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**MORE ANALYSTS, BETTER RATINGS:
DO RATING AGENCIES INVEST ENOUGH
IN LESS DEVELOPED COUNTRIES?**

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Rating agencies' track record is good in developed countries but poor in emerging economies. Why? Given the almost-monopolistic structure of the industry, we conjecture that agencies might underinvest in information gathering. We propose an indicator quantifying the agencies' effort to gather information and assess whether greater effort affects rating levels. We detect: (i) absolute underinvestment for non-OECD sovereigns (less effort in spite of greater opaqueness); (ii) relative underinvestment for non-OECD firms compared with OECD ones (though the former receive a larger effort, more intense effort boosts firm ratings in non-OECD countries while depressing them in OECD countries).

JEL classification codes: G2, G3

Key words: sovereign risk, credit ratings, rating agencies' effort

I. Introduction

Rating agencies are a very important ingredient of world financial markets. Their role has rapidly expanded with globalization (Sylla, 2002) and is receiving a powerful boost from regulators, e.g. in the ongoing revision of the Basel minimum capital requirements for banks (Basel Committee on Banking Supervision, 2001). Rating agencies' mission is to collect and process

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information on sovereign and private entities around the world so as to assign them an individual rating. The rating, representing the estimated probability that the borrower will be able to meet its financial obligations, is valuable to investors as a corrective for the disadvantages of informational asymmetry vis-à-vis borrowers.

Rating agencies have a very good track record in anticipating borrowers' default in the developed countries where they have long been active, most notably the USA (Ederington, Yawitz and Roberts, 1987). On the other hand, in recent years they have been severely reproached for their poor performance in connection with major financial crises, such as the Mexican and Asian crises. Many hold that rating agencies' downgrades of Asian crisis countries were late and also disproportionate with respect to these countries' economic fundamentals (Ferri, Liu and Stiglitz, 1999; International Monetary Fund, 1999; Monfort and Mulder, 2000). Others observe, more generally, that in evaluating private entities from less developed countries rating agencies rely excessively on sovereign ratings and attribute too little weight to individual firms' performance (Bongini, Laeven and Majnoni, 2001; Ferri, Liu and Majnoni, 2001; Ferri and Liu, 2003).

What is the source of this inadequate rating behavior in less developed countries? We answer this question by taking an industrial organization approach. We start out observing that the rating industry is highly concentrated, with just three global players (Moody's, Standard & Poor and Fitch). This almost monopolistic market structure (White, 2002) raises two potential issues: rent extraction and underinvestment. Focusing on the latter issue, we propose a synthetic indicator of the effort made by the agency to collect and process information about each rated entity. Then, referring to Moody's, we empirically assess whether more intense effort affects rating levels.¹

Comparing countries belonging to the Organization for Economic Cooperation and Development (OECD) with non-OECD countries, we find: (i) absolute underinvestment for non-OECD sovereigns, where agencies' effort is lower in the latter countries than for OECD sovereigns, and (ii) relative

¹ While a more complete assessment should include Standard & Poor and Fitch, the data needed to test this problem according to our methodology were publicly available only for Moody's. This is a limitation of our study that has to be acknowledged upfront.

underinvestment for non-OECD versus OECD firms, where the former receive a larger effort than the latter, but more intense effort significantly boosts firm ratings for the former while depressing them for the latter.

The rest of the paper is organized as follows. Section II expands on the perils of rating agencies' underinvestment in collecting and processing information on issuers from less developed countries (LDCs). In section III we propose our indicator of the agencies' effort to assign individual ratings and present some descriptive evidence. Our econometric results are reported in section IV. Section V discusses the policy implications of the main findings.

II. Why Underinvestment in Rating Matters

In view of the substantial extent to which investors' decisions rely on ratings, any issuer approaching international financial markets *de facto* needs to obtain a rating. Investors look to ratings to help overcome their asymmetry of information *vis-à-vis* issuers. The attention they pay to ratings is now being reinforced by regulatory developments, assigning a central role to rating agencies' verdicts on issuers (e.g. Basel Committee on Banking Supervision, 2001).

In theory, a reputation mechanism should induce rating agencies to make the socially optimal level of investment in collecting and processing information on issuers, since they put their reputation at risk any time they underinvest and thus do not carry out their business properly.² In practice, however, the highly concentrated market structure of the rating industry may hinder the smooth functioning of such reputation mechanism. Not only does the industry count only three global players, Moody's, Standard & Poor and Fitch, but the agencies tend to move their ratings together (Cantor and Packer, 1997). This almost monopolistic industry structure raises at least two problems.

First, rating agencies may be able to extract rent from issuers (the party paying for the rating). Evidence on this is reported by White (2002),

² It is worth stressing that in this paper we disregard the possibility that ratings are distorted by conflicts of interest. A referee pointed out the possible parallel with what happens in the areas of auditing and investment banking: rating agencies, being paid by the issuers and not by investors, might be tempted to overstate the issuers' quality.

documenting the high returns of the rating agencies. However, in our view, though rent extraction raises a distributive issue, it does not per se imply inefficiency.

Second, thanks to their market power, rating agencies may indulge in underinvestment. This problem is more serious than the first because the information content of the ratings might be less than socially optimal. This would engender inefficiency, since investors would either have to supplement rating agencies' work or renounce holding some assets.

In view of this argument, it seems essential to check whether rating agencies do in fact underinvest in collecting and processing information on issuers. This problem is even more acute for issuers in LDCs. To be sure, the lower quality of information released by (potential) issuers in LDCs likely intensifies the extent of informational asymmetries faced by investors (largely from developed countries). As a result, there may be large negative consequences in terms of increased cost or diminished availability of funds for borrowers located in LDCs.

Far from discarding the underinvestment hypothesis, various recent evidence suggests that rating agencies may not be investing enough in LDCs. Nickell, Perraudin and Varotto (2000) show that issuers suffer a domicile effect—i.e. their ratings are constrained because of the level of the rating obtained by their sovereigns—and that this poses greater problems in LDCs. Ferri, Liu and Majnoni (2001) find that firm ratings are downgraded in connection with sovereign downgrades in non-OECD countries, while the same does not hold in OECD countries. Ferri and Liu (2003) show that: (i) individual firms' idiosyncratic risks (as proxied by the performance indicators reportedly used by rating agencies) play an immeasurably larger role for OECD firms than for non-OECD ones, while sovereign ratings are much more important for the latter than for the former; (ii) cross-country indicators of information/institutional quality help explain this unsatisfactory situation in LDCs but do not solve the puzzle entirely.

But how can we tell whether rating agencies are underinvesting? In the next section we propose a measure to quantify the agency's effort.

III. Rating Agencies' Effort to Assign Individual Ratings

Our methodology—to proxy the effort made by the agency in collecting

and processing information used to assign the rating to any issuer—relies on the units of analysts (UNIANA) allocated to that issuer.³

In practice, we use data from Moody's on-line archive www.moodys.com (consulted between January and May 2001) and calculate UNIANA as follows. For any rating issued by Moody's, beside the level of the rating the archive also reports the names of up to two analysts—the chief analyst and the backup analyst, if any—responsible for the rating. We then account for the fact that the same analyst is typically responsible for more than one rating. Thus, the average effort (time) each analyst allocates to the ratings he is in charge of is a decreasing function of the number of ratings he handles. Then, to quantify such average effort we have to count how many firms (not sovereigns, since as a rule analysts engaged on sovereign ratings are not employed in firm ratings and vice versa) that analyst is engaged with. Assuming that each analyst j distributes his effort uniformly over the n_j firms (sovereigns) handled and considering that more than one analyst may be in charge of firm (sovereign) i , we calculate the total analyst effort made by Moody's for any firm (sovereign) i as:

$$UNIANA_i = \sum_{j=1}^{m_i} (1/n_j^i) \quad (1)$$

where $m_i = 1, 2$ is the total number of analysts in charge of firm (sovereign) i and n_j^i is the total number of firms (sovereigns) to which analyst j assigns a rating, including the rating of firm (sovereign) i .⁴

In our sample of sovereign issuers, UNIANA varies from a minimum of 0.037 (i.e. the sovereign obtains its rating from only one analyst in charge of

³ While the indicator for sovereigns is calculated for all available countries, the equivalent indicator for non-bank firms will be computed for countries other than the USA. This choice stems from two motives. First, ratings are disproportionately more widespread in the USA than elsewhere. In addition, within rating agencies, analysis of US firms is largely segregated from that of the rest of the world and, accordingly, the analysts engaged in one sector are normally not employed in the other.

⁴ Our measure can only be a proxy of Moody's effort; analysts differ in terms of their ability and/or experience, but we cannot measure this on the basis of the information available on Moody's web site. Unfortunately, this is a limitation of our data that we could not overcome.

27 sovereign ratings, or from two analysts each responsible for 54 sovereign ratings, or from any equivalent combination) to a maximum of 0.133 (i.e. the sovereign obtains its rating from only one analyst in charge of 7.5 sovereign ratings, or from two analysts each responsible for 15 sovereign ratings). Mean and median values of UNIANA for sovereigns are, respectively, 0.084 (12 ratings per analyst) and 0.087 (11.5 ratings per analyst).

In our sample of non-financial firms' ratings, UNIANA varies from a minimum of 0.001 (i.e. the firm receives its rating from an analyst who is involved in some 500 firm ratings) to a maximum of 2 (the firm receives its rating from two analysts who rate that firm only). Mean and median values of UNIANA for firms are, respectively, 0.077 (13 ratings per analyst) and 0.042 (23.8 ratings per analyst).

Our basic conjecture is that the higher is $UNIANA_i$ ($UNIANA_k$), the larger is the investment made by Moody's to gather and process information on firm i (on sovereign k), so that $UNIANA_i$ ($UNIANA_k$) provides a rough and ready gauge of the informational value added Moody's creates for firm i (for sovereign k) compared with what was previously known about it by the public. Naturally, $UNIANA_i$ ($UNIANA_k$) is only a proxy. Analysts of course may differ in ability and experience, but it is impossible for us to capture these differences on the basis of the information available on Moody's web site. Thus, we can only hope that these differences in skill do not cause a systematic bias in our data.

An important issue for our analysis is whether there are systematic differences between the rating effort for firms and sovereigns from developed countries (for convenience, identified as the group of OECD countries) and that for firms and sovereigns from developing countries (for convenience, identified as the group of non-OECD countries). The issue stems primarily from our expectation that the availability and quality of information will be better in OECD countries than in non-OECD countries. For example, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) highlight the substantial differences across countries in terms of their ability to: (i) ensure the provision of high-quality information to the public (accounting standards); (ii) enforce existing legislation (rule of law); (iii) safeguard creditors' rights. La Porta et al. also document that financial markets are less well developed in countries that are poor performers on the previous ladder.

Accounting standards and the rule of law rank highest among the determinants of financial market development for La Porta et al. To be sure, among the 90 countries considered in our empirical analysis on sovereign ratings,⁵ both indicators are far lower for non-OECD than for OECD countries (58.5 vs. 66.5 for accounting standards, and 52.7 vs. 100 for rule of law, in both cases out of a maximum value of 100). In addition, working on a larger set of countries, Chan-Lee and Ahn (2001) propose an index of information quality of capital markets. Referring to the set of countries used in the analysis of sovereign ratings below, that index is on average 49.7 (out of 100) for non-OECD countries and 76.0 for OECD countries.

This leads us to anticipate that, *ceteris paribus*, rating agencies are likely to invest more to assign firm and sovereign ratings in non-OECD countries than in OECD countries. Non-OECD countries have a deeper need to improve on their (poor) quality of public information and thus the potential benefit to invest in gathering and processing information on issuers should be greatest in these countries. Before addressing this more systematically, via our econometric analysis, let's check whether UNIANA is in fact higher for non-OECD than for OECD countries.

Figure 1 shows median values—but mean values would deliver analogous results—of UNIANA for firms and sovereigns separately for the two groups of countries. For sovereigns, we detect absolute underinvestment in non-OECD countries: rating agencies' effort is marginally smaller than for OECD

⁵ We include: Argentina, Australia, Austria, *Bahrain*, *Barbados*, Belgium, *Belize*, *Bolivia*, Brazil, *Bulgaria*, Canada, Chile, China, Colombia, *Costa Rica*, *Cyprus*, *Croatia*, Czech Republic, Denmark, *Dominican Republic*, *Ecuador*, *Egypt*, *El Salvador*, *Estonia*, *Fiji*, Finland, France, Germany, Greece, *Guatemala*, *Honduras*, *Hong Kong*, Hungary, Iceland, India, *Indonesia*, *Iran*, Ireland, *Israel*, Italy, *Jamaica*, Japan, *Jordan*, Kazakhstan, South Korea, *Kuwait*, *Latvia*, *Lebanon*, Lithuania, Malaysia, *Malta*, *Mauritius*, Mexico, *Moldova*, *Morocco*, Netherlands, *New Zealand*, *Nicaragua*, Norway, *Pakistan*, Panama, *Papua New Guinea*, *Paraguay*, *Peru*, Philippines, Poland, *Portugal*, *Rumania*, *Russian Federation*, *Saudi Arabia*, *Singapore*, Slovak Republic, *Slovenia*, *South Africa*, Spain, Sweden, Switzerland, *Taiwan*, Thailand, *Trinidad and Tobago*, *Tunisia*, Turkey, *Turkmenistan*, *Ukraine*, United Kingdom, *United Arab Emirates*, *Uruguay*, *United States*, Venezuela and *Vietnam*. However, for underlined (*italicized*) countries we do not observe the sovereign (*any firm*) rating.

countries. This is at odds with the observation that information quality is lower for non-OECD countries. By contrast, for firm ratings the data confirm our hypothesis that the rating effort is likely to be larger in non-OECD countries; the median value of UNIANA is 0.071 for non-OECD countries, versus 0.033 for OECD countries. Naturally, even though the latter evidence goes in the expected direction, it does not automatically guarantee that rating agencies invest enough in evaluating firms from non-OECD countries.

Figure 1. Units of Analysts for Firms and Sovereigns (Median)

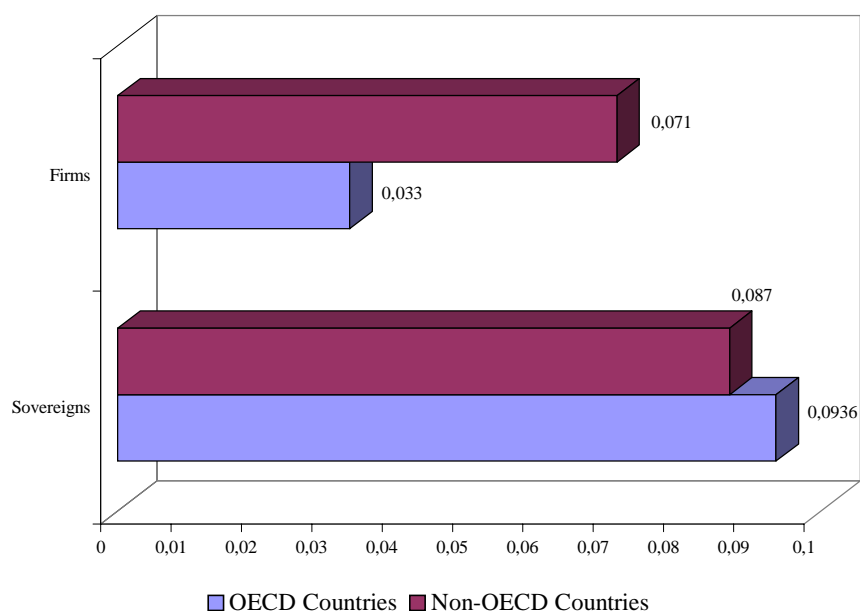
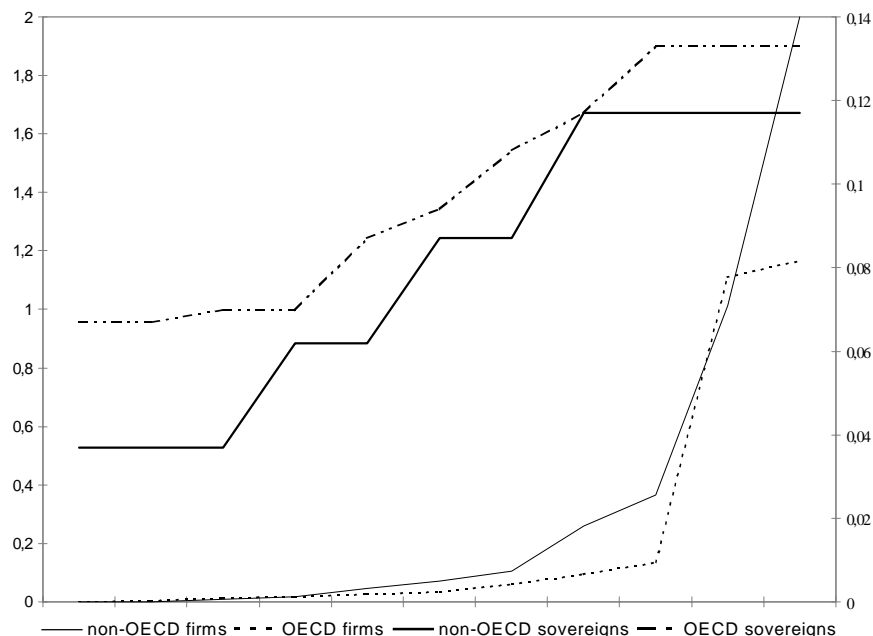


Figure 2 reports the distribution of the effort variable separately for firms and sovereigns and also distinguishes between OECD and non-OECD countries. It is worth noting that the effort is systematically higher—and not just higher at the median—for OECD sovereigns, while the opposite holds for firms. Furthermore, as might be expected, Moody's spends less analyst effort to rate firms than to rate sovereigns.

Lastly, let's take a glimpse at median firm and sovereign ratings for the two groups of countries. To do this, we convert alphanumeric ratings into numeric

Figure 2. Distribution of Effort by Moody’s to Rate Firms and Sovereigns: OECD vs. non-OECD Countries
(Firms are on Left-hand Sale: Sovereigns are on Right-hand Sale)



values on the scale 0-100.⁶ As expected, both sovereign and firm ratings are far lower in non-OECD than in OECD countries. Median ratings—but the landscape would be the same for mean values—differ more for sovereigns (52.5 against 96.25) than for firms (45 against 65). This evidence suggests there may be a sample selection bias, according to which in non-OECD countries only the best firms request a rating, whereas such requests are much more common for firms in non-OECD countries (even excluding the USA).

Although this descriptive evidence is suggestive, it does not offer decisive support in testing our hypothesis. It is now time to go for a deeper analysis, by means of multivariate econometric analysis.

⁶ In Moody’s scale: Aaa = 100; Aa1 = 95; Aa2 = 90; Aa3 = 85; A1 = 80; A2 = 75; A3 = 70; Baa1 = 65; Baa2 = 60; Baa3 = 55; Ba1 = 50; Ba2 = 45; Ba3 = 40; B1 = 35; B2 = 30; B3 = 25; Caa1 = 20; Caa2 = 15; Caa3 = 10; Caa = 5; C = 0.

IV. Econometric Results

We analyze sovereign and firm ratings separately.⁷ Regarding sovereign ratings, we estimate an equation exploring the determinants of the ratings as a function of other variables and of $UNIANA_k$. For non-financial firms, we estimate an equation of the determinants of the ratings as a function of other variables and of $UNIANA_i$.

A. Sovereign Ratings

The first equation we estimate for sovereign ratings is the following:

$$\begin{aligned} RAT_k = & \beta_0 + \beta_1 luni_k + \beta_2 lppc_k + \beta_3 \lg dp_k + \beta_4 lpop_k \\ & + \beta_5 ldist_k + \beta_6 oecd_k + \beta_7 linf_k + \varepsilon_k \end{aligned} \quad (2)$$

where, for country k , RAT_k is its sovereign rating, $luni_k$ is the logarithm of $UNIANA_k$, $lppc_k$ is the logarithm of GDP per capita, $lgdp_k$ is the logarithm of GDP (in billions of current US\$), $lpop_k$ is the logarithm of the population (in millions of inhabitants), $ldist_k$ is the logarithm of the distance of the country (in kilometers) from the USA, where rating agencies have their headquarters, $oecd_k$ is a 0-1 dummy variable taking value 1 for industrialized countries traditionally belonging to the OECD (i.e., Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, USA) and $linf_k$ is the logarithm of the information quality indicator proposed by Chan-Lee and Ahn (2001).⁸

This specification is motivated as follows. First, we expect that the country's sovereign ratings should reflect its economic fundamentals (Cantor and Packer, 1996). Thus, the rating should be higher for countries with larger $lppc$. Second, the size of the country might affect the rating: this is captured here by $lgdp$

⁷ All of the following regressions are OLS. Where appropriate, as pointed out by the value of the Cook-Weisberg test, we used the White correction for heteroscedasticity.

⁸ In the sovereign regressions we also include the USA.

and *lpop*. Third, we presume that *ldist* may have a negative impact, since it might raise the rating agencies' transaction costs.⁹ Fourth, we expect that ratings may be higher for OECD—industrialized—countries (*oecd* = 1) and for countries with better information quality (higher *linf*).¹⁰ Fifth, and most importantly here, our expectation is that as the effort by the rating agency (i.e. *luni*) increases, the asymmetry of information will decrease and the rating should thus be higher on average. Finally, all independent variables—save the *oecd* dummy—are expressed in logarithms to allow: (i) for possible nonlinear relationships, and (ii) easy reading of the coefficient as elasticities.

The basic descriptive statistics for these variables are presented in Table 1. Once more, we can appreciate the major difference in sovereign rating levels between OECD and non-OECD countries. Ratings show ample variability, as do country size variables, distance and GDP per capita. Information quality (accounting) standards vary from a minimum of 21.1 (24.0) to the maximum of 100.0 (83.0). OECD countries account for 24% of our sample. On average (and on median), more effort is made for OECD sovereign ratings than for non-OECD ones.

Results obtained from estimating equation (2) are reported in Table 2. We proceed from the most general specification to the preferred one, obtained by eliminating those regressors that turn out to be statistically insignificant. We report results for four different specifications. Specification (i) introduces *luni* together with the other explanatory variables, omitting, however, the institutional regressors *oecd*, *linf* and *accounting*, where the last two variables would imply losing several observations. Specification (ii) considers all the explanatory variables, omitting, however, *accounting*, which is alternative to *linf*, thus losing 30 observations. Specification (iii) runs preferred specification (i) on the sub-sample of 46 countries for which *linf* is available.

⁹ We also tried, without success, to include *engl_k*, a 0-1 variable taking value 1 for English-speaking countries and 0 for the others, presuming that it could reduce the transaction costs for determining the rating.

¹⁰ As an alternative to *linf*, we also considered *accounting*, the logarithm of ACCOUNTING, as proposed by La Porta et al. (1998), even though the former is preferable as it covers more countries.

Table 1. Descriptive Statistics: Sovereign Ratings

Variables	Mean	Median	Min.	Max.	Source
RAT	62.2	57.5	5	100	Moody's
- OECD	95.2	96.3	75	100	
- non-OECD	48.8	51.3	5	97.5	
UNIANA	0.084	0.087	0.037	0.133	Moody's
- OECD	0.096	0.094	0.067	0.133	
- non-OECD	0.080	0.087	0.037	0.117	
ACCOUNTING	61.4	63	24	83	La Porta et al.
- OECD	67.2	66.5	54	83	(1998)
- non-OECD	55.6	58.5	24	78	
INF	60.7	62.7	21.1	100	Chan-Lee and
- OECD	75.9	79.3	50.4	100	Ahn (2001)
- non-OECD	49.7	49.8	21.1	91.7	
POP	53.6	9.2	0.2	1,200	IMF
GDP	322.8	56.9	0.7	8,700	IMF
GDP per capita	9228.8	3830	370	38,350	IMF
DIST	7,900	7,262	0	16,165	World Atlas
<i>oecd</i>	0.24	0	0	1	OECD

Specification (iv) is obtained by replacing *linf* with *accounting*, thus losing 9 additional observations.

Focusing our comment on the preferred specifications, all reach a high explanatory power, as highlighted by the R^2 . In addition, it is confirmed that sovereign ratings are positively related with *lppc*, while their correlation with the size of the country is generally insignificant. As to the institutional explanatory variables, *accounting* is not significant (specification iv) but both *oecd* and *linf* strongly correlate with higher ratings.

The effort variable that is most interesting here (*luni*) has a positive sign. However, it is significant only in specification (i), where we omit institutional variables and refer to the full sample of 76 countries. To check whether the significance of *luni* is driven by the omission of the institutional variables or

Table 2. Estimates of the Sovereign Rating Equation (RAT)

Explanatory variables	Specification (i)		Specification (ii)		Spec. (iii)	Spec. (iv)
	General	Preferred	General	Preferred	Preferred	Preferred
<i>luni</i>	11.19 (1.58)	10.35 (1.75)*	0.69 (0.11)	2.19 (0.37)	9.28 (1.42)	11.00 (1.25)
<i>lppc</i>	14.42 (5.21)***	17.06 (15.5)***	2.48 (0.59)		17.00 (9.95)***	8.41 (2.69)**
<i>lgdp</i>	2.69 (1.10)		5.90 (1.91)*	7.48 (2.96)***		
<i>lpop</i>	-3.20 (-1.48)		-5.34 (-2.43)**	-7.14 (-2.99)***		
<i>ldist</i>	4.42 (1.49)		1.65 (0.85)			
<i>oecd</i>			16.54 (2.72)**	17.00 (3.31)***		23.25 (2.66)**
<i>linf</i>			22.82 (2.86)***	23.84 (2.98)***		
<i>accounting</i>						10.36 (0.86)
Constant	-47.81 (-0.96)	-55.75 (-2.6)**	-96.52 (-1.29)	-51.53 (-0.79)	-56.86 (-2.1)**	-29.75 (-0.48)
No. observ.	75	76	45	46	46	37
F	84.18***	170.21***	54.61***	54.89***	75.48***	51.85***
R2	0.746	0.745	0.851	0.852	0.741	0.810
C-W test	4.35**	5.31**	14.91***	15.61***	8.40***	12.06***

Notes: t-statistics are in parentheses. ***, ** and * indicate, respectively, that the hypothesis of the coefficient being zero may be rejected at the 1%, 5% and 10% confidence level. The variable *ldist* is not defined for the USA (where DIST = 0), so the number of observations increases by one unit when dropping *ldist*. Estimates are obtained via the OLS method and are heteroscedastic consistent according to the Huber-White correction, as the Cook-Weisberg test indicates the presence of heteroscedasticity.

by the different sample, in specification (iii) we re-run specification (i) on the smaller sample of 46 countries for which we observe *linf*. Here *luni* is insignificant. Thus, losing observations on so many countries is sufficient to dismiss the effort variable and specifications (i) and (ii) are not really comparable. All in all, we may conclude that there is at least some evidence of a positive association between *luni* and sovereign ratings, indicating that, ceteris paribus, the sovereign rating increases when the rating agency allocates to that sovereign more units of analysts.

Thus, our results suggest that higher investment to gather and process information on sovereign issuers may raise their ratings. As we have seen, such investment is lower in non-OECD than in OECD countries. We can therefore conclude that LDCs may be somewhat damaged by rating agencies' underinvestment.

B. Non-bank Firm Ratings

In line with what we have done for sovereign ratings, we estimate a rating determination equation for non-bank firm ratings. The equation we estimate for firm ratings is:

$$\begin{aligned} \text{FRAT}_i = & \beta_0 + \beta_1 \text{RAT}_i + \beta_2 \text{uni}_i + \beta_3 \text{noecd}_i + \beta_4 \text{INF}_i + \beta_5 \text{norat}_i \\ & + \beta_6 \text{nouni}_i + \beta_7 \text{noinf}_i + \beta_8 \text{dusct}_i + \varepsilon_i \end{aligned} \quad (3)$$

The dependent variable (FRAT_i) is the individual rating of the firm, and is regressed on: the contemporaneous sovereign rating in the country where the firm is incorporated (RAT_i); the number of units of analysts engaged in the rating of the firm (uni_i , the value of UNIANA_i , as described in formula (1), but rescaled over 0-100), a 0-1 dummy variable identifying firms domiciled in non-OECD countries (noecd_i , taking value 1 if firm i does not belong to OECD countries); the information quality indicator for the country the firm is domiciled in (INF_i); an interaction variable norat_i , obtained multiplying RAT_i by noecd_i ; an interaction variable nouni_i , obtained multiplying uni_i by noecd_i ; an interaction variable noinf_i , obtained multiplying INF_i by noecd_i ; a vector of 0-1 dummy variables controlling for the sector

to which the firm belongs, taking value 1 if firm i 's main activity belongs to that sector ($dusct_i$).

We know that non-OECD firms have lower ratings, so we may anticipate that $noecd$ is negative and significant. We expect that the rating of the firm depends largely on its sovereign rating (RAT positive and significant), but that this link may be stronger for non-OECD countries and weaker for OECD countries ($norat$ positive and significant).¹¹ By the same token, we anticipate that the positive impact on firm ratings deriving from better information quality (INF positive and significant) might be stronger for non-OECD countries ($noinf$ positive and significant), which suffer more acute information asymmetry. As to sector characteristics—here grossly proxying firm performance—we don't have any specific a priori. Finally, we expect that there might be a relationship between the number of units of analysts engaged in the firm's rating and the rating assigned. The relationship might be generally negative if the rating agency makes a larger effort vis-à-vis problematic firms; this could happen, for example, if a firm with poor prospects in its specific sector/country is put under special watch by the rating agency, with the agency increasing its effort level—assigning more analysts to supervise the firm—and soon or simultaneously lowering that firm's rating (in this case, we expect the coefficient of uni to be negative and significant). By contrast, the relationship between the agency's effort and the firm's rating might be positive in situations where the agency is underinvesting in information gathering and processing; for example, in a highly opaque environment, relatively low ratings may be prudently assigned but when the agency increases its efforts (assigning more analysts) toward individual firms in that environment it may systematically discover that these firms deserve higher ratings. As argued above, this situation might obtain in countries with lower quality of disclosure, i.e. in non-OECD countries (in this case, we expect a significant coefficient for $nouni$ with a positive sign and possibly larger in absolute value than the coefficient for uni).

Key descriptive statistics for the dependent and independent variables are presented in Table 3. First, we observe that 84% of the firms in our sample are from OECD countries. Second, as expected, we find that the major

¹¹ See, among others, Ferri, Liu and Majnoni, (2001) and Ferri and Liu (2003).

Table 3. Descriptive Statistics: Firm Ratings

Variables	Mean	Median	Min.	Max.	Source
FRAT	58	60	0	100	Moody's
- OECD	60.7	65	0	100	
- non-OECD	44	45	10	70	
RAT	87.7	90	25	100	Moody's
-OECD	94.5	95	75	100	
- non-OECD	51.1	55	25	70	
UNIANA	0.077	0.042	0.001	2	Moody's
- OECD	0.065	0.033	0.001	1.167	
- non-OECD	0.141	0.071	0.001	2	
INF	81.1	89.5	21.1	100	Chan-Lee and Ahn (2001)
- OECD	86.9	89.5	50.4	100	
- non-OECD	49.1	49.8	21.1	75.6	
<i>oecd</i>	0.84	1	0	1	OECD

difference in sovereign rating levels between OECD and non-OECD countries also obtains here and it translates into firm ratings too. Third, the level of information quality significantly lags behind in non-OECD countries. Finally, on average (and on median), more effort is made for non-OECD firm ratings than for OECD ones.

Results obtained from estimating equation (3) are reported in Table 4. We report results for two different specifications. Specification (i) introduces *uni* together with the other explanatory variables omitting, however, the institutional regressor INF and the related *noinf*, where the last two variables imply dropping ten observations (from 631 to 621). Specification (ii) considers all the explanatory variables. The preferred specifications are obtained by eliminating those regressors that turn out to be statistically insignificant.

The results confirm that firm ratings depend largely on their sovereign ratings (and also on the sector to which they belong): on average, increasing

Table 4. Estimates of the Firm Rating Equation (FRAT)

Explanatory variables	Specification (i)		Specification (ii)	
	General	Preferred	General	Preferred
RAT	0.345 (2.36)**	0.318 (2.17)**	0.491 (3.20)***	0.515 (3.37)***
<i>uni</i>	-0.262 (-2.34)**	-0.261 (-2.35)**	-0.281 (-2.52)**	-0.266 (-2.39)**
<i>noecd</i>	-29.968 (-1.90)*	-32.052 (-2.04)**	-30.566 (-1.89)*	-30.775 (-1.91)*
INF			-0.154 (-2.06)**	-0.191 (-2.58)**
<i>norat</i>	0.518 (2.55)**	0.523 (2.58)**	0.358 (1.56)	0.307 (1.35)
<i>nouni</i>	0.197 (0.95)	0.310 (1.77)*	0.212 (1.02)	0.322 (1.83)*
<i>noinf</i>			0.190 (1.20)	0.246 (1.57)
Constant	35.101 (2.50)**	34.764 (2.51)**	34.531 (2.43)**	30.888 (2.20)**
No. observations	631	631	621	621
F	12.46***	15.49***	11.67***	16.39***
Adjusted R ²	0.286	0.2812	0.292	0.2842
C-W test	0.31	0.71	0.16	0.48

Notes: t-statistics are in parentheses. ***, ** and * indicate, respectively, that the hypothesis of the coefficient being zero may be rejected at the 1%, 5% and 10% confidence level. Estimates are obtained via the OLS method. We do not apply the Huber-White correction, as the Cook-Weisberg test rejects the presence of heteroscedasticity. Though not reported in the table, we distinguish 18 macro-sectors: oil (62 firms; omitted in the estimates); electric industry (37 firms); telecoms (52); trading, retail & consumer products (40); TV, telephone, electronics & electrical equipment (73); construction, real estate, building material & cement (24); agriculture (12); automotive, tires, transports, aerospace, shipping, machinery & mechanical components (60); metals, mining, shipyards, containers, steel & railroads (50); hotels, casinos, entertainment, amusements, motion pictures, records,

advertising, media, jewelry & broadcasting (21); restaurants, food, drinks, brewery, sugar & tobacco (48); finance, diversified & miscellaneous (43); textiles, apparel & shoes (6); chemicals, plastics, paper, pharmaceuticals & drugs (59); health equipment, help supply services, office systems, environment, research development labs, hospitals & hospital supplies (9); printing, publishing, glass, photo & optical products (18); sovereign guaranteed (5); other firms not included elsewhere (16).

the sovereign rating by 10 points (e.g. passing from Aa1 to Aaa) implies that the firm rating rises by 3 to 5 points, depending on the specification. Furthermore, non-OECD firm ratings are more sensitive to sovereign ratings: if sovereign ratings rise by 10 points, firm ratings increase by 8 points for non-OECD firms. As to our effort variable (*uni*), it is significant and negative, thus confirming our expectation that rating agencies invest more vis-à-vis more problematic firms: a 10% increase in the agency's effort is accompanied by a decrease in the rating by 2.5 points. Most interestingly to us, however, the underinvestment hypothesis also receives some support. Namely, there is a specific positive impact of the effort for non-OECD firms (*nouni*) and the coefficient for *nouni* is larger in absolute value than that for *uni*. Thus, an increase in the agencies' effort correlates with a drop in the rating for OECD firms but with a slight increase in the rating for non-OECD firms. This indicates that in non-OECD countries higher informational investment by Moody's is accompanied by better firm ratings. In turn, this reveals that when Moody's decides to put more into analyzing non-OECD firms—on which little is known—these firms, on average, turn out to be deserving. This suggests that Moody's is underinvesting in these firms.

Inserting the information quality variable (INF) does not generally alter the results. The only noticeable change is that the special sensitivity of non-OECD firm ratings to sovereign ratings becomes insignificant.¹² Interestingly, controlling for the other regressors, firm ratings exhibit a negative correlation with the level of INF. Again, this is probably to be interpreted as evidence that lower-quality firms may also wish to get a rating in countries with higher information standards—and with more developed capital markets—whereas equivalent firms in countries with lower standards wouldn't consider such a course.

¹² However, this might be explained by the collinearity between INF and *oecd*.

All in all, our results on firm ratings are even more suggestive than those we obtained on sovereign ratings. We find that, on average, comparing two otherwise equivalent non-OECD firms γ and δ , if firm γ has one more analyst than firm δ exclusively dedicated to it by Moody's, then the rating for firm γ is almost 3 points above that of firm δ . In practice, in our sample of non-OECD firms, *uni*—rescaled to 0-100—varies from a minimum of 0.05 to a median of 3.55 to a maximum of 100. Accordingly, a firm moving from the median to the maximum level of *uni* could benefit from an increase in its rating of 5.4 points (just above one notch, which amounts to 5 points). Generally, such increase would significantly reduce the interest rate charged on that firm. More specifically, for the 7% of non-OECD firms with a rating of 50 (Ba1 in Moody's alphanumeric scale), such an increase in Moody's effort would allow them to move from a below-investment-grade rating to a rating above the investment grade threshold (i.e. above 55, or Baa3 in Moody's alphanumeric scale).¹³ On the basis of the historical linkage between rating levels and interest rate spreads in the USA (e.g. Hickman, 1960; Atkinson, 1967), such firms would enjoy a reduction in their interest rate of about 200 basis points.

Thus, our results suggest that even though rating agencies spend more effort, on average, on non-OECD firms than on OECD firms, they may still be underinvesting in collecting and processing information on the former. It appears that non-OECD firms, probably suffering because of inadequate information disclosure and quality of institutions in their home countries, would generally stand to gain if rating agencies decided to intensify scrutiny of them. In fact, given their expected gain, non-OECD firms might be willing to pay higher fees to elicit more effort from rating agencies and, hence, get better ratings.

It is worth recalling that the basic reason rating agencies exist is that they may reduce informational asymmetries between issuers and investors. In light of this, our results indicate that rating agencies should definitely invest more resources in their ratings of firms in non-OECD countries. This need will only be heightened in the immediate future, as the enforcement of the new

¹³ Moving from below to above the threshold greatly expands potential investors in the firm (Dale and Thomas, 1991).

Basel regulation will link bank minimum capital requirements—and, thus, credit supply—to ratings assigned to firms and sovereigns by the rating agencies.

V. Conclusions

This paper started out by asking whether rating agencies invest enough in assessing the credit worthiness of issuers in less developed countries. When they assign ratings to these issuers, rating agencies send potent signals to global financial markets and these signals will become even more compelling with prescribed changes in regulation. Even though a reputation mechanism should, in theory, elicit adequate effort from rating agencies, two observations led us to question whether this is actually true for the ratings of issuers in LDCs. First, the almost-monopolistic market structure of their industry raises the suspicion that, with no sanction, rating agencies may not only practice rent extraction but also indulge in underinvestment, particularly vis-à-vis borrowers in LDCs in a poor position to complain of unfair treatment. Second, the consensus view holds that rating agencies failed recent crucial exams, e.g. the East Asian crisis; rather than forewarning markets, they were late to downgrade and, possibly, downgrades were too heavy handed.

In the light of this, we proposed a synthetic measure quantifying the effort made by the rating agency to collect and process information on each rated entity. We used data (on both sovereign and non-bank firm ratings) from Moody's to check empirically for any sign of underinvestment vis-à-vis entities in LDCs. Underinvestment may occur either in absolute or in relative terms. The former, more obvious, case is proved if rating agencies' effort is lower in LDCs than in developed countries. The latter case needs a premise. Because of the poorer quality of information they disclose, issuers in LDCs are likely to be subject to more acute informational asymmetries with investors than those prevailing in developed countries. Accordingly, rating agencies' effort should be more intense vis-à-vis issuers from LDCs. We posited that if we were to find evidence that stepped-up effort raises rating levels in LDCs but not in developed countries, this would indicate relative underinvestment.

In our empirical results we found evidence of: (i) absolute underinvestment on sovereign issuers from LDCs, i.e. rating agencies' effort is smaller there

than in developed countries; and (ii) relative underinvestment on non-financial firms from LDCs, i.e. despite a larger rating effort on firms in LDCs than in firms in developed countries, the ratings of the latter decrease with effort while those of the former do not and sometimes even increase.

In our view, this raises an important policy issue. Incentives should be devised to induce rating agencies to increase their effort in less developed countries. Otherwise, the distortion deriving from their underinvestment could prove an obstacle to LDCs' access to global financial markets.

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