



Split ratings and debt-signaling in bond markets: A note



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ABSTRACT

Split ratings occur when national and international credit rating agencies assign different ratings to the same firm. Employing various proxies for asymmetric information and data from advanced and emerging bond markets, we review the evidence that split ratings are caused by asymmetric information between firms and credit rating agencies. We then apply the debt-signaling model to the split ratings problem, by testing for a systematic relationship between the debt-to-equity ratio and the magnitude of split ratings across countries. We finally test for the existence of an optimal debt-signal, which implies that higher debt-to-equity ratios will reduce the ratings split to an optimal minimum, after which accumulating more debt widens the ratings split. Our results suggest that firms in emerging markets can use the debt-signal up to a maximal point, after which it becomes inefficient.

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1. Introduction

Split ratings occur when national and international credit rating agencies (CRAs) assign different ratings to the same firm (Shin & Moore, 2003). We focus on the information asymmetry between firms and CRAs, and examine the mechanism by which CRAs update their beliefs regarding bond risk in response to information publicly released by firms. First, we hypothesize that due to asymmetric information, CRAs possess distinct prior beliefs regarding the quality of firms, which may be updated in response to new information. To penetrate market noise, firms attempt to reveal their quality via a debt-signal, which if successful, will cause the posterior beliefs of CRAs to converge in such a manner that contracts the ratings split. Second, using several proxies for asymmetric information, we test for the existence of an optimal debt signal, which implies a quadratic relationship between debt-to-equity ratios and split ratings.

Our primary contribution to the literature is the idea that debt-signaling can help emerging market firms overcome the more pronounced split ratings margins from which they suffer. We further

contribute to the literature by arguing that the debt-signal has an upper bound, after which it is detrimental to a firm's credit rating. Our results are significant for two reasons. First, if the magnitude of split ratings is correlated with the degree of asymmetric information, then higher levels of split ratings will hinder the price discovery process. This is particularly true in emerging bond markets where information about firm performance is relatively scarce. Second, if the optimal debt-signal reduces the cost of price discovery then it could promote the convergence of bond yields for comparable firms across emerging and advanced markets. Hence, our research has important implications for bond market efficiency and integration.

In Section 2, we develop our hypothesis regarding the importance of debt-signaling for less efficient bond markets, and we compare several proxies for asymmetric information, including the debt-to-equity ratio, market-based proxies such as the price-to-earnings ratio and the price-to-book ratio, as well as the standard deviation of forecasted EPS (which serves as an opinion-based proxy). In Section 3, we measure the effect of asymmetric information upon national–international split ratings. We first analyze our cross-country data set, which consists of 313 firms drawn randomly from 14 countries, to detect evidence of split ratings. We then employ a step-wise regression method to test for the relationship between split ratings and debt-signaling. We consider baseline models that control for firm size, industry and country effects, and proceed sequentially to examine models that contain

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Table 1
Split ratings.

Category	Whole samples	Advanced economies	Emerging economies
Number of firms with non-split	90	81	9
Number of firms with split by one level	87	68	19
Number of firms with split by two levels	67	33	34
Number of firms with split by more than two levels	69	13	56
Total number of firms	313	195	118

information proxies, including the debt-to-equity ratio, market-based proxies and an opinion-based proxy, and regress the proxy variables on the split ratings gap.

To test the debt-signaling hypothesis, we employ a dummy variable to capture the “bloc effect,” which measures the impact of incremental changes in the magnitude of information proxies upon split ratings in emerging bond markets compared to their advanced counterparts. In this manner we estimate the effectiveness of each information proxy as an explanation for split ratings across bond markets. More generally, this method allows us to distinguish between the explanatory power of debt-signaling compared to other proxies. To test for the existence of an *optimal* debt-signal, we first specify an ordered probit model and employ polynomial regression to detect the hypothesized quadratic relationship between the debt–equity ratio and split ratings, and we then compare the results with the outcome of the original linear regression. We finally analyze the results from our interaction terms in the context of a multiple regression test on the debt-to-equity ratio and other proxies, to determine whether their signs or significance are altered by the presence of other independent variables.

In Section 4, we review and interpret the results of our empirical analysis, with regard to their implications for credit ratings and bond market efficiency. We find evidence that supports the optimal debt-signal hypothesis in emerging markets, but not in advanced bond markets. Consequently, our research explores the relationship between capital structure, asymmetric information, and split ratings, and addresses a major challenge that emerging economies must overcome in order to create more efficient and integrated bond markets.

2. Hypothesis development

Credit rating agencies exist in order to mitigate information asymmetries between investors and firm insiders regarding a firm's valuation (Langhor & Langhor, 2008), but this role is often complicated by the fact that CRAs can assign different ratings to the same firm or bond. The prevalence of split ratings is displayed in Table 1, which is a sample of 313 randomly selected firms collected from five advanced and nine emerging economies. Table 1 shows that firms in emerging markets have higher degrees of split ratings than firms in advanced markets. Of the 90 firms not assigned split ratings, 81 are in advanced economies and only nine firms are in emerging markets. At the other end of the spectrum, only 13 firms in advanced markets are assigned split ratings of two or more rating levels, while 56 firms in emerging markets are similarly rated. These stylized facts support our claim that emerging market firms tend to have a higher incidence of split ratings.

Explanations for split ratings range from Ederington (1986) who argues that split ratings are random errors, to Cantor and Packer (1997), who emphasize the use of different rating models by CRAs, to Morgan (2002) who hypothesizes that split ratings are correlated with the opacity of a firm's assets. Each of these arguments is problematic. For instance, the random error argument is contradicted by evidence that Moody's systematically assigns lower ratings than S & P (Livingston, Naranjo, & Zhou, 2007). Dandapani and Lawrence (2007) found that one third of all split ratings can be explained by different rating methods, which means that the majority of split ratings variation cannot be similarly explained, nor does their approach explain why split ratings are more prevalent in emerging markets than in advanced

markets. Finally, Livingston et al. (2007) find that six out of seven variables used to measure asset opacity are significant for explaining the ratings split, but asset opacity is specific to the firm and not the CRA, and perhaps for this reason, Shin and Moore's (2003) test of the asset opacity hypothesis in Japanese markets is inconclusive.

Our argument rests on the claim that asymmetric information is the most important financial market imperfection.² We postulate that if all parties were equally well informed there would be less variation among CRAs, and the distinction between advanced and emerging markets in terms of split ratings would disappear.³ But due to asymmetric information, each CRA forms distinct prior beliefs, or conditional probability distributions regarding the quality of firms, which are expressed as a variation in credit ratings. By beliefs we mean that CRAs have *prior* probability distributions regarding the value of a specific firm, and in response to the debt-signal CRAs may update their prior beliefs, generating a *posterior* probability distribution that is distinct from the prior distribution. Alternatively, new information may have no effect on CRA beliefs regarding the value/risk of a specific firm, which means that the CRA's prior and posterior distributions are identical and so the firm's credit ratings will remain unchanged. In principle however, CRA beliefs may continue to evolve in response to new information until a stationary signaling equilibrium is obtained, which implies that the underlying stochastic process is stable over time, so that CRA beliefs and credit ratings are consistent and mutually reinforcing.

Debt-signaling has two primary outcomes; pooling and separating. We use this framework to analyze the adverse selection problem faced by CRAs in emerging markets, since CRAs cannot always distinguish between high quality and low quality firms. We also use this framework to examine the hypothesis that debt-signaling can help high quality firms distinguish themselves from low quality firms (Klein, O'Brien, & Peters, 2002; Leland & Pyle, 1977; Myers & Majluf, 1984; Ross, 1977). A pooling equilibrium illustrates adverse selection, since pooling implies that CRAs (and investors) assign the same valuation to high quality and low quality firms, thereby under-estimating the credit worthiness of high quality firms and over-estimating the credit worthiness of low quality firms. In a separating equilibrium by contrast, CRA beliefs regarding firm quality will converge in a manner that distinguishes between high quality and low quality firms, which causes a contraction in the ratings split.

We argue that debt-signaling is more likely to yield a separating equilibrium in emerging markets than in advanced markets. Debt is an effective signal in noisy markets because it is senior to equity in the cash-flow waterfall, and once equity is exhausted during the bankruptcy work-out process, what remains of the firm's assets reverts to debt-holders. Debt thereby increases a firm's financing costs as well as the likelihood of default if a firm becomes illiquid. The debt-signal is thus

² International CRAs provide ratings for a limited number of listed firms in emerging bond markets and may lack locally specific knowledge, while national CRAs suffer from ratings criteria that vary widely, so it is not obvious which of these entities is better informed about a firm's operations. For this reason, we follow the literature on split ratings by positing asymmetric information as an explanation for split ratings without specifying which entity is better informed.

³ Shen, Huang, and Hasan (2012) go further to argue that the higher degree of asymmetric information in emerging markets leads CRAs to adopt different rating methods across markets.

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