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The Credit Rating Agencies – Are They Reliable? A Study of Sovereign Ratings

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Executive Summary

Sovereign credit ratings estimate the future ability and willingness of the sovereign governments to service their commercial and financial obligations in full and on time. The process of evaluating the nations and assigning ratings is a business involving various international rating agencies. Governments seek the credit ratings so as to improve their access to the international capital markets. The sovereign credit ratings are an important scale for determining the cost of borrowing to a country. The ratings provide a perception to the lenders about the level of credit risk of the national governments. However, the reliability of the ratings has been a matter of debate in the past due to the methodology followed by the rating agencies.

The present paper attempts to check the reliability of these ratings by considering the ratings assigned by two of the major international rating agencies – Moody's and Standard and Poor's. This is done through comparison of the ratings assigned by them and checking whether the difference is significant and responsive for the countries rated by both. A regression analysis of the ratings and some of the commonly used indicators by the two agencies to determine the ratings is also done.

The results indicate an increase in the average rating difference of the two agencies over time and that the difference in the ratings assigned by the two agencies is statistically significant. Moreover, these agencies are also found to be non-responsive to each other's ratings. This raises reasonable doubts on the consistency of these ratings as the methodology followed by these agencies involves several common determinants. The regression of the ratings over the determinants indicate that the ratings of these two agencies have more or less the common determinants except the 'external balances' indicator exclusively determining the S&P ratings. Considering the fact that the ratings provided by these two agencies are significantly different from each other, the differences in the ratings could be explained by the differences in the weights attached to the determinants by the two agencies. However, a test of significance for the differences in weights of the given set of indicators attached by the two agencies reveals that there is no significant difference in the weights. Thus, the differences can also be attributed to the weights attached to the subjective criteria used by these agencies in order to decide the ratings. Such criteria imply the qualitative biases built by the agencies against nations on the basis of social and political conditions and their reactions to news regarding the changes in the capital markets of a nation.

KEY WORDS

Credit Ratings
Credit Rating Agencies
Sovereign Ratings
Transparency

The history of the credit ratings agencies goes back to the early 20th century when Moody's and Standard and Poor's (S&P) used to publish ratings for corporate securities in America. Later in the 1920s, Fitch also began its business of rating the corporates. Despite this, the initial spread of the rating business was only limited to the US. It is only in the last thirty years that these agencies have spread their services to other nations. Moreover, the process of rating countries began only in the 1970s when S&P and Moody's rated only the US and Canada, Australia being added later by Moody's. The sovereign ratings actually took off in the 1980s and 1990s and by the year 2000, the major companies were rating about 100 nations each. (Klein, 2004). The international credit rating agencies such as Moody's, S&P, and Fitch have many a times faced criticism for being unreliable and non-transparent in providing credit ratings to nations. The recent financial crisis that hit many of the developed nations resulted in a threat to the credit standing of nations such as the US and the UK (Reuters, 2009). The credit rating agencies also went about downgrading the rating of countries such as Greece in April 2010. There have been various opinions regarding this downgrading of Greece and its impact on other European nations. (Paphitis and Pylas, 2010; Wachman and Fletcher, 2010). Two of the agencies, S&P and Fitch, also indicated a threat to the credit standing of India during June, 2008 and stated that they might downgrade. (*The Financial Express*, 2009).

Credit rating of any entity is the estimation of the ability of banks, financial, and non-financial institutions, and the corporate bodies to service their debt obligations effectively and on time. It analyses various factors or types of risks that affect the ability of these institutions to service their debts. These obligations involve interest and/or principal amount repayment of the various rated instruments such as bonds and deposits. Apart from these institutions, credit rating is also done for an economy as a whole. This type of credit rating for nations or states within a nation is known as '*sovereign credit rating*'. Such a rating estimates the future ability and willingness of the sovereign governments to service their commercial and financial obligations in full and on time. It is a forward looking estimate of default probability of governments. In the context of the international capital market, the sovereign credit ratings have a great significance. Governments seek the credit ratings so as to im-

prove their access to the international capital markets. The sovereign credit ratings are an important scale for determining the cost of borrowing to a country. These ratings provide a perception to the lenders about the level of credit risk of the national government. The changes in these ratings have an effect on the terms of borrowing available to a country. Sovereign ratings are important not only for the governments but also for the assessment of other borrowers of the same nationality. The ratings that are assigned to the non-sovereign entities are generally not greater than that assigned to their home countries (Standard and Poor's, 2006).

Given the background of the sovereign credit ratings, the issue of the reliability of the ratings and the process followed by the agencies become relevant. These ratings have often been a matter of debate for the methodology followed by the rating agencies being transparent, on one hand, and the possibility of them being affected by subjective opinions rather than objective analysis and their consequences, on the other hand. An early pioneer research by Cantor and Packer (1996) identifies various determinants and their impact on the sovereign credit ratings. It analyses the data for 49 countries on various indicators and the ratings provided by Moody's and S&P for the year 1995 and finds that the variables of GDP growth, inflation, and external debt have a significant impact on the sovereign ratings. Moreover, the indicators of economic development and the default history also affect these ratings. Ferri, Liu and Stiglitz (1999), using the Cantor and Packer method, criticize the rating agencies for being unreliable in assigning ratings on the basis of their qualitative judgments rather than the quantitative analysis. Their observation of the ratings assigned to the Asian countries before and after the East Asian Crisis during 1997-98 find them to be pro-cyclical and significantly away from ratings that were predicted by a model using the economic indicators, both before and after the crisis. Moreover, they observe that excessively downgrading the ratings of some of the Asian countries resulted in aggravating the crisis. However, Mora (2006) suggests a more cautious view to the observations made by Ferri, Liu and Stiglitz (1999). She observes that the ratings remain more or less sticky both during and after the East Asian Crisis and are not found to aggravate the boom-bust cycle in the capital market. She also points out that ratings cannot be necessarily countercyclical and hence should be carefully used for

regulatory purposes. Riehart (2001) finds that the rating agencies are not capable of predicting currency or bank crises as the downgrades are never preceded by a crisis. Reisen (2003) finds that the rating models and the determinants used by the rating agencies have not been modified overtime despite the criticism faced by them for not being able to predict the Asian crisis during 1998-99. The sovereign ratings tend to follow the financial markets rather than lead them. This results in an excessive inflow of capital in case of improvement in ratings during a boom and creates a panic among investors and drive the money out of a country if the ratings fall during a bust.

The present paper attempts to check the reliability of the ratings assigned by the two major rating agencies – Moody's and S&P, considering the differences in them. This is done in three steps beginning with the comparison of the ratings assigned by these agencies at two different periods. It is then checked whether the difference in the ratings assigned by these two agencies is significant and responsive for the countries rated by both. Finally, an attempt is made to identify the determinants of ratings for both the agencies using regression analysis of the ratings and some of the commonly used indicators. This is done using the ratings provided by both these agencies in the year 2007 and 2010, and the indicators data set for 2006-07 and 2008-09 respectively.

PROCESS OF SOVEREIGN RATING AND RATING AGENCIES

The process of credit rating of various institutions is a business involving a number of international rating agencies. Both the above mentioned rating agencies – Moody's and S&P – started their operation during early 20th century in 1916 and 1923 respectively by rating the corporate in the US. Later, in 1970, these companies began rating sovereign nations starting with the US, Canada, and Australia (Klein, 2004). Today, more than 100 nations are being rated for their creditworthiness by these agencies. They are constantly increasing their coverage with time as more and more emerging or developing economies are assigned with the sovereign ratings. There also exists an element of competition among these agencies in the international capital market for being more reliable and consistent in providing accurate ratings to the sovereigns.

Rating Scales

The credit rating agencies use different types of notations to provide ratings to the sovereigns. These notations indicate different levels of rating and hence the level of credit worthiness for different nations. Table 1 shows different notations and the corresponding grades, levels of credit risk, and the capacity to meet financial commitment for Moody's and S&P's. We find from the Table how the interpretations of various ratings are comparable for both the rating agencies. The agencies use different notations; however, every notation used by Moody's has its counterpart in the S&P rating.

Rating Indicators

The credit rating of sovereigns is done using indicators that can be both quantifiable and qualitative in nature. The former implies a list of measures of economic and financial performance and the latter indicates the factors such as political stability. The credit rating agencies use the indicators for quantitative analysis through assigning weights to different indicators/variables in order to decide the ratings and update them by monitoring these variables. Moreover, the agencies do not reveal any details regarding the weights they attach to each of these indicators possibly making the process of quantitative analysis vulnerable to subjective biases. However, these agencies do provide a list of indicators that they consider for their analysis (Moody's, 2004). A study regarding the determinants of sovereign credit rating by Cantor and Packer (1996) identifies some of the commonly used economic indicators by these two agencies for sovereign ratings. They also provide an explanation of the relationship between each variable and a country's ability to repay the debts.

GDP per capita (US\$): Sovereign ratings are directly correlated to the GDP per capita. A higher level of per capita income indicates a greater potential of the tax base of the borrowing country and hence a greater ability of a government to repay debts. The sovereigns rated high under this factor have high levels of per capita income and the ones with lower level of GDP per capita get lower grades on this count.

Real GDP growth: A relatively higher rate of economic growth suggests that a country's existing debt burden will become easier to service over time. In a country with growing standard of living and income levels, the gov-

Table 1: Rating Scales/Grades Used by Moody's and S&P alongwith their Respective Interpretations

No.	Moody's Ratings	Standard and Poor's Ratings	Interpretation		
			Grading	Credit Risk	Capacity to meet Financial Commitment
1	Aaa	AAA	Highest quality	Minimal	Extremely Strong
2	Aa1	AA+			
3	Aa2	AA	High quality	Very Low	Very strong
4	Aa3	AA-			
5	A1	A+	Upper-Medium	Low	Still strong
6	A2	A			
7	A3	A-			
Speculative Grade					
8	Baa1	BBB+	Medium	Moderate	Weakened
9	Baa2	BBB			
10	Baa3	BBB-			
11	Ba1	BB+	Lower-Medium	Substantial	Inadequate
12	Ba2	BB			
13	Ba3	BB-			
14	B1	B+	Low	High	Impaired
15	B2	B			
16	B3	B-			
17	Caa1	CCC+	Poor	Very high	Not likely
18	Caa2	CCC			
19	Caa3	CCC-			
20	Ca1	CC+	Very low	Very near default	Vulnerable to non-payment
21	Ca2	CC			
22	Ca3	CC-			
23	C1	C+	Lowest	In default	Highly vulnerable to non-payment
24	C2	C			
25	C3	C-			

Moody's use numeric 1, 2 & 3 and Standard and Poor's use (+) and (-) sign for generic rating classification to show relative standing in major rating categories.

Source: Moody's (2008) and Standard and Poor's (2008)

ernment has the capacity to withstand economic and political shocks. Thus, it has a better ability to service its debts than the country with a stagnant economy. The countries with advanced level of development, ranking top in the ratings, tend to preclude high levels of growth, whereas, the countries with medium level of speculative grading show high levels of growth due to more policy flexibility and superior economic prospects.

Inflation (Consumer Price Index): High rate of inflation indicates structural problem in the government finance. The inability and unwillingness of the government to pay current budgetary expenses through taxes or debt issuance, compels it to resort to inflationary money finance. Thus high level of inflation in an economy leads

to lower level rating assigned and *vice-versa*. The lower level of inflation is supported by high monetary flexibility in the market due to transparent and well-developed capital market. On the other hand, countries with weak financial sector and relatively shallow capital market are likely to experience high inflation.

Fiscal balance: A large fiscal deficit indicates the unwillingness and inability of the government to tax its citizens to cover the current expenses and service its debts. Scores under this factor are not only the function of surpluses and deficits, but also of revenue and expenditure flexibility and effectiveness of expenditure programmes. Thus lower scores are assigned where government money is not being spent effectively. A

higher score is assigned to a sovereign, despite significant financing needs, if the investment in public infrastructure underpins sustainable economic growth.

External balances: A large current account deficit indicates that the public and private sectors together rely heavily on funds from abroad. Current account deficits that persist, result in the growth in foreign indebtedness. The quantitative measure for this indicator is current account balance (cross-border receipts less the cross-border payments) as a percentage of current account receipts (CAR). This ratio tends to be positive for most creditworthy sovereigns and highly negative for the least credit worthy sovereigns.

External debt: For the calculation of external debt, complete international investment position of a country is considered. It includes private sector debts, equity liabilities of public sector, and external indebtedness denominated in local as well as foreign currency. A higher debt burden corresponds to higher risk of defaults. The weight of the burden increases as the country's foreign currency debt rises relatively to the foreign currency earnings. The measure of the magnitude of external debt burden is the ratio of external debt to current account receipts (CAR). A country with higher ratio is likely to face disruption in servicing its debts and hence a fall in its credit ratings.

Economic development: Although development is already measured by per capita income, the rating agencies consider the relation between economic development and risk. Once a country reaches a certain income or development level, it may be less likely to default.

Default history: - A 'default' in general is the failure to meet a principal or interest payment on due date. A sovereign default occurs when the government either fails to pay scheduled debt service on due date or tenders an exchange offer of new debt with less favourable terms than the original issue. Other factors being equal, the countries that have defaulted on debt in the recent past are considered as high credit risk destinations. Historically, it has been found that the defaulting countries suffer a severe decline in their prestige or in their standing with creditors.

Political Risk and Sovereign Rating

Apart from the quantitative aspect, the analysis also in-

corporates qualitative aspects due to existence of political and policy developments in the nations. In the case of sovereign creditworthiness, other than the ability, the issue of willingness to repay the debts also becomes crucial. This issue is addressed by the factor of political risk existing in a nation. The stability, predictability, and transparency of the country's political institutions are important considerations in analysing the parameters for economic policymaking, including how quickly policy errors are identified and corrected. The government that is unwilling to repay the debt is usually pursuing economic policies which weaken its ability to repay. The ability and the willingness of the countries to repay their debts vary in the case of local and foreign currency debts. Servicing of the local currency debts is supported by its taxation powers and ability to control domestic monetary and financial system, whereas in the case of foreign currency debts, the country has to secure foreign exchange. A higher grade under this factor implies broad public backing with clear process of succession and transparent conduct of the government also being responsive to changes. Lower grades are given to governments with short track records and considerably less open and less effective governance. Political and external shocks are more likely to disrupt economic policy at lower levels of grading than at the higher level.

Although the political factors are important criteria for sovereign risk analysis, in some cases, significant improvements in fiscal and external performance lead to considerably higher sovereign ratings than the political factors would indicate. Haque, Mark and Mathieson (1998) attempt to examine the relative importance of political and economic variables in determining the country credit ratings. They include the political events as variables in the regression model for econometric analysis to examine their influence. The authors find from their empirical results that the effect of political variables is "orthogonal" and excluding them would not bias the parameter estimates of the economic variables. They conclude that the raters are concerned mainly with the country's ability to repay debts and hence consider the political events only when they affect the same.

Sovereign Rating Comparison: Moody's and S&P

Considering the fact that the indicators/determinants used by these agencies for deciding the ratings are similar, there should be similarity in the ratings assigned by

them in case of the commonly rated countries. However, while comparing the rating assigned to the commonly rated countries, we find differences in the ratings of Moody's and S&P. Given in Tables 2a, 2b, and 2c are the list of all the countries in 1995, 2007, and 2010 respectively for which the ratings assigned by both these agencies were found to be different. Following are the findings from the tables:

- In 1995, out of 49 countries being rated by both Moody's and S&P, for 21 (or 41%) countries, the rating levels differed. Out of these, 12 countries were rated higher by S&P and 9 were rated higher by Moody's.
- In 2007, 93 countries were rated by both the agencies out of which 67 (or 70%) had different ratings assigned by these agencies. Moreover in 2007, 66 countries were rated higher by Moody's and only 1 was rated higher by S&P.
- In 2010, 105 countries were rated by both the agencies out of which 77 (73%) had different ratings assigned by these agencies with 74 being rated higher by Moody's and only 3 being rated higher by S&P.
- Looking at the average level of rating differences, in 1995, the average rating difference is found to be 1.38 (approx.) which is near to only one level difference, whereas in 2007 and 2011, the average rating differences are found to be 2.60 (approx.) and 2.75 (approx.) that is near 3 levels of difference. Hence, we find a considerable increase in the differences in ratings given by Moody's and S&P over a period of time.

- Comparing the changes in ratings between 2007 and 2010, which is a relatively shorter time period, we find that there is an upgrade in ratings for 25 countries done by Moody's and 32 countries by S&P with the average value of the rating level upgrade by former being 1.7 and the latter 1.5 in 2010. Moreover, out of 25 countries with upgraded ratings by Moody's, four have been upgraded with relatively greater ratings by S&P in 2010. Also, there are 15 countries for which S&P has upgraded the rating during 2007 to 2010, but Moody's has not.
- Considering the countries that have been downgraded over these three years, there are only 9 countries that have been downgraded by Moody's whereas there are 19 countries that have been downgraded by S&P. Moreover, there are twelve countries that have been downgraded by S&P in 2010, but the Moody's has not changed their ratings. Also, out of nine countries downgraded by Moody's in 2010, for only one country, S&P has not changed the ratings from 2007 to 2010. Also, there are four countries that have been downgraded by relatively greater margin by S&P, while there are only two countries which Moody's has downgraded more.

For all the new countries that have been covered over the years, almost all are rated higher by Moody's than S&P. This implies that the former has been more lenient and responsive while the latter has been more stringent and rigid towards its rating decisions. Looking at the recent changes in these ratings for the period, 2007 to

Table 2a: Sovereign Credit Ratings assigned by Moody's and S&P for Selected Countries having Differences in Level of Ratings in 1995

Country	Moody's Ratings	S&P's Ratings	Level Diff. in Ratings
Argentina	B1	BB-	1
Bermuda	Aa1	AA	1
Canada	Aa2	AA+	1
Chile	Baa1	A-	1
China	A3	BBB	2
Finland	Aa2	AA-	1
Hong Kong	A3	A	1
India	Baa3	BB+	1
Indonesia	Baa3	BBB	1
Italy	A1	AA	2
Korea	A1	AA-	1

Source: Cantor and Packer, 1996.

Country	Moody's Ratings	S&P's Ratings	Level Diff. in Ratings
Norway	Aa1	AAA	1
Poland	Baa3	BB	2
Portugal	A1	AA-	1
Singapore	Aa2	AAA	2
Slovak Republic	Baa3	BB+	1
South Africa	Baa3	BB	2
Sweden	Aa3	AA+	2
Taiwan	Aa3	AA+	2
Turkey	Ba3	B+	1
Venezuela	Ba2	B+	2
Average rating level difference			1.38

Table 2b: Sovereign Credit Ratings Assigned by Moody's and S&P for Selected Countries Having Differences in Level of Ratings in 2007

Sl. No.	Country	Moody's Ratings	S&P's Ratings	Level Diff in Ratings
1	Andorra	Aaa	AA	1
2	Bahamas	Aa1	A-	5
3	Bahrain	A1	A	1
4	Barbados	A1	BBB+	3
5	Belgium	Aaa	AA+	1
6	Belize	B2	CCC-	4
7	Bermuda	Aaa	AA	1
8	Bolivia	B2	B-	1
9	Botswana	Aa3	A	2
10	Brazil	Ba1	BB	1
11	Bulgaria	A1	BBB	4
12	Chile	Aa3	A	2
13	China	A2	A-	1
14	Colombia	Ba1	BB	1
15	Costa Rica	Baa3	BB	2
16	Croatia	A1	BBB	3
17	Cyprus	Aa1	A	4
18	Czech Republic	Aa1	A-	5
19	Dominican Republic	Ba3	B	2
20	Ecuador	Caa2	CCC+	1
21	Egypt	Baa2	BB+	2
22	El Salvador	Baa3	BB+	1
23	Estonia	Aa1	A	4
24	Greece	Aaa	A	5
25	Guatemala	Ba1	BB-	2
26	Hong Kong	Aa1	AA-	2
27	Hungary	Aa1	A-	5
28	Iceland	Aaa	AA-	3
29	India	Baa2	BB+	2
30	Indonesia	Ba3	B+	1
31	Israel	Aa1	A-	5
32	Italy	Aaa	AA-	3
33	Jamaica	Ba3	B	2
34	Japan	Aaa	AA-	3
35	Jordan	Baa3	BB	2
36	Kazakhstan	A2	BBB-	4
37	Korea	A1	A	1
38	Kuwait	Aa2	A+	2
39	Latvia	Aa1	A-	5
40	Lebanon	B2	B-	1
41	Lithuania	Aa1	A	4
42	Malta	Aa1	A	4
43	Mexico	A1	BBB	4
44	Mongolia	Ba2	B	3
45	Morocco	Baa2	BB+	2
46	New Zealand	Aaa	AA+	1
47	Oman	A1	BBB+	3
48	Pakistan	Ba3	B+	1
49	Panama	Baa1	BB	4
50	Papua New Guinea	Ba2	B	3
51	Poland	Aa1	BBB+	6
52	Portugal	Aaa	AA-	3
53	Qatar	Aa2	A+	2
54	Romania	A1	BBB-	5
55	Russia	A2	BBB	4
56	Saudi Arabia	Aa3	A+	1
57	Slovak Republic	Aa1	A	4
58	Slovenia	Aaa	AA	2
59	South Africa	A2	BBB+	2
60	Suriname	Ba2	B-	4
61	Taiwan	Aa3	AA-	3
62	Trinidad and Tobago	A1	A-	2
63	Tunisia	A3	BBB	2
64	Turkey	Ba1	BB-	2
65	Uruguay	Ba2	B	3
66	Venezuela	B1	BB-	1
67	Vietnam	Ba2	BB-	1
Average rating level difference				2.60

Source: Moody's (2008) and Standard and Poor's (2008)

2010, we find that S&P has changed its ratings for a larger number of countries as compared to Moody's and out of them, a significant number is of countries that have faced a downgrade done only by S&P. Moreover, the upgrades and downgrades done by these two agencies are also of different magnitude and in some cases also in opposite directions. Given the fact that the weights assigned to the indicators by the two agencies are not known, the differences in the ratings could be attributed

to the differences in the weights attached to the indicators by the two agencies. It thus becomes important to enquire whether these differences in rating of the two agencies are significant and whether the ratings are responsive to each other. Moreover, it is also relevant to check whether the differences are only due to variation in weights attached by the agencies or due to the existence of qualitative biases developed by the agencies on the basis of subjective criteria.

Table 2c: Sovereign Credit Ratings Assigned by Moody's and S&P for Selected Countries Having Differences in Level of Ratings in 2010

S. No.	Country	S&P's Ratings	Moody's Ratings	Level Diff in Ratings
1	Albania	B+	Ba1	3
2	Andorra	A	Aaa	5
3	Angola	B+	Ba3	1
4	Argentina	B-	B2	1
5	Azerbaijan	BB+	Baa2	2
6	Bahamas	A	Aa1	6
7	Bahrain	BB-	A1	1
8	Bangladesh	BBB	Ba2	1
9	Barbados	B+	A3	2
10	Belarus	AA+	Ba2	1
11	Belgium	B	Aaa	1
12	Belize	AA+	B1	1
13	Bermuda	AA	Aaa	2
14	Bolivia	B	B1	1
15	Bosnia & Herzegovina	B+	Ba3	1
16	Botswana	A-	Aa3	3
17	Brazil	BBB-	Baa2	1
18	Bulgaria	BBB	A1	4
19	Chile	A+	Aa1	3
20	Colombia	BB+	Baa3	1
21	Costa Rica	BB	Baa2	3
22	Croatia	BBB	A1	4
23	Cyprus	A+	Aaa	4
24	Czech Republic	A	Aa1	4
25	Dominican Republic	B	Ba2	6
26	Ecuador	B-	Caa2	2
27	Egypt	BB+	Baa2	2
28	El Salvador	BB	Baa3	2
29	Estonia	A	Aa1	4
30	Fiji Islands	B-	Ba3	2
31	Georgia	B+	Ba1	3
32	Greece	BB+	Aaa	10
33	Guatemala	BB	Baa3	2
34	Honduras	B	Ba3	2
35	Hungary	BBB-	Aa2	7
36	Iceland	BBB-	Baa2	1
37	India	BBB-	Baa2	1
38	Indonesia	BB	Ba1	1
39	Ireland	AA	Aaa	2
40	Israel	A	Aa1	4
41	Italy	A+	Aaa	4
42	Jamaica	B-	Ba3	3
43	Japan	AA	Aaa	1
44	Jordan	BB	Baa3	2
45	Kazakhstan	BBB-	Baa2	1
46	Korea	A	Aa2	3
47	Kuwait	AA-	Aa2	1
48	Latvia	BB	Aa3	8
49	Lebanon	B	Ba3	2
50	Lithuania	BBB	Aa2	6
51	Malta	A	Aaa	5
52	Mexico	BBB	A1	4
53	Mongolia	BB-	Ba2	1
54	Montenegro	BB	Baa1	4
55	New Zealand	AA+	Aaa	1
56	Oman	A	Aa2	3
57	Pakistan	B-	B1	2
58	Panama	BBB-	A2	4
59	Papua New Guinea	B+	Ba2	5
60	Paraguay	B+	B2	1
61	Peru	BBB-	Baa	1
62	Philippines	BB-	Ba1	2
63	Poland	A-	Aa1	5
64	Portugal	A-	Aaa	6
65	Romania	BB+	A1	6
66	Russia	BBB	A2	3
67	Slovakia	A+	Aaa	4
68	Slovenia	AA	Aaa	2
69	South Africa	BBB+	A1	3
70	Spain	AA	Aaa	2
71	Suriname	B+	Ba2	2
72	Thailand	BBB+	A3	1
73	Trinidad and Tobago	A	A1	1
74	Tunisia	BBB	A3	2
75	Turkey	BB	Ba1	1
76	Uruguay	BB-	Ba1	2
77	Venezuela	BB-	B1	1
Average rating level difference				2.75

Source: Moody's (2010) and Standard and Poor's (2010)

RATING ANALYSIS

The analysis of the ratings is done using the ordinary least square (OLS) method. For the purpose of analysis, some other methodologies such as Granger Causality Test and Transition Matrix were also proposed. The

former was to bring out the objectivity of the ratings and the latter to point out the probabilities of the changes in the ratings.¹ The Granger Causality Test requires a

¹ The author is thankful to an anonymous referee who suggested the use of these two methodologies.

long and consistent time series data which is usually unavailable in the case of the sovereign credit ratings. Moreover, the Granger Test of Precedence could not be done on such data which is predominantly cross-sectional. The transition matrix would be an 'n x n' matrix with the number of rows and columns (n) being the ratings provided by the agencies. Creating a matrix with n = all the rating levels (currently 25) would not be feasible for analysis purpose; therefore, these rankings will have to be merged into groups, i.e., the first group of all rankings falling in the top investment grades, the second in the medium investment grades, the third in the top speculative grade and so on. However, the problem here with such a matrix would be that the changes in the ratings occur more often from one level to another within the group rather than moving from one group to another. Such a phenomenon, therefore, would not be reflected in the probability of change in ratings but would have a definite impact on the credit standing of the nation in the international financial markets.

The rating analysis through OLS has been done in two different parts. First, it is examined to see whether there are significant differences in the level of ratings assigned by Moody's and S&P and their responsiveness to each other's ratings. Secondly, the relationship between the ratings and the various economic indicators used by these agencies are examined. The analysis is based on the methodology suggested by Cantor and Packer (1996) with some changes being made in the present analysis.

Data and Methodology

The cross-section data for the above indicators is collected from different sources. The data on GDP per capita, real GDP growth, fiscal balances, external balances, and external debt are obtained from the sovereign risk indicators' list provided by S&P. The data on CPI inflation and internal debt are obtained from the World Economic Outlook (International Monetary Fund, 2008) database and Moody's respectively. The list of developed and developing nations was obtained from the World Bank (2007; 2010) list of economies and the list of default history again from Standard and Poor's (2008). The present analysis is done using the ratings given by the agencies to different countries at two different points in time, i.e., 2007 and 2010. Moreover, the data sets of the economic indicators used in order to examine relationship with the ratings are also for two different points

in time – 2006-07 and 2008-09 respectively.

For the purpose of regression analysis through OLS (ordinary least square) method, it was required to convert the ratings of both these agencies into the numeric form. This was done on the basis of the method used by Cantor and Packer (1996) to convert the ratings of these two agencies in the year 1995. The lowest rating notations used then by Moody's and S&P were B3 and B- respectively as no country was rated below B3 or B-. Hence, the numeric representation was assigned from 1 for B3 (Moody's) and B- (S&P) to 16 for Aaa (Moody's) and AAA (S&P), the highest rating level. However, for the present analysis, the numeric conversion starts from the lowest level rating as theoretically defined by the two agencies, i.e., 'C3' and 'C-' for Moody's and S&P respectively. These ratings are equated to 1 and moving on to the highest rating for both 'Aaa' (Moody's) and 'AAA' (Standard and Poor's) which would be equivalent to 25. Table 3 gives the respective numeric conversions for each level of rating by both the agencies.

For the analysis of the differences in ratings of the two agencies, the ratings of countries commonly rated by them in the year 2007 and 2010 are considered which are 93 and 105 respectively. The following linear regression model is used:

$$Y = a + bX + u \quad (1)$$

where,

Dependent variable Y = Moody's ratings

Explanatory variable X = S&P's ratings

Intercept 'a' = Basic difference in level of ratings of the two agencies

Slope 'b' = Responsiveness of Moody's to S&P's ratings

u = Random error term

For the above equation (1), the null hypothesis tested are: H_0 : a = 0 and b = 1, indicating that there is no basic difference in the level of ratings of the agencies and that change in the level of rating by S&P leads to an equivalent change by the Moody's ratings. Hence, the alternative hypotheses would imply a two-tailed test.

The second part of the analysis is of ratings assigned by the agencies and the economic indicators using the Cantor and Packer type of model. Using multiple regression analysis, the relative significance of nine economic indicators commonly used by the rating agencies which

Table 3: The Rating Scales/Grades Used by Moody's and S&P and their respective Numeric Conversions

Moody's Ratings	Standard and Poor's Ratings	Numeric Conversions
Aaa	AAA	25
Aa1	AA+	24
Aa2	AA	23
Aa3	AA-	22
A1	A+	21
A2	A	20
A3	A-	19
Baa1	BBB+	18
Baa2	BBB	17
Baa3	BBB-	16
Ba1	BB+	15
Ba2	BB	14
Ba3	BB-	13
B1	B+	12
B2	B	11
B3	B-	10
Caa1	CCC+	9
Caa2	CCC	8
Caa3	CCC-	7
Ca1	CC+	6
Ca2	CC	5
Ca3	CC-	4
C1	C+	3
C2	C	2
C3	C-	1

Source: Moody's (2008) and Standard and Poor's (2008)

determine the sovereign ratings are estimated. The linear regression model of the following form is used for the purpose:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + u \quad (2)$$

where the explanatory variables are:

- X_1 – GDP per capita (1000 US\$)
- X_2 – Real GDP growth (% annual change)
- X_3 – Inflation (annual % change)
- X_4 – Fiscal balance (% of GDP)
- X_5 – External balance (current account balance/GDP) (%)
- X_6 – External debt (net external debt/current account receipts) (%)
- X_7 – Internal debt (net internal debt /GDP) (%)
- X_8 – Economic development (dummy variable; high

income = 1 & non-high income = 0)

X_9 – Default history (dummy variable; with default history =1 & without default history = 0)

u – Random error term

For the dependent variable, Y , the individual ratings given by Moody's and S&P, the average of the ratings assigned by these agencies, and the difference in the ratings for all of the commonly rated countries (Moody's ratings– S&P's ratings) are used as alternatives. The ratings are for the year 2007 and 2010.

Regression Results and Interpretations

Table 4 gives the results of the regression of Moody's ratings over the S&P ratings. The values of the intercepts (3.21 and 3.77) indicate a significant difference (at 5% level of significance) in the basic level of ratings between the two agencies. The two-tail test for $b=1$ results in rejection of the null hypothesis. The responsiveness (0.93 and 0.89) is significantly away from one indicating that a change in the rating by S&P does not lead to an equivalent change in the Moody's ratings. The present evidence raises reasonable doubts regarding the ratings assigned by these agencies being consistent. These agencies use the similar economic indicators as the criteria to decide the ratings but seem to have subjective differences in the weights they attach to these indicators leading to such differences in ratings. Thus, it is important to examine the weights attached and the significance of the indicators used by these agencies to decide the ratings. Tables 5a and 5b show the results of the regressions of the ratings of the two agencies, and the average and difference of ratings in 2007 and 2010 on the same set of indicators in the two data sets of 2006-07 and 2008-09 respectively. Beginning with the results for the average ratings in 2007, we find that GDP per capita, inflation, external debt, internal debt, and the dummy for economic development come out as statistically significant variables (at 5% level). Moreover, these coefficients carry the expected signs. The variables of real GDP change,

Table 4: Results of Regression of the Ratings of Moody's and S&P in 2007 and 2010

Details	Coefficient Values		Standard Error	
	2007	2010	2007	2010
Intercept 'a'	3.21	3.77	0.665	0.758
Slope Coefficient 'b'	0.926	0.898	0.035	0.041

Source: Our estimates of the regression (1) above

fiscal balances, and the external balances are found to be insignificant. Regression of the individual ratings of the two agencies over the indicators show that for both Moody's and S&P, the significant variables are the same as in the case of the average ratings. This indicates that it is these set of indicators that determine not only the average ratings but also the individual ratings of both these agencies. Apart from the given set of indicators, the ratings by S&P are also determined by the external balances. However, these variables do not impact Moody's ratings.

Moving to the second set of ratings for 2010, the results

for the average ratings of 2010 show that only GDP per capita and internal debt are found to be statistically significant (at 5% level) with the expected signs of the coefficients. All other variables are found to be insignificant. The regression of the individual ratings on the new data set for 2008-09 shows that the variables significant for both the agencies are the same as for the average ratings. Moreover, for this data set, the S&P and Moody's rating are also determined by the dummy for default history and the dummy of economic development respectively. The significant *R*-square values for all three regressions in both the data sets also indicate a good

Table 5a: Results of Regression of Ratings of 2007 by the Two Agencies and the Economic Indicators

Explanatory Variables	Dependent Variables				
		Average Ratings	S&P's Ratings	Moody's Ratings	Rating Differences (Moody's - S&P)
Intercept	Coeff.	18.988	16.817	20.629	2.153
	<i>t</i> -stat	15.037	16.505	14.405	3.194
GDP per capita (1,000 US\$)	Coeff.	0.114	0.138	0.092	-0.025
	<i>t</i> -stat	2.991***	4.250***	2.137**	-1.236
	<i>P</i> -Value	0.004	0	0.036	0.221
Real GDP (% change)	Coeff.	-0.061	-0.08	-0.035	0.094
	<i>t</i> -stat	-0.503	-0.817	-0.257	1.454
	<i>P</i> -Value	0.617	0.417	0.798	0.151
Inflation (annual % change)	Coeff.	-0.205	-0.159	-0.212	0.008
	<i>t</i> -stat	-2.340**	-2.346**	-2.137**	0.175
	<i>P</i> -Value	0.022	0.021	0.036	0.862
Fiscal Balance (%)	Coeff.	-0.096	-0.115	-0.121	-0.046
	<i>t</i> -stat	-1.035	-1.536	-1.157	-0.925
	<i>P</i> -Value	0.304	0.128	0.252	0.358
External Balance (%)	Coeff.	-0.024	0.055	-0.071	-0.124
	<i>t</i> -stat	-0.45	2.767***	-1.159	-4.281***
	<i>P</i> -Value	0.654	0.007	0.251	0
External Debt (%)	Coeff.	-0.015	-0.012	-0.019	-0.011
	<i>t</i> -stat	-2.709***	-2.963***	-3.154***	-3.619***
	<i>P</i> -Value	0.009	0.004	0.002	0.001
Internal Debt (%)	Coeff.	-0.026	-0.02	-0.033	-0.013
	<i>t</i> -stat	-2.521**	-2.330**	-2.809**	-2.354**
	<i>P</i> -Value	0.014	0.022	0.007	0.022
Economic Development	Coeff.	2.246	2.281	2.493	0.853
	<i>t</i> -stat	2.039**	2.288**	1.996**	1.45
	<i>P</i> -Value	0.045	0.025	0.05	0.152
Default History	Coeff.	-1.585	-1.108	-1.913	-0.004
	<i>t</i> -stat	-1.825	-1.585	-1.942	-0.009
	<i>P</i> -Value	0.072	0.117	0.056	0.993
<i>R</i> -Square		0.71	0.759	0.656	0.362
No. of Countries		76	90	76	76

Note:- ** - Significant at 5% level; *** - Significant at 1% level

Source: Regression results based on Data from Moody's, S&P,, International Monetary Fund, World Bank.

Table 5b: Results of Regression of Ratings of 2010 by the Two Agencies and the Economic Indicators

Explanatory Variables	Dependent Variables				
		Average Ratings	S&P's Ratings	Moody's Ratings	Rating Differences (Moody's - S&P)
Intercept	Coeff.	16.387	14.222	18.454	3.446
	<i>t</i> -stat	10.697	10.911	10.269	2.373
GDP per capita (1,000 US\$)	Coeff.	0.00011	0.00013	0.00009	-0.00002
	<i>t</i> -stat	3.083***	4.259***	2.159**	-0.551
	<i>P</i> -Value	0.003	0.000	0.035	0.584
Real GDP (% change)	Coeff.	0.176	0.202	0.157	-0.167
	<i>t</i> -stat	0.825	1.103	0.628	-0.826
	<i>P</i> -Value	0.412	0.274	0.532	0.412
Inflation (annual % change)	Coeff.	-0.055	-0.061	-0.055	0.039
	<i>t</i> -stat	-0.418	-0.573	-0.354	0.311
	<i>P</i> -Value	0.678	0.569	0.725	0.757
Fiscal Balance (%)	Coeff.	0.018	0.058	0.009	-0.076
	<i>t</i> -stat	0.277	1.088	0.121	-1.243
	<i>P</i> -Value	0.783	0.280	0.904	0.218
External Balance (%)	Coeff.	-0.005	-0.006	-0.003	0.000
	<i>t</i> -stat	-1.192	-1.916	-0.630	0.095
	<i>P</i> -Value	0.238	0.059	0.531	0.924
External Debt (%)	Coeff.	-0.009	-0.005	-0.009	-0.003
	<i>t</i> -stat	-0.722	-0.486	-0.654	-0.304
	<i>P</i> -Value	0.473	0.629	0.516	0.762
Internal Debt (%)	Coeff.	-0.177	-0.123	-0.211	-0.052
	<i>t</i> -stat	-2.460**	-2.129**	-2.509**	-0.759
	<i>P</i> -Value	0.017	0.037	0.015	0.451
Economic Development	Coeff.	-1.429	-1.192	-2.041	-0.154
	<i>t</i> -stat	-1.751	-1.725	-2.112**	-0.199
	<i>P</i> -Value	0.085	0.089	0.039	0.843
Default History	Coeff.	2.023	2.475	1.473	-0.843
	<i>t</i> -stat	1.476	2.050**	0.917	-0.649
	<i>P</i> -Value	0.145	0.044	0.363	0.519
R-Square		0.683	0.751	0.568	0.157
No. of Countries		71	80	71	71

Note: ** - Significant at 5% level; *** - Significant at 1% level

Source: Regression results based on Data from Moody's, S&P, International Monetary Fund, World Bank.

amount of explanatory power of the selected indicators in explaining variations in individual as well as the average ratings.

The results of the regression clearly indicate that the ratings of these two agencies have more or less the common determinants except the external balances and default history indicator exclusively determining the S&P ratings, and the economic development indicator exclusively determining the Moody's ratings. We may recall from the earlier findings that there is a significant difference in the basic level ratings and also the respon-

siveness of ratings of one agency (Moody's) to the ratings of the other (S&P).


This can be possible if the weights attached to the determinants are different in case of both the agencies. To check this, we also consider the regression of the difference in ratings over the same indicators. The results show that only the variables of external balances and internal and external debt are found to be significant in 2007. Thus only three of the indicators explain the difference in the ranks given by these two agencies through the weights attached. The differences in the ratings do ap-

pear to be caused due to the dissimilarity of the weights attached to indicators. Moreover, a test of significance for the differences in weights of the given set of indicators attached by the two agencies reveals that there is no significant difference in the weights. Further the regression of difference in ratings of 2010 over the indicators in the updated data set shows that none of the indicators are significant. This result implies that the differences in these ratings provided by the two agencies are not explained by any of these variables or the differences in the weights attached to them. Thus, the differences can also be attributed to the weights attached to the subjective criteria used by these agencies in order to decide the ratings. Such criteria imply the qualitative biases built by the agencies against nations on the basis of social and political conditions and their reactions to the news regarding the changes in the capital markets of a nation. These agencies do attach some weights to the qualitative criteria (as mentioned earlier also) while making the rating decisions. However, it appears that they do not have the fixed weights attached to these criteria and are changed according to the non-transparent methodologies of the raters.

CONCLUSION

The sovereign rating comparisons of the two rating agencies – Moody's and S&P — and the analysis of their country ratings and the determinants used by them reveal certain key findings: (i) there has been a considerable increase in the average difference in the ratings provided by these agencies over time; (ii) the difference in the ratings assigned by the two agencies during a given year is statistically significant; (iii) the sovereign rating process followed by the two agencies involves several common indicators determining the rating decisions but for the three indicators that are markedly different; and (iv) the differences in their ratings are also caused due to the subjective assessments of different countries. An exception to this exists for the variables of external balances and external debt as well as internal debt in case of regressions of rating differences over the indicators dur-

ing 2007 (see Table 5a). However, the same regression of 2010 rating differences strongly indicates towards this reason as none of the variables are significant. These findings suggest definite subjective differences in the way these agencies weigh different indicators. Not only the differences in weights attached to different indicators by the rating agencies but also the subjective biases in favour or against the nations rated by these agencies, are relevant explanations. Such biases may result in rating changes among agencies sending out wrong signals to the investors, which by itself can aggravate a situation of crisis or a boom. Thus, the present analysis raises doubts regarding the consistency of the rating decisions by the credit rating agencies. Even in terms of communication of facts, the reliability of these ratings is questionable.

Sovereign credit ratings are given considerable importance in the financial markets. These ratings have a special relevance for developing or emerging economies. There is a significant impact of the sovereign ratings by the specialized rating agencies on the access of developing countries to capital markets. An increase in the ratings of a country improves the terms of borrowing and a decrease worsens it. Considering the assessment of countries by the agencies, there has been no problem for the developed economies, but it is not the case for the developing economies which have a limited access to the capital markets as compared to the developed countries. The degradation in the rating of such countries due to its debt servicing problems or any other negative event further aggravates the economic conditions for the borrowing country (Loser, 2004). In such a situation, the methodology used and the factors or indicators included in the rating process by these agencies become vital. There seems to be a need for increase in the objectivity of the rating decisions and greater transparency and rationalization of the criteria used by the rating agencies. This would not only make the sovereign ratings more reliable and consistent but also prevent them from contributing negatively. 

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Underpricing of Initial Public Offerings in Indian Capital Market

Neeta Jain and C Padmavathi

Executive Summary

This paper is an attempt to empirically explore the determinants of underpricing of Initial Public Offerings (IPOs) in the Indian Capital Market. IPOs are one of the largest sources of capital for the firms to invest in the growth opportunities. It encourages investment activities in the economy by mobilizing funds from low growth opportunities to high growth opportunities. It has been observed that IPOs are underpriced in most of the countries (Loughran, Ritter and Rydqvist 1994). Underpricing is the pricing of the issue at lesser price than the true value of the issue. The degree of underpricing varies from country to country and issue to issue in the same country. The underpriced IPO leaves money on the table which is a cost (loss of capital) for the company and the same becomes a gain for the investors in the form of positive initial returns on the underpriced shares. Though underpricing is a cost for the issuing company, the issuing company underprices the issue.

There are many theoretical explanations for underpricing of IPOs. This is an empirical study which aims to find out the factors which are causing underpricing in India. The underpricing of IPOs is a serious problem for any economy. On the one hand, high underpricing tendency in the primary market discourages IPOs issued by those companies which cannot afford or do not want underpricing (leaving money on the table). On the other hand, it creates arbitrage activities in the secondary market and in the grey market. The underpricing of IPOs thus hampers the growth opportunities and creates instability in the secondary market.

In India, introduction of book building mechanism of IPOs in 1998 aimed to reduce underpricing because in the book building mechanism, offer price of the issue is determined on the basis of market feedback. The present study on 227 book-built IPOs for the period of 2004 to 2009 found that the average underpricing during this period was 28 per cent while the maximum underpricing was around 242 per cent. Thus underpricing of IPOs is still an issue of concern.

KEY WORDS

IPO
Underpricing
Book building
Subscription
Market Return
Opening Return