bonds for which data is not available. For any one rating event only one bond is observed. The dataset comprises 583 rating events for three CRAs which originate from 69 sovereigns and are represented by 104 individual sovereign bonds. We use 39 U.S. bonds as benchmarks for spread calculations.

4.1.1. Descriptive statistics

We identify rating events using a comprehensive credit rating scale (CCR-58 point) which includes ratings, watch and outlook status. Rating values range between 1-58 as follows: AAA=58, AA+=55, …, CC=7, CCC-=4, C/SD/CC/D=1. For positive watch (outlook) we add +2 (+1) whereas for negative watch (outlook) we subtract 2 (1), respectively. Possible events include merely rating change events (positive/negative), outlook or watch signals (positive/negative) with no corresponding rating events. Further, the combined events (positive/negative) are those when a rating change occurs together with either watch or outlook signal. Lastly, change from negative (positive) watch to negative (positive) outlook is also an event on the 58 point scale. Every increase to the CCR scale is considered a positive event whereas every decrease to the scale is considered a negative event.

Table 1 presents statistics on the credit events of qualifying sovereigns per CRA giving average numerical rating, number of observations, positive and negative events and proportions of the events exceeding the +/-4 CCR points. Overall, the events by one CCR point constitute the biggest share among all CRAs (above 44% for positive events and above 33% for the negative). For this period, qualified sovereigns rated by S&P recorded 119 upgrades and 127 downgrades. Moody's and Fitch show 92 (84) upgrades and 87 (74) downgrades respectively. The highest average numerical rating is observed for Fitch (28) followed by Moody's (27) and S&P (26). Overall S&P releases the highest proportion of downgrades against upgrades in all time periods.[10] S&P being the most conservative corresponds with prior literature (e.g. Alsakka and ap Gwilym, 2010). Fitch has the highest

10. With the exception of Moody's in the post-event period who issue 54% downgrades against 46% upgrades.

proportion (31%) of positive actions by more than 4 CCR points. In terms of downgrades Moody's delivered the highest proportion of 4 and above CCR points drops (41%).

We also partition the sample into the pre-regulatory (Sept 2007-April 2012) and post-regulatory period (May 2012-Sept 2014). From the total 583 events, 314 (269) actions occur in pre-event (post-event) period. Positive (negative) actions in the first period constitute 52% (48%) of events whereas they amount to 49% (51%) in the second period. Interestingly, the average rating is higher in the pre-event period and drops in the post-event phase.

Table 2 illustrates basic statistical properties of three event samples. For instance, the pooled sample for S&P (Moody's), including cumulative two-day [0,+1] yield spread is represented by a mean of 2.11 (0.32)% and a standard deviation of 38.15 (36.79) %. For Fitch the former amounts to -0.08 with standard deviation of 34.86%. The mean term to maturity is the highest for Moody's sub-sample (8.1 years with S.D. of 5.51) followed by S&P (7.62 years with S.D. 5.15) and Fitch (7.59 with S.D. 4.2). Further list of statistics representing the variables used in the multivariate analysis can be found in Table 2.

Following Ferreira and Gama (2007), we construct a sample of non-events where each bond on the rating event date is randomly assigned a non-event date. The reasoning behind using non-events together with the events data lies in the fact if the model was estimated using only the latter we would be measuring the incremental change of rating action exceeding one notch (3 CCR points in 58-point scale) in the yield spreads (Gande and Parsley, 2005).

The non-event sample is compiled in the same time frame as the event sample whereas it includes only clean observations. A clean observation is defined as:

a) no credit event for that sovereign issued by any of the three CRAs in a time window of 30 days before and after the non-event date.

b) no credit event regarding the U.S. sovereign issued by any of the three CRAs in the window of 30 days prior and post the non-event date.

c) not within proximity of the date of the regulatory change regarding disclosure (30 April 2012), specifically within a window of 30 days prior and post that event.

Additionally, when the non-event date is being matched to the event date recorded in the pre-regulatory period (September 2007-April 2012), only the clean observations from this period are available for random selection. Equivalently, when the non-event is matched to an event date which took place after the regulation cut-off date (May 2012-September 2014) only clean non-event observations in that pool are available.

The non-event sample for each CRA equals the same number of observations as the event sample (583 total, 246 S&P, 179 Moody's, 158 Fitch) which results in a total sample of 1166 observations with 492 for S&P, 358 for Moody's and for 316 Fitch sub-samples respectively.

5. MULTIVARIATE ANALYSIS

5.1. Measures of quality

Following the empirical literature (see Section 3), the quality of ratings is captured by the information content of ratings (Kisgen and Strahan, 2010; Becker and Milbourn, 2011).

The quality is examined by testing whether the market is more aligned with ratings through bond yields after the certification period. Because bond prices change far more frequently than ratings, we look at the change in informativeness (accuracy) levels rather than absolute match to market measures. Kliger and Sarig (2000) suggest using rating changes, rather than actual rating levels, because in this setting each firm controls for itself meaning that all price relevant elements are included. Specifically, we test whether rating changes are able to explain bond yield changes (decreases or increases in bond spreads). This capability differentiates ratings into less or more informative. To do this, we compare the correlations between the credit ratings changes and the bond yields changes prior and post the regulatory event date. High quality ratings are expected to explain bond values by correlating strongly with the bond yields. Low quality ratings, on the other hand, reveal factors other than the expected repayment (pay-off), and thus correlate less with the yields on bonds. The second proposition ultimately tests whether ratings encompass information regarding bond values, other than the easily detected properties including bond contracts and issuers' fixed effects.

We run Ordinary Least Squares (OLS) regressions, where the change in bond yield spread is regressed on change in credit ratings, an indicator variable depicting regulation which is defined in two ways (Eq. 1a & Eq. 1b), a vector of global risk characteristics, ratings on the 58 CCR scale followed by bond characteristics and year and/or country fixed effects. Outliers in sub-samples are identified using the MM-robust regression method (similar to Kurov (2010)) and excluded before estimation.

Similar to Livingston et al. (2010), separate sets of regressions for rating upgrades and downgrades are used. Unlike their paper we test that for each of the three CRAs. The rationale for benchmark regressions is to observe whether the rating actions result in substantial information content for the sovereigns bonds and whether bonds react differently to the actions issued by each agency.

In the first specification, we measure the effect of disclosure rules by ESMA using a *Regulation* dummy as well as its interaction with the (change in) sovereign bond ratings (Eq.1a).

$$\begin{aligned}\Delta \text{Yield}_{i,t} &= \beta_1 \Delta \text{Rating}_{i,t} + \beta_2 \text{Regulation}_{i,t} + \beta_3 (\Delta \text{Rating} * \text{Regulation})_{i,t} + \beta_4 \text{Rating58}_{i,t} + \beta_5 \text{X}_{i,t} \\ &+ \beta_6 \text{Maturity}_{i,t} + \lambda_1 \text{CF} + \gamma_1 \text{YF} + \varepsilon_{i,t}\end{aligned}$$

$$\varepsilon_{i,t} \approx N(0,1) \qquad (1a)$$

Where $\Delta Yield_{i,t}$ is the change in yield spread to the closest maturity Treasury Bond *i*- country, *t*- day in the time window [0, +1] expressed in basis points.[11]

Δ*Rating* is the change in sovereign issuer CCR by one of the three CRAs coded as absolute ordinal values 0, 1, 2, 3 for ease of interpretation. The coefficient β_1 resembles the marginal effect of yield spreads as a result of a unit change in the CCR scale (on the event date and zero on the non-event date). For negative events (downgrade in CCR sovereign rating) we are expecting a positive sign as the yields spreads increase to reflect the underlying risk on the bonds. On the other hand, the positive events (upgrade in CCR) lead to decreased risk for investors (i.e. spreads are narrowing) hence we are expecting a negative sign.

Regulation indicator variable equals 1 after the endorsement rules introduced by ESMA took their final effect on April 30 2012, 0 otherwise.

Δ*Rating***Regulation,* the key variable in this model, measures the linkage between quality of ratings and ESMA's requirement for identifiers rules by observing correlations between ratings and yields in the post-intervention period. In the case of positive rating changes, if the sign is negative (corresponding to the expected sign on the Δ*Rating* variable) and significant, the effect of rating changes on bond yields is stronger in the post regulatory period. This corresponds to a higher quality of ratings. If on the other hand, the interaction produces a positive significant coefficient, the effect is weaker and implying that ratings are of lower quality. Similarly, in the case of negative events, if the interaction has a positive significant coefficient we detect stronger links between rating changes and spreads after the regulation took place, indicating higher quality of ratings. Conversely, if the sign is negative there is a weaker effect suggesting lower quality of ratings.

11. Similarly to Gande and Parsley (2005) and Ferreira and Gama (2007) we use this window to minimise the impact of clusters of credit events that could possibly affect our results.

Rating58 represents the sovereign's CCR taking values 1-58 and represents a proxy for the macroeconomic conditions of the sovereigns considered in the sample.

$X_{i,t}$ is a set of global risk factors. Following Longstaff and Schwartz (1995), Favero et al. (2010), Christopher et al. (2012) and Eichler (2014) we include one of three risk factors on the right hand side. These include CBOE VIX volatility index, Treasury rate (5 years maturity), and interest rate swap spreads (5 years maturity). All data is accessed from Bloomberg. The factors (index or rates) are in the form of the logarithmic changes in the window [0, +1] around the event. Since the bond spreads are calculated using the U.S. benchmark we use U.S. based measures of international risk due to exogeneity to the rest of the data sample.

$Maturity_{i,t}$ is the bond's time to maturity and deals with possible heterogeneity among spread changes which derive due to differences in the remaining years to maturity of bonds. We take the natural logarithm of the remaining years to maturity of the bond *i* on the event date *t*.

CF and TF are country (year) fixed effects respectively. They control for geographic and time specific effects (trends).

The second specification uses most of the previous variables. However, instead of using the *Regulation* indicator variable it defines the regulation using the *EE* and *EU* dummies, together with their interactions with the change in sovereign ratings Δ*Rating*.

$$\Delta \text{Yield}_{i,t} = \beta_1 \Delta \text{Rating}_{i,t} + \beta_2 \text{EE}_{i,t} + \beta_3 \text{EU}_{i,t} + \beta_4 (\Delta \text{Rating} * \text{EE})_{i,t} + \beta_5 (\Delta \text{Rating} * \text{EU})_{i,t} + \beta_6 \text{Rating58}_{i,t} + \beta_7 \text{X}_{i,t} + \beta_8 \text{Maturity}_{i,t} + \lambda_1 \text{CF} + \gamma_1 \text{YF} + \varepsilon_{i,t}$$

$$\varepsilon_{i,t} \approx N(0,1) \qquad \text{(1b)}$$

EE (EU) specifies whether the rating is EU endorsed (EU originated) in the post-regulatory period (30 April 2012) by taking value of 1, 0 otherwise.

*ΔRating*EE/EU* tests whether any change in rating quality depends on the identifiers and hence the location of the analyst. Here we are testing whether ratings originated outside the EU induce more (less) reaction in yield spreads than the ratings issued in the EU. For instance, if the interaction *ΔRating*EE,* tested on the positive events sample, produces a negative significant coefficient, this implies a stronger link between bond yields and ratings in the post-regulation period when the rating is endorsed (rather than originated in the EU). If the sign is positive and significant, the effect between yields and ratings is decreased, implying a lower quality of ratings in the post-regulation period when the ratings are assigned the EE identifier. The same logic applies to negative events, i.e. when the coefficient on the interaction is positive and significant it means that the sovereign rating assigned by the analyst outside the EU in the post-event period is of better quality. Finally, when the sign is negative there is a weaker link between the spreads and ratings in the post-regulation period for ratings issued in a jurisdiction outside the EU.

6. EMPIRICAL RESULTS

Specifications a and b in Tables 3-5 present the results of Eq. (1a) and Eq. (1b) for the three CRAs by separating positive (Panel I) and negative events (Panel II). The coefficient on Δ*Rating* has the expected sign for all CRAs in the majority of specifications. However, only positive events by S&P and negative events by Fitch have significant coefficients for the effect on bond yields. The second specification (b) minimally improves explanatory power of the model for all sub-samples for the three CRAs.

The negative relationship between S&P rating upgrades and yields is significant (at 1%) and economically relevant (see Panel I Table 3). The estimates remain robust to the inclusion of country[12] and/or year fixed effects, which control for unobserved differences across the

12. Additionally, we performed the same exercise using regional instead of country dummies, for all CRAs, but the results were similar.

time or country spectrum. The coefficient in specification b (IV) suggests that bond spreads narrow by 9.57 (3.19*3) basis points after S&P issues an upgrade by one notch (three CCR points). This suggests a strong link between ratings and bond spreads. Negative events of S&P do not demonstrate a strong link with the spreads. The presented results for S&P do not find evidence of the impact of regulation on rating quality neither via the interaction (Δ*Rating*Regulation)* in specification (a) nor via the use of identifiers (*ΔRating*EE/EU)* in specification (b).

The coefficients for market reactions to Moody's rating changes have the expected sign for both positive and negative events, however these are insignificant. The 58 CCR scale rating (*Rating58*) in Panel I is negative and significant across specifications implying the higher the rating by Moody's the lower the yield on the sovereign. We do not find any evidence that the effect is stronger or weaker for sovereigns with ratings issued either in the EU or outside.

Fitch negative events yield significant and economically relevant results for bond spreads. Average bond spreads increase in the given time window by up to 11.37 (3.79*3) basis points when Fitch issues a one notch downgrade. Specification b (I and II) suggests that the effect on yields of sovereign bonds originated outside EU (EE identifier) in the post-event period is weaker. This indicates lower quality of these ratings, but the results are only significant at 10%. For the rest of the specifications there is no visible effect of regulation on the quality of ratings.

Inclusion of the global risk factor in the model considerably strengthens the explanatory power, especially in the negative events samples for S&P and Moody's. In addition to using country and/or year fixed effects, it protects from the omitted variable bias. The importance of including international exposure to common risks when predicting sovereign spreads has been stressed in the literature (Favero et al., 2010). Among the three global risk factors suggested in Section 5.1, in Tables 3-5 we present only the interest rate swap spreads as they bring the most explanatory benefits. The yield spreads are found to positively correlate with the swap spreads.[13]

7. CONCLUSION

Using an extensive sovereign rating sample from Fitch, Moody's and S&P originating from 69 countries and covering the period Sept 2007-Sept 2014, we investigate the impact of the recent EU CRA regulation with regards to ESMA identifiers. The regulation, which took effect in April 2012, obliges CRAs to identify the location of the analysts assigning a rating, which can be either the EU or a jurisdiction outside the EU with a comparable regulatory regime to that of the EU. It is imperative to investigate the effect of disclosure rules by ESMA on the market as there are fears that endorsement rules might add credibility to CRAs and as a result make ratings more, rather than less, influential.

The study lies within the literature measuring the quality of ratings from the information content angle, which is limited. The quality refers to the ability of ratings to explain bond yields. With contrast to the recent literature (Kisgen and Strahan, 2010; Becker and Milbourn, 2011; Bongaerts et al., 2012) our study does not measure the effect of entry of a new player (i.e., competition levels among the CRAs) on the quality of ratings. We look directly at the information disclosure rules applied to the already existing CRAs.

The majority of rating changes fall at 1 or 2 CCR points suggesting that all CRAs rely considerably on the outlook and watch signals to imply future downgrades and upgrades. Similarly to Alsakka and ap Gwilym (2010), we find that S&P is the most conservative among the three CRAs by issuing the highest proportion of downgrades during the sample period. S&P also represents the lowest mean value of ratings in both pre- and post-regulatory periods. Interestingly, positive actions by S&P have a stronger effect on sovereign yields than

13. The volatility index (Treasury rate) is inversely (positively) related to the sovereign bond yields. Although results are not reported in the interests of brevity they are available on request.

the negative ones. In this setting we assume that high quality ratings are expected to explain bond values by correlating strongly with the bond yields, therefore the positive actions by S&P are of higher quality. This could imply that S&P dedicates more time to issue ratings which are not inflated to avoid penalties from the regulators and protect their reputation (Dimitrov et al., 2015). There is no evidence, however, that the rating quality improved after the introduction of identifiers. In other words, the quality of S&P positive actions was high to start with and remained at that level throughout the sample, regardless of regulatory pressures.[14]

The opposite is true for Fitch. Although the CRA issues the highest proportion of positive actions by more than 4 CCR points we find that upgrades have a poor connection with bond spreads suggesting their lower quality. The negative events by Fitch have the strongest effect on bond spreads amongst the three CRAs, yielding statistically significant and economically relevant results. Except for two specifications, where there is a minor link between identifiers and rating quality, the Fitch subsample does not provide evidence on the impact of the ESMA regulation on quality of ratings. The results by Moody's also do not yield significant results, therefore we infer that the identifiers do not have any discernible effect on rating quality. These findings resonate with Dimitrov et al. (2015), who find that the US Dodd-Frank Act did not result in more accurate nor more informative ratings. This lends support to an emerging viewpoint that EU CRA regulation did not achieve the desired effects, at least with regards to the disclosure rules and the use of identifiers.

This study will be of interest to policymakers, market participants and academics alike. The quality of ratings inspected in the current setting is an underdeveloped area in the empirical literature. It is also closely linked to banking regulation and maintaining financial

14. The same logic applies to negative events by S&P. Namely negative ratings were of poorer quality and remained as such regardless of the introduced regulation.

stability. The effects of recent EU CRA regulation are at a preliminary stage yet current evidence is questioning the effectiveness of the regime.

Table 1 Credit events

Entire sample	**S&P**		**Moody's**		**Fitch**		**Total**
Observations	246		179		158		583
Average numerical rating	26		27		28		
Upgrade by 1 CCR point	62	52.10%	49	53.26%	37	44.05%	148
Upgrade by > 3 CCR point	31	26.05%	18	19.57%	26	30.95%	75
Downgrade by 1 CCR point	59	46.46%	29	33.33%	32	43.24%	120
Downgrade by > 3 CCR point	44	34.65%	36	41.38%	27	36.49%	107
Positive events	119	48.37%	92	51.40%	84	53.16%	295
Negative events	127	51.63%	87	48.60%	74	46.84%	288
Total no of events	246	100.00%	179	100.00%	158	100.00%	583
Pre-regulatory							
Observations	126		98		90		314
Average numerical rating	27		27		29		
Upgrade by 1 CCR point	28	45.90%	31	56.36%	20	41.67%	79
Upgrade by > 3 CCR point	21	32.31%	9	16.36%	15	31.25%	45
Downgrade by 1 CCR point	28	43.08%	13	30.23%	19	45.24%	60
Downgrade by > 3 CCR point	25	19.84%	20	46.51%	16	38.10%	61
Positive events	61	48.41%	55	56.12%	48	53.33%	164
Negative events	65	51.59%	43	43.88%	42	46.67%	150
Total no of events	126	100.00%	98	100.00%	90	100.00%	314
Post-regulatory							
Observations	120		81		68		269
Average numerical rating	25		26		27		
Upgrade by 1 CCR point	34	58.62%	18	48.65%	17	47.22%	69
Upgrade by > 3 CCR point	10	16.13%	9	24.32%	11	30.56%	30
Downgrade by 1 CCR point	31	50.00%	16	36.36%	13	40.63%	60
Downgrade by > 3 CCR point	19	15.83%	16	36.36%	11	34.38%	46
Positive events	58	48.33%	37	45.68%	36	52.94%	131
Negative events	62	51.67%	44	54.32%	32	47.06%	138
Total no of events	120	100.00%	81	100.00%	68	100.00%	269

Notes: This table presents summary statistics for the credit rating dataset, which includes daily pooled sovereign rating observations by S&P, Moody's and Fitch including outlook and watch originating from 69 countries for pre-regulatory (Sept 2007-April 2012) and post-regulatory (May 2012-Sept 2014) periods.

Table 2 Data summary of credit events for events sample

Sample	S&P	Moody's	Fitch
No of countries	64	49	49
No of sovereign bonds	83	61	62
No of benchmark bonds	35	34	30
Mean ΔYield	2.11	0.32	-0.084
S.D. ΔYield	38.15	36.79	34.86
Mean ΔCCR Positive events (abs. 1-3)	0.84	0.85	0.993
S.D. ΔCCR Positive events (abs. 1-3)	1.05	1	1.12
Mean ΔCCR Negative events (abs. 1-3)	0.97	1.01	0.89
S.D. ΔCCR Negative events (abs. 1-3)	1.14	1.2	1.14
Mean Rating58 (1-58)	26	27	28
S.D. Rating58 (1-58)	12.15	12.11	11.73
Mean term to maturity (years)	7.62	8.1	7.59
S.D. term to maturity (years)	5.15	5.51	4.2
Mean coupon rate (%)	7.02	6.9	6.72
S.D. coupon rate (%)	2.27	2.15	2.08
Mean amount issued (billion USD)	1.3	1.22	1.37
S.D. amount issued (billion USD)	1.44	1.28	1.28
Mean CBOE VIX	20.64	20.39	20.61
S.D. CBOE VIX	9.9	9.2	9.95
Mean Treasury rate (5 years maturity)	1.52	1.61	1.54
S.D. Treasury rate (5 years maturity)	0.69	0.69	0.64
Mean Interest rates swap spreads (5 years maturity)	28.32	28.04	27.61
S.D. Interest rates swap spreads (5 years maturity)	22.92	22.41	19.99

Notes: This table presents summary statistics of credit events for each CRA for 69 sovereigns from Sept 2007 to Sept 2014. $\Delta Yield_{i,t}$ is the change in yield spread to the closest maturity Treasury Bond i- country, t- day in the time window [0, +1]. ΔCCR Positive (Negative) events is the change in sovereign issuer or issue CCR coded as absolute ordinal values 1, 2, 3. *Rating58* represents sovereign's CCR taking values 1-58. CBOE VIX volatility index, Treasury rate and interest rates swap spreads are three global risk factors. Since the bond spreads are calculated using the U.S. benchmark we use U.S. measure of international risk as it is exogenous to the rest of data sample. $Maturity_{i,t}$ is bond's time to maturity and deals with possible heterogeneity among spread changes which derive due to distinctive remaining years to maturity of bonds.

Table 3 S&P

Panel I Positive events	Specification a				Specification b			
VARIABLES	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
ΔRating	-2.4159***	-2.7271***	-2.6844***	-3.1171***	-2.4174***	-2.7286***	-2.7973***	-3.1899***
	(-2.92)	(-3.24)	(-3.02)	(-3.47)	(-2.91)	(-3.23)	(-3.14)	(-3.54)
Regulation	0.3351	-2.0433	0.4420	-1.1311				
	(0.18)	(-0.58)	(0.16)	(-0.27)				
ΔRating*Regulation	1.7029	1.8290	1.7798	2.0527				
	(1.32)	(1.40)	(1.30)	(1.49)				
Rating58	0.0917	0.0609	0.4729	0.3120	0.0885	0.0579	0.6913**	0.5087
	(1.54)	(1.00)	(1.65)	(0.99)	(1.47)	(0.94)	(2.14)	(1.39)
Maturity	0.2716	0.5581	0.2607	1.0928	0.2924	0.5657	0.1350	0.5477
	(0.27)	(0.53)	(0.12)	(0.39)	(0.28)	(0.54)	(0.06)	(0.19)
Global risk	15.3692	19.0476	5.1575	8.6542	15.5881	19.2029	8.4494	10.7810
	(1.14)	(1.40)	(0.34)	(0.58)	(1.15)	(1.41)	(0.56)	(0.71)
EE					0.0290	-2.2016	-2.7929	-3.4194
					(0.01)	(-0.58)	(-0.76)	(-0.70)
EU					0.5029	-1.7757	3.4696	1.1991
					(0.24)	(-0.48)	(1.00)	(0.25)
ΔRating*EE					1.4593	1.6334	1.8079	2.0303
					(0.90)	(1.00)	(1.07)	(1.19)
ΔRating *EU					2.0622	2.1315	1.9867	2.1943
					(1.24)	(1.28)	(1.14)	(1.25)
Observations	236	236	236	236	236	236	236	236
R-squared	0.0668	0.1123	0.2480	0.2984	0.0681	0.1133	0.2572	0.3030
ll	-880.6	-874.7	-855.1	-846.9	-880.4	-874.5	-853.6	-846.1
year fe	no	yes	no	yes	no	yes	no	Yes
country fe	no	no	yes	yes	no	no	yes	yes

Table 3 Continued

PANEL II Negative events	Specification a				Specification b			
VARIABLES	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
ΔRating	1.8618	1.8582	1.5068	1.7102	1.8707	1.8667	1.5272	1.7240
	(1.16)	(1.10)	(0.83)	(0.90)	(1.17)	(1.11)	(0.84)	(0.91)
Regulation	1.3003	-3.0582	-0.4518	-8.3840				
	(0.37)	(-0.45)	(-0.08)	(-1.02)				
ΔRating*Regulation	0.9606	0.6798	1.6601	1.3352				
	(0.40)	(0.27)	(0.64)	(0.49)				
Rating58	0.1258	0.1091	-0.2818	-0.0361	0.1323	0.1178	-0.2577	-0.0092
	(1.10)	(0.93)	(-0.55)	(-0.06)	(1.16)	(1.00)	(-0.50)	(-0.02)
Maturity	1.0667	1.3676	0.8101	3.6287	1.1139	1.5578	0.6072	3.7190
	(0.52)	(0.63)	(0.15)	(0.62)	(0.53)	(0.69)	(0.11)	(0.62)
Global risk	35.5444	39.7877	45.3697	58.4469*	35.6377	39.7435	44.1384	56.7282*
	(1.41)	(1.54)	(1.51)	(1.89)	(1.41)	(1.53)	(1.47)	(1.83)
EE					-3.9593	-8.7151	-5.8765	-12.8557
					(-0.81)	(-1.10)	(-0.70)	(-1.20)
EU					4.2083	-0.5227	2.1319	-6.0327
					(1.05)	(-0.08)	(0.36)	(-0.70)
ΔRating*EE					5.1612	4.5926	5.7083	4.8820
					(1.54)	(1.31)	(1.58)	(1.28)
ΔRating *EU					-1.4662	-1.3836	-0.7330	-0.5704
					(-0.53)	(-0.49)	(-0.24)	(-0.18)
Observations	240	240	240	240	240	240	240	240
R-squared	0.0291	0.0447	0.1141	0.1442	0.0436	0.0567	0.1260	0.1523
ll	-1063	-1061	-1052	-1048	-1061	-1060	-1050	-1047
year fe	no	yes	no	yes	no	yes	no	yes
country fe	no	no	yes	yes	no	no	yes	yes

Notes: This table presents the estimated coefficients and robust z-statistics in parentheses from specifications of Eq. (1a) and (1b) using Ordinary Least Squares. The credit rating dataset consists of daily pooled positive sovereign events by S&P in 58 CCR scale originating from 64 countries for pre-regulatory (Sept 2007-April 2012) and post-regulatory (May 2012-Sept 2014) periods. Outliers are excluded using the MM-robust regression method. For every event observation there is a randomly selected non-event observation. The dependent variable is Δ*Yield* which measures, in basis points, the changes in the window [0, +1] sovereign yield spreads towards the benchmark US bonds on a particular sovereign bond *i* on the event day *t*. The independent variables are explained in section 5.1. The global risk includes one of the three risk measures i.e. interest rates swap spreads over US Treasury curve with 5 years maturity. The choice of US measures of international risk is determined by the fact our spread variable is benchmarked against US bonds yields. Year (country) fixed effects are included (“yes”), not included (“no”). We estimate Eq. (1a) and (1b) separately for positive and negative events as absolute values (Panel I and II) for interpretation reasons. Significant levels such that: *** p<1%, ** p<5%, * p<10%.

Table 4 Moody's

Panel I Positive events	Specification a				Specification b			
VARIABLES	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
ΔRating	-1.9588	-1.5159	1.8368	1.4272	-1.9517	-1.5107	2.1237	1.8845
	(-0.98)	(-0.73)	(0.85)	(0.65)	(-0.97)	(-0.73)	(0.97)	(0.84)
Regulation	0.2138	4.8817	4.1878	8.7850				
	(0.06)	(0.67)	(0.84)	(1.20)				
ΔRating*Regulation	1.6517	1.1212	-2.0666	-1.6657				
	(0.72)	(0.47)	(-0.87)	(-0.69)				
Rating58	-0.1388	-0.1130	-0.9329**	-1.1081**	-0.1409	-0.1096	-0.8989**	-1.0416**
	(-1.60)	(-1.26)	(-2.15)	(-2.41)	(-1.53)	(-1.15)	(-2.06)	(-2.26)
Maturity	-0.6530	-0.7600	-6.5717	-5.5737	-0.6853	-0.8707	-7.0942*	-5.2372
	(-0.49)	(-0.56)	(-1.60)	(-0.99)	(-0.49)	(-0.60)	(-1.67)	(-0.89)
Global risk	-4.3997	-4.2584	-16.8030	-21.4313	-4.2934	-4.4146	-17.3304	-22.3509
	(-0.25)	(-0.24)	(-0.97)	(-1.20)	(-0.24)	(-0.24)	(-0.99)	(-1.25)
EE					-0.3340	3.7121	4.3664	8.8014
					(-0.08)	(0.50)	(0.81)	(1.16)
EU					1.5700	5.7764	0.3429	3.6505
					(0.33)	(0.75)	(0.05)	(0.38)
ΔRating*EE					2.3216	1.9590	-1.6585	-1.3662
					(0.96)	(0.79)	(-0.66)	(-0.53)
ΔRating *EU					0.0190	-1.0455	-4.2066	-4.2606
					(0.01)	(-0.35)	(-1.43)	(-1.42)
Observations	122	122	122	122	122	122	122	122
R-squared	0.0564	0.0920	0.4965	0.5377	0.0635	0.1034	0.5090	0.5531
ll	-452.6	-450.2	-414.3	-409.1	-452.1	-449.5	-412.7	-407.0
year fe	no	yes	no	yes	no	yes	no	yes
country fe	no	no	yes	yes	no	no	yes	yes

Table 4 Continued

Panel II Negative events	Specification a				Specification b			
VARIABLES	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
ΔRating	1.0372	0.6940	0.9625	0.6431	1.0364	0.6923	0.9522	0.5335
	(0.99)	(0.60)	(0.78)	(0.48)	(0.98)	(0.60)	(0.75)	(0.39)
Regulation	-2.6955	-2.6579	-4.9165	-2.6500				
	(-1.12)	(-0.39)	(-1.20)	(-0.32)				
ΔRating*Regulation	0.0018	0.3715	0.3211	0.6259				
	(0.00)	(0.24)	(0.19)	(0.35)				
Rating58	0.0695	0.0690	0.0543	-0.0032	0.0709	0.0712	0.0507	-0.0775
	(1.03)	(0.95)	(0.17)	(-0.01)	(1.03)	(0.97)	(0.16)	(-0.20)
Maturity	-2.0707	-2.0611	-5.3948	-8.7568	-2.1052	-2.1210	-5.3855	-9.3757
	(-1.44)	(-1.38)	(-0.99)	(-1.33)	(-1.45)	(-1.40)	(-0.97)	(-1.38)
Global risk	47.9153***	48.5420***	51.0093**	50.2324**	48.1727***	48.7230***	51.1394**	49.9505**
	(2.68)	(2.65)	(2.50)	(2.40)	(2.66)	(2.63)	(2.48)	(2.36)
EE					-2.7260	-2.4839	-4.9426	-1.2758
					(-1.11)	(-0.36)	(-1.20)	(-0.14)
EU					-2.1824	-2.5050	-4.5872	-6.5238
					(-0.29)	(-0.25)	(-0.33)	(-0.44)
ΔRating*EE					0.0625	0.4373	0.3625	0.7249
					(0.04)	(0.27)	(0.21)	(0.40)
ΔRating *EU					-1.0330	-0.7547	-0.2802	0.3981
					(-0.22)	(-0.16)	(-0.05)	(0.07)
Observations	160	160	160	160	160	160	160	160
R-squared	0.0855	0.1004	0.1786	0.2038	0.0859	0.1010	0.1787	0.2054
ll	-609.8	-608.5	-601.2	-598.7	-609.7	-608.4	-601.2	-598.5
year fe	no	yes	no	yes	no	yes	no	yes
country fe	no	no	yes	yes	no	no	yes	yes

Notes: This table presents the estimated coefficients and robust z-statistics in parentheses from specifications of Eq. (1a) and (1b) using Ordinary Least Squares. The credit rating dataset consists of daily pooled positive sovereign events by Moody's in 58 CCR scale originating from 49 countries for pre-regulatory (Sept 2007-April 2012) and post-regulatory (May 2012-Sept 2014) periods. Outliers are excluded using the MM-robust regression method. For every event observation there is a randomly selected non-event observation. The dependent variable is Δ*Yield* which measures, in basis points, the changes in the window [0, +1] sovereign yield spreads towards the benchmark US bonds on a particular sovereign bond *i* on the event day *t*. The independent variables are explained in section 5.1. The global risk includes one of the three risk measures i.e. interest rates swap spreads over US Treasury curve with 5 years maturity. The choice of US measures of international risk is determined by the fact our spread variable is benchmarked against US bonds yields. Year (country) fixed effects are included ("yes"), not included ("no"). We estimate Eq. (1a) and (1b) separately for positive and negative events as absolute values (Panel I and II) for interpretation reasons. Significant levels such that: *** p<1%, ** p<5%, * p<10%.

Table 5 Fitch

Panel I Positive events	Specification a				Specification b			
VARIABLES	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
ΔRating	1.1533	0.6733	1.1591	0.3483	1.1516	0.6818	1.0597	0.1710
	(1.26)	(0.68)	(1.17)	(0.31)	(1.26)	(0.69)	(1.07)	(0.15)
Regulation	3.8161*	4.6511	0.5043	5.2495				
	(1.72)	(1.18)	(0.13)	(1.05)				
ΔRating*Regulation	-1.3742	-0.6952	-0.7830	0.4353				
	(-0.95)	(-0.44)	(-0.50)	(0.25)				
Rating58	0.0899	0.0747	-0.5545*	-0.5485	0.0986	0.0857	-0.4671	-0.4871
	(1.17)	(0.94)	(-1.67)	(-1.40)	(1.27)	(1.06)	(-1.39)	(-1.24)
Maturity	-0.0116	0.1973	-7.4933**	-6.4854	-0.0513	0.2722	-7.8665**	-6.0301
	(-0.01)	(0.15)	(-2.14)	(-1.47)	(-0.04)	(0.21)	(-2.25)	(-1.36)
Global risk	11.6406	10.4532	10.3426	7.6761	10.8281	9.4180	6.4473	3.4613
	(1.06)	(0.92)	(0.78)	(0.56)	(0.97)	(0.82)	(0.48)	(0.25)
EE					2.5789	2.7571	-4.3174	-0.9031
					(0.83)	(0.57)	(-0.85)	(-0.14)
EU					4.4681*	5.2968	3.6402	8.5493
					(1.77)	(1.32)	(0.77)	(1.55)
ΔRating*EE					0.3409	1.4561	1.3215	2.7920
					(0.17)	(0.67)	(0.60)	(1.17)
ΔRating *EU					-2.5299	-1.9259	-2.0022	-0.8700
					(-1.48)	(-1.08)	(-1.09)	(-0.44)
Observations	164	164	164	164	164	164	164	164
R-squared	0.0384	0.0646	0.2301	0.2638	0.0487	0.0778	0.2459	0.2837
ll	-606.9	-604.6	-588.7	-585.0	-606.0	-603.5	-587.0	-582.8
year fe	no	yes	no	yes	no	yes	no	yes
country fe	no	no	yes	yes	no	no	yes	yes

Notes: This table presents the estimated coefficients and robust z-statistics in parentheses from specifications of Eq. (1a) and (1b) using Ordinary Least Squares. The credit rating dataset consists of daily pooled positive sovereign events by Moody's in 58 CCR scale originating from 49 countries for pre-regulatory (Sept 2007-April 2012) and post-regulatory (May 2012-Sept 2014) periods. Outliers are excluded using the MM-robust regression method. For every event observation there is a randomly selected non-event observation. The dependent variable is Δ*Yield* which measures, in basis points, the changes in the window [0, +1] sovereign yield spreads towards the benchmark US bonds on a particular sovereign bond *i* on the event day *t*.

Table 5 Continued

Panel II Negative events	Specification a				Specification b			
VARIABLES	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
ΔRating	2.4566*	2.6749*	3.3409**	3.7713**	2.4894*	2.7130*	3.3591**	3.7930**
	(1.71)	(1.79)	(2.10)	(2.31)	(1.74)	(1.82)	(2.11)	(2.30)
Regulation	1.3867	0.9573	1.2062	5.8843				
	(0.41)	(0.14)	(0.20)	(0.65)				
ΔRating*Regulation	-2.3262	-3.0001	-2.5671	-3.7173				
	(-1.10)	(-1.38)	(-1.13)	(-1.59)				
Rating58	0.0167	0.0735	0.5336	0.5948	0.0241	0.0781	0.5455	0.5941
	(0.16)	(0.67)	(1.28)	(1.27)	(0.23)	(0.71)	(1.29)	(1.24)
Maturity	1.0418	0.2939	-0.4736	0.9891	1.3806	0.6712	-0.4189	0.9031
	(0.44)	(0.12)	(-0.09)	(0.18)	(0.58)	(0.27)	(-0.08)	(0.16)
Global risk	28.7587	33.2585	25.3548	29.5135	31.3169	35.8860	27.0467	30.9904
	(1.27)	(1.43)	(0.94)	(1.06)	(1.39)	(1.54)	(0.99)	(1.10)
EE					0.9922	-0.2131	1.6123	6.8306
					(0.24)	(-0.03)	(0.20)	(0.62)
EU					1.6271	1.7265	0.0960	4.6076
					(0.41)	(0.25)	(0.01)	(0.46)
ΔRating*EE					-4.4287*	-4.4826*	-4.4716	-4.7979
					(-1.68)	(-1.68)	(-1.57)	(-1.66)
ΔRating *EU					-0.1628	-1.2167	-0.7630	-2.5561
					(-0.06)	(-0.45)	(-0.27)	(-0.86)
Observations	140	140	140	140	140	140	140	140
R-squared	0.0336	0.1013	0.2013	0.2760	0.0598	0.1226	0.2113	0.2792
ll	-567.2	-562.1	-553.8	-547.0	-565.2	-560.4	-552.9	-546.6
year fe	no	yes	no	yes	no	yes	no	yes
country fe	no	no	yes	yes	no	no	yes	yes

Continued. The independent variables are explained in section 5.1. The global risk includes one of the three risk measures i.e. interest rates swap spreads over US Treasury curve with 5 years maturity. The choice of US measures of international risk is determined by the fact our spread variable is benchmarked against US bonds yields. Year (country) fixed effects are included (“yes”), not included (“no”). We estimate Eq. (1a) and (1b) separately for positive and negative events as absolute values (Panel I and II) for interpretation reasons. Significant levels such that: *** p<1%, ** p<5%, * p<10.

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