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Abstract

Using panel data on credit ratings for firms from 63 countries over the 2000–2016 period, we uncover divergent patterns in the rating standards applied by rating agencies over time. Standards strengthen by 1.5 notches for U.S. firms and by 2.2 notches for other developed country firms, but weaken by 1.1 notches for emerging country firms. Default and credit spread tests show that standards tightening for U.S. and other developed country firms is likely unwarranted, whereas standards loosening for firms in emerging economies appears to be justified. This novel and puzzling evidence suggests that rating agencies do not adopt consistent global standards over time.

1. Introduction

The quality of credit ratings continues to receive growing attention from academics and practitioners alike, given the central role of ratings in disseminating credit information to market participants (Kliger and Sarig, 2000), their relevance in facilitating corporate financing (Blume et al., 1998; Faulkender and Petersen, 2006), and their use in financial regulation and contracting (Frost, 2007). This issue has become even more pressing in the wake of high-profile bankruptcies (e.g., Enron and WorldCom) and the 2007–2009 financial crisis, as credit rating agencies (CRAs) have come under increased regulatory and public scrutiny for their role in exacerbating financial turmoil. This has indeed fueled research on the timeliness and informational value of credit ratings, and has given renewed impetus to study the changes in the rating standards applied by CRAs over time.

To be sure, early work (e.g., Lucas and Lonski, 1992) persuasively focuses attention on changes in corporate bond ratings and concludes that the credit quality of U.S. corporate debt trended down since downgraded bonds outnumbered upgraded bonds. It is only when Blume et al. (1998) turned the spotlight to CRAs that the decline in ratings was interpreted as tightening in rating standards. The authors conclude that CRAs have become more conservative in assigning corporate ratings in the U.S. over the period 1978–1995. Their evidence is confirmed by Baghai et al. (2014) for the 1985–2009 period and by Alp (2013) for the 2002–2007 period.[1]

This study takes a logical next step by providing the first international evidence on the time-series trends in ratings. Indeed, research on this important issue has yet to receive adequate attention in the literature because it is still unclear whether the increased rating conservatism over time affects non-U.S. firms. The paucity of such research is all the more surprising since the regulatory scrutiny of CRAs has gained considerable momentum beyond U.S. borders. For instance, the International Organization of Securities Commissions (IOSCO) issued a report in 2011 to review supervisory initiatives of CRAs and to evaluate the extent to which regulatory programs implemented four principles (quality and integrity in the rating process; independence and conflicts of interest;

[1] Alp (2013) shows, however, that from 1985 to 2002, CRAs tightened their standards for investment-grade ratings, while loosening them for speculative-grade ratings.

transparency and timeliness of ratings disclosure; and confidential information) regarding the activities of CRAs in Australia, the European Union (E.U.), Japan, Mexico, and the U.S.[2] Further, in response to the 2007–2009 financial crisis, the E.U. adopted new regulation (Regulation (EC) No 1060/2009), which was subsequently revised in 2011 and 2013, in order to restore market confidence and to increase investor protection (European Commission, 2014).

Using panel data on credit ratings for firms from 63 countries over the 2000–2016 period, our empirical analysis yields several fresh findings pointing to divergence in rating standards over time between firms in the U.S. and other developed countries[3] on the one hand and those in emerging countries[4] on the other hand. First, we find that firms in the U.S. and other developed countries are less likely to earn top ratings (AAA, AA, and A) over time, whereas those in emerging countries increasingly receive such ratings. From 2000 to 2016, the proportions of AAA, AA, and A ratings decreased from 0.9, 4.0, and 13.3 (3.0, 12.6, and 27.4) percent to 0.3, 2.1, and 8.6 (0.2, 3.8, and 17.0) percent in the U.S. (other developed economies), respectively. This runs counter the finding that in the emerging economies, the proportions of AAA, AA, and A ratings increased from 0.0, 0.0, and 2.9 percent in 2000 to 1.6, 1.6, and 14.1 percent in 2016, respectively.

Second, we analyze the unconditional time-series trends in credit ratings. We start by revisiting the U.S. evidence and find that the average rating in the U.S. has trended down over the 2000–2016 sample period, confirming the evidence of Blume et al. (1998) and Baghai et al. (2014) on increased conservatism using earlier sample periods. We then show that while firms in other developed countries receive lower ratings, emerging country firms earn better ratings over time. Relative to U.S. firms, emerging country firms receive an upgrade of about one-tenth of a rating notch in a typical year, which corresponds to roughly a two-notch better rating over the 17 years included in our sample period. By

[2] The report is available at: http://www.iosco.org/library/pubdocs/pdf/IOSCOPD346.pdf.

[3] Our sample of other developed countries includes Australia, Austria, Belgium, Bermuda, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

[4] Our sample of emerging countries includes Argentina, Bahrain, Brazil, Bulgaria, Chile, China, Colombia, Cyprus, Czech Republic, Egypt, Hong Kong, Hungary, India, Indonesia, Israel, Kazakhstan, Korea, Macau, Malaysia, Mexico, Mongolia, Morocco, Oman, Panama, Peru, Philippines, Poland, Qatar, Russia, Saudi Arabia, Singapore, Slovenia, South Africa, Sri Lanka, Thailand, Trinidad and Tobago, Turkey, United Arab Emirates, and Venezuela.

contrast, an average firm in other developed countries receives a two-notch downgrade relative to an average U.S. firm over the same period.

Third, we investigate whether a firm that maintains the same fundamentals over time receives a different rating today than in prior years. Following Baghai et al. (2014), we regress ratings (translated into numerical scores on the following scale: AAA = 1; AA+ = 2; AA = 3; AA- = 4; …; and C = 21) on firm characteristics and year dummy variables, the coefficients of which capture any changes in the standards employed by CRAs over time. Controlling for various fixed effects, our regression results show that the coefficient estimates on the year indicators exhibit an upward (downward) trend for the U.S. and other developed country firms (emerging country firms). These trends are economically meaningful. Holding firm characteristics constant between 2000 and 2016, standards for U.S. firms tighten by about 1.5 notches, lending further credence to Baghai et al. (2014), who show that ratings dropped on average by three notches over the 1985–2009 period. For firms in other developed countries, standards tighten by about 2.2 notches over our sample period. However, there is no such evidence for firms in emerging countries. Instead, if an emerging country firm held all characteristics constant between 2000 and 2016, its rating would have been preserved until 2005, then upgraded by 1.1 notches between 2005 and 2016.

Fourth, we test the robustness of the evidence on standards divergence. Our findings remain qualitatively unchanged when we control for country-level variables that may affect the criteria used by CRAs in rating firms across countries. Specifically, we control for the inflation rate, GDP growth, economic risk rating, financial risk rating, political risk rating, and rule of law. Equally important, our findings remain valid after controlling for firm systematic and idiosyncratic risks, earnings quality, and information quality. In an additional test, we investigate whether the sovereign ceiling rule drives the evidence on standards divergence. This rule requires that a firm's rating be bound by the sovereign rating of its country of domicile. We find that the evidence on standards divergence continues to hold for those firms for which ratings are away from the upper limit rating imposed by the ceiling rule. Thus, it is unlikely that our evidence reflects the impact of the ceiling rule.

Next, we investigate the informativeness of ratings. There exist two competing views regarding the interpretation of standards changes over time. A skeptic could assert that rating policies adjust to reflect changes in the overall business conditions (e.g., technological shifts, deregulation, business cycles, political risk), in which case standards changes are warranted. Alternatively, one could argue that standards changes reflect irrational shifts in CRA behavior and thus are unwarranted. We run several tests to disentangle these two competing interpretations. We first examine the time-series trends in corporate actual default rates. For U.S. firms, we find that the drop in the default rate is more pronounced for non-investment grade (NIG) firms than for investment grade (IG) firms. We estimate that standards tightening for U.S. firms results in a one percent reduction each year in the default rate of NIG firms relative to that of IG firms. This finding is consistent with the conclusion of Alp (2013) and Baghai et al. (2014) that increased conservatism in the U.S. is likely unjustified. Of more importance to this study, our results reveal that standards tightening for other developed country firms is likely unjustified, in line with the U.S. evidence. For these firms, we estimate that the default rate of NIG firms drops each year by 1.6 percent relative to that of IG firms.[5] Turning to emerging country firms, we find no evidence of a significant time trend in the default rate differential between the NIG and IG pools, which implies that standards loosening for these firms is likely warranted.

In another test, we investigate the informativeness of ratings using expected default probabilities (EDPs), which we estimate following the approach of Hillegeist et al. (2004). For U.S. and other developed country firms, we find that the relation between their ratings and EDPs deteriorates over time, implying that their ratings have weaker ability to predict defaults (as perceived by equity investors) and that increased conservatism vis-à-vis these firms is likely unwarranted. In contrast to this evidence, we find that the ratings of emerging country firms have the same ability to predict defaults over time, suggesting that standards loosening for these firms is likely warranted. We also test the informativeness of ratings with respect to bond spreads and find consistent evidence. The relation between the ratings of U.S. and other developed country firms and their corresponding bond spreads weakens over time, suggesting that CRA increased conservatism in rating these firms is likely

[5] In this test, we use the default rate of European country firms as a proxy for the default rate of other developed country firms because their default rate data are unavailable.

unjustified. This is not the case for emerging country firms, for which we find that the relation between their ratings and bond spreads remains stable over time. Thus, standards loosening for these firms is likely justified.

Taken together, our results overwhelmingly point to unwarranted tightening (warranted loosening) in the standards used by CRAs over time in rating U.S. and other developed country firms (emerging country firms). These interpretations are consistent regardless of whether we rely on realized defaults (measured by actual default rates), equity investors' perceptions of defaults (EDPs), or bond investors' perceptions of defaults (credit spreads) to measure the informativeness of ratings.

Our study relates and contributes to the empirical literature on the time-series variations in rating standards. Previous studies show that CRAs have become increasingly conservative in rating U.S. firms (Blume et al., 1998; Alp, 2013; Baghai et al., 2014). However, they do not investigate whether such conservatism affects other firms around the world. Our study complements this literature and is the first—to the best of our knowledge—to address the question of whether firms in other developed and emerging countries are affected by CRA conservatism. Our findings suggest that although CRAs have become increasingly conservative in rating other developed country firms, there is no such evidence for emerging country firms. Relatedly, another distinctive feature of our study is that it helps to address the growing allegations that CRAs have a bias against emerging market economies.[6] Our results suggest that if such a bias exists, it is actually decreasing over time, at least in the realm of corporate ratings. Indeed, our evidence suggests that emerging country firms earn better ratings over time in comparison to the worse ratings assigned to U.S. and other developed country firms.

Our study is also related to the literature on ratings comparability. For example, Cornaggia et al. (2017) show that there exist significant and persistent differences in ratings across broad asset classes, such as corporate, financial, municipal, sovereign, and structured finance bonds. Our study complements these results by uncovering another source of ratings inconsistency, namely divergence in global corporate rating standards over time. This is surprising and puzzling given that CRAs have

[6] See, e.g., "BRICS wants to set up an alternative rating agency. Why it may not work," February 7, 2017, by Misheck Mutize and Sean Gossel. The Conversation. Available at: theconversation.com/brics-wants-to-set-up-an-alternative-rating-agency-why-it-may-not-work-72382.

persistently maintained that ratings are comparable and have the same meaning across asset classes and over time.

The rest of this study is organized as follows. In Section 2, we briefly discuss the related literature. In Section 3, we describe our sample construction and discuss summary statistics. We report and discuss the results on rating standards in Section 4 and rating informativeness in Section 5. In Section 6, we discuss potential explanations of the results, and in Section 7, we draw our conclusions.

2. Related literature

In a Modigliani and Miller (1958) world of perfect information, credit ratings should be irrelevant. However, in a less than perfect world, CRAs are expected to play an essential role in decreasing information asymmetry by disseminating valuable and unbiased information about firm credit quality. Ideally, credit ratings provide a forward-looking assessment of the creditworthiness of firms (or their debt securities), play an essential role in mitigating information asymmetry, and help to alleviate firms' financing frictions. [7]

However, the issuer-pays model of CRAs creates potential for a conflict of interest (SEC, 2003), providing an incentive for CRAs to cater to issuers by offering them favorable ratings to attract business. This conflict of interest leads to an upward bias in credit ratings (Bolton et al., 2012; Opp et al., 2013).[8] Yet, reputational concerns would limit CRAs' incentive to issue inflated ratings. This might be the case since CRAs face a dynamic trade-off between selling inflated ratings for short-term profit

[7] Credit ratings are one of the most important indicators of firm credit quality (Altman, 1998), as it may improve firm access to capital and ensure compliance with investment guidelines or regulations (Jorion et al., 2009). The relevance of the information content of credit ratings is further reinforced by CRAs' ability to access confidential information that is no longer made available to equity analysts, following the passage of Regulation Fair Disclosure (hereafter, Reg FD) (Jorion et al., 2005). Reg FD, implemented in 2000, prohibits U.S. public companies from disclosing non-public information selectively. However, Reg FD allowed firms to disclose non-public information to CRAs for the purpose of determining or monitoring credit ratings, as long as the ratings were publicly disclosed. While the Dodd-Frank Act of 2010 removed this exemption from Reg FD, CRAs argue that this revision is unlikely to affect their access to issuers' non-public information (Ali et al., 2017).

[8] Ratings inflation has been shown to be particularly serious in structured products markets. For example, Griffin and Tang (2012) document positive adjustments to credit ratings for collateralized debt obligations (CDOs) by a major CRA. CRA over-optimism led to 60 percent of global structured products being rated AAA in 2007 (Coval et al., 2009).

and candidly revealing firms' prospects to improve their long-term reputation (Fulghieri et al., 2014). Further, over the last two decades, CRAs have come under increased investor criticism and regulatory pressure for their failure to predict high-profile accounting scandals, such as those of Enron and WorldCom (Alp, 2013), and their role in fueling financial crises (Ferri et al., 1999). CRAs were also blamed for inflating the ratings of structured finance products prior to the 2007–2009 financial crisis (e.g., Bar-Isaac and Shapiro, 2013; Fong et al., 2014). Examples of important regulatory initiatives include the Sarbanes–Oxley Act (SOX) (Section 702), which is intended to study the roles and functions of CRAs and to address the problem of conflicts of interest in the rating industry, and the 2006 Credit Rating Agency Reform Act, the purpose of which is to foster accountability, transparency, and competition in the rating industry. In turn, this increased regulatory pressure seems to have elevated CRAs' reputation concerns and led them to adopt more conservative rating standards. Consistent with this view, Cheng and Neamtiu (2009) provide evidence that ratings quality improves post-SOX.

Of more relevance to the focus of our study is the evidence that CRAs have become more conservative in rating U.S. corporate bonds over time. Three studies are particularly germane to the focus of our paper. Blume et al. (1998) use IG ratings for the period 1978–1995 and show that rating standards have become more stringent over time. However, they do not conclusively rule out the possibility that such stringency is justified by declining corporate credit quality or by deterioration in the economic environment. Alp (2013) presents evidence of a structural break toward more stringent standards around 2002 for both IG and NIG ratings and attributes this phenomenon to elevated reputation concerns resulting from increased regulatory pressure and investor criticism. Baghai et al. (2014) find that corporate rating standards unjustifiably strengthen by three notches over the period 1985 to 2009. We complement this literature by investigating whether credit rating conservatism affects non-U.S. firms.

It is possible that CRAs have become more conservative over time in rating non-U.S. firms for at least two reasons. First, CRAs have persistently maintained that ratings are comparable and have the same meaning across asset classes and over time. In this case, one would expect CRAs to adopt consistent rating policies across the world and to become increasingly conservative in rating non-U.S.

firms. Second, to the extent that regulatory pressure is the main driver of rating conservatism vis-à-vis U.S. firms, one can predict that such conservatism also affects firms outside of the U.S. because the regulatory scrutiny of CRAs has gained considerable momentum beyond the U.S. borders. In particular, the East Asian financial crisis has brought intense security and investor attention to CRAs. International financial institutions blamed CRAs for their inability to predict the East Asian Crisis (BIS, 1998; IMF, 1998; World Bank, 1998; as cited in Ferri et al., 1999). In addition, the European Parliament and the Council of the European Union adopted new regulation (Regulation (EC) No 1060/2009) on CRAs, which ended the self-regulation for European CRAs and approved a new law to increase CRAs' liability (April 23, 2009). As noted by Castle (2008), the objective is to "bring Europe more into line with the United States".

Alternatively, it is possible that differences in institutional characteristics across different markets play a role in shaping divergent rating policies in these markets. For example, growth in credit demand in emerging markets may provide CRAs with new business opportunities to generate additional revenues. In this case, CRAs may have an incentive to be less conservative in rating corporate bonds in these markets. In sum, we view the issue of whether CRA conservatism applies to firms in non-U.S. markets as an empirical question.

3. Sample construction and summary statistics

We use the S&P Capital IQ database and select foreign-currency, long-term, issuer-level ratings between 2000 and 2016.[9] We keep ratings of C or higher and ratings of firms with a non-missing GVKEY identifier. We translate ratings into numerical scores on the following scale: AAA = 1; AA+ = 2; AA = 3; AA- = 4; …; and C = 21. The higher the rating, the lower the expected default risk. Ratings of BBB- or higher are often referred to as IG ratings, while those of BB+ or lower are often categorized as NIG ratings.

We obtain annual accounting data from the Compustat Global database and remove financials (SIC 6000−6999), utilities (SIC 4900−4999), and governmental and quasi-governmental entities (SIC

[9] We start our sample in 2000 because ratings data for emerging country firms are limited prior to that year.

9000 and above). We then construct variables to control for the determinants of firm ratings. The variables we construct are: *Total debt ratio* (long-term debt (DLTT) plus debt in current liabilities (DLC), all scaled by total assets (AT)); *Debt to cash flow ratio* (DLTT plus DLC, all scaled by operating income before depreciation (OIBDP); *Debt to cash flow ratio* is set equal to zero for negative values); *Negative Debt to cash flow ratio* (a dummy indicating *Debt to cash flow ratio* is equal to zero); *Interest coverage ratio* (OIBDP scaled by interest expense (XINT)); *Convertible debt ratio* (convertible debt (DCVT) scaled by AT, where DCVT is set equal to zero if it is missing); *Firm size* (AT scaled by the average AT of all firms in a given country-year); *Operating margin* (OIBDP scaled by sales (SALE)); *Operating margin volatility* (standard deviation of the five most recent observations of *Operating margin*, with a minimum of two observations); *Cash ratio* (cash and short-term investments (CHE) scaled by AT); *Rent ratio* (rental expense (XRENT) scaled by AT, where XRENT is set equal to zero if it is missing); *Tangibility* (property, plant, & equipment (PPENT) scaled by AT); and *Capital expenditures ratio* (capital expenditures (CAPX) scaled by AT). We winsorize our variables for each country. The variables *Operating margin*, *Operating margin volatility*, and *Interest coverage ratio* are winsorized at the 1st and 99th percentiles. The variables *Total debt ratio*, *Debt to cash flow ratio*, *Convertible debt ratio*, *Firm size*, *Cash ratio*, *Rent ratio*, *Tangibility*, and *Capital expenditures ratio* are winsorized at the 99th percentile. We then match these variables with ratings in a way that the information content of these variables is made available to the CRAs prior to ratings announcements. Specifically, we obtain the first rating issued for a firm during the one-year window starting in month +3 after its fiscal year-end. The resulting matched sample with non-missing values consists of 26,082 firm-year observations representing 3,486 unique firms located in 63 unique countries.

Table 1 shows the distribution of our sample firms and their ratings across countries. We classify countries into three groups: emerging countries (based on Capital IQ's emerging country indicator), the U.S., and developed countries[10] (countries other than the U.S. and not classified as emerging countries). Our sample consists of 16,044 ratings observations in the U.S. (Panel A), 7,273 ratings observations in the developed countries (Panel B), and 2,765 ratings observations in the

[10] For brevity, we use the term "developed countries" to refer to developed countries other than the U.S.

emerging countries (Panel C), representing roughly 61.5, 27.9, and 10.6 percent of our sample observations, respectively. Firms from Australia, Canada, France, Germany, Japan, and the United Kingdom have a significant weight in our sample of developed economies, while firms from Brazil, Hong Kong, Indonesia, Korea, Mexico, and Russia have a large representation in our sample of emerging countries.

[Insert Table 1 about here]

Table 2 shows the distribution of ratings by year and rating category (e.g., BBB+, BBB, and BBB- are combined into a BBB rating category) for U.S. firms in Panel A, firms in the developed countries in Panel B, and firms in the emerging countries in Panel C. In accord with the evidence in Baghai et al. (2014), Panel A shows that in the U.S. sample, the proportions of AAA, AA, and A ratings generally decreased over time, indicating that fewer U.S. firms receive top ratings in recent years than in early years. The proportions of AAA, AA, and A ratings decreased from 0.9, 4.0, and 13.3 percent in 2000 to 0.3, 2.1, and 8.6 percent in 2016, respectively. As shown in Panel B, the distribution of ratings in the developed economies parallels that in the U.S. From 2000 to 2016, the proportions of AAA, AA, and A ratings decreased from 3.0, 12.6, and 27.4 percent to 0.2, 3.8, and 17.0 percent, respectively. In sharp contrast, Panel C shows that for emerging country firms, there exists a remarkable increase in the fractions of AAA, AA, and A ratings over time. The proportions of AAA, AA, and A ratings increased from 0.0, 0.0, and 2.9 percent in 2000 to 1.6, 1.6, and 14.1 percent in 2016, respectively. These preliminary findings are puzzling because they suggest that the shift in the distribution of ratings in the emerging economies is opposite to those in the U.S. and developed economies.

[Insert Table 2 about here]

To visualize this new evidence, Figure 1 plots the proportion of IG ratings over time for each country group and provides evidence consistent with our previous observations. U.S. and developed country firms experience a decrease in the proportion of IG ratings, whereas emerging country firms experience an increase in the proportion of IG ratings.

[Insert Figure 1 about here]

Table 3 presents the mean (Panel A) and trend (Panel B) statistics of our main variables for each country group along with difference tests in these statistics between the developed countries and the U.S. in Column (7) and between the emerging countries and the U.S. in Column (8). Panel A shows that firms in the emerging and developed countries receive, on average, a higher rating than U.S. firms. Emerging country firms have an average rating of 11.0 (equivalent to BB+), and developed country firms have an average rating of 9.2 (BBB), compared with an average rating of 11.5 (BB) for U.S. firms. Consistent with these statistics, emerging and developed country firms generally have better fundamentals than their U.S. counterparts. For example, they have less financial leverage (measured by *Total debt ratio*), a better capacity to service debt obligations (*Debt to cash flow ratio* or *Interest coverage ratio*), a higher operating margin (*Operating margin*), and more tangible assets (*Tangibility*), as shown in columns (7) and (8).

In Panel B of Table 3, we examine the time-series trends of our main variables. For each country group, we estimate a trend in the variable of interest by regressing that variable on a linear trend variable, which takes the value of 0 in 2000, 1 in 2001, 3 in 2002, etc. We report the coefficient estimates on the trend variable along with their *P*-values. U.S. firms and firms in the developed countries receive lower ratings over time, as indicated by the positive and significant coefficient estimates in columns (2) and (4), respectively. By contrast, the negative and significant coefficient estimate in Column (6) suggests that emerging country firms earn better ratings over time. Columns (7) and (8) provide tests of differences in ratings trends. The negative and significant difference estimate of -0.1 in Column (8) indicates that relative to U.S. firms, emerging country firms receive an upgrade of about one-tenth of a rating notch in a typical year, which corresponds to roughly a two-notch better rating for emerging country firms over the 17 years included in our sample period. It is also interesting to note that firms in the developed countries receive a relatively lower rating over time when compared with U.S. firms, as indicated by the positive and significant difference estimate of 0.1 in Column (7). Over the full sample period, a typical firm in the developed countries receives a two-notch downgrade relative to a typical U.S. firm.

[Insert Table 3 about here]

In sum, we observe improvement in the ratings of emerging country firms and a deterioration in the ratings of U.S. firms. For firms in the developed countries, the deterioration in ratings is worse than that for U.S. firms. How can one interpret these results? It is possible that changes in ratings over time correctly reflect changes in the underlying credit quality of firms. However, this is unlikely to be the case, particularly for U.S. firms. As shown in Column (2) of Panel B of Table 3, these firms receive lower ratings, yet they generally have better fundamentals over time. For example, U.S. firms experience a decrease in financial leverage, have a better capacity to service debt, and enjoy better and less volatile operating margins. The alternative interpretation of our results is that there exist shifts in the standards applied by CRAs over time across country groups. In what follows, we test this by controlling for the variables that could affect firm credit quality and the macroeconomic environment.

4. Rating standards

4.1. Main results

As in Baghai et al. (2014), we run OLS regressions to measure how a CRA's rating standards change over time. We regress S&P's rating on a set of firm characteristics to proxy for the standard determinants of ratings. These variables are: *Total debt ratio*, *Debt to cash flow ratio*, *Negative Debt to cash flow ratio*, *Interest coverage ratio*, *Convertible debt ratio*, *Firm size*, *Operating margin*, *Operating margin volatility*, *Cash ratio*, *Rent ratio*, *Tangibility*, and *Capital expenditures ratio*. We include year dummy variables, the coefficients of which capture any strengthening or loosening in rating standards over time relative to the omitted year, the first year in the sample (year 2000). This approach correctly measures the trends in standards if the coefficient estimates on firm characteristics remain stable over time. We include various fixed effects in alternative specifications. Country (industry) fixed effects control for variations in rating criteria across countries (industries). Firm fixed effects control for the effects of time-invariant, firm-specific factors, such as unobservable qualitative criteria used by CRAs in the rating process. We cluster standard errors at the firm level to account for correlations among ratings of the same firm.

Table 4 reports the estimation results for the sample of U.S. firms in columns (1) and (2), the sample of developed country firms in columns (3) and (4), and the sample of emerging country firms in columns (5) and (6). The table provides evidence on divergence in the standards employed by CRAs over time across country groups. Results in columns (1) and (2) corroborate those of Baghai et al. (2014) by extending their sample through 2016. The coefficient estimates on the year indicators for 2001 to 2016 have positive signs and are significant at the 1 percent level. They generally exhibit a steady upward trend, suggesting that CRAs gradually moved toward more stringent standards (the standards cease to strengthen and begin loosening around 2012). This stringency is economically meaningful. Holding firm characteristics constant between 2000 and 2016, the standards tighten by about 1.5 notches over that period (Column (2)). These results lend further credence to Baghai et al. (2014), who show that CRAs have become more conservative in assigning corporate ratings over the 1985–2009 period. Turning to the effects of our control variables, the estimated coefficients on firm characteristics have signs largely consistent with prior literature and expectations, except for *Cash ratio* and *Tangibility*. For example, firms with higher debt ratios, higher debt to cash flow ratios, or lower interest coverage ratios receive lower ratings as they are generally riskier. Firms that are more profitable enjoy better ratings. Firms with more growth opportunities, measured by *Capital expenditure ratio*, have a lower credit risk and thus receive higher ratings.

[Insert Table 4 about here]

Two additional facts are clear from Table 4. First, all of the coefficient estimates on the year indicators in columns (3) and (4) are positive and significant at the 1 percent level and display an upward trend, indicating that CRAs impose more stringent standards over time for developed country firms (the standards appear to stop tightening in 2014), in line with the U.S. evidence. Economically, the standards tighten by about 2.2 notches between 2000 and 2016 (Column (4)). Second, in columns (5) and (6), the year indicators for 2001 to 2005 have insignificant coefficients; however, the coefficient estimates on the year indicators for 2006 to 2016 have negative signs and are significant at the 5 percent level. If a firm held all characteristics constant between 2000 and 2016, it preserved its rating until 2005; however, its rating was upgraded by 1.1 notches between 2005 and 2016 (Column (6)).

Figure 2 plots the coefficient estimates on the year indicators for each of the six regression models estimated in Table 4. For emerging country firms, there is a visible break toward more lenient standards in 2005. By contrast, for U.S. firms (firms in the developed countries), the standards tighten between 2000 and 2012 (2014), after which the standards appear to loosen slightly.

[Insert Figure 2 about here]

So far, our results do not control for country-level economic, financial, or political risk factors, which may affect the criteria used by CRAs in rating firms in different countries. For example, it is possible that today's economic conditions in the U.S. (Brazil) are worse (better) than they were in the past, and as such, CRAs apply more (less) stringent ratings criteria in today's environment for U.S. (Brazilian) firms even if they kept the same fundamentals as in previous years. In that case, the changes in ratings over time in different countries may reflect the impact of different business cycles and not necessarily shifts in CRAs' rating policies in those countries. Thus, it is important to control for country-level risk factors in our ratings regression models. In addition to the explanatory variables listed in Table 4, we include several control variables: (1) *Inflation rate*, (2) *GDP growth*, (3) *Economic risk rating*, (4) *Financial risk rating*, (5) *Political risk rating*, and (6) *Rule of law*. The first two variables are from the World Development Indicators (WDI), and the other variables are from the International Country Risk Guide. To measure changes in standards, we use a linear time trend instead of year indicators because these indicators would absorb all variation in the country-level factors and their coefficients would no longer be identified. The linear time trend variable takes the value of 0 in 2000, 1 in 2001, 3 in 2002, etc. We cluster standard errors at the year level because we are interested in the significance of the linear time trend, which remains constant within each year.

Table 5 reports the estimation results for the U.S. sample in columns (1) and (2) and the full sample in columns (3)–(6). In columns (1) and (2), we include the inflation rate and GDP growth variables as additional controls and find that the coefficient estimates on the trend variable are positive and significant, as expected. The impact of the trend variable is economically meaningful and is in line with that in Table 4. For example, the coefficient estimate of 0.095 in Column (2) represents the number of notches by which CRAs tighten standards in a typical year in our sample period. This

estimate corresponds to 1.6 notches strengthening in standards over the full sample period, compared with our previous estimate of 1.5 notches in Table 4.

[Insert Table 5 about here]

In columns (3) and (4) of Table 5, we test the significance of the trend variable for each country group using the full sample. To this end, we introduce interaction terms between the trend variable and indicators for emerging and developed country firms separately. The coefficient estimates on these interaction terms identify any incremental impact of the trend variable for emerging and developed country firms relative to U.S firms. We find that the coefficient estimates on *Linear trend* × *Developed country dummy* are positive and significant and those on *Linear trend* × *Emerging country dummy* are negative and significant, which suggest that relative to U.S. firms, CRAs impose more stringent standards over time for developed country firms and apply more lenient standards over time for emerging country firms. We test the significance of the total impact of the trend variable for emerging and developed country firms and report the results at the bottom of Table 5. For example, in Column (4), we find that standards strengthen (weaken) by 0.113 (0.080) notches each year for developed (emerging) country firms, which correspond to roughly 1.9 (1.4) notches tightening (weakening) in standards over our sample period.

In columns (5) and (6) of Table 5, we drop the variables *Inflation rate* and *GDP growth* and include the variables *Economic risk rating*, *Financial risk rating*, *Political risk rating*, and *Rule of law*. Our results are robust to the inclusion of these additional factors and are consistent with those in columns (3) and (4). For example, the trend total effect results in Column (6) suggest that CRAs strengthen standards for developed country firms by 0.090 notches each year (or 1.5 notches over the 2000–2016 period) and weaken standards for emerging country firms by 0.087 notches (or 1.5 notches over the 2000–2016 period).

In sum, country-level risk factors cannot explain away our findings that standards tighten for U.S. and developed country firms and weaken for emerging country firms. As such, these divergent trends in standards are unlikely to be due to cross-country variations in economic, financial, or political conditions.

4.2. Robustness tests

Delving deeper into the puzzling evidence on divergent patterns in rating standards between the U.S. and developed countries on the one hand and the emerging countries on the other hand, we investigate the robustness of this evidence to sevral alternative explanations. For the sake of brevity, the results of our robustness tests are not tabulated in the paper but are available upon request.

We test the robustness of our results in Table 5 to several additional firm-level control variables that would offer alternative interpretations of the observed changes in rating standards over time. We include these variables sequentially. First, we control for firm systematic and idiosyncratic risks because they have been shown to be negatively correlated with ratings (Alp, 2013; Baghai et al., 2014). We estimate systematic (idiosyncratic) risk as the predicted (residual) values from regressing firms' monthly stock returns on country stock market index returns over a fiscal year. Second, we control for firm earnings quality. Jorion et al. (2009) argue that increased tightening in rating standards can be attributed to changing accounting quality over time. In addition, Gu and Zhao (2006) show that bond ratings are significantly related to accruals and their income-smoothing effect. We employ discretionary accruals as a proxy for earning management. Following Dechow et al. (1995), we measure discretionary accruals using the modified Jones model (Jones, 1991). Third, we control for the number of equity analysts following a firm because Fong et al. (2014) show that equity analyst coverage can incentivize CRAs into offering less favorable ratings through a disciplining channel. We also add dispersion in analyst forecasts as a measure of information asymmetry since CRAs may be more conservative in rating firms with higher information asymmetry. We measure dispersion in analyst forecasts as the standard deviation of analyst earnings forecasts divided by the absolute value of the consensus (mean) earnings forecast. Fourth, as an alternative measure of information asymmetry, we use the average effective bid-ask spread measure of Roll (1984). We estimate the spread as the square root of the negative of the serial covariance of daily stock returns over the fiscal year. If the serial covariance is positive, we set the spread to zero. In each of these robustness tests, the additional control variables take the expected signs and, more importantly, the evidence on standards tightening for the U.S and developed country firms and loosening for the emerging country firms persists both statistically and economically.

Next, we test whether our results are driven by the sovereign rating ceiling rule, which requires that a firm's rating be bound by the sovereign rating of its country of domicile (Borensztein et al., 2013; Almeida et al., 2017). The enforcement of this rule may explain standards tightening for developed country firms. To the extent that developed countries have experienced ratings downgrades over time, firms located in those countries and the ratings of which are bound by their corresponding country sovereign ratings (bound firms) would be mechanically downgraded due to the ceiling rule, independent of any changes in their underlying fundamentals.[11] In this case, standards tightening does not imply CRA conservatism but instead simply reflects the impact of the ceiling rule. Likewise, the ceiling rule may also explain standards loosening for emerging country firms as a result of sovereign ratings upgrades over time. One way to test whether the ceiling rule drives the evidence on changes in rating standards over time is to separate out the ratings trends of bound and non-bound firms, i.e., firms with ratings away from their corresponding country sovereign ratings. If the ceiling rule is the main driver of our results, we should observe no changes in rating standards over time for developed and emerging non-bound firms. We re-estimate the ratings models in columns (3)–(6) of Table 5 after including dummy variables indicating developed and emerging country bound firms and their interactions with the linear time trend variable. A bound firm dummy variable indicates whether a firm has a rating at or above its country sovereign rating. We find that in the developed countries, both bound and non-bound firms experience standards tightening. The evidence for emerging country bound firms points to increased CRA leniency, but lacks statistical significance, perhaps because of the small number of such firms in our sample. Importantly, emerging country non-bound firms experience significant loosening in their rating standards. Overall, these results suggest that the evidence on standards tightening for developed country firms and loosening for emerging country firms is unlikely to be related to the impact of the ceiling rule.

5. Ratings informativeness

[11] We do not test the implications of the ceiling rule for U.S. firms' ratings because the U.S. has received top ratings during our sample period. The U.S. sovereign rating is AAA for the 2000–2010 period and AA+ for the 2011–2016 period.

There are two competing interpretations of the observed changes in rating standards over time. On the one hand, it may be the case that changes in standards are justified by changes in the overall business conditions (e.g., technological shifts, deregulation, business cycles, political risk, etc.). Holding firm characteristics constant, a deterioration (an improvement) in the business environment may lead to higher (lower) firm default risk, which justifies lower (higher) ratings. On the other hand, changes in standards may be unrelated to the business environment and simply reflect irrational shifts in CRA behavior, in which case changes in standards are unwarranted.

To disentangle these two competing explanations, we examine ratings informativeness. Specifically, we investigate how informative ratings are with respect to actual default rates, EDPs, and bond spreads.

5.1. Actual default regressions

We examine the time trends in corporate actual default rates for the IG and NIG rating categories. Suppose that CRA standards unjustifiably tighten. In this case, firms will obtain ratings that are worse than they merit, which will then result in some IG firms being misclassified as NIG firms. As such, we expect to observe an improvement in the credit quality of the NIG pool and a decline in the overall default rate of that pool over time. Nonetheless, an improvement in business conditions can also lower default risk for all rated firms (both IG and NIG firms). To reduce the impact of the business cycle and identify the effect of standards tightening only, we employ the default rate of the IG pool as a benchmark and focus on the default rate differential between the NIG and IG pools. If standards tightening is unwarranted, we expect to observe a stronger drop in the default rate of the NIG pool. However, if standards tightening is justified, we expect to observe no difference in the default rate trend between the NIG and IG pools.

We obtain data on actual default rates for the IG and NIG pools from S&P, which computes and publishes corporate default rates for U.S. firms (S&P, 2016) and firms in the emerging countries (S&P, 2013), but not for firms in the developed countries. Instead, S&P computes and publishes corporate default rates for firms in the European countries (S&P, 2015). In an effort to conduct

complete analysis of default rates for our country groups, we use the default rates of European country firms as a proxy for the default rates of developed country firms. This is a reasonable approximation because most European countries are developed countries. We focus on static pool cumulative three-year default rates, which are default rates computed for firms pooled at the start of a given year with a three-year horizon. For example, for all firms rated IG at the start of 2005, S&P computes and reports a default rate over the 2005–2007 period. We regress default rates on a linear time trend variable and estimate Newey–West standards errors with two lags because subsequent default rates overlap over two years.

Table 6 reports the estimation results for the U.S. sample in Panel A, the developed country sample in Panel B, and the emerging country sample in Panel C. In Column (1) of Panel A, we use the default rate of all-rated U.S. firms as a dependent variable and find a negative and significant coefficient estimate on the trend variable. The decrease in the default rate suggests that the overall credit quality of all-rated U.S. firms improves over time. Columns (2) and (3) show that both IG and NIG U.S. firms experience a decline in their default rates over time. In Column (4), we use the difference in default rate between NIG and IG U.S. firms as a dependent variable, so the coefficient on the trend variable captures the time trend in the default rate differential between the NIG and IG pools. The estimated coefficient on the trend variable is negative and significant, implying that the drop in the default rate is more pronounced for NIG U.S. firms than for IG U.S. firms. This finding is consistent with the prediction that standards tightening is unjustified. However, the stronger decline in the default rate of NIG U.S. firms may also be related to the gradual improvement in U.S. economic conditions. In Column (5), we include the variable *Three-year-ahead average GDP growth*[12] as an additional control to address the concern that our dependent variable may be affected by the business cycle. As expected,

[12] The variable *Three-year-ahead average GDP growth* is constructed in a way that countries with more frequent ratings (i.e., those with greater influence over country group default rates) carry higher weights in the estimation process of GDP growth. This process involves three steps. First, we construct country weights at the country group-country-year level. For each country group-country-year cell, we define a country's weight as the number of rated firms in that country group-country-year cell scaled by the number of rated firms in the country group-year cell. Second, we construct GDP growth rates at the country group-year level. For each country group-year, we compute a weighted average GDP growth rate using the country weights (from step 1), where GDP growth rate data are from the WDI database. Third, for each country group-year cell, we define the variable *Three-year-ahead average GDP growth* as the simple average of the weighted average GDP growth rates (from step 2) in that year and subsequent two years.

we find that the coefficient estimate on this control is negative and significant, indicating that higher GDP growth leads to a smaller differential in default rate between the NIG and IG pools. Interestingly, the estimated coefficient on the trend variable remains negative and significant. Controlling for general economic conditions, we estimate that standards tightening for U.S. firms results in a 1 percent reduction each year in the default rate of NIG firms relative to that of IG firms. Our results are consistent with the conclusions of Alp (2013) and Baghai et al. (2014) that increased conservatism in the U.S. is likely unjustified.

[Insert Table 6 about here]

Panel B of Table 6 shows similar evidence for European country firms. The estimated coefficient on the trend variable in Column (5) suggests that the default rate of NIG firms declines each year by roughly 1.6 percent relative to that of IG firms, controlling for the effects of the business cycle. To the extent that the developed country firms and European country firms have similar default rate patterns, standards tightening for developed country firms is likely unjustified, in line with the U.S. evidence.

Panel C of Table 6 provides different evidence for the sample of emerging country firms. As shown in Column (5), the time trend in the default rate differential between the NIG and IG pools is insignificant at conventional significance levels, after controlling for GDP growth. This finding implies that standards loosening for emerging country firms is likely justified. The coefficient estimate on our GDP growth control variable is positive and significant, suggesting that higher GDP growth leads to a smaller differential in default rates between the NIG and IG pools, as expected.

In sum, our analysis of actual default rates reveals that standards tightening for U.S. and developed country firms are likely unwarranted, whereas standards loosening for emerging country firms are likely warranted. Although actual defaults analysis offers a direct test for the informativeness of ratings, one potential disadvantage is that this test typically lacks statistical power because actual defaults are relatively rare events. Alternatively, one can investigate the informativeness of ratings in a larger sample using EDPs or bond spreads. Below, we conduct such analyses to ensure robustness of our evidence.

5.2. EDP regressions

In this section, we examine the relation between ratings and EDPs. For each firm-year observation included in our sample, we estimate an EDP based on the Black-Scholes-Merton option-pricing model following the approach of Hillegeist et al. (2004).[13] We first focus on the U.S. sample and regress estimated EDPs (measured in percentage) on S&P's rating and its interaction with a linear trend variable to assess the informativeness of U.S. firm ratings over time. We include firm and industry fixed effects in alternative specifications and cluster standard errors at the firm level.

Columns (1) and (2) of Table 7 report the estimation results. The coefficient estimates on S&P's rating are positive and significant, indicating that lower ratings are associated with higher EDP estimates, as expected. Importantly, the coefficient estimates on the interaction term *Rating* × *Linear trend* are negative and significant, suggesting that the relation between the ratings of U.S. firms and their EDP estimates weakens over time. If increased conservatism makes ratings lower than what the fundamentals would suggest and have weaker ability to predict defaults (as perceived by equity investors), then this conservatism is likely unwarranted.

[Insert Table 7 about here]

In columns (3) and (4) of Table 7, we report the results of EDP regressions using the full sample of all countries. We introduce additional interaction terms to test the relation between ratings and estimated EDPs for each country group. As before, the interaction term *Rating* × *Linear trend*

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[13] We estimate the EDP for each firm as $N\left(-\frac{ln(V_A/X)+\left(\mu-\delta-(\sigma_A^2/2)\right)T}{\sigma_A\sqrt{T}}\right)$, where $N(.)$ is the standard cumulative normal distribution, V_A is the value of assets, X is total liabilities, μ is assets return, δ is the dividend rate, σ_A is the volatility of assets returns, and T is the maturity of liabilities. We assume that T is equal to 1 year. We obtain V_A and σ_A by solving the following system of equations:

$$\begin{cases} V_E = V_A e^{-\delta T} N(d_1) - X e^{-T} N(d_2) + \left(1 - e^{-\delta T}\right) V_A \quad \text{(equity value equation)} \\ \sigma_E = \left[V_A e^{-\delta T} N(d_1) \sigma_A\right] / V_E \quad \text{(optimal hedge equation)} \end{cases}$$

where V_E is the value of equity, $d_1 = [ln(V_A/X) + (r - \delta + \sigma_A^2/2)T]/\sigma_A\sqrt{T}$, r is the risk-free rate, $d_2 = d_1 - \sigma_A\sqrt{T}$, and σ_E is the volatility of equity returns. We measure r as the yield on 1-year constant maturity U.S. Treasuries. We compute δ as the ratio of dividends to V_A and μ as $max\left[\left(V_{A,t}/V_{A,t-1}\right) - 1,\ r\right]$.

measures the trend in the relation between ratings and estimated EDPs for U.S. firms. The coefficient estimates on this interaction term are similar to those in columns (1) and (2). The three-way interaction term *Rating* × *Linear trend* × *Developed country dummy* (*Rating* × *Linear trend* × *Emerging country dummy*) captures the incremental trend for developed (emerging) country firms relative to U.S. firms. For ease of interpretation, we test the total trend effect for the developed and emerging country groups and report the results at the bottom of Table 7. Consistent with the U.S. evidence, the total trend effect for developed country firms is negative and significant, suggesting that the relation between the ratings of these firms and their estimated EDPs deteriorates over time. Thus, standards tightening for these firms is likely unjustified. By contrast, the total trend effect for emerging country firms is insignificant, indicating that the relation between the ratings of these firms and their estimated EDPs remains stable over time. If CRAs loosen their standards and offer better ratings over time for emerging country firms, and these ratings have the same ability to predict defaults (as perceived by equity investors), then these higher ratings are likely warranted.

5.3. Bond spread regressions

In this section, we investigate the informativeness of ratings over time with respect to bond spreads, that is, as perceived by bond investors. We obtain bond transaction data from the Trade Reporting and Compliance Engine (TRACE) database and bond characteristics from the Mergent Fixed Income Securities Database (FISD). As TRACE and FISD have no coverage of bonds trading outside of the U.S. bond market, a potential limitation of our analysis is that we have incomplete coverage of bonds issued by firms from developed and emerging countries. Nonetheless, many of these firms are international firms with bonds trading in the U.S. market. Following the literature, we apply several filters to address likely erroneous data entries and reporting changes in TRACE[14] and

[14] We remove trades that are later canceled and agency transaction duplicates, correct trades that are later reversed and replaced, address the TRACE data structure change in February 2012, and further remove trades that have a negative reported yield, include a commission, or have a settlement period longer than five days (Dick-Nielsen, 2009; Bongaerts et al., 2012; Dick-Nielsen et al., 2012; Driss et al., 2016).

discard bonds with special features.[15] We then compute monthly credit spreads as bond yields less benchmark treasury yields[16] and merge these spreads with monthly bond ratings from FISD. To remove the influence of outliers, we discard observations with spreads of more than 1,000 basis points.

We regress bond spreads (measured in basis points) on S&P's rating and its interaction with a linear trend variable. We control for time to maturity because it is known to be positively correlated with spreads (Baghai et al., 2014). To abstract from differences in bond liquidity, we also control for bond turnover (total trading volume divided by the amount outstanding, winsorized each quarter at the 99th percentile). Dick-Nielsen et al. (2012) find that for IG bonds, turnover is negatively related to spreads. We add a dummy variable controlling for the effect of the 2007–2009 financial crisis because we expect to observe higher spreads during that period. Additionally, we include various fixed effects in alternative specifications and cluster standards errors at the bond level.

Columns (1)–(3) of Table 8 report the estimation results for the sample of U.S. firms. S&P's ratings have some ability to classify bond credit quality, as indicated by the positive and significant coefficient estimates on S&P's rating. A one-notch increase in S&P's rating corresponds to a decrease in spreads of 41 to 54 basis points. However, the coefficient estimates on the interaction term *Rating* × *Linear trend* are negative and significant, suggesting that S&P's ratings are perceived to contain less credit-relevant information over time. Increased CRA conservatism in rating U.S. firms is likely unwarranted based on the perceptions of bond investors. Our control variables take the expected signs. Bond spreads tend to increase with time to maturity and decrease with bond liquidity. Bond spreads are higher during the 2007–2009 financial crisis, as indicated by the positive and significant coefficient estimates on *Crisis dummy*.

[Insert Table 8 about here]

[15] We discard all bonds that are convertible, puttable, substitutable, or exchangeable. We also remove bonds that have credit enhancement features, are non-fixed coupon or zero-coupon bonds, or have a duration less than one year. Following Bongaerts et al. (2012), we keep callable bonds in our sample, as the sample size would be significantly reduced otherwise.

[16] The benchmark treasury rate is computed by interpolating the two treasury yield curve rates with the closest maturities to the corporate bond. Treasury yield curve rates data are obtained from the Federal Reserve System's H15 table.

Columns (4)–(6) report the results for the full sample of all countries. We introduce interactions as in Table 7 to test the time trend in the relation between ratings and bond spreads for each country group. Focusing on the total effect results reported at the bottom of Table 8, we find that this relation weakens over time for developed country firms (total trend effect is negative and significant), but remains stable over time for emerging country firms (total trend effect is insignificant). These findings are consistent with our prior evidence that standards tightening (loosening) for developed (emerging) country firms is likely unwarranted (warranted).

6. Discussion

The evidence on divergence in global corporate rating standards over time is puzzling. Previous literature proposed reputation concerns as an explanation for CRA conservatism vis-à-vis U.S. firms (Alp, 2013; Baghai et al., 2014). The increased regulatory scrutiny and investor criticism over CRA performance in high-profile accounting scandals and well-known defaults (e.g., Enron) around 2002 may have elevated CRA reputation concerns, which in turn may have led CRAs to become increasingly conservative. While this is a plausible explanation for our evidence on conservatism for U.S. and developed country firms, it leaves unanswered the question of why CRAs began to loosen their standards for emerging country firms a few years later (around 2005). Thus, growing pressure on CRAs does not offer a complete story for our findings.

A potential explanation for standards divergence is that CRAs made rating mistakes in the past and are learning about the correct rating model over time (Baghai et al., 2014). That is, CRAs were too lenient (strict) in rating firms in the U.S. and other developed countries (emerging countries) and since then have moved toward more (less) stringent standards. As such, the observed time variations in rating standards simply reflect corrections of previous rating mistakes. For example, CRAs may have used excessively conservative rating practices in response to intense scrutiny in the aftermath of the 1997 East Asian financial crisis. Given the unfavorable credit outlook of the emerging economies in

the aftermath of the crisis (as well as the ensuing financial turmoil of Russia and Brazil),[17] CRAs may have had reputational incentives to excessively downgrade the crisis-hit countries and their local firms (e.g., Ferri et al., 2001). It would then be plausible to expect CRAs to revise upward their ratings in the wake of the recovery from the East Asian crisis.[18] If CRAs are learning about the correct rating model over time, then we would expect to observe more informative ratings over time. However, our results suggest that for U.S. and developed country firms, the relation between ratings and various measures of ratings informativeness (actual default, EDPs, and credit spreads) deteriorates over time, casting doubt on this explanation.

The agency problems resulting from the issuer-pays business model along with the rapid growth in credit demand in emerging markets may have played a role in counterbalancing CRA conservatism in these markets. As shown in Panel C of Table 2, the number of rated firms in emerging countries increased more than threefold over the period 2000–2016. This growth may have created new business opportunities and a flow of additional revenues, which may have strengthened CRAs' incentives to offer favorable ratings. In turn, this could have encouraged further demand for ratings from emerging country issuers and attracted more business for CRAs. This argument parallels that used in the literature to explain ratings inflation in the mortgage-backed securities (MBSs) market prior to the 2007–2009 financial crisis. CRAs offered issuer-friendly ratings and received substantial income from rating new deals in this growing market. Mathis et al. (2009) model CRA incentives in the face of reputation effects. They identify reputation cycles in which CRAs become more optimistic over

[17] Russia's 1998 default on its debt and Brazil's 1999 currency crisis are partially attributed to international financial contagion from the 1997 East Asian financial crisis and its rapid spread within the Asian region, for which CRAs were blamed for their inadequate response. For instance, CRAs have been criticized for exacerbating the crisis by downgrading the crisis-hit countries (and their local firms) in the midst of their financial turmoil (e.g., IMF, 1998; Ferri et al., 2001). Extant evidence suggests that sovereign credit rating changes in emerging markets are contagious within and across national borders (e.g., Kräussl, 2005; Kaminsky and Schmukler, 2002). More recently, Ferreira and Gama (2007) provide evidence on the spillover effects of sovereign debt rating and credit outlook changes and stress that geographic proximity and emerging market status amplify the effect of a spillover.

[18] In this regard, one should be mindful of the stylized fact that rating cycles display strong asymmetries in terms of length and depth as upgrades tend to be slower than downgrades (Broto and Molina. 2016). Caution is merited here since firm ratings tend to be characterized by an asymmetric response to changes in sovereign ratings. For instance, Ferri et al. (2001) show that sovereign downgrades trigger firm downgrades, whereas sovereign upgrades do not systematically lead to upgrades.

time and predict that CRA incentives to be truthful weaken when there is more business in a given product. He et al. (2012) provide empirical support for this prediction. They find that over the period 2000–2006, large issuers of MBSs received AAA ratings for greater proportions of their issues and that these larger issues had poorer ex-post performance, as measured by subsequent price drops.

Similar to the evidence on ratings inflation in the MBSs market, previous literature shows that CRAs may offer favorable ratings for corporate bonds when their reputation concerns are weak. For example, Becker and Milbourn (2011) show that increased competition from Fitch in the corporate rating market led S&P and Moody's to issue more favorable ratings. This result is in line with the finding of Bae et al. (2018) that DBRS, a Canadian CRA, inflates ratings for Canadian bonds in response to increased competition from S&P. Kedia et al. (2014) provide evidence consistent with the allegation that CRAs loosened standards to "chase revenue." They show that Moody's bond ratings were more favorable to issuers after Moody's went public in 2000. Bolton et al. (2012) present a theory predicting that ratings are more likely to be inflated during economic booms (when CRA reputation costs are low) and when investors are more trusting. Our evidence on standards loosening for emerging country firms may be consistent with this theory for two reasons. First, relative to developed markets, emerging markets have weaker creditor rights and lower information quality, leading (foreign) investors to increasingly rely on CRAs' rating services and to be more trusting. Second, emerging markets have experienced strong economic growth since the 1997 East Asian financial crisis, which may have lowered CRA reputation costs. As such, we expect CRAs to be less conservative in rating emerging country firms over time.

In sum, structural differences between emerging and developed markets may have played a role in shaping different rating policies in these markets. Several observations specific to emerging markets, such as (i) growth in credit demand, (ii) the economic recovery cycle over the last two decades, and (iii) the trusting nature of investors, lead us to cautiously make the claim that CRAs may have adopted less stringent standards over time for emerging country firms. This is not to say that ratings tend to be inflated. Instead, these factors may have acted together as a countervailing force against CRA increased conservatism in emerging markets. What remains unexplored in our study is the exact cause of standards divergence. Future research could usefully investigate whether this

phenomenon can be explained by variation in CRA incentives and whether there exist implications for firm investment and financing policies.

7. Conclusion

Although rigorously gathered empirical evidence suggests that CRAs have become more conservative in assigning corporate credit ratings in the U.S. (e.g., Blume et al., 1998; Alp, 2013; Baghai et al., 2014), many questions remain unanswered. In particular, the question of whether CRAs embrace the same standards for non-U.S. firms is relevant and timely, given the growing interest in understanding the times-series variations in rating standards around the world, especially in the wake of recent global financial turmoil. Our study addresses this unanswered question and thus fills an important gap in the literature.

Consistent with prior literature, we first show that CRAs have become increasingly conservative in rating U.S. firms over our 2000–2016 sample period. We then provide novel evidence on a downward trend in the ratings of other developed country firms and an upward trend in the ratings of emerging country firms. This evidence survives extensive robustness tests. The evidence holds when we control for various country-level factors, such as the inflation rate, GDP growth, economic risk rating, financial risk rating, political risk rating, and rule of law. The evidence also persists when we control for several firm-level characteristics, such as firm systematic and idiosyncratic risks, earnings quality, and information quality. Next, we show that the sovereign ceiling rule does not drive our results. Finally, we investigate the informativeness of ratings using actual defaults, expected defaults, and credit spreads. Our results point to unwarranted tightening (warranted loosening) in the standards used by CRAs over time in rating U.S. and other developed country firms (emerging country firms).

Our study offers fresh directions for future research. One would have expected CRAs to use consistent standards when rating different firms from different countries over time, yet this is not what we find. Our study leaves unanswered the question of why CRAs have become more conservative in rating U.S. and other developed country firms and less so in rating emerging country

firms. Future research could usefully investigate the exact reason for standards divergence and its implications for firm financing and investment policies. Our evidence may have important policy implications and calls for more scrutiny of CRAs' rating policies, notably with respect to their stability over time.

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Figure 1. Share of IG ratings over time across country groups. This figure plots the share of IG ratings over the period 2000–2016 for firms in three country groups: emerging countries (based on Capital IQ's emerging country indicator), the U.S., and developed countries (countries other than the U.S. not classified as emerging countries). A country group's share of IG ratings is the fraction of IG ratings out of all ratings for firms in that country group. Ratings of BBB- or higher are IG ratings, and ratings of BB+ or lower are NIG ratings. The ratings data are from the S&P's Capital IQ database.

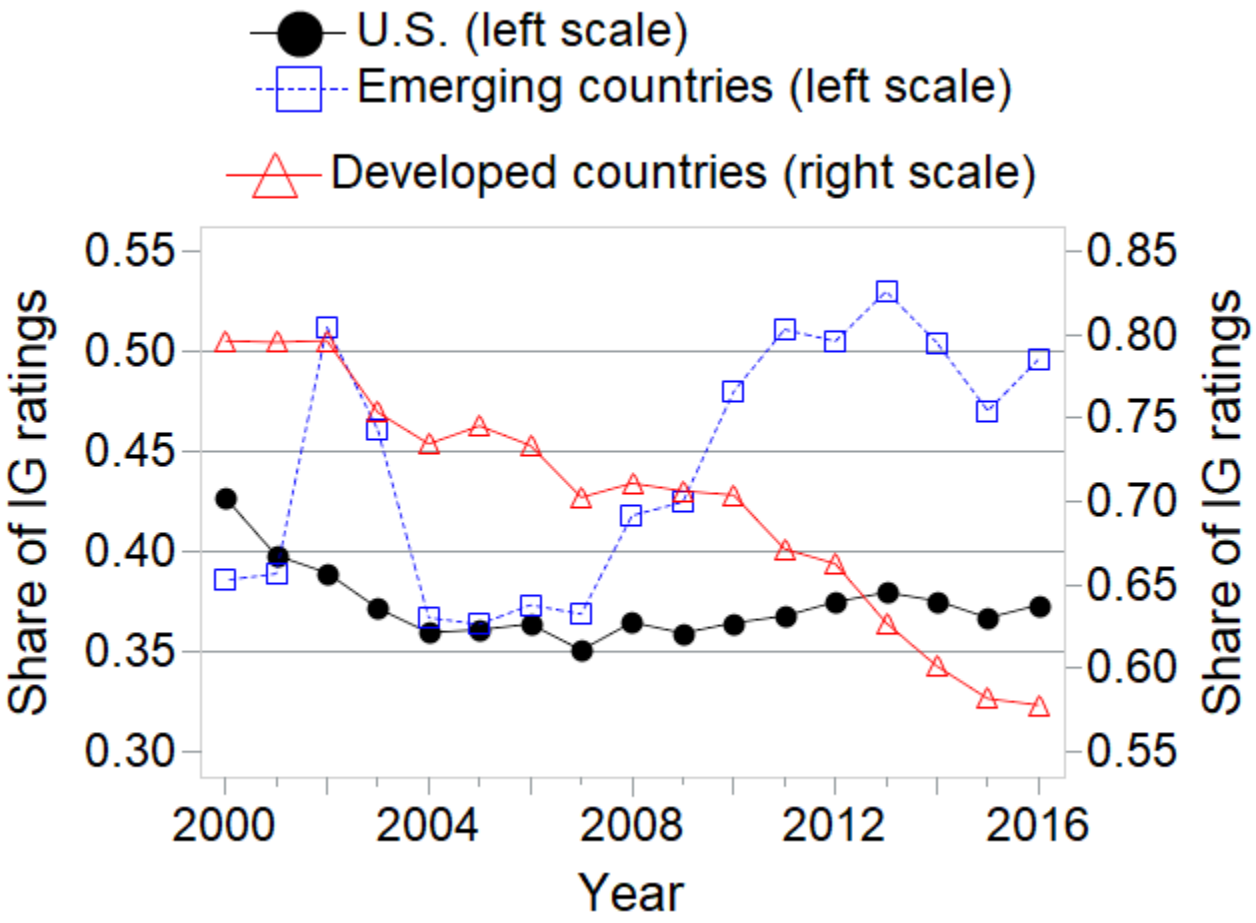

Figure 2. Plot of coefficient estimates on year dummies in ratings models. This figure plots the coefficient estimates on year dummies in the OLS regression models of Table 4. Models (1) and (2) are for the sample of U.S. firms, models (3) and (4) are for the sample of firms in developed countries (countries other than the U.S. not classified as emerging countries), and models (5) and (6) are for the sample of firms in emerging countries (based on Capital IQ's emerging country indicator). The ratings data are from the S&P's Capital IQ database.

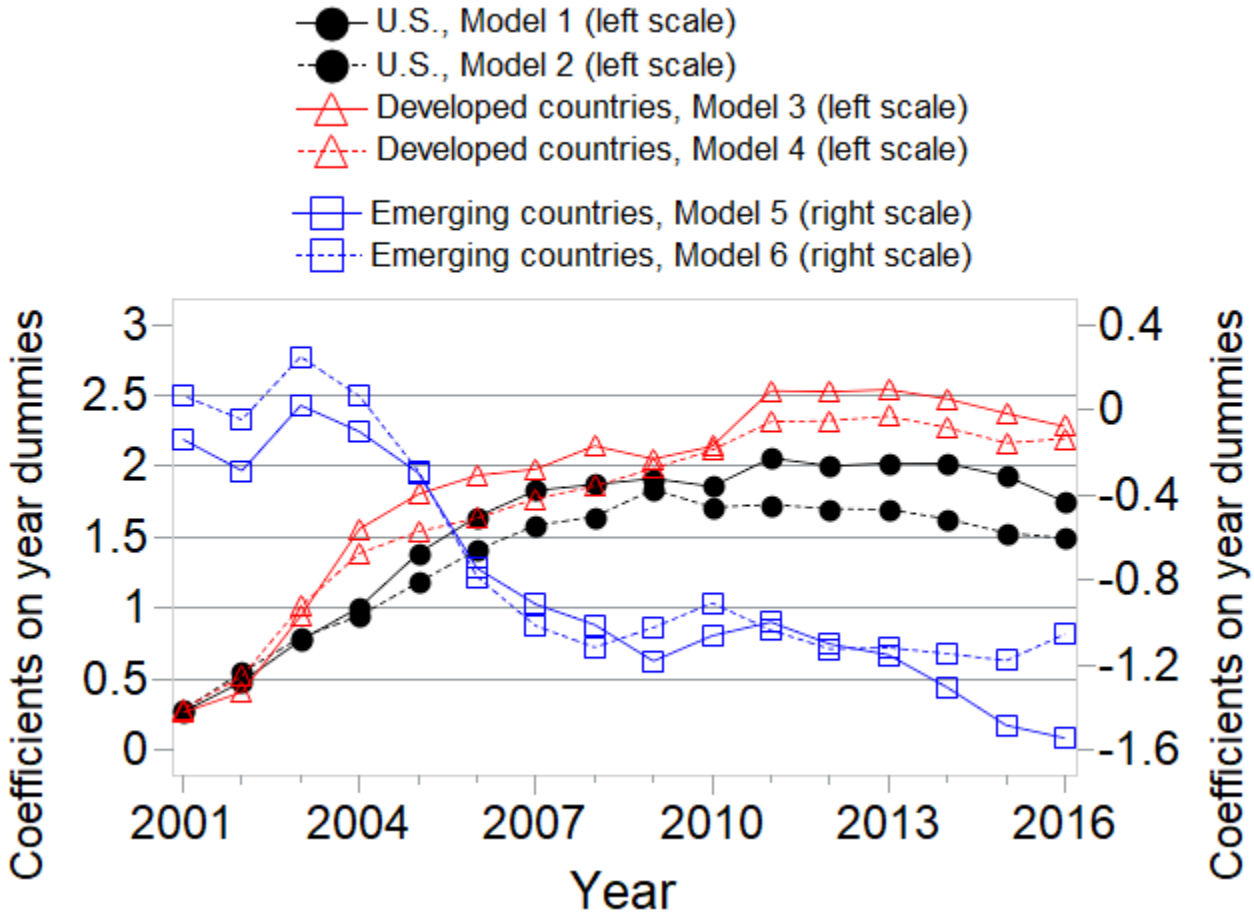

Table 1. Sample distribution by country. This table presents the distribution of sample firms and their ratings by country. Panel A is for U.S. firms, Panel B is for firms in developed countries (countries other than the U.S. not classified as emerging countries), and Panel C is for firms in emerging countries (based on Capital IQ's emerging country indicator). The ratings data are from the S&P's Capital IQ database.

Panel A: United States				
Country	Ratings		Firms	
	N	%	*N*	%
United States	16,044	100.00	2,145	100.00
Panel B: Developed countries				
Country	Ratings		Firms	
	N	%	*N*	%
Australia	530	7.29	66	6.97
Austria	46	0.63	5	0.53
Belgium	56	0.77	7	0.74
Bermuda	15	0.21	2	0.21
Canada	1,459	20.06	201	21.22
Denmark	58	0.80	7	0.74
Finland	108	1.48	9	0.95
France	665	9.14	62	6.55
Germany	527	7.25	62	6.55
Greece	35	0.48	6	0.63
Iceland	2	0.03	1	0.11
Ireland	57	0.78	8	0.84
Italy	141	1.94	18	1.90
Japan	1,283	17.64	220	23.23
Luxembourg	109	1.50	15	1.58
Netherlands	325	4.47	35	3.70
New Zealand	101	1.39	11	1.16
Norway	100	1.37	10	1.06
Portugal	43	0.59	4	0.42
Spain	107	1.47	19	2.01
Sweden	296	4.07	25	2.64
Switzerland	269	3.70	28	2.96
United Kingdom	941	12.94	126	13.31
All countries	7,273	100.00	947	100.00
Panel C: Emerging countries				
Country	Ratings		Firms	
	N	%	*N*	%
Argentina	43	1.56	6	1.52
Bahrain	5	0.18	1	0.25
Brazil	319	11.54	37	9.39
Bulgaria	6	0.22	2	0.51
Chile	120	4.34	16	4.06
China	123	4.45	34	8.63

Colombia	10	0.36	2	0.51
Cyprus	7	0.25	2	0.51
Czech Republic	15	0.54	1	0.25
Egypt	1	0.04	1	0.25
Hong Kong	244	8.82	42	10.66
Hungary	20	0.72	3	0.76
India	105	3.80	16	4.06
Indonesia	189	6.84	36	9.14
Israel	19	0.69	2	0.51
Kazakhstan	36	1.30	4	1.02
Korea	213	7.70	21	5.33
Macau	3	0.11	1	0.25
Malaysia	68	2.46	6	1.52
Mexico	320	11.57	39	9.90
Mongolia	4	0.14	1	0.25
Morocco	2	0.07	1	0.25
Oman	3	0.11	1	0.25
Panama	3	0.11	1	0.25
Peru	31	1.12	9	2.28
Philippines	33	1.19	4	1.02
Poland	50	1.81	9	2.28
Qatar	8	0.29	1	0.25
Russia	353	12.77	44	11.17
Saudi Arabia	18	0.65	2	0.51
Singapore	100	3.62	13	3.30
Slovenia	2	0.07	1	0.25
South Africa	77	2.78	9	2.28
Sri Lanka	12	0.43	1	0.25
Thailand	113	4.09	12	3.05
Trinidad and Tobago	1	0.04	1	0.25
Turkey	71	2.57	9	2.28
United Arab Emirates	13	0.47	2	0.51
Venezuela	5	0.18	1	0.25
All countries	2,765	100.00	394	100.00

Table 2. Sample distribution by year and rating category. This table presents the distribution of ratings by year and rating category (e.g., the BBB ratings category includes ratings of BBB-, BBB, and BBB+). Panel A is for U.S. firms, Panel B is for firms in developed countries (countries other than the U.S. not classified as emerging countries), and Panel C is for firms in emerging countries (based on Capital IQ's emerging country indicator). The ratings data are from the S&P's Capital IQ database.

Panel A: United States

		Rating category (%)							
Year	*N*	AAA	AA	A	BBB	BB	B	CCC	CC
2000	1,040	0.87	4.04	13.27	24.52	27.02	27.12	2.60	0.58
2001	1,050	0.76	2.29	14.00	22.76	25.71	30.38	3.71	0.38
2002	1,040	0.67	1.73	12.69	23.85	27.12	27.79	5.29	0.87
2003	1,017	0.59	1.77	12.19	22.62	29.79	25.86	6.00	1.18
2004	1,029	0.58	1.46	11.76	22.16	30.42	28.86	4.66	0.10
2005	1,014	0.49	1.38	11.24	22.98	31.36	28.50	3.65	0.39
2006	962	0.52	1.35	11.23	23.28	29.52	30.15	3.85	0.10
2007	935	0.53	1.39	10.27	22.89	30.59	31.55	2.57	0.21
2008	894	0.56	1.57	10.51	23.83	30.31	31.54	1.57	0.11
2009	860	0.58	1.51	10.35	23.49	26.40	31.40	5.47	0.81
2010	848	0.47	1.53	10.02	24.41	25.71	34.43	3.30	0.12
2011	870	0.46	1.26	10.46	24.60	27.70	32.99	2.18	0.34
2012	867	0.46	1.27	10.38	25.37	29.64	30.57	2.19	0.12
2013	872	0.46	1.49	10.55	25.46	29.70	30.39	1.95	0.00
2014	903	0.33	1.77	10.08	25.36	30.68	29.57	2.10	0.11
2015	943	0.32	1.80	9.54	25.03	31.81	28.95	2.55	0.00
2016	900	0.33	2.11	8.56	26.33	33.33	24.56	4.11	0.67
All years	16,044	0.54	1.77	11.09	24.00	29.21	29.58	3.44	0.37

Panel B: Developed countries

		Rating category (%)							
Year	*N*	AAA	AA	A	BBB	BB	B	CCC	CC
2000	270	2.96	12.59	27.41	36.67	10.00	10.00	0.00	0.37
2001	313	1.92	10.86	28.75	38.02	10.54	7.99	1.60	0.32
2002	344	1.74	8.43	26.74	42.73	11.05	7.85	0.58	0.87
2003	357	1.96	7.00	26.89	39.50	15.97	7.28	0.56	0.84
2004	535	1.31	5.98	26.92	39.25	16.82	9.16	0.37	0.19
2005	538	1.12	6.13	26.95	40.33	17.10	7.81	0.37	0.19
2006	537	0.93	6.33	26.44	39.66	18.99	7.08	0.56	0.00
2007	437	1.14	6.41	21.51	41.19	18.76	9.61	1.37	0.00
2008	429	0.93	6.29	20.75	43.12	18.41	9.79	0.47	0.23
2009	378	0.53	6.88	21.43	41.80	16.40	10.05	2.12	0.79
2010	385	0.52	5.71	21.30	42.86	15.32	12.47	1.82	0.00
2011	411	0.49	4.87	19.71	42.09	17.03	14.84	0.73	0.24
2012	427	0.47	4.92	18.50	42.39	18.50	14.05	1.17	0.00
2013	448	0.45	4.69	16.52	41.07	18.97	16.29	2.01	0.00
2014	469	0.21	4.90	16.20	38.81	20.26	17.27	2.35	0.00

2015	495	0.20	4.44	16.16	37.37	21.01	19.39	1.41	0.00
2016	500	0.20	3.80	17.00	36.80	21.40	16.80	3.60	0.40
All years	7,273	0.92	6.19	22.05	40.19	17.34	11.81	1.26	0.23
Panel C: Emerging countries									
		Rating category (%)							
Year	*N*	AAA	AA	A	BBB	BB	B	CCC	CC
2000	70	0.00	0.00	2.86	35.71	25.71	22.86	5.71	7.14
2001	72	0.00	0.00	5.56	33.33	33.33	16.67	5.56	5.56
2002	82	0.00	1.22	4.88	45.12	20.73	21.95	6.10	0.00
2003	102	0.00	0.98	8.82	36.27	15.69	27.45	9.80	0.98
2004	109	0.92	0.00	10.09	25.69	21.10	37.61	4.59	0.00
2005	132	0.76	0.76	9.09	25.76	37.12	23.48	3.03	0.00
2006	150	0.67	2.00	9.33	25.33	37.33	24.00	1.33	0.00
2007	160	0.63	1.88	8.13	26.25	40.63	21.88	0.63	0.00
2008	189	0.53	1.59	8.47	31.22	36.51	20.63	1.06	0.00
2009	186	0.54	1.61	10.75	29.57	33.87	21.51	1.61	0.54
2010	175	1.14	1.71	13.14	32.00	29.71	20.00	1.14	1.14
2011	182	2.20	2.20	11.54	35.16	26.92	20.88	1.10	0.00
2012	196	2.04	2.04	9.69	36.73	28.57	18.37	2.55	0.00
2013	217	1.84	1.38	9.68	40.09	25.35	19.35	1.84	0.46
2014	234	1.71	1.28	11.11	36.32	31.20	15.81	2.14	0.43
2015	253	1.58	1.98	11.86	31.62	36.36	13.44	3.16	0.00
2016	256	1.56	1.56	14.06	32.42	34.38	13.28	2.73	0.00
All years	2,765	1.16	1.48	10.16	32.77	31.28	19.96	2.64	0.54

Table 3. Summary statistics. This table presents summary statistics of the main variables. Panel A (B) presents the number of observations and mean values (trend estimates) of the main variables by country group. The country groups are: emerging countries (based on Capital IQ's emerging country indicator), the U.S., and developed countries (countries other than the U.S. not classified as emerging countries). Difference tests in the mean and trend statistics between the developed (emerging) countries and the U.S. are presented in Column (7) (Column (8)). Ratings are converted into numerical scores on the following scale: AAA = 1; AA+ = 2; AA = 3; AA- = 4; …; and C = 21. All of the variables are as defined in the text. For the firm-level variables, we cluster standard errors at the firm level. The *p*-values are reported in parentheses. The superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Mean statistics

	United States		Developed countries		Emerging countries		Difference tests	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	*N*	Mean	*N*	Mean	*N*	Mean	(4) - (2) (*P*-value)	(6) - (2) (*P*-value)
Rating	16,044	11.523	7,273	9.228	2,765	10.977	-2.294***	-0.545***
							(<.000)	(0.007)
Total debt ratio	16,044	0.402	7,273	0.305	2,765	0.319	-0.096***	-0.082***
							(<.000)	(<.000)
Debt to cash flow ratio	16,044	3.725	7,273	3.368	2,765	3.387	-0.357***	-0.337*
							(0.003)	(0.054)
Negative debt to cash flow ratio dummy	16,044	0.035	7,273	0.022	2,765	0.019	-0.013***	-0.016***
							(0.000)	(0.001)
Interest coverage ratio	16,044	11.383	7,273	21.779	2,765	15.997	10.395***	4.614***
							(<.000)	(0.003)
Convertible debt ratio	16,044	0.018	7,273	0.001	2,765	0.001	-0.017***	-0.017***
							(<.000)	(<.000)
Firm size	16,044	3.390	7,273	4.472	2,765	3.981	1.081***	0.590***
							(<.000)	(<.000)
Operating margin	16,044	0.170	7,273	0.187	2,765	0.258	0.017***	0.088***
							(0.007)	(<.000)
Operating margin volatility	16,044	0.054	7,273	0.046	2,765	0.052	-0.008**	-0.002
							(0.021)	(0.585)
Cash ratio	16,044	0.087	7,273	0.092	2,765	0.119	0.004	0.031***
							(0.183)	(<.000)
Rent ratio	16,044	0.021	7,273	0.010	2,765	0.007	-0.011***	-0.014***

							(<.000)	(<.000)
Tangibility	16,044	0.328	7,273	0.354	2,765	0.462	0.025**	0.133***
							(0.016)	(<.000)
Capital expenditures ratio	16,044	0.057	7,273	0.058	2,765	0.081	0.000	0.024***
							(0.711)	(<.000)
Inflation rate	17	2.232	355	1.830	429	5.548	-0.402	3.316***
							(0.150)	(<.000)
GDP growth	17	2.109	364	1.766	440	4.334	-0.342	2.224***
							(0.432)	(<.000)
Economic risk rating	17	38.284	355	40.103	437	37.834	1.818***	-0.449
							(0.005)	(0.489)
Financial risk rating	17	33.620	355	38.676	437	39.145	5.056***	5.524***
							(<.000)	(<.000)
Political risk rating	17	82.497	355	84.357	437	68.350	1.860**	-14.147***
							(0.026)	(<.000)
Rule of law	17	1.588	364	1.574	440	0.204	-0.014	-1.384***
							(0.565)	(<.000)

Panel B: Trend statistics

	United States		Developed countries		Emerging countries		Difference tests	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	*N*	Trend (*P*-value)	*N*	Trend (*P*-value)	*N*	Trend (*P*-value)	(4) - (2) (*P*-value)	(6) - (2) (*P*-value)
Rating	16,044	0.015*	7,273	0.128***	2,765	-0.095***	0.113***	-0.110***
		(0.071)		(<.000)		(<.000)	(<.000)	(<.000)
Total debt ratio	16,044	-0.003***	7,273	0.000	2,765	0.001	0.004***	0.005***
		(<.000)		(0.729)		(0.241)	(<.000)	(<.000)
Debt to cash flow ratio	16,044	-0.041***	7,273	0.001	2,765	0.023	0.043**	0.064*
		(<.000)		(0.918)		(0.498)	(0.035)	(0.068)
Negative debt to cash flow ratio dummy	16,044	-0.001***	7,273	0.000	2,765	0.000	0.001**	0.002**
		(0.000)		(0.867)		(0.598)	(0.022)	(0.045)
Interest coverage ratio	16,044	0.352***	7,273	-0.422***	2,765	0.138	-0.774***	-0.213

		(<.000)		(0.008)		(0.416)	(<.000)	(0.225)
Convertible debt ratio	16,044	-0.001***	7,273	-0.000	2,765	-0.000	0.001***	0.001***
		(<.000)		(0.614)		(0.327)	(<.000)	(0.001)
Firm size	16,044	0.056***	7,273	0.027***	2,765	0.013	-0.029***	-0.043***
		(<.000)		(<.000)		(0.127)	(<.000)	(<.000)
Operating margin	16,044	0.001***	7,273	0.001**	2,765	-0.005***	-0.000	-0.007***
		(0.000)		(0.040)		(<.000)	(0.676)	(<.000)
Operating margin volatility	16,044	-0.001***	7,273	-0.001*	2,765	-0.002***	0.000	-0.001
		(0.003)		(0.086)		(0.002)	(0.678)	(0.234)
Cash ratio	16,044	0.002***	7,273	0.000	2,765	0.001**	-0.001***	-0.000
		(<.000)		(0.160)		(0.011)	(<.000)	(0.362)
Rent ratio	16,044	-0.000***	7,273	0.000***	2,765	0.000***	0.001***	0.001***
		(<.000)		(<.000)		(<.000)	(<.000)	(<.000)
Tangibility	16,044	-0.002***	7,273	-0.003***	2,765	-0.008***	-0.001	-0.006***
		(0.000)		(<.000)		(<.000)	(0.122)	(<.000)
Capital expenditures ratio	16,044	-0.000	7,273	-0.000***	2,765	-0.000**	-0.000**	-0.000
		(0.259)		(0.000)		(0.040)	(0.044)	(0.152)
Inflation rate	17	-0.100**	355	-0.075***	429	-0.363***	0.025	-0.263**
		(0.030)		(<.000)		(0.001)	(0.552)	(0.025)
GDP growth	17	-0.113	364	-0.177***	440	-0.045	-0.063	0.067
		(0.120)		(<.000)		(0.239)	(0.384)	(0.370)
Economic risk rating	17	-0.252**	355	-0.273***	437	0.113**	-0.020	0.366***
		(0.034)		(<.000)		(0.019)	(0.851)	(0.001)
Financial risk rating	17	-0.117	355	-0.146***	437	0.175***	-0.028	0.293***
		(0.127)		(0.003)		(0.000)	(0.734)	(0.000)
Political risk rating	17	-0.286*	355	-0.466***	437	-0.099	-0.180	0.186
		(0.096)		(<.000)		(0.258)	(0.280)	(0.291)
Rule of law	17	0.002	364	-0.001	440	0.004	-0.003	0.002
		(0.188)		(0.776)		(0.480)	(0.442)	(0.730)

Table 4. Ratings models and year indicators. This table presents the estimation results of OLS regression models. The dependent variable is S&P's rating converted into numerical scores on the following scale: AAA = 1; AA+ = 2; AA = 3; AA- = 4; …; and C = 21. The models control for various firm characteristics. All of the variables are as defined in the text. We include year dummy variables for the years 2001–2016 (omitting year 2000, the first year in the sample). Firm, industry, and country fixed effects are included in alternative specifications. Models (1) and (2) are for the U.S. sample, models (3) and (4) are for the developed country sample (countries other than the U.S. not classified as emerging countries), and models (5) and (6) are for the emerging country sample (based on Capital IQ's emerging country indicator). We cluster standard errors at the firm level. The *p*-values are reported in parentheses. The superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Sample					
	United States		Developed countries		Emerging countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)
Total debt ratio	2.669***	2.773***	4.833***	4.360***	3.323***	1.298***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)
Debt to cash flow ratio	0.162***	0.067***	0.097***	0.049***	0.047**	0.041***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.016)	(0.005)
Negative debt to cash flow ratio dummy	2.180***	1.057***	1.067***	0.876***	1.291	0.880
	(0.000)	(0.000)	(0.003)	(0.000)	(0.120)	(0.257)
Interest coverage ratio	-0.010***	-0.002***	-0.006***	-0.003***	-0.002*	-0.000
	(0.000)	(0.009)	(0.000)	(0.000)	(0.066)	(0.857)
Convertible debt ratio	3.607***	0.530	-0.904	0.679	7.406**	-4.208
	(0.000)	(0.225)	(0.720)	(0.763)	(0.011)	(0.331)
Firm size	-1.263***	-0.886***	-1.203***	-0.991***	-1.059***	-0.583***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Operating margin	-1.211***	-0.556***	-2.793***	-0.534	-1.099	-0.641
	(0.000)	(0.004)	(0.000)	(0.155)	(0.127)	(0.430)
Operating margin volatility	0.638**	-0.030	0.496	-0.357	1.025	-0.039
	(0.016)	(0.888)	(0.440)	(0.422)	(0.405)	(0.962)
Cash ratio	-0.309	-0.046	0.776	-0.713	-2.862***	-2.222***
	(0.461)	(0.897)	(0.363)	(0.121)	(0.000)	(0.001)
Rent ratio	3.523**	1.442	8.216***	2.235	11.357**	1.592
	(0.030)	(0.463)	(0.004)	(0.244)	(0.014)	(0.777)
Tangibility	0.354	-0.202	-1.127**	-0.892**	0.346	0.405

	(0.232)	(0.596)	(0.021)	(0.046)	(0.514)	(0.504)
Capital expenditures ratio	-2.958***	-4.793***	-2.350*	-4.228***	-1.116	-2.627***
	(0.000)	(0.000)	(0.088)	(0.000)	(0.417)	(0.007)
Constant	12.859***	12.311***	10.758***	11.211***	15.039***	14.028***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2001 dummy	0.266***	0.281***	0.263***	0.287***	-0.141	0.065
	(0.000)	(0.000)	(0.008)	(0.000)	(0.419)	(0.668)
2002 dummy	0.480***	0.547***	0.406***	0.517***	-0.288	-0.048
	(0.000)	(0.000)	(0.000)	(0.000)	(0.340)	(0.859)
2003 dummy	0.772***	0.793***	0.944***	1.012***	0.019	0.248
	(0.000)	(0.000)	(0.000)	(0.000)	(0.957)	(0.441)
2004 dummy	1.005***	0.944***	1.558***	1.385***	-0.104	0.062
	(0.000)	(0.000)	(0.000)	(0.000)	(0.758)	(0.854)
2005 dummy	1.385***	1.180***	1.802***	1.539***	-0.298	-0.289
	(0.000)	(0.000)	(0.000)	(0.000)	(0.360)	(0.387)
2006 dummy	1.644***	1.409***	1.935***	1.633***	-0.747**	-0.786**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.026)	(0.020)
2007 dummy	1.829***	1.583***	1.979***	1.771***	-0.916***	-1.018***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.003)
2008 dummy	1.871***	1.644***	2.143***	1.859***	-1.012***	-1.118***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
2009 dummy	1.913***	1.836***	2.051***	1.984***	-1.183***	-1.026***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.007)
2010 dummy	1.857***	1.710***	2.140***	2.114***	-1.064***	-0.910**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.022)
2011 dummy	2.057***	1.729***	2.532***	2.313***	-1.000***	-1.038**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.010)
2012 dummy	2.002***	1.700***	2.525***	2.321***	-1.103***	-1.126***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.005)
2013 dummy	2.021***	1.695***	2.540***	2.352***	-1.154***	-1.120***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.006)
2014 dummy	2.019***	1.628***	2.475***	2.272***	-1.307***	-1.148***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)
2015 dummy	1.930***	1.529***	2.372***	2.164***	-1.485***	-1.181***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)

2016 dummy	1.751***	1.493***	2.281***	2.194***	-1.545***	-1.057***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.009)
Firm dummies	NO	YES	NO	YES	NO	YES
Industry dummies	YES	NO	YES	NO	YES	NO
Country dummies	NO	NO	YES	NO	YES	NO
Number of firms	2,145	2,145	947	947	394	394
Number of observations	16,044	16,044	7,273	7,273	2,765	2,765
Adjusted R^2	0.660	0.323	0.662	0.333	0.724	0.228

Table 5. Ratings models, linear trends, and country-level factors. This table presents the estimation results of OLS regression models. The dependent variable is S&P's rating converted into numerical scores on the following scale: AAA = 1; AA+ = 2; AA = 3; AA- = 4; …; and C = 21. The models control for various firm characteristics and country-level variables. All of the variables are as defined in the text. We include a linear time trend variable, which takes the value of 0 in 2000, 1 in 2001, 2 in 2002, etc. In models (3)–(6), we interact the trend variable with dummy variables indicating developed countries (countries other than the U.S. not classified as emerging countries) and emerging countries (based on Capital IQ's emerging country indicator). Firm, industry, and country fixed effects are included in alternative specifications. Models (1) and (2) are for the U.S. sample, and models (3)–(6) are for the sample of all countries. We cluster standard errors at the year level. The *p*-values are reported in parentheses. The superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Sample					
	United States		All countries		All countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)
Linear trend	0.128***	0.095***	0.123***	0.092***	0.090***	0.063***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Developed country dummy			-1.339***		-0.550*	
			(0.000)		(0.051)	
Linear trend × Developed country dummy			0.015*	0.021***	0.024	0.027**
			(0.072)	(0.000)	(0.135)	(0.031)
Emerging country dummy			2.260***		-0.049	
			(0.000)		(0.950)	
Linear trend × Emerging country dummy			-0.196***	-0.172***	-0.181***	-0.150***
			(0.000)	(0.000)	(0.000)	(0.000)
Total debt ratio	2.589***	2.514***	3.058***	2.640***	3.111***	2.787***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Debt to cash flow ratio	0.160***	0.066***	0.134***	0.057***	0.134***	0.057***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Negative debt to cash flow ratio dummy	2.115***	1.055***	1.794***	0.999***	1.816***	1.014***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Interest coverage ratio	-0.010**	-0.002	-0.007***	-0.002*	-0.007***	-0.002*
	(0.017)	(0.186)	(0.004)	(0.064)	(0.004)	(0.052)
Convertible debt ratio	3.803***	0.891**	3.985***	1.103***	3.896***	0.905**
	(0.000)	(0.020)	(0.000)	(0.006)	(0.000)	(0.018)

Firm size	-1.272***	-0.894***	-1.219***	-0.834***	-1.213***	-0.807***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Operating margin	-1.181*	-0.597*	-1.662**	-0.574*	-1.682**	-0.572*
	(0.053)	(0.058)	(0.015)	(0.068)	(0.015)	(0.066)
Operating margin volatility	0.570*	-0.198	0.493	-0.263*	0.541	-0.148
	(0.066)	(0.176)	(0.143)	(0.085)	(0.117)	(0.259)
Cash ratio	-0.185	0.216	-0.174	-0.138	-0.331	-0.403**
	(0.700)	(0.393)	(0.624)	(0.526)	(0.351)	(0.038)
Rent ratio	3.576***	1.889	6.183***	3.079***	5.973***	2.661***
	(0.001)	(0.130)	(0.000)	(0.000)	(0.000)	(0.000)
Tangibility	0.377*	-0.438	0.113	-0.421*	0.038	-0.399**
	(0.053)	(0.108)	(0.323)	(0.058)	(0.703)	(0.025)
Capital expenditures ratio	-3.406***	-5.477***	-2.693***	-4.839***	-2.221***	-4.199***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Inflation rate	0.191***	0.155***	0.099***	0.067***		
	(0.003)	(0.001)	(0.000)	(0.000)		
GDP growth	-0.086*	-0.099***	-0.024	-0.044**		
	(0.055)	(0.006)	(0.261)	(0.011)		
Economic risk rating					-0.054***	-0.056***
					(0.005)	(0.000)
Financial risk rating					-0.006	-0.016
					(0.811)	(0.328)
Political risk rating					-0.045***	-0.045***
					(0.002)	(0.000)
Rule of law					-1.143**	-0.750
					(0.045)	(0.111)
Constant	13.119***	12.907***	13.035***	12.604***	21.278***	20.167***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Testing the trend total effect for developed countries						
Linear trend + Linear trend × Developed country dummy			0.138***	0.113***	0.114***	0.090***
			(0.000)	(0.000)	(0.000)	(0.000)
Testing the trend total effect for emerging countries						

Linear trend + Linear trend × Emerging country dummy			-0.073***	-0.080***	-0.091***	-0.087***
			(0.000)	(0.000)	(0.000)	(0.000)
Firm dummies	NO	YES	NO	YES	NO	YES
Industry dummies	YES	NO	YES	NO	YES	NO
Country dummies	NO	NO	YES	NO	YES	NO
Number of firms	2,145	2,145	3,482	3,482	3,483	3,483
Number of observations	16,044	16,044	26,052	26,052	26,064	26,064
Adjusted R^2	0.654	0.899	0.665	0.906	0.667	0.908

Table 6. Actual default rate regressions. This table presents the estimation results of OLS regression models. The dependent variable is an actual default rate (measured in percentage), obtained from S&P (2012; 2014; and 2015). Column (1) uses the default rate of all-rated firms; Column (2) uses the default rate of NIG firms; Column (3) uses the default rate of IG firms; and columns (4) and (5) use the difference in default rates between NIG and IG firms. Ratings of BBB- or higher are IG ratings, and ratings of BB+ or lower are NIG ratings. The explanatory variable is a linear time trend variable, which takes the value of 0 in 2000, 1 in 2001, 2 in 2002, etc. In Column (5), we control for three-year-ahead average GDP growth. Panel A is for U.S. firms, Panel B is for firms in developed countries (countries other than the U.S. not classified as emerging countries), and Panel C is for firms in emerging countries (based on Capital IQ's emerging country indicator). We estimate Newey–West standard errors with two lags. The *p*-values are reported in parentheses. The superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Panel A: United States				
	Cumulative three-year default rate (in %)				
	All ratings	NIG ratings	IG ratings	NIG less IG ratings	NIG less IG ratings
	(1)	(2)	(3)	(4)	(5)
Variable	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)
Linear trend	-0.328*	-0.889**	-0.076***	-0.813**	-1.057***
	(0.065)	(0.023)	(0.004)	(0.028)	(0.004)
Three-year-ahead average GDP growth					-2.815***
					(0.008)
Constant	8.394***	19.023***	1.320***	17.703***	24.930***
	(0.000)	(0.000)	(0.000)	(0.000)	(<.000)
Number of observations	14	14	14	14	14
Adjusted R^2	0.139	0.271	0.243	0.260	0.506
	Panel B: European countries				
	Cumulative three-year default rate (in %)				
	All ratings	NIG ratings	IG ratings	NIG less IG ratings	NIG less IG ratings
	(1)	(2)	(3)	(4)	(5)
Variable	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)
Linear trend	-0.171*	-0.950*	-0.065***	-0.885*	-1.563**
	(0.080)	(0.052)	(0.005)	(0.059)	(0.013)
Three-year-ahead average GDP growth					-3.349**
					(0.034)
Constant	3.325***	17.150***	0.811***	16.339***	26.192***
	(0.006)	(0.005)	(0.003)	(0.005)	(0.001)
Number of observations	13	13	13	13	13
Adjusted R^2	0.206	0.259	0.428	0.247	0.453
	Panel C: Emerging countries				
	Cumulative three-year default rate (in %)				

	All ratings	NIG ratings	IG ratings	NIG less IG ratings	NIG less IG ratings
	(1)	(2)	(3)	(4)	(5)
Variable	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)
Linear trend	-1.269**	-1.434**	-0.742*	-0.691	-0.710
	(0.017)	(0.027)	(0.068)	(0.122)	(0.113)
Three-year-ahead average GDP growth					-1.902**
					(0.022)
Constant	14.718***	18.208***	7.211*	10.997**	20.306***
	(0.004)	(0.004)	(0.055)	(0.018)	(0.002)
Number of observations	11	11	11	11	11
Adjusted R^2	0.414	0.315	0.336	0.071	0.193

Table 7. Expected default probability regressions. This table presents the estimation results of OLS regression models. The dependent variable is an expected default probability (EDP, measured in percentage), estimated following the approach of Hillegeist et al. (2004). The explanatory variables include a linear time trend variable (takes the value of 0 in 2000, 1 in 2001, 2 in 2002, etc.), S&P's rating (converted into numerical scores on the following scale: AAA = 1; AA+ = 2; AA = 3; AA- = 4; …; and C = 21), and dummy variables indicating developed countries (countries other than the U.S. not classified as emerging countries) and emerging countries (based on Capital IQ's emerging country indicator). We also include interaction terms among these variables. Firm, industry, and country fixed effects are included in alternative specifications. Models (1) and (2) are for the U.S. sample, and models (3) and (4) are for the sample of all countries. For models (3) and (4), we test the total trend effects for developed and emerging countries and report the results at the bottom of the table. We cluster standard errors at the firm level. The *p*-values are reported in parentheses. The superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Sample			
	United States		All countries	
	(1)	(2)	(3)	(4)
Variable	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)
Rating	1.342***	1.939***	1.322***	1.939***
	(0.000)	(0.000)	(0.000)	(0.000)
Linear trend	0.337***	-0.006	0.323***	-0.006
	(0.000)	(0.927)	(0.000)	(0.927)
Rating × Linear trend	-0.048***	-0.013*	-0.047***	-0.013*
	(0.000)	(0.074)	(0.000)	(0.075)
Rating × Developed country dummy			-0.011	-1.109**
			(0.965)	(0.024)
Rating × Emerging country dummy			-0.735	-1.875
			(0.172)	(0.170)
Linear trend × Developed country dummy			0.685***	0.716***
			(0.001)	(0.009)
Linear trend × Emerging country dummy			-0.136	-0.327
			(0.782)	(0.623)
Rating × Linear trend × Developed country dummy			-0.046**	-0.048
			(0.034)	(0.119)
Rating × Linear trend × Emerging country dummy			0.028	0.084
			(0.651)	(0.321)
Constant	-10.733***	-17.711***	0.044	-13.362***
	(0.000)	(0.000)	(0.995)	(0.000)
Testing the total effect of Rating × Linear trend for developed countries				
Rating × Linear trend + Rating × Linear trend × Developed country dummy			-0.093***	-0.061**
			(0.000)	(0.042)
Testing the total effect of Rating × Linear trend for emerging countries				
Rating × Linear trend + Rating × Linear trend × Emerging country dummy			-0.019	0.071
			(0.753)	(0.399)

Firm dummies	NO	YES	NO	YES
Industry dummies	YES	NO	YES	NO
Country dummies	NO	NO	YES	NO
Number of firms	1,723	1,723	2,558	2,558
Number of observations	13,462	13,462	18,468	18,468
Adjusted R^2	0.142	0.274	0.233	0.404

Table 8. Bond spread regressions. This table presents the estimation results of OLS regression models. The dependent variable is credit spread (bond yield less a benchmark Treasury yield, measured in basis points). The explanatory variables include a linear time trend variable (takes the value of 0 in 2000, 1 in 2001, 2 in 2002, etc.), S&P's rating (converted into numerical scores on the following scale: AAA = 1; AA+ = 2; AA = 3; AA- = 4; …; and C = 21), and dummy variables indicating developed countries (countries other than the U.S. not classified as emerging countries) and emerging countries (based on Capital IQ's emerging country indicator). We also include interaction terms among these variables. We control for time to maturity, bond turnover, and the 2007–2009 crisis period. All variables are as defined in the text. Bond, firm, industry, and country fixed effects are included in alternative specifications. Models (1)–(3) are for the U.S. sample, and models (4)–(6) are for the sample of all countries. For models (4)–(6), we test the total trend effects for developed and emerging countries and report the results at the bottom of the table. We cluster standard errors at the bond level. The *p*-values are reported in parentheses. The superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Sample					
	United States			All countries		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)	Coefficient (*P*-value)
Rating	54.171***	45.635***	41.036***	54.183***	45.640***	41.097***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Linear trend	0.789***	0.642***	0.713***	0.789***	0.642***	0.737***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rating × Linear trend	-0.157***	-0.121***	-0.090***	-0.157***	-0.121***	-0.091***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rating × Developed country dummy				3.580	-4.153	-5.782
				(0.543)	(0.552)	(0.408)
Rating × Emerging country dummy				-16.593	-9.733	-15.706
				(0.175)	(0.478)	(0.223)
Linear trend × Developed country dummy				0.471	0.350	0.189
				(0.263)	(0.353)	(0.625)
Linear trend × Emerging country dummy				1.516	1.593	0.241
				(0.428)	(0.441)	(0.905)
Rating × Linear trend × Developed country dummy				-0.061	-0.046	-0.021
				(0.264)	(0.368)	(0.673)
Rating × Linear trend × Emerging country dummy				-0.178	-0.204	-0.089

				(0.458)	(0.421)	(0.711)
Ln (days to maturity)	24.272***	23.342***	29.183***	24.718***	23.632***	30.343***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Turnover	-11.811***	-10.168***	-9.778***	-12.036***	-10.237***	-9.981***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Crisis dummy	242.625***	246.728***	243.068***	241.728***	246.072***	242.623***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-381.965***	-322.355***	-357.309***	-384.980***	-320.855***	-363.069***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Testing the total effect of Rating × Linear trend for developed countries						
Rating × Linear trend + Rating × Linear trend × Developed country dummy				-0.218***	-0.167***	-0.112**
				(0.000)	(0.001)	(0.015)
Testing the total effect of Rating × Linear trend for emerging countries						
Rating × Linear trend + Rating × Linear trend × Emerging country dummy				-0.335	-0.325	-0.180
				(0.161)	(0.199)	(0.453)
Bond dummies	NO	NO	YES	NO	NO	YES
Firm dummies	NO	YES	NO	NO	YES	NO
Industry dummies	YES	NO	NO	YES	NO	NO
Country dummies	NO	NO	NO	YES	NO	NO
Number of bonds	4,690	4,690	4,690	5,059	5,059	5,059
Number of observations	139,248	139,248	139,248	148,997	148,997	148,997
Adjusted R^2	0.578	0.676	0.716	0.579	0.675	0.715