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CREDIT RATING INFLATION IN THE POST-FINANCIAL CRISIS ERA: CONFLICT OF INTERESTS OR CHANGED CONDITIONS

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Abstract

Credit Rating Agencies (CRAs) have been criticized for persistently assigning inflated ratings. Aiming to limit such behaviour, following the 2008/09 crisis, regulators imposed new rules on CRAs. In this paper, I show that, in the post-financial crisis era, rating inflation and investors perception are, on average, non-existent. Evidence shows poor credit quality and time drives rating inflation, but investors fail to perceive it. I also uncover CRAs greater competition's dual effect: leads to inflation, while investors link monitoring to reduced inflation. Lastly, I expose that issuers benefiting the most from inflation are more likely to issue bonds within three months, whilst dismissing investors' perception.

Keywords: Corporate Debt Markets; Information Intermediation; Fixed Income Securities, Corporate Bond Issuance

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1 Introduction

Credit Rating Agencies (CRAs) are highly important for the financial system as they play a major role in capital markets. CRAs reduce information asymmetries between issuers and investors, providing uninformed investors with valuable insights for risk assessment and decision making.

This work project intends to evaluate the fairness of the current accusations of the persistence of rating inflation by analysing its existence, along with the investors' perception, in the post-financial crisis era. This assessment is performed within U.S. corporate bonds simultaneously rated by S&P Ratings (S&P) and Egan Jones Ratings (EJR), during the 5-year period from June 2013 till June 2018. Beyond, within the same time span, I evaluate the impact bonds' characteristics, external monitoring, relationship with the CRA and credit quality have in explaining rating inflation and the investors' perception. For further analysis, I evaluate the link between the firms' decisions to raise capital and rating inflation, as well as inflation perception, after the 2008/09 financial crisis.

In the US, in 2018, nearly 95 per cent of the outstanding credit ratings were assigned by the larger NRSROs, namely S&P Ratings, Moody's Investors Services and Fitch Ratings, revealing a clear dominant market positioning. The remaining 5 per cent are the responsibility of the other 7 existing NRSROs.[1] The same leading position is verified in the European market.

The market structure has been highly criticized but is not the only matter under intense scrutiny. The commonly used issuer-pay business model (as opposed to investor-pay), where bonds' issuers are responsible to pay for their credit ratings, has been identified as a major source of conflict of interests. This criticism continued as the larger agencies failed to predict the major financial failures of Enron (2001) and WorldCom (2002), becoming particularly intense with the 2008/09 financial crisis. Allegations of inflated ratings became recurrent due to the high scores assigned to sub-prime mortgage bonds, with critics agreeing that S&P and Moody's have not done enough to penalize aggressive borrowing with lower ratings. In response, not only agencies improved their model's accuracy and restricted interactions between the analyst and sales teams, but stricter regulation tar-

[1] "Annual Report on Nationally Recognized Statistical Rating Organizations", US Securities and Exchange Commission (SEC) (2020) (p. 11)

geting the major contributors to the financial crisis (including the CRAs) was adopted, from which I emphasize the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. Following this act, the SEC Office of Credit Ratings was established to supervise the NRSROs and ensure the quality of their credit ratings, rising their exposure to liability claims for poor performance.

From the beginning of the current year (2020), the Covid-19 outbreak prompted dramatic changes in the market conditions. The pandemic's severe impact on the economy contributed to substantial rating downgrades, with March breaking records, presenting the fastest pace of downgrading since 2002[2]. According to The Economist [3], *as of May 5th, S&P had downgraded or put on negative watch a fifth of the corporate and sovereign issuers that it rates, in response to the virus and a tumbling oil price — and over three-fifths in the worst-hit industries, such as cars and entertainment.* This raises doubts over the quality of the credit ratings and, consequently, the efficacy of the previously mentioned measures. Critics pointed this as a rerun of the last financial crisis[2], advocating with no doubt the existence of rating inflation.

In this work project, in the first part, the analysis of 3 809 bonds belonging to 874 issuers rated simultaneously by an issuer-pay (S&P) and investor-pay agency (EJR) reveal that, after the 2008/09 financial crisis, rating inflation, defined as the difference in notches between the ratings assigned by both agencies, has been absent, on average, failing to unearth enough support to sustain critics' allegations of generalized inflation. Additionally, the examination of a subsample of 1 372 bonds from 334 issuers discloses that, within the same period, investors do not perceive ratings as inflated, pricing bonds accordingly: on average, the yield difference for symmetric split-rating bonds is close to zero.

Next, evaluating the main characteristics' impact in explaining rating inflation and investors' perception reveals that bonds with lower credit quality, facing higher incentives for rating shopping, are more likely to benefit from rating inflation. As well, results reveal that rating inflation is increasing over time. These findings are robust to the inclusion of issuer fixed effects. Nonetheless, investors did not yet perceive it, failing to reflect in market prices the relation between rating

[2] See "Rating agencies brace for backlash after rash of downgrades", *Financial Times*, April 3, 2020

[3] See "Credit-rating agencies are back under the spotlight", *The Economist*, May 7, 2020

inflation and both the credit quality and time.

Issuers establishing closer relations with the issuer pay CRA do not benefit from added rating inflation, neither bonds with a longer maturity, but investors perceive the opposite, reflecting it in higher yields. Further, data interestingly exposes a dual effect of bonds' monitoring. Greater competition amongst CRAs positively relates to rating inflation, due to the deteriorating effect competition has on the quality of ratings. Investors, not familiar with the findings, perceive monitoring to diminish inflation.

In the second part, evidence suggests that issuers' benefiting the most from inflation (presenting a difference in notches above the median for the month) are more likely to issue bonds within three months, whilst disregarding the investors' perception in the decision-making process.

The first part of my project is inspired in the paper of Badoer et al. (2019), which presents evidence that the quality of the issuer-paid ratings has significant impacts in the borrowing costs and firms' choice of debt and demonstrates the issuer-paid model's inherent conflicts of interests lead to optimistically biased ratings, through the comparison of symmetric split-rating bonds' yields.

The second part is motivated by the analysis developed in the paper of Zhu (2020). Evidence is presented confirming that stronger mutual fund flows, that are the existing bondholders of the company, predict a higher likelihood of the firm issuing new bonds. This impact in the corporate financing decision arises from the fact that larger bondholder flows drive lower yields, leading firms to replace equity financing and bank loans by bond financing.

2 Literature Review

CRAs publish their assessment on financial products or issuers' creditworthiness, through the analysis of the issuers current and historical financial position and performance. Nonetheless, agencies are faced with a constant tension between the investors' need for ratings accuracy and the issuers' desire for favourable ratings as a way to benefit from lower costs of access to capital markets. In fact, studies suggest this is a source of rating inflation. Jianga et al. (2012), studying the short

period in the 1970s when S&P and Moody's business models differed, found evidence on the existence of rating inflation arising from the different payment methods. S&P, while operating under an investor-paid business model, assigned, on average, lower ratings than Moody's for the same corporate bonds. As S&P switched to an issuer-pay model, both agencies assessments became indistinguishable, with S&P assigning higher ratings for bonds subject to conflicts of interest (defined as expecting higher rating fees or posing a lower credit quality).

The financial crisis of 2008/09 confirmed what has long been suggested: the existence of rating inflation from agencies operating under the issuer-pay business model. Several studies further proved its inefficacy through a direct comparison with the investor-pay model, including the analysis of the Egan Jones Ratings agency. In fact, Beaver et al. (2006) found evidence that EJR is timelier and more symmetric (meaning its ratings adjust equally to positive and negative news to the issuers' credit profile) when compared to Moody's. The inefficiency associated with the issuer-pay model may result from additional aspects besides the unavoidable conflicts of interests, as a dominant market position. Implementation of measures threatening market power, including tighter regulation and/or reputational concerns, induces timeliness, accuracy, and volatility improvements for the larger CRAs (Cheng and Neamtiu (2009)).

The business model and the lack of competition lying at the roots of rating inflation could indicate that a switch to investor-pay and a greater opposition could portray options to hinder inflation in ratings. However, both answers reveal ineffective.

On one hand, though the issuer-pay standard is highly criticized, it succeeds the investor-pay model given its drawbacks. Critics argue the latter is not exempt from conflicts of interests. Agencies may be vulnerable to investors' preferences on ratings, depending on the larger positions they hold or their investment guidelines. As well, investors and issuers may be overlapping, leading threats of subscription cancellation when unsatisfied with the assigned ratings. Moreover, the model's efficacy and usage rely on the agencies' ability to enforce the contractual limits on the customers' sharing of information, which as White (2002) pointed out, became extremely difficult with the spread of low-cost photocopying. The posterior technological progress worsened the

situation.

On the other hand, greater competition has been historically associated with a deteriorating ability of ratings to predict default. As an example, from 1995 till 2006, while Fitch was capturing market share, S&P and Moody's were relaxing their standards, exchanging ratings accuracy for short-term profits (Becker and Milbourn (2011)). Beyond, increased competition reflected in a higher number of CRAs available, rising the likelihood of finding agencies with a high bias towards issuers, ultimately widening the scope for ratings shopping (issuers' process of shopping around for the most favourable rating). As a matter of fact, approaching 2011, bonds presenting only one rating became increasingly common, with a great prospect of the chosen agency being positively biased towards the firm (Kronlund (2019)). An exception occurred with the entry of an agency operating under a different business model (EJR), which helped uncover credit rating quality improvements. Xia (2014) found evidence that EJR entry in the industry intensified reputational concerns, pushing S&P's responsiveness to credit risk and constricting credit standards.

Altogether, changing to investor-pay model standards is unfeasible, and so it is important to scrutinise the factors that encourage issuer-paid agencies to inflate their credit ratings, namely the relationship issuer-agency and the current economic cycle.

Studies have shown that the relationship established with the CRA may benefit the issuer. Firms contributing to higher agencies' revenues, with larger incentives to ratings shopping or enlisting directors with personal connections with the agencies, enjoy from larger inflation. Evidence was encountered after analysing the main characteristics of the issuers overrated by S&P (Badoer et al. (2019)) and through the comparison of rating inflation across firms considering the length of their partnership with CRAs (Mählmann (2011)).

The credit rating quality was verified to be negatively related to the economic cycle (Bar-Isaac and Shapiro (2013)). During periods of expansion, skilled analysts are more expensive, CRAs enjoy from larger revenues and issuers from lower probabilities of default. Thus, the return of investing in rating quality and subsequent reputational concerns are diminished, leading agencies to take this opportunity to be less rigorous.

Literature, thus, proves the presence of rating inflation before the financial crisis 2008/09, while revealing the features that had a meaningful role in extending the gap between the rating assigned by the larger CRAs and the accurate assessment of credit risk.

This paper contributes to the literature by providing evidence that, in the post-financial crisis period, rating inflation has been, on average, absent, but increasing over time. Investors have perceived ratings as not being inflated but failed to recognize the increasing inflation over time. Beyond, it provides evidence over the impact bonds' characteristics, external monitoring, relationship with the CRA and credit quality have in rating inflation, for the same time span. The paper further contributes by revealing evidence that rating inflation influences the firms' decisions to raise capital, with the issuers that benefit the most from inflation more likely to issue bonds within three months. Investors' perception, however, is disregard in the decision-making process.

3 Methodology

3.1 Sample Construction

The data set consists of publicly offered U.S. corporate bonds (US Corporate Debentures and US Corporate Bank Notes), the respective current and historical ratings and yields (information on yields is not disclosed for all bonds). The bonds selected for the analysis are simultaneously rated by S&P and EJR. The information concerning yields is made available by Trade Reporting and Compliance Engine (TRACE), operated by FINRA[4]. The information regarding the bonds' characteristics and respective issuers, as well as the current and historical bond ratings assigned by S&P, Moody's, and Fitch, are made available by Mergent Fixed Income Securities Database (FISD)[5]. The information concerning the current and historical bond ratings assigned by EJR is made available

[4]Made available by TRACE from FINRA, at https://www.finra.org/filing-reporting/trace

[5]Made available by Mergent FISD from the Wharton Research Data Services, at https://wrds-web.wharton.upenn.edu/wrds/query_forms/navigation.cfm?navId=274

at the agency's website[6], according to the *Rule 17g-7 Rating Disclosure*[7]. This directive requires all NRSROs to disclose the information, in XBRL format, of all rating actions within 24 months, or within 12 months if the credit ratings are paid by the issuer.

I assess the existence of rating inflation in the U.S. corporate bonds through the comparison of credit ratings assigned by agencies with opposite business models: issuer and investor paid. I considered S&P (issuer paid CRA) and EJR (investor paid CRA) for the analysis, as they follow the same rating scale and similar rating definitions, and provide through-the-cycle ratings based on defaults probabilities.

I assume rating inflation to exist if, under disagreement, the issuer paid CRA (S&P) assigns a higher rating. This assumption is developed from the previously identified conflicts of interests underlying S&P's business model, whilst taking into consideration the diverse empirical findings revealing that the more favourable ratings are assigned by issuer-pay agencies. Besides this objective measure, it is important to analyse investors' perception of rating inflation. Analysing the bonds' yield (in percentual points) with one notch rating disagreement, I assume that investors perceiving ratings to be inflated price bonds differently, despite the debt instruments presenting the same average rating and thus similar likelihood of default. The measure is inspired by the paper by Badoer et al. (2019).

3.2 Model for the analysis of rating inflation and investors perception

I assess rating inflation, as an objective measure, considering historical and current bonds' rating information. Firstly, as credit ratings are expressed in letters, I perform a numerical transformation: to each rating is assigned a number ranging 1-22, with 1 corresponding to the highest credit quality (rating grade AAA) and 22 to the poorest quality (rating grade D). The frontier between investment grade and speculative-grade lies within 10 and 11, corresponding to BBB- and BB+ respectively.

The information, rather than disclosing a full monthly rating history, divulges only rating ac-

[6]Made available by Egan-Jones Ratings Company, at https://www.egan-jones.com/17g-7

[7]See "Rating History Files Publication Guide", U.S. Securities and Exchange Commission (SEC), at https://www.sec.gov/structureddata/rocr-publication-guide.html

tions. Hence, to build a monthly time-series per bond, I use each valid observation to fill all succeeding entries with missing information up to the next valid observation, and repeat the procedure for both agencies. It is worth remarking that I consider the first rating action date as a starting point, and that no month presents valid observations for bonds belonging to a defaulted firm or after a rating withdraw. More, I only consider the last valid observation for the months when a particular bond presents more than one rating action from the same agency.

Resulting, the higher the rating, the lower the corresponding number. Taking this into account, I compute rating inflation per bond, denoted as I_i, as the difference (in notches) between the corresponding numerical rating assigned by EJR, $REJ_{i,t}$, and the one assigned by S&P, $RSP_{i,t}$. In the presence of inflation, the output of the following estimate is positive.

$$I_{i,t} = REJ_{i,t} - RSP_{i,t} \tag{1}$$

Perception of rating inflation is evaluated using the historical and current bonds' yield information. For the purpose of this analysis, monthly information is needed. As such, I assume the bonds' monthly yield to equal the average, per month, of all the information on yields for that month. The detection of rating inflation perception considering yields is inspired on the first identification strategy developed by Badoer et al. (2019) and reported on the *Ratings Quality and Borrowing Choice* paper. This measure compares the yields of bonds with the same average rating, but to which S&P and EJR assign ratings with only one notch difference.

The methodology followed differs when evaluating the rating inflation perception, denoted $PI_{i,t}$, as I assess, for example, the yield for a bond rated BB+ by S&P and BB by EJR ($YOSP_{i,t}$) against the average yield of all bonds (rather than to each bond individually) rated BB+ by EJR and BB by S&P ($\overline{YOEJR}_{i,t}$). The bonds are identified according to the following steps: for each month under analysis, the bond benefiting from an optimistic S&P rating presents a difference in notches of 1, whereas the bonds with an optimistic EJR rating face a difference in notches of -1. Further, the rating assigned by S&P to the inflated bond must be the same as the rating assigned by EJR to the bonds defined as non-inflated, to ensure the average rating holds across all bonds. Resulting,

I calculate rating inflation perception, in percentage, as the difference between the inflated bond's yield ($YOSP_{i,t}$) and the average of the non-inflated bonds' yields ($\overline{YOEJR}_{i,t}$).

$$PI_{i,t} = YOSP_{i,t} - \overline{YOEJR}_{i,t} \tag{2}$$

The conclusions from the analysis are interpreted alike the cited paper. It is assumed that under the absence of rating inflation, both agencies' assessments are equally informative of the issuers' likelihood of defaulting, leading investors to price the bonds equally, which corresponds to $PI_{i,t}$ equal to zero. In a scenario of rating inflation perceived, equivalent to $PI_{i,t}$ presenting a positive outcome, investors value less the optimistic than the pessimistic S&P ratings, and bonds with the same average rating are priced differently. This is due to the investors' belief of unequal information on future defaults and their incapability of identifying the inflated bonds. The larger the outcome of $PI_{i,t}$, the greater the perception of rating inflation.

Rating inflation is analysed considering 3 809 bonds belonging to 874 issuers. However, information regarding yields was not disclosed for all bonds, and thus, for the assessment of perceived inflation, only 1 372 bonds from 334 issuers are analysed.

Descriptive statistics (presented in Table 1 and Table 2) reveal that, on average, during the period under analysis, there is no rating inflation, with investors perceiving inflation to be absent. Nonetheless, consistently some bonds are inflated through time.

Particularly, I identify bonds inflated as presenting a positive difference in notches. Accordingly, bonds perceived by investors as inflated reflect a positive difference in yields. Concerning rating inflation, 1 754 bonds, corresponding to 421 issuers, are identified to have been inflated at least once during the period under analysis. Data reveals these bonds benefit, on average, from a rating assigned by S&P approximately 1,6 notches above the rating assigned by EJR (Table 8). With regards to the perception of rating inflation (Table 10), investors identify 907 bonds, corresponding to 286 issuers, as inflated at least once during the five-year period. Investors price those bonds, on average, 1,2 percentual points above the average yield of bonds with the same average rating but perceived as non-inflated.

For additional tests, I split the full sample into two different subsamples: investment grade (IG) and speculative-grade (SG). Those are constructed according to the bonds' credit quality: for the IG subsample, bonds are required to be simultaneously defined as investment grade by S&P and EJR, presenting a numerical rating under 10 (including); for the SG subsample, bonds are assigned simultaneously a numerical rating above 11 (including), placing them in the High Yield territory. Rating inflation is thus further evaluated in only 3 128 IG bonds from 642 issuers, and 599 SG bonds from 225 issuers. Inflation perceived is as well evaluated in the subsamples: 1 108 IG and 181 SG bonds from 229 and 83 issuers, respectively.

It is worth noticing the main characteristics of the bonds and respective issuers considered for the analysis of (perceived as) inflated versus (perceived as) non-inflated bonds. The number of the issuers' rated outstanding bonds reveals differences, being higher (12,2 against 9,6) for issuers whose bonds benefit from rating inflation (Tables 8 and 9). Contrarily, bonds perceived as being inflated belong to issuers with fewer rated outstanding bonds (14 against 15,4). The current maturity, on average, of the bonds perceived as inflated (14 years) showcase a major difference when set against the perceived as non-inflated bonds (3,5 years) (Tables 10 and 11).

Given those differences, it is critical to verify if there is a significant relationship between these characteristics and the existence of (perceived) rating inflation. To examine how (perceived) rating inflation, notches difference ($I_{i,t}$) and yield difference ($PI_{i,t}$), relates with the bond's characteristics, external monitoring, relationship with the rating agency and credit quality (investment grade versus speculative-grade), I test the panel regressions presented below. It is important to note that, to control for the effect of potential outliers, both the notches difference and yield difference are winsorized at 0.05 per cent level, leading those variables' values at the bottom and top 5 per cent to correspond to the 5th and 95th percentile, respectively. Further, to address the possibility that (perceived) rating inflation is explained by time-invariant characteristics specific to the issuer or the type of bond, or that the relationship may suffer from omitted variables, the regressions control for issuer and month fixed effects, as well as bond type and month fixed effects. Thereby, time trends

and purely cross-issuer or cross-bond type explanations are ruled out.

$$I_{i,t} = \beta_0 + \beta_1 Size_i + \beta_2 C_i + \beta_3 Mat_{i,t} + \beta_4 AG_{i,t} + \beta_5 B_{f,t} + \beta_6 PB_{f,t} + \beta_7 HY_{i,t} + \alpha_f + u_{i,t} \quad (3)$$

$$PI_{i,t} = \beta_0 + \beta_1 Size_i + \beta_2 C_i + \beta_3 Mat_{i,t} + \beta_4 AG_{i,t} + \beta_5 B_{f,t} + \beta_6 PB_{f,t} + \beta_7 HY_{i,t} + \alpha_f + u_{i,t} \quad (4)$$

Bond's characteristics comprise three variables: $Size_i + C_i + Mat_{i,t}$. The offering amount ($Size_i$) provides information over the bonds' size, in billion U.S. dollars, and remains unchanged over time. The coupon (for the case of coupon bonds, C_i) is constant over time and its value is in U.S. dollars. The current maturity ($Mat_{i,t}$) is in years, and its calculation is based on the difference between the maturity date and the current date.

Monitoring aims to analyse how closely bonds are tracked. I considered two variables: the number of agencies rating each bond ($AG_{i,t}$) and the issuers' number of rated outstanding bonds ($B_{f,t}$). The number of agencies considers the larger CRAs (S&P Ratings, Fitch Ratings and Moody's Investors Service) and the investor-pay agency analysed (Egan Jones Ratings), taking a minimum value of 2 (as the full sample includes only bonds analysed by S&P and EJR simultaneously), and a maximum of 4 (when all cited agencies cover the bond). The issuers' number of rated outstanding bonds is taken as a proxy for the total number of outstanding bonds and considers the maximum number of bonds rated by one of the four previously mentioned agencies.

The relationship established between the issuer and the CRA identified as designating inflated ratings (S&P) is proxied by the percentage of the total outstanding bonds rated by this agency ($PB_{f,t}$). To the assessment of this variable, the monthly number of each issuer's bonds rated by S&P was compared against the corresponding total number of rated outstanding bonds.

The credit quality ($HY_{i,t}$) of each bond determines whether the bond is considered to present a low likelihood of defaulting (investment grade) or if rendering a poorer quality poses a higher probability of payment failure (non-investment grade, also known as speculative-grade or high yield). Based on the rating scale of the agencies under analysis, an investment grade bond reveals a rating between AAA and BBB-, corresponding to a numerical rating between 1 and 10, whilst a high

yield bond has a rating below BB+ (included), equivalent to a numerical rating above 11 (included). This (dummy) variable assigns 1 to bonds unveiling a numerical rating above 10 (including), which are the bonds defined as High Yield or lying in the frontier between HY and IG (presenting a rating of BBB- or BB+), more prone to slip (further) into the speculative-grade territory. It is worth remarking that analyses performed within the IG and SG subsamples, which include only bonds simultaneously rated IG and SG, respectively, consider the variable $In\ Frontier_{i,t}$ as a substitute of $HY_{i,t}$. The (dummy) variable $In\ Frontier_{i,t}$ assigns 1 to bonds lying in the frontier between HY and IG (revealing a rating of BBB- or BB+, corresponding to a numerical rating of 10 or 11).

These explanatory variables chosen concern to the individual and group level. The bond's characteristics, the number of agencies rating, and the credit quality are evaluated at the individual (bond) level. The remaining variables (relationship with the issuer pay CRA and the number of rated outstanding bonds) are assessed at the group (issuer) level, holding constant across the different bonds pertaining to the same issuer.

To allow for correlation across the error term over each firm's bonds per month, the standard errors are two-way clustered by issuer and month. The results are presented in Tables 3 and 4.

To capture how rating inflation, as well as inflation perception, evolves over time, a full set of year dummies is included in the testing of the panel regressions with issuer, as well as bond type fixed effects. As previously, the standard errors are two-way clustered by issuer and month. The results are presented in Tables 5 and 6.

4 Results

Data reveals that when capturing all unobserved, time-constant factors specific to the issuers, the goodness-of-fit is greater (approximately 0,7) than when accounting for the time-invariant characteristics particular to each bond type (approximately 0,05). It is further verified the inclusion of issuer fixed effects reduces the explanatory power of some independent variables. Hence, rating inflation (and perceived inflation) is common to all bonds belonging to the same issuer, revealing

that CRAs have a propensity to inflate ratings depending on the firm, rather than on the bonds' characteristics, and investors perceive it. Similar behaviour cannot be observed regarding the bond type, given that the explanatory variables help explain the difference in bonds' (perceived) rating inflation within each type.

Whilst accounting for the fixed effects considerations, evidence shows that investors perception of rating inflation is positively related to longer maturities. Credit ratings, assessing issuers' likelihood of default, are slower and less precise in adjusting to events affecting issuer's credit profile, which are less frequent and far off in the future for lengthier maturities. Though maturity does not present a material impact in rating inflation, investors believe it does, particularly for speculative-grade bonds. The coefficient estimate suggests that, as maturity for riskier bonds rises, investors price bonds assigned a higher rating by S&P nearly 0,2 percentual points above the symmetric split-rating bonds.

Further, the supervision of each bond helps explain the difference in notches. Evidence reveals an increasing number of CRAs rating a bond leads the issuer-pay to assign additional 0,2 notches above the investor-pay rating. This is aligned with previous empirical research, revealing that increased competition among rating agencies coincides with lower quality ratings, with deteriorating ability to predict defaults. Interestingly, investors perceive the opposite relation, as a higher number of agencies rating a bond may be related to greater supervision, preventing inflation.

A larger percentage of an issuer's bonds being rated by S&P signs a closer relationship between the CRA and the firm, potentially leading to rating inflation. Investors perceive this potential influence in inflation, pricing bonds assigned a higher rating by S&P nearly 0,6 per cent, and 0,8 per cent for IG bonds, above the symmetric split-rating bonds. However, in fact, the relationship degree is insignificant in explaining the difference in notches.

Highly significant is credit quality. Bonds carrying higher risk, namely the ones defined as speculative-grade or lying in the frontier between speculative and investment grade, have a greater incentive to rating shopping. Coefficient estimates reveal that the issuer-pay agency benefits bonds defined as SG or in the frontier with additional 0,8 notches. Focusing the analysis on the IG sub-

sample, the bonds lying in the frontier benefit from further 0,6 notches. Within the SG subsample, bonds do not benefit from being in the frontier as they pose a lower likelihood of default. The findings are robust to the inclusion of issuer fixed effects, indicating that the credit quality is critical in explaining rating inflation, even when accounting for the issuers' time-invariant characteristics. Nonetheless, investors do not perceive the strong relationship between credit quality and rating inflation.

In the aftermath of the 2008/09 financial crisis, the severe critics over the rating inflation led to stricter regulation, improvements in the CRAs models' accuracy and implementation of measures aiming to halt conflicts of interests. Evidence reveals the years following the financial crisis are negatively related with rating inflation, but over time the difference in notches is increasing, revealing higher inflation, particularly for bonds with higher risk (defined as speculative-grade). As with credit quality, the findings remain robust to the inclusion of issuer fixed effects. Coefficient estimates for the difference in yields uncover that though rating inflation is increasing, investors are not yet perceiving and reacting to it.

Furthermore, to analyse how the variables' explanatory power varies across the distribution, I test the previous panel regression as quantile regressions with issuer and month fixed effects, as well as bond type and month fixed effects. The sample under analysis is divided into three quantiles and, as previously, the standard errors are two-way clustered by issuer and month. Observing the results (alongside their significance) presented in Tables 12, 13, 14, 15, 16 and 17, I can conclude that what predicts rating inflation for the full sample comes mostly from the top quantile, characterized for its high levels of rating inflation. The same conclusion can be drawn when considering inflation perception.

5 Predicting Future Issuance

Rating inflation, alongside investors perception, may impact firms financing decisions. Firms can take advantage of the larger CRA's rating imprecision to issue bonds and benefit from the resulting

lower costs of debt. The existence of rating inflation may not be accompanied by a perception of inflation, depending on the investors' ability to identify and price the firms receiving inflated ratings.

To examine how rating inflation affects a firm decision to issue corporate bonds, a firm's bond issue within three months was regressed on the existence of rating inflation, as well as on the perception of rating inflation. The original sample holds, being subject of analysis 752 and 286 firms for the assessment of the rating inflation and the inflation perception impact, respectively. To show that results are robust, besides the usage of month fixed effects, I include the following control variables: the average of the issuer bond's characteristics and credit quality, supervision and relationship. This test was inspired by the analysis reported on the *Capital Supply and Corporate Bond Issuances: Evidence From Mutual Fund Flows*, exploited by Zhu (2020).

The dependent (dummy) variable, denoted as $D(Issue_{f,t+[1,3]})$, is assigned a value of 1 if a firm issues a bond in the following three months. As an example, if in a given year a firm issues a bond in April, $D(Issue_{f,January}) = D(Issue_{f,February}) = D(Issue_{f,March}) = 1$.

The independent (dummy) variables of interest concern both the objective measure ($\tilde{I}_{f,t}$) and perception of rating inflation ($\widetilde{PI}_{f,t}$) and are analysed separately. Firstly, to construct them, I compute both the monthly difference in notches and yields per issuer according to a weighted average based on their bonds' offering amount. Following, I evaluate the median of the issuers' monthly difference in notches, as well as in yields, for each month. Then, I construct the (dummy) variables assigning a value of 1 to the issuers presenting a monthly difference in notches above the median for the same period, and 0 under the scenario of a monthly difference equal or below the median. The same methodology is applied for the perception of rating inflation, considering the monthly difference in yields.

To control for the firms' characteristics ($X_{f,t}$), I include in the tests the average of the offering amount, coupon and current maturity across issuers' rated outstanding bonds. As previously, the offering amount and coupon are constant through time.

The relationship with the issuer pay CRA and the number of rated outstanding bonds, as men-

tioned previously, are assessed at the group (issuer) level, holding constant across the different bonds from the same issuer, per month. Likewise, the number of agencies rating each firm considers the larger CRAs and EJR, taking a minimum value of 2 and a maximum of 4.

The credit quality reflects an approximate average of each issuer's bonds credit quality, on a monthly basis. Considering that this variable represents a dummy, 1 is assigned when the majority of the issuers' rated bonds presents a poor credit quality, being defined as high yield or lying in the frontier.

$$D(Issue_{f,t+[1,3]}) = \alpha_t + \beta D(\tilde{I}_{f,t}) + \gamma X_{f,t} + \varepsilon_{f,t} \tag{5}$$

$$D(Issue_{f,t+[1,3]}) = \alpha_t + \beta D(\widetilde{PI}_{f,t}) + \gamma X_{f,t} + \varepsilon_{f,t} \tag{6}$$

I use a logistic model with monthly fixed effects[8], with the standard errors clustered by month. The results are presented in Table 7.

Evidence discloses firms presenting credit ratings, on average, inflated above the median for the period have a bigger likelihood (nearly 5 per cent, or 1 per cent when accounting for the control variables) of issuing bonds in the subsequent three months. The finding is robust to the inclusion of control variables, mitigating the concern of the results being driven by the firms' characteristics. Though the coefficient is marginally smaller, the estimate is still statistically and economically significant. Interestingly, investors' perception over a firm's rating inflation has no significant impact on the discussed decision. All in all, firms reveal a higher likelihood of issuing when benefiting from rating inflation above the monthly median, whereas they disregard investors' perception on their decision-making process.

Analysing the control variables shed some light on the relation between issuer's characteristics, supervision, relationship and credit quality, and the issuer's decisions to issue bonds within three months' time. Firms more acquainted with exploiting capital markets to raise additional income, reflected in a greater average size and number of outstanding bonds, reveal a higher likelihood (nearly 1,5 and 1 per cent respectively) of issuing in the coming three months. Evidence also

[8]Marginal effects evaluated at the mean are shown in place of the coefficients.

shows a closer relationship with the issuer-pay agency has a great influence in the firms' decisions, as reflected in the strong positive relationship between the percentage of an issuer's bonds rated by S&P and its likelihood of issuing soon.

Results further reveal a larger number of CRAs rating the issuer is positively related to the firms' decision. This is a reflection of the previously unearthed positive connection between a bond's monitoring and its inflation on the credit ratings. As discussed, as competition surges amongst CRAs, the quality of the ratings diminishes, but investors fail to perceive and price it. Given the higher prospect of the ratings assigned being inaccurate, firms seize the opportunity to issue debt with lower associated costs.

An issuer's bonds being, on average, defined as speculative-grade or lying in the frontier between speculative and investment grade, reflect the firm's poor credit quality. Evidence showcases this poor quality drives an approximately 3 per cent lower chance of issuing in the coming three months, as issuers are already faced with high costs attached to their debt instruments, deterring them from issuing further bonds.

6 Conclusion

Credit Rating Agencies (CRAs) are of extreme importance for the functioning of capital markets but have long been highly criticized for persistently assigning inflated ratings. In this paper, I evaluate the fairness of the allegations of generalized inflation. I provide evidence that, in the post-financial crisis era, rating inflation has been, on average, absent. Additionally, on average, investors do not perceive ratings as being inflated, pricing bonds accordingly: symmetric split-rating bonds have showcased similar yields. I present evidence suggesting that poor credit quality drives rating inflation, given their higher incentives for rating shopping. Further, data shows that, during the period under analysis, rating inflation has been increasing over time. Nonetheless, investors have not perceived it, failing to reflect in market prices the relation between rating inflation and both the credit quality and time.

Investors perceive inflation to exist within issuers establishing closer relations with the issuer pay CRA and for bonds with a longer maturity, whilst in fact, they do not benefit from added rating inflation. Further, bonds' monitoring exposes a dual effect: greater competition amongst CRAs positively relates to rating inflation, due to the deteriorating effect competition has on ratings quality, while investors perceive monitoring to diminish inflation.

My analysis further indicates that, after the Great Recession, the issuers benefiting the most from inflation (presenting a difference in notches above the median for the month) are more likely to issue bonds within three months, whilst disregarding the investors' perception in the decision-making process.

Table 1
Summary Statistics for Rating Inflation Sample

Variable	N	Mean	Std Dev	Min	Max
Rating inflation (in notches)	102 415	-0.492	1.66	-11	16
D (Rating inflation (in notches))	102 415	0.260	0.438	0	1
Size	102 415	0.636	0.578	0.004	15
Coupon	102 340	4.872	1.843	0.450	15
Current Maturity	102 415	9.089	9.303	0	97.809
Number of agencies rating (per bond)	102 415	3.661	0.505	2	4
Number of bonds	102 415	10.262	10.588	1	97
Perc bonds rated by S&P	102 415	0.932	0.128	0.143	1
HY	102 415	0.342	0.474	0	1

This table presents the summary statistics for the sample of bonds simultaneously rated by S&P and EJR, their characteristics, external monitoring, relationship with the CRA and credit quality, during the five-year period from June 2013 till June 2018.

Table 2
Summary Statistics for Rating Inflation Perception Sample

Variable	N	Mean	Std Dev	Min	Max
Inflation perception (in %)	14 024	0.005	2.064	-26.591	32.531
D (Inflation perception (in %))	14 024	0.511	0.499	0	1
Size	14 024	0.794	0.901	0.075	11
Coupon	14 000	4.621	1.821	0.65	13.25
Current Maturity	14 024	9.082	8.999	0	46.287
Number of agencies rating (per bond)	14 024	3.659	0.478	2	4
Number of bonds	14 024	14.702	16.935	1	93
Perc bonds rated by S&P	14 024	0.915	0.132	0.2	1
HY	14 024	0.388	0.487	0	1

This table presents the summary statistics for the sample of bonds, that being simultaneously rated by S&P and EJR during the five-year period from June 2013 till June 2018, disclosed information on their monthly yields. The statistics for the bonds' characteristics, external monitoring, relationship with the CRA and credit quality are also presented.

Table 3
Rating Inflation

	Rating inflation (in notches)					
	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.036	0.036	-0.078	0.177**	0.238***	-0.083
	(0.02)	(0.02)	(0.08)	(0.07)	(0.08)	(0.22)
Coupon	-0.010	-0.001	-0.063**	-0.052**	-0.045*	-0.055
	(0.01)	(0.01)	(0.03)	(0.02)	(0.03)	(0.06)
Current Maturity	0.000	-0.000	0.006	0.006*	0.003	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Number of agencies rating	0.017	-0.052	0.108	0.205*	0.181	0.034
	(0.06)	(0.07)	(0.09)	(0.10)	(0.13)	(0.16)
Number of bonds	0.009	0.006	0.076	0.006	0.005	0.026
	(0.01)	(0.01)	(0.06)	(0.01)	(0.01)	(0.02)
Perc bonds rated by S&P	0.041	0.124	0.132	0.079	0.016	0.057
	(0.21)	(0.24)	(0.37)	(0.31)	(0.35)	(0.62)
HY	0.764***			0.306***		
	(0.14)			(0.11)		
In frontier		0.608***	-0.496**		0.138	0.001
		(0.15)	(0.24)		(0.13)	(0.23)
constant	-0.907***	-0.613	-0.704	-1.383***	-1.264**	-0.237
	(0.33)	(0.37)	(0.63)	(0.50)	(0.57)	(1.03)
Issuer FE	Yes	Yes	Yes	No	No	No
Bond Type FE	No	No	No	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	102 327	80 683	12 499	102 340	80 689	12503
N of Bonds	3 809	3 128	599	3 809	3 128	599
N of Issuers	874	642	225	874	642	225
R2	0.728	0.743	0.675	0.046	0.050	0.044

This table presents fixed effects regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously by EJR and S&P between June 2013 and June 2018 in columns (1) and (4). For additional tests, the sample is split, with the sub-sample in columns (2) and (5) consisting of a monthly unbalanced panel of bonds simultaneously rated investment grade, and in columns (3) and (6) simultaneously rated as speculative grade. Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 4
Rating Inflation Perception

	Perception of rating inflation (in percentage)					
	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.108*	0.106	0.372	- 0.004	0.010	-0.714**
	(0.06)	(0.07)	(0.26)	(0.04)	(0.04)	(0.32)
Coupon	0.007	0.063***	-0.272**	0.044	0.073***	-0.041
	(0.03)	(0.02)	(0.10)	(0.03)	(0.02)	(0.10)
Current Maturity	0.097***	0.092***	0.176***	0.098***	0.093***	0.194***
	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.04)
Number of agencies rating	-0.075	-0.162	0.411	-0.261***	-0.194***	-0.332
	(0.12)	(0.12)	(0.62)	(0.07)	(0.06)	(0.25)
Number of bonds	-0.003	-0.002	0.014	-0.004*	-0.003*	0.031
	(0.00)	(0.00)	(0.09)	(0.00)	(0.00)	(0.03)
Perc bonds rated by S&P	-0.237	0.111	-1.218**	0.582*	0.818***	-0.735
	(0.35)	(0.39)	(0.57)	(0.33)	(0.30)	(0.52)
HY	0.175			0.167		
	(0.22)			(0.10)		
In frontier		0.123	0.632		0.119	0.507
		(0.23)	(0.48)		(0.11)	(0.33)
constant	-0.517	-0.719	0.208	-0.650	-1.200***	1.272
	(0.62)	(0.65)	(2.00)	(0.41)	(0.39)	(0.96)
Issuer FE	Yes	Yes	Yes	No	No	No
Bond Type FE	No	No	No	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	13 996	11 399	1 379	14 000	11 403	1 382
N of Bonds	1 372	1 108	181	1372	1108	181
N of Issuers	334	229	83	334	229	83
R2	0.677	0.731	0.598	0.483	0.604	0.257

This table presents fixed effects regressions in which the dependent variable is the monthly difference, in percentual points, (winsorized at 0.05% level) in the yields of the bonds assigned the same average rating by S&P and EJR, but with only one notch difference. The estimation sample consists of a monthly unbalanced panel of bonds, rated simultaneously by EJR and S&P and disclosing information on their monthly yields, between June 2013 and June 2018 in columns (1) and (4). For additional tests, the sample is split, with the sub-sample in columns (2) and (5) consisting of a monthly unbalanced panel of those bonds simultaneously rated investment grade, and in columns (3) and (6) simultaneously rated as speculative grade. Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 5
Rating Inflation Over Time

	Rating inflation (in notches)					
	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.036	0.037	-0.076	0.177***	0.239***	-0.085
	(0.02)	(0.02)	(0.08)	(0.07)	(0.08)	(0.22)
Coupon	-0.010	-0.000	-0.063**	-0.052**	-0.045*	-0.057
	(0.01)	(0.01)	(0.03)	(0.02)	(0.03)	(0.06)
Current Maturity	-0.000	-0.001	0.006	0.006*	0.003	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Number of agencies rating	0.018	-0.052	0.108	0.205*	0.180	0.030
	(0.06)	(0.07)	(0.09)	(0.10)	(0.13)	(0.16)
Number of bonds	0.009	0.006	0.077	0.006	0.006	0.025
	(0.01)	(0.01)	(0.06)	(0.01)	(0.01)	(0.02)
Perc bonds rated by S&P	0.020	0.095	0.153	0.068	0.002	0.067
	(0.21)	(0.24)	(0.36)	(0.31)	(0.35)	(0.62)
HY	0.768***			0.306**		
	(0.15)			(0.12)		
In frontier		0.611***	-0.510**		0.138	-0.009
		(0.15)	(0.24)		(0.13)	(0.23)
2014Y	-0.335***	-0.345***	-0.410***	-0.319***	-0.330***	-0.139
	(0.05)	(0.06)	(0.08)	(0.05)	(0.05)	(0.13)
2015Y	-0.211***	-0.248***	-0.088	-0.186**	-0.258***	0.244
	(0.07)	(0.08)	(0.15)	(0.08)	(0.08)	(0.18)
2016Y	-0.010	-0.060	0.046	0.033	-0.096	0.431**
	(0.08)	(0.09)	(0.17)	(0.08)	(0.09)	(0.21)
2017Y	0.093	0.095	-0.023	0.155*	0.063	0.334
	(0.08)	(0.09)	(0.18)	(0.09)	(0.10)	(0.24)
2018Y	0.206**	0.235**	0.077	0.209**	0.121	0.452*
	(0.09)	(0.10)	(0.20)	(0.10)	(0.11)	(0.25)
constant	-0.833**	-0.520	-0.640	-1.336**	-1.145*	-0.434
	(0.34)	(0.38)	(0.63)	(0.51)	(0.58)	(1.07)
Issuer FE	Yes	Yes	Yes	No	No	No
Bond Type FE	No	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	102 327	80 683	12 499	102 340	80 689	12 503
N of Bonds	3 809	3 128	599	3 809	3 128	599
N of Issuers	874	642	225	874	642	225
R2	0.727	0.741	0.669	0.044	0.049	0.037

This table presents fixed effects regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously by EJR and S&P between June 2013 and June 2018 in columns (1) and (4). For additional tests, the sample is split, with the sub-sample in columns (2) and (5) consisting of a monthly unbalanced panel of bonds simultaneously rated investment grade, and in columns (3) and (6) simultaneously rated as speculative grade. Alongside issuer fixed effects, a full set of year dummies is included in the testing. Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 6
Rating Inflation Perception Over Time

	Perception of rating inflation (in percentage)					
	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.108*	0.106	0.431*	-0.007	0.009	-0.676**
	(0.06)	(0.07)	(0.26)	(0.04)	(0.04)	(0.34)
Coupon	0.007	0.063***	-0.286***	0.045	0.073***	-0.043
	(0.03)	(0.02)	(0.10)	(0.03)	(0.02)	(0.10)
Current Maturity	0.097***	0.092***	0.176***	0.098***	0.093***	0.198***
	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.03)
Number of agencies rating	-0.068	-0.163	0.586	-0.260***	-0.194***	-0.367
	(0.12)	(0.11)	(0.60)	(0.07)	(0.06)	(0.27)
Number of bonds	-0.002	-0.002	0.088	-0.004*	-0.003*	0.042
	(0.00)	(0.00)	(0.12)	(0.00)	(0.00)	(0.03)
Perc bonds rated by S&P	-0.194	0.153	-0.901	0.585*	0.836***	-0.529
	(0.35)	(0.38)	(0.67)	(0.33)	(0.30)	(0.58)
HY	0.173			0.164		
	(0.22)			(0.10)		
In frontier		0.147	0.304		0.125	0.426
		(0.23)	(0.49)		(0.11)	(0.33)
2014Y	-0.031	-0.074	0.658*	-0.132**	-0.106*	0.226
	(0.06)	(0.06)	(0.37)	(0.06)	(0.06)	(0.30)
2015Y	-0.102	-0.237***	0.612	-0.140	-0.263***	0.506
	(0.09)	(0.09)	(0.49)	(0.10)	(0.09)	(0.32)
2016Y	-0.238**	-0.282***	0.115	-0.223**	-0.183**	-0.171
	(0.10)	(0.10)	(0.45)	(0.10)	(0.09)	(0.36)
2017Y	-0.033	-0.158	0.791	0.017	-0.084	0.505
	(0.10)	(0.11)	(0.53)	(0.09)	(0.09)	(0.41)
2018Y	-0.060	-0.090	0.073	0.035	0.006	-0.091
	(0.12)	(0.14)	(0.53)	(0.08)	(0.10)	(0.30)
constant	-0.523	-0.634	-1.423	-0.604	-1.134***	0.955
	(0.62)	(0.66)	(1.90)	(0.43)	(0.41)	(1.09)
Issuer FE	Yes	Yes	Yes	No	No	No
Bond Type FE	No	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	13 996	11 399	1 379	14 000	11 403	1 382
N of Bonds	1 372	1 108	181	1 372	1 108	181
N of Issuers	334	229	83	334	229	83
R2	0.672	0.727	0.554	0.475	0.600	0.203

This table presents fixed effects regressions in which the dependent variable is the monthly difference, in percentual points, (winsorized at 0.05% level) in the yields of the bonds assigned the same average rating by S&P and EJR, but with only one notch difference. The estimation sample consists of a monthly unbalanced panel of bonds, rated simultaneously by EJR and S&P and disclosing information on their monthly yields, between June 2013 and June 2018 in columns (1) and (4). For additional tests, the sample is split, with the sub-sample in columns (2) and (5) consisting of a monthly unbalanced panel of those bonds simultaneously rated as investment grade, and in columns (3) and (6) as speculative grade. Alongside issuer fixed effects, a full set of year dummies is included in the testing. Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 7
(Perceived) Rating Inflation Impact in Debt Issuance within 3 Months

	Issue within Three Months		
	(1)	(2)	(3)
D (Rating Inflation)	0.049***	0.013**	
	(0.013)	(0.005)	
Avg Size		0.014***	
		(0.005)	
Avg Coupon		0.002	
		(0.002)	
Avg Maturity		0.000	
		(0.000)	
Number of Bonds		0.006***	
		(0.002)	
Perc bonds rated by S&P		0.066***	
		(0.016)	
Number of agencies rating		0.027***	
		(0.004)	
Avg Credit Quality		-0.030***	
		(0.011)	
D (Inflation Perception)			-0.017
			(0.04)
Month FE	Yes	Yes	Yes
N	30 661	30 661	3 413
N of Issuers	752	752	286

This table presents logistic regressions in which the dependent (dummy) variable is assigned a value of 1 if a firm issues bonds in the subsequent three months. The estimation sample consists of a monthly unbalanced panel of issuers whose bonds are rated simultaneously by S&P and EJR, between June 2013 and June 2018, in columns (1) and (2). Those issuers disclosing information on their bonds monthly yields constitute the estimation sample in column (3). The independent (dummy) variable, in column (1), is assigned a value of 1 if the issuer presents credit ratings, on average, inflated above the median for the period. To demonstrate the estimate robustness, control variables are included in column (2). The independent (dummy) variable, in column (3), is assigned a value of 1 if the monthly average difference in yields is above the median for the month. A logistic model with monthly fixed effects is used. In place of the coefficients, marginal effects evaluated at the mean are shown. Heteroskedasticity-consistent standard errors are clustered by month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

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Appendix

Figure 1: **Rating inflation (in notches).** The figure plots the average monthly difference in credit ratings (in notches), across all bonds simultaneously rated by S&P and EJR, for the 5-year period from June 2013 till June 2018.

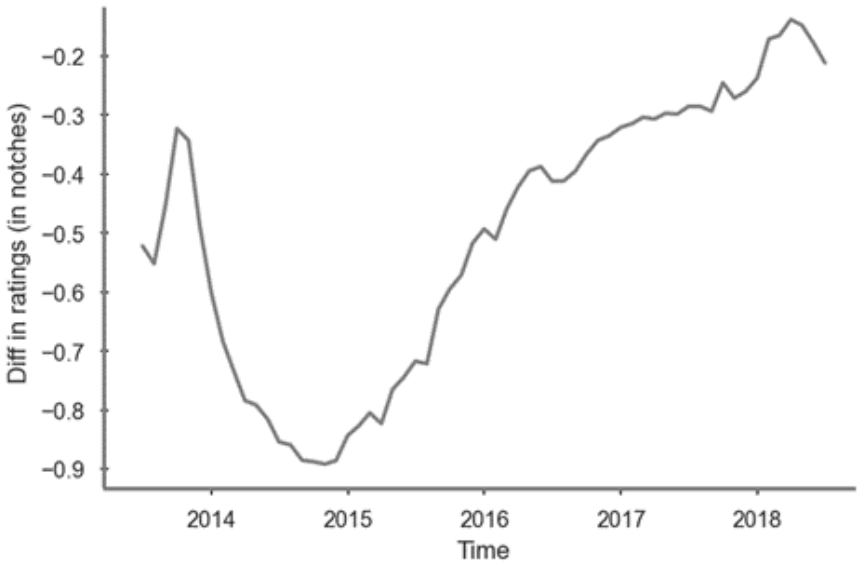

Figure 2: **Rating inflation perception (in percentual points).** The figure plots the average of the bonds' monthly average difference in yields (in percentual points), across all bonds simultaneously rated by S&P and EJR and disclosing information on their monthly yields, for the 5-year period from June 2013 till June 2018.

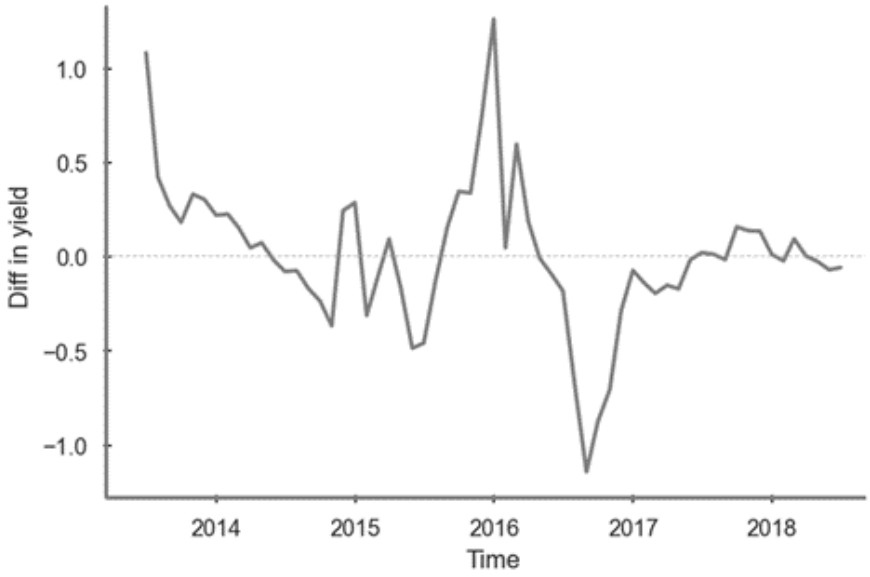

Figure 3: **Rating inflation for bonds simultaneously rated speculative-grade by S&P and EJR (in notches).** The figure plots the average monthly difference in credit ratings (in notches), across bonds simultaneously rated speculative-grade (credit rating of BB+ or below) by S&P and EJR, for the 5-year period from June 2013 till June 2018.

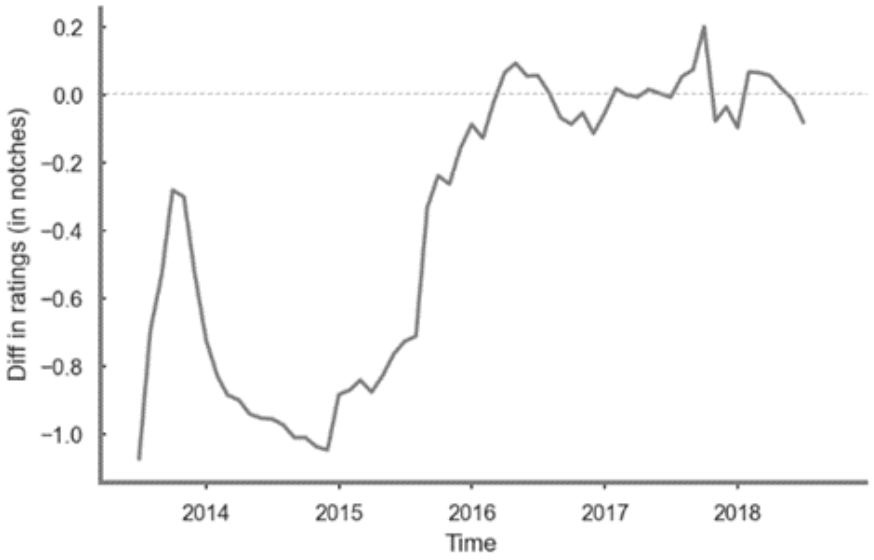

Figure 4: **Rating inflation perception for bonds simultaneously rated speculative-grade by S&P and EJR (in percentual points).** The figure plots the average of the bonds' monthly average difference in yields (in percentual points), across bonds simultaneously rated speculative-grade (credit rating of BB+ or below) by S&P and EJR and disclosing information on their monthly yields, for the 5-year period from June 2013 till June 2018.

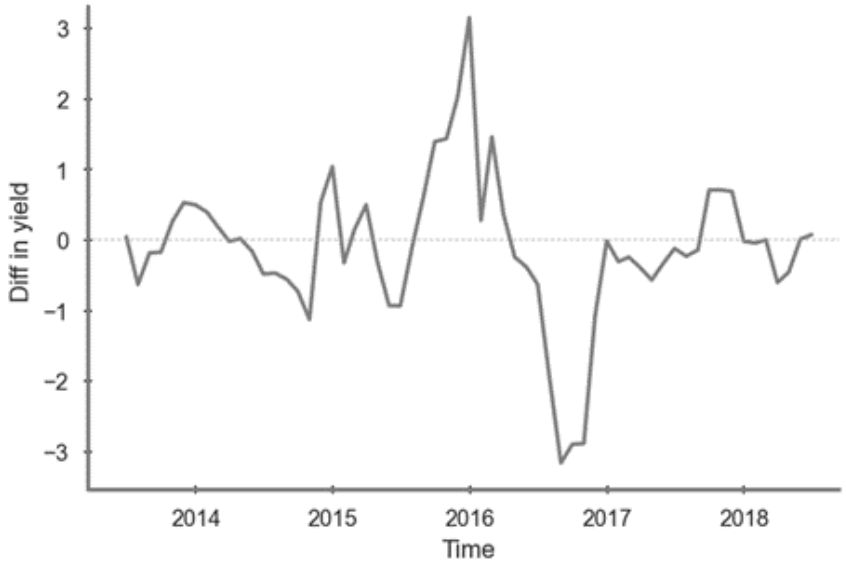

Table 8
Summary Statistics for Rating Inflation for the Sub-sample of Inflated Bonds

Variable	N	Mean	Std Dev	Min	Max
Rating inflation (in notches)	26 586	1.580	0.866	1	16
D (Rating inflation (in notches))	26 586	1	0	1	1
Size	26 586	0.742	0.744	0.004	11
Coupon	26 525	4.848	1.897	0.587	13.25
Current Maturity	26 586	8.949	8.897	0	46.287
Number of agencies rating (per bond)	26 586	3.666	0.501	2	4
Number of bonds	26 586	12.243	13.780	1	97
Perc bonds rated by S&P	26 586	0.922	0.132	0.2	1
HY	26 586	0.457	0.498	0	1

This table presents the summary statistics for the sub-sample of bonds, that being simultaneously rated by S&P and EJR during the five-year period from June 2013 till June 2018, presented a positive difference in notches. The statistics for the bonds' characteristics, external monitoring, relationship with the CRA and credit quality are also presented.

Table 9
Summary Statistics for Rating Inflation for the Sub-sample of Non-Inflated Bonds

Variable	N	Mean	Std Dev	Min	Max
Rating inflation (in notches)	75 829	-1.218	1.199	-11	0
D (Rating inflation (in notches))	75 829	0	0	0	0
Size	75 829	0.599	0.502	0.004	15
Coupon	75 815	4.881	1.823	0.45	15
Current Maturity	75 829	9.139	9.440	0	97.809
Number of agencies rating (per bond)	75 829	3.659	0.507	2	4
Number of bonds	75 829	9.567	9.109	1	97
Perc bonds rated by S&P	75 829	0.936	0.127	0.143	1
HY	75 829	0.301	0.459	0	1

This table presents the summary statistics for the sample of bonds, that being simultaneously rated by S&P and EJR during the five-year period from June 2013 till June 2018, presented a negative to null difference in notches. The statistics for the bonds' characteristics, external monitoring, relationship with the CRA and credit quality are also presented.

Table 10
Summary Statistics for Rating Inflation Perception for the Sub-sample of Inflated Bonds

Variable	N	Mean	Std Dev	Min	Max
Inflation perception (in %)	7 172	1.206	1.494	0	32.531
D (Inflation perception (in %))	7 172	1	0	1	1
Size	7 172	0.825	1.089	0.075	11
Coupon	7 172	4.927	1.498	1.35	13.25
Current Maturity	7 172	14.417	9.676	0.003	46.287
Number of agencies rating (per bond)	7 172	3.633	0.485	2	4
Number of bonds	7 172	14.035	16.762	1	93
Perc bonds rated by S&P	7 172	0.925	0.124	0.2	1
HY	7 172	0.406	0.491	0	1

This table presents the summary statistics for the sample of bonds, that being simultaneously rated by S&P and EJR during the five-year period from June 2013 till June 2018, disclosed information on their monthly yields, and presented a positive difference in yields. The statistics for the bonds' characteristics, external monitoring, relationship with the CRA and credit quality are also presented.

Table 11
Summary Statistics for Rating Inflation Perception for the Sub-sample of Non-Inflated Bonds

Variable	N	Mean	Std Dev	Min	Max
Inflation perception (in %)	6 876	-1.252	1.815	-26.591	0
D (Inflation perception (in %))	6 876	0	0	0	0
Size	6 876	0.761	0.644	0.096	6
Coupon	6 852	4.306	2.061	0.65	13.25
Current Maturity	6 876	3.521	2.673	0	40.291
Number of agencies rating (per bond)	6 876	3.687	0.469	2	4
Number of bonds	6 876	15.366	17.067	1	93
Perc bonds rated by S&P	6 876	0.905	0.139	0.25	1
HY	6 876	0.368	0.482	0	1

This table presents the summary statistics for the sample of bonds, that being simultaneously rated by S&P and EJR during the five-year period from June 2013 till June 2018, disclosed information on their monthly yields, and presented a negative to null difference in yields. The statistics for the bonds' characteristics, external monitoring, relationship with the CRA and credit quality are also presented.

Table 12
Rating Inflation in the Full Sample
Analysis of the lower and upper quantile

	Rating Inflation (in notches)			
	(1)	(2)	(3)	(4)
	Q1	Q3	Q1	Q3
Size	-0.005	-0.004	0.041	0.011
	(0.01)	(0.01)	(0.05)	(0.03)
Coupon	-0.002	-0.000	-0.030**	-0.009
	(0.01)	(0.00)	(0.01)	(0.01)
Current Maturity	-0.001	0.000	0.000	0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Number of agencies rating (per bond)	0.037	0.003	0.127	0.117***
	(0.05)	(0.01)	(0.08)	(0.04)
Number of bonds	0.015	-0.000	0.001	-0.004**
	(0.01)	(0.00)	(0.01)	(0.00)
Perc bonds rated by S&P	0.207	-0.026	0.064	0.099
	(0.13)	(0.22)	(0.19)	(0.17)
HY	-0.436***	0.410***	-0.259***	0.148**
	(0.12)	(0.08)	(0.08)	(0.06)
constant	-1.984***	1.232***	-2.004***	0.886***
	(0.24)	(0.22)	(0.35)	(0.21)
Issuer FE	Yes	Yes	No	No
Bond Type FE	No	No	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
N	51557	26518	51569	26525
N of Bonds	2 314	1 754	2 314	1 754
N of Issuers	682	421	682	421
R2	0.709	0.641	0.072	0.080

This table presents quantile regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously by EJR and S&P between June 2013 and June 2018. The sample is distributed in three quantiles, with the first quantile in columns (1) and (4) and the third quantile in columns (2) and (4). Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 13
Rating Inflation in the Full Sample over Time
Analysis of the lower and upper quantile

	Rating Inflation (in notches)			
	(1)	(2)	(3)	(4)
	Q1	Q3	Q1	Q3
Size	-0.005	-0.003	0.040	0.011
	(0.01)	(0.01)	(0.05)	(0.03)
Coupon	-0.002	-0.000	-0.030**	-0.009
	(0.01)	(0.00)	(0.01)	(0.01)
Current Maturity	-0.001	0.000	0.000	0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Number of agencies rating (per bond)	0.036	0.003	0.128	0.116***
	(0.05)	(0.01)	(0.08)	(0.04)
Number of bonds	0.016	-0.001	0.001	-0.004**
	(0.01)	(0.00)	(0.01)	(0.00)
Perc bonds rated by S&P	0.182	-0.018	0.059	0.100
	(0.13)	(0.21)	(0.19)	(0.17)
HY	-0.433***	0.412***	-0.260***	0.147**
	(0.12)	(0.07)	(0.08)	(0.06)
2014Y	-0.125***	-0.036	-0.066*	0.053*
	(0.04)	(0.04)	(0.04)	(0.03)
2015Y	-0.099**	0.008	-0.077	0.130***
	(0.05)	(0.05)	(0.05)	(0.04)
2016Y	0.011	0.091	-0.001	0.178***
	(0.06)	(0.06)	(0.06)	(0.04)
2017Y	0.088	0.060	0.082	0.078
	(0.06)	(0.06)	(0.07)	(0.05)
2018Y	0.119*	0.044	0.113	-0.009
	(0.06)	(0.07)	(0.07)	(0.06)
constant	-1.944***	1.195***	-1.997***	0.812***
	(0.24)	(0.22)	(0.35)	(0.22)
Issuer FE	Yes	Yes	No	No
Bond Type FE	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	51557	26518	51569	26525
N of Bonds	2 314	1 754	2 314	1 754
N of Issuers	682	421	682	421
R2	0.707	0.639	0.070	0.078

This table presents quantile regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously by EJR and S&P between June 2013 and June 2018. The sample is distributed in three quantiles, with the first quantile in columns (1) and (4) and the third quantile in columns (2) and (4). Alongside issuer fixed effects in columns (1) and (2) and bond type fixed effects in columns (3) and (4), a full set of year dummies is included in the testing. Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 14
Rating Inflation in the Sub-sample of IG Bonds
Analysis of the lower and upper quantile

	Rating Inflation (in notches)			
	(1)	(2)	(3)	(4)
	Q1	Q3	Q1	Q3
Size	-0.007	-0.006	0.061	0.015
	(0.01)	(0.01)	(0.06)	(0.03)
Coupon	-0.004	-0.002	-0.042***	-0.012
	(0.01)	(0.00)	(0.01)	(0.01)
Current Maturity	-0.001	0.000	0.001	0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Number of agencies rating (per bond)	-0.054	-0.002	0.154	0.178***
	(0.05)	(0.02)	(0.10)	(0.05)
Number of bonds	0.014	-0.002	0.000	-0.003
	(0.01)	(0.00)	(0.01)	(0.00)
Perc bonds rated by S&P	0.207	-0.044	-0.063	0.163
	(0.15)	(0.27)	(0.24)	(0.24)
In frontier	-0.409***	0.380***	-0.120	-0.072
	(0.13)	(0.09)	(0.11)	(0.07)
constant	-1.636***	1.311***	-1.936***	0.583*
	(0.29)	(0.27)	(0.43)	(0.30)
Issuer FE	Yes	Yes	No	No
Bond Type FE	No	No	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
N	41213	18503	41221	18511
N of Bonds	1 882	1 320	1 882	1 320
N of Issuers	499	266	499	266
R2	0.724	0.715	0.036	0.094

This table presents quantile regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously investment-grade by EJR and S&P between June 2013 and June 2018. The sample is distributed in three quantiles, with the first quantile in columns (1) and (4) and the third quantile in columns (2) and (4). Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 15
Rating Inflation in the Sub-sample of IG Bonds over Time
Analysis of the lower and upper quantile

	Rating Inflation (in notches)			
	(1)	(2)	(3)	(4)
	Q1	Q3	Q1	Q3
Size	-0.007	-0.006	0.061	0.015
	(0.01)	(0.01)	(0.06)	(0.03)
Coupon	-0.004	-0.002	-0.041***	-0.012
	(0.01)	(0.00)	(0.01)	(0.01)
Current Maturity	-0.001	0.000	0.001	0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Number of agencies rating (per bond)	-0.056	-0.003	0.155	0.178***
	(0.05)	(0.02)	(0.10)	(0.05)
Number of bonds	0.015	-0.002	0.000	-0.003
	(0.01)	(0.00)	(0.01)	(0.00)
Perc bonds rated by S&P	0.187	-0.052	-0.066	0.163
	(0.15)	(0.26)	(0.24)	(0.24)
In frontier	-0.407***	0.385***	-0.120	-0.072
	(0.14)	(0.09)	(0.11)	(0.07)
2014Y	-0.113***	-0.015	-0.069**	0.073*
	(0.04)	(0.04)	(0.03)	(0.04)
2015Y	-0.108**	0.059	-0.107**	0.144***
	(0.05)	(0.06)	(0.05)	(0.05)
2016Y	-0.012	0.107	-0.048	0.168***
	(0.06)	(0.08)	(0.06)	(0.06)
2017Y	0.066	0.111	0.028	0.056
	(0.06)	(0.08)	(0.07)	(0.06)
2018Y	0.099	0.105	0.022	-0.029
	(0.07)	(0.09)	(0.08)	(0.07)
constant	-1.588***	1.254***	-1.897***	0.518*
	(0.28)	(0.27)	(0.43)	(0.31)
Issuer FE	Yes	Yes	No	No
Bond Type FE	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	41213	18503	41221	18511
N of Bonds	1 882	1 320	1 882	1 320
N of Issuers	499	266	499	266
R2	0.722	0.712	0.034	0.090

This table presents quantile regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously investment-grade by EJR and S&P between June 2013 and June 2018. The sample is distributed in three quantiles, with the first quantile in columns (1) and (4) and the third quantile in columns (2) and (4). Alongside issuer fixed effects in columns (1) and (2) and bond type fixed effects in columns (3) and (4), a full set of year dummies is included in the testing. Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 16
Rating Inflation in the Sub-sample of SG Bonds
Analysis of the lower and upper quantile

	Rating Inflation (in notches)			
	(1)	(2)	(3)	(4)
	Q1	Q3	Q1	Q3
Size	-0.047	0.135***	0.034	0.103
	(0.04)	(0.07)	(0.12)	(0.09)
Coupon	-0.030	-0.007	-0.009	-0.037
	(0.02)	(0.01)	(0.04)	(0.02)
Current Maturity	0.004	0.005*	0.004	0.009
	(0.00)	(0.00)	(0.01)	(0.01)
Number of agencies rating (per bond)	0.061	-0.010	0.064	-0.118**
	(0.07)	(0.05)	(0.10)	(0.05)
Number of bonds	-0.062	0.018	0.009	0.004
	(0.04)	(0.02)	(0.02)	(0.01)
Perc bonds rated by S&P	0.033	0.683***	0.427	0.193
	(0.33)	(0.21)	(0.37)	(0.23)
In frontier	-0.607***	0.530***	-0.005	0.234***
	(0.09)	(0.13)	(0.17)	(0.07)
constant	-1.254***	0.578*	-2.380***	1.743***
	(0.49)	(0.33)	(0.70)	(0.27)
Issuer FE	Yes	Yes	No	No
Bond Type FE	No	No	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
N	5585	3623	5589	3625
N of Bonds	353	290	353	290
N of Issuers	159	121	159	121
R2	0.660	0.565	0.036	0.121

This table presents quantile regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously speculative-grade by EJR and S&P between June 2013 and June 2018. The sample is distributed in three quantiles, with the first quantile in columns (1) and (4) and the third quantile in columns (2) and (4). Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 17
Rating Inflation in the Sub-sample of SG Bonds over Time
Analysis of the lower and upper quantile

	Rating Inflation (in notches)			
	(1)	(2)	(3)	(4)
	Q1	Q3	Q1	Q3
Size	-0.048	0.123*	0.040	0.102
	(0.04)	(0.06)	(0.12)	(0.09)
Coupon	-0.030	-0.005	-0.008	-0.037
	(0.02)	(0.01)	(0.04)	(0.02)
Current Maturity	0.004	0.005*	0.005	0.009
	(0.00)	(0.00)	(0.01)	(0.01)
Number of agencies rating (per bond)	0.062	0.007	0.062	-0.115**
	(0.07)	(0.05)	(0.11)	(0.05)
Number of bonds	-0.063	-0.010	0.008	0.003
	(0.04)	(0.03)	(0.02)	(0.01)
Perc bonds rated by S&P	0.057	0.666***	0.419	0.184
	(0.33)	(0.21)	(0.37)	(0.23)
In frontier	-0.636***	0.512***	-0.017	0.230***
	(0.08)	(0.13)	(0.17)	(0.07)
2014Y	-0.190**	-0.250**	0.027	-0.040
	(0.08)	(0.10)	(0.14)	(0.09)
2015Y	-0.079	-0.321***	0.056	-0.061
	(0.13)	(0.09)	(0.16)	(0.09)
2016Y	0.006	-0.162	0.096	-0.030
	(0.14)	(0.12)	(0.18)	(0.10)
2017Y	-0.015	-0.218*	0.141	-0.065
	(0.15)	(0.12)	(0.21)	(0.12)
2018Y	-0.071	-0.249*	0.266	-0.087
	(0.13)	(0.13)	(0.20)	(0.11)
constant	-1.198**	0.799**	-2.461***	1.803***
	(0.53)	(0.33)	(0.75)	(0.28)
Issuer FE	Yes	Yes	No	No
Bond Type FE	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	5585	3623	5589	3625
N of Bonds	353	290	353	290
N of Issuers	159	121	159	121
R2	0.652	0.531	0.023	0.094

This table presents quantile regressions in which the dependent variable is the monthly difference, in notches (winsorized at 0.05% level) in the credit ratings assigned by S&P Ratings and Egan Jones Ratings. The estimation sample consists of a monthly unbalanced panel of bonds rated simultaneously speculative-grade by EJR and S&P between June 2013 and June 2018. The sample is distributed in three quantiles, with the first quantile in columns (1) and (4) and the third quantile in columns (2) and (4). Alongside issuer fixed effects in columns (1) and (2) and bond type fixed effects in columns (3) and (4), a full set of year dummies is included in the testing. Heteroskedasticity-consistent standard errors are clustered by issuer and month, and absolute values of t-statistics are in parentheses below coefficient estimates. ***, **, and * denote significance different from zero at the 1%, 5%, and 10% level, respectively.

Table 18
Volatility Metrics by Region/Sector (Downgrade) as of Sept 31st, 2020

		Three Month			One Year		
		Rating Volatility (Notch)	Downgrade Rate (%)	Avg Downgrade Notch per Issuer	Rating Volatility (Notch)	Downgrade Rate (%)	Avg Downgrade Notch per Issuer
By Region							
Global	**Current**	0.05	2.65%	0.04	0.32	16.01%	0.27
	(*Hist Avg*)	*0.10*	*3.87%*	*0.06*	*0.39*	*13.27%*	*0.25*
North America	**Current**	0.05	2.19%	0.03	0.36	17.17%	0.29
	(*Hist Avg*)	*0.10*	*3.80%*	*0.06*	*0.39*	*13.14%*	*0.25*
By Sector							
NFC ex.	**Current**	0.06	3.48%	0.05	0.46	22.84%	0.40
Infrastructure	(*Hist Avg*)	*0.10*	*4.21%*	*0.07*	*0.41*	*14.51%*	*0.27*
Finance	**Current**	0.03	1.90%	0.03	0.17	8.41%	0.12
	(*Hist Avg*)	*0.10*	*3.86%*	*0.06*	*0.40*	*13.10%*	*0.25*
Utilities, Project	**Current**	0.05	1.73%	0.03	0.22	10.24%	0.16
Finance & Sovereign	(*Hist Avg*)	*0.08*	*2.96%*	*0.05*	*0.30*	*10.15%*	*0.19*

Moody's Investor Services, one of the three largest issuer-paid CRAs (alongside S&P Ratings and Fitch Ratings), disclosed its three months and one year volatility metrics, as well as their historical averages. The rating volatility and average downgrade notch per issuer have been approximately equal to the historical average. As a consequence of the poor economic conditions driven by the current pandemic, the downgrade rate has slightly diverged from the historical average. Nonetheless, aligned with the previously shown results, the differences of the current volatility metrics against their averages are not sufficiently large to sustain allegations of generalized rating inflation.

Source: Default Report from Moody's Investors Services