Market Impact under a New Regulatory Regime:

Credit Rating Agencies in Europe

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Abstract

We investigate whether there are any identifiable differences in market perceptions of rating news released by Moody's, S&P and Fitch following the establishment of a new regulatory regime in July 2011, when the European Securities and Markets Authority assumed responsibility for rating agencies' regulation in Europe. We focus the analysis on the impact of bank rating actions on stock returns and volatility during 2008-2013. Among the intended effects of the new regulatory regime are higher rating quality and enhanced market stability, yet we find very mixed evidence. Many differentials in market responses across CRAs are identified, which mean that a consistent effect of the new regulatory regime is not discernible.

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1. Introduction

The recent European debt crisis presented a uniquely challenging period for credit rating agencies (CRAs), triggering increased scrutiny of their relative performance. CRAs were partly blamed for the recent financial crisis and the subsequent effects on the global economy. This paper investigates the impact of the recently established regulatory regime for CRAs operating in Europe (see Section 2). We set out the key motivations and milestones in the regime overseen by the European Securities and Markets Authority (ESMA), which was assigned with direct supervision of CRAs in the EU in July 2011. ESMA could play an important role in restoring the confidence of investors and market participants in the rating industry as well as enhancing financial stability. ESMA seeks to mitigate mechanistic reliance on credit ratings, hence reducing the potential for market overreactions to credit rating actions. However, some aspects of the proposed and implemented regulations might lead to unintended consequences. The desire to reduce mechanistic market reactions is somewhat contradicted by the inherent process of endorsement and approval of CRAs.

The empirical investigation in the paper aims to establish whether there is any identifiable difference in market perceptions of CRA actions in Europe across a sample period encompassing the establishment of the new regulatory regime. The analysis considers multiple CRAs (S&P, Moody's and Fitch) in a competitive setting and studies differences in their rating opinions. We specifically investigate the impact of bank rating actions by the largest three CRAs on European banks' stock returns and volatility during January 2008 to December 2013. We also examine whether there is any change in market reactions to rating news after the establishment of the new regulatory regime in July 2011, while testing for the sensitivity of results to the selection of this specific date.

Prior literature demonstrates that corporates' stock returns respond strongly to rating downgrades from Moody's and S&P, while reactions to rating upgrades are much more

muted (e.g. Hand et al. 1992; Dichev and Piotroski, 2001, Li et al., 2006; Behr and Güttler, 2008; Halek and Eckles, 2010). Some recent studies investigate links between sovereign risk and domestic banks. De Bruyckere et al. (2013) find significant spillovers between bank and sovereign credit risk during the European debt crisis, providing evidence in favour of an asset holding channel and a collateral channel. Alsakka et al. (2014) show that sovereign rating actions have strong effects on bank rating downgrades in Europe during the recent crisis. Correa et al. (2014) find that sovereign rating downgrades (not upgrades) have a large significant impact on bank stock returns for those banks that are expected to receive stronger support from their governments.

The literature linked to bank ratings is relatively limited, and mainly focused on their determinants. Caporale et al. (2011) find that country-specific factors (in the form of heterogeneous intercepts) affect EU countries' bank ratings. Shen et al. (2012) find that larger bank assets and higher sovereign credit ratings boost bank credit ratings. Hau et al. (2013) find that bank characteristics significantly affect the quality of ratings assigned to banks in Europe and the United States by the three largest CRAs. They also show that CRAs tend to assign higher ratings to large banks and to those banks that provide CRAs with a large quantity of securities rating business.

To the best of our knowledge, there is no prior research which examines the effect of the new EU regulatory regime (i.e. ESMA oversight) on the market perceptions of credit rating actions. The findings can shed light on changes in rating quality and market stability. We also fill a clear void in the literature on the effect of bank rating actions on European banks' stock returns and volatility during the recent financial crisis. Our main findings are summarised as follows. The impact of rating downgrades on the abnormal returns and share price volatility varies across CRAs. There is no consistent picture across CRAs on the question of whether the establishment of ESMA oversight has clearly identifiable positive

consequences. S&P and Moody's downgrades trigger stronger negative abnormal returns, while these effects did not exist before July 2011. The regulatory change has dampened the negative abnormal returns reported following bank rating downgrades by Fitch prior to July 2011. For share price volatility, we identify reductions following S&P downgrades. This effect did not exist before July 2011. Moody's rating downgrades trigger modest increases (decreases) in volatility after (before) July 2011, while Fitch rating downgrades have insignificant impact on banks' share price volatility.

The remainder of the paper is organised as follows. Section 2 reviews the regulatory developments affecting the rating industry in Europe, Section 3 describes the data, Section 4 presents the methodology, Section 5 analyses the empirical results and Section 6 concludes the paper.

2. Regulatory developments affecting the credit rating industry in Europe

The relevant regulatory developments are listed chronologically in Table 1. This section comments on three key phases of these developments.

2.1. 'Reactive' phase of the EU Regulation of CRAs

Until 2010, there was no EU legislation directly addressing the CRAs industry. Self-regulation following the International Organization of Securities Commissions (IOSCO) Code was an indirect form of supervision applied voluntarily (Johnson, 2004). The recent regulatory efforts originate from the US sub-prime crisis where CRAs were too permissive in rating structured finance products. The sub-prime crisis shed light on the importance of ratings to financial and economic stability (Alcubilla and Del Pozo, 2012). The G-7 Ministers and Central Bank Governors requested the Financial Stability Forum (FSF) to study the origins of the turbulence and to advocate possible actions (report published in April 2008).

During the 2008 G-20 summit in Washington, member countries "aimed to ensure that no institution, product or market was left unregulated at EU and international levels" (European Commission (EC), 2013). Since there was no regulatory oversight of the CRAs in many jurisdictions, including Europe, this issue had to be tackled. The EC classified the main deficiencies of CRAs into three main areas: failures in integrity, failures in reliability and lack of transparency. In December 2009, the EC outlined a new set of laws for CRAs. The first aspect focuses on registration procedures which require that financial firms in the EU obtain ratings only from certified CRAs. Secondly, explicit rules aimed at reducing conflicts of interest were introduced. Sanctions include governance requirements, inspections of CRAs, while increased transparency and enhancement of ratings quality were expected.

The problems of mechanistic reliance on ratings were recognised by the FSB/G-20 during the Toronto summit in June 2010. In October 2010, FSB released 'Principles for Reducing Reliance on CRA Ratings' which applies to standards, laws and regulations at the international level (FSB, 2010).

2.2. 'Implementation' phase of the EU Regulation of CRAs

The European Parliament and the Council formulated EU regulation on CRAs (CRA I Regulation), valid from December 2010 (EC, 2011a). This regulation was amended in May 2011 (CRA II) to respond to the creation of the European credit ratings' supervisory authority, named the European Securities and Markets Authority (ESMA) (EC, 2011b). ESMA was assigned with the responsibility for CRAs from July 2011. We consider this to be the most critical date in the process of establishing new oversight within a formal legislative context. In November 2011, EC released a proposal to amend the existing CRA regulation, known as CRA III regulation (EC, 2011c), as well as a proposal for a Directive on the use of external ratings by market participants (EC, 2011d). ESMA (2012) reported to the European Parliament on its progress in implementing CRA regulation.

The European Central Bank (ECB, 2012) notes that regulations on CRAs were applied from a micro-prudential perspective and intended to restore the confidence of investors and market participants as well as enhance financial stability. The main actions were intended to (i) reduce excessive reliance on credit ratings, (ii) alleviate risks associated with spillover effects, (iii) develop a stronger rating market to improve the overall quality of rating practices, (iv) safeguard compensation systems for investors, and (v) strengthen the independence of CRAs and the soundness of rating processes and methodologies with a view to achieving enhanced ratings quality.

The European Council and Parliament released technical standards for CRAs in March 2012, followed by processes for enforcing fines and penalties on CRAs in July (Official Journal of European Union (OJEU), 2012). At that time, sovereign ratings were a primary focus (EC, 2012). The legislation introduced a regime of civil liability which will enable an issuer to sue the CRA if proven to be a victim of misconduct or negligence (OJEU, 2012). European Parliament (2013) voted in favour of the new tougher CRA rules. The EC is required to report to the Parliament by 1 July 2016, to reassess the state of affairs and propose modifications to regulatory proposals.

Amendments to the CRA III regulation entered into force in June 2013 (OJEU, 2013a). The accompanying Directive was to be implemented by December 2014 (OJEU, 2013b). The regulation applies all principal requirements outlined in the initial Regulation (EC) No 1060/2009, to rating outlooks and watches. As part of its supervision and policy work plan, ESMA (2013a) reported on its investigation of the three biggest CRAs. ESMA compliments CRAs on adequacy of resources, training possibilities, practices during committee discussions and consistency and continuity of rating sovereigns amongst others. The report also reveals deficiencies which could lead to lower quality and reliability of sovereign ratings. In many instances ESMA proposes possible remedial actions.

ESMA (2014a) points to six action plans for CRAs conducted during 2012 and 2013, where it comments on the record keeping practices and strengthening of the compliance function by CRAs. Deficiencies have been found in the areas of validating the rating methodologies and the security of IT systems used by CRAs. ESMA's activity in 2013 included: (i) bank rating methodology, (ii) sovereign rating process investigation, (iii) monitoring of structured finance ratings by four CRAs, and (iv) deficiencies in publication controls. There are currently 23 registered and two certified CRAs in the EU (ESMA, 2014b). Amongst the registered CRAs, Fitch, Moody's and S&P represent 87 percent of the total market share (ESMA, 2013b).

2.3. 'Enhancement phase' of the EU Regulation of CRAs

ESMA's future plans include technical reports to the EC on structured finance and on its efforts to minimise references in laws and regulations to external ratings (ESMA, 2014a). ESMA intends to enhance the existing collaboration with the IOSCO Committee and finalise amendments to the Code of Conduct for CRAs. There are proposals to form a European sovereign debt creditworthiness centre which requires ESMA's technical assistance.

Following the G-20 summit in 2013, the FSB urged regulators to expedite the process of reducing reliance on ratings in line with the agreements in October 2012 (see FSB, 2012). Accelerating this process involves two phases: (i) the initial stage recorded references to ratings made in laws and regulations across jurisdictions (see FSB, 2013); (ii) the second phase concentrates on the strategies applied by authorities to execute the FSB Principles (progress was reported in FSB, 2014). It is reported that approaches differ across jurisdictions and financial sectors and the developments are often uneven. Attention was drawn to internal ratings-based (IRB) approaches for which reliability, comparability and transparency are questionable (Basel Committee on Banking Supervision, 2013).

In the ongoing phase of increasing regulatory oversight of the CRAs, little is yet known about its effectiveness. Some proposals need to be carefully evaluated, e.g. the methodology requirements might pose a threat to the independence of the CRAs (ESMA, 2012, EC, 2012). Difficulties arise relating to technological improvements and choices between competition and stability in ratings need to be made (ESMA, 2012). The increased responsibilities and the criteria set by the Parliament do not match the timing of the reforms and imposed deadlines, thus causing a considerable strain on ESMA's capabilities.

3. Data sample

We investigate the reactions of banks' stock returns and volatilities to bank rating actions by Moody's, S&P and Fitch during the period January 2008 to December 2013. In July 2011, ESMA assumed responsibility for the ongoing regulatory reform and oversight of CRAs operating in Europe. The sample period is selected in order to overlap the establishment of the new regulatory regime, with the aim of capturing any significant change in market perceptions of rating actions. The sample initially comprises the European banks included in the 2011 EU stress test. There were a total of 91 banks from 21 European countries. However, some banks are excluded because they are not listed; hence have no share price information. This reduces the sample to 44 banks from 17 European countries (see Table 2). The daily share prices, national stock indices and other financial data of the sampled banks are retrieved from DataStream.

Bank senior unsecured long-term debt ratings are collected from Bloomberg. Figure 1 presents the distribution of daily ratings of banks for each CRA. It is worth noting that none of the banks are rated at the triple-A rating category. This is consistent with the findings of Alsakka et al. (2014) that European bank ratings are frequently constrained by the sovereign ceiling during the crisis period, and therefore the average bank ratings tend to be lower than the average sovereign ratings by 1 or 2 notches. Only 15% of banks ratings' observations

were at speculative-grade (BB+/Ba1 or below) during the sample period. About 25% of the daily observations are at AA+/Aa1, AA/Aa2 or AA-/Aa3 rating categories, and about 45% at A+/A1, A/A2 or A-/A3 rating categories. These proportions reflect the developed nature of the sample countries. The percentage of banks' ratings observations at investment-grade (BBB-/Baa3 or above) by S&P, Moody's and Fitch dropped from 89%, 97% and 95% in the pre- July 2011 sub-sample to 71%, 68% and 78% in the post- July 2011 sub-sample.

We identify actual rating changes according to mapped 20-notch numerical ratings (AAA/Aaa = 20, AA+/Aa1 = 19, AA/Aa2 = 18 … CCC-/Caa3 = 2, CC/Ca, SD-S/C = 1) by notches on the basis of daily intervals. Table 3 reports the numbers of rating events released by the CRAs on the sampled banks during January 2008 - December 2013. This reveals a strong bank rating downgrade trend in European countries as a consequence of the sovereign debt crisis, with the total number of rating downgrades far exceeding the number of upgrades. For the sample, there are 126 (5) bank rating downgrades (upgrades) by S&P, 171 (4) by Moody's, and 120 (8) by Fitch. The limited numbers of rating upgrades released by the CRAs on the sampled banks during the period makes empirical investigation of the effects of upgrades (in Sections 4 and 5) infeasible.

Moody's greater willingness to use downgrades of more than one-notch is notable. Approximately a quarter of bank rating downgrades by S&P and Fitch are of more than one-notch, compared to 43% by Moody's. Almost all of the rating downgrade events are "clean" i.e. are not followed by rating downgrade from other CRA(s) within at least 1 week. There are only 43 'unclean' rating events which involve more than one CRA taking rating downgrade action on the same bank within one week.

4. Methodology

4.1. Event study

We employ standard event study methodology to measure the reaction of bank share prices and volatility to bank rating downgrades. We examine changes in cumulative abnormal return (CAR), Buy-and-hold abnormal return (BHAR)[1] and intraday high-low range (i.e. stock volatility) during time windows: [-1, 0], [0, 1], [0, 5], [0, 22], whereby day 0 is the day when a rating downgrade is released. Because all the sample banks are located in Europe, there is no time zone issue in identifying event dates. Therefore, we focus on one-day windows (i.e. [-1, 0] and [0, 1]) which capture the immediate impact of rating actions (if any). This is especially relevant to the intraday high-low range which measures daily market volatility or intraday heterogeneity in market participants' views of the banks' valuations.

Abnormal stock return (AR) is estimated using the market model, as follows:

$$AR_t = R_t - E(R_t)$$

Where $E(R_t) = \hat{\alpha} + \hat{\beta} \times R_t^M$

R_t is the continuously compounded rate of return for stock *i* on day *t.*

R_t^M is the continuously compounded rate of return for the national stock market index where the bank is listed, on day *t*.

$\hat{\alpha}$ and $\hat{\beta}$ are the estimated parameters of the market model. The estimation window is a 200-day rolling window from day -250 to day -50 (i.e. pre-event window). The reason for selecting day -50 (not day -1) is to avoid any possible effects of rating anticipation.

Cumulative abnormal returns (CAR) during time windows *s* are estimated as follows:

$$CAR_{s,t} = \sum_{i=0}^{s} AR_{t+i}$$

[1] BHAR is proposed by Barber and Lyon (1997), and is examined in order to disentangle the longer-term impacts of rating actions.

Where s = 1 ≡ time window is [0, 1]; s = 5 ≡ time window is [0, 5]; and s = 22 ≡ time window is [0, 22].

Buy-and-Hold abnormal returns (BHAR) during time windows s are computed as follows:

$$BHAR_{s,t} = \prod_{i=0}^{s}[1 + R_{t+i}] - \prod_{i=0}^{s}[1 + E(R_{t+i})]$$

Stock volatility is captured by intraday range (Parkinson, 1980) which is measured by the logarithm of intraday high over intraday low prices. The intraday range is estimated as:

$$Range_{it} = \frac{1}{2ln2} ln(\frac{High_{it}}{Low_{it}})$$

Prior research shows that the daily range is significantly more efficient than the realized volatility. Alizadeh et al. (2002) and Brandt and Diebold (2006) demonstrate that the range-based volatility estimator appears robust to microstructure noise such as bid-ask bounce.

We conduct the tests in the event study on the pre- and post- July 2011 sub-samples. In order to avoid any possible bias due to the distribution of the sample means, we conduct both t-test and non-parametric tests. The non-parametric tests are sign- and Wilcoxon tests, testing whether the medians of CAR, BHAR and intraday high-low range during the time windows are significantly different to zero.

4.2. Multivariate analysis

The multivariate analysis aims to control for multiple factors that may affect banks' share prices and volatility, such as the levels of banks' creditworthiness, bank size, book-to-market, bank characteristics or country characteristics (e.g. Shen et al., 2012; Hau et al., 2013). The following Equations are estimated:

$$CAR_{i,s} = \alpha_1 + \beta_1 \times \Delta\text{Rating}_{\text{i,t}} + \sum_{\text{k=1}}^{\text{n}} \phi_{\text{k}} \times X_{i,t}^{\text{k}} + \varepsilon_{i,t} \quad (1a)$$

$$CAR_{i,s} = \alpha_1 + \beta_1 \times \Delta\text{Rating}_{\text{i,t}} + \gamma_1 \times \Delta\text{Rating}_{\text{i,t}} \times \text{D}_{\text{Reg.change}} + \sum_{\text{k=1}}^{\text{n}} \phi_{\text{k}} \times X_{i,t}^{\text{k}} + \varepsilon_{i,t} \quad (1b)$$

$$BHAR_{i,s} = \alpha_1 + \beta_1 \times \Delta\text{Rating}_{\text{i,t}} + \sum_{\text{k=1}}^{\text{n}} \phi_{\text{k}} \times X_{i,t}^{\text{k}} + \varepsilon_{i,t} \quad (2a)$$

$$BHAR_{i,s} = \alpha_1 + \beta_1 \times \Delta\text{Rating}_{\text{i,t}} + \gamma_1 \times \Delta\text{Rating}_{\text{i,t}} \times \text{D}_{\text{Reg.change}} + \sum_{\text{k=1}}^{\text{n}} \phi_{\text{k}} \times X_{i,t}^{\text{k}} + \varepsilon_{i,t} \quad (2b)$$

$$\Delta Range_{i,s} = \alpha_1 + \beta_1 \times \Delta\text{Rating}_{\text{i,t}} + \sum_{\text{k=1}}^{\text{n}} \phi_{\text{k}} \times X_{i,t}^{\text{k}} + \varepsilon_{i,t} \quad (3a)$$

$$\Delta Range_{i,s} = \alpha_1 + \beta_1 \times \Delta\text{Rating}_{\text{i,t}} + \gamma_1 \times \Delta\text{Rating}_{\text{i,t}} \times \text{D}_{\text{Reg.change}} + \sum_{\text{k=1}}^{\text{n}} \phi_{\text{k}} \times X_{i,t}^{\text{k}} + \varepsilon_{i,t} \quad (3b)$$

$CAR_{i,s}$ is the cumulative daily abnormal return of bank i during time windows s around credit rating actions from each CRA. Time windows are restricted to [-1, 0], [0, 1], [0, 5] and [0, 22]. Time windows [-1, 0] and [0, 1] convey the market movements when rating news is released, while time windows [0, 5] and [0, 22] capture market movements after rating news during 1 week and 1 month later.

$BHAR_{i,s}$ is the Buy-and-hold abnormal return of bank *i* over the time window *s*.

$\Delta Range_{i,s}$ is the cumulative daily change in the intraday high-low range of bank *i* stock prices over time window *s*.

$\Delta Rating_{i,t}$ is the daily change in the rating level of bank *i* at time *t*.

$D_{reg.change}$ is a dummy variable for the regulatory change, taking the value of one when the regulatory regime has been established (i.e. post July 2011) and zero otherwise.[2] We also

[2] We conduct robustness tests by changing the supposed event date and comparing the outcomes for several plausible alternative dates between April 2011 and April 2012. The results remain very similar, although the Moody's results demonstrate a specific change around July 2011 and therefore support this choice of date. We also apply falsification tests whereby the event date is selected outside the plausible date range. These placebo investigations confirm some genuine effects of the change in regulatory regime.

include the interaction between $\Delta Rating$ and $D_{reg.change}$ in order to disentangle any impact(s) of the new regulatory regime on the market participants' perceptions of CRAs' actions.

ΣX^k is a set of control variables, including the current rating level of bank *i*, bank size (measured by the logarithm of total assets), book-to-market ratio, individual bank dummies and year dummies. The current rating level of the bank is a control for the fundamental conditions of the bank. In other words, this captures the likelihood that less healthy banks (i.e. lower credit ratings) tend to experience more volatile changes in returns and volatility. The bank size and book-to-market ratio are included as they could explain the variation in returns to some extent (Fama and French, 1992). Bank dummies and year dummies are included to control for individual bank characteristics and the business cycle.[3,4,5]

Estimation of Equations (1), (2), and (3) are based on a sample of rating event days plus random bank-matched non-event days, drawn from the full sample excluding non-event observations within one month before and after rating announcements. This mitigates rating clustering and market noise (e.g. Ferreira and Gama, 2007, Tran et al., 2014). It is noteworthy that the sample consists of observations on non-consecutive days that may be very distant from each other. Therefore, estimations of the equations are not time series investigations.[6,7] In line with prior literature, we expect rating downgrades to convey new information to the public, hence, trigger significant and negative impacts on stock return and volatility.

[3] Robustness tests based on alternative specifications include sovereign ratings as control variables, but these were not significant factors, while other results remained similar.

[4] Further robustness tests used banks' bond yield spread against domestic government debt yields. With some minor exceptions, the results were unaffected by the inclusion of this variable.

[5] We also carry out equivalent investigations using country dummies (instead of bank dummies) in order to control for country clustering or country characteristics. The results are qualitatively similar.

[6] We also conduct robustness tests by including lagged values of the dependent variables (i.e. CAR, BHAR, and intraday low-high range) to control for potential persistence in the dependent variables. The results are qualitatively similar.

[7] In a time series model, it would be feasible to test for a structural break. Due to the nature of the rating event data (see Section 3), it is neither feasible nor appropriate to apply such tests here.

5. Empirical results

5.1. Event study

Tables 4-6 present the event study results. Overall, there is mixed evidence on the impact of the new regulatory regime. The responses of CAR and BHAR to bank rating downgrades are very similar (see Tables 4 and 5).[8] Specifically, there is evidence of a shift in market perceptions of rating actions across CRAs. Prior to July 2011, reactions to Fitch downgrades are significant in each testing procedure. Within one week of Fitch downgrading a bank, the share prices decline by around 5-6 percentage points. This loss in share values is large compared to the reactions of returns to S&P downgrades which induce no significant reaction and Moody's where much smaller reactions are found (around 1.5 percentage points; significant in the t-test, not the non-parametric tests).

In contrast, in the post- July 2011 subsample, reactions to Fitch downgrades are no longer significant. This could imply that the new regulation has dampened the market reactions to rating news. However, market responses to S&P and Moody's actions have also altered. S&P downgrades trigger a significant impact on CARs. The impact is only very short-term, i.e. during the day when rating news is released and no further significant reaction is found in the next days. The magnitude of the negative abnormal return is about 1.15 percentage points (see Table 4). On the other hand, Moody's downgrades induce longer lasting effects. The negative abnormal returns are reported up to one month after Moody's bank rating downgrades. On the day of rating announcements from Moody's, share values decrease by 0.6 percentage points and the effect continues until one month later. The magnitude of the reduction is also very large, i.e. over 5 percentage points (see Tables 4 and 5). Across CRAs, the evidence does not offer a clear or consistent interpretation of the market response to new regulation.

[8] The result for time window [-1, 0] is absent from Table 5 because it would not differ from the result reported in Table 4.

Table 6 presents results for the intraday high-low range. The greater the high-low range, the higher is the stock price volatility. Overall, the findings of Table 6 show some evidence of a shift in market perceptions of rating actions across CRAs which is consistent with the results in Tables 4 and 5. In the sub-sample prior to July 2011, S&P downgrades trigger an increase in the intraday high-low range of less than 1 percentage point, and only during very short time windows, i.e. [-1, 0] and [0, 1]. This indicates that S&P downgrades trigger an immediate and very short-lived negative impact on share price volatility. In the post July 2011 sub-sample, the t-test on the intraday high-low range shows a significant increase of about 0.6 percentage points in response to S&P downgrades. However, the impact of S&P downgrades post July 2011 is not short-lived. Interestingly, the measure of stock price volatility reduces significantly within one month following S&P downgrades.

This pattern of market reactions is unexpected. Negative rating news (i.e. rating downgrades) often triggers negative market reactions (Hand et al., 1992; Dichev and Piotroski, 2001; Li et al., 2006; Halek and Eckles, 2010). However, it is noteworthy that these papers examine assets' returns. Table 6 presents results on asset volatility which behaves differently to asset returns (e.g. Beber and Brandt, 2009). Tran et al. (2014) illustrate that additional rating news (even negative rating news) could play a "confirmation" role and reduce market volatility. In other words, share price volatility reduces in response to S&P downgrades, which was not revealed prior to the regulatory regime changes. The direct implication is that the regulatory changes might enhance the transparency in the rating procedure, therefore, promote market stability in the sense that share prices are less volatile in response to S&P downgrades.

Similarly, the measure of share price volatility reduces in response to Fitch downgrades. The reduction appears in both prior to- and post- July 2011 periods. There is clearer evidence of the reduction in the later period. Prior to July 2011, the measure of share

price volatility reduces about 1 percentage point within one month following Fitch downgrades. Post July 2011, the reduction is strongly significant under each testing procedure (i.e. at the 1% level of significance), and is immediate when Fitch rating downgrades are released. This supports the view that the regulatory changes might contribute to enhanced market stability.

However, the evidence from the reactions to Moody's downgrades contradicts this. The measure of share price volatility reduces prior to July 2011 but the reduction is not significant post July 2011. It is noteworthy that the pattern of reactions from abnormal returns and Buy-and-hold abnormal returns is also changed, but in the opposite fashion (compared to those of share volatility). The impact of Moody's downgrades becomes strongly significant and the magnitude of the reactions in abnormal returns is economically meaningful after July 2011. A possible explanation could arise from an alteration in the intra-CRA rating comparisons relating to the sampled banks. Prior to July 2011, Moody's ratings are commonly higher than S&P and Fitch ratings on the same banks. The proportion of Moody's ratings which are lower than both S&P and Fitch ratings on the same banks is only 2.5%, whereas in the sub-sample post-July 2011, the equivalent proportion is 28.2%. Prior to July 2011, 80.9% of S&P ratings are lower than those from Moody's on the same banks, and 59.8% of Fitch ratings are lower than Moody's ratings on the same banks. In the post- July 2011 subsample, the equivalent figures are 25.4% and 16.8%.

In summary, there is evidence of some shifts in market perceptions of rating actions across CRAs during the timeline of the new regulatory regime. However, it is not obvious that the shift is due to the new regime or due to other reasons for changing market dynamics in response to CRA news.[9] The next section seeks to resolve this more clearly.

[9] We have also conducted equivalent investigations after excluding 43 "unclean events", described in Section 3. The results are qualitatively similar.

5.2. Multivariate analysis

Tables 7 to 9 present the results from the multivariate investigations (i.e. estimations of Equations (1), (2) and (3)). The main independent variables of interest are *ΔRating* (i.e. daily changes in rating levels) and *ΔRating x* $D_{reg.change}$ (i.e. the interaction between changes in rating levels and the regulatory change dummy). In the baseline models (i.e. Equations (1a), (2a), (3a)), the estimated coefficients of *ΔRating* represent the impact of rating downgrades on the cumulative changes in abnormal returns, Buy-and-hold abnormal returns, intraday high-low range. The estimated coefficients of *ΔRating* in Equations (1b), (2b) and (3b) represent the impact of rating downgrades on stock returns and volatility prior to the regulatory regime establishment (i.e. prior to the time milestone when $D_{reg.change} = 0$). The estimated coefficients of the interaction term *ΔRating x* $D_{reg.change}$ represent the impact of downgrades on the dependent variables in the post-July 2011 period (i.e. $D_{reg.change} = 1$).

Table 7 reports results for Eq. (1a) and Eq. (1b). Panel A of Table 7 shows that the coefficients of *ΔRating* and *ΔRating x* $D_{reg.change}$ for S&P are insignificant during most time windows. There is only one exception which is the interaction term during the [-1, 0] window, which indicates that reactions to S&P rating downgrades become more significant after the regulatory change in July 2011. S&P downgrades trigger significant negative abnormal returns of 0.9 percentage points after July 2011. The negative abnormal return is only very short-lived, i.e. on the same day when S&P downgrades are released.

Panel B of Table 7 reports the results for Moody's. In contrast to S&P, the baseline model (Eq. (1a)) shows that Moody's downgrades are influential, whereby they induce significantly negative CAR, and the effect is not short-lived. The magnitude of the negative abnormal return is 1.24 percentage points within one week following Moody's downgrades. The results of Eq. (1b) show that that prior to July 2011 Moody's bank downgrades are not significantly influential. In contrast, the coefficient of the interaction term *ΔRating x*

$D_{reg.change}$ is negative and highly significant, implying that the impact of Moody's actions is much stronger after July 2011. Abnormal returns of -1.37 (-5.91) percentage points are found within one day (month) following Moody's downgrades in the post-July 2011 period.

Panel C of Table 7 reports the results for Fitch. Similarly to Moody's, the baseline model (Eq. (1a)) shows that Fitch downgrades are influential, whereby the abnormal return is -2.36 percentage points within one week. It is noteworthy that the magnitude of the market reaction is almost double that for Moody's downgrades. In Eq. (1b), the coefficients of Fitch $\Delta Rating$ are negative and significant, implying that Fitch downgrades are influential in the period prior to July 2011. Interestingly, the coefficients of the interaction term $\Delta Rating \ x \ D_{reg.change}$ during [0, 5] and [0, 22] time windows are positive and significant. The effect of the regulatory change on the market impact of Fitch rating downgrades is positive. In other words, the regulatory change has dampened the reactions to Fitch downgrades.

Table 8 reports the results for Eq. (2a) and Eq. (2b) which investigate the market impact of downgrades on Buy-and-hold abnormal returns. Overall, the results are qualitatively similar to those in Table 7. There is evidence of some shifting in market perceptions of CRA downgrade actions. S&P downgrades have insignificant impact on BHAR. However, the effect of the regulatory change on the impact of S&P downgrades is significant only during the [-1, 0] window.[10] In other words, after the regulatory change, S&P downgrades trigger short-lived negative BHAR. After the regulatory change, there is evidence of strengthened negative reactions to Moody's downgrades which is not short-lived. In contrast, the market impact of Fitch downgrades is weaker after the regulatory change, implying that the regulatory change has dampened negative reactions to Fitch downgrades.

Table 9 reports the results for Eq. (3a) and Eq. (3b), which investigate the market impact of rating downgrades on the intraday high-low range. Panel A of Table 9 shows that

[10] The estimations of Eq. (2a) and Eq. (2b) for time window [-1, 0] is absent from Table 8 because it would not differ from the results reported in Table 7 (Eq. (1a) and Eq. (1b) for the [-1, 0] time window).

S&P downgrades trigger short-lived increases in share price volatility (i.e. during [-1, 0], [0, 1] time windows). The magnitude of the increases is about 0.5 percentage points, and only observed in the period before the regulatory change. However, the coefficients of $\Delta Rating \times D_{reg.change}$ variable are negative and significant during [0, 5], [0, 22] time windows, implying that after the regulatory change, the share price volatility is reduced on average by 0.63% within one week/month following S&P downgrades. This pattern of volatility reactions did not exist before the regulatory change. This lends support to the prior analysis that the regulatory change might promote transparency in rating procedures, and thus enhance financial market stability (see Section 5.1).

For the period before July 2011, Panel B of Table 9 shows that the banks' share price volatility is reduced on average by 0.8 percentage points within one month following Moody's downgrades. Yet, the regulatory change has altered the impact of Moody's rating downgrades, whereby they trigger modest increases in volatility after July 2011. Panel C of Table 9 demonstrates that Fitch bank downgrades have insignificant impact on share price volatility before and after the regulatory change.

In summary, there remains mixed evidence of shifting market perceptions of rating actions across CRAs during the timeline of the new regulatory regime. One exception is the volatility impact of Fitch downgrades, which are not influential before nor after the regulatory change. In general, larger banks are associated with more negative abnormal return and lower volatility. Banks with higher ratings experience more negative abnormal returns and increased volatility following downgrades. We also carry out several robustness checks for outlier or extreme values which produce qualitatively similar results. We have repeated the analysis while controlling for banks in specific crisis countries (Greece, Ireland, Italy, Portugal, Spain) and find that the inferences are unaffected.

6. Conclusion

The primary focus of this paper is to investigate whether there is any identifiable difference in market perceptions of rating actions by Moody's, S&P and Fitch following the establishment of the new regulatory regime in July 2011 (i.e. when ESMA assumed the ongoing regulatory oversight of CRAs operating in Europe). Using a sample of 44 publicly listed European banks which were part of the 2011 EU stress test, we examine the reactions of banks' stock returns and price volatility to bank rating actions by the three largest CRAs during January 2008 to December 2013. The sample period is characterised by a strong bank rating downgrade trend as a consequence of the sovereign debt crisis. We focus our empirical investigation (event study and regression analysis) on banks' rating downgrades, given the very limited numbers of rating upgrades released by the CRAs for this data sample.

The empirical findings present mixed evidence of some shifting market perceptions of CRAs' rating downgrades after the establishment of the new regulatory regime. Differentials in market reactions to different CRAs are identified. Firstly, S&P and Moody's rating downgrades trigger significant negative abnormal returns after July 2011, while these effects did not exist before July 2011. The negative abnormal return is only very short-lived following S&P actions. Secondly, the regulatory change has dampened the market response within one week/month following bank rating downgrades by Fitch. Third, S&P downgrades trigger short-lived increases in share price volatility prior to the regulatory change, while after the regulatory change the share price volatility reduces following S&P actions. In the period prior to July 2011, Moody's downgrades reduce the banks' share price volatility, while they trigger modest increases in volatility after July 2011. Finally, the regulatory change did not alter the insignificant impact of Fitch rating downgrades on banks' share price volatility. Overall, there is mixed evidence on whether the new regulatory regime has improved ratings quality or promoted market stability. On this evidence, the documented shifts in market

perceptions of CRA downgrades cannot be attributed to the new regulatory regime. The most plausible interpretation is that the new regulation has not yet succeeded in having a strong or consistent effect on market behaviour.

To the best of our knowledge, this paper is the first to examine the effect of the new regulatory regime (i.e. ESMA's responsibility for CRAs) on the market reactions to credit rating actions, and therefore policy makers in the EU and ESMA should be particularly interested in these empirical findings. The paper is also relevant to fund managers and other investors, especially those who focus on international diversification. This paper considers multiple CRAs in a competitive setting and studies differences in their rating opinions, and hence CRAs will also be interested from a reputational perspective. Further, the investigation of volatility reactions is particularly relevant to the widespread desire for greater stability in financial markets.

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Table 1- Regulatory developments in Europe which affect CRAs

	Date	Authority	Event
'Reactive phase'	October 2007	G-7 and Central Banks Governors	Request to FSF for examining causes and weaknesses which triggered market turmoil in 2007.
	April 2008	FSF	Response to request from October 2007. Deficiencies of CRAs found in relation to structured products.
	June 2008	ESME[11]	EC outlines problems with lack of competition among the CRAs.
	November 2008	G-20 summit in Sao Paulo	CRAs included on the list of 'systemically important institutions'.
	November 2008	G-20 summit in Washington	Compulsory registration when providing public ratings.
	April 2009	G-20 summit in London	Political agreement is reached about the CRA Regulation. Financial Stability Forum is re-established as Financial Stability Board (FSB).
	March 2009	IOSCO	Review of enactment of the IOSCO 2008 Code of Conduct on Fundamentals for CRAs.
	December 2009	EC	EC outlines a new set of laws aimed at CRAs. (i.e., registration procedures, governance requirements, internal controls, disclosure rules, improvement in rating methodologies).
	June 2010	G-20 summit in Toronto	Declaration stating need of reducing reliance on ratings in rules and regulations.
	October 27 2010	FSB/G-20	Response to June 2010 summit; release of principles minimising mechanistic reliance on CRA ratings (endorsed by G-20 states in Nov 2010).
'Implementation phase'	October 2008 & April 2009	FSF	Follow up reports on the implementation of proposals by national authorities, international bodies and private sector.
	September 16 2009	EC	Regulation (EC) No 1060/2009 of the European Parliament and of the Council on credit rating agencies; known as CRA regulation.
	July 4 2010	CESR	Implementation of the Central Repository (CEREP).
	January 1 2011	ESMA	ESMA replaces Committee of European Securities Regulators.
	January 1 2011	ESFS	Establishment of European System of Financial Supervisors: Newly formed ESMA, EBA, EIOPA and ESRB.
	February 2011	IOSCO	IOSCO's Principles form a benchmark for all regulations of the CRAs in main jurisdictions.
	May 11 2011	EC	Regulation (EU) No 513/2011 of the European Parliament and of the Council amending Regulation (EC) No 1060/2009; known as CRA II regulation.
	July 1 2011	ESMA	ESMA assigned with direct supervision of CRAs registered in

[11] European Securities Market Expert replaced by ESMA in January 2011.

			the EU.
'Implementation phase'	November 15 2011	EC	Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 1060/2009 on credit rating agencies; known as CRA III regulation.
	November 15 2011	EC	Proposal for a Directive of the European Parliament and of the Council amending Directive 2009/65/EC on the coordination of laws, regulations and administrative provisions relating to undertakings of collective investment in transferable securities (UCITS) and Directive 2011/61/EU on Alternative Investment Funds Managers in respect of the excessive reliance on credit ratings.
	February 7 2012	ESMA	Supplementing Regulation (EC) NO 1060/2009 on fees charged by ESMA to CRAs.
	March 31 2012	EC	Technical standards Supplementing Regulation (EC) No 1060/2009 on the: content and format of ratings data (no.446); assessment of compliance of methodologies (no.447); presentation of data (no.448); registration and certification (no.449).
	July 12 2012	EC	Supplementing Regulation (EC) No 1060/2009 including rules on fines aimed at CRAs; rights to defence and temporal provisions.
	July 19 2012	ESMA	Memorandum of Understanding on the supervision of CRAs between ESMA and: authorities in Canada, CNV Argentina, SEC, MAS and ASIC.
	October 2012	FSB	FSB sets Roadmap and Workshop for Reducing Reliance on CRA Ratings.
	November 28 2012	European Council and European Parliament	Agreement of the trilogue of the EU rules to regulate CRAs (new directive). Statement by Commissioner Barnier.
	January 16 2013	European Parliament	Rules on rating sovereign debt and private firm's creditworthiness approved by Parliament.
'Enhancement phase'	May 21 2013	EC	Amendment of Regulation (EC) No 1060/2009 on credit rating agencies (CRA III regulation); entered into force on 20 June 2013.
	June 23 2013	ECAI	Regulation (EU) No 575/2013 Capital Requirements Regulation (CRR).
	April 28 2014	EC	Supervisory jurisdictions of Argentina, Brazil, Hong Kong, Mexico and Singapore recognised as equivalent to the requirements of Regulation (EC) No 1060/2009 on CRAs.
	May 5 2014	EC	Report on feasibility of a network between smaller CRAs in the EU.
	May 16 2014	EC	EU publishes response to the FSB request for action plans aimed at minimising reliance on CRA ratings.

Table 2 - List of sampled banks

	Bank	Country
1	Allied Irish Banks Plc	Ireland
2	Alpha Bank	Greece
3	Banco BPI, SA	Portugal
4	Banco Comercial Portugues, SA	Portugal
5	Banco Popular Espanol, SA	Spain
6	Banco de Sabadell, SA	Spain
7	Banco Santander, SA	Spain
8	Bank of Cyprus Public Co Ltd	Cyprus
9	Bank of Ireland	Ireland
10	Bank of Valletta	Malta
11	Bankia	Spain
12	Bankinter, SA	Spain
13	Barclays Plc	UK
14	BNP Paribas	France
15	Commerzbank AG	Germany
16	Credit Agricole	France
17	Espirito Santo Financial Group, SA	Portugal
18	Danske Bank	Denmark
19	Deutsche Bank AG	Germany
20	Dexia	Belgium
21	DNB ASA	Norway
22	Erste Bank Group	Austria

	Bank
23	EFG Eurobank Ergasias SA
24	HSBC Holdings Plc
25	Intesa Sanpaolo S.p.A
26	Jyske Bank
27	KBC Bank
28	Lloyds Banking Group Plc
29	Marfin Popular Bank
30	National Bank of Greece
31	Nordea Bank AB
32	Nova Kreditna Banka Mari
33	Oesterreichische Volksbank
34	OTP Bank Nyrt
35	Piraeus Bank Group
36	Raiffeisen Bank Internation
37	Royal Bank of Scotland Gr
38	Skandinaviska Enskilda Ba
39	Societe Generale
40	Svenska Handelsbanken AI
41	Swedbank AB
42	Sydbank
43	Unione di Banche Italiane S
44	Unicredit S.p.A

This table presents the banks and their country of origin which are included in our sample. The chosen banks are thos
the 2011 EU stress test. The sample period is from January 2008 to December 2013.

Table 3 - Rating events

No. of events	S&P			Moody's			Fitch		
	<7/2011	≥7/2011	Σ	<7/2011	≥7/2011	Σ	<7/2011	≥7/2011	
Downgrades	**68**	**58**	**126**	**88**	**83**	**171**	**62**	**58**	
of which									
1-notch downgrades	50	47	97	50	47	97	47	36	
(percentage)	*73.5%*	*81.0%*	*77.0%*	*56.8%*	*56.6%*	*56.7%*	*75.8%*	*62.1%*	*6*
2-notch downgrades	7	11	18	23	31	54	10	19	
(percentage)	*10.3%*	*19.0%*	*14.3%*	*26.1%*	*37.3%*	*31.6%*	*16.1%*	*32.8%*	*2*
≥2-notch downgrades	11	0	11	15	5	20	5	3	
(percentage)	*16.2%*	*0.0%*	*8.7%*	*17.0%*	*6.0%*	*11.7%*	*8.1%*	*5.2%*	

This table reports numbers of rating downgrades released by the CRAs on the sampled banks (see Table 2) during Jan
is the regulatory-change date, whereby ESMA was assigned with direct supervision of CRAs in the EU. There a
released by the CRAs on the sampled banks (i.e. 5 by S&P, 4 by Moody's and 8 by Fitch) making empirical investigati

Table 4: Response of Cumulative daily abnormal returns

	Before July 2011					Post July 201	
Time window	[-1,0]	[0,1]	[0,5]	[0,22]	[-1,0]	[0,1]	[0,5
Panel A: S&P downgrades							
Mean	0.113	-0.466	-0.850†	-2.770	**-1.152***	-1.002	-1.
t-test	0.427	0.370	0.352	0.196	0.100	0.145	0.
sign-test	0.500	0.404	0.043	0.313	0.012	0.448	0.
Wilcoxon	0.428	0.340	0.049	0.468	0.015	0.223	0.
Obs	68	68	68	68	58	58	
Panel B: Moody's downgrades							
Mean	-0.749†	-0.936†	-1.501†	0.849	**-0.622****	**-1.043*****	**-1.27**
t-test	0.034	0.092	0.067	0.290	0.012	0.008	0.
sign-test	0.334	0.500	0.334	0.099	0.018	0.049	0.
Wilcoxon	0.101	0.253	0.183	0.131	0.003	0.016	0.
Obs	88	88	88	88	82	82	
Panel C: Fitch downgrades							
Mean	-1.291†	-2.336†	**-5.954****	**-5.751****	0.455	0.022	1.
t-test	0.036	0.033	0.015	0.034	0.291	0.485	0.
sign-test	0.304	0.221	0.100	0.304	0.256	0.074	0.
Wilcoxon	0.110	0.167	0.054	0.049	0.342	0.177	0.
Obs	62	62	62	62	58	58	

This table presents the results of the event study on cumulative abnormal returns (CARs). Ro
average CARs during the time windows in percentage points. Rows 't-test', 'sign-test', 'W
values from the respective tests. Abnormal returns are estimated based on the market mod
window of [-250,-50]. Bold figures denote significant in both t-test and non-parametric
significant in either t-test or non-parametric tests only. *, **, *** denote significance at
levels. [-1,0] window captures abnormal returns in day 0. See Tables 2 and 3 for details on

Table 5: Response of Buy and Hold abnormal returns

	Before July 2011				Post July 2011		
Time window	[0,1]	[0,5]	[0,22]		[0,1]	[0,5]	[0,
Panel A: S&P downgrades							
Mean	-0.138	0.385	0.032		-1.011	-1.138	-2
t-test	0.457	0.410	0.495		0.144	0.170	
sign-test	0.404	0.111	0.195		0.448	0.074	
Wilcoxon	0.347	0.059	0.324		0.218	0.160	
Obs	68	68	68		58	58	
Panel B: Moody's downgrades							
Mean	-0.883†	-1.307†	0.593		**-1.030*****	**-1.332****	**-5.01**
t-test	0.093	0.076	0.345		0.007	0.024	
sign-test	0.500	0.196	0.142		0.049	0.049	
Wilcoxon	0.224	0.143	0.227		0.012	0.023	
Obs	88	88	88		82	82	
Panel C: Fitch downgrades							
Mean	-2.247†	**-5.003****	**-5.032****		-0.254	1.513	
t-test	0.033	0.014	0.039		0.345	0.143	
sign-test	0.221	0.100	0.221		0.043	0.448	
Wilcoxon	0.163	0.047	0.027		0.114	0.465	
Obs	62	62	62		58	58	

This table presents the results of the event study on Buy-and-Hold abnormal (BHARs). Row 'Mean' reports average BHARs during the time windows in perc points. Rows 't-test', 'sign-test', 'Wilcoxon' report p-values from the respectiv Abnormal returns are estimated based on the market model using a rolling w of [-250, -50]. Bold figures denote significant in both t-test and non-parametri † denotes significant in either t-test or non-parametric tests only. *, **, *** significance at the 10%, 5%, 1% levels. See Tables 2 and 3 for details on th sample.

Table 6: Response of Cumulative daily changes in intraday ranges

	Before July 2011					Post July 2011	
Time window	[-1,0]	[0,1]	[0,5]	[0,22]	[-1,0]	[0,1]	[0,5]
Panel A: S&P downgrades							
Mean	**0.636****	0.874†	0.214	0.761	0.244	0.603†	-0.215
t-test	0.023	0.050	0.329	0.112	0.327	0.088	0.281
sign-test	0.198	0.452	0.272	0.500	0.145	0.347	0.074
Wilcoxon	0.042	0.235	0.315	0.385	0.148	0.345	0.019
Obs	68	68	68	68	58	58	58
Panel B: Moody's downgrades							
Mean	-0.285	-0.989†	**-1.219***	-0.918	-0.270	0.191†	-0.058
t-test	0.332	0.091	0.069	0.138	0.136	0.242	0.434
sign-test	0.139	0.166	0.053	0.500	0.454	0.053	0.244
Wilcoxon	0.016	0.120	0.083	0.338	0.190	0.056	0.287
Obs	88	88	88	88	82	82	82
Panel C: Fitch downgrades							
Mean	-0.612	0.092	-0.766	**-1.041***	-0.104	**-0.974*****	-0.546
t-test	0.156	0.452	0.116	0.064	0.394	0.002	0.091
sign-test	0.187	0.221	0.450	0.126	0.288	0.018	0.248
Wilcoxon	0.197	0.106	0.144	0.066	0.383	0.005	0.133
Obs	62	62	62	62	58	58	58

This table presents the results of the event study on cumulative changes in the intraday h
The range utilizes intraday high and low prices using Parkinson (1980). Row 'Mean' r
cumulative changes in the range during the time windows in percentage points. Rows
test', 'Wilcoxon' report p-values from the respective tests. Bold figures denote significa
and non-parametric tests. † denotes significant in either t-test or non-parametric tests o
denote significance at the 10%, 5%, 1% levels. See Tables 2 and 3 for details on the data

Table 7: Response of CAR to downgrades

Time window	[-1,0]		[0,1]		[0,5]	
Panel A: Reactions to S&P actions						
$\Delta Rating$	-0.0006	0.0022	-0.0057	-0.0037	-0.0112	-0.0109
	(-0.22)	(0.66)	(-1.15)	(-0.58)	(-1.40)	(-1.04)
$\Delta Rating \times D_{Reg.change}$		-0.0091*		-0.0066		-0.0012
		(-1.68)		(-0.80)		(-0.09)
Rating level	-0.0004	-0.0004	-0.0024	-0.0023	-0.0029	-0.0029
	(-0.42)	(-0.33)	(-1.39)	(-1.35)	(-1.16)	(-1.15)
Book to market	0.0018	0.0018	0.0044	0.0044	0.0051	0.0051
	(0.81)	(0.81)	(0.95)	(0.95)	(0.83)	(0.83)
size	0.0071	0.0080	-0.0388	-0.0382	-0.1025*	-0.1024*
	(0.40)	(0.45)	(-0.95)	(-0.92)	(-1.87)	(-1.85)
cons	-0.1317	-0.1446	0.5850	0.5757	2.3469*	2.3440*
	(-0.47)	(-0.51)	(0.91)	(0.89)	(1.89)	(1.87)
Obs.	518	518	518	518	518	518
R^2	0.11	0.12	0.07	0.07	0.09	0.09
Panel B: Reactions to Moody's actions						
$\Delta Rating$	-0.0045**	-0.0024	-0.0075**	-0.0023	-0.0124**	-0.0086
	(-2.40)	(-0.92)	(-2.58)	(-0.65)	(-2.28)	(-1.17)
$\Delta Rating \times D_{Reg.change}$		-0.0055*		-0.0137***		-0.0099
		(-1.73)		(-2.96)		(-1.16)
Rating level	-0.0007	-0.0007	-0.0011	-0.0011	-0.0018	-0.0018
	(-0.99)	(-1.01)	(-0.91)	(-0.94)	(-0.91)	(-0.92)
Book to market	0.0018	0.0018	0.0037	0.0037	0.0040	0.0040
	(0.89)	(0.89)	(0.86)	(0.87)	(0.69)	(0.69)
size	-0.0133	-0.0131	-0.0231	-0.0226	-0.0371	-0.0367
	(-0.91)	(-0.89)	(-0.99)	(-0.97)	(-1.20)	(-1.20)
cons	0.3100	0.3052	0.5488	0.5367	0.6513	0.6475
	(0.95)	(0.93)	(1.05)	(1.03)	(1.34)	(1.34)
Obs.	562	562	562	562	562	562
R^2	0.10	0.11	0.09	0.10	0.08	0.08

Table 7 - Continued

Time window	[-1,0]		[0,1]		[0,5]	
Panel C: Reactions to Fitch actions						
$\Delta Rating$	-0.0045	-0.0093*	-0.0119**	-0.0206**	-0.0236*	-0.0578***
	(-1.61)	(-1.94)	(-2.19)	(-2.18)	(-1.82)	(-2.63)
$\Delta Rating \times D_{Reg.change}$		0.0089		0.0161		0.0628***
		(1.53)		(1.64)		(2.82)
Rating level	0.0002	0.0004	-0.0023	-0.0019	-0.0062**	-0.0047*
	(0.18)	(0.37)	(-1.50)	(-1.24)	(-2.10)	(-1.71)
Book to market	0.0028	0.0028	0.0049	0.0049	0.0045	0.0042
	(1.28)	(1.26)	(1.12)	(1.10)	(0.75)	(0.70)
size	-0.0186	-0.0169	-0.0218	-0.0188	-0.0919**	-0.0801*
	(-1.02)	(-0.95)	(-0.92)	(-0.81)	(-2.09)	(-1.94)
cons	0.4061	0.3693	0.4996	0.4076	1.4993**	1.2965**
	(1.00)	(0.92)	(0.94)	(0.79)	(2.17)	(2.01)
Obs.	512	512	512	512	512	512
R^2	0.11	0.12	0.12	0.12	0.11	0.14

This table reports the results of estimations of Equations (1a) and (1b). The dependent variable is c
during the time windows. Absolute values of change in rating levels are used for ease of interpre
standard errors are used. *, **, *** denote significance at the 10%, 5%, 1% levels. Bank-matched ra
sample is used. See Tables 2 and 3 for details on the data sample. Bank dummies and year dummies a
for sake of presentation.

Table 8: Response of Buy and Hold Abnormal returns to downgrades

Time window	[0,1]		[0,5]		
Panel A: Reactions to S&P actions					
$\Delta Rating$	-0.0050	-0.0026	-0.0073	-0.0061	-0.009
	(-1.07)	(-0.44)	(-1.10)	(-0.72)	(-0.8
$\Delta Rating \times D_{Reg.change}$		-0.0076		-0.0039	
		(-1.00)		(-0.34)	
Rating level	-0.0023	-0.0022	-0.0025	-0.0024	-0.001
	(-1.39)	(-1.33)	(-0.99)	(-0.97)	(-0.2
Book to market	0.0038	0.0038	0.0032	0.0032	0.008
	(0.97)	(0.97)	(0.73)	(0.73)	(1.4
size	-0.0318	-0.0310	-0.0766*	-0.0762*	-0.1880**
	(-0.89)	(-0.86)	(-1.78)	(-1.76)	(-3.0
cons	0.4753	0.4645	1.7616*	1.7518*	2.8217**
	(0.85)	(0.82)	(1.80)	(1.78)	(2.8
Obs.	518	518	518	518	51
R^2	0.07	0.07	0.10	0.10	0.1
Panel B: Reactions to Moody's actions					
$\Delta Rating$	-0.0075***	-0.0023	-0.0116**	-0.0076	-0.012
	(-2.63)	(-0.67)	(-2.26)	(-1.10)	(-1.4
$\Delta Rating \times D_{Reg.change}$		-0.0134***		-0.0105	
		(-2.98)		(-1.27)	
Rating level	-0.0011	-0.0011	-0.0014	-0.0014	0.000
	(-0.93)	(-0.96)	(-0.74)	(-0.75)	(0.2
Book to market	0.0032	0.0033	0.0026	0.0026	0.008
	(0.89)	(0.90)	(0.62)	(0.63)	(1.5
size	-0.0236	-0.0232	-0.0368	-0.0364	-0.1447**
	(-1.04)	(-1.02)	(-1.18)	(-1.17)	(-2.8
cons	0.5606	0.5487	0.6528	0.6488	2.2540**
	(1.10)	(1.08)	(1.32)	(1.31)	(2.8
Obs.	562	562	562	562	56
R^2	0.09	0.10	0.08	0.08	0.1

Table 8 - Continued

Time window	[0,1]		[0,5]		[
Panel C: Reactions to Fitch actions					
$\Delta Rating$	-0.0119**	-0.0198**	-0.0195*	-0.0483***	-0.007(
	(-2.25)	(-2.15)	(-1.81)	(-2.74)	(-0.51)
$\Delta Rating \times D_{Reg.change}$		0.0144		0.0529***	
		(1.49)		(2.86)	
Rating level	-0.0024*	-0.0021	-0.0058**	-0.0046*	-0.001(
	(-1.67)	(-1.42)	(-2.14)	(-1.78)	(-0.40)
Book to market	0.0042	0.0042	0.0028	0.0026	0.008
	(1.15)	(1.13)	(0.65)	(0.59)	(1.51)
size	-0.0162	-0.0135	-0.0782*	-0.0682*	-0.2028***
	(-0.69)	(-0.58)	(-1.93)	(-1.76)	(-3.28)
cons	0.3743	0.2874	1.2805**	1.1097*	3.1732***
	(0.71)	(0.56)	(2.02)	(1.84)	(3.25)
Obs.	512	512	512	512	512
R^2	0.11	0.12	0.11	0.14	0.16

This table reports the results of estimations of Equations (2a) and (2b). The dependent
and-Hold abnormal returns during the time windows. Absolute values of change in ratin
for ease of interpretation. Huber-White robust standard errors are used. *, **, *** denot
the 10%, 5%, 1% levels. Bank-matched random sampling from the full sample is used. S
3 for details on the data sample. Bank dummies and year dummies are included but not r
of presentation.

Table 9: Cumulative changes in intraday range in response to downgrades

Time window	[-1,0]		[0,1]		[0,5]	
Panel A: Reactions to S&P actions						
$\Delta Rating$	0.0049***	0.0057***	0.0046**	0.0052**	0.0009	0.0
	(2.74)	(2.71)	(2.30)	(2.07)	(0.41)	(1
$\Delta Rating \times D_{Reg.change}$		-0.0027		-0.0021		-0.0
		(-0.85)		(-0.54)		(-1
Rating level	0.0003	0.0004	0.0015**	0.0015**	0.0005	0.0
	(0.49)	(0.53)	(2.35)	(2.38)	(0.76)	(0
Book to market	-0.0012	-0.0012	-0.0012	-0.0012	-0.0014	-0.0
	(-0.93)	(-0.93)	(-0.90)	(-0.90)	(-1.29)	(-1
size	-0.0039	-0.0036	0.0174	0.0176	-0.0082	-0.0
	(-0.44)	(-0.40)	(1.06)	(1.06)	(-0.57)	(-0
cons	0.0882	0.0813	-0.4187	-0.4242	0.1175	0.1
	(0.42)	(0.39)	(-1.14)	(-1.14)	(0.52)	(0
Obs.	524	524	524	524	524	
R^2	0.12	0.12	0.11	0.11	0.12	
Panel B: Reactions to Moody's actions						
$\Delta Rating$	-0.0001	-0.0013	-0.0028	-0.0064	-0.0050	-0.0
	(-0.06)	(-0.36)	(-1.04)	(-1.52)	(-1.46)	(-1
$\Delta Rating \times D_{Reg.change}$		0.0031		0.0095**		0.0
		(0.73)		(1.99)		(0
Rating level	0.0016**	0.0016**	0.0019***	0.0019***	0.0020**	0.002
	(2.44)	(2.45)	(2.59)	(2.65)	(2.57)	(2
Book to market	-0.0017	-0.0017	-0.0014	-0.0014	-0.0016	-0.0
	(-1.28)	(-1.28)	(-1.01)	(-1.03)	(-1.39)	(-1
size	-0.0157*	-0.0158*	-0.0126	-0.0129	-0.0340***	-0.0342
	(-1.69)	(-1.68)	(-1.03)	(-1.04)	(-2.77)	(-2
cons	0.3346	0.3371	0.2603	0.2681	0.5145***	0.5168
	(1.62)	(1.61)	(0.96)	(0.97)	(2.73)	(2
Obs.	568	568	568	568	568	
R^2	0.12	0.12	0.10	0.11	0.10	

Table 9 - Continued

Time window	[-1,0]		[0,1]		[0,5]	
Panel C: Reactions to Fitch actions						
$\Delta Rating$	0.0006	-0.0019	0.0018	0.0055	-0.0011	0.0007
	(0.28)	(-0.58)	(0.65)	(1.08)	(-0.45)	(0.18)
$\Delta Rating \times D_{Reg.change}$		0.0046		-0.0069		-0.0034
		(1.18)		(-1.33)		(-0.82)
Rating level	0.0010	0.0011	0.0017**	0.0015**	0.0011	0.0010
	(1.51)	(1.61)	(2.37)	(2.08)	(1.50)	(1.37)
Book to market	-0.0020	-0.0021	-0.0015	-0.0015	-0.0015	-0.0014
	(-1.48)	(-1.49)	(-1.10)	(-1.08)	(-1.34)	(-1.32)
size	-0.0207**	-0.0198**	-0.0073	-0.0086	-0.0230**	-0.0236**
	(-2.14)	(-2.13)	(-0.54)	(-0.65)	(-2.43)	(-2.54)
cons	0.3052**	0.2909**	0.0918	0.1134	0.3382**	0.3486**
	(2.02)	(1.99)	(0.44)	(0.56)	(2.27)	(2.40)
Obs.	518	518	518	518	518	518
R^2	0.14	0.14	0.10	0.11	0.11	0.11

This table reports the results of estimations of Equations (3a) and (3b). The dependent variab
in the intraday high-low range during the time windows. Absolute values of change in rating le
interpretation. Huber-White robust standard errors are used. *, **, *** denote significance at the 10
matched random sampling from the full sample is used. See Tables 2 and 3 for details on the data
and year dummies are included but not reported for sake of presentation.

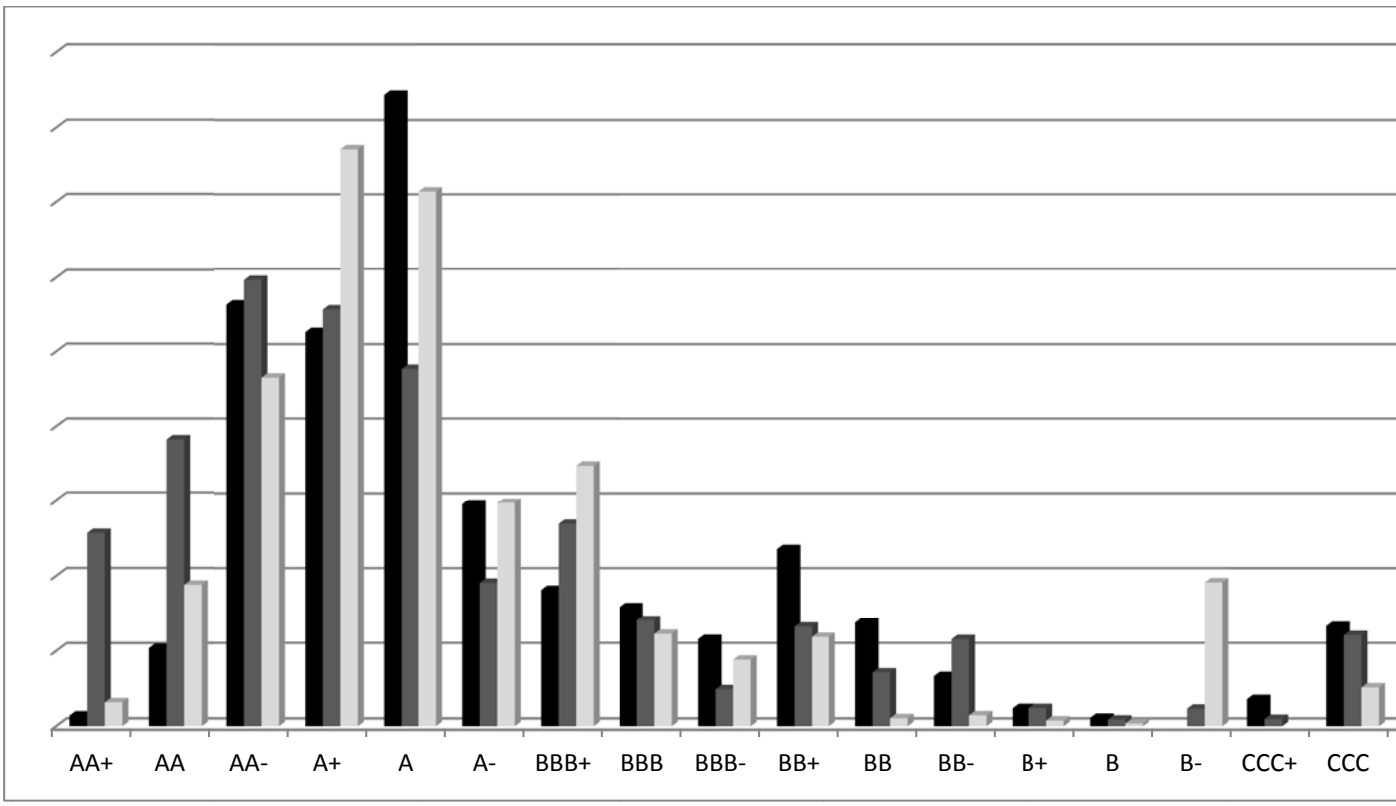

Figure 1: Distributions of daily bank rating observations. Moody's symbols (i.e. Aa1, Aa2 ... Caa3) are categoris
categories (i.e. AA+, AA ... CCC-). The dataset covers 44 banks (see Table 2) during the period from January 2008 to