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## How Do Global Credit Rating Agencies Rate Firms from Developing Countries?

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# How Do Global Credit Rating Agencies Rate Firms from Developing Countries?

Li-Gang Liu and Giovanni Ferri

September 2001

This paper seeks the relative contribution of sovereign risks and firm-level credit risks in a firm's rating assignment. The findings reveal that sovereign risks contribute to a major part of firms' ratings in developing countries, whereas such risks play a negligible role in assigning ratings in developed countries.

The authors show that this result for developing countries partly depends on the "country ceiling effect"—private ratings are bound upwards by their sovereign rating—but in these countries idiosyncratic information is irrelevant even for firms whose rating would lie anyhow well below their sovereign. They also document that the information content of firm ratings is much smaller in developing countries than in developed countries. Finally, the paper suggests that cross-country indicators of information quality, rule of law and other institutional quality indicators help explain this unsatisfactory situation but do not solve the puzzle entirely.



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# **How Do Global Credit Rating Agencies Rate Firms from Developing Countries?**

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**Li-Gang Liu and Giovanni Ferri**

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## PREFACE

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Masaru Yoshitomi  
Dean  
ADB Institute

## ABSTRACT

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What is the relative contribution of sovereign risks and firm-level credit risks in a firm's rating assignment? Or, stated otherwise, what is the information content of these components in a firm's rating? This paper intends to examine this issue, which has not been adequately addressed so far, using a tailor-made firm-level database, matching sovereign and firm ratings with firm performance indicators reportedly used by rating agencies. The paper decomposes factors contributing to a firm's credit rating by measuring each factor's relative weight. By matching a firm's credit risk indicators with its corresponding sovereign risk, we are able to disentangle the relative importance of each factor in a firm's rating assignment.

We make three contributions. First, our findings reveal that sovereign risks contribute to a major part of firms' ratings in developing countries, whereas such risks play a negligible role in assigning firms' ratings in developed countries. Second, we show that this result for developing countries partly depends on the "country ceiling effect"—private ratings are bound upwards by their sovereign rating—but in these countries idiosyncratic information is irrelevant even for firms whose rating would lie anyhow way below their sovereign. Accordingly, we document that the information content of firm ratings is much smaller in developing countries than in developed countries. Third, we show that cross-country indicators of information quality, rule of law and other institutional quality indicators help explain this unsatisfactory situation but do not solve the puzzle entirely. Global rating agencies need also to improve their rating methodology to meet the challenges of the emerging market ratings.

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# How Do Global Credit Rating Agencies Rate Firms from Developing Countries?

Li-Gang Liu and Giovanni Ferri\*

## 1. Introduction

Credit rating agencies are an integral part of modern capital markets. Their assessments on sovereign and corporate entities have been increasingly used as benchmarks by regulators and investors.<sup>1</sup> The rating industry counts only three major world players—Moody's, Standard & Poor's (S&P), Fitch-IBCA, all originating in the United States—that have become global following the dramatic growth of international financial markets.<sup>2</sup> But do these global rating agencies really think globally? In other words, do they convey to markets high-quality information on borrowers in both developed and emerging economies?

This question has become pertinent after the harsh criticism rating agencies received following the East Asian financial crises. Besides, their expected worldwide influence will certainly be further expanded by the new Basel criteria linking bank capital asset requirements to corporate and sovereign ratings (Basel Committee on Banking Supervision, 2001). Indeed, in the course of the recent financial crises, rating agencies have been criticized for their pro-cyclical rating behaviors, which to a certain extent may have exacerbated the massive capital outflows from crisis countries. Given the considerable influence rating agencies exert on financial markets, their rating behavior and methodologies have also come under close scrutiny.<sup>3</sup> Studies on rating agencies' sovereign rating assignments have been extensive.<sup>4</sup> However, our understanding has so far been limited as to how credit rating agencies rate firms differently around the world. Specifically, cursory evidence and some research findings underline that rating criteria used for firms in developing countries differ with respect to those reserved to firms in developed countries.

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<sup>1</sup> For example, this is especially true for institutional investors who are generally bound by securities regulations prescribing that they only invest in countries or securities that are rated above the investment grade.

<sup>2</sup> See White (2001) for a critical assessment of the degree of competition and contestability in the credit rating industry.

<sup>3</sup> IMF (1999), for example, provides a comprehensive discussion of the problems faced in assigning ratings in developing countries and the analytical methodology used by credit rating agencies during the recent crises.

<sup>4</sup> Among others, see Ferri, Liu, and Stiglitz (1999) and Monfort and Mulder (2000) for recent assessments and also see Cantor and Packer (1994, 1996) for early analyses of rating agencies' behavior on sovereign ratings.

Indeed, this has become a critical issue as a tight linkage between sovereign and firm ratings seems to hold for developing countries but not for developed ones (Ferri, Liu, and Majnoni, 2001). Specifically, whenever there is a sovereign downgrading in developing countries, firms' ratings in those countries will also tend to be adversely affected. Furthermore, the correlation is very large, close to 0.7 for industrial firms in developing countries, whereas there is not much correlation for firms in developed countries. Such rating behavior is likely to put firms in developing countries in a rather disadvantaged position whenever their sovereign experiences a downgrading—possibly even an excessive disadvantage with respect to the evolution in such firms' underlying fundamentals—and/or during an economic downturn.<sup>5</sup> Such a distinct rating pattern naturally raises questions. In particular, how do rating agencies distinguish credit risks versus their corresponding sovereign risks for firms in developing countries?

This paper intends to address that key question. Specifically, the paper aims at examining the contribution of firm-specific information in each individual firm's rating assignment, in addition to its country's corresponding sovereign rating. The revealed importance of firm-level information as measured in weights is compared with that of the firm's country's sovereign rating. The causes of the difference in both developed and developing countries are also carefully scrutinized. The paper also investigates the relationship between the level of information disclosure and the importance of firm-level information in the assignment of firm ratings. The ability of rating agencies to reduce information asymmetry under different market environments is also under assessment and comparison.

In order to carry out our examination, we ventured to build a large database accurately matching around the world sovereign ratings, individual firms' ratings and those individual firms' risk indicators that rating agencies reportedly use in rating assignments. The database covers three years: 1997, 1998 and 1999. Accordingly, the period over which we cast our analysis is relatively homogeneous as to regimes of international mobility of capital. We also complement our database with the widely used law and finance indicators proposed by La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) as well as with the information quality indicator recently proposed by Chan-Lee at the ADB Institute (2001). On this, we have some a priori. First, comparably less public information on individual firms may be available in countries endowed with underdeveloped financial markets that are therefore more opaque. Second, any time rating agencies disclose additional information on individual firms' risks, such action should have more value the more opaque is the market. Third, rating agencies' ability may, however, be inversely related to the degree of countries' financial market opaqueness.

The main findings of this paper are as follows. First, we show that sovereign risks contribute a major part of firms' ratings in developing countries, whereas such risks play a negligible role in assigning firms' ratings in developed countries. Second, we demonstrate that this result for developing countries partly depends on the “country ceiling effect”—private ratings are bound upwards by their sovereign rating—but in

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<sup>5</sup> Although Ederington, Yawitz and Roberts (1987) show that market yields on bonds do reflect publicly available financial statistics on issuers, besides the ratings of the issue, this evidence is hardly relevant to our context. Indeed, their data refers to the US and does not reflect the information asymmetry in LDCs.

these countries idiosyncratic information is irrelevant even for firms whose rating would lie anyhow way below their sovereign. Accordingly, we document that the information content in developing countries' ratings is much smaller than in developed countries. Third, we find that cross-country indicators of information quality, rule of law etc. help explain this unsatisfactory situation but do not solve the puzzle entirely.

This paper proceeds by first discussing rating methodologies of major international rating agencies such as Moody's and S&P (Section 2). Their track record in providing market information to investors in their assessing sovereign and firm risks in developed and developing countries is then considered. The core of the issues raised in this paper and methodology of econometric estimation are discussed in Section 3. Section 4 presents the data to be used for the empirical estimation. The information content of firm-level ratings—i.e., idiosyncratic risk vs. country risk—is empirically examined in Section 5. Section 6 concludes and sheds light on policy implications.

## **2. Rating Methodology of Global Credit Rating Agencies**

### ***2.1 The General Principles***

Possibly under pressure from market participants, international institutions, and academia, the global credit ratings agencies (GCRAs) have recently started to publish their ratings criteria and explain their rationales for ratings' changes to the public in a regular fashion. These publications are also the means for the public to gauge GCRAs' rating philosophy and methodologies on their various types of issue and issuer ratings. A firm's desire to obtain a credit rating is often motivated by its need for issuing debt-related instruments in capital markets. However, information asymmetry is one of the major obstacles to the firm's endeavor. To reduce the information asymmetry problem, the firm has to seek a credit rating from an independent credit rating agency. This is because potential creditors such as banks and institutional investors frequently rely on external ratings as a yardstick for the borrower's credit and default risks. In addition, if a firm is incorporated outside of the major public and private debt markets located in the US, the EU, and Japan and attempts to raise funds there, it would have to obtain a credit rating by a GRCA in order for it to enter such markets.<sup>6</sup>

The process to obtain a credit rating on a particular issue usually starts with a request from the firm who has expressed an interest in securing a rating before a bond issuance.<sup>7</sup> After signing a letter of rating agreement, a series of meetings between the issuer and the rating agency ensues. Analysts and corporate financial officers then exchange queries, views and information relevant to coming up with a credit rating of the firm. The time needed to assign the rating will usually take about 6 to 12 weeks for S&P (S&P, 1998) and a similar length of time for Moody's. Fees charged on the issuer vary with the nature of issues or issuers and time to come up with the rating. However,

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<sup>6</sup> This is true even though rating fees charged by GCRAs are in general higher than at domestic or local credit rating agencies.

<sup>7</sup> To be sure, recently issuers have been requesting credit ratings also for other purposes, even in the absence of current bond issuance. The sophistication and innovation of financial products postulates increased use of such issuer ratings. In addition, in some cases, rating agencies elaborate "unsolicited" ratings, to be disclosed to the public only in case the interested party has no objection.

the standard time could be reduced if there is an urgent market need or if the firm is forthcoming with its information disclosure as well as if its financial statements are highly accurate. Credit rating agencies will also ensure confidentiality if sensitive information of the rated firm is provided. In this sense, rating agencies do have information that other market participants do not have. Such ratings will better reflect the firm's ability to honor its debt obligations. However, in most cases, credit ratings assignments are mainly based on publicly available information.<sup>8</sup>

Table 1 summarizes corporate rating criteria published by Standard & Poor's. Credit rating criteria often encompass a set of both qualitative and quantitative indicators. In general, a firm's growth potential, its capital requirements, the degree of competition in its market and industrial environment, its productive diversification and ownership structure are included as business risks. For example, management quality is generally considered as an important element in determining a firm's ability in honoring its future debt obligations; but it is also difficult to quantify. It will be up to the analysts to evaluate by probing managers about their risk profiles, strategies and management philosophy. Subjective judgements often play an important role in this part of the rating process. However, a firm's track record of financial performance can act as a proxy of management quality. Analysts also evaluate other qualitative information such as: (i) what sector the firm belongs to; (ii) whether it is a capital intensive firm or not; (iii) competition in the sector and the firm's position within its industry; (iv) the firm's ownership structure; and (v) other indicators pertaining to the firm's commitment to timely payments of its debt obligations.

Obviously, a firm's ability to honor its debt can be best assessed from its income statements, balance sheets, and indicative financial performance ratios. This quantitative information includes a set of financial indicators that are likely to determine the ability of the issuer to generate future income to fulfill its timely debt repayment obligations. The most important, perhaps, among the set of performance ratios is whether the firm can generate cash to meet its timely debt repayment (Moody's, 2000). In general, the cash flow adequacy ratio is measured by the firm's coverage on its interest rate obligations. The second most important financial indicator is whether a firm has overly extended itself: this can be gauged through the measure of its debt leverage. This indicator often reflects the firm's capital structure and assets protection. The third most important financial indicator measures the firm's profitability and efficiency. The firm's returns on equity, on assets, or on its permanent capital are often used to this purpose. These indicators can also be used to track the firm's management quality. Finally, other financial risks—such as whether the firm can withstand business cycles and financial flexibility in a stress scenario—are also considered. These stress tests, however, are not based on true forecasts of the firm's future performance. Rather, generally, they are based on the firm's past performance as revealed by its 3 to 5 years' financial statements.

Although a firm's financial statement and ratios cannot represent the whole picture of the firm's ability to honor its debt, credit rating agencies do systematically compare their ratings directly with firms' financial ratios. Table 2 compares a set of rating categories with a set of firms' financial indicators pertinent to firms' cash flows,

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<sup>8</sup> The reliability and accuracy of publicly available information depends on the level of information disclosure. As we will discuss, this could be a particular problem for firms in LDCs.

capital structure, profitability, and financial flexibility for a group of 967 US-based firms. Several prominent features stand out. First, the higher is a firm's rating, the higher are its interest coverage ratios (EBIT and EBITDA interest coverage), as well as its funds flow to total debt and free operating cash flows as a share of total debt. Thus, the firm's cash flow and liquidity are very important determinants of the firm's rating. Second, highly-rated firms tend to have superior return on capital and enjoy better operating efficiency. Third, and not surprisingly, ratings are negatively related to firms' leverage ratios, measured as both long-term debt and gross total debt as a whole. Indeed, as rating grades move below BBB, the "border line" between investment grades versus speculative investment grades, the financial ratios also deteriorate markedly and the worsening is especially pronounced in interest coverage ratios, profitability, and leverage ratios.

World geographical location of the firm plays a very important role in its rating assignment. Indeed, it can be critical for firms located in non-OECD areas since country risks (as represented by sovereign risks) are closely related to firm-level risks. It is understood that to some extent such a close relationship between firm ratings and sovereign ratings is justifiable. This is because of a well-observed yet not well documented phenomenon, namely macroeconomic cycles are more vicious in Less Developed Countries (LDCs) than in Developed Countries (DCs). Generally, firms will directly suffer from such macroeconomic shocks, irrespective of the quality of their management and operations. This is especially true when countries are going through a current account cum-financial crisis (the "twin crises" of Kaminsky and Reinhart, 1999), or are experiencing political instability and civil strife. This is perhaps why a country-ceiling is normally capped on local firms. Such a consideration is a legitimate one. Specifically, in sectors such as the banking sector, the impact of an adverse shock, for example, a balance of payment shock, can be inescapable (Kaminsky and Reinhart, 1999).

Similarly to those for firms, sovereign rating criteria include both qualitative and quantitative aspects of evaluation.<sup>9</sup> The sovereign rating not only takes into account the country's tangible ability to pay back its debt obligations, but offers also an implicit evaluation of its institutional quality, such as rule of law, political stability, and general commitment to carry out rule-based capital market transactions.

## ***2.2 The Unsatisfactory Situation with LDC Firms' Ratings***

The country ceiling based rating behavior has also its unpleasant side effects. As Ferri-Liu-Majnoni (2001) demonstrates, whenever there is a sovereign downgrade, this tends to trigger also a firm downgrade. The impact is indeed asymmetric in the sense that the average firm downgrades generally follow with a sovereign downgrading whereas a sovereign upgrading does not necessarily lead to an average firm upgrading: Figures 1 through 4 suggest this occurred in the East Asian crisis and in its aftermath.

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<sup>9</sup> See S&P, Moody's, Cantor and Packer (1994) and Ferri, Liu, and Stiglitz (1999) for a survey of sovereign rating criteria.

Based on Moody's data for a large set of countries,<sup>10</sup> Figure 1 reports on the  $x$  axis yearly minimum sovereign ratings in 1996 (pre-crisis) and on the  $y$  axis the relative 1998 (peak-of-the-crisis) yearly minimum sovereign ratings. The rating-transition graph can be read as follows. Figure 1 is divided into different regions by three lines: the 45° continuous line contrasts 1996 with 1998 ratings; the vertical (horizontal) dotted line separates below-investment-grade from above-investment-grade ratings for 1996 (1998). Points lying below (above) the 45° line identify those countries suffering a downgrade (enjoying an upgrade) between 1996 and 1998; points lying on the 45° line refer to those countries whose rating did not change. In addition, the horizontal and vertical dotted lines divide the graph into four quadrants. Points in the Northwest (Southeast) quadrant identify countries holding above-investment-grade (below-investment-grade) ratings in both 1996 and 1998. Points in the Southwest (Northeast) quadrant identify countries holding above-investment-grade (below-investment-grade) ratings in 1996 and switching to below-investment-grade (above-investment-grade) in 1998.

Figure 1 highlights downgrades for Brazil, India and Venezuela, but the sharpest downgrades are for the East Asian crisis countries: Indonesia, Korea and Thailand fall below investment grade and Malaysia comes close to the threshold. Figure 2 shows that corporate ratings follow closely, being sharpest in Indonesia, but plunging the average corporation below-investment-grade also in Korea and in Thailand.<sup>11</sup> To be sure, Figure 3 shows that both the Korean and Thai sovereign ratings are brought back to investment grade in 1999, but Figure 4 displays that this recovery does not materialize as quickly for Korean and Thai corporations.

Such unsatisfactory rating behaviors also have serious consequences. First, too tight a rating between firm and sovereign ratings will make it difficult for investors to distinguish country risks vs. idiosyncratic credit risks of firms in emerging markets. As a consequence, investors are not able to disentangle firm-related risks from country-related risks and therefore tend to shun all sectors of the country. This is perhaps one of the reasons behind the herding behavior of international capital flows to developing countries. Indeed, rating agencies have also realized that the tight band between firm and sovereign ratings tends to impose constraints on the accurate pricing of risks. As an alternative, domestic currency ratings and national rating scales were introduced as a compromise solution to this problem. However, the meaning of the national scale system is not quite the same as the global rating scales of the GCRA's, which in practice indicate the likelihood of default. The history of domestic currency ratings is also too short to be used as a default indicator.

Second, simply relying on sovereign risks to determine a firm's rating, without carefully analyzing credit risks of firms, can be sometimes misleading. The defaults of PRC's Guangdong International Trust and Invest Company (GITIC) and the Hainan

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<sup>10</sup> Specifically, for each of the two years, we consider the year-minimum sovereign rating for the following 31 countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, People's Republic of China, Colombia, Denmark, Finland, France, Germany, India, Indonesia, Japan, Korea, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Philippines, Singapore, Sweden, Switzerland, Thailand, UK, USA and Venezuela.

<sup>11</sup> Specifically, for each of the two years, we consider the year-minimum average-non-bank rating for the 31 countries included in Figure 1.

Development Bank are cases in point. Since the information disclosure on these firms was poor, GCRA's then relied on the assumption that the state is an implicit guarantor to assign ratings. The perceived guarantee by the state allows the two companies to get ratings that may not have been consistent with their financial performance and management quality.

Third, poor information disclosure at the firm level is frequently cited as the main reason for using the sovereign rating as the benchmark for corresponding firm ratings. However, the role of rating agencies is to process financial information of firms and to reduce the information asymmetry between investors and firms. If GCRA's do not examine closely the firm's performance, one wonders whether they are effectively exercising their due diligence in properly checking relevant information before assigning a firm rating. This is a crucial issue also because firms pay to get rated. The efficacy of GCRA's in reducing information asymmetry in emerging markets is then cast in doubt.

Fourth, the expected regulatory changes in bank capital adequacy ratios will give a new meaning to credit ratings. Despite imperfections in rating agencies' rating behavior and methodologies especially felt during crisis episodes, past experiences do show that under normal circumstances they facilitate the efficient functioning of capital markets so as to effectively reduce fundamental distortions of financial markets such as information asymmetry and costs of information gathering. The new Basel accord on bank capital asset requirements, which is expected to be finalized at end of 2001, will promote external ratings issued by rating agencies to a role even more important than in the past. The new Accord modulates capital asset requirements according to whether banks' counterparts are rated and, when rated, according to the level of their ratings. Accordingly, developing countries may be disadvantaged in two ways. First, as ratings are generally low and less widespread in developing countries, capital requirements—and hence the cost of credit—may increase irrespectively of corporate profitability. Second, if private ratings in developing countries are excessively sensitive to the respective sovereign ratings, the impact of—possibly excessive—sovereign downgrading will be amplified by the new Basel criteria.

### **3. Estimation Framework**

Now we first review the literature along similar lines of research before moving into our own model specification. Using performance indicators of firms to predict rating consistency or accuracy is not a novel approach. Empirical studies examining rating consistency using indicators of firm performance have been extensive. Indeed, a small set of financial statistics such as the interest coverage ratio, profitability, leverage, and asset size can predict approximately two-thirds of ratings (Ederington, 1985). The fact that financial indicators alone cannot fully predict ratings should not be viewed as a surprise.<sup>12</sup> Past studies do show that credit ratings indeed disclose to the market useful

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<sup>12</sup> For example, comparing different classifications of models in predicting rating consistency, Ederington (1985) shows that an unordered logit model performs better than linear, ordered probit, and linear discriminant ones. Resti and Omachi (2001) using a logit model demonstrate that unexplained discordant pairs are large enough that one cannot totally rely on financial indicators alone to predict ratings since credit rating analysts do use their subjective judgment in assigning ratings. In similar studies, but the

information beyond what is contained in the firm's financial ratios, although this additional information depends on the timeliness of credit reviews by the credit rating agencies (Ederington, Yawitz, and Roberts, 1987).

Existing studies mostly focus on the accuracy of ratings assigned by rating agencies. Though differentiated by sector, the sample of firms in these studies is also drawn from the same macroeconomic environment, typically the US. Thus, an important ingredient that affects individual firm ratings such as the sovereign risks does not factor into the analysis. This approach is no longer valid when referring to a diversified range of firms from different countries and regions. In addition, rather than emphasizing the exclusive role of financial indicators in predicting credit ratings, we allow for the fact that financial indicators can only predict a large part of firms' idiosyncratic risks. A firm's rating would have to be linked with its environment where the firm operates, i.e. its overall industrial, institutional, and macroeconomic environment. Such an approach would not only allow us to investigate the sovereign and firm rating relationship—which has not been investigated before—but would also permit us to compare the relative importance of sovereign risks in the process of assigning an individual firm's credit rating. Furthermore, we also attempt to explain the reason why there is a disparity in accounting for the relative importance of firm-level information in a firm's rating assignment.

### 3.1 Estimation Model

We assume that, for profit reasons, a rating agency attempts to capture a firm's risk in its rating assignment as accurately as possible. This is because the credit rating business relies on its accuracy of predicting default and thus its reputation capital to generate continuous business. This motivation can be formalized by minimizing the squared distance between a firm's true risk,  $R_{it}^t$  and its assigned firm rating,  $R_{it}^f$ . The rating agency's utility function can be expressed as follows:

$$U_{it} = -[R_{it}^f - R_{it}^t]^2 \quad (1)$$

Where  $R_{it}^t$  consists of two components: one related to the firm's idiosyncratic risks (or credit risk) and the other related to the overall macroeconomic risk, as captured by the sovereign risk,  $R_{it}^s$ . The subscript  $i$  represents firms and  $t$  represents time horizon of the sample. Hence,  $R_{it}^t$  can then be formulated as follows:

$$R_{it}^t = \alpha R_{it}^c + \beta R_{it}^s \quad (2)$$

Where  $R_{it}^c$  is the firm's idiosyncratic risk and  $R_{it}^s$  is the aggregate risk of the country where the firm is located. For the sake of simplicity, we assume that the aggregate country risk can be fully captured by the sovereign risk rating. Based on the

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orientation is on Moody's banking sector strength ratings, Laruccia and Revoltella (2000) and Poon, Firth, and Fung (1999) also validate the financial indicator approach in predicting rating consistency and accuracy, in spite of unexplained factors not associated with firms' financial indicators. Though from a different angle, these studies present some evidence that credit ratings possess more information than financial indicators alone.



discussion in the previous section, we know that both qualitative and quantitative indicators are used to come up with a firm rating. Although qualitative indicators are hard to quantify, they are important in the rating assignment. The quantitative indicators are basically derived from the firm's balance sheet data, usually related to the firm's cash flow, its profitability, its leverage ratio, and its asset size.  $R_{it}^c$  can be further decomposed as follows:

$$R_{it}^c = \eta R_{it}^q + (1-\eta)R_{it}^l \quad (3)$$

Where  $R_{it}^q$  summarizes quantitative rating criteria and  $R_{it}^l$  summarizes qualitative rating criteria. Thus, the rating agency's detailed utility function can be rewritten as:

$$U_{it} = -[R_{it}^f - \alpha(\eta R_{it}^q + (1-\eta)R_{it}^l) - \beta R_{it}^s]^2 \quad (4)$$

Maximizing the utility function with respect to the rating agency's rating,  $R_{it}^f$ , we have following first order condition:

$$R_{it}^{f*} = \lambda R_{it}^q + \mu R_{it}^l + \beta R_{it}^s \quad (5), \text{ where}$$

$$\lambda = \alpha\eta$$

$$\mu = \alpha(1-\eta)$$

In order for us to interpret the results in terms of contribution weights to the firm's rating assignment of each of the three components, i.e.,  $R_{it}^q$ ,  $R_{it}^l$ , and  $R_{it}^s$ , we then normalize the coefficients of these variables by imposing a constraint:  $\mu = 1 - \lambda - \beta$ . Finally, the estimation equation can be further rewritten as follows:

$$R_{it}^{f*} = \lambda R_{it}^q + \beta R_{it}^s + (1 - \lambda - \beta)R_{it}^l \quad (6)$$

Other than the firm's quantifiable rating criteria and sovereign risk ratings,  $R_{it}^l$  is not observable. Following a procedure similar to that used by Levitt (1996), we can rewrite equation (6) using an indicator variable notation:

$$R_{it}^{f*} = \lambda R_{it}^q + \beta R_{it}^s + [(1 - \lambda - \beta)R_{it}^l] * I_{it} \quad (7)$$

where  $I_{it}$  is firm specific dummies. To implement such an empirical estimation equation requires a considerably large panel data set.

### 3.2 Estimation Approach

Our optimal aim is to estimate equation (7) in a way to identify the weight of the qualitative rating criteria ( $R_{it}^l$ ) and ascertain whether such weights vary across developed and developing countries. However, this will put a restrictive and thereby high requirement on the data. A large enough panel data are needed for such an analysis because of the loss of degrees of freedom directly related to incorporating  $I_{it}$  dummies. As discussed in the next section, we only have a three-year averaged cross sectional data of 563 firms of 45 countries. Instead, we assume that financial indicators implicitly

encompass qualitative indicators about a firm.<sup>13</sup> Thus, predicted ratings using financial performance data of rated firms should contain both qualitative and quantitative assessment of rating agencies on rated firms.

Accordingly, we estimate a revised econometric specification:

$$R_{it}^{f*} = \lambda R_{it}^{ql} + \beta R_{it}^s + \lambda_1^{LDC} R_{it}^{ql} + \beta_1^{LDC} R_{it}^s + \varepsilon \quad (8)$$

where  $R_{it}^{ql}$  is the estimated firms' rating which is supposed to contain both qualitative and quantitative assessment of ratings.  $\lambda_1^{LDC} R_{it}^{ql}$  and  $\beta_1^{LDC} R_{it}^s$  identify the expected specific effects for LDCs. The specific regressors employed will be detailed below.

#### 4. The Data

Matching a firm's rating information with its corresponding financial performance information is a painstaking process. This is especially challenging in that we have to assemble a dataset of 563 firms scattered in 45 countries across the globe. We decided to use the data published by S&P's credit statistics because of its relatively large coverage of firms from emerging economies and its relative ease in assembling a dataset that is satisfactory in terms of consistency. We also exclude US firms from the sample because of their large number and homogeneity. In addition, we use only long-term issuer's ratings to avoid inconsistency arising from different types of issues. We are able to compile a dataset consisting of information of ratings as well as a set of averaged three-year financial performance indicators from 1997 to 1999. Table 3 presents the distribution of countries as well as firms of the countries represented in the data sample. Close to a quarter of firms are from LDCs. Summary statistics of ratings of the dataset are presented in Table 4. The comparison with US firms' performance presented in Table 1 is revealing. For firms rated between A and AAA in our sample, interest coverage ratios as measured by EBIT and EBITDA interest coverage are in general lower than for US firms. Returns to capital and operating income margins, a measure of firms' efficiency, are also lower than those of US firms; so are the leverage ratios. However, when measured in terms of absolute numbers with respect to sales, equity, and assets, our AAA-rated firms have a much larger median value than the US firms. This is also true for our AA-rated and A-rated firms. This comparison also suggests that US firms are more efficiently run than the firms in our sample if using the same set of categories. This may also be attributed to market discipline and competition. A similar pattern also emerges for our B, BB, and BBB rated firms.

Firms from emerging market economies are generally rated BBB or below (Table 5). This is largely due to the fact that the majority of the sovereign ratings in these countries is also rated BBB or below. Compared with other firms in the sample, firms from LDCs are more profitable since their returns to capital are higher. They are also quiet efficiently run as indicated by their operating income as a share of sales. They in general have a large equity and assets size. In addition, for the same rating categories,

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<sup>13</sup> One could imagine that the qualitative indicators of a firm such as management quality and efficiency can be reflected in their rate to assets and operating income margin, for example.

the leverage ratios for emerging economies are lower, contrary to commonly held perceptions about emerging market firms.

A simple comparison of the median value of firms' financial performance indicators between our sample and the sample of US firms as presented in Table 2 reveals that non-US firms in our sample tend to have lower interest rate coverage and operating efficiency than US firms. As a result, the US firms tend to have a higher leverage ratio at the same rating category, but with less equity and assets.

## 5. Empirical Results

### 5.1 *Idiosyncratic vs. Sovereign Risks*

The first step of our analysis consists in estimating firm ratings based exclusively on those quantitative performance indicators that rating agencies reportedly use. These are several key financial indicators often mentioned by rating agencies. The decision as to which specific ones to include in the estimating equation can be determined both by our priors and by their statistical significance. Table 6 presents the statistical relationship between actual ratings assigned by a rating agency and a set of financial indicators using a step-wise regression. As we can see from column I of Table 6, EBITINT, the interest coverage ratio, ROC, the return on capital, OPERINC, the ratio of operating income to sales, DEBTRATIO, the debt leverage ratio, TOTASSETS, the total assets are all statistically significant and also have the expected signs. Specifically, a firm's liquidity (EBITINT), profitability (ROC, OPERINC), size (TOTASSETS) are statistically significant and positively related to ratings, whereas as expected the debt leverage ratio (DEBTRATIO) is statistically significant and negatively related to firm ratings. In addition, as indicated by column II of Table 6, GOVTOWNER, a dummy taking value 1 for firms owned by the government, SUBSDY, a dummy taking value 1 for subsidiaries of foreign companies, are also factors affecting a firm's rating.<sup>14</sup> In addition, sector dummies such as automobiles (AUTO), forestry-related manufacturing (FOREST), home building and civil engineering (HOME), media (MEDIA), steel and mineral products (METALS) are also important. In practice, the coefficients estimated from Column II of Table 6 are used to approximate a firm's estimated rating, which is then used as a proxy to represent a firm's "true" credit risks.

The next step investigates the determinants of actual individual firm ratings. Through this, we assess the contribution of these estimated firm ratings together with the contribution of the sovereign rating of the country where the firm belongs. Table 7 presents the basic results of the contribution of firm risks and sovereign risks to firm ratings. To facilitate our discussion in terms of the contribution of the major components of firm ratings, we take logs on sovereign and firm ratings.<sup>15</sup> Columns in set I present the results using OLS; columns in set II also use OLS but adjust for

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<sup>14</sup> We also considered LISTED, a dummy taking value 1 for firms listed on a stock exchange, which did not turn out to be significant.

<sup>15</sup> This, in fact, implies that the original function form is Cobb-Douglas, i.e.  $R_{it}^{f*} = (R_{it}^{ql})^\lambda (R_{it}^s)^\beta$ . Since there is no theoretical basis on the relationship between the firm rating and the sovereign rating, we do not impose any restrictions on  $\lambda$  and  $\beta$ .

heteroschedaticity;<sup>16</sup> and columns in set III re-run the same equations using two stage least squares with instrumental variables. We now discuss our main findings in turn.

Column IIA examines the relationship between a firm's actual rating and its corresponding firm credit risk and sovereign risk. The dependent variable is the average firm rating. The explanatory variables are the estimated average firm ratings derived (from Table 6) and the average sovereign ratings. Specifically, AVGFRAT1 represents the estimated average firm ratings; AVGSRAT represents the actual sovereign ratings; NONOECDFRAT1 is the result of multiplying AVGFRAT1 by NONOECD, a dummy taking value 1 for countries that belong to the developing country group. NONOECDSRAT is the result of multiplying AVGSRAT by the NONOECD dummy. The basic idea behind inserting these two variables is to ascertain whether AVGFRAT1 and AVGSRAT have a different impact for OECD vs. NONOECD countries.

Indeed, the results of the estimation by OLS are quite revealing. As expected and given the dominance of the firms from OECD countries, the message from these results is that sovereign risks are not important; but firm credit risks play a major role in determining a firm's actual credit rating. However, if we disentangle the effects by country groups, the impact of firm and sovereign risks in a firm's rating tends to be differentiated. AVGFRAT1 is more important for OECD countries, where its elasticity is 1.3, indicating that one percentage change in the credit risk of a firm will lead to a change of more than 1 percentage points in the actual rating assignment of the firm. But for NONOECD countries, the elasticity is 0.49, indicating one percentage change in the credit risk of a firm in developing countries will only lead to less than a percentage change in the firm's actual rating. Such contrast is more prominent when looking at the effect of the sovereign risk on actual firm ratings. For OECD countries, the sovereign risk effect on firm ratings is absent. However, the sovereign effect of NONOECD countries has a strong positive effect on the actual firm rating. The elasticity of NONOECDSRAT is 0.58, implying that 1 percentage point change in the sovereign risk will contribute to about 0.6 percentage point change in the actual firm rating.

As discussed in the section on the rating methodology of rating agencies, this strong effect of SOVRAT in LDCs could stem from the country sovereign ceiling effect. In view of this, we estimated two additional specifications of the rating's determinants equation. In the first, we dichotomize NONOECDFRAT1 into NONOECDFRAT1A—the firms whose AVGFRAT1 lies at or above their SOVRAT, for which the country sovereign ceiling might be binding—and NONOECDFRAT1B, the other firms whose AVGFRAT1 lies below their SOVRAT. The regression results are presented in column IIB of Table 7.

The results show that in this specification the effect of NONOECDFRAT1A is smaller (only 0.37 compared with a general effect just above 1) and that of NONOECDSRAT1A is even stronger (0.77), while SOVRAT turns out to be significant here, albeit with a small coefficient (0.14).

The results for the other firm group—whose AVGFRAT1 lies below their SOVRAT—are presented in column IIC of Table 7. As expected, the impact of an individual firm's credit risk has a higher contribution (0.56) compared with that in column IIB. In addition, the contribution of the sovereign risk to actual ratings tends to

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<sup>16</sup> Using the Breusch-Pagan test, there appears to be heteroschedaticity. We then use the White (1980) methods to adjust for heteroschedaticity.

be higher as well (0.90), implying that sovereign risks are even more important when the country ceiling is binding.

In order to check that our results are not driven by endogeneity,<sup>17</sup> we re-estimate specifications IIB and IIC using two stage least squares with instrumental variables.<sup>18</sup> Results are reported in columns IIIA, IIIB, and IIIC of Table 7, respectively. Although the results presented in IIIA are qualitatively similar to those in IIA, the size of the coefficient changes considerably. The impact of the sovereign effect for developing countries increases from the previous 0.58 to the current 0.69 and the impact of firm credit effect decreases from the previous 0.49 to the current 0.18. The most notable change occurs to IIIB and IIIC when instrumental variables are applied. On one hand, the specific coefficient of AVGFRAT1A becomes 1.186 but that of NONOECDFRAT1A reaches  $-1.991$ , thus rendering negative ( $-0.81$ ) the contribution of firm risks for non-OECD countries. On the other hand, the contribution of sovereign risk becomes overwhelming. The coefficient increases from the previous 0.76 to the current 2.03.

Such a result implies that when the country ceiling effect is binding—i.e., the estimated firm rating is higher than the actual sovereign rating—the information content of actual firm ratings is mainly driven by the sovereign information. Any firm credit risk information does not contribute much, if at all, to the actual firm rating. In fact, any further information on the firm credit risk tends to have a negative impact in the actual rating assignment. The results for firms whose country ceiling is actually non binding—i.e., the estimated firm risk is actually lower than its sovereign risk—are more or less consistent with IIC. The elasticity of NONOECDFRAT1B is 0.21, but is not statistically significant. Similarly, the elasticity for sovereign non-OECD countries is more than 1, but is not statistically significant, either. Such a result seems to indicate that a firm's credit risk is important in determining its actual rating. Its sovereign information is even more important when its country ceiling is binding. Arguably, the results may be sensitive to the instrumental variables used and should not be taken wholly literally: What we want to stress from them is that our qualitative results appear robust.

## 5.2 Discussion

The pattern of how rating agencies rate firms from developing countries is very well revealed as discussed in the previous section. The fundamental question is why GCRA's follow such patterns in their private rating assignment process in LDCs. Why don't they give to firms' performance indicators in LDCs a weight comparable to the one they

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<sup>17</sup> The potential endogeneity implies that the function form might also be non-linear. However, since we do not have a theoretical model that gives an explicit non-linear function form, we continue to use our specification (8). It would be interesting to explore and diagnose non-linearity of the estimating specification in future research.

<sup>18</sup> The instruments employed are GDP per capita, rule of law index, Frankel and Romer (1999) derived natural trade as a measure of openness, distance from the equator, and some sector dummies. Except for sector dummies, they are all in logs. We also examine the correlation of these instruments with the regressors as a way to test the robustness of the instruments. Our results indicate that these instruments are highly correlated with the regressors and the rationale for using such variables is in line with the recent literature on economic openness and institution quality and economic development, such as Hall and Jones (1999) and Frankel and Romer (1999).

normally use in DCs? To our knowledge, the theoretical literature has not yet provided satisfactory explanations to this specific problem. Nevertheless, based on related literature, we can lay out two types of possible arguments: one hinges on the industrial structure of GCRA and the other stems from the existence of perverse incentives within a repeated strategic interaction framework between GCRA and investors.

The first argument runs as follows. As is well known and documented, the GCRA industry is characterized by low or nonexistent competition and contestability. Accordingly, we can assume that GCRA—at least jointly but possibly even on an individual basis—enjoy a non-negligible market power. This might lead to rent extraction by GCRA on rated entities: in spite of the little data available—a case of little transparency by agents advocating for maximum transparency—White (2001) documents that bond rating is quite profitable. Although, this raises a distributive problem, as rated firms may be subject to excessive cost to get their ratings, it does not question yet the industry efficiency. However, this is not the end of the story.

Besides extracting rent, a firm enjoying market power may indulge in under-investing. And if GCRA under-invest this is indeed a source of inefficiency. If GCRA, in fact, invest less than the socially optimal amount in collecting and processing information on rated entities, the quality of the ratings they issue is sub-optimal, and may decay over time. The next question is: Why should GCRA's under-investment problem be more acute for LDCs than for DCs? The argument here may go along the following lines. Even though exit is precluded by the lack of competition, GCRA's customers and authorities could use voice to induce GCRA to invest more in collecting and processing information on rated entities. But the bulk of their customers—both rated entities and investors—and the authorities they may listen to—e.g. the U.S. Securities and Exchange Commission—are based in DCs, not in LDCs. According to this interpretation, it would be plausible that the information content of firm ratings in LDCs is lower because GCRA invest less there in collecting and processing idiosyncratic information. To be more precise, for this argument to be proved under-investment in LDCs might not necessarily be in absolute terms, i.e. fewer analysts per rated entity. Rather, it could be in relative terms, i.e. the number of analysts per rated entity could even be higher in LDCs, but not high enough to compensate for the lower information quality in these countries. Therefore, even if we were to recognize that the quality of information in LDCs is not as good as in DCs, there would still be a question as to why GCRA do not invest enough in LDCs.<sup>19</sup> In other words, there should always be a fee high enough to justify adequate investment by GCRA in LDCs.

The second argument descends from the possibility that there exist perverse incentives within a repeated strategic interaction framework between GCRA and investors. Bernheim (1994) tries to explain why we observe that often the conveying of information among parties is governed by conformity, i.e. party A will not necessarily tell party B what party A knows or thinks, but rather what party A believes best in order to build the reputation she needs with party B. Loury (1994)—through a non-formalized paper—and Morris (2001)—using a formal model—apply this reputational approach to

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<sup>19</sup> For example, Ferri (2001) shows that, with all other things being equal, firm ratings in non-OECD countries (but not in OECD ones) tend to increase when more analysts are employed on rated firms.

explain political correctness. Extrapolating from this literature, we propose the following possible explanation for GCRAs' unsatisfactory rating assignments in LDCs.

Suppose investors in DCs are somewhat negatively prejudiced with respect to the performance prospects of firms in LDCs. If the rating agency were to issue a strong positive signal on an LDC firm by granting it a rating above its sovereign, it would indeed be a powerful indication for investors. However, if the rating agency cares about maintaining a reputation of being conservative, it may have insufficient incentives to grant such a rating. It will in fact be the case that the rating agency cannot be 100 per cent sure that the LDC firm will actually outperform. Something could always happen and it is not optimal for the rating agency to take the risk of losing its reputation. According to this reasoning, although the rating agency often knows that the rated LDC firm is very good, it will have the incentive to conform the issued rating to the negative prejudice held by investors in DCs.

### ***5.3 Information Quality and Firm Rating Quality across Countries***

The essence of what we have argued thus far can be summarized as follows: Due to the spontaneous evolution of financial markets and to regulation, rating agencies are becoming more important on a global scale. In spite of the drop in the cost of acquiring information thanks to technological progress, the role of GCRAs is thus becoming even more fundamental for the working of world financial markets. Based on previous papers and on additional arguments, what we have questioned is the ability of GCRAs in reality to provide investors with guidance as to the specific risks of individual firms in LDCs. The main suspicion is that GCRAs do not (yet) adequately de-couple individual firm ratings and sovereign ratings in these countries.

Nevertheless, we know that the quality and reliability of information varies widely across countries. Then, it is a legitimate question to ask whether the smaller information content in firm ratings in LDCs simply reflects the fact that information quality is poorer in these countries. There are indeed many differences between emerging and mature capital markets; but one key difference between the two concerns information disclosure, as well as the enforcement of information disclosure. Such a difference is governed largely by the enforcement of the rule of law, which dictates also the quality of information disclosure. If rating agencies cannot trust the information published by firms in developing countries, they may tend either to discount such information or to rely on benchmark information such as sovereign and macroeconomic information—which is compiled in a consistent framework and published by international organizations such as the IMF and the World Bank. Thus GCRAs might hold sovereign information as more reliable than firm-level data. This might explain why the sovereign contribution in firm rating is substantial for firms from developing countries. Our hypothesis to test here is that the rating pattern can be explained by the quality of institutions and information of the home country where firms belong.

Table 8 presents the relationship between “institutional quality” and the “tightness” between firm and sovereign ratings. The “tightness” between sovereign and firm rating is measured as the standard deviation between a firm's actual rating and its corresponding sovereign rating (STDEVACT). As observed before, for developing countries, the two ratings are closely banded together, whereas for developed countries, they are not so.

Thus, the standard deviation between the firm and sovereign ratings tends to be much smaller in developing countries than in developed ones. The second “tightness” measure between the firm and sovereign ratings we use is the ratio of the standard deviation between the two ratings and the level of the sovereign rating (STDEVSORAT). Indeed, both measures of the closeness between the firm and sovereign risks can be well explained by the rule of law index developed by Transparency International (2000) and the information quality index recently developed by Chan-Lee (2001).<sup>20</sup>

The results indicate that the higher is the rule of law index, the higher the dispersion between the firm and sovereign ratings. Such a relationship is also statistically significant. However, for non-OECD country firms there is a negative and statistically significant relationship between the rule of law or information quality index and the dispersion between the firm rating and sovereign ratings. On one hand, this may imply that institutional quality matters as well when firm ratings are concerned. On the other hand, this result is telling us that the poorer information quality is not the whole story accounting for the smaller information content of firm ratings in emerging economies.

## 6. Conclusions and Policy Implications

This paper has shed light on the puzzling observation that firm and sovereign ratings patterns widely differ in developed versus developing countries. The starting point was observing that the close relationship between firm and sovereign ratings in developing countries is non-existent in developed countries. This naturally leads one to question the importance of information contents in the firm rating assignment. Our results indicated, not surprisingly, that in developed countries individual firm credit risks represent almost all the information contents of firm ratings. However, for firms in developing countries the bulk of the rating content rests with their sovereign risks only, while individual firm’s credit risks play a negligent role. Examining then the rationale behind such a pattern, we found that the quality of institution and the quality of information disclosure can partly explain this rating behavior, but do not totally solve the puzzle of firm ratings assignment by GCRA in emerging economies.

Our results have important policy implications: First, we demonstrated that firms in LDCs tend to be penalized because of their domicile, regardless of their profitability and performance, which implies low private ratings because of low sovereign ratings. Therefore, for LDC firms to obtain favorable ratings, it is imperative to improve their information disclosure and quality. In fact, this requires that developing countries strengthen their culture of rule of law and quality of information disclosure by investing more on social capital and institution building. As recent literature on growth and institutions demonstrates, enhancement of institutional quality can *cause* economic growth (Hall and Jones, 1999). Similarly, such improvement of institutions also has a positive impact on the cost of capital, which will be epitomized in the rating information for firms from developing countries. Second, at the same time, as things stand, from an international regulatory perspective, any measure linking to ratings would have a different bearing in DCs than in LDCs. On the part of LDCs, it would be desirable to

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<sup>20</sup> See his Policy Matrix Database for Assessing the Informational Quality of Financial Systems, online at [www.adbi.org/ChanLee/default0100731.htm](http://www.adbi.org/ChanLee/default0100731.htm)



devise incentives for GCRA's to improve on this situation. Since pricing the risk of a related party is a very difficult problem, there is not yet a satisfactorily theoretical and empirical solution. We believe it would be beneficial for both investors and LDC firms if GCRA's can also devise separate firm-level ratings based on firm specific risks only, similar to what Moody's have been doing in its Bank Financial Strength Rating. Indeed, the international financial institutions might also be keen to participate in this process of upgrading the quality of private ratings across the world. Finally, mechanisms of firm credit enhancement guaranteed by a credit bureau or by multinational institutions, such as the Multilateral Investment Guarantee Agency, could prove extremely beneficial in the short run and during a crisis situation toward improving private ratings and reducing the cost of capital in LDCs.

## Tables and Figures

**Table 1: Corporate Rating Criteria**

<b>Business Risk (Qualitative Rating Criteria)</b>	<b>Financial Risk (Quantitative Rating Criteria)</b>
<p><i>Growth Prospects:</i></p> <ul style="list-style-type: none"> <li>• Industry sector and trend</li> <li>• Technology change in the sector</li> <li>• Company's stand in the sector and peer comparison</li> <li>• Management quality</li> </ul> <p><i>Capital Requirements:</i></p> <ul style="list-style-type: none"> <li>• Fixed or working capital intensive</li> <li>• Need for capital additions</li> <li>• R&amp;D spending requirements</li> </ul> <p><i>Competitive Environment:</i></p> <ul style="list-style-type: none"> <li>• Nature of product (commodity or differentiated)</li> <li>• Competitors (domestic and foreign)</li> <li>• Barriers to entry</li> <li>• Access to basic inputs of production</li> <li>• Regulatory environment</li> </ul> <p><i>Diversification and Ownership Structure:</i></p> <ul style="list-style-type: none"> <li>• Ability to manage diversification</li> <li>• Strength of linkage to parent company including financial, management, operational, R&amp;D and technical support, position in the group, and relative size.</li> </ul>	<p><i>Cash Flow Adequacy:</i></p> <ul style="list-style-type: none"> <li>• Interest rate coverage ratios: EBIT and EBITDA interest coverage ratio</li> <li>• Funds flow as a share of total debt</li> <li>• Free operating cash flow as a share of total debt</li> </ul> <p><i>Capital Structure/Assets protection:</i></p> <ul style="list-style-type: none"> <li>• Leverage (total and net debt as a share of equity and total capital)</li> <li>• Debt structure, including assessments of lease, off-balance sheet obligations</li> </ul> <p><i>Profitability:</i></p> <ul style="list-style-type: none"> <li>• Specific financial targets: Return on equity, return on assets, return on permanent capital.</li> <li>• Historical, current, and projected performance</li> <li>• Performance through the business cycles</li> <li>• Earnings volatility</li> </ul> <p><i>Financial Flexibility:</i></p> <ul style="list-style-type: none"> <li>• Considerations related to legal problems, insurance coverage, restrictive covenants in loan agreements, or obligations to affiliated entities.</li> </ul>

Source: Standard & Poor's: Corporate Credit Ratings: A Guide

**Table 2: Adjusted Key Industrial Financial Ratios, Long-term Debt**

Three-year (1997-1999) medians	AAA	AA	A	BBB	BB	B	CCC
EBIT int. coverage ratio (x)	17.5	10.8	6.8	3.9	2.3	1.0	0.2
EBITDA int. coverage ratio (x)	21.8	14.6	9.6	6.1	3.8	2.0	1.4
Fund flows % total debt	105.8	55.8	46.1	30.5	19.2	9.4	5.8
Free Oper. Cash flow/total debt (%)	55.4	24.6	15.6	6.6	1.9	-4.5	-14.0
Return on Capital (%)	28.2	22.9	19.9	14.0	11.7	7.2	0.5
Operating income % sales	29.2	21.3	18.3	15.3	15.4	11.2	13.6
Long-term debt/total capital (%)	15.2	26.4	32.5	41.0	55.8	70.7	80.3
Total debt % Capital	26.9	35.6	40.1	47.4	61.3	74.3	89.4
Nos. of Companies	10	34	150	234	276	240	23

Source: Research: Adjusted Key US Industrial Financial Ratios, S&P, 07-Sep-2000.

**Table 3: Distribution of Firms by Country (3-Year Average Data)**

<b>Country</b>	<b>Number of Companies</b>	<b>Percentage</b>
Argentina	24	4.3
Australia	48	8.5
Belgium	2	0.4
Brazil	13	2.3
Canada	97	17.2
Chile	11	2.0
Colombia	3	0.5
Croatia	1	0.2
Czech Republic	1	0.2
Denmark	1	0.2
Dominican Republic	1	0.2
Egypt	1	0.2
Finland	6	1.1
France	28	5.0
Germany	13	2.3
Greece	2	0.4
Hong Kong, China	1	0.2
Hungary	1	0.2
India	2	0.4
Indonesia	12	2.1
Ireland	4	0.7
Israel	3	0.5
Italy	1	0.2
Japan	120	21.3
Malaysia	2	0.4
Mexico	34	6.0
Netherlands/Netherland Antilles	13	2.3
New Zealand	8	1.4
Norway	2	0.4
Panama	1	0.2
Philippines	3	0.5
Poland	3	0.5
Portugal	2	0.4
Russia	2	0.4
Singapore	1	0.2
Slovakia	1	0.2
South Africa	1	0.2
Rep. of Korea	5	0.9
Spain	2	0.4
Sweden	10	1.8
Switzerland	10	1.8
Thailand	5	0.9
Turkey	1	0.2
UK	59	10.5
Venezuela	2	0.4
<b>Total</b>	<b>563</b>	<b>100</b>
<i>Memorandum: Firms from Developing Countries</i>	135	24.8

**Table 4: Median Value of Credit Ratings and 3-Year Average Financial Indicators  
(All Countries including both OECD and Non-OECD Countries)**

Rating	AAA	AA	A	BBB	BB	B	CCC & below
EBIT int. cov. (x)	11.65	10.6	5.8	3.6	2.2	1.2	0.9
EBITDA int. cov. (x)	17.1	18.2	9.35	6.3	3.6	2.4	1.4
Return on Capital (%)	17.5	12.5	11.85	8.5	9.0	2.95	2.3
Oper. Inc. % Sales	19.15	15.35	16.7	15.9	16.55	12.4	9.5
Total Debt % Cap.	22.2	27	34.9	43	51.95	70.4	78
Sales (mil. \$)	33,385.5	7,154.2	5,111.3	2,091.7	978.2	458.0	423.9
Equity (mil. \$)	24,930.2	4,604.1	2,959.9	1,283.2	520.8	223.7	178.7
Total Assets (mil. \$)	43,995.5	9,659.4	6,054.7	3,000.2	1,660.1	946.5	781.5
No. of Firms	4	40	101	181	108	87	26

Note: Numbers are median values of 3-year financial averages (1997-99).  
Data Source: Standard & Poor's.

**Table 5: Median Value of Credit Ratings and 3-Year Averaged Financial Indicators (Non-OECD Developing Countries Only)**

Rating	AAA	AA	A	BBB	BB	B	CCC & below
EBIT int. cov. (x)	n.a.	n.a.	n.a.	3.05	2.0	1.2	1.0
EBITDA int. cov. (x)	n.a.	n.a.	n.a.	6.0	2.9	2.0	1.4
Return on Capital (%)	n.a.	n.a.	n.a.	10.9	11.1	6.4	2.15
Oper. Inc. % Sales	n.a.	n.a.	n.a.	33.8	20.3	17.7	12.45
Total Debt % Cap.	n.a.	n.a.	n.a.	41	47.75	56.9	70.8
Sales (mil. \$)	n.a.	n.a.	n.a.	1,547.5	921.7	409.4	246.9
Equity (mil. \$)	n.a.	n.a.	n.a.	2,263.9	593.9	289.7	200.4
Total Assets (mil. \$)	n.a.	n.a.	n.a.	4,673.3	1,568.9	823.4	781.5
No. of Firms	0	0	0	35	37	34	20

Note: Numbers are median values of 3-year financial averages (1997-99).  
Data Source: Standard & Poor's.

**Table 6: Determinants of Actual Ratings  
(Dependent Variable is AVGFRAT)**

Variables	I	II
CONSTANT	59.276 (36.19)*	56.894 (25.68)*
EBITINT	0.096 (2.71)*	0.089 (2.60)*
ROC	0.308 (4.65)*	0.270 (4.21)*
OPERINC	0.017 (2.04)**	0.011 (1.37)
DEBRATIO	-0.190 (-8.50)*	-0.183 (-8.39)*
TOTASSETS	0.000 (9.55)*	0.000 (8.59)*
GOVTOWNER	-	4.323 (1.61)
SUBSDY	-	5.887 (3.41)*
AUTO	-	-5.829 (-1.31)
FOREST	-	-6.989 (-2.91)*
HOME	-	-13.742 (-4.33)*
MEDIA	-	-4.666 (-1.79)***
METALS	-	-7.278 (-3.61)*
Usable Observations	511	508
Adj. R <sup>2</sup>	0.393	0.442

Note:

\* indicates 99-100% significance level

\*\* indicates 95-99% significance level

\*\*\* indicates 90-95% significance level

Legend:

AVGFRAT: Average Firm Rating

EBITINT: Coverage Before Income Taxes

ROC: Rate of Return on Capital

OPERINC: Operating Income Margin

DEBRATIO: Debt Ratio

TOTASSETS: Total Assets

GOVTOWNER: Government Ownership Dummy

SUBSDY: Subsidiaries of Foreign Companies Dummy

AUTO: Auto Industry Dummy

FOREST: Paper and Forest Industry Dummy

HOME: Home Building Industry Dummy

MEDIA: Media Industry Dummy

METALS: Metal and Mining Industry Dummy

**Table 7: Contribution of Firm and Sovereign Risk in Firm Ratings  
(Dependent Variable is LOG[AVGFRAT])**

Variables	IA	IB	IC	IIA	IIB	IIC	IIIA	IIIB	IIIC
CONSTANT	-0.461 (-1.27)	-0.667 (-2.76)*	-1.985 (-7.91)*	-0.461 (-0.89)	-0.667 (-1.37)	-1.985 (-6.40)*	0.329 (0.19)	-0.738 (-0.96)	-2.050 (-3.36)*
LOG[AVGFRAT1]	1.273 (20.95)*	1.008 (19.67)*	1.085 (19.38)*	1.273 (17.11)*	1.008 (8.06)*	1.085 (14.95)*	1.307 (6.02)*	1.186 (8.69)*	1.000 (8.54)*
LOG[AVGSRAT]	-0.137 (-1.45)	0.142 (2.52)**	0.362 (10.56)*	-0.137 (-1.06)	0.142 (1.73)**	0.362 (10.13)*	-0.339 (-0.63)	0.000 (9.77)	0.450 (6.97)*
LOG[NONOECDFRAT1]	-0.779 (-8.91)*	-	-	-0.779 (-5.60)*	-	-	-1.125 (-2.56)*	-	-
LOG[NONOECDSRAT]	0.720 (8.99)*	-	-	0.720 (5.44)*	-	-	1.028 (2.72)*	-	-
LOG[NONOECDFRAT1A]	-	-0.636 (-3.94)*	-	-	-0.636 (-4.72)*	-	-	-1.991 (-1.85)**	-
LOG[NONOECDSRAT1A]	-	0.625 (3.70)*	-	-	0.625 (4.60)*	-	-	2.034 (1.75)**	-
LOG[NONOECDFRAT1B]	-	-	-0.527 (-4.73)*	-	-	-0.527 (-2.00)**	-	-	-0.790 (-0.82)
LOG[NONOECDSRAT1B]	-	-	0.539 (5.02)*	-	-	0.539 (2.09)**	-	-	0.800 (-0.88)
Usable Observations	506	506	506	506	506	506	503	503	503
R Bar **2	0.605	0.563	0.570	0.605	0.563	0.570	0.584	0.502	0.547

Note: I: Ordinary Least Square  
 II: OLS Adjusted for Heteroscedasticity  
 III: 2SLS Using Instrumental Variables  
 \* indicates 99-100% significance level  
 \*\* indicates 95-99% significance level  
 \*\*\* indicates 90-95% significance level

Legend:  
 AVGFRAT : Average firm rating  
 AVGFRAT1 : Estimated firm rating using firm financial indicators  
 AVGSRAT : Average sovereign rating  
 NONOECDFRAT1 : Estimated firm rating for developing countries  
 NONOECDSRAT : Sovereign rating for developing countries  
 NONOECDFRAT1A : Estimated firm ratings which are higher than their sovereign rating  
 NONOECDSRAT1A : Sovereign ratings for those firms whose estimated ratings are higher than their sovereign rating  
 NONOECDFRAT1B : Estimated firm ratings which are lower than their sovereign rating  
 NONOECDSRAT1B : Sovereign ratings for those firms whose estimated ratings are lower than their sovereign rating

**Table 8: Explaining the Rating Pattern**

<b>Variable</b>	<b>IA</b> (Dep. Var. is STDEVACT)	<b>IB</b> (Dep. Var. is STDEVACT)	<b>IIA</b> (Dep. Var. is STDEVSOVRAT )	<b>IIB</b> (Dep. Var. is STDEVSOVRAT)
CONSTANT	13.561 (6.00)*	9.054 (3.55)*	0.180 (7.52)*	0.145 (5.33)*
LAW	1.455 (5.07)*	-	0.010 (3.33)*	-
NONOECDLAW	-3.266 (-8.50)*	-	-0.027 (-6.74)*	-
INFORQ	-	2.216 (6.34)*	-	0.016 (4.21)
NONOECDINF	-	-2.996 (-7.82)*	-	-0.025 (-6.12)*
Usable Observations	552	548	552	548
R Bar **2	0.302	0.330	0.193	0.208

Note:

\* indicates 99-100% significance level

\*\* indicates 95-99% significance level

\*\*\* indicates 90-95% significance level

Legend:

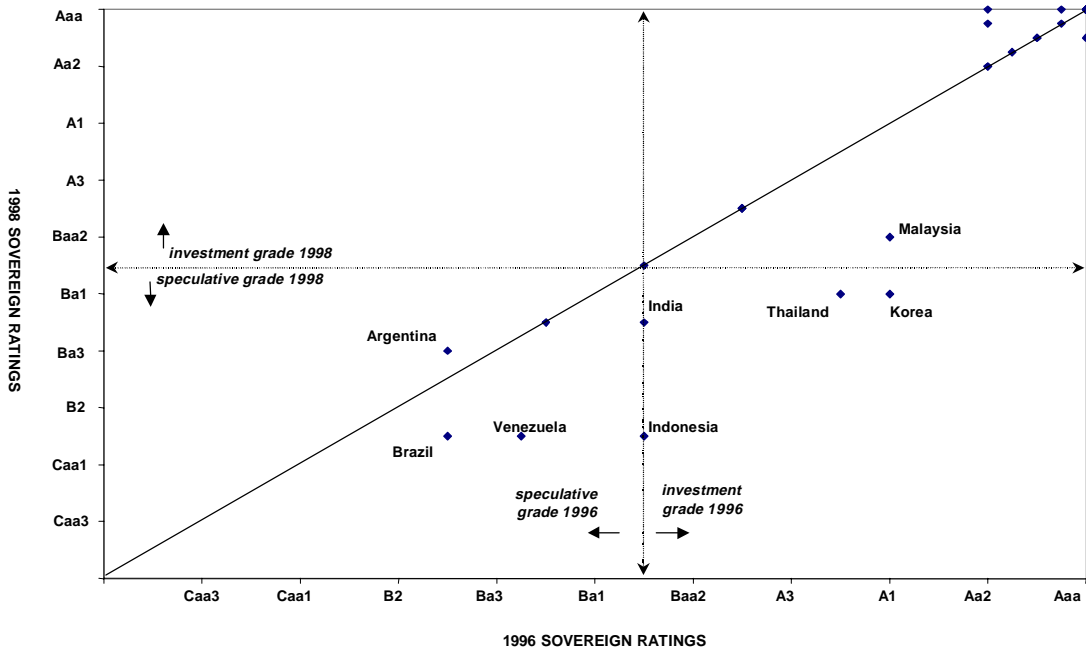
LAW : Rule of Law Index by *Transparency International*

NONOECDLAW : Rule of Law Index for Developing Countries

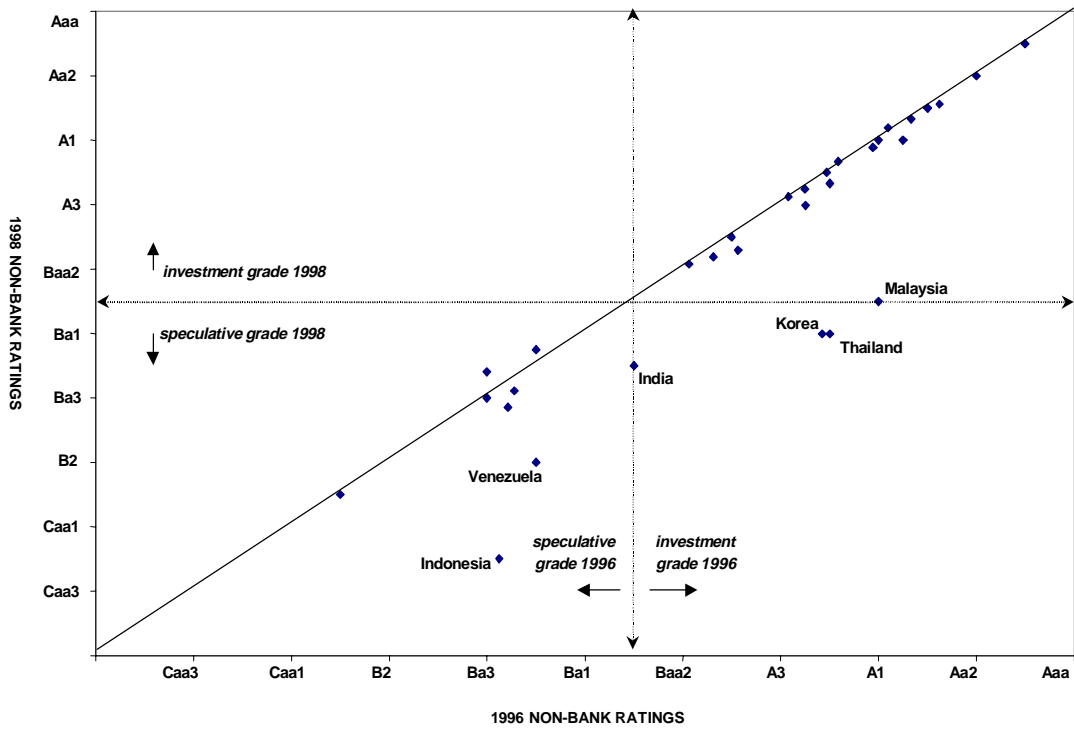
INFORQ : Financial Sector Information Quality by Chan-Lee and Ahn (2001)

NONOECDINF : Financial Sector Information Quality for Developing Countries

**Figure 1: The Impact of the 1997-98 Crises: 1998 vs. 1996 Sovereign Ratings**

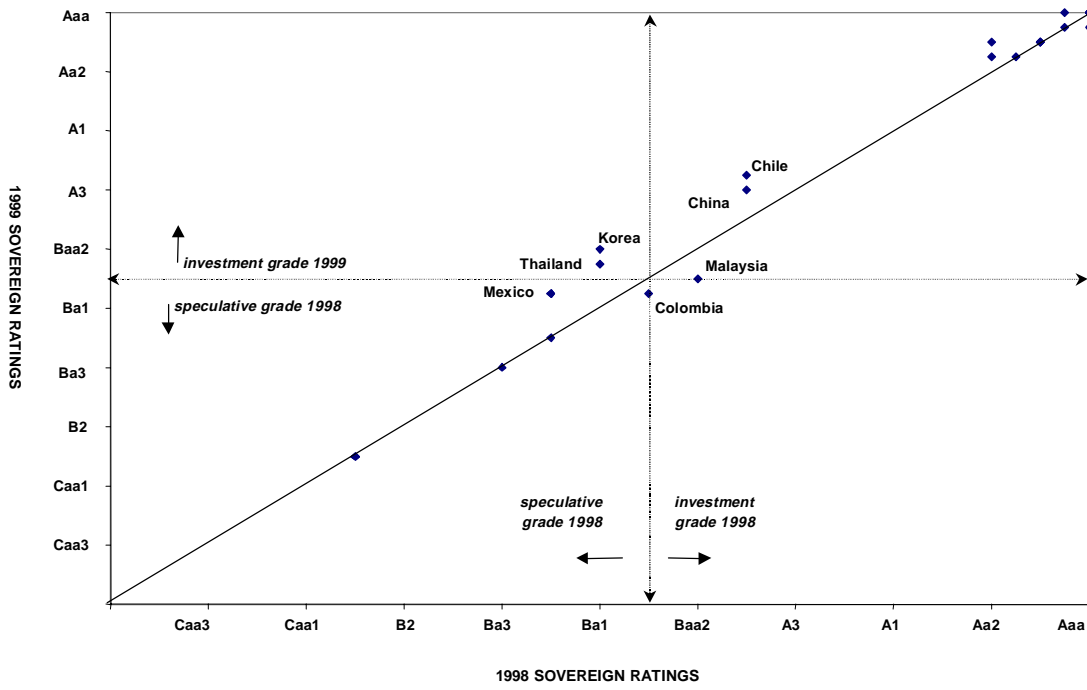


**Figure 2: The Impact of the 1997-98 Crises: 1998 vs. 1996 Average Non-Bank Ratings**

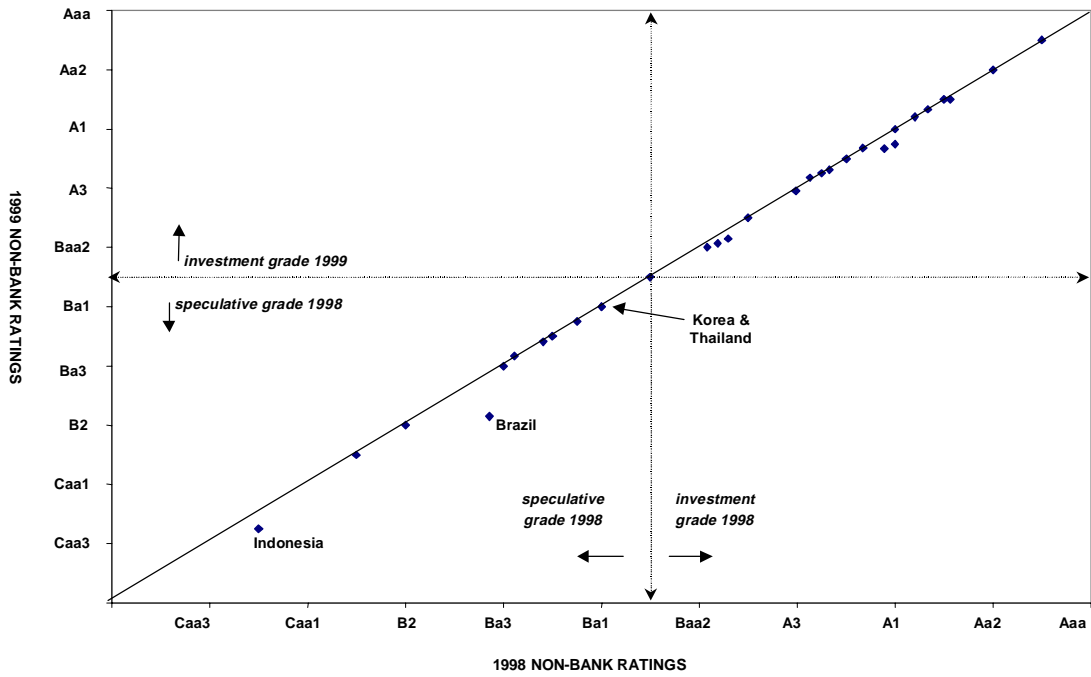




**Figure 3: The Impact of the Recovery: 1999 vs. 1998 Sovereign Ratings**



**Figure 4: The Impact of the Recovery: 1999 vs. 1998 Average Non-Bank Ratings**



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