Market Power and Credit Rating Standards: Global Evidence

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Abstract

Using a global sample from 27 developed markets between 1994 to 2016, we document a tightening trend of corporate credit ratings, which parallels the growth of rating agencies' market shares in the region. Increased market share precedes a decline in ratings and the result holds among a set of constant firms. In addition, the trend reverses following the NRSRO designation of a local rating agency in the region. Further supporting the notion that market power strengthens rating agencies' reputational incentives to issue stringent ratings, we find that rating agencies' market shares are associated with pessimistic qualitative rating adjustments.

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1. Introduction

Global credit rating agencies ("Global CRAs") are important gatekeepers of the debt market.[1] The demand of their ratings has increased at an unprecedented rate in the past two decades, as the financial systems become more integrated and companies seek financing from the global credit markets. For example, during the period from 2001 to 2016, volume of S&P rated corporate issuers increased by 33%, 48%, and 277% in the U.S., Europe, and Asia, respectively.[2] Despite a massive literature on credit rating agencies and Global CRAs' economic significance outside the U.S., the international evidence on their rating standards is limited. In addition, while the dominance of the Global CRAs has received considerable attention and regulatory debate (EC, 2016), the U.S.-based literature yields ambiguous answers on rating agencies' market power and corporate credit ratings (Becker and Milbourn, 2011; Bae, Kang, and Wang, 2015). The purpose of this study is to (1) provide comprehensive evidence on the evolution of Global CRAs' rating standards worldwide, and (2) assess the impact of rating agencies' market power on their rating standards using a global sample.

We predict that corporate credit ratings are more stringent when Global CRAs have greater market power.[3] This prediction, in line with the reputation model in Morris (2001), stems from the intuition that the reputation penalties for biased ratings are asymmetric. CRAs are penalized for optimistically biased ratings but not for pessimistically biased ratings (Dimitrov, Palia, and Tang, 2015). When market share is high, the long-term reputation losses (i.e., foregone sales when inflated ratings are detected) are likely to be larger than the short-term gains from inflating ratings

[1] For ease of exposition, we use Global CRAs to refer to the two largest credit rating agencies in the U.S., Standard & Poor's (S&P) and Moody's Investor Services (Moody's), who collectively account to more than 80% of the market share in the corporate credit rating market around the globe (OECD, 2010).

[2] In terms of dollar values, this represent an increase from $847 billion to $1,124 billion in the U.S., from $596 billion to $883 billion in Europe, and from $92 billion to $347 billion in Asia (S&P, 2007, 2017).

[3] For structured finance products, rating agencies may have different reputational incentives due to the complexity of products and the dominance of few issuers (Griffin, Lowery, and Saretto, 2014; Frenkle, 2015).

(Bolton, Freixas, and Shapiro, 2012). Following this reasoning, we expect that when Global CRAs have greater market power, the high economic rent strengthens their reputation-building incentives which in turn induces tighter rating standards. In contrast, when CRAs' market power is lower, the conflicts of interest inherent in the issuer-pay model may dominate the reputation building incentives, leading to a looser rating to cater to issuers' demand and grab business.[4]

The existing evidence on Global CRAs' market power and corporate ratings is inconclusive and puzzling. Using Fitch's entrance to capture increased competition in the U.S., Becker and Milbourn (2011) find that corporate credit ratings are more inflated in industries where Fitch's market share is higher. However, Bae et al. (2015) document that this finding is sensitive to controlling for industry characteristics. In addition, the finding of inflated ratings induced by Fitch's entrance, while not conflicting, is puzzling in light of the phenomenon that corporate rating standards have become more stringent over time (Blume, Lim, and MacKinlay, 1998; Alp, 2013; Baghai, Servaes, and Tamayo, 2014).[5]

One possible reason for the tightening trend of corporate rating standards is the overall increase in Global CRAs' market power. As noted by Becker and Milbourn (2011), revenues and profits of Global CRAs grew rapidly over their sample period. However, exploring the effect of market power using a U.S. sample is relatively challenging because the rating industry in the U.S. has been historically dominated by a few major players and yields relatively small variation over time. Within a Global CRA, the market power of the rating agency varies not only across regions due to the presence of other local rating agencies, but also over time due to macroeconomic and

[4] We note, however, there are also arguments why our prediction may not hold. If CRAs' market power is too high, the reputational incentives to issue tougher ratings may be reduced because the issuers have nowhere else to turn (Horner, 2002; Baghai and Becker, 2018).

[5] This phenomenon was first documented by Blume et al. (1998) for U.S. issuers from 1978 to 1995 and confirmed by Alp (2013) and Baghai et al. (2014) for the period up to 2009. All these studies use only firms in the U.S. JP Morgan (2013) describes the massive migration of blue chip companies towards lower credit rating as "BBB is the new A." The drivers of this migration, however, remain under-explored.

regulatory factors. Because of the large variation in market power across regions and over time, a global sample offers a powerful setting to test the impact of rating agencies' market power.

We begin our analyses by examining time-series changes in corporate credit ratings worldwide. Based on S&P long-term issuer-level ratings for 32,934 non-financial firm-years from 27 developed markets from 1994 to 2016, we document a global trend of tightening corporate ratings.[6] Taking year 1994 as a reference point, on average, our sample U.S. and non-U.S. firms suffer a drop in ratings of 2.6 and 4.3 notches by 2016, respectively, after controlling for firm fundamentals, sovereign risk, macro-economic environment, and industry effects. The tightening trend is also present in relatively risky (e.g., speculative grade) and sound (e.g., investment grade) firms, in different regions (e.g., Europe and Asia Pacific), and is robust to various empirical specifications.[7]

We next turn to the examination of Global CRAs' market power and corporate credit ratings. We observe that the growth in Global CRAs' regional market shares parallels the tightening trend in corporate ratings in both U.S. and non-U.S. markets. Consistent with our prediction, we find that an increase in Global CRAs' market shares precedes a decline in credit ratings. The effect is also economically significant and dominates the impact of macro-economic factors. For example, a one standard deviation in S&P's regional market share is predicted to decrease the average corporate ratings by 0.644 and 1.339 notches in the U.S. and the other 26 developed markets, respectively.

[6] We focus on developed markets because the rating models used in those markets may differ from those used in developing markets. For example, Ferri and Liu (2002) find that rating agencies rely much less on firm-specific information in developing countries.

[7] Furthermore, we fail to find an increase in the actual or estimated default rates over the sample period, such as the expected default frequencies (EDF) based on a KMV model and the spreads of credit default swaps (CDS). In fact, we observe a significant decline (insignificant change) in the actual default rates and EDF in the U.S. (non-U.S. samples), and an insignificant change in CDS spreads for all sample firms during our sample period, which suggests that the tightening trend is not driven by the deterioration in the default risk.

Endogeneity is an important challenge for interpreting these results as evidence of the causal effect of Global CRAs' market power on the rating standards. The growth in the CRAs' market share may be related to factors that lead to pessimistic ratings. We address this concern by controlling for various firm-, country-, and industry- factors, and use both level and change regressions. Another concern is that tighter ratings are due to increases in smaller but riskier issuers accessing the debt market in certain regions. If Global CRAs find it easier to grow in these regions, then this will lead to an association with market shares and rating standards due to changing characteristics of the issuers. To mitigate this concern, we repeat our analyses after excluding first-time issuers or limiting the sample to a set of constant firms during the sample period. Our results continue to hold. Further, we examine the transition metrics during the three-year period after the rating initiation and find results consistent with the notion that high market share strengthens the reputational incentives and reduces the catering effect. Relative to when S&P market share is low, the proportion of new issuers being downgraded is nearly half and the proportion of new issuers being upgraded is nearly double when S&P market share is high.

We also exploit an exogenous shock to Global CRAs' market power to bolster the causal inference of market power and rating standards. Our analysis takes advantage of JCR (Japan Credit Rating Agency)'s designation of Nationally Recognized Statistical Rating Organization (NRSRO) by the U.S. SEC in 2007. Because JCR's NRSRO designation is triggered by the 2006 Credit Rating Agency Reform Act (White, 2010), not by Global CRAs' rating standards of Japanese firms, alternative explanations due to various confounding drivers of Global CRA's rating standards in the region is mitigated. We confirm that this event leads to a decline in the market share of Global CRAs in Japan. In addition, both our level and change analyses find that higher market share of Global CRAs, and lower market share of JCR, precedes harsher ratings of Japanese

firms from Global CRAs. More importantly, using other Asia Pacific firms as the control sample, our difference-in-differences analysis finds that Global CRAs' corporate ratings of Japanese firms become more inflated following the NRSRO designation of JCR, suggesting that weakened market power leads to inflated corporate ratings.

To further assess our argument that increased market power affects rating agencies' reputational incentives rather than reflecting a deterioration in issuers' reporting quality or changes in the economic climate, we examine Global CRAs' rating adjustments. Using a unique dataset of rating adjustments made by Moody's, we find that a higher Moody's market share is associated with more pessimistic qualitative adjustments. Prior to a rating's release to an issuer, Moody's first initiates a rating based on the issuer's reported financial information; then modifies the initial rating using *quantitative* adjustments that address limitations in the reported accounting numbers and *qualitative* adjustments that capture non-financial risk factors (Moody's, 2007; Kraft, 2015). Because qualitative adjustments are subject to greater discretion than quantitative ones, this finding provides further support that increased market power affects rating agencies' reputational incentives.

Our final set of analyses assesses whether the tightened ratings remain relevant across our global sample. We find that both U.S. and non-U.S. firms with lower than predicted ratings in the current year have lower future leverage and are more likely to withdraw their ratings. These findings suggest that tightened ratings restrict borrowers' access to capital, as global financial markets do not completely undo the rating pessimism.

Our findings contribute to the literature in several ways. To our knowledge, this is the first study to provide comprehensive evidence of corporate rating patterns for a broad set of firms internationally. Most cross-country studies on credit ratings focus on the link between sovereign

ratings and corporate ratings (Almeida, Cunha, Ferreira, and Restrepo, 2017).[8] Other studies compare the rating practices of Global CRAs and local rating agencies within a single country setting (Li, Shin, and Moore, 2006). We contribute to the literature by establishing large-sample evidence for corporate rating patterns over a long time horizon and examining possible determinants of the observed rating trend, beyond the impact of sovereign ratings.

Second, we add to the literature on the tightening trend of credit ratings in the U.S. Prior U.S.-based studies suggest that the trend may be caused by increased regulatory scrutiny and investor criticism following the collapse of Enron and WorldCom, or by the entry of first-time issuers with speculative grades (Alp, 2013). However, as Baghai et al. (2014) point out, this explanation is incomplete because the trend in the U.S. predates these well-known accounting scandals. In addition, the result for non-investment grade firms is sensitive to research design choices (e.g., inclusion of firm fixed effects). We complement these studies by showing that the time-series pattern exists globally and is likely driven by Global CRAs' growing reputation concern when their market shares expand.

Third, we extend the literature on competition and credit ratings. Prior studies note the failure of Global CRAs on their assessment of structured products and suggest that competition and conflicts of interest create a "race to the bottom" phenomena (Griffin and Tang, 2011; Griffin, Nickerson, and Tang, 2013; Efing and Hau, 2015). In contrast, the empirical literature finds increasingly stringent standards on corporate bonds and mixed evidence on competition and corporate ratings (Becker and Milbourn, 2011; Bae et al., 2015). Theories suggest that differences in product complexity and reputational incentives between these two product markets may play an

[8] One exception is Ferri and Liu (2002) who examine the determinants of firm-level credit ratings for a cross-country sample. They find that the relative weight of sovereign risk in explaining a firm's corporate credit rating is greater in developing than developed countries and that the firm-specific information content of credit ratings is smaller in developing countries. However, their study is limited to a rather small sample and a short period (1997-1999).

important role (Bolton et al., 2012; Frenkel, 2015).[9] By using an international setting and exploring large variations in Global CRAs' market power, our findings improve our understanding on the impact of competitive threats and reputational incentives on corporate rating standards.

Our study also has implications for policy makers. Regulators point to the dominance of a few players in the rating industry and call for increasing competition to reduce incumbents' market power.[10] In the EU, rules aimed to facilitate market entry of new rating agencies, such as Article 8b, were put in place to spur more competition in the rating industry.[11] Our study implies that Global CRAs' market power may contain the conflicts of interest and in fact lead to tightened rating standards in corporate bond markets. While market power may have a discipline effect on rating standards through reputation building, it may have other side effects such as discouraging innovation and investment (De Loecker, Eeckout, and Unger, 2018). Other mechanisms, such as improving transparency on rating methodologies may be worth further considerations.

2. Data

Our measure of corporate credit ratings is the S&P long-term, foreign-currency, issuer-level ratings obtained from Compustat. We convert the letter ratings into scale numbers ranging from 1 for the lowest rated firms (CCC) to 17 for the highest (AAA). [12] Appendix A presents the

[9] Sangiorgi and Spatt (2017)'s review provides more detail discussion on the economics of CRAs. As they note, on p. 88, "adverse reputational consequences in structured instruments after the financial crisis were viewed as distinct from reputation involving corporate bonds."

[10] Paul Stevens, the president of Investment Company Institute, notes in the hearing on the U.S. Credit Rating Agency Duopoly Relief Act of 2005, "the NRSRO designation process should be reformed to facilitate the recognition of more rating agencies and thereby introduce much needed competition in the credit rating industry…Creating competition would provide NRSROs even stronger incentives to ensure that their ratings are of the highest quality and reliability." (Stevens, 2005).

[11] Article 8d of the 2009 EU Credit Rating Agency Regulation requires issuers, who intend to appoint two or more agencies to rate an issuance or entity, to consider appointing at least one agency with no more than 10% of the total market share in the EU.

[12] Since we have very few observations with a CCC rating, we pool them together (CCC-, CCC and CCC+) to form the lowest ordinal category. We exclude observations with credit ratings that indicate default.

rating translation. Firms with a rating BBB- or better are often called investment grade firms, while firms with a rating below BBB- are called non-investment grade or speculative grade firms.

We obtain accounting data from Compustat and Global Vantage for U.S. and non-U.S. firms, respectively. Stock price and return data are from CRSP and Global Vantage for U.S. and non-U.S. firms, respectively. If price and return information is missing from Global Vantage for non-U.S. firms, we collect the information from Datastream, if available. We match rating, accounting and stock price/return datasets based on GVKEY (matched with price and return data from Datastream based on SEDOL and ISIN). We match ratings with financial data using the rating at the end of the third month after the fiscal year end to ensure that ratings are issued based on the most recent financial information. We exclude financial firms (SIC 6000-6000). In addition, we require a firm-year have necessary data for the variables used in our baseline regressions (discussed in Section 3) and a market have at least two firms meeting the data requirement. To make our sample firms comparable and to mitigate the concern that Global CRAs' rating models differ between developed and developing markets, we limit our sample to developed markets in North America, Europe, and Asia Pacific. Our final sample covers 3,714 unique firms, 32,934 firm-years, from 27 markets from 1994 to 2016.

Panel A of Table 1 presents the sample distribution by market. The U.K. and Japan make up the greatest portion of the non-U.S. sample. The average rating of the U.S. and non-U.S. samples during the sample period is 7.172 and 9.324, roughly corresponding to BB+ and BBB. Panel B presents the sample distribution by year. We find that the average rating of rated firms continuously decreases from 1994 to 2016, from 8.272 (BBB-) to 6.905 (BB+) in the U.S. sample and from 11.596 (A) to 8.355 (BBB-) in the non-U.S. sample. Thus, non-U.S. sample firms suffer a greater decline by more than three notches on average. In addition, the portion of investment grade firms

decreases from 56% to 42% in the U.S. and from 90% to 66% in the non-U.S. sample. These results suggest that S&P issuer-level ratings have become increasingly tighter over time. Panel C provides the descriptive data on firm characteristics. We winsorize all continuous variables at the top and bottom 1% of their distribution. Compared to the sample U.S. firms, our sample non-U.S. firms have a greater interest coverage (*INTCOV*), are more profitable (*PM*), have lower leverage (*LEV*), are larger (*ASSETS*), retain more cash (*CASH*), have more tangible assets (*TANG*) but incur less capital expenditure (*CAPEX*), have more retained earnings (*RE*) but also show a greater tendency to distribute dividends (*DIVIDEND*), and appear to be less risky based on market-based measures (*RETVOL* and *BETA).*

3. Analysis of Global Rating Trends

To analyze time-series variation in corporate credit ratings, we estimate an ordered probit regression where ratings are modeled as a function of year indicators, firm characteristics, country characteristics, and industry indicators. Year indicators are used to capture the time trend of ratings relative to the omitted year, 1994 (i.e., the first year of our sample period). Alternatively, we replace the year indicators with a *TREND* variable, which equals the year minus 1993 and hence ranges from 1 to 23. Coefficients on year indicators reflect how ratings change from year to year, while the coefficient on *TREND* tells us the average speed at which ratings change over the whole sample period.

Based on prior studies (Alp, 2013; Baghai et al., 2014) and data availability for global firms, we include the following firm characteristics in our model: (1) interest coverage (*INTCOV*), operating margin (*PM*), leverage (*LEV*), inflation-adjusted total assets (*SIZE*), cash balance (*CASH*), tangible assets (*TANG*), capital expenditure (*CAPEX*), market-to-book (*MTB*), retained

earnings (*RE*), dividend payment indicator (*DIVIDEND*), idiosyncratic return volatility (*RETVOL*), and the firm's beta (*BETA*). Furthermore, we use the 3-year average of interest coverage, operating margin and leverage (Blume et al., 1998; Alp, 2013).[13] We also standardize firm-year idiosyncratic return volatility and beta by subtracting the country-year mean then dividing by the country-year standard deviation. Our model captures country effects in two ways: (1) country indicators, and (2) country-year characteristics including sovereign ratings (*SOVRATE*), GDP per capita (*GDPPC*), GDP growth (*GDPGR*), the current account relative to GDP (*CURRENT*), and inflation (Borenztein, Cowan, and Vlenzuela, 2013). We include industry indicators based on the two-digit SIC codes. Appendix B provides detailed definitions of the variables. In all of our regression analyses, we use robust standard errors clustered by firm for the U.S. sample and by country for the non-U.S. sample.

Panel A of Table 2 presents the estimation results using the year indicators to capture the time trend in corporate credit ratings. Consistent with prior U.S. literature, we find that the U.S. sample experiences a continuous decrease in corporate ratings (Column (1)). We also find that the pattern exists in the non-U.S. sample. In addition, the result is similar across the model including country indicators (Columns (2)) and the model further including country-year characteristics (Column (3)). Figure 1 plots the coefficients on year indicators in Columns (1) and (2).

To assess the economic significance, we follow Alp (2013) and measure the economic significance of year indicators as the coefficients on year indicators divided by the average distance of the adjacent rating categories. The average distance between adjacent rating categories, that is, the average distance of one notch, is calculated by averaging the difference between the cut points, $(\mu_{16}-\mu_1)/15$ where μ_{16} is the cutting point for the highest rating level (17) and μ_1 is the cutting point

[13] Our results are qualitatively similar if we use the current year value for these variables.

for the lowest rating level (1). For the U.S. sample, the coefficient on year indicator 2016 is -1.533 (Column (1)) and the average distance of one notch in the U.S. sample is 0.594 (=(μ_{16}-μ_1)/15=(9.918-1.013)/15). This yields the economic significance of the coefficient as -1.533/0.594 = -2.6, representing the total amount of the drop in ratings from 1994 to 2016. Following this calculation, the coefficient on year indicator 2016 is -2.512 (Column (2)) and the average distance of one notch is 0.585 for non-U.S. firms. Accordingly, the total amount of drop in ratings from 1994 to 2016 is 4.3 (=2.512/0.585) for non-U.S. firms.

The coefficients on firm and country characteristics are generally consistent with prior literature. Firms with greater interest coverage (*INTCOV*), profitability (*PM* and *RE*), size (*SIZE*), tangible assets (*TANG*), growth potential (*MTB*), and a greater likelihood of distributing dividends (*DIVIDEND*) enjoy better ratings, while firms with higher leverage (*LEV*), return volatility (*RETVOL*), and *BETA* suffer poorer ratings. In addition, corporate ratings are positively associated with sovereign ratings in the non-U.S. sample.

Panel B of Table 2 presents the estimation results using the *TREND* variable. We find that the coefficient on *TREND* is significantly negative in all columns. The economic significance of the coefficient on *TREND* can be interpreted in the following way. For the U.S. sample, the coefficient on *TREND* is -0.069 (Column (1)). Dividing it by the average distance of one notch equals -0.069/0.594 = -0.116. This indicates that on average, the U.S. corporate ratings decrease by 0.116 notch per year from 1994 to 2016, thereby resulting in a total decrease of 2.6 notches (=0.116*22 years). The magnitude of the total decrease in ratings is comparable to that reported in Panel A. Similarly, the coefficient on *TREND* is -0.102 (Column (2)) and the average distance of one notch is 0.585 for the non-U.S. sample, thus the corresponding ratings drop is 0.174

(=0.102/0.585) notch every year for the non-U.S. sample. This yields a total decline of 3.8 notches (=0.174*22 years) from 1994 to 2016.

Panel C of Table 2 presents the results of alternative specifications of the baseline rating models (Columns (1) and (2)) in Panel B. To conserve space, we present the coefficient on *TREND* only. First, we estimate the rating model separately for investment grade and non-investment grade firms. Second, we separate the non-U.S. sample into firms from Europe and Asia Pacific and estimate the model for each region. Third, we estimate OLS models with firm fixed effects.[14] Fourth, we employ only the variables used by Blume et al. (1998), including interest coverage (*INTCOV*), operating profit (*PM*), total leverage (*LEV*), long-term leverage (*LTLEV*), the log of inflation-adjusted market value (*LOGMV*), idiosyncratic return volatility (*RETVOL*), and *BETA*. Fifth, Jorion, Shi, and Zhang (2009) argue that the tightening of credit ratings in their sample period is due to the deterioration in accounting quality as captured by discretional accruals. We address this possibility by controlling for discretionary accruals, estimated following the model in Jorion et al. (2009) model and within each country-year-industry based on the 2-digit SIC codes. Sixth, we include square and cube terms of all explanatory variables to allow for non-linearities. Finally, we standardize all the firm characteristic variables by subtracting the country-year mean value and dividing the resulting value by the country-year standard deviation. This adjustment corrects for any time-series patterns in the explanatory variables, allowing us to focus on how firms compare to each other annually. In all of the above alternative specifications and sub-samples, the significantly negative coefficient on *TREND* persists.

Our findings so far suggest that S&P corporate ratings have become increasingly tighter for both U.S. and non-U.S. firms in the past two decades. One potential explanation for the tightening

[14] We do not include firm fixed effects in our ordered probit model because non-linear models with a large number of fixed effects may suffer from the incidental parameters problem.

trend is that rated firms become riskier over time. To test this explanation, we examine whether there is an increasing trend in actual default rates, expected default frequency (EDF), and credit default swap (CDS) spreads. We obtain the default rates (i.e., the proportion of rated firms that default out of the total number for rated firms) for each letter rating category of S&P non-financial, corporate, long-term ratings and for each sample country-year between 2000 and 2016 from the European Securities and Markets Authority.[15] Following the method outlined in Bharath and Shumway (2008), we calculate EDF for every firm-month during 1994-2016 using quarterly accounting variables and monthly market values. For the CDS spreads, we obtain daily, 5-year maturity, CDS spreads from the Markit database for the 2001-2015 period and calculate the firm-month mean value of CDS spreads.

Figure 2 presents the time trend of the annual default rate of issuers with S&P long-term ratings for the 2000-2016 period and the annual mean EDF of the universe covered by CRSP and Compustat for the 1994-2016 period. We find that both the actual default rate and EDF peak around 2001 (i.e., Enron and Worldcom scandals) and 2009 (i.e., global financial crisis), but do not display an increasing trend over time, i.e., the default risk does not increase over time.

Panel D of Table 2 presents the OLS regression estimates for the time trend of the actual default rates, EDF, and CDS spreads. Following Baghai et al. (2014), we control for *RECESSION*, which is measured by either the fraction of recession months in a given year (for the regressions of the actual default rate of the S&P long-term corporate ratings) or a dummy variable indicating a country-month experiencing a recession (for the regressions of EDF and CDS spreads).[16] Columns (1) - (7) report the regression results for the actual default rates. There are no default events for the

[15] https://cerep.esma.europa.eu/cerep-web/statistics/ratingActivity.xhtml.

[16] We obtain the monthly recession indicators from the Federal Reserve Bank of St. Louis website (https://fred.stlouisfed.org/). As the data source does not provide country-level recession information for most of the sample countries, we use regional recession information.

AAA and AA categories in any country-year during this sample period. In most rating categories and in both the U.S. and non-U.S. samples, the actual default rates are negatively associated with the time trend. For the aggregate default rate of all rating categories, the coefficient on *TREND* is significantly negative in the U.S. sample and is insignificant in the non-U.S. sample (Column (7)). Columns (8) - (9) report the time trend of EDF for the universe of the Compustat/CRSP sample, and our rating sample, respectively. Similarly, we find that the coefficient on *TREND* is significantly negative in the U.S. sample and is insignificant in the non-U.S. sample. Finally, Columns (10)- (11) present the time trend for the CDS spreads using the universe from the Markit database and our rating sample, respectively. We do not observe any statistically significant association between CDS spreads and *TREND*.

In sum, we conclude that the tightening trend in corporate credit ratings is unlikely due to rated firms becoming increasingly risky over time, as the actual or estimated default risk does not increase over time.

4. The Impact of Rating Agencies' Market Power

4.1 Global CRAs' Market Power and Corporate Credit Ratings

To test the impact of Global CRAs' market power, we use S&P's market share as a proxy for the market power. Market share is the key business focus of CRAs, especially given their public listing status (Kedia, Rajgopal, Zhou, 2014).[17] We develop this measure at the region level because Global CRAs generally structure their business segments at this level. For example, S&P has three geographic business units covering Americas, EMEA (Europe, Middle East, Africa) and APAC

[17] S&P global Inc. and Moody's went public in 1978 and 2000, respectively. As all public listed firms, the pressure for improving revenue and market share is high. The U.S. Permanent Subcommittee on Investigation states "Competitive pressures, including the drive for market share and need to accommodate investment bankers bringing in business, affected the credit ratings issued by Moody's and S&P."

(Asia Pacific) for corporate credit ratings (S&P Global Ratings Managerial Structure, July 9, 2018). [18] Its Global Ratings' Credit Conditions Committees meet quarterly to review macroeconomic conditions in each region. While S&P implements a common rating process for all issuers worldwide, the input of the process involves substantial local knowledge and the ratings are determined by rating committees that decide both quantitative and qualitative adjustments (S&P General Description of the Credit Rating Process, May 16, 2018). If the tightening trend in credit ratings is driven by the increased reputational incentives associated with S&P's market power, we should observe an increasing time trend in S&P market share and a negative association between S&P market share and the ratings levels.

We partition our sample countries into three regions: North America, Europe, and Asia Pacific. In every region-year, we measure S&P market share as the sum of the market value of non-financial firms with outstanding S&P long-term corporate ratings divided by the sum of the market value of all firms with long-term debts as reported by Compustat.[19] Panel A of Table 4 presents the distribution of the regional S&P market shares by year. Column (1) shows that the S&P market share in North America increases from about 81% in 1994 to more than 91% in 2001, and then slightly declines to 87% in 2016. Column (2) shows that in Europe, the S&P market share increases from around 40% in the early sample period to a peak of 79% around 2009, before decreasing to 68% in 2016. Column (3) shows that in the Asia Pacific region, S&P market share experiences a relatively pronounced inverse U-shape change – the S&P market share increases from less than

[18] S&P derives 40% of its total revenues from outside the U.S., mostly from Europe and Asia. As of December 2017, out of 20,400 employees worldwide, only 5,200 are in the U.S. (S&P 2017 10-K). Moody's structures their business segments in a similar way and derives 38% of its revenue outside the U.S. As of December 2017, out of 10,617 employees worldwide, only 3,386 are in the U.S. (Moody's 2017 10-K).

[19] If a firm-year has a S&P long-term corporate rating but the long-term debt balance is missing, we assume that the long-term debt is zero.

25% in 1994 to nearly 68% in 2004 then gradually decreases to 31% by the end of the sample period. At the bottom of panel, we present an OLS regression analysis for the time trend of the S&P market share in respective regions. Consistent with the descriptive data, the estimates show that on average, both North America and Europe experience an increase in S&P market share over time, while the trend in the Asia Pacific region is insignificant.

We test the impact of S&P market power on credit ratings using both level and change regressions. For the level regression, we first calculate the three-year average value of S&P's market share to address the concern that short-term growth in market share may have limited impact on rating properties. We also use lagged value of the average S&P market share (*LAG_S&P_SHARE*) to mitigate the concern of reverse causality, i.e., improved reputation capital associated with rigorous standards may increase market share. We then regress the level of ratings at year *t* on lagged S&P market share (i.e., the average S&P market share during year *t-3* to *t-1)*. For the change regression, we regress the change in ratings from year *t-1* to *t* on the lagged change in market share (i.e., the change in the three-year average market share from year *t-2* to year *t-1*). Panel B of Table 4 presents the results. Columns (1) - (3) and (4) - (6) present the level and change analysis, respectively. Following the baseline model presented in Panel A of Table 2, we control for the macro-economic factors and firm characteristics. Corresponding to the dependent variables of respective columns, control variables of Columns (1) - (3) and (4) - (6) are measured at level and changes, respectively. We also control for country and industry fixed effects whenever necessary. Columns (1) - (3) show that current year credit ratings are significantly negatively associated with lagged S&P market share, for both full sample and sub-samples covering U.S. and non-U.S. firms. Similarly, Columns (4) - (6) show that current changes in credit ratings are significantly negatively associated with prior changes in S&P market share across all samples.

To provide an understanding of the economic significance of the impact of S&P market share on credit ratings in respective regions, we re-run an OLS regression for Columns (2) and (3). The coefficient on *LAG_S&P_SHARE* is -21.493 and -8.475 for the U.S. and non-U.S. sample, respectively. For a one standard deviation of change in market share in the U.S. (0.030) and non-U.S. sample (0.158), average ratings in these two samples are predicted to decrease by 0.645 and 1.339 notches, respectively. Overall, these findings suggest that higher S&P market share (or an increase in S&P market share) is associated with a lower level of credit ratings. These analyses provide support that Global CRAs' greater market power is associated with tighter ratings standards.

One alternative explanation for above findings is that the increase in Global CRAs' market share is due to an increase in smaller but riskier issuers accessing the debt market, whose greater default risks lead to more pessimistic ratings. The increasingly stringent ratings could also reflect a "correction" effect. That is, to cater a new client, CRAs initiate a friendlier rating for the first year and then gradually tighten the rating over time. However, CRAs' catering incentive could be constrained by their concern for building and maintaining high reputation. To shed light on these issues, we conduct several sets of analysis. First, we remove firms that initiate ratings after our sample period starts (i.e., 1994). Second, we limit the sample to a set of constant firms during our sample period. Third, we examine the rating migration during the three years after an issuer initiates the rating to see whether the transition varies with S&P market power.

Panel A of Table 4 presents the results for the first two analyses. We examine the impact of S&P market share on the level of credit ratings and only report the main variable of interest, i.e., *LAG_S&P_SHARE*. We address the effects of first-time issuers in two alternative ways: (1) remove only the first three years' ratings since a firm initiated its rating, and (2) completely remove firms

that have initiated ratings since 1994. We find that that the coefficient on *LAG_S&P_SHARE* remains significantly negative for both the U.S. and non-U.S. samples and for both specifications (Columns (1)-(4)). For the constant sample, untabulated statistics show that 225 U.S. and 58 non-U.S. firms have presented for the 23 years of the whole sample period. Despite the small sample size, we find that the coefficients on *LAG_S&P_SHARE* are significantly negative for both the U.S. and non-U.S. samples (Columns (5)-(6)). Taken together, these results suggest that the negative association between credit ratings and S&P market share is not caused by an increasing number of riskier firms with relatively low ratings entering the sample over time, as firms that constantly present in the sample also suffer tighter ratings when S&P market share increases.

Panels B and C of Table 4 present the rating transition for first time issuers during the three years after the rating is initiated, conditional on S&P market share when the new rating is initiated. Since we look at the three-year period after the rating initiation, we limit the sample period to 1994-2013 and we identify totally 3,751 new issuers rated by S&P. In every region, we partition the sample period into two subperiods, based on the ranking of annual S&P market share in that region, and then examine how the rating initiated in each sub-period transit during the three years after initiation. First of all, consistent with the notion that CRAs tend to start with a friendlier rating with new clients (Conaggia, Cornaggia, and Hund, 2017), both panels show that a greater portion of firms being downgraded than upgraded. More importantly, the portion of new issuers being downgraded when S&P market share is high is nearly half of that when S&P market share is low. In contrast, the portion of new issuers being upgraded when S&P market share is high nearly double that when S&P market share is low. This evidence indicates that when S&P market power is high, it tends to initiate a relatively low rating, thereby reducing the probability to downgrade, but increasing the probability to upgrade, in the future. Putting together, this analysis suggests that the

continuously stringent corporate ratings may partly be driven by CRAs' tightening of their ratings for the first-time issuers over time, but the effects are weaker when S&P market power is high and the new issuers have a low rating to begin with.

4.2 Further Evidence on a Decline in CRA's Market Power: NRSRO Status Designation for Local Rating Agencies

While we find that the increase in S&P's market share in a region is associated with tightening ratings, one should be cautious in interpreting the link as causal. Global CRAs' market share in each region may be affected by factors that also determine rating properties, which may make the observed association the result of omitted variables. We provide further evidence on the effect of market power using changes in Global CRAs' shares triggered by an event that is relatively exogenous to the rating behavior of Global CRAs. We use a competing local rating agency's designation as a NRSRO to proxy for a drop in Global CRAs' market power. An NRSRO designation is determined by the SEC and can be considered relatively exogenous to the rating behavior of the incumbent players in the region. Also, the granting of NRSOR status to a local competitor is an undoubtedly material event that weakens the market power of the S&P in the region. NRSRO designation allows the ratings of local agencies to be widely used by corporations for regulatory purposes, thereby widening the rating agency's entry to local companies that need to access international debt markets.

We use the NRSRO designation of Japan Credit Rating Agency (JCR) as our main event. As of 2017, there are ten credit rating agencies registered as NRSROs with the U.S. SEC. [20] Two of which have principal office outside the U.S.: the Japan Credit Rating Agency (Japan) and HR

[20] See the SEC's 2017 Annual Report on NRSRO. Moody's, S&P, and Fitch, were immediately grandfathered into the category when the SEC first established the NRSRO status in 1975.

Ratings (Mexico). Unlike Japan, a developed country with a well-established credit market, Mexico is an emerging market with a limited sample for corporate ratings. Thus, we use the first designation of a local rating agency in Japan (i.e., the 2007 NRSRO designation of JCR) as our event. [21]

We extract the information about JCR's market share from the European Securities and Markets Authority website. However, the website only reports information about the number of firms JCR rates, without those firms' details. Therefore, we can only calculate an equal-weighted market share for JCR, i.e., the proportion of firms rated by JCR out of the total number of firms with long-term debts reported in Computstat. This measure likely over-weighs small firms and thus overstates JCR's market share. We calculate a similar equal-weighted measure for S&P market share. Using the firm-level market value reported by Compustat, we also calculate a value-weighted market share of S&P out of rated Japanese firms, i.e., the measure that we use in prior analysis of S&P market share.

Panel A of Table 5 reports the distribution of JCR and S&P market shares. We find that JCR market share remains relatively stable over time, comprising about 13-15% of the market in terms of the number of rated firms. In contrast, the equal-weighted measure of the S&P market share suggests that S&P rates fewer firms than JCR, while the value-weighted measure of the S&P market share suggests that S&P in fact claims a bigger portion of the market than JCR. These results suggest that JCR rates smaller but a greater number of firms, while S&P rates bigger but fewer firms. Furthermore, both measures of the S&P market share indicate that S&P experiences an increase in market share in Japan prior to JCR's NRSRO designation in 2007 and a decrease afterward. From 2006 to 2007, the S&P's market share in Japan drops significantly, from 8.58% to 4.90% on an equal-weighted basis and from 69.5% to 58.2% on a value-weighted basis.

[21] JCR also obtained accreditation from other governments and registered as a "Credit Rating Agency" with the Financial Services Agency in Japan in 2010. It was certified by the EU in 2011.

Panels B and C of Table 5 present the results for the level and change regressions, respectively. To conserve space, we only report the coefficient estimates for the main variables of interest, i.e., lagged JCR and S&P market shares or lagged changes in JCR and S&P market shares. Panel B shows that S&P credit ratings are positively associated with JCR market share but negatively associated with S&P market share (Columns (1)-(3)). When we include both rating agencies' market shares in the same regression, the coefficient on JCR market share remains significantly positive, while the coefficient on S&P market share remains significantly negative (Columns (4)-(5)). Panel C shows that an increase in JCR market share is associated with an increase in future S&P ratings but an increase in S&P market share is associated with a decrease in future S&P ratings. These results indicate that an a higher (or an increase in) JCR's market share is associated with looser S&P ratings for Japanese firms, while a higher (or an increase in) S&P market share is associated with tighter S&P ratings.

We further corroborate our finding using a difference-in-differences design. We take Japanese firms as the treatment sample, and the other Asia Pacific firms as the control sample, and compare their S&P ratings during a ten-year window from 2002 to 2011, where 2002-2006 and 2007-2011 are taken as the pre- and post- designation period, respectively. Our model includes a dummy variable indicating the post-period (*POST*), a dummy variable indicating the treatment sample (*JAPAN*), and their interaction term. We use the same firm-level controls as in Table 2. We also use an alternative specification after replacing *POST* and *JAPAN* with year and country fixed effects. Our main variable of interest is the interaction term *POST* **x** *JAPAN*. Panel D of Table 5 reports the results. We find that the coefficient on the interaction term is significantly positive (Columns (1)-(2)), suggesting that compared to the control sample, Japanese firms experience an increase in S&P ratings after JCR obtains the NRSRO designation. Figure 3 plots the coefficients

on year dummies for Japanese and other Asia Pacific firms during 2002-2010. Here we follow the credit rating model in Panel A of Table 2. We use year 2001 as the benchmark year and run the regression separately for the two groups of firms. In the figure, Year 2006 is taken as the event year 0, Years 2002-2005 and Years 2007-2010 are taken as pre-event period [-4, -1] and post-event period [1, 4], respectively. The figure shows that S&P ratings of non-Japanese firms decrease almost monotonically from 2002 to 2010. In contrast, Japanese firms experience a decrease in ratings before 2006 but a reversal in ratings afterward.

As a robustness check, we conduct two placebo tests for the ten-year period before 2007 (i.e., 1997-2006) and ten-year period since 2007 (i.e., 2007-2016). In each placebo test, we treat the second half of the sample period as the pseudo post-event period. The coefficient on interaction term is either significantly negative (during 1997-2006) or insignificantly different from zero (during 2007-2016). These findings suggest that the NRSRO designation of JCR weakens S&P market power that induces S&P to issue more friendly ratings.

Overall, the results in Table 5 suggest that a decline in a Global CRA's market power is associated with higher ratings in Japan. This result further corroborates our prior findings in the global sample that growing market power is associated with tighter ratings.

4.3 Additional Evidence from Moody's Rating Adjustments

To provide further insight into the impact of Global CRAs' market power on credit ratings, we examine Moody's market share and its corporate credit ratings. In addition to the long-term issuer ratings, we obtain Moody's rating adjustments from its Financial Metrics database, which provides detailed information on how Moody's assigns corporate ratings by incorporating quantitative financial and market information and qualitative credit risk factors. Due to data

availability, the sample for this analysis consists of 2,999 unique firms (16,993 firm-years) from 2003-2015.

In its rating process, Moody's yields three ratings step by step (Kraft, 2015). First, it generates an initial rating based on financial ratios calculated from reported accounting numbers. Next, Moody's makes adjustments to reported accounting numbers to address limitations in accounting standards such as off-balance-sheet liabilities and non-recurring items, then recalculates those financial ratios to generate a second rating. Last, it assesses the qualitative factors of credit risk, such as "management quality, aggressive accounting, weak controls, governance risk, industry structure, and managerial bondholder friendliness" (Moody's, 2007) and yields the final rating that is released to the issuer (i.e., actual rating). We label the difference between the initial and second ratings as a quantitative rating adjustment, and between the second and final ratings as a qualitative rating adjustment. We are particularly interested in the qualitative adjustment, because it not only captures Moody's private information but also is subject to the greater discretion of rating analysts. In sum, the actual ratings released by Moody's to rated firms can be expressed in the following way:

Actual Rating = Initial Rating + Quantitative Rating Adjustment + Qualitative Rating Adjustment.

We conduct two sets of analyses to assess the impact of Moody's market power on credit ratings. First, we regress actual ratings on Moody's market share (*LAG_MD_SHARE*), after controlling for Moody's adjusted financial ratios (in the notion as "*VARIBALE_ADJ*"). Because adjusted financial ratios capture the components of the initial rating and the quantitative rating adjustment in actual ratings, the *LAG_MD_SHARE* variable should capture the effects of Moody's other private information, including the qualitative rating adjustment. Second, we regress Moody's quantitative and qualitative rating adjustments on its market share.

Table 6 report the results. The main explanatory variable is *LAG_MD_SHARE*, which is calculated in the same way as we calculate S&P's market share in prior analyses. Panel A presents the results for actual ratings, after controlling for Moody's adjusted financial accounting ratios. Columns (1) - (2) report the coefficient estimates where the regressions only control for accounting-based risk measures, Columns (3) - (4) report the coefficient estimates where we further control for market-based risk measures, which results in a smaller sample. Consistent with our analysis of S&P ratings in Table 2, we find that Moody's ratings are positively associated with interest coverage, firm size, tangible assets, retained earnings, and market-to-book ratio, and negatively associated with leverage, idiosyncratic return volatility, and beta. More importantly, we find that after controlling for adjusted accounting ratios, the coefficient on *LAG_MD_SHARE* is significantly negative for both U.S. and non-U.S. samples in all models, suggesting that Moody's is increasingly stringent with corporate ratings when its market share grows.

Panel B of Table 6 reports the results for quantitative and qualitative rating adjustments. For the analysis of quantitative rating adjustments, we control for the ratings initially assigned based on reported accounting numbers (*FS_RATE*), as firms with relatively high ratings to start with are less likely to be adjusted further upward, while firms with relatively low ratings to start with are less likely to be adjusted downward. Next, we control for adjustments to various financial ratios (in the notion as "*VARIABLE DIFF*"). For the analysis of qualitative rating adjustments, in addition to *FS_RATE*, we control for the quantitative rating adjustments already made (*QUANT_ADJ*), since firms that already enjoy a great magnitude of upward quantitative rating adjustments are less likely to receive further upward adjustments while firms that already suffered a great magnitude of downward quantitative rating adjustments are less likely to be further adjusted downward. In addition, we attempt to capture qualitative credit risk factors using market capitalization (*LOGMV*),

the percentage of institutional holdings (*INST%*), and analyst following *(#ANALYSTS*), assuming that larger firms with greater institutional holdings and analyst coverage tend to have better governance, more talented management, and lower credit risks. Columns (1) and (2) show that the coefficient on *LAG_MD_SHARE* is insignificant, while Columns (3) - (4) show that the coefficient on *LAG_MD_SHARE* is significantly negative for both the U.S. and non-U.S. samples. These results suggest that the negative association between Moody's market share and actual ratings is driven by high Moody's market share leading to more pessimistic qualitative adjustments.

In brief, the analysis of Moody's ratings and rating adjustments confirms that Moody's ratings also become increasingly tighter when its market share grows. In addition, the impact is mainly driven by Moody's subjective adjustments.

5. The Impact of Tightening Rating Trend on Capital Structure

Given that ratings are an important determinant of the cost of debt, we would expect firms that are disadvantaged by tighter ratings to use less debt. We gauge the impact on capital structure from two perspectives. First, whether firms with lower than predicted ratings in the current year will issue less debt and therefore have lower leverage in the future. Second, whether firms with lower than predicted ratings in the current year are more likely to withdraw their ratings (and thus have fewer chances to access bond market) in the future. We measure tighter ratings (i.e., the actual rating issued by S&P is lower than the predicted rating) in two alternative ways. In the first approach, we remove year indicators from the regressions reported in Columns (1) - (2) of Panel A, Table 2 and estimate the predicted rating for every firm-year based on the OLS regression (instead of the ordered probit model). Predicted ratings larger than 17 (AAA) are set as equal to 17 and predicted ratings smaller than 1 (CCC) are set as equal to 1. Within that range, predicted ratings are not

rounded but are instead included as a continuous variable. Next, we develop a variable *RATE_TIGHT = Predicted Firm Rating - Actual Firm Rating*. Positive values of *RATE_TIGHT* indicate tighter ratings, while negative values of *RATE_TIGHT* indicate inflated ratings. Our second approach follows the method proposed in Baghai et al. (2014) by using the first half of our sample period (1994-2004) to estimate the coefficients of regressions in Columns (1) - (2) of Panel A of Table 2 (again, we use OLS regressions and remove year indicators), and then use the estimated coefficients to predict the firm-year ratings in the second half of our sample period (2005-2016). Then, *RATE_TIGHT* is only calculated for firm-years in the second half of the sample period.

Table 7 presents the impact of tightened ratings on leverage. The main explanatory variable is *RATE_TIGHT* lagged by one year. We report three alternative leverage ratios: long-term leverage (*LTLEV*), total book leverage (*LEV*), and market leverage (*MKTLEV*). In addition, we control for current year ratings (*RATE*), market-to-book (*MTB*), tangible assets (*TANG*), operating margin (*PM*), firm size (*SIZE*), tax shield (*TAXSHIELD*), and research and development investment (*RD*). Panel A shows the results for the sample where *RATE_TIGHT* is estimated for all the firm-years in the whole sample period. Panel B presents the results for the sample where *RATE_ TIGHT* is estimated only for firm-years in the second half of the sample period. In both panels, we observe a significant negative coefficient on *RATE_TIGHT* for both samples and all alternative measures of leverage. These findings suggest that firms suffering tighter ratings in the current year have lower leverage in the next year. The coefficients on the control variables are consistent with Baghai et al. (2014). Firms with lower ratings (*RATE*), those with higher growth potential (*MTB*), more tangible assets (*TANG*), greater profitability (*PM*), and larger size (*SIZE*) have higher leverage in the following year, while firms with high R&D investment (*RD*) have

lower leverage in the next year. In untabulated results, we also examine the two-year- and three-year-ahead leverage ratios and reach similar conclusions. Therefore, tightened ratings, in fact, have a longer impact on capital structure than we report here.

Table 8 presents the impact the tightening rating trend on the bond market access. Following Baghai et al. (2014), we use the availability of an S&P long-term issuer rating in a firm-year as a proxy for the firm's access to the bond market. Thus, we replace the dependent variable in Table 7 with a dummy variable that is set to one if a firm has an S&P long-term issuer rating in a given year and zero otherwise, then we estimate the regression using a probit model. Again, we consider two alternative ways of estimating tighter ratings, i.e., *RATE_TIGHT*, and report the respective results in Columns (1) - (2) and (3) - (4). We observe a significantly negative coefficient on *RATE_TIGHT* for both samples, suggesting that firms with tighter ratings in the prior year are less likely to retain their ratings in the current year. Overall, the findings in Tables 7 and 8 suggest that tightened ratings limit firms' access to the debt market.

6. Conclusion

Despite extensive U.S. evidence on the incentives of credit rating agencies and their rating properties, international evidence is scarce. Using a global sample of issuer level credit ratings in developed markets, we find that Global CRAs have become more stringent in assigning corporate credit ratings worldwide. Consistent with Global CRAs' market power driving the increasingly tighter ratings, we find that Global CRAs' respective market shares increase globally over time and are associated with tighter ratings.

We provide further evidence on the effect of market power using changes from a competing local rating agency's designation as a NRSRO. NRSRO designation is determined by the SEC and therefore can be considered relatively exogenous to the rating behavior of Global CRAs. Following

designation of a local rating agency, we find that Global CRA's market share drops rapidly and the tightening trend reverses. These findings support the view that increased competition leads to rating inflation and market power has the disciplining effect of increasing the reputational incentives of CRAs. Consistent with the reputational incentives associated with increased market share, we find that Global CRAs make more pessimistic qualitative rating adjustments when their market shares are higher.

We also find that Global CRAs' greater market share is associated with lower future firm leverage and more limited access to public bond markets. These findings suggest that increases in CRA's market power may come at the expense of restricting local firms' access to capital. Thus, curbing the market power of CRAs through accreditation of local rating agencies, for example, may reduce the financing burden of local firms. Overall, we contribute to the literature by examining the evolution and determinants of credit rating patterns in global markets and improves our understanding on the economic consequences of Global CRAs' market power.

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Appendix A: Rating Translation

S&P rating	Numerical value	Investment grade (IV)
AAA+	17	1
AA+	16	1
AA	15	1
AA-	14	1
A+	13	1
A	12	1
A-	11	1
BBB+	10	1
BBB	9	1
BBB-	8	1
BB+	7	0
BB	6	0
BB-	5	0
B+	4	0
B	3	0
B-	2	0
CCC+ and below	1	0

Appendix B: Variable Definition

Variable	Definition
Variables of interest	
RATE	S&P long-term, foreign currency issuer level credit ratings.
TREND	Year minus 1993.
DEFAULT RATE	The proportion of rated firms that default out of the total number for rated firms for each letter rating category of S&P non-financial, corporate, long-term ratings. From the European Securities and Markets Authority website (https://cerep.esma.europa.eu/cerep-web/statistics/ratingActivity.xhtml).
LAG_S&P_ SHARE	The three-year average ratio (from year t-3 to year t-1) of the total market value of non-financial firms with outstanding S&P long-term corporate ratings to the total market value of firms with long-term debts as reported by Compustat.
LAG_JCR_EW (SP_EW)	The ratio of the number of Japanese firms with a long-term JCR (S&P) rating in year t-1 to the number of Japanese firms with long-term debt covered by Compustat in that year.
LAG_SP_VW	The sum of the market value of Japanese firms with a long-term S&P rating in year t-1 divided by the total market value of all Japanese firms with long-term debt covered by Compustat in that year.
LAG_MD_ SHARE	The three-year average ratio (from year t-3 to year t-1) of the total market value of non-financial firms with outstanding Moody's long-term corporate ratings to the total market value of firms with long-term debts as reported by Compustat.
FALSE WARNING	An indicator variable set to one if S&P issues a speculative grade to a firm but the firm does not default within one, two, or three years, and zero otherwise.
RATE_TIGHT	Predicted ratings minus actual ratings.
Control variables	
INTCOV	Operating income after depreciation (oiadp) plus interest expense (xint) divided by interest expense (xint). I modify the functional form of interest coverage in line with BLM. First, before taking the 3-year averages, the ratio is set to zero for negative values. Any 3-year average that is greater than 100 is bounded at 100. Then, to address the non-linearity of the relation between interest coverage and credit risk, we break the variable into four continuous variables, interest coverage-a to interest coverage-d, which capture the incremental value of interest coverage in the intervals of (0–5), (5–10), (10–20), and (20–100).
PM	Operating income before depreciation (oibdp) to sales (sale). We take the 3-year average.
LEV	Long-term debt (dltt) plus short-term debt (dlc), divided by assets (at). We take the 3-year average.
LTLEV	Long-term debt (dltt) to assets (at). We take the 3-year average.
MKTLEV	The sum of long-term and short-term debt divided by the sum of long-term and short-term debt and market equity.
SIZE	The log of the book value of assets (at) in millions of U.S. dollars, in constant 2005 dollars.
CASH	Cash and short-term investments (che) to assets (at).
TANG	Net book value of property, plant, and equipment (ppent) to assets (at).
CAPEX	Capital expenditures (capx) to assets (at).

MTB	Book assets (at) minus book equity plus market equity all divided by book assets (at). Market equity is calculated as the fiscal-year closing price (prcc_f) times the shares outstanding (csho). Book equity is defined as stockholder's equity (seq) minus preferred stock plus balance-sheet deferred taxes and investment tax credit (txditc). If data item txditc is missing, it is set to zero. If data item seq is not available, it is replaced by either common equity (ceq) plus preferred stock par value (pstk), or assets (at) − liabilities (lt). Preferred stock is the preferred stock liquidating value (pstkl) (or the preferred stock redemption (pstkrv) or the preferred stock par value (pstk)).
RE	Retained earnings (re) to assets (at).
DIVIDEND	A firm is a dividend payer in calendar year t if it has positive dividends per share by the ex date (dvpsx_f) in the fiscal year that ends in year t.
RETVOL	The root mean squared error from a regression of a firm's daily stock returns on the country's value-weighted index return. One firm-year observation of idiosyncratic risk is computed using firm-specific daily stock returns from one calendar year. A minimum of 50 observations in a calendar year are required to calculate idiosyncratic risk. We standardize firm-year RETVOL by subtracting the country-year mean and then dividing by the country-year standard deviation.
BETA	Market model beta estimated from the same regression used to define RETVOL. We standardize firm-year BETA by subtracting the country-year mean and then dividing by the country-year standard deviation.
SOVRATE	Sovereign rating assigned by S&P.
GDPPC	Logarithm of GDP per capita in thousands of U.S. dollars, obtained from the World Development Indicators database of the World Bank.
GRPGR	Country-year GDP growth rate, obtained from the World Development Indicators database of the World Bank.
INFLATION	Country-year consumer price inflation rate, obtained from the World Development Indicators database of the World Bank.
CURRENT	Country-year ratio of the current account to GDP, obtained from the World Development Indicators database of the World Bank.
FS_RATE	Moody's ratings based on reported accounting numbers.
QUANT_ADJ	Moody's quantitative rating adjustments arising from adjustments to reported accounting numbers.
VARIABLE_ADJ	Moody's adjusted financial ratios.
VARIABLE__DIFF	The difference between the financial ratios that Moody's calculates from reported accounting numbers and the financial ratios that Moody's recalculates after adjusting reported accounting numbers.
Log(MV)	Log of market capitalization.
INST%	Percentage of institutional holdings.
#ANALYSTS	Number of analysts following.
RECESSION	The fraction of recession months in a given region-year. Monthly recession indicators are from the Federal Reserve Bank of St. Louis website (https://fred.stlouisfed.org/).
TAXSHIELD	The ratio of investment tax credits (itcb) divided by assets(at). Missing values of investment tax credits are replaced by zero.
RD	The ratio of R&D expenditures(xrd) to total sales(revt). Missing values of R&D are replaced by zero.
MVA	Logarithm of the market value of assets (computed as the book value of assets − book value of equity + market value of equity).
AGE	The number of years a firm has been included in the Compustat database.

%RATED	The percentage of firms that have a bond rating in a country-year-industry, where the industry is based on the 2-digit SIC.
YOUNG FIRM	A dummy variable set to one if a firm is three years old or less, zero otherwise.
ANNRET	Annual stock return over the previous year.

Table 1
Sample Distribution and Descriptive Statistics

Panel A presents the number of firm-years and the average rating by country. Panel B reports the number of firms, average rating, and percentage of investment grade issuers ("IV") over time. Panel C shows the descriptive statistics of firm-year characteristics for the U.S. and non-U.S. samples. See Appendix B for definitions of variables.

Panel A: Rating distribution by country

	#Firm-years	Average rating
Australia	825	9.182
Austria	91	10.176
Belgium	85	10.365
Canada	1,085	7.445
Denmark	62	9.855
Finland	145	8.724
France	862	9.477
Germany	671	9.304
Greece	70	6.014
Hong Kong	490	8.931
Ireland	247	8.300
Italy	291	8.976
Japan	1,835	10.907
Luxembourg	143	5.790
Netherlands	417	8.463
New Zealand	181	9.422
Norway	118	8.644
Poland	73	5.973
Portugal	78	9.872
Singapore	118	9.994
South Korea	322	10.280
Spain	290	9.821
Sweden	341	9.786
Switzerland	302	10.414
Taiwan	179	9.073
UK	1,382	9.396
Non-U.S. Sample	**10,703**	**9.324**
U.S.	22,231	7.172
Full Sample	**32,934**	**7.871**

Table 1, continued

Panel B: Rating distribution by year

	U.S.				Non-U.S.			
	#Firms	**Rate**	**# IV firms**	**% IV firms**	**#Firms**	**Rate**	**# IV firms**	**% IV firms**
1994	760	8.272	424	56%	146	11.596	132	90%
1995	864	7.988	452	52%	177	11.034	151	85%
1996	1,005	7.661	491	49%	218	11.037	186	85%
1997	1,111	7.536	531	48%	253	10.518	203	80%
1998	1,136	7.545	549	48%	307	10.303	247	80%
1999	1,100	7.421	530	48%	346	10.289	289	84%
2000	1,063	7.276	496	47%	394	9.911	322	82%
2001	999	7.324	481	48%	418	9.744	339	81%
2002	983	7.155	447	45%	446	9.565	347	78%
2003	983	7.078	433	44%	634	9.363	475	75%
2004	998	7.018	425	43%	640	9.391	476	74%
2005	995	6.944	420	42%	633	9.471	480	76%
2006	980	6.842	405	41%	628	9.430	475	76%
2007	919	6.927	389	42%	536	9.401	405	76%
2008	896	6.790	385	43%	536	9.351	404	75%
2009	905	6.736	386	43%	485	9.198	362	75%
2010	912	6.822	392	43%	492	9.116	364	74%
2011	909	6.914	386	42%	519	8.904	368	71%
2012	899	6.991	400	44%	542	8.670	371	68%
2013	941	6.970	412	44%	564	8.550	374	66%
2014	974	6.998	420	43%	587	8.566	391	67%
2015	970	6.866	411	42%	599	8.427	394	66%
2016	929	6.905	391	42%	603	8.355	395	66%

Table 1, continued

Panel C: Descriptive statistics of firm characteristics

	U.S.		Non-U.S.	
	Mean	**Median**	**Mean**	**Median**
RATE	7.172	7.000	9.324	10.000
INTCOV	11.216	4.795	12.742	5.664
PM	0.122	0.153	0.176	0.158
LEV	0.349	0.327	0.304	0.289
ASSETS	6760	2478	14905	9484
CASH	0.088	0.047	0.098	0.074
TANG	0.360	0.305	0.373	0.337
CAPEX	0.064	0.044	0.057	0.047
MTB	1.663	1.373	1.671	1.333
RE	0.075	0.129	0.122	0.126
DIVIDEND	0.528	1.000	0.707	1.000
RETVOL	0.024	0.020	0.019	0.017
BETA	1.016	0.965	0.722	0.683

Table 2
Analyses of Global Corporate Credit Ratings Trends

This table presents the regression analyses for the time trend in corporate credit ratings from 1994 to 2016. Panels A and B present the ordered probit model estimation, with alterative specifications of the time trend variables. Panel C represents the results for alternative specifications and samples. Panel D presents the time trend of actual and estimated default rates. *RATE* is the S&P Long-Term, Foreign Currency Issuer rating converted into numerical identifiers 1–17 (with 17 being AAA). Appendix B provides definitions on other variables. Robust t-statistics, in parentheses, are based on standard errors clustered at the firm level for the U.S. sample and at the country level for the non-U.S. sample. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Panel A: Rating regressions with year indicators

	Dep Var= RATE, ordered probit model					
	U.S.		**Non-U.S.**			
	(1)		(2)		(3)	
Year Indicators						
Y1995	-0.173***	(-7.02)	-0.232***	(-4.16)	-0.278***	(-4.22)
Y1996	-0.344***	(-10.70)	-0.404***	(-7.36)	-0.527***	(-5.70)
Y1997	-0.363***	(-9.48)	-0.636***	(-6.52)	-0.744***	(-3.50)
Y1998	-0.407***	(-9.52)	-0.680***	(-6.37)	-0.780***	(-3.14)
Y1999	-0.616***	(-13.55)	-0.827***	(-7.87)	-0.981***	(-3.58)
Y2000	-0.792***	(-15.94)	-1.074***	(-8.45)	-1.202***	(-3.98)
Y2001	-0.779***	(-15.31)	-1.173***	(-8.88)	-1.298***	(-3.69)
Y2002	-0.656***	(-12.76)	-1.242***	(-8.18)	-1.331***	(-3.54)
Y2003	-0.783***	(-14.90)	-1.675***	(-8.22)	-1.805***	(-5.13)
Y2004	-1.048***	(-19.13)	-1.889***	(-9.70)	-2.032***	(-5.49)
Y2005	-1.212***	(-21.29)	-2.094***	(-11.40)	-2.257***	(-5.22)
Y2006	-1.426***	(-23.43)	-2.250***	(-13.94)	-2.418***	(-5.45)
Y2007	-1.471***	(-23.38)	-2.223***	(-12.16)	-2.432***	(-4.71)
Y2008	-1.262***	(-19.36)	-2.130***	(-12.03)	-2.318***	(-4.72)
Y2009	-1.299***	(-20.39)	-2.158***	(-9.05)	-2.348***	(-3.59)
Y2010	-1.385***	(-21.80)	-2.258***	(-9.30)	-2.428***	(-4.30)
Y2011	-1.397***	(-21.54)	-2.364***	(-11.19)	-2.465***	(-4.65)
Y2012	-1.465***	(-22.22)	-2.449***	(-10.76)	-2.542***	(-4.22)
Y2013	-1.550***	(-23.09)	-2.510***	(-10.83)	-2.591***	(-4.15)
Y2014	-1.591***	(-22.90)	-2.494***	(-10.84)	-2.578***	(-4.07)
Y2015	-1.565***	(-22.35)	-2.475***	(-10.86)	-2.595***	(-3.79)
Y2016	-1.533***	(-21.32)	-2.512***	(-10.62)	-2.587***	(-3.62)
SOVRATE					0.129***	(4.07)
GDPPC					0.132	(0.09)
GDPGR					-0.032	(-0.02)
CURRENT					1.612	(1.33)
INFLATION					-0.778	(-0.20)
INTCOV1	0.088***	(6.22)	0.010	(0.29)	0.008	(0.23)
INTCOV2	0.106***	(12.96)	0.058***	(2.73)	0.054**	(2.57)
INTCOV3	0.071***	(15.04)	0.047***	(4.48)	0.046***	(4.34)
INTCOV4	0.012***	(8.54)	0.013***	(10.08)	0.013***	(9.62)
PM	0.115***	(6.38)	0.030	(0.55)	0.039	(0.74)
LEV	-1.470***	(-11.09)	-2.074***	(-10.97)	-2.091***	(-10.17)
SIZE	0.515***	(22.12)	0.626***	(11.00)	0.619***	(10.07)
CASH	-0.937***	(-5.55)	-0.266	(-1.04)	-0.414	(-1.63)

TANG	0.320**	(2.56)	0.930***	(5.31)	0.817***	(4.60)
CAPEX	-0.287	(-0.93)	-0.317	(-0.59)	0.066	(0.10)
MTB	0.324***	(16.70)	0.206***	(5.79)	0.214***	(5.83)
RE	0.310***	(4.75)	0.675***	(3.05)	0.725***	(3.09)
DIVIDEND	0.825***	(19.86)	0.577***	(7.61)	0.578***	(7.54)
RETVOL	-0.893***	(-26.24)	-0.555***	(-6.62)	-0.561***	(-7.06)
BETA	-0.141***	(-7.73)	-0.233***	(-6.62)	-0.230***	(-7.48)
Country FE	NO		YES		YES	
Industry FE	YES		YES		YES	
#Firm-Years	22,231		10,703		10,298	
Pseudo R^2	0.28		0.24		0.25	

Table 2, continued

Panel B: Rating regressions with the TREND variable

	Dep Var= RATE, ordered probit model		
	U.S.	**Non-U.S.**	
	(1)	(2)	(3)
TREND	**-0.069*** **	**-0.102*** **	**-0.072** **
	(-22.74)	**(-7.87)**	**(-2.33)**
SOVRATE			0.152***
			(2.97)
GDPPC			-1.913
			(-1.10)
GDPGR			1.161
			(1.20)
CURRENT			0.771
			(0.63)
INFLATION			-3.163
			(-0.90)
INTCOV1	0.086***	0.010	0.008
	(6.10)	(0.28)	(0.24)
INTCOV2	0.105***	0.054***	0.051**
	(12.81)	(2.66)	(2.44)
INTCOV3	0.070***	0.044***	0.043***
	(15.01)	(4.36)	(4.12)
INTCOV4	0.011***	0.012***	0.012***
	(8.38)	(9.45)	(8.93)
PM	0.115***	0.017	0.023
	(6.51)	(0.35)	(0.50)
LEV	-1.415***	-2.029***	-2.052***
	(-10.81)	(-12.57)	(-11.54)
SIZE	0.502***	0.608***	0.604***
	(22.18)	(13.03)	(11.22)
CASH	-0.913***	-0.209	-0.342
	(-5.42)	(-0.79)	(-1.32)
TANG	0.367***	1.004***	0.877***
	(2.95)	(5.99)	(5.33)
CAPEX	-0.327	-0.633	-0.201
	(-1.07)	(-1.30)	(-0.34)
MTB	0.318***	0.206***	0.210***
	(16.59)	(5.25)	(5.70)
RE	0.307***	0.712***	0.750***
	(4.79)	(3.17)	(3.20)
DIVIDEND	0.830***	0.564***	0.566***
	(20.04)	(6.78)	(6.45)
RETVOL	-0.889***	-0.500***	-0.497***
	(-26.25)	(-7.60)	(-7.46)
BETA	-0.133***	-0.211***	-0.219***
	(-7.54)	(-6.39)	(-7.48)
Country FE	NO	YES	YES
Industry FE	YES	YES	YES
#Firm-Years	22,231	10,703	10,298
Pseudo R^2	0.28	0.23	0.24

Table 2, continued

Panel C: Alternative specifications of rating regressions, coefficient on TREND

	Dep Var = RATE	
	U.S.	**Non-U.S.**
	(1)	(2)
1.Investment grade	-0.078***	-0.109***
	(-13.82)	(-8.41)
Non- Investment grade	-0.045***	-0.062***
	(-12.32)	(-7.81)
2. Non-U.S. - sub-sample of European firms		-0.134***
		(-14.04)
Non-U.S. - sub-sample of Asian Pacific firms		-0.075***
		(-3.59)
3. Firm fixed effects	-0.109***	-0.139***
	(-12.27)	(-9.95)
4. Blume, Lim, and MacKinlay model	-0.068***	-0.103***
	(-24.01)	(-9.62)
5. Control for earnings management (Discretionary accruals)	-0.069***	-0.088***
	(-22.49)	(-4.93)
6. Control for square and cube terms of explanatory variables	-0.072***	-0.113***
	(-22.12)	(-9.34)
7. Standardize explanatory variables	-0.006***	-0.053***
	(-2.83)	(-3.46)

Table 2, continued

Panel D: Actual default rates, expected default frequency (EDF) and CDS spreads over time

Dep Var =	**Default rate, OLS regressions**							**Monthly EDF**		**Monthly 5-year CDS spread**	
Period =	**2000-2016**							**1994-2016**		**2001-2015**	
Sample=	**A**	**BBB**	**BB**	**B**	**CCC**	**CC**	**ALL**	**EDF universe**	**Rating sample**	**CDS universe**	**Rating sample**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
						U.S.					
TREND	-0.019**	-0.047***	-0.161***	-0.413**	-0.370	0.100	-0.157*	-0.003***	-0.002***	0.000	0.000
	(-2.27)	(-3.17)	(-4.71)	(-2.56)	(-0.78)	(0.05)	(-1.80)	(-17.25)	(-7.23)	(0.27)	(0.29)
RECESSION	0.178*	0.472**	1.622***	4.511**	18.918***	0.53	2.372**	0.067***	0.056***	0.008***	0.006***
	(1.77)	(2.70)	(3.99)	(2.34)	(3.32)	(0.02)	(2.28)	(46.00)	(26.67)	(11.60)	(7.72)
Industry FE	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES
#Years	17	17	17	17	17	17	17	23	23	15	15
#Firm-months								1,027,664	390,436	123,432	73,930
Adj R^2	0.37	0.55	0.73	0.46	0.45	0.00	0.37	0.25	0.23	0.02	0.02
						Non-U.S.					
TREND	n.a.	-0.023	-0.071**	-0.198	-0.249	0.004	-0.027	-0.004*	-0.001	0.001	0.001
		(-1.39)	(-2.11)	(-1.59)	(-1.01)	(0.02)	(-1.04)	(-1.84)	(-0.76)	(1.41)	(0.93)
RECESSION	n.a.	0.127*	0.521	6.083***	6.282*	2.286	1.146**	0.057***	0.038***	0.010***	0.009***
		(1.75)	(0.48)	(3.53)	(1.91)	(1.20)	(2.19)	(10.87)	(8.40)	(10.52)	(9.66)
Country FE		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE		NO	NO	NO	NO	NO	NO	YES	YES	YES	YES
#Country-years		442	442	442	442	442	442	573	567	358	322
#Firm-months								2,304,652	180,118	60,894	29,138
Adj R^2		0.06	0.07	0.09	0.15	0.09	0.16	0.20	0.14	0.07	0.10

Table 3
S&P Market Share and Corporate Credit Ratings

This table presents the impact of S&P market share on corporate credit ratings. Panel A reports the distribution of S&P market share across regions and over time. The S&P market share of each region is calculated as the sum of the market value of firms with long-term S&P ratings in a region-year divided by the total market value of all firms with long-term debt covered by Compustat in that region-year. Panel B shows the regression results for the impact of S&P market share on credit ratings. The dependent variable is either the level or the change in firm-year credit ratings. Corresponding to the dependent variable of each column, control variables are measured at level or changes. The variable of interest is *LAG_SP_SHARE* (*LAG_*Δ*S&P_SHARE*), the lagged level of (lagged change in) regional S&P market share. Panel C presents the results after removing first-time issuers or retaining a constant group of issuers. See Appendix B for definitions on other variables. Robust t-statistics, in parentheses, are based on standard errors clustered at the firm level for the U.S. sample and the country level for the non-U.S. sample. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Panel A: Distribution of S&P market share over time

	Regional S&P market share		
	North America	**Europe**	**Asia Pacific**
Year	**(1)**	**(2)**	**(3)**
1994	80.60%	40.00%	24.40%
1995	82.10%	41.90%	27.40%
1996	81.20%	41.40%	29.60%
1997	84.30%	49.90%	35.70%
1998	87.70%	54.80%	44.70%
1999	84.90%	65.10%	50.40%
2000	86.70%	69.90%	51.50%
2001	91.30%	72.80%	64.20%
2002	90.10%	72.50%	65.50%
2003	90.30%	72.50%	65.40%
2004	88.60%	74.60%	67.60%
2005	89.00%	74.70%	65.00%
2006	88.80%	75.20%	65.10%
2007	88.20%	76.60%	57.80%
2008	89.00%	78.80%	57.70%
2009	88.90%	79.10%	58.20%
2010	88.50%	76.60%	52.00%
2011	89.30%	77.50%	51.40%
2012	89.00%	75.30%	53.80%
2013	87.80%	74.70%	51.50%
2014	87.70%	74.30%	45.80%
2015	86.80%	68.90%	34.30%
2016	86.70%	67.80%	30.80%
TREND	**0.002*****	**0.014*****	0.004
	(2.89)	(4.89)	(0.96)

Table 3, continued

Panel B: S&P market share and corporate credit ratings

	Dep Var = RATE, ordered probit model			Dep Var = ΔRATE, OLS regressions		
	Full sample	**U.S.**	**Non-U.S.**	**Full sample**	**U.S.**	**Non-U.S.**
	(1)	(2)	(3)	(4)	(5)	(6)
LAG_S&P_SHARE	**-5.522*** **	**-11.083*** **	**-4.831*** **	**-0.897*** **	**-0.863** **	**-0.753*** **
	(-7.07)	**(-21.48)**	**(-12.33)**	**(-5.12)**	**(-2.32)**	**(-2.98)**
INTCOV1	0.047**	0.074***	-0.002			
	(2.34)	(5.39)	(-0.10)			
INTCOV2	0.070***	0.092***	0.037**			
	(4.90)	(11.55)	(2.49)			
INTCOV3	0.050***	0.061***	0.033***			
	(7.24)	(13.28)	(4.97)			
INTCOV4	0.010***	0.010***	0.010***			
	(11.89)	(7.23)	(6.75)			
ΔINTCOV				0.001	0.000	0.002
				(0.95)	(0.08)	(1.11)
PM	0.089***	0.104***	0.045	2.213***	2.465***	1.553***
	(6.50)	(6.17)	(1.21)	(9.63)	(9.35)	(3.40)
LEV	-1.623***	-1.539***	-2.105***	-2.078***	-1.751***	-3.333***
	(-15.04)	(-11.76)	(-12.02)	(-7.15)	(-10.64)	(-5.78)
SIZE	0.399***	0.438***	0.482***	0.308***	0.273***	0.368***
	(23.52)	(21.71)	(10.19)	(7.82)	(7.61)	(3.25)
CASH	-0.876***	-1.011***	-0.214	-0.064	-0.177	0.231
	(-4.53)	(-6.10)	(-0.87)	(-0.59)	(-1.43)	(0.91)
TANG	0.533***	0.365***	1.093***	0.663**	0.427*	0.772***
	(3.81)	(3.00)	(6.77)	(2.22)	(1.85)	(2.88)
CAPEX	-0.140	-0.454	0.242	1.212***	1.324***	0.947
	(-0.96)	(-1.47)	(0.56)	(7.25)	(5.98)	(1.65)
MTB	0.267***	0.313***	0.203***	0.136***	0.133***	0.133***
	(7.85)	(16.82)	(6.25)	(17.15)	(9.22)	(5.75)
RE	0.364***	0.296***	0.688***	1.167***	1.202***	1.040***
	(6.09)	(4.69)	(3.41)	(19.40)	(12.89)	(4.90)
DIVIDEND	0.697***	0.766***	0.550***	0.086***	0.110***	0.068**

	(12.60)	(18.59)	(6.67)	(4.14)	(2.86)	(2.25)
RETVOL	-0.923***	-0.989***	-0.640***	-0.375***	-0.412***	-0.273***
	(-9.79)	(-28.58)	(-6.14)	(-11.39)	(-14.69)	(-4.89)
BETA	-0.138***	-0.109***	-0.227***	0.009	0.012	0.000
	(-4.19)	(-6.08)	(-4.96)	(1.44)	(1.09)	(0.01)
Country FE	YES	NO	YES	YES	NO	YES
Industry FE	YES	YES	YES	YES	YES	YES
#Firm-years	32,028	21,471	10,557	28,866	19,524	9,342
Pseudo R^2 /Adj R^2	0.26	0.27	0.23	0.13	0.15	0.11

Table 4

First Time Issuers and Corporate Credit Ratings

This table presents the impact of S&P market share on corporate credit ratings for the sample excluding first time issuers and the sample limited to first time issuers. Panel A presents the regression results for the impact of S&P market share on corporate credit ratings after removing first-time issuers or retaining a constant group of issuers. The dependent variable is the lagged level of regional S&P market share *LAG_S&P_SHARE*. Panels B and C present the distribution of rating transition during the three years after an issuer initiates the ratings between 1994 and 2013, conditional on the S&P market share when the rating is initiated. See Appendix B for definitions on other variables. Robust t-statistics, in parentheses, are based on standard errors clustered at the firm level for the U.S. sample and the country level for the non-U.S. sample. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Panel A: S&P market share and corporate credit ratings, excluding first-time issuers

	Dep Var= RATE, ordered probit model					
	Remove first three years' ratings		**Remove new issuers since 1994**		**Constant Sample 1994-2016**	
	U.S.	**Non-U.S.**	**U.S.**	**Non-U.S.**	**U.S.**	**Non-U.S.**
	(1)	(2)	(3)	(4)	(5)	(6)
LAG_S&P_SHARE	**-11.946*** **	**-4.993*** **	**-10.515*** **	**-4.427*** **	**-12.940*** **	**-4.962*** **
	(-20.28)	**(-9.15)**	**(-12.75)**	**(-5.83)**	**(-9.88)**	**(-6.60)**
Firm Characteristics	YES	YES	YES	YES	YES	YES
Country FE	NO	YES	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES	YES	YES
#Firm-years	17,432	7,876	8,444	1,809	4,951	1,277
Pseudo R^2	0.28	0.23	0.27	0.27	0.26	0.28

Table 4, continued

Panel B: Rating transition during the three years after a rating initiation between 1994 and 2013, when S&P market share is high

	Rating after three years												
Initial rating	AAA	AA	A	BBB	BB	B	CCC	CC	Default	Sum	%Sum	%Down	%Up
AAA	4	0	0	0	0	0	0	0	0	4	0.27%	0.00%	0.00%
AA	0	31	1	0	0	0	0	0	0	32	2.15%	3.13%	0.00%
A	0	3	123	19	0	0	0	0	0	145	9.74%	13.10%	2.07%
BBB	0	0	19	278	21	4	0	0	2	324	21.77%	8.33%	5.86%
BB	0	0	1	34	260	70	5	1	7	378	25.40%	21.96%	9.26%
B	0	0	3	6	82	435	46	3	13	588	39.52%	10.54%	15.48%
CCC	0	0	0	1	0	6	9	0	0	16	1.08%	0.00%	43.75%
CC	0	0	0	0	0	0	1	0	0	1	0.07%	0.00%	100.00%
Sum										1,488	100.00%	12.90%	10.48%

Panel C: Rating transition during the three years after a rating initiation between 1994 and 2013, when S&P market share is low

	Rating after three years												
Initial rating	AAA	AA	A	BBB	BB	B	CCC	CC	default	Sum	%Sum	%Down	%Up
AAA	8	2	0	0	0	0	0	0	0	10	0.44%	20.00%	0.00%
AA	0	55	20	3	0	0	0	0	0	78	3.45%	29.49%	0.00%
A	0	5	196	63	7	1	0	0	0	272	12.02%	26.10%	1.84%
BBB	0	1	30	338	39	11	1	1	4	425	18.78%	13.18%	7.29%
BB	0	0	2	34	375	85	14	0	31	541	23.91%	24.03%	6.65%
B	0	2	4	5	76	640	80	12	97	916	40.48%	20.63%	9.50%
CCC	0	0	0	0	0	4	9	0	8	21	0.93%	38.10%	19.05%
CC	0	0	0	0	0	0	0	0	0	0	0.00%	0.00%	0.00%
Sum										2,263	100.00%	21.17%	5.61%

Table 5
The Impact of Local Credit Agency's NRSRO Designation on Corporate Credit Ratings

This table presents the impact of Japan Credit Rating (JCR) Inc and S&P market share on S&P corporate ratings of Japanese firms during 2000-2016. Panel A reports the distribution of JCR market share and S&P market share over time. *JCR_EW* (*S&P_EW*) is equal-weighted JCR (S&P) market share of Japanese firms, calculated as the ratio of the number of Japanese firms with a long-term JCR (S&P) rating in a year to the number of Japanese firms with long-term debt covered by Compustat in that year. The value-weighted S&P market share (*S&P_VW*) is calculated as the sum of the market value of Japanese firms with a long-term S&P rating in a year divided by the total market value of all Japanese firms with long-term debt covered by Compustat in that year. Panels B and C present the regression results for the impact of JCR (S&P) market share on credit ratings. The dependent variable is either the level (Panel B) or the change (Panel C) in firm-year S&P credit ratings in Japan. Panel D reports the difference-in-differences regression on changes in S&P credit ratings after the NRSRO designation of JCR. See Appendix B for definitions on other variables. Robust t-statistics, in parentheses, are based on standard errors clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Panel A: Distribution of JCR and S&P market share of Japanese firms over time

Year	JCR_EW	SP_EW	SP_VW	ΔSP_EW	ΔSP_VW
2000	14.61%	6.27%	48.09%		
2001	14.69%	6.12%	63.69%	-0.16%	15.60%
2002	13.86%	6.35%	64.23%	0.23%	0.54%
2003	14.02%	6.45%	64.09%	0.10%	-0.14%
2004	14.39%	8.31%	71.45%	1.86%	7.36%
2005	14.98%	8.09%	69.34%	-0.22%	-2.10%
2006	15.49%	8.58%	69.49%	0.49%	0.15%
2007	15.88%	4.96%	58.21%	-3.62%	-11.28%
2008	14.02%	4.93%	58.69%	-0.04%	0.48%
2009	13.65%	2.82%	54.27%	-2.10%	-4.43%
2010	13.42%	2.53%	44.26%	-0.29%	-10.01%
2011	13.42%	2.60%	42.86%	0.06%	-1.40%
2012	13.10%	2.48%	43.17%	-0.12%	0.32%
2013	12.95%	2.48%	41.63%	0.00%	-1.54%
2014	13.05%	2.42%	32.61%	-0.06%	-9.02%
2015	13.18%	2.48%	32.58%	0.06%	-0.03%
2016	.	2.56%	29.55%	0.08%	-3.03%
2000-2006 (Pre-U.S. NRSRO registration)	14.58%	7.17%	64.34%	0.38%	3.57%
2007-2016	13.63%	3.03%	43.78%	-0.60%	-3.99%

Table 5, continued

Panel B: The impact of JCR and S&P market share on S&P's corporate credit ratings, level regression

	Dep Var= RATE, ordered probit model				
	(1)	(2)	(3)	(4)	(5)
LAG_JCR_EW	38.622***			52.627***	56.211***
	(7.12)			(7.77)	(6.72)
LAG_SP_EW		-1.413***		-8.814***	
		(3.55)		(-2.80)	
LAG_SP_VW			-0.736***		-1.787**
			(-3.45)		(-2.43)
Firm Characteristics	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
#Firm-Years	1,387	1,387	1,387	1,387	1,387
Pseudo R^2 or Adj R^2	0.33	0.32	0.32	0.33	0.33

Panel C: The impact of JCR and S&P market share on S&P's corporate credit ratings, change regression

	Dep Var= ΔRATE, OLS regression				
	(1)	(2)	(3)	(4)	(5)
LAG_ΔJCR_EW	6.831***			6.618***	6.557***
	(2.91)			(2.81)	(2.85)
LAG_ΔSP_EW		-1.403***		-1.225***	
		(-2.92)		(-2.79)	
LAG_ΔSP_VW			-1.137***		-1.121***
			(-3.15)		(-3.10)
ΔFirm Characteristics	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
#Firm-Years	1,137	1,137	1,137	1,137	1,137
Pseudo R^2 or Adj R^2	0.25	0.24	0.25	0.25	0.25

Table 5, continued

Panel D: The effect of JCR's NRSRO designation on S&P's corporate credit ratings, difference-in-differences regressions

	Dep Var = RATE, ordered probit model			
	[2002-2011]	**[2002-2011]**	**Placebo test, pre-period [1997-2006]**	**Placebo test, post-period [2007-2016]**
	(1)	(2)	(3)	(4)
Post	**-0.246****	n.a.	**-0.661*****	**-0.248*****
	(-2.04)		**(-2.26)**	**(-3.36)**
Japan	0.055	n.a.	1.233***	0.888***
	(0.22)		(2.84)	(3.57)
Post **x** Japan	**0.852*****	**0.801*****	**-0.988*****	0.100
	(3.83)	**(3.20)**	**(-3.63)**	(0.84)
Firm Characteristics	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	NO	YES	NO	NO
Country FE	NO	YES	NO	NO
#Firm-Years	2,325	2,325	2,123	1,827
Pseudo R^2	0.23	0.25	0.21	0.24

Table 6
Additional Evidence from Moody's Rating Adjustments

This table presents the impact of Moody's market share on Moody's long-term corporate ratings and rating adjustments. *VARIABLE_ADJ* refers to financial ratios calculated after adjusting reported accounting numbers. *VARIABLE_DIFF* refers to the differences between accounting ratios calculated from Moody's adjusted accounting numbers and the ratios calculated from reported accounting numbers. See Appendix B for definitions on other variables. Robust t-statistics, in parentheses, are based on standard errors clustered at the firm level for the U.S. sample and at the country level for the non-U.S. sample. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Panel A: Moody's market share and corporate credit rating

Dep Var=	**Long-Term Credit Ratings, ordered probit model**			
Sample=	**U.S.**	**Non-U.S.**	**U.S.**	**Non-U.S.**
	(1)	(2)	(3)	(4)
LAG_MD_SHARE	**-0.263****	**-3.848*****	**-0.395****	**-4.878*****
	(-2.26)	**(-3.68)**	**(-2.24)**	**(-3.45)**
INTCOV1_ADJ	0.301***	0.116***	0.183***	0.093*
	(13.81)	(2.64)	(7.78)	(1.90)
INTCOV2_ADJ	0.221***	0.111***	0.157***	0.093***
	(16.68)	(3.46)	(10.99)	(2.58)
INTCOV3_ADJ	0.128***	0.074***	0.092***	0.065**
	(15.40)	(3.51)	(10.03)	(2.15)
INTCOV4_ADJ	0.034***	0.021***	0.027***	0.016
	(9.43)	(2.73)	(5.19)	(1.46)
PM_ADJ	0.313	1.265**	1.307***	0.512
	(1.32)	(2.27)	(4.61)	(1.10)
LEV_ADJ	-0.615***	-1.011**	-1.181***	-1.882***
	(-4.90)	(-2.19)	(-6.28)	(-2.72)
SIZE_ADJ	0.405***	0.459***	0.550***	0.662***
	(17.70)	(11.23)	(16.51)	(11.26)
CASH_ADJ	-0.262	-0.284	-0.802*	0.641
	(-0.77)	(-0.87)	(-1.90)	(0.81)
TANG_ADJ	0.654***	0.058	0.435**	0.812**
	(3.77)	(0.24)	(2.07)	(2.31)
CAPEX_ADJ	-2.903***	0.274	-1.028	1.039
	(-5.36)	(0.18)	(-1.19)	(0.78)
RETA_ADJ	1.215***	0.689***	1.065***	0.914***
	(13.80)	(5.05)	(9.25)	(2.84)
MTB_ADJ			0.444***	0.360***
			(8.22)	(4.45)
RETVOL			-0.507***	-0.418***
			(-10.35)	(-10.32)
BETA			-0.148***	-0.217***
			(-4.67)	(-5.69)
Country FE	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES
#Firm-years	11,401	5,592	7,031	3,207
Pseudo R^2 or Adj R^2	0.2	0.18	0.28	0.28

Table 6, continued

Panel B: Analysis of rating adjustments

Dep Var=	Quantitative rating adjustment, OLS regressions		Qualitative rating adjustment, OLS regressions	
Sample=	**U.S.**	**Non-U.S.**	**U.S.**	**Non-U.S.**
	(1)	(2)	(3)	(4)
LAG_MD_SHARE	-0.015	-0.990	**-0.866****	**-1.209*****
	(-0.05)	(-0.78)	**(-2.16)**	**(-3.12)**
FS_RATE	-0.125***	-0.102***	-0.287***	-0.314***
	(-17.48)	(-10.86)	(-15.80)	(-8.26)
QUANT_ADJ			-0.517***	-0.557***
			(-13.06)	(-11.42)
DIFF_INTCOV	-0.003	-0.004		
	(-1.14)	(-1.64)		
PM_DIFF	1.503***	2.641***		
	(7.26)	(5.63)		
LEV_DIFF	-2.681***	-3.134**		
	(-3.06)	(-2.48)		
SIZE_DIFF	-1.478**	-1.332***		
	(-2.38)	(-3.35)		
CASH_DIFF	5.943**	3.358***		
	(2.12)	(3.34)		
TANG_DIFF	-1.861*	-4.043***		
	(-1.65)	(-4.94)		
CAPEX_DIFF	14.465***	12.697**		
	(3.68)	(2.34)		
MTB_DIFF	1.691	5.553		
	(0.82)	(0.85)		
RE_DIFF	1.402**	2.609*		
	(2.16)	(1.70)		
Log(MV)			0.470***	0.535***
			(10.96)	(7.72)
INST%			-0.903***	0.120
			(-5.01)	(0.64)
#ANALYSTS			0.018***	0.007
			(3.08)	(0.91)
Country FE	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES
#Firm-years	5,230	2,175	5,282	2,211
Pseudo R^2 or Adj R^2	0.35	0.36	0.22	0.43

Table 7
The Impact of a Tightening Rating Trend on Future Leverage

Panel A of this table presents the association between tighter credit ratings and future leverage. Tightening credit ratings ("*RATE_TIGHT*") are defined as predicted ratings from OLS models minus the actual credit ratings. We predict the ratings based on the model presented in Table 2, including industry and country fixed effects but not year fixed effects. A positive value for *RATE_TIGHT* indicates a tighter rating and a negative value indicates an inflated rating. Panel B reports results using alternative prediction models. We estimate the model from Table 2 for the 1994-2004 period by excluding year dummies, and then use the coefficient to predict the firm-year ratings for the 2005-2016 period. All regressions control for country- and industry-fixed effects. Robust t-statistics, in parentheses, are based on standard errors clustered at the firm level for the U.S. sample and at the country level for the non-U.S. sample. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Panel A: Tightening credit rating and one-year-ahead leverage

Dep Var=	**Long-term leverage**		**Total book-leverage**		**Market leverage**	
Sample =	**U.S.**	**Non-U.S.**	**U.S.**	**Non-U.S.**	**U.S.**	**Non-U.S.**
	(1)	(2)	(3)	(4)	(5)	(6)
RATE_TIGHT	**-0.032*** **	**-0.031*** **	**-0.040*** **	**-0.042*** **	**-0.038*** **	**-0.034*** **
	(-18.44)	**(-12.59)**	**(-20.48)**	**(-11.17)**	**(-23.49)**	**(-7.30)**
RATE	-0.048***	-0.040***	-0.052***	-0.052***	-0.057***	-0.055***
	(-31.48)	(-18.13)	(-32.87)	(-17.06)	(-43.57)	(-14.40)
MTB	0.034***	0.013**	0.039***	0.021***	-0.072***	-0.070***
	(7.46)	(2.19)	(8.20)	(3.02)	(-19.58)	(-9.59)
TANG	0.134***	0.174***	0.124***	0.196***	0.101***	0.193***
	(7.71)	(6.57)	(6.86)	(5.56)	(6.48)	(5.32)
PM	0.112***	0.184***	0.103***	0.200***	0.026	0.057
	(5.07)	(3.43)	(4.63)	(3.19)	(1.45)	(1.17)
SIZE	0.014***	0.023***	0.021***	0.036***	0.040***	0.049***
	(5.52)	(6.84)	(7.34)	(6.76)	(14.11)	(7.44)
TAXSHIELD	-0.133	0.001	0.648	-0.098	0.495	-0.340
	(-0.19)	(0.01)	(0.87)	(-0.61)	(0.66)	(-1.53)
RD	-0.559***	-0.061	-0.648***	-0.212	-0.559***	0.032
	(-7.83)	(-0.42)	(-8.67)	(-1.17)	(-8.17)	(0.19)
Country FE	NO	YES	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
#Firm-years	19,630	9,438	19,630	9,438	19,630	9,438
Adj R^2	0.46	0.48	0.46	0.48	0.62	0.62

Table 7, continued

Panel B: Tightening credit ratings and one-year-ahead leverage, an alternative prediction model for tightened ratings

Dep Var=	**Long-term leverage**		**Total book-leverage**		**Market leverage**	
Sample=	**U.S.**	**Non-U.S.**	**U.S.**	**Non-U.S.**	**U.S.**	**Non-U.S.**
	(1)	(2)	(3)	(4)	(5)	(6)
RATE_TIGHT	**-0.029*** **	**-0.033*** **	**-0.035*** **	**-0.044*** **	**-0.036*** **	**-0.038*** **
	(-13.39)	**(-16.93)**	**(-14.95)**	**(-14.03)**	**(-18.46)**	**(-8.10)**
RATE	-0.046***	-0.040***	-0.049***	-0.052***	-0.057***	-0.056***
	(-23.17)	(-18.44)	(-24.37)	(-30.69)	(-33.94)	(-19.36)
MTB	0.050***	0.008	0.055***	0.015**	-0.066***	-0.077***
	(7.41)	(1.49)	(7.92)	(2.54)	(-12.67)	(-9.71)
TANG	0.142***	0.129***	0.127***	0.151***	0.121***	0.167***
	(6.10)	(4.20)	(5.18)	(4.42)	(5.47)	(4.39)
PM	0.100***	0.287***	0.103***	0.289***	-0.019	0.087
	(3.30)	(4.99)	(3.37)	(4.53)	(-0.77)	(1.59)
SIZE	0.024***	0.025***	0.031***	0.037***	0.049***	0.051***
	(6.76)	(8.35)	(8.12)	(11.18)	(15.13)	(8.59)
TAXSHIELD	-0.784	-0.013	-0.065	-0.108	1.325	-0.286
	(-0.70)	(-0.10)	(-0.05)	(-0.77)	(0.89)	(-1.23)
RD	-0.550***	-0.173	-0.640***	-0.341**	-0.508***	0.010
	(-5.51)	(-1.27)	(-6.20)	(-2.40)	(-6.01)	(0.06)
Country FE	NO	YES	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
#Firm-years	9,550	5,693	9,550	5,693	9,550	5,693
Adj R^2	0.47	0.52	0.47	0.52	0.64	0.64

Table 8
The Impact of Tightening Rating Trend on Bond Market Access

This table reports the coefficients for the probit regression models of bond market access. The dependent variable is a dummy variable set equal to one if the firm has a S&P long-term issuer rating in a given year. *RATE_TIGHT* is defined as predicted ratings from OLS models minus the actual credit ratings. Columns (1)-(2) predict the ratings based on the model presented in Table 2, including industry- and country-fixed effects but not year-fixed effects. A positive value for *RATE_TIGHT* indicates a tighter rating. Columns (3)-(4) report results using alternative prediction models, where we estimate the model from Table 2 for the 1994-2004 period by excluding year dummies, and then use the coefficient to predict the firm-year ratings for the 2005-2016 period. Robust t-statistics, in parentheses, are based on standard errors clustered at the firm level for the U.S. sample and at the country level for the non-U.S. sample. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Dep Var=	**Rating availability, probit models**			
Sample period=	**1994-2016**		**2005-2016**	
	U.S.	**Non-U.S.**	**U.S.**	**Non-U.S.**
	(1)	(2)	(3)	(4)
RATE_TIGHT	**-0.103*** **	**-0.078*** **	**-0.084*** **	**-0.083*** **
	(-6.58)	**(-4.45)**	**(-3.95)**	**(-3.65)**
MVA	0.344***	0.382***	0.449***	0.436***
	(13.66)	(4.73)	(11.39)	(5.32)
Log(AGE+1)	-0.049	0.009	0.063	0.179
	(-1.24)	(0.08)	(1.07)	(1.59)
log(%RATED+1)	3.105***	6.887***	4.011***	6.355***
	(7.05)	(4.25)	(6.54)	(3.60)
YOUNG FIRM	0.151	-0.149	0.468	0.361
	(0.76)	(-0.61)	(1.04)	(0.70)
PM	0.038**	0.052	0.047	0.056
	(2.14)	(0.98)	(1.09)	(1.60)
TANG	0.259*	-0.216	0.094	-0.253
	(1.74)	(-0.90)	(0.41)	(-0.76)
MTB	-0.192***	-0.123**	-0.262***	-0.192*
	(-7.94)	(-1.98)	(-5.47)	(-1.92)
RETVOL	-21.239***	-18.925***	-18.834***	-6.050
	(-15.41)	(-3.60)	(-8.56)	(-0.96)
RD	-0.168**	0.118	-1.281**	-2.811
	(-2.25)	(0.22)	(-2.50)	(-1.35)
ANNRET	0.150***	0.168	0.060	0.240
	(3.61)	(1.14)	(0.97)	(1.25)
Country FE	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
#Firm-years	19,771	9,405	9,373	5,502
Pseudo R^2	0.28	0.43	0.27	0.43

Figure 1. Time Trend in Credit Ratings

This figure plots the coefficients on *Year dummies* from the credit rating models in Columns (1) and (2), Panel A of Table 2, the sample period 1994 to 2016.

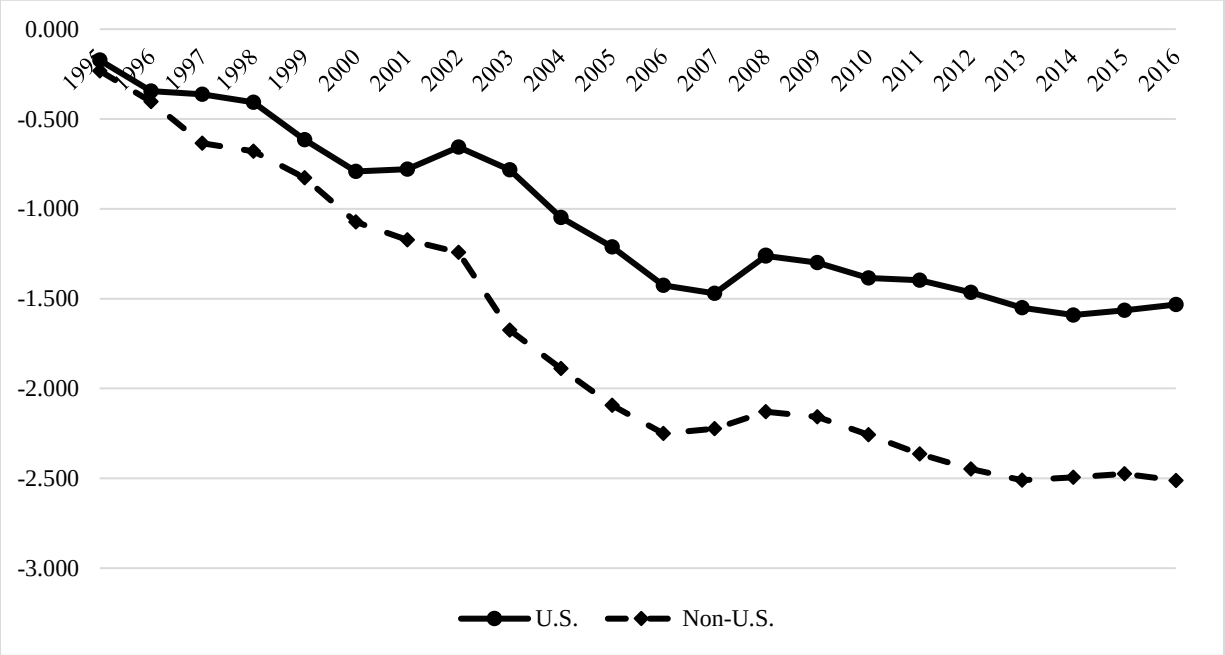

Figure 2. Time Trend of EDF and the Default Rate of S&P Rated Firms

This figure presents the time trend of the annual default rate of issuers with S&P long-term ratings for the 2000-2016 period and the annual mean value of EDF for the universe of the Compustat/CRSP sample for the 1994-2016 period. The annual default rate of issuers with S&P long-term ratings is calculated as the ratio of the number of default firms with S&P long-term ratings in the 27 sample countries to the total number of S&P rated firms in those countries. The annual mean value of EDF is calculated from the mean value of the monthly EDF of all firms in the 27 sample countries covered by CRSP and Compustat.

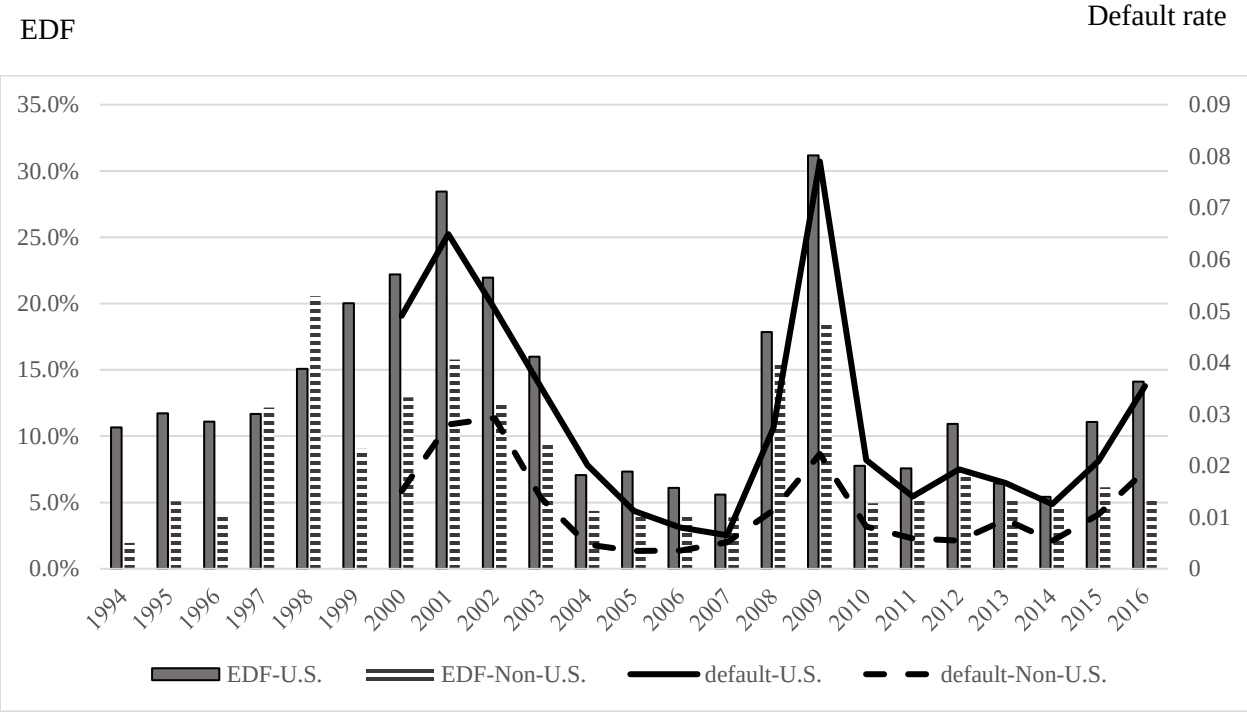

Figure 3. Time Trend in S&P Credit Ratings around JCR's NRSRO Designation

Figure 3 plots the coefficients on year indicators for Japanese and other Asia Pacific firms during 2002-2010. We follow the credit rating model in Panel A of Table 2. We use year 2001 as the benchmark year and run the regression separately for the two groups of firms. In the figure, Year 2006 is taken as the event year 0, Years 2002-2005 and Years 2007-2010 are taken as pre-event period [-4, -1] and post-event period [1, 4], respectively.