EUROPEAN CENTRAL BANK
EUROSYSTEM

WORKING PAPER SERIES
NO 711 / JANUARY 2007

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1 We are grateful to Fitch Ratings, Moody's, and Standard & Poor's for providing us historical sovereign rating data, to Renate Dreiskena for help with the data, to Vassilis Hajivassiliou and Philip Vermeulen for helpful clarifications, to Moritz Kraemer, participants at an ECB seminar, and an anonymous referee for useful comments. The opinions expressed herein are those of the authors and do not necessarily reflect those of the the ECB or the Eurosystem.

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ISSN 1561-0810 (print)
ISSN 1725-2806 (online)

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Abstract

In this paper we study the determinants of sovereign debt credit ratings using rating notations from the three main international rating agencies, for the period 1995-2005. We employ panel estimation and random effects ordered probit approaches to assess the explanatory power of several macroeconomic and public governance variables. Our results point to a good performance of the estimated models, across agencies and across the time dimension, as well as a good overall prediction power. Relevant explanatory variables for a country's credit rating are: GDP per capita, GDP growth, government debt, government effectiveness indicators, external debt, external reserves, and default history.

JEL: C23; C25; E44; F30; F34; G15; H63

Keywords: credit ratings; sovereign debt; rating agencies; panel data; random effects ordered probit

Non-technical summary

Sovereign credit ratings are a condensed assessment of a government's ability and willingness to repay its public debt both in principal and in interests on time. In this, they are forward-looking qualitative measures of the probability of default put forward by rating agencies. This paper studies the determinants of sovereign debt credit ratings of the three main international rating agencies: Standard and Poor's, Moody's and Fitch Ratings. We build an extensive ratings database, with sovereign foreign currency ratings, attributed by the three agencies, as well as the credit rating outlook, for a panel of 130 countries from 1970 to 2005.

In the first part of the paper we explain the main econometric approaches to the study of the determinants of credit ratings focussing on specification of the functional form and the estimation methodology. There are two major strands of empirical work in the literature: on the one hand, OLS analysis on a numerical representation of the ratings, which allows for a straightforward generalization to panel data by doing fixed or random effects estimation; on the other hand, ordered response models. We discuss in some detail the main advantages and caveat of the several approaches and suggest an original specification and a more robust estimation procedure. Our specification allows for an important distinction between short and long-run impact of the explanatory variables on the credit rating.

In terms of the regressors, we divide them in four main blocks: macroeconomic performance (per capita GDP, unemployment rate, inflation rate, real GDP growth), government performance block (government debt, fiscal balance and government effectiveness), external balance (external debt, foreign reserves and current account balance) and other explanatory variables (default history, European Union and regional dummies).

The main finding is that GDP per capita, real GDP growth, government debt, government effectiveness, external debt and external reserves, sovereign default indicator as well as being a member of European Union, are the most important determinants of the sovereign debt ratings. We find that the government related variables have a stronger effect than found in existing literature.

The large sample allows for a sub-period analysis and for a differentiated analysis of high and low ratings. While the results are roughly stable across agencies, time periods and ratings levels, some additional interesting results emerge. For instance, for the low rating levels, external debt and external reserves are more relevant. On the other hand, for the early sub-period, 1996-2000, the current account balance was more important, while external reserves were possibly somewhat more important in the later period, 2001-2005 (for Moody's and S&P). Moreover, after the Asian crisis, it seems there was a decline in the relevance of the current account variable in the specifications for Moody's and S&P.

In the last part of the paper we analyse some specific country cases. We find that, for instance, Spain's rating upgrades since 1998 were mainly due to its good macroeconomic performance, while Portugal's deterioration of its creditworthiness during the same period can be mainly attributed to poor government performance. Additionally new European Union member countries benefited not only from their good macroeconomic performance, but also from a credibility effect of joining the European Union.

1. Introduction

Sovereign credit ratings are a condensed assessment of a government's ability and willingness to repay its public debt both in principal and in interests on time. In this, they are forward-looking qualitative measures of the probability of default put forward by rating agencies. Naturally, one should try to understand the determinants of credit ratings, given their relevance for international financial markets, economic agents and governments. Indeed, sovereign credit ratings are important in three ways. First, sovereign ratings are a key determinant of the interest rates a country faces in the international financial market and therefore of its borrowing costs. Second, the sovereign rating may have a constraining impact on the ratings assigned to domestic banks or companies. Third, some institutional investors have lower bounds for the risk they can assume in their investments and they will choose their bond portfolio composition taking into account the credit risk perceived via the rating notations. For instance, the European Central Bank when conducting open market operations can only take as collateral bonds that have at least a single A attributed by at least one of the major rating agencies.

In this paper we perform an empirical analysis of foreign currency sovereign debt ratings, using rating data from the three main international rating agencies: Fitch Ratings, Moody's, and Standard & Poor's. We have compiled a comprehensive data set on sovereign debt ratings, macroeconomic data, and qualitative variables for a wide range of countries starting in 1990. Regarding the empirical modelling strategy, we follow the two main strands in the literature. We make use of linear regression methods on a linear transformation of the ratings and we also estimate our specifications under an ordered probit response framework.

Our main contribution to the existing literature is the innovation of the estimation method used and the functional form specification, and the large dataset employed. Under the linear framework, we argue that random effects estimation will be inadequate due to the correlation between the country specific error and the regressors, but also that its alternative, fixed effects estimation will not be very informative. We salvage the random effects approach by means of modelling the country specific error, which in practical terms implies adding time-averages of the explanatory variables as additional

time-invariant regressors. This setting will allow us to make the constructive distinction between immediate and long-run effects of a variable on the sovereign rating. Moreover, we also use a limited dependent variable framework by estimating the augmented-model using ordered probit and random effects ordered probit specifications. The latter is the best procedure for panel data as it considers the existence of an additional normally distributed cross-section error. This approach allows both to determine the cut-off points throughout the rating scale as well as to test whether a linear quantitative transformation of the ratings is actually more appropriate than a possible non-linear transformation. Furthermore, we perform robustness check by allowing for a sub-period analysis and for a differentiated high and low rating analysis.

We find that in particular six core variables have a consistent impact on sovereign ratings. These are the level of GDP per capita, real GDP growth, the public debt level and government effectiveness, as well as the level of external debt and external reserves. A dummy reflecting past sovereign defaults is also found significant as well as, in some cases, the fiscal balance and a dummy for European Union countries. It is noteworthy that fiscal variables turn out to be more important than found in the previous literature.

The paper is organised as follows. In Section Two we give an overview of the rating systems and review the relevant related literature. Section Three explains our methodological choices, specifically regarding the econometric approaches employed. In Section Four we describe the dataset and report on the empirical analysis, notably in terms of the estimation and prediction results. Section Five summarises the paper's main findings.

2. Rating systems and literature

2.1. Overview of rating systems

We use sovereign credit ratings by the three main international rating agencies, Moody's, Standard & Poor's (S&P) and Fitch Ratings. Although these agencies do not use the same qualitative codes, in general, there is a correspondence between each agency rating level as shown in Table 1. S&P and Fitch use a similar qualitative letter

rating in descending order form AAA to CCC-, while Moody's system goes from Aaa to Caa3.

[Insert Table 1 here]

2.2. Literature review

Sovereign ratings are assessments of the relative likelihood of default. The rating agencies assess the risk of default by analysing a wide range of elements from solvency factors that affect the capacity to repay the debt, but also socio-political factors that might affect the willingness to pay of the borrower. For example, S&P determines the rating by evaluating the country's performance in each of the following areas: political risk, income and economic structure, economic growth and prospects, fiscal flexibility, general government debt burden, off-shore and contingent liabilities, monetary flexibility, external liquidity, public-sector external debt burden and private sector external debt burden.

Given that the rating materializes out of the analysis of a vast amount of data, it would be useful to find a reduced set of variables capable of explaining a country's rating. A first study on the determinants of sovereign ratings by Cantor and Packer (1996) concluded that the ratings can be largely explained by a small set of variables namely: per capita income, GDP growth, inflation, external debt, level of economic development, and default history. Further studies incorporated more variables. Macroeconomic performance variables like the unemployment rate or the investment-to-GDP ratio. In papers focussing on the study of currency crises several external indicators such as foreign reserves, current account balance, exports or terms of trade seem to play an important role. Moreover, indicators of how the government conducts its fiscal policy, budget balance and government debt can also be relevant, as well as variables that assess political risk, like corruption or social indexes. Table 2 summarises some of the relevant related studies and findings.

[Insert Table 2 here]

Regarding the econometric approach, there are two major strands in the literature. The first uses linear regression methods on a numerical representation of the ratings. The early study by Cantor and Packer (1996), applies OLS regressions to a linear representation of the ratings, on a cross section of 45 countries. This methodology was also pursued by Afonso (2003), Alexe et al. (2003) and Butler and Fauver (2006). Using OLS analysis on a numerical representation of the ratings is quite simple and allows for a straightforward generalization to panel data by doing fixed or random effects estimation (Monfort and Mulder, 2000; Eliasson, 2002 and Canuto et al., 2004).

Although estimating the determinants of ratings using these approaches has in general a good fit and a good predictive power it faces some critiques. As ratings are a qualitative ordinal measure, using traditional estimation techniques on a linear representation of the ratings is not the most adequate framework of estimation. First, it implies the assumption that the difference between two rating categories is equal for any two adjacent categories, which would need to be tested. Furthermore, even if this assumption was true, because of the presence of elements in the top and bottom category, the estimates are biased, even in big samples. Nevertheless, Eliasson (2002) argues that given the existence of many categories one can treat the rating variable as continuous and to overcome the criticism of the assumption of an even distance between steps, it is possible to use different quantitative transformations. For instance, Reisen and Maltzan (1999) apply a logistic transformation of the ratings and Afonso (2003) applies both a logistic and an exponential transformation of the ratings. In that case, the differences between categories are not constant, but are still imposed *a priori*.

The other strand of the literature uses ordered response models. Because the ratings are a qualitative ordinal measure, the established wisdom advises the use of ordered probit estimation. This method will itself determine the size of the differences between each category. For example, this procedure was used by Hu et al. (2002), Bissoondoyal-Bheenick (2005) and Bissoondoyal-Bheenick et al. (2005). Although this should be considered the preferred estimation procedure it is not entirely satisfying. The crucial point is that the ordered probit asymptotic properties do not generalise for a small sample, so if we estimate the determinants of the ratings using a cross-section of countries, we would have too few observations. It is therefore imperative to try to maximize the number of observation by using panel data, but when doing so, one has to

be careful. Indeed, the generalization of ordered probit to panel data is not completely straightforward, due to the existence of a country specific effect. Furthermore, within this framework, the need to have many observations makes it harder to perform robustness analysis by, for instance, partitioning the sample. In Section Three we will address these questions when explaining our modelling strategy.

3. Methodology

Using a linear scale we grouped the ratings in 17 categories, by putting together in the same bucket the few observations below B-. Indeed, if we used a specific number for each existing rating notch, for instance 21 categories, it might be hard to efficiently estimate the threshold points between CCC+ and CCC, CCC and CCC- and so on, given that the bottom rating categories have very few observations. Table 1 above also shows the relation established between the qualitative and the possible linear scales. Moreover, and as we will see latter in the paper, a linear transformation is quite adherent to the data. Nevertheless, we also report in Appendix 3 estimation results using a logistic transformation.

3.1. Explanatory variables

Building on the evidence provided by the existing literature, we identify a set of main macroeconomic and qualitative variables that may determine sovereign ratings.

GDP per capita – positive impact on rating: more developed economies are expected to have more stable institutions to prevent government over-borrowing and to be less vulnerable to exogenous shocks.

Real GDP growth – positive impact: higher real growth strengthens the government's ability to repay outstanding obligations.

Inflation – uncertain impact: on the one hand, it reduces the real stock of outstanding government debt in domestic currency, leaving overall more resources for the coverage of foreign debt obligations. On the other hand, it is symptomatic of problems at the macroeconomic policy level, especially if caused by monetary financing of deficits.

Unemployment – negative impact: a country with lower unemployment tends to have more flexible labour markets making it less vulnerable to changes in the economic environment. In addition, lower unemployment reduces the fiscal burden of unemployment and social benefits while broadening the base for labour taxation.

Government debt – negative impact: a higher stock of outstanding government debt implies a higher interest burden and should correspond to a higher risk of default.

Fiscal balance – positive impact: large fiscal deficits absorb domestic savings and also suggest macroeconomic disequilibria, negatively affecting the rating level. Persistent deficits may signal problems with the institutional environment for policy makers.

Government effectiveness – positive impact: high quality of public service delivery and competence of bureaucracy should impinge positively of the ability to service debt obligations. (We initially used all six World Bank Governance Indicators: voice and accountability, political stability, regulatory quality, rule of law, control of corruption and government effectiveness, but only this last one turned up as significant).

External debt – negative impact: the higher the overall economy's external indebtedness, the higher becomes the risk for additional fiscal burdens, either directly due to a sell-off of foreign government debt or indirectly due to the need to support over-indebted domestic borrowers.

Foreign reserves – positive impact: higher (official) foreign reserves should shield the government from having to default on its foreign currency obligations.

Current account balance – uncertain impact: a higher current account deficit could signal an economy's tendency to over-consume, undermining long-term sustainability. Alternatively, it could reflect rapid accumulation of fixed investment, which should lead to higher growth and improved sustainability over the medium term.

Default history – negative impact: past sovereign defaults may indicate a great acceptance of reducing the outstanding debt burden via a default. The effect is modelled

by a dummy variable indicating the past occurrence of a default and by a variable measuring the number of years since the last default. This variable measures the recovery of credibility after a default and can be expected to influence positively the rating score.

3.2. Linear regression framework

A possible starting point for our linear panel model would follow Monfort and Mulder (2000), Eliasson (2002) or Canuto, Santos and Porto (2004), generalizing a cross section specification to panel data,

$$R_{it} = \beta X_{it} + \lambda Z_i + a_i + \mu_{it}, \qquad (1)$$

where we have: R – quantitative variable, obtained by a linear or by a non-linear transformation; X_{it} is a vector containing time varying variables that includes the time-varying explanatory variables described above and Z_i is a vector of time invariant variables that include regional dummies.

In (1) the index i (i=1,…,N) denotes the country, the index t (t=1,…,T) indicates the period and a_i stands for the individual effects for each country i (that can either be modelled as a error term or as N dummies to be estimated). Additionally, it is assumed that the disturbances μ_{it} are independent across countries and across time.

There are three ways to estimate this equation: pooled OLS, fixed effects or random effects estimation. In *normal conditions* all estimators are consistent and the ranking of the three methods in terms of efficiency is clear: a random effects approach is preferable to the fixed effects, which is preferable to pooled OLS. The question one should ask is whether the *normal conditions* are fulfilled. What we mean by normal conditions is whether or not the country specific error is uncorrelated with the regressors $E(a_i | X_{it}, Z_i)$=0. If this is the case one should opt for the random effects estimation, while if this condition does not hold, both the pooled OLS and the random effects estimation give inconsistent estimates and fixed effects estimation is preferable.

In our case, it seems more natural that the country specific effect is correlated with the regressors.[1] Given this scenario one should be tempted to say that the "fixed effects estimation" is the best strategy, but that has a problem. Because there is not much variation of a countries rating over time, the country dummies included in the regression will capture the country's average rating, while all the other variables will only capture movements in the ratings across time. This means that, although statistically correct, a regression by fixed effects would be seriously striped of meaning.

There are two ways of rescuing a random effects approach under correlation between the country specific error and the regressors. One is to do the Hausman-Taylor IV estimation but for that we would have to come up with possible instruments that are not correlated with a_i, which does not seem an easy task. In this paper we will opt for a different approach that consists on modelling the error term a_i. This approach, described in Wooldridge (2002), is usually applied when estimating non-linear models, as IV estimation proves to be a Herculean task but, as we shall see, the application to our case is quite successful. The idea is to give an explicit expression for the correlation between the error and the regressors, stating that the expected value of the country specific error is a linear combination of time-averages of the regressors $\overline{X}_i$. This follows Hajivassiliou and Ioannides (2006) and Hajivassiliou (2006).

$$E(a_i \mid X_{it}, Z_i) = \eta \overline{X}_i . \qquad (2)$$

If we modify our initial equation (1), with $a_i = \eta \overline{X}_t + \varepsilon_i$ we get

$$R_{it} = \beta X_{it} + \lambda Z_i + \eta \overline{\mathrm{X}}_{\mathrm{i}} + \varepsilon_i + \mu_{it} , \qquad (3)$$

where ε_i is an error term by definition uncorrelated with the regressors. In practical terms, we eliminate the problem by including a time-average of the explanatory variables as additional time-invariant regressors. We can rewrite (3) as:

[1] This idea can easily be checked by doing some exploratory regressors. We estimated equation (1) using random effects and performed the Hausman test; the Qui-Square statistisc was in fact very high, and the null hypothesis of no correlation was rejected with p-values of 0.000.

$$R_{it} = \beta(X_{it} - \overline{X}_i) + (\eta + \beta)\overline{X}_i + \lambda Z_i + \varepsilon_i + \mu_{it}\,. \qquad (4)$$

This expression is quite intuitive. $\delta = \eta + \beta$ can be interpreted as a long-term effect (e. g. if a country has a permanent high inflation what is the respective effect on the rating), while β is a short-term effect (e. g. if a country manages to reduce inflation this year by one point what would be the effect in the rating). This intuitive distinction is useful for policy purposes as it can tell what a country can do to improve its rating in the short to medium-term. We will estimate equation (4) by random effects, but we also estimate the OLS and fixed effects versions. The way we modelled the error term can be considered successful if the coefficients of $\overline{X}_i$ are significant and if the Hausman test indicates no correlation between the regressors and the new error term.

3.3. Ordered response framework

Alternatively we estimate the determinants of sovereign debt ratings in a limited dependent variable framework. As we mentioned before, the ordered probit is a natural approach for this type of problem, because the rating is a discrete variable and reflects an order in terms of probability of default. The setting is the following. Each rating agency makes a continuous evaluation of a country's credit-worthiness, embodied in an unobserved latent variable R^*. This latent variable has a linear form and depends on the same set of variables as before,

$$R_{it}^* = \beta(X_{it} - \overline{X}_i) + \delta\overline{X}_i + \lambda Z_i + \varepsilon_i + \mu_{it}\,. \qquad (5)$$

Because there is a limited number of rating categories, the rating agencies will have several cut-off points that draw up the boundaries of each rating category. The final rating will then be given by

$$R_{it} = \begin{cases} AAA\ (Aaa) & if \quad R_{it}^* > c_{16} \\ AA+\ (Aa1) & if \quad c_{16} > R_{it}^* > c_{15} \\ AA\ (Aa2) & if \quad c_{15} > R_{it}^* > c_{14} \\ \vdots & \\ < CCC + (Caa1) & if \quad c_1 > R_{it}^* \end{cases}. \qquad (6)$$

The parameters of equation (5) and (6), notably β, δ, λ and the cut-off points c_1 to c_{16} are estimated using maximum likelihood. Since we are working in a panel data setting, the generalization of ordered probit is not straightforward, because instead of having one error term, we now have two. Wooldridge (2002) describes two approaches to estimate this model. One "quick and dirty" possibility is to assume we only have one error term that is serially correlated within countries. Under that assumption one can do the normal ordered probit estimation but a robust variance-covariance matrix estimator is needed to account for the serial correlation. The second possibility is the random effects ordered probit model, which considers both errors ε_i and μ_{it} to be normally distributed, and the maximization of the log-likelihood is done accordingly. This second approach should be considered the best one, but it has as a drawback the quite cumbersome calculations involved. In STATA this procedure was created by Rabe-Hesketh et al. (2000) and substantially improved by Frechette (2001a, 2001b), and we will use such procedures in our calculations.

4. Empirical analysis

4.1. Data

We build a ratings database with sovereign foreign currency rating attributed by the three above-mentioned main rating agencies. For the rating notations we covered a period from 1970 to 2005. The rating of a particular year is the rating that was attributed at 31st of December of that year. In 2005 there are 130 countries with a rating, though only 78 have a rating attributed by all three agencies (see Appendix 2 for rating coverage description).[2]

In Figure 1 we can see the evolution of the number of countries rated by each agency and it is possible to notice a significant increase in mid 1990's of the number of countries with rating, especially from S&P and Moody's.

[Insert Figure 1 here]

[2] The full historical rating dataset that we compiled, including foreign and local currency ratings as well as credit rating outlooks, is available from the authors on request.

In general the ratings attributed by the three agencies are quite similar. As shown in Table 3 around 50 per cent of all observations have the same pair-wise rating. It is also interesting to notice that S&P and Fitch have much closer ratings, and Moody's is more divergent with a significant number of observations having a distance of two notches vis-à-vis the other two agencies. This might indicate, for instance, that Moody's and S&P give different weights to different indicators or simply reflects the uncertainty in measuring the default risk.

[Insert Table 3 here]

For the present study we limited the sample to 1995-2005 because of data availability of explanatory variables. The variables inflation, unemployment, GDP growth, fiscal balance and current account entered as a 3 years average, reflecting the agencies' approach to take out the effect of the business cycle when deciding on a sovereign rating. The external debt variable was taken from the World Bank and is only available for non-industrial countries, so for industrial countries it was attributed the value 0, which is equivalent to having a multiplicative dummy. As for the dummy variable for European Union, we consider that the rating agencies anticipated the EU accession. Thus we tested the contemporaneous variable as well as up to three leads. We find that for Moody's and S&P the variable enters with two leads, while for Fitch we find no anticipation of EU accession. (See Appendix 1 for a full list of variables used in the estimations as well as their specification and data sources.)

Regarding the estimation procedure, starting out with the broadest possible set of variables, we sequentially dropped those that did not reveal any explicative power (export growth, investment, trade openness, domestic credit growth, interest payments and also most of the regional dummy variables).

4.2. Linear panel results

4.2.1. Full sample

The results generated by the panel regressions point to broadly similar regression models across the three rating agencies (see Tables 4, 5 and 6). In view of the analytical considerations above the discussion will focus on the random effects estimations. This is supported by the Hausmann tests reported at the end of each table pointing to the acceptability of the random effects approach. Nevertheless, we also report the pooled OLS and the fixed effects results for completeness and comparison purposes.

[Insert Tables 4, 5 and 6 here]

We report the results of two models for each of the rating agencies, the unrestricted and the restricted model. While the unrestricted model incorporates all variables discussed above, the restricted model contains only the variables which were found to have a statistically significant impact. Although the sequence of excluding individual variables in moving from the unrestricted to the restricted regression can have an impact on the final specfication, the restricted models presented in the tables are quite robust to alternative exclusion procedures. As can be seen from the statistics reported at the end of each table, the explanatory power of the models is very high with R-square values around 95 per cent and it remains almost constant moving from the unrestricted to the restricted versions, while the number of observations increases marginally. In addition, the variables found to be significant in the unrestricted model generally remain significant with the same sign in the restricted version.

The restricted models reveal a homogenous set of explanatory variables across agencies. On the real side, GDP per capita and GDP growth rates turn out significant for all three companies. In the fiscal area, this applies to the government debt ratio as a difference from the average and to the government effectiveness indicator. On the external side, the average external debt ratio and the average level of reserves are found to be significant across agencies. Default, EU and industrial country dummies are also significant for all agencies. Moreover, the size of the coefficients is of the same order of magnitude and they have the expected signs. In particular, the level and growth rate of

real income drive up the rating, government and external debt have a negative impact and government effectiveness and higher external reserves have a positive impact.

Beyond this set of core variables, the agencies appear to employ a limited number of additional variables. For Fitch the analysis finds the smallest set of additional variables, comprising government effectiveness as a deviation from the average and foreign currency reserves also as the short-run deviation. By contrast, the analysis finds more significant explanatory variables for Moody's and Standard and Poor's, with a large degree of homogeneity between these two agencies. In particular, on the real side inflation is found to have a significantly negative impact. In the fiscal area, the average debt level exerts an additional negative impact on the ratings level, whereas the fiscal balance has a strong positive impact. With regard to the external sector, the current account balance has a negative impact.

The findings regarding the current account effect may appear surprising as it suggests that countries with high current account surpluses would tend to be rated lower than otherwise equal countries without such surpluses. However, this result is quite recurrent in the literature (Monfort and Mulder, 2000 or Eliasson, 2002). A possible explanation is that a current account deficit could in fact serve as an indicator for the willingness of foreigners to cover the current account gap through loans and foreign investment. In this situation, a higher current account deficit would be associated with either higher credit-worthiness or good economic prospects of the economy and consequently a higher sovereign rating.

Finally, the impact of the unemployment variables appears not entirely clear cut. While the average level of unemployment is found to have a significant negative impact on the rating by Moody's, the short-run deviation from the average enters positively and significantly in the S&P model. Structural reforms that raise unemployment in the short run but improve fiscal sustainability in the long run could provide an explanation for this latter finding, but further research would be necessary to validate this hypothesis.

One can also assess how successfull and important our specification is. First, most of the time averages of the explanatory variables are significant, which proves that if we

did not include them we would be mispecifying the model.[3] Second, the models pass the Hausman test, which sugested that the problem was entirely corrected. Furthermore, if we look at the fixed effects estimation we can see how poor it is. Notice the estimated constant and its significance. In general the constant captures the middle rating, while the estimated country dummies (ommited here), which vary from -7 to 7 notches, capture each country's average rating. All the other variables only capture small movements from the rating in relation to its average[4].

4.2.2. Differentiation across sub-periods

The separation of the overall sample into two sub-periods allows to assess broadly the robustness of the empirical models and provides additional insight into possible changes in the rating determinants. In particular, cutting the sample period in 2000 could reveal any changes in the sovereign ratings methodology in response to the Asian crisis which was perceived by market participants as revealing previously underestimated risks to sovereign sustainability. Additionally, this also divides the full sample in two rather similar sized sub-samples.

The models for the sub-periods are generally in line with those for the full estimation period, although the significance levels of the individual coefficients are reduced (see Tables 7–9). The lower significance levels reflect the reduction in the respective sample sizes in half, which makes the coefficient estimates less certain. Taking this into account, signs and orders of magnitude of the coefficient estimates from the full-period models are mostly confirmed for the sub-periods. In particular, the core variables identified above enter the models for the sub-periods with the correct sign and generally significantly with a comparable order of magnitude.

[Insert Tables 7, 8 and 9 here]

Regarding the possible impact of the Asian crisis on ratings approaches, the stability of the ratings models suggests that there was no fundamental change in methodologies. A

[3] This is in fact the cause why without including time-averages the models would not pass the Hausman test.
[4] We also estimated the model with the average rating of the three agencies, and also pooling the data for the three agencies, but the results where quite similar.

change that may point to some adaptation of ratings methods in response to the Asian events is the decline in importance of the current account variable for Moody's and S&P, both with regard to the value of the estimated coefficient as well as its significance level. The change may suggest that the function of the current account as an indicator for foreigners' willingness to cover the current account gap has declined. Finally, for Moody's the increase in value and significance of the coefficient on external reserves may point to a higher importance attached to this variable after the Asian crisis. Taken together with the reduced importance of the current account, this could suggest a move towards a broader view on foreign financial relationships, which includes capital flows in addition to the current account movements.

Looking at the individual agencies, for Fitch coefficient values remain remarkably stable over the sub-periods. An exception is the negative (though insignificant) value for GDP growth in the early sub-sample. For S&P, sign reversals between sub-periods occur for the explanatory variables unemployment, government effectiveness and external debt, but there are no significant coefficient estimates with opposing signs. For Moody's, the models point to a sign reversal for the insignificant estimate of the coefficient on inflation.

4.2.3. Differentiation across ratings levels

As a further test of the robustness of the results derived above, the sample was split into two groups according to the ratings level: regressions were run separately for high-rated countries with grades BBB+ and below and those above this grade. The choice of the threshold reflects practical considerations. While market participants generally divide bond issuers into investment-grade and non-investment grade at the threshold of BBB-, this threshold would result in a relatively small number of observations for low ratings making inference problematic. From the estimation of the ratigns above BBB+, we removed the variable external debt because there were too few observations of non-industrial countries.

The results for the separate regressions according to ratings levels confirm the overall results from the full sample (see Tables 10–12). Looking at the random effects estimation for each agency, the variables that were found to be significant across

agencies in the full sample also show up consistently with the correct sign in the individual regression models for high and low ratings. Most of the coefficients are statistically significant. Notably, the importance of average external reserves appears to rise for low ratings in the models for Fitch and S&P. In the cases of statistical significance external reserves always have a positive impact on the ratings.

[Insert Tables 10, 11 and 12 here]

The explanatory power of the individual regressions is somewhat lower than that found for the full sample as well as for the sub-periods. This reflects the fact that splitting the sample in this way reduces the number of rating categories for each estimation, so that, with a discrete dependent variable, estimated rating errors become relatively larger.

Beyond the core variables, the results for Moody's and S&P suggest a significant difference in the importance of inflation for high and low ratings, respectively. For both agencies the (significant) coefficient on inflation as an average and the deviation from it is much higher for high ratings than for low ratings. (For Fitch, this finding is supported by the pooled OLS and the fixed effects estimations, but not for the random effects specification.) This suggests that for high rated countries inflation has a much more important impact on the rating. A possible explanation is that for this set of countries price level stability may be taken as an indicator for sound economic and in particular monetary policies which support the long-run sustainability of government finances.

Turning to differences across agencies, the results point to a relatively high level of consistency in the approach to high and low ratings for Fitch and Moody's. For these two agencies signs and (mostly) significance levels of coefficient are generally consistent for high and low ratings. A somewhat higher degree of variation in this regard can be observed for S&P where the sign of the estimated impact of some variables switches between high and low ratings, although in most instances the comparison involves statistically insignificant coefficients. Additionally, one notices also a higher R-square for low ratings for S&P and Fitch.

4.3. Ordered probit results

In view of the discussion of econometric issues above, ordered probit models should give additional insight into the determinants of sovereign ratings. In particular, this method allows to relax the rigid assumption on the shape of the ratings schedule. Instead it generates estimates of the threshold values between rating notches allowing an assessment of the shape of the ratings curve. Given the data requirements, the method was only applied to the full sample, which appears appropriate in view of the overall robustness of the empirical results to the use of sub-samples.

The results from the ordered probit estimation validate the findings highlighted above (see Tables 13 and 14, respectively for the ordered probit robust standard errors and the random effects ordered probit). The core variables identified in the linear regressions also show up with the correct sign in the ordered probit approach. In addition, the ordered probit models suggest the significance of somewhat more explanatory variables, namely inflation and the current account, which were significant only in some specifications in the linear approach. At the same time, in the area of external variables, reserves do not show up significantly for Moody's and Fitch in the restricted specifications, both for the ordered probit and for the random effects ordered probit. Finally, for the current account variable, the restricted specification for Moody's shows a negative sign for deviations from the long-term average, but a positive sign for the average, and similar sign switches appear also in some instances for the other agencies. This result goes some way in reconciling the counter intuitive result of the negative effect of current account on sovereign ratings, with the conventional wisdom.

[Insert Tables 13 and 14 here]

The estimated threshold coefficients reported in the second part of the tables suggest that the linear specification assumed for the panel regression above is appropriate. The plot of the results of the random effects ordered probit (see Figure 2), shows that for all three agencies the thresholds between rating notches are broadly equally distributed across the ratings range. In other words, the distance for a country to move e.g. from B– to B is roughly equal to that for moving from AA to AA+. Nevertheless, the econometric tests at the bottom of the tables reveal additional insights. For the restricted

model of Moody's, the test does not reject the null hypothesis of equal distances between thresholds, but the significance level is close to 10 per cent. Indeed the estimated thresholds point to a relatively large jump between the ratings for BBB– and BBB. This suggests that countries close to the non-investment grade rating are given a wider range before they actually cross that threshold. For Fitch, the hypothesis of equal distances is strongly rejected as the thresholds for higher ratings are further apart than those of the lower ratings. In this case the kink lies at the A rating.

[Insert Figure 2 here]

Finally, for S&P, different distances are found throughout the ratings scale. Looking at Figure 2, it appears that for lower ratings the relative distance between thresholds of S&P coincides with that of Moody's. However, above the investment grade limit, the distances between thresholds at first decline and then increase, resulting in a slightly curved ratings schedule that makes the transition to the highest grades most difficult.

4.4. Prediction analysis

Our prediction analysis will focus on two elements: the prediction for the rating of each individual observation in the sample, as well as the prediction of movements in the ratings through time.

Prediction with the pooled OLS model was done by rounding the fitted value (which is continuous) to the closest integer between 1 and 17. For the random effects estimations we can have two predictions, with or without the country specific effect, ε_i, and we can write the corresponding estimated versions of (4) as:

$$\hat{R}_{it} = \hat{\beta}(X_{it} - \overline{\mathrm{X}}_i) + \hat{\delta}\overline{\mathrm{X}}_i + \hat{\lambda}Z_i + \hat{\varepsilon}_i, \qquad (7a)$$

$$\tilde{R}_{it} = \hat{\beta}(X_{it} - \overline{\mathrm{X}}_i) + \hat{\delta}\overline{\mathrm{X}}_i + \hat{\lambda}Z_i. \qquad (7b)$$

We can then estimate each country specific effect by taking the time average of the estimated residual for each country. As a result we can include or exclude this

additional information that comes out of the estimation. In other words, we generate in-sample and out-of-sample prediction. After the fitted value is computed it is then also rounded to the closest integer between 1 and 17. The prediction with both ordered probit and the random effects ordered probit was done by fitting the value of the latent variable, setting the error term to zero, and then match it up to the cut points do determine the predicted rating. Table 15 presents an overall summary of the prediction errors, for the three agencies and for the several methods using the respective restricted specifications.

[Insert Table 15 here]

The first conclusion is that the random effects model including the estimated country effect is the method with the best fit. On average for the three agencies, it correctly predicts 70 per cent of all observations and more than 95 per cent of the predicted ratings lie within one notch (99 per cent within two notches). This is not surprising, the country errors capture factors like political risk, geopolitical uncertainty and social tensions that are likely to systematically affect the ratings, therefore, such term acts like a correction for these factors.

This additional information cropping up from the random effects estimation with the country specific effect can be very useful if we want to work with countries that belong to our sample. But if we want to make out of sample predictions we will not have this information. In that case, only the random effects estimation excluding the country error is comparable to the OLS specification, to the ordered probit and to the random effects ordered probit. We can see that in general both ordered probit and random effects ordered probit have a better fit than the pooled OLS and random effects for all three agencies, though not as clearly for Fitch. Overall, the simple ordered probit seems the best method as far as prediction in levels is concerned as it predicts correctly around 45 per cent of all observations and more then 80 per cent within one notch.

Another interesting aspect to notice is that the OLS and the random effects specifications are biased downward, while the ordered probit and random effects ordered probit ones are slightly biased upward. The explanation for this turns out to be simple if we look at Figures 3 to 5, were we present a map of predicted versus actual

rating for every category using the four estimation methods. We can see that both the OLS and the random effects specifications tend to under predict actual AAA's (Aaa) while both ordered probit models and random effects ordered probit tend to over predict the actual rating in the top categories, attributing many AAA's (Aaa) to countries with actual lower rating. In the bottom end of the rating scale the opposite happens, OLS and random effects have a propensity to overestimate ratings that are bellow CCC+ (Caa1), on the other hand, both ordered probit prediction errors are quite balanced.

[Insert Figures 3, 4 and 5 here]

Those figures provide some additional insights. For Moody's, ordered probit performs well in the bottom ratings while random effects ordered probit is better for top ratings. Also notice that all four models have difficulty explaining the rating A3. Out of 21 observations the maximum correctly predicted is 2 (with OLS) with a substantial number of predictions lying outside 1 notch.

For S&P the ordered probit outperforms all other models in the middle and bottom categories. For Fitch, one should mention that the number of observations used for the random effects ordered probit is higher than the other models (because of the non-inclusion of one of the variables), which makes comparison harder. One element we need to highlight is the fact that there is only one observation in the category A+, which is the possible cause for the identification of the jump in both limited dependent variable estimations, mentioned before in section 4.4. For completeness, Figure 6 reports the map of predicted ratings using the random effects estimation including country specific errors.

[Insert Figure 6 here]

Let's now turn to how the models perform in predicting changes in ratings. Table 16 presents the total number of sample upgrades (downgrades), the predicted number of upgrades (downgrades) and the number of upgrades (downgrades) that where correctly predicted by the several models.

[Insert Table 16 here]

Roughly the models correctly predict between one third and one half of both upgrades and downgrades. In our opinion this is quite satisfactory given that the empirical approach used here necessarily neglects two sources of information that are known to enter the decision of the rating agencies. First, in contrast to the backward-looking models presented above, rating agencies base their decision to a considerable extent on projected economic developments. Thus, a full empirical model of the agencies' approach would need to incorporate the agencies' expectations regarding the relevant explanatory variables. However, as the agencies generally do not publish their projections, any such modelling attempt would remain highly tentative. Still, the observation that many of the actual rating changes are predicted by the models with a lag of one or two years appears to support the relevance of this point. Second, ratings agencies also generally make a clear point that they cover qualitative variables in addition to quantitative data in the ratings process. While the relative importance of the qualitative and quantitative factors that enter the ratings decision is uncertain (and might well vary across countries), rating agencies' public statements indicate that such factors can play an important role.[5] In the models above, by contrast, the only variable reflecting such considerations is the government effectiveness indicator and it thus appears likely that in these models the impact of qualitative factors is under-represented.

The most noticeable difference between the models is not the number of corrected predicted changes but the total number of predicted changes. In fact, the ordered probit and random effects ordered probit predict significantly more changes than the OLS and random effects counterparts. For instance, for S&P, while both OLS and random effects predict around 79 upgrades and 50 downgrades, the ordered probit model predicts 102 upgrades and 64 downgrades.

4.5. Examples of specific country analysis

In terms of the magnitude of the coefficients, the comparison between the ordered probit and random effects ordered probit is not straightforward because the estimated distances between the categories are different. But in general, once this is accounted for, by

[5] For example, see Rother (2005) for an analysis of the impact of EMU convergence on country ratings in eastern Europe.

standardising the coefficients in relation to the average jump, they are both in line with the linear panel results. An improvement of 2 percentage points in the budget deficit, a reduction of 5 percentage points in public debt, or a higher GDP growth by 3 percentage points, all have the same relative impact on the ratings between 0.1 and 0.2 notches. An increase of 10 per cent in GDP per capita would improve the rating by 0.15 to 0.25 notches. As we mentioned, a reduction of the unemployment only affects the rating if this reduction is sustainable. If that is the case, a reduction of 4 percentage points increases the rating by 0.2 to 0.35 notches. The effect of inflation is quite small, a reduction of 20 percentage points on inflation increases the rating by 0.05 to 0.1 notches. These values are too small to be noteworthy for industrial countries, but if one does the same calculation with the value estimated for high rated countries a reduction of 4 percentage points in inflation would increase the rating by 0.15 notches.

Now that we have an idea of the estimated impact of the variables we can do some specific country analysis. As an example, in Table 17 we show the rating for some European countries and some emerging markets both in 1998 and 2005. Then, we use the estimated short-run coefficients of the random effects ordered probit together with the values for the relevant variables. Afterwards, we divide the overall prediction change in the rating for each agency into the contributions of the different blocks of explanatory variables: macroeconomic performance, government and fiscal performance, external elements and European Union[6]. The upper and lower bound presented are computed by adding and subtracting one standard deviation to the point estimate of the coefficients.

[Insert Table 17 here]

Let's compare, for instance, Portugal and Spain. In 1998 they both had an AA (Aa2) rating but in 2005 while Spain had been upgraded to AAA (Aaa) by all agencies, Portugal had been downgraded by S&P. If we analyse the contributions of the main key variables we see that, for Portugal the positive contribution of the macroeconomic performance was overshadowed by the negative government developments. For such

[6] As an exception, we used the long-run coefficient of unemployment instead of the short-run coefficient. We are implicitly assuming that all the changes in unemployment between these two years were structural.

government performance contributed the worsening of the budget deficit since 2000, the upward trend in government debt and the worsening in the World Bank governance effectiveness indicator. As for Spain, the good macroeconomic performance was the main cause of the upgrade, specially the reduction of structural unemployment since the mid nineties and the increase of GDP per capita due to the persistent high growth.

Another example can be seen with the new European Union member states Slovakia, the Czech Republic, Hungary, Slovenia and Poland, which have in general been upgraded by the three agencies, in some cases more than two notches. The good macroeconomic performance, especially in Slovakia and the Czech Republic, plays a major role, but there was also an important credibility effect of joining the European Union, mostly visible for Moody's. It is in fact for Moody's that we observe the strongest upgrades. For Poland, the effect of the macro performance might be undervalued. One of the key elements was the sharp reduction of inflation of more then 12 percentage points, but, as we mentioned before, the effect of inflation for high rated countries is under assessed in the main estimations. If we consider such information, one would have an estimated additional impact of almost half a notch.

As a final example for the emerging economies, we report the results for five countries that have, in general also been upgraded: Brazil, Mexico, Malaysia, Thailand and South Africa. We should briefly highlight that for Brazil the main positive contribution came from the external area specially the reduction of external debt and the increase in foreign reserves. This effect is particular to Fitch. For Malaysia and Thailand the main contribution came from the macro side, while for Mexico and South Africa the contributions are more balanced.

5. Conclusion

In this paper we studied the determinants of global sovereign debt ratings using ratings from the three main international rating agencies, for the period 1995-2005. Overall, our results point to a good performance of the estimated models, across agencies and across the time dimension, as well as a good overall prediction power.

Regarding the methodological approach, we used both a linear framework and an ordered probit approach. We modelled the country specific error using a random effects approach, which in practical terms implied adding time-averages of the explanatory variables as additional time-invariant regressors. This setting allowed us to distinguish between immediate and long-run effects of a variable on the sovereign rating level. Moreover, we also used a limited dependent variable framework by means of an ordered probit and random effects ordered probit specifications. The latter is the best procedure for panel data as it considers the existence of an additional normally distributed cross-section error term. This approach allowed both to determine the cut-off points throughout the rating scale as well as assessing whether a linear quantitative transformation of the ratings is actually more appropriate than a possible non-linear transformation.

Our main findings in the panel random effects framework allowed us to detect a set of core variables that are relevant for the determination of the ratings: per capita GDP; GDP real growth rate; government debt; government effectiveness; external debt and external reserves; sovereign default indicators. Moreover, the importance of fiscal variables appears stronger than in the previous existing literature.[7]

The ordered probit analysis confirmed the overall estimation results from the linear panel regressions. Interestingly, there is some evidence for different approaches of the agencies with regard to the distance between ratings thresholds. For instance, for Moody's the estimated thresholds point to a relatively large jump between the ratings for BBB– and BBB. This suggests that countries close to the non-investment grade rating are given a wider range before they actually cross that threshold. For Fitch, the hypothesis of equal distances is strongly rejected as the thresholds for higher ratings are further apart than those of the lower ratings. In this case the kink lies at the A rating. On the other hand, no clear switching pattern emerges for S&P.

The panel sample we used is quite comprehensive, which allowed for a sub-period analysis and for a differentiated high and low rating analysis. While the results are

[7] We performed additional analysis from some different perspectives. For instance, we used the information on credit rating outlooks but no relevant improvement on the fit of the models occurred. In addition, we assessed also whether different exchange rate regimes added information to the rating determination, but that was not the case.

roughly stable across agencies, time periods and ratings levels, some additional interesting results emerge. For instance, for the low rating levels, external debt and external reserves are more relevant. On the other hand, for the early sub-period, 1996-2000, the current account balance was more important, while external reserves were possibly somewhat more important in the later period, 2001-2005 (for Moody's and S&P). Moreover, after the Asian crisis, it seems there was a decline in the relevance of the current account variable in the specifications for Moody's and S&P.

Another relevant outcome ot the analysis ist that low ratings levels are more affected by external debt and external reserves while inflation plays a bigger role for high rating levels. On the other hand, the specifications for the Fitch ratings seem to be most consistent over time and ratings categories. There was more variation for S&P and Moody's in the middle of the rating scales, which possibly points to a more quantitative model-based approach for Fitch.

Finally, regarding the prediction analysis, the random effects model including the estimated country effect turns out to be the method with the best fit. On average for the three agencies, such specification correctly predicted 70 per cent of all observations and more than 95 per cent of the predicted ratings lay within one notch. Moreover, the models also correctly predicted between one third and one half of respectively upgrades and downgrades. This is quite satisfactory for two reasons: first, the rating agencies also have a forward looking behaviour that is absent from our models and second, other qualitative factors not captured in our variables may play an important role.

Looking forward, further studies could investigate how to capture agencies' expectations in empirical models as well as their views on qualitative variables. Moreover, in our modelling approach we only use the government effectiveness indicator in order to asses the impact of qualitative factors on the rating determination. Therefore, other qualitative information could also be tentatively assessed as for instance, socio-political factors.

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Tables and figures

Table 1 – S&P, Moody's and Fitch rating systems and linear transformations

Characterization of debt and issuer (source: Moody's)		Rating			Linear transformations	
		S&P	Moody's	Fitch	Scale 21	Scale 17
Highest quality	Investment grade	AAA	Aaa	AAA	21	17
High quality		AA+	Aa1	AA+	20	16
		AA	Aa2	AA	19	15
		AA-	Aa3	AA-	18	14
Strong payment capacity		A+	A1	A+	17	13
		A	A2	A	16	12
		A-	A3	A-	15	11
Adequate payment capacity		BBB+	Baa1	BBB+	14	10
		BBB	Baa2	BBB	13	9
		BBB-	Baa3	BBB-	12	8
Likely to fulfil obligations, ongoing uncertainty	Speculative grade	BB+	Ba1	BB+	11	7
		BB	Ba2	BB	10	6
		BB-	Ba3	BB-	9	5
High credit risk		B+	B1	B+	8	4
		B	B2	B	7	3
		B-	B3	B-	6	2
Very high credit risk		CCC+	Caa1	CCC+	5	1
		CCC	Caa2	CCC	4	
		CCC-	Caa3	CCC-	3	
Near default with possibility of recovery		CC	Ca	CC	2	
				C		
Default		SD	C	DDD	1	
		D		DD		
				D		

Table 2 – Some previous related studies

Reference	Data	Explanatory variables	Agencies	Methodology
Cantor and Packer (1996)	Cross-section, 1995, 45 Countries	Per capita GDP, GDP growth, Inflation, current account surplus, government budget surplus, debt-to-exports, economic development, default history	S&P Moody's	Linear transformation of the data. OLS estimation.
Monfort and Mulder (2000)	Panel, 1995-1999 (half-yearly), 20 emerging markets	Debt-to-GDP, debt-to-exports, debt service-to-exports, debt reschedule, reserves, current account surplus, real effective exchange rate, export growth, short-term debt share, terms of trade, inflation, growth of domestic credit, GDP growth, government budget surplus, investment-to-GDP ratio, per capita GDP, US treasury bill rate, Spread over T-bonds, regional dummies	S&P Moody's	Linear transformation of the data. Two specifications: static (OLS estimation of the pooled data) and dynamic (error correction specification including as regressor the previous rating and several variables in first differences)
Eliasson (2002)	Panel, 1990-1999, 38 emerging markets	Per capital GDP, GDP growth, inflation, debt-to-exports ratio, government budget surplus, short-term debt to foreign reserves ratio, export growth, interest rate spread	S&P	Linear transformation of the data. Static specification and both fixed and random effects estimation. Dynamic specification.
Hu, Kiesel and Perraudin (2002)	Unbalanced panel, 1981-1998, 12 to 92 countries	Debt service-to-exports ratio, debt-to-GNP ratio, reserves to debt, reserves to imports, GNP growth, inflation, default history, default in previous year, regional dummies, non-industrial countries dummy	S&P	Ordered probit on pooled data. Two scales: 1-8 and 1-14
Afonso (2003)	Cross-section, 2001, 81 countries	Per capita income, GDP growth, inflation, current account surplus, government budget surplus, debt-to-exports ratio, economic development, default history	S&P Moody's	Linear, logistic and exponential transformation of the data. OLS estimation.
Alexe et al. (2003)	Cross-section 1998, 68 countries	Per capita GDP, inflation, trade balance, export growth, reserves, government budget surplus, debt-to-GDP ratio, exchange rate, domestic credit-to-GDP ratio, government effectiveness, corruption index, political stability	S&P	Linear transformation and OLS estimation.
Canuto, Santos and Porto (2004)	Panel 1998-2002, 66 countries	Per capita GDP, GDP growth, inflation, government debt to receipts, government budget surplus, trade to GDP, debt-to-exports ratio, economic development, default history	S&P Moody's Fitch	Linear transformation. OLS, fixed effects and first differences estimation.
Borio and Packer (2004)	Panel 1996-2003, 52 countries	Per capita GDP, GDP growth, inflation, corruption perception index, political risk index, years since default, frequency of high inflation periods, government debt-to-GDP ratio, debt-to-exports ratio, others	S&P Moody's	Linear transformation of data. OLS regression of average credit rating including year dummies as regressors.
Bissoondoyal-Bheenick, Brooks and Yip (2005)	Cross-section 2001, 60 countries	GDP, inflation, foreign direct investment to GDP, current account to GDP, trade to GDP, real interest rate, mobile phones	S&P Moody's Fitch	Estimate a ordered probit with 9 categories
Bissoondoyal-Bheenick (2005)	Panel 1995-1999, 95 countries	Per capita GDP, inflation, govt financial balance to GDP, government debt-to-GDP ratio, real effective exchange rate, export to GDP, reserves, unemployment rate, unit labour cost, current account to GDP, debt-to-GDP ratio	S&P Moody's	Estimate an ordered probit using two scales 1-21 and 1-9 for each year individually.
Butler and Fauver (2006)	Cross-section 2004, 93 countries	Per capita income, debt-to-GDP ratio, inflation, underdevelopment index, legal environment index, legal origin dummies	Institutional Investor	OLS estimation.

Note: Additional related studies from the rating agencies are provided by S&P (2004, 2006), Fitch (2006) and Moody's (2006).

Table 3 – S&P, Moody's and Fitch rating systems

Differences in notches	S&P-Moody's	S&P-Fitch	Moody's-Fitch
6	0	1	0
5	0	1	3
4	1	0	7
3	3	1	12
2	61	13	60
1	202	128	114
0	518	487	370
-1	161	135	123
-2	67	21	46
-3	13	4	6
-4	9	0	0
-5	2	0	0
-6	0	0	0
Total	**1037**	**791**	**741**
Within 1 *	85.0%	94.8%	81.9%
Within 2 **	97.3%	99.1%	96.2%

Notes: * – % of differences in notches within +/- 1 notch.
** – % of differences in notches within +/- 2 notches.

Table 4 – Estimations for Moody's

	Pooled OLS		Random Effects		Fixed Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.618***	3.934***	3.431	8.291	10.064***	9.952
	(2.85)	*(3.22)*	*(0.95)*	*(12.49)*	*(99.36)*	*(143.93)*
GDP per capita	1.686***	1.607***	1.779***	1.789***	1.800***	1.876
	(5.07)	*(4.91)*	*(7.61)*	*(8.03)*	*(7.53)*	*(9.61)*
GDP per capita Avg.	0.664***	0.631***	0.650			
	(4.11)	*(3.92)*	*(1.46)*			
GDP growth	7.431***	9.044***	8.643***	8.768***	8.971***	5.909
	(2.04)	*(2.76)*	*(3.07)*	*(3.26)*	*(3.14)*	*(2.44)*
GDP growth Avg.	0.527		5.237			
	(0.12)		*(0.46)*			
Unemployment	-0.044	-0.069**	0.014		0.024	
	(-1.43)	*(-2.34)*	*(0.52)*		*(0.87)*	
Unemployment Avg.	-0.049***	-0.051***	-0.072*	-0.073*		
	(-3.68)	*(-3.67)*	*(-1.78)*	*(-1.70)*		
Inflation	-0.452***	-0.497***	-0.124*	-0.145**	-0.105**	-0.136
	(-2.64)	*(-2.95)*	*(-1.79)*	*(-2.11)*	*(-2.01)*	*(-2.66)*
Inflation Avg.	-0.648***	-0.712****	-0.360*	-0.347**		
	(-3.55)	*(-4.05)*	*(-1.84)*	*(-2.00)*		
Gov Debt	-0.008	-0.014**	-0.014**	-0.014**	-0.016***	-0.015
	(-1.21)	*(-2.40)*	*(-2.38)*	*(-2.53)*	*(-2.65)*	*(-3.54)*
Gov Debt Avg.	-0.013***	-0.016***	-0.011	-0.014**		
	(-4.12)	*(-4.81)*	*(-1.49)*	*(-2.24)*		
Gov Balance	6.995*		7.740***	6.991***	7.598***	6.056
	(1.94)		*(2.77)*	*(2.54)*	*(2.58)*	*(2.99)*
Gov Balance Avg.	6.311*	6.122*	7.893			
	(1.80)	*(1.67)*	*(0.80)*			
Gov Effectiveness	0.277		0.242		0.205	0.542
	(0.88)		*(1.18)*		*(0.98)*	*(2.90)*
Gov Effectiveness Avg.	1.927***	1.756***	1.906***	2.470***		
	(10.89)	*(9.78)*	*(4.06)*	*(6.80)*		
External Debt	-0.010***	-0.009***	-0.004*	-0.004*	-0.003	
	(-5.84)	*(-5.60)*	*(-1.79)*	*(-1.95)*	*(-1.27)*	
External Debt Avg.	-0.007***	-0.006***	-0.004**	-0.004**		
	(-6.54)	*(-5.82)*	*(-2.20)*	*(-2.47)*		
Current Account	-8.334***	-8.881***	-7.246***	-8.760***	-7.074***	-2.605
	(-3.84)	*(-4.27)*	*(-3.67)*	*(-4.84)*	*(-3.37)*	*(-1.96)*
Current Account Avg.	-1.320		-3.321			
	(-0.77)		*(-0.78)*			
Reserves	1.689***	1.891***	1.423**	1.710***	1.488***	1.132
	(3.02)	*(3.52)*	*(3.63)*	*(4.61)*	*(3.84)*	*(3.56)*
Reserves Avg.	1.758***	1.788***	1.475	1.254		
	(3.85)	*(4.03)*	*(1.60)*	*(1.43)*		
Def 1	-1.667***	-1.671***	-1.998***	-2.075***	-2.109***	-2.244
	(-6.19)	*(-6.72)*	*(-6.87)*	*(-8.11)*	*(-6.77)*	*(-7.71)*
Def 2	0.065***	0.089***	-0.015		-0.049	
	(2.67)	*(3.88)*	*(-0.32)*		*(-0.76)*	
EU (2)	1.220***	1.273***	1.598***	1.650***	1.704***	1.376
	(6.97)	*(7.22)*	*(6.63)*	*(6.69)*	*(6.84)*	*(6.51)*
IND	2.176***	2.653***	2.289***	3.157***		
	(6.08)	*(7.57)*	*(2.89)*	*(4.61)*		
LAC	-1.072***	-1.282***	-0.903*			
	(-5.44)	*(-6.39)*	*(-1.93)*			
R^2	0.950	0.948	0.945	0.940	0.984	0.980
Countries	66	66	66	66	66	78
Observations	551	557	551	557	551	699
Hausman Test[$]			21.93 (0.06)	14.30 (0.160)		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 13 and 10 degrees of freedom respectively (the number of time-varying regressors). The p-value is in brackets.

Table 5 – Estimations for S&P

	Pooled OLS		Random Effects		Fixed Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	4.521***	3.749***	4.347	7.421***	10.301***	10.278***
	(3.64)	*(3.78)*	*(1.25)*	*(15.11)*	*(136.51)*	*(240.18)*
GDP per capita	1.339***	1.430***	1.411***	1.403***	1.452***	1.918***
	(4.65)	*(5.32)*	*(7.12)*	*(7.67)*	*(7.14)*	*(11.53)*
GDP per capita Avg.	0.461***	0.530***	0.450			
	(2.90)	*(4.01)*	*(1.05)*			
GDP growth	5.715*	7.568***	8.125***	8.256***	8.221***	6.896***
	(1.95)	*(2.83)*	*(3.50)*	*(3.72)*	*(3.37)*	*(3.02)*
GDP growth Avg.	-5.358		-1.907			
	(-1.45)		*(-0.20)*			
Unemployment	-0.008		0.055**	0.056***	0.062***	0.053***
	(-0.32)		*(2.53)*	*(2.73)*	*(2.63)*	*(2.63)*
Unemployment Avg.	-0.024*	-0.022*	-0.018			
	(-1.90)	*(-1.81)*	*(-0.45)*			
Inflation	-0.586**	-0.597**	-0.235***	-0.229***	-0.219***	-0.235***
	(-2.39)	*(-2.40)*	*(-6.17)*	*(-6.13)*	*(-5.33)*	*(-6.07)*
Inflation Avg.	-0.732***	-0.716***	-0.427***	-0.353**		
	(-2.83)	*(-2.79)*	*(-2.65)*	*(-2.44)*		
Gov Debt	-0.026***	-0.024***	-0.033***	-0.033***	-0.033***	-0.030***
	(-4.78)	*(-4.67)*	*(-6.61)*	*(-7.22)*	*(-5.92)*	*(-6.62)*
Gov Debt Avg.	-0.011***	-0.009***	-0.010	-0.012**		
	(-3.56)	*(-3.24)*	*(-1.34)*	*(-1.97)*		
Gov Balance	5.892*	6.280**	4.387**	4.411**	4.430**	3.948*
	(1.81)	*(2.05)*	*(1.97)*	*(2.01)*	*(2.01)*	*(1.85)*
Gov Balance Avg.	7.026**	6.639**	5.144			
	(2.19)	*(2.12)*	*(0.59)*			
Gov Effectiveness	0.385		0.370**	0.362**	0.371**	0.717***
	(1.30)		*(2.36)*	*(2.47)*	*(2.33)*	*(4.40)*
Gov Effectiveness Avg.	2.287***	2.244***	2.370***	2.758***		
	(12.82)	*(14.26)*	*(4.91)*	*(7.75)*		
External Debt	-0.004*	-0.004*	-0.003*	-0.003	-0.003*	
	(-1.81)	*(-1.74)*	*(-1.68)*	*(-1.51)*	*(-1.65)*	
External Debt Avg.	-0.007***	-0.007***	-0.006*	-0.007**		
	(-5.76)	*(-5.72)*	*(-1.81)*	*(-2.18)*		
Current Account	-6.338***	-6.183***	-3.700**	-3.586**	-3.476*	
	(-2.85)	*(-2.93)*	*(-2.18)*	*(-2.18)*	*(-1.96)*	
Current Account Avg.	-0.439		0.123			
	(-0.26)		*(0.03)*			
Reserves	0.564		0.064		0.048	
	(1.16)		*(0.19)*		*(0.13)*	
Reserves Avg.	2.170***	2.117***	1.909**	1.988**		
	(5.31)	*(5.49)*	*(2.06)*	*(2.28)*		
Def 1	-1.032***	-1.131***	-1.307***	-1.337***	-1.353***	-1.422***
	(-3.62)	*(-5.84)*	*(-5.23)*	*(-6.74)*	*(-5.48)*	*(-6.58)*
Def 2	-0.010		-0.018		-0.025	
	(-0.31)		*(-0.33)*		*(-0.34)*	
EU (2)	1.068***	1.008***	0.415**	0.418**	0.291	
	(6.07)	*(6.02)*	*(2.41)*	*(2.48)*	*(1.55)*	
IND	2.446***	2.387***	2.831***	3.438***		
	(8.24)	*(8.77)*	*(3.03)*	*(4.69)*		
LAC	-0.677***	-0.669***	-0.459			
	(-3.82)	*(-4.06)*	*(-0.94)*			
R^2	0.951	0.950	0.948	0.946	0.987	0.985
Countries	65	65	65	65	65	74
Observations	564	568	564	565	564	657
Hausman Test [$]			16.77 (0.210)	10.73 (0.467)		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 13 and 11 degrees of freedom respectively (the number of time-varying regressors). The p-value is in brackets.

Table 6 – Estimations for Fitch

	Pooled OLS		Random Effects		Fixed Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.477***	3.238***	4.409	7.179***	10.918***	11.055***
	(2.97)	*(3.12)*	*(1.19)*	*(13.16)*	*(100.38)*	*(183.16)*
GDP per capita	1.670***	1.752***	1.697***	1.667***	1.743***	1.820***
	(5.54)	*(6.13)*	*(8.83)*	*(9.51)*	*(9.31)*	*(10.87)*
GDP per capita Avg.	0.562***	0.604***	0.375			
	(3.93)	*(4.64)*	*(0.87)*			
GDP growth	3.468		3.385	4.110*	3.277	
	(1.10)		*(1.39)*	*(1.74)*	*(1.36)*	
GDP growth Avg.	0.659		3.220			
	(0.14)		*(0.26)*			
Unemployment	-0.024		0.017		0.019	
	(-0.74)		*(0.61)*		*(0.64)*	
Unemployment Avg.	0.013		0.027			
	(0.76)		*(0.50)*			
Inflation	-0.424***	-0.421***	-0.107		-0.088	-0.127***
	(-3.41)	*(-3.09)*	*(-1.24)*		*(-0.98)*	*(-1.61)*
Inflation Avg.	-0.478***	-0.464***	-0.150			
	(-3.38)	*(-3.21)*	*(-0.66)*			
Gov Debt	-0.024***	-0.026***	-0.022***	-0.027***	-0.020***	-0.023***
	(-3.75)	*(-5.18)*	*(-3.82)*	*(-7.30)*	*(-3.19)*	*(-5.51)*
Gov Debt Avg.	-0.007**	-0.006*	-0.007			
	(-2.15)	*(-1.92)*	*(-0.69)*			
Gov Balance	0.310		4.371		4.872	4.381*
	(0.08)		*(1.37)*		*(1.53)*	*(1.78)*
Gov Balance Avg.	9.084***	8.223***	5.220			
	(2.94)	*(2.86)*	*(0.69)*			
Gov Effectiveness	0.715**	0.869***	0.787***	0.887***	0.807***	0.953***
	(2.44)	*(3.22)*	*(4.54)*	*(5.34)*	*(4.69)*	*(5.96)*
Gov Effectiveness Avg.	1.966***	1.960***	2.155***	2.741***		
	(12.33)	*(12.55)*	*(4.23)*	*(7.47)*		
External Debt	-0.007***	-0.006***	-0.005***	-0.005***	-0.005***	-0.005***
	(-3.17)	*(-2.83)*	*(-2.97)*	*(-2.76)*	*(-2.83)*	*(-3.06)*
External Debt Avg.	-0.010***	-0.010***	-0.010**	-0.011***		
	(-7.12)	*(-7.12)*	*(-2.53)*	*(-3.34)*		
Current Account	-3.591		-3.137		-3.176	
	(-1.44)		*(-1.16)*		*(-1.10)*	
Current Account Avg.	0.545		2.955			
	(0.32)		*(0.63)*			
Reserves	0.804		-0.100		-0.197	
	(1.34)		*(-0.23)*		*(-0.45)*	
Reserves Avg.	2.854***	2.886***	3.090***	2.987***		
	(6.74)	*(6.80)*	*(3.59)*	*(3.78)*		
Def 1	-1.243***	-1.257***	-1.523***	-1.331***	-1.501***	-1.329***
	(-4.26)	*(-6.32)*	*(-4.13)*	*(-4.60)*	*(-3.92)*	*(-3.92)*
Def 2	-0.011		0.075		0.093	
	(-0.31)		*(1.15)*		*(1.08)*	
EU	1.063***	1.029***	0.507**	0.554**	0.305	
	(5.57)	*(5.64)*	*(2.03)*	*(2.40)*	*(1.14)*	
IND	2.246***	2.119***	2.781***	2.634***		
	(5.90)	*(6.19)*	*(2.61)*	*(3.55)*		
LAC	-0.627***	-0.738***	-0.718			
	(-3.41)	*(-4.19)*	*(-1.29)*			
R^2	0.950	0.950	0.947	0.944	0.987	0.987
Countries	58	58	58	58	58	58
Observations	481	481	480	481	480	481
Hausman Test [$]			12.68(0.473)	3.68 (0.816)		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 13 and 7 degrees of freedom respectively (the number of time-varying regressors). The p-value is in brackets.

Table 7 – Estimations for Moody's: two sub-periods

	Pooled OLS		Random Effects		Fixed Effects	
	1996-2000 (1)	2001-2005 (2)	1996-2000 (3)	2001-2005 (4)	1996-2000 (5)	2001-2005 (6)
Constant	6.593***	-0.434	8.299***	8.222***	10.434***	9.968***
	(3.89)	*(-0.21)*	*(11.80)*	*(10.16)*	*(165.01)*	*(28.21)*
GDP per capita	1.640**	0.846**	1.667***	1.074***	1.709***	1.306***
	(2.44)	*(2.07)*	*(2.75)*	*(4.43)*	*(2.75)*	*(6.17)*
GDP per capita Avg.	0.288	1.276***				
	(1.29)	*(4.60)*				
GDP growth	2.989	13.248**	4.222	9.358*	3.731	4.752
	(0.64)	*(2.51)*	*(0.98)*	*(1.83)*	*(0.89)*	*(1.18)*
GDP growth Avg.						
Unemployment	-0.090***	-0.097**				
	(-2.55)	*(-2.23)*				
Unemployment Avg.	-0.050***	-0.043**	-0.067	-0.067		
	(-2.74)	*(-2.14)*	*(-1.54)*	*(-1.40)*		
Inflation	-0.340***	-4.834***	-0.049	0.205	0.055	0.197
	(-2.78)	*(-2.82)*	*(-0.53)*	*(0.21)*	*(0.79)*	*(0.21)*
Inflation Avg.	-0.513***	-5.240***	-0.269	-0.031		
	(-4.04)	*(-3.03)*	*(-1.30)*	*(-0.03)*		
Gov Debt	-0.030***	-0.019**	-0.025***	-0.018	-0.022***	-0.011
	(-2.76)	*(-2.51)*	*(-2.68)*	*(-1.60)*	*(-2.74)*	*(-1.05)*
Gov Debt Avg.	-0.018***	-0.021***	-0.014**	-0.014*		
	(-3.88)	*(-4.29)*	*(-1.93)*	*(-1.90)*		
Gov Balance			7.643**	3.110	7.415**	2.169
			(1.91)	*(0.71)*	*(2.00)*	*(0.64)*
Gov Balance Avg.	6.351	0.271				
	(1.39)	*(0.05)*				
Gov Effectiveness					0.184	0.455
					(0.70)	*(1.37)*
Gov Effectiveness Avg.	1.831***	1.198***	2.313***	2.629***		
	(7.00)	*(4.35)*	*(5.45)*	*(6.25)*		
External Debt	-0.014***	-0.006**	-0.007**	0.000		
	(-7.38)	*(-2.51)*	*(-2.40)*	*(-0.02)*		
External Debt Avg.	-0.008***	-0.004**	-0.005**	-0.002		
	(-6.16)	*(-2.12)*	*(-2.48)*	*(-0.60)*		
Current Account	-9.369***	-4.944	-7.767***	-2.553	-5.338**	0.929
	(-3.17)	*(-1.50)*	*(-2.68)*	*(-0.85)*	*(-2.06)*	*(0.40)*
Current Account Avg.						
Reserves	0.988	1.368**	0.065	2.462***	-0.549	1.669***
	(0.91)	*(2.11)*	*(-0.08)*	*(3.76)*	*(-0.87)*	*(2.72)*
Reserves Avg.	1.660**	1.831***	0.845	0.773		
	(2.32)	*(3.30)*	*(0.79)*	*(0.70)*		
Def 1	-0.783**	-2.303***	-1.764***	-2.281***	-2.088***	-2.171***
	(-2.22)	*(-6.21)*	*(-5.07)*	*(-3.93)*	*(-5.00)*	*(-2.59)*
Def 2	0.046	0.158***				
	(1.34)	*(4.93)*				
EU (2)	1.381***	1.095***	1.099***	1.803***		1.392***
	(4.98)	*(4.81)*	*(2.64)*	*(7.69)*		*(3.70)*
IND	3.411***	1.987***	3.787***	3.157***		
	(6.74)	*(3.64)*	*(4.43)*	*(3.93)*		
LAC	-1.057***	-1.614***				
	(-3.97)	*(-5.08)*				
R^2	0.949	0.957	0.941	0.944	0.988	0.989
Countries	64	65	64	65	75	77
Observations	280	277	280	277	324	375
Hausman Test [$]			12.86 (0.169)	14.31 (0.112) [#]		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 9 degrees of freedom. The p-value is in brackets. [#] The Hausman test was done excluding External Debt, as it was highly non-significant and seemed correlated with the errors in this particular sample.

Table 8 – Estimations for S&P: two sub-periods

	Pooled OLS		Random Effects		Fixed Effects	
	1996-2000 (1)	2001-2005 (2)	1996-2000 (3)	2001-2005 (4)	1996-2000 (5)	2001-2005 (6)
Constant	3.744***	1.648	7.496***	8.006***	10.519***	10.079***
	(2.41)	*(1.12)*	*(13.57)*	*(15.63)*	*(225.94)*	*(21.00)*
GDP per capita	3.159***	0.629***	2.059***	0.876***	2.063***	1.566***
	(4.86)	*(1.95)*	*(3.44)*	*(4.17)*	*(3.35)*	*(8.05)*
GDP per capita Avg.	0.562***	0.896***				
	(2.73)	*(4.54)*				
GDP growth	4.236	6.115	5.864**	4.559	7.955**	2.715
	(1.06)	*(1.50)*	*(1.88)*	*(1.17)*	*(2.25)*	*(0.61)*
GDP growth Avg.						
Unemployment			0.109***	-0.003	0.080**	-0.047
			(2.89)	*(-0.06)*	*(1.85)*	*(-0.85)*
Unemployment Avg.	-0.036***	0.006				
	(-2.16)	*(0.40)*				
Inflation	-0.457***	-6.513***	-0.129***	-1.024	-0.156***	-0.219
	(-2.86)	*(-4.33)*	*(-2.81)*	*(-0.81)*	*(-3.15)*	*(-0.18)*
Inflation Avg.	-0.617***	-6.692***	-0.407*	-1.012		
	(-3.49)	*(-4.41)*	*(-1.84)*	*(-0.79)*		
Gov Debt	-0.029***	-0.024***	-0.041***	-0.020*	-0.038***	-0.015
	(-2.71)	*(-3.35)*	*(-4.53)*	*(-1.91)*	*(-3.47)*	*(-1.07)*
Gov Debt Avg.	-0.008*	-0.018***	-0.014**	-0.013**		
	(-1.76)	*(-4.84)*	*(-2.16)*	*(-2.24)*		
Gov Balance	5.140	6.695	3.849	8.296**	3.144	7.047*
	(1.17)	*(1.63)*	*(1.23)*	*(2.18)*	*(0.82)*	*(1.88)*
Gov Balance Avg.	9.078**	-3.677				
	(2.20)	*(-0.83)*				
Gov Effectiveness			0.359*	-0.074	0.493**	0.572*
			(1.71)	*(-0.29)*	*(2.41)*	*(1.80)*
Gov Effectiveness Avg.	2.098***	1.918***	2.433***	2.922***		
	(9.34)	*(8.44)*	*(6.23)*	*(8.48)*		
External Debt	0.003	-0.008**	0.002	-0.008**		
	(0.81)	*(-2.46)*	*(0.79)*	*(-2.13)*		
External Debt Avg.	-0.007***	-0.007***	-0.006**	-0.010**		
	(-4.16)	*(-3.90)*	*(-2.03)*	*(-2.44)*		
Current Account	-7.098**	-0.304	-5.781**	-0.867		
	(-2.30)	*(-0.09)*	*(-2.37)*	*(-0.31)*		
Current Account Avg.						
Reserves						
Reserves Avg.	1.896***	1.397***	1.675	1.618**		
	(3.26)	*(2.87)*	*(1.51)*	*(1.97)*		
Def 1	-0.845***	-1.256**	-1.504***	-1.169**	-1.588	-0.941
	(-2.60)	*(-5.40)*	*(-4.71)*	*(-2.37)*	*(-4.65)*	*(-1.06)*
Def 2						
EU (2)	1.001***	0.960***	0.816	0.663***		
	(3.50)	*(4.67)*	*(1.60)*	*(3.45)*		
IND	2.560***	1.789***	3.901***	2.513***		
	(6.15)	*(4.92)*	*(4.47)*	*(3.53)*		
LAC	-0.882	-0.674***				
	(-3.98)	*(-2.82)*				
R^2	0.944	0.967	0.939	0.959	0.990	0.991
Countries	64	65	63	65	67	74
Observations	290	278	288	277	308	349
Hausman Test [$]			7.84 (0.644)	16.86 (0.112)		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 10 and 11 degrees of freedom respectively (the variable EU (2) is time invariant in the second sample) . The p-value is in brackets.

Table 9 – Estimations for Fitch: two sub-periods

	Pooled OLS		Random Effects		Fixed Effects	
	1996-2000 (1)	2001-2005 (2)	1996-2000 (3)	2001-2005 (4)	1996-2000 (5)	2001-2005 (6)
Constant	4.953***	1.732	7.160***	7.783***	11.149***	10.637***
	(2.96)	*(1.15)*	*(12.04)*	*(14.13)*	*(144.80)*	*(17.37)*
GDP per capita	2.201***	1.030***	1.881***	1.197***	2.014***	1.354***
	(2.92)	*(3.02)*	*(3.61)*	*(6.00)*	*(4.00)*	*(5.92)*
GDP per capita Avg.	0.403*	0.960***				
	(1.93)	*(4.94)*				
GDP growth			-2.392	3.377		
			(-0.79)	*(0.88)*		
GDP growth Avg.						
Unemployment						
Unemployment Avg.						
Inflation	-0.233**	-7.223***			-0.098	-1.086
	(-2.12)	*(-5.06)*			*(-1.01)*	*(-0.73)*
Inflation Avg.	-0.364***	-7.316***				
	(-3.20)	*(-4.97)*				
Gov Debt	-0.046***	-0.027***	-0.039***	-0.021*	-0.036***	-0.015
	(-4.19)	*(-3.99)*	*(-5.81)*	*(-1.85)*	*(-4.09)*	*(-0.78)*
Gov Debt Avg.	-0.008*	-0.010**				
	(-1.67)	*(-2.24)*				
Gov Balance					0.852	6.226*
					(0.22)	*(1.84)*
Gov Balance Avg.	12.422***	0.503				
	(3.26)	*(0.12)*				
Gov Effectiveness	1.490***	-0.907**	0.714***	0.298	0.545**	0.294
	(3.60)	*(-2.09)*	*(3.26)*	*(1.04)*	*(2.15)*	*(1.15)*
Gov Effectiveness Avg.	1.958***	1.461***	2.628***	2.771***		
	(8.59)	*(6.37)*	*(6.28)*	*(8.20)*		
External Debt	-0.001	-0.008***	-0.001	-0.008**	-0.001	-0.008*
	(-0.28)	*(-2.76)*	*(-0.23)*	*(-2.26)*	*(-0.22)*	*(-1.78)*
External Debt Avg.	-0.008***	-0.012***	-0.010***	-0.014***		
	(-4.34)	*(-5.35)*	*(-2.68)*	*(-3.51)*		
Current Account						
Current Account Avg.						
Reserves						
Reserves Avg.	2.313***	2.225***	2.557**	2.696***		
	(3.42)	*(4.16)*	*(2.40)*	*(3.45)*		
Def 1	-0.717**	-1.409**	-1.440***	-1.338**	-1.848**	-0.970
	(-2.22)	*(-5.32)*	*(-3.02)*	*(-2.36)*	*(-2.43)*	*(-0.97)*
Def 2						
EU	0.843***	0.959***	0.841*	0.579**		
	(2.92)	*(4.45)*	*(1.67)*	*(2.34)*		
IND	2.953***	1.359***	2.883***	2.146***		
	(5.48)	*(2.89)*	*(2.96)*	*(3.39)*		
LAC	-1.017***	-0.917***				
	(-3.84)	*(-4.17)*				
R^2	0.943	0.969	0.932	0.957	0.990	0.993
Countries	54	58	54	58	54	58
Observations	235	246	235	246	235	246
Hausman Test [$]			6.95 (0.325)	11.25 (0.128)		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 8 and 7 degrees of freedom respectively (the variable EU (2) is time invariant in the second sample). The p-value is in brackets.

Table 10 – Estimations for Moody's: high and low rated countries

	Pooled OLS		Random Effects		Fixed Effects	
	Above BBB+ (1)	BBB+ and below (2)	Above BBB+ (3)	BBB+ and below (4)	Above BBB+ (5)	BBB+ and below (6)
Constant	8.496***	8.526***	9.606***	8.298***	14.243***	6.303***
	(6.17)	*(6.13)*	*(9.90)*	*(14.06)*	*(87.56)*	*(60.59)*
GDP per capita	0.863***	1.132**	1192***	1.591***	1.197***	1.684***
	(3.11)	*(2.09)*	*(6.64)*	*(3.07)*	*(6.73)*	*(4.41)*
GDP per capita Avg.	0.274	-0.021				
	(1.71)	*(-0.12)*				
GDP growth	1.210	6.393	1.747	6.927*	1.600	4.976
	(0.24)	*(1.63)*	*(0.48)*	*(1.74)*	*(0.44)*	*(1.50)*
GDP growth Avg.						
Unemployment	-0.139***	-0.080**				
	(-3.71)	*(-2.37)*				
Unemployment Avg.	-0.004	-0.007	-0.005	-0.059		
	(-0.20)	*(-0.36)*	*(-0.08)*	*(-1.46)*		
Inflation	-6.363*	-0.405***	-4.171*	-0.174**	-3.994*	-0.138**
	(-1.79)	*(-3.43)*	*(-1.75)*	*(-2.26)*	*(-1.69)*	*(-2.39)*
Inflation Avg.	-6.272*	-0.547***	-4.676*	-0.333**		
	(-1.77)	*(-4.29)*	*(-1.81)*	*(-2.28)*		
Gov Debt	-0.007	-0.020**	-0.018***	-0.018**	-0.020***	-0.018***
	(-0.93)	*(-2.54)*	*(-3.04)*	*(-2.06)*	*(-3.53)*	*(-2.97)*
Gov Debt Avg.	-0.002	-0.028**	-0.005	-0.019***		
	(-0.70)	*(-6.73)*	*(-0.80)*	*(-3.38)*		
Gov Balance			6.955***	2.931	5.843***	3.009
			(2.90)	*(0.59)*	*(3.20)*	*(0.95)*
Gov Balance Avg.	12.504***	5.168				
	(4.48)	*(0.95)*				
Gov Effectiveness					0.214	0.591*
					(1.27)	*(1.66)*
Gov Effectiveness Avg.	1.490***	2.132***	2.436***	2.359***		
	(7.86)	*(9.64)*	*(5.15)*	*(6.98)*		
External Debt		-0.010***		-0.005*		
		(-5.47)		*(-1.96)*		
External Debt Avg.		-0.006***		-0.004**		
		(-5.06)		*(-2.33)*		
Current Account	1.186	-7.238***	-2.922	-7.595***	-2.386	-3.367**
	(0.51)	*(-2.93)*	*(-1.59)*	*(-2.95)*	*(-1.33)*	*(-1.98)*
Current Account Avg.						
Reserves	2.130***	1.470**	1.112**	2.269***	1.013***	1.664***
	(3.42)	*(2.27)*	*(2.48)*	*(4.04)*	*(2.50)*	*(3.61)*
Reserves Avg.	0.139	1.967***	1.082	0.607		
	(0.20)	*(3.61)*	*(0.84)*	*(0.64)*		
Def 1		-1.514***		-1.956***		-2.192***
		(-5.68)		*(-7.37)*		*(-7.30)*
Def 2		0.092***				
		(3.67)				
EU (2)	0.611***	2.803***	0.591**	2.272***	0.601***	2.245***
	(3.83)	*(5.64)*	*(2.28)*	*(6.24)*	*(2.27)*	*(13.65)*
IND	2.194***		1.821			
	(9.49)		*(2.86)*			
LAC		-0.755***				
		(-3.24)				
R^2	0.815	0.832	0.785	0.795	0.955	0.923
Countries	33	42	39	42	41	49
Observations	324	291	324	291	336	363
Hausman Test [$]			4.89(8) (0.768)	20.68 (0.023)*		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 8 and 10 degrees of freedom respectively (the variables on External debt were removed from the estimation above BBB+ because there where few observation points). The p-value is in brackets.

Table 11 – Estimations for S&P: high and low rated countries

	Pooled OLS		Random Effects		Fixed Effects	
	Above BBB+ (1)	BBB+ and below (2)	Above BBB+ (3)	BBB+ and below (4)	Above BBB+ (5)	BBB+ and below (6)
Constant	4.124**	9.598***	10.338***	7.373***	14.748***	6.020***
	(2.07)	*(8.16)*	*(12.48)*	*(19.25)*	*(225.90)*	*(81.45)*
GDP per capita	0.210	1.886***	0.290*	1.998***	0.276**	2.269***
	(0.62)	*(5.41)*	*(1.94)*	*(6.42)*	*(1.98)*	*(8.60)*
GDP per capita Avg.	0.829***	-0.281*				
	(3.83)	*(-1.73)*				
GDP growth	-1.010	9.169***	-0.328	6.230*	0.167	3.759
	(-0.22)	*(2.87)*	*(-0.16)*	*(1.90)*	*(0.09)*	*(1.08)*
GDP growth Avg.						
Unemployment			-0.084***	0.088***	-0.099***	0.095***
			(-3.70)	*(3.71)*	*(-4.65)*	*(3.96)*
Unemployment Avg.	-0.026	0.025				
	(-1.18)	*(1.64)*				
Inflation	-11.197***	-0.468***	-3.670**	-0.234***	-3.221	-0.216***
	(-2.98)	*(-3.41)*	*(-1.98)*	*(-5.66)*	*(-1.55)*	*(-5.65)*
Inflation Avg.	-10.477***	-0.521***	-3.495*	-0.356***		
	(-2.79)	*(-3.51)*	*(-1.85)*	*(-3.08)*		
Gov Debt	-0.017**	-0.028***	-0.029***	-0.031***	-0.029***	-0.032***
	(-2.27)	*(-4.06)*	*(-7.63)*	*(-4.71)*	*(-7.67)*	*(-4.90)*
Gov Debt Avg.	0.001	-0.022***	-0.002	-0.020***		
	(0.25)	*(-6.57)*	*(-0.23)*	*(-3.81)*		
Gov Balance	0.725	4.989	-2.096	4.129	-3.123*	5.579*
	(0.21)	*(1.31)*	*(-1.18)*	*(1.26)*	*(-1.94)*	*(1.85)*
Gov Balance Avg.	13.582***	10.104***				
	(5.14)	*(2.22)*				
Gov Effectiveness			0.363**	0.477**	0.379***	0.514**
			(2.51)	*(2.04)*	*(2.52)*	*(2.24)*
Gov Effectiveness Avg.	1.119***	2.790***	1.894***	2.732***		
	(5.84)	*(13.84)*	*(4.04)*	*(8.77)*		
External Debt		-0.002		-0.002		
		(-1.18)		*(-0.77)*		
External Debt Avg.		-0.006***		-0.006**		
		(-4.39)		*(-2.12)*		
Current Account	0.912	-6.384***	-0.980	0.173		
	(0.37)	*(-2.94)*	*(-0.58)*	*(0.10)*		
Current Account Avg.						
Reserves						
Reserves Avg.	-0.520	2.676***	-0.311	2.293**		
	(-0.92)	*(5.91)*	*(-0.25)*	*(2.43)*		
Def 1		-0.842***		-1.390***		-1.513***
		(-4.16)		*(-6.68)*		*(-6.87)*
Def 2						
EU (2)	0.556***	0.778***	0.005	0.256		
	(3.43)	*(3.28)*	*(0.03)*	*(1.15)*		
IND	1.869***	1.111**	2.475***	0.445		
	(7.46)	*(2.20)*	*(3.81)*	*(0.59)*		
LAC		-0.428*				
		(-1.91)				
R^2	0.813	0.838	0.745	0.814	0.975	0.934
Countries	42	40	42	40	42	42
Observations	330	297	327	297	327	330
Hausman Test [$]			12.97 (0.164)	16.29 (0.131)		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 9 and 11 degrees of freedom respectively (the variables on External debt were removed from the estimation above BBB+ because there where few observation points) . The p-value is in brackets.

Table 12 – Estimations for Fitch: high and low rated countries

	Pooled OLS		Random Effects		Fixed Effects	
	Above BBB+ (1)	BBB+ and below (2)	Above BBB+ (3)	BBB+ and below (4)	Above BBB+ (5)	BBB+ and below (6)
Constant	5.438***	5.201***	10.299***	6.941***	14.644***	6.555***
	(3.38)	*(3.61)*	*(9.49)*	*(16.60)*	(170.63)	*(59.37)*
GDP per capita	0.740**	2.488***	1.101***	2.350***	1.159***	2.416***
	(2.16)	*(5.96)*	*(6.59)*	*(6.85)*	(7.40)	*(7.35)*
GDP per capita Avg.	0.823***	0.270				
	(4.44)	*(1.46)*				
GDP growth			3.170	0.531		
			(1.38)	*(0.16)*		
GDP growth Avg.						
Unemployment						
Unemployment Avg.						
Inflation	-16.326***	-0.364***			-4.069*	-0.137
	(-4.88)	*(-4.18)*			(-1.72)	*(-1.49)*
Inflation Avg.	-17.617***	-0.338***				
	(-5.36)	*(-3.39)*				
Gov Debt	-0.003	-0.028***	-0.023***	-0.025***	-0.018***	-0.024***
	(-0.50)	*(-3.80)*	*(-7.04)*	*(-3.88)*	(-5.51)	*(-3.27)*
Gov Debt Avg.	-0.007***	0.000				
	(-2.65)	*(-0.05)*				
Gov Balance					4.214**	2.290
					(2.25)	*(0.56)*
Gov Balance Avg.	12.403***	10.113**				
	(5.04)	*(2.32)*				
Gov Effectiveness	-0.029	0.875**	0.572***	0.913***	0.593***	0.818***
	(-0.08)	*(2.31)*	*(3.27)*	*(3.38)*	(3.35)	*(2.99)*
Gov Effectiveness Avg.	0.839***	2.103***	1.447	2.507***		
	(4.50)	*(7.65)*	*(1.62)*	*(6.76)*		
External Debt		-0.002		-0.004**		-0.005**
		(-1.07)		*(-2.25)*		*(-2.32)*
External Debt Avg.		-0.011***		-0.013***		
		(-6.62)		*(-4.27)*		
Current Account						
Current Account Avg.						
Reserves						
Reserves Avg.	-0.928	4.042***	0.122	4.039***		
	(-1.53)	*(6.27)*	*(0.07)*	*(3.64)*		
Def 1		-1.159***		-1.236***		-1.325***
		(-5.75)		*(-4.52)*		*(-4.28)*
Def 2						
EU	0.525***	-0.241	0.433*	-0.569		
	(3.32)	*(-0.46)*	*(1.71)*	*(-1.30)*		
IND	1.473***		2.552**			
	(5.55)		*(2.06)*			
LAC		-0.649***				
		(-3.32)				
R^2	0.832	0.830	0.669	0.812	0.973	0.924
Countries	38	33	39	33	38	33
Observations	296	229	301	229	296	229
Hausman Test [$]			5.91 (0.315)	2.42 (0.933)		

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 5 and 7 degrees of freedom respectively (the variables on External debt were removed from the estimation above BBB+ because there where few observation points). The p-value is in brackets.

Table 13 – Ordered Probit (robust standard errors)

	Moody's		S&P		Fitch	
	(1)	(2)	(3)	(4)	(5)	(6)
GDP per capita	1.940***	1.948***	1.716***	1.691***	2.051***	2.011***
	(4.52)	*(4.44)*	*(4.00)*	*(4.02)*	*(5.96)*	*(5.47)*
GDP per capita Avg.	0.418	0.482	0.252	0.480	0.369	
	(1.41)	*(1.44)*	*(0.75)*	*(1.54)*	*(1.28)*	
GDP growth	2.977		2.613		2.367	
	(0.58)		*(0.71)*		*(0.62)*	
GDP growth Avg.	-0.382		-8.511		-0.988	
	(-0.05)		*(-1.01)*		*(-0.11)*	
Unemployment	-0.066	-0.072*	-0.020		-0.026	
	(-1.42)	*(-1.69)*	*(-0.54)*		*(-0.49)*	
Unemployment Avg.	-0.049*	-0.063**	-0.038	-0.040	0.006	
	(-1.87)	*(-2.26)*	*(-1.40)*	*(-1.50)*	*(0.19)*	
Inflation	-0.402***	-0.426***	-0.515**	-0.504**	-0.372***	-0.359**
	(-2.57)	*(-2.62)*	*(-2.40)*	*(-2.10)*	*(-2.68)*	*(-2.26)*
Inflation Avg.	-0.464***	-0.503***	-0.621***	-0.562**	-0.387**	-0.277**
	(-3.15)	*(-3.56)*	*(-2.69)*	*(-2.48)*	*(-2.42)*	*(-2.10)*
Gov Debt	-0.010	-0.016*	-0.024***	-0.022***	-0.022**	-0.024***
	(-1.03)	*(-1.64)*	*(-2.75)*	*(-2.57)*	*(-2.43)*	*(-2.87)*
Gov Debt Avg.	-0.018***	-0.020***	-0.014**	-0.013**	-0.011	-0.010
	(-2.96)	*(-3.41)*	*(-2.19)*	*(-2.27)*	*(-1.46)*	*(-1.43)*
Gov Balance	6.727	5.833	5.617	8.089**	2.340	
	(1.44)	*(1.35)*	*(1.37)*	*(2.48)*	*(0.53)*	
Gov Balance Avg.	3.843		4.001		7.575	
	(0.54)		*(0.49)*		*(0.94)*	
Gov Effectiveness	0.293		0.220	0.389	0.681**	0.742**
	(0.99)		*(0.81)*	*(1.50)*	*(1.97)*	*(2.19)*
Gov Effectiveness Avg.	1.781***	1.600***	2.185***	2.054***	1.887***	2.212***
	(5.46)	*(4.62)*	*(5.64)*	*(5.33)*	*(4.86)*	*(6.18)*
External Debt	-0.010***	-0.008***	-0.003	-0.004	-0.006**	-0.006**
	(-3.94)	*(-4.31)*	*(-1.51)*	*(-1.57)*	*(-2.24)*	*(-1.96)*
External Debt Avg.	-0.005***	-0.005***	-0.006**	-0.006***	-0.010***	-0.011***
	(-2.76)	*(-3.01)*	*(-2.32)*	*(-2.64)*	*(-3.58)*	*(-4.37)*
Current Account	-8.477***	-8.315***	-7.094**	-5.429*	-5.051	-4.773
	(-2.58)	*(-3.21)*	*(-2.29)*	*(-1.94)*	*(-1.38)*	*(-1.58)*
Current Account Avg.	4.085		5.939		5.055	7.514*
	(1.14)		*(1.51)*		*(1.13)*	*(1.94)*
Reserves	1.879***	2.287***	0.716		0.795	
	(3.50)	*(3.97)*	*(1.32)*		*(1.18)*	
Reserves Avg.	0.833		1.449	1.655*	2.835***	2.322**
	(0.86)		*(1.41)*	*(1.74)*	*(2.61)*	*(2.19)*
Def 1	-1.119***	-1.048***	-0.923**	-0.882**	-1.217***	-1.219***
	(-3.46)	*(-3.67)*	*(-2.31)*	*(-2.38)*	*(-3.11)*	*(-2.93)*
EU	1.146***	1.105***	0.914**	0.901**	1.053**	0.889*
	(3.02)	*(2.63)*	*(2.04)*	*(2.10)*	*(2.19)*	*(1.88)*
IND	1.547**	1.525**	2.088***	1.470**	1.923**	2.105**
	(2.19)	*(1.99)*	*(3.23)*	*(2.41)*	*(2.01)*	*(2.39)*
LAC	-0.830**	-0.857**	-0.621*	-0.680*	-0.719**	
	(-2.24)	*(-2.34)*	*(-1.72)*	*(-1.82)*	*(-2.05)*	

Table 13 (Cont.) – Ordered Probit (robust standard errors)

	Moody's		S&P		Fitch	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.97	3.63	5.08	2.93	4.12	6.76
Cut1	1.00	1.00	1.00	1.00	1.00	1.00
Cut2	1.79	1.77	1.73	1.74	2.14	2.12
Cut3	2.66	2.63	2.65	2.69	2.87	2.85
Cut4	3.49	3.43	3.21	3.28	3.72	3.68
Cut5	3.99	3.89	3.92	4.00	4.27	4.23
Cut6	4.60	4.49	4.91	4.98	5.22	5.17
Cut7	5.47	5.39	5.72	5.78	6.30	6.17
Cut8	6.78	6.63	6.90	6.99	7.51	7.30
Cut9	7.50	7.35	7.80	7.89	8.32	8.06
Cut10	8.27	8.08	8.33	8.42	9.00	8.76
Cut11	9.04	8.81	9.61	9.69	10.50	10.30
Cut12	9.61	9.36	10.60	10.58	11.39	11.15
Cut13	10.18	9.90	11.18	11.07	11.45	11.19
Cut14	10.72	10.39	11.46	11.32	12.26	11.93
Cut15	11.50	11.12	12.22	11.99	13.24	12.89
Cut16	12.07	11.68	13.32	13.02	13.82	13.46
LogPseudoLik	-704.56	-727.14	-743.14	-755.25	-602.85	-614.66
Pseudo R^2	0.500	0.490	0.495	0.488	0.504	0.495
Countries	66	66	65	65	58	58
Observations	551	557	564	565	480	481
Equal differences[$]	12.97 (0.529)	13.21 (0.510)	32.22 (0.004)	38.33 (0.001)	139.81 (0.000)	182.87 (0.000)
Jump[&]			[13-14] 14.31 (0.352)	[13-14] 15.32 (0.288)	[12-13] 14.01 (0.373)	[12-13] 12.30 (0.504)

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent [$]The null is that the differences between categories is equal for all categories. The test statistic is to be compared to a Qui-Square with 14 degrees of freedom. [&] The null is that the differences between categories is equal for all categories except for the identified jump. The test statistic is to be compared to a Qui-Square with 13 degrees of freedom. The p-value is in brackets.

The correspondence between the ratings, R, and the cut-off points is specified below:

$$R_{it} = \begin{cases} AAA & if \quad R_{it}^{*} > c_{16} \\ AA+ & if \quad c_{16} > R_{it}^{*} > c_{15} \\ AA & if \quad c_{15} > R_{it}^{*} > c_{14} \\ AA- & if \quad c_{14} > R_{it}^{*} > c_{13} \\ A+ & if \quad c_{13} > R_{it}^{*} > c_{12} \\ A & if \quad c_{12} > R_{it}^{*} > c_{11} \\ A- & if \quad c_{11} > R_{it}^{*} > c_{10} \end{cases}$$

$$R_{it} = \begin{cases} BBB+ & if \quad c_{10} > R_{it}^{*} > c_{9} \\ BBB & if \quad c_{9} > R_{it}^{*} > c_{8} \\ BBB- & if \quad c_{8} > R_{it}^{*} > c_{7} \\ BB+ & if \quad c_{7} > R_{it}^{*} > c_{6} \\ BB & if \quad c_{6} > R_{it}^{*} > c_{5} \\ BB- & if \quad c_{5} > R_{it}^{*} > c_{4} \\ B+ & if \quad c_{4} > R_{it}^{*} > c_{2} \\ B & if \quad c_{3} > R_{it}^{*} > c_{2} \\ B\ - & if \quad c_{2} > R_{it}^{*} > c_{1} \\ <CCC+ & .if \quad c_{1} > R_{it}^{*} \end{cases}$$

Table 14 – Random effects ordered Probit

	Moody's		S&P		Fitch	
	(1)	(2)	(3)	(4)	(5)	(6)
GDP per capita	3.422***	3.349***	3.246***	2.686***	4.087***	4.160***
	(9.40)	*(9.14)*	*(9.02)*	*(8.12)*	*(12.15)*	*(13.12)*
GDP per capita Avg.	0.478***	0.562***	1.117***	0.614***	1.132***	0.913***
	(2.75)	*(3.84)*	*(6.03)*	*(3.94)*	*(7.81)*	*(5.45)*
GDP growth	6.464**	7.852**	5.979*	7.729***	-5.119*	
	(2.06)	*(2.30)*	*(1.93)*	*(2.60)*	*(-1.73)*	
GDP growth Avg.	-9.387**		-8.43*		-6.083	
	(-2.04)		*(-1.79)*		*(-1.31)*	
Unemployment	0.016		0.152***	0.135***	0.012	
	(0.50)		*(4.57)*	*(3.01)*	*(0.36)*	
Unemployment Avg.	-0.078***	-0.085***	0.002		-0.073***	-0.033**
	(-4.40)	*(-5.18)*	*(0.10)*		*(-4.40)*	*(-2.09)*
Inflation	-0.199	-0.214	-0.353**	-0.418***	-0.273**	-0.245*
	(-1.41)	*(-1.51)*	*(-2.53)*	*(-2.93)*	*(-1.96)*	*(-1.79)*
Inflation Avg.	-0.623***	-0.939***	-0.532***	-0.949***	-0.713***	-0.272*
	(-4.01)	*(-6.11)*	*(-3.41)*	*(-6.08)*	*(-4.62)*	*(-1.84)*
Gov Debt	-0.03***	-0.032***	-0.085***	-0.088***	-0.043***	-0.051***
	(-4.61)	*(-4.94)*	*(-11.90)*	*(-12.41)*	*(-7.24)*	*(-9.07)*
Gov Debt Avg.	-0.026***	-0.028***	-0.027***	-0.031***	0.001	
	(-6.99)	*(-8.80)*	*(-8.77)*	*(-10.47)*	*(0.26)*	
Gov Balance	13.898***	10.937***	10.187***	11.559***	9.487***	
	(3.74)	*(2.77)*	*(3.07)*	*(3.32)*	*(3.00)*	
Gov Balance Avg.	6.757*		8.873**		22.304***	21.812***
	(1.84)		*(2.40)*		*(6.18)*	*(5.83)*
Gov Effectiveness	0.223		0.707**	0.794**	1.761***	1.838***
	(0.64)		*(2.08)*	*(2.42)*	*(4.86)*	*(5.17)*
Gov Effectiveness Avg.	3.679***	3.547***	4.606***	3.752***	2.722***	3.104***
	(13.46)	*(15.44)*	*(16.30)*	*(15.62)*	*(11.37)*	*(12.28)*
External Debt	-0.004**	-0.002**	-0.002			
	(-2.29)	*(-2.21)*	*(-0.79)*			
External Debt Avg.	-0.004***		-0.008***	-0.014***		
	(-3.11)		*(-6.40)*	*(-10.39)*		
Current Account	-8.57***	-12.863***	-4.899**		2.772	
	(-3.62)	*(-5.94)*	*(-2.04)*		*(1.23)*	
Current Account Avg.	5.24**	3.723*	18.39***	5.769**	18.993***	26.980***
	(2.21)	*(1.73)*	*(7.21)*	*(2.54)*	*(7.89)*	*(11.27)*
Reserves	2.246***	2.952***	0.205		-0.549	
	(4.37)	*(5.82)*	*(0.42)*		*(-1.14)*	
Reserves Avg.	0.416		3.365***	2.520***	0.876*	
	(0.88)		*(6.94)*	*(5.57)*	*(1.83)*	
Def 1	-3.101***	-2.936***	-1.789***	-2.077***	-2.176***	-1.266***
	(-12.18)	*(-11.95)*	*(-8.05)*	*(-9.25)*	*(-9.33)*	*(-6.03)*
EU	2.197***	2.237***	0.324		0.336	
	(9.04)	*(8.90)*	*(1.55)*		*(1.57)*	
IND	3.554***	3.626***	3.923***	5.848***	4.982***	6.163***
	(7.71)	*(9.08)*	*(8.18)*	*(11.38)*	*(13.24)*	*(15.54)*
LAC	-1.766***	-1.711***	-1.485***	-0.901***	-2.570***	-3.165***
	(-7.08)	*(-8.86)*	*(-6.38)*	*(-4.34)*	*(-11.08)*	*(-13.78)*

Table 14 (Cont.) – Random effects ordered Probit

	Moody's		S&P		Fitch	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	8.13	7.00	3.22	7.63	2.46	3.71
Cut1	1.00	1.00	1.00	1.00	1.00	1.00
Cut2	2.00	2.06	2.19	2.16	2.35	2.38
Cut3	3.40	3.36	4.12	4.07	3.33	3.43
Cut4	4.94	5.01	5.34	5.34	4.64	4.82
Cut5	5.94	6.14	7.11	7.19	5.77	5.93
Cut6	7.09	7.35	9.15	9.32	7.51	7.54
Cut7	8.65	8.92	10.75	10.80	9.13	9.02
Cut8	10.72	10.75	13.11	12.92	10.80	10.81
Cut9	11.76	11.82	14.59	14.30	11.82	12.02
Cut10	12.97	13.13	15.46	14.99	12.92	13.10
Cut11	14.25	14.49	17.49	16.59	15.30	15.42
Cut12	15.50	15.72	18.96	18.00	16.99	17.52
Cut13	17.62	17.50	21.51	19.99	17.63	18.42
Cut14	19.11	18.86	22.72	21.07	19.85	20.87
Cut15	20.60	20.26	24.54	23.00	22.11	23.07
Cut16	21.64	21.26	27.07	25.69	24.06	25.04
LogLik	-566.33	-578.24	-514.45	-531.22	-537.09	-533.09
Observations	551	557	564	565	553	564
Equal differences [$]	29.26 (0.009)	19.91 (0.133)	52.21 (0.000)	59.68 (0.000)	68.57 (0.000)	70.23 (0.000)
Jump[&]	[7-8]	[7-8]		[9-10]	[12-13]	
Different Slopes[#]			[2-3 ,5-6, 7-8, 10-11,12-13, 14-15, 15-16]	[2-3, 5-6, 7-8, 12-13, 14-15, 15-16]	[10-11, 13-14, 14-15,15-16]	[10-11, 11- 12, 13-14,14-15, 15-16]
Test[*]	18.22 (0.149)	12.22 (0.510)	19.23 (0.116)	14.02 (0.300)	22.03 (0.037)	16.69 (0.214)

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent [$]The null is that the differences between categories is equal for all categories. The test statistic is to be compared to a Qui-Square with 14 degrees of freedom. [&] Identifies two cut points that have a irregular difference. [#] Identifies a cluster of categories that seem to have a higher slope (increase difficulty in transition between adjacent notches). [*]The null is that, excluding the jump point, within the two identified clusters the slopes are equal. The test statistic is to be compared to a Qui-Square with either 13 degrees of freedom (if only a jump or different slopes was identified) or 12 degrees of freedom (if both where identified). The p-value is in brackets.

For the correspondence between the ratings and the cut-off points see note to Table 13.

Table 15 – Summary of prediction errors

	Estimation Procedure	Obs.	Prediction error (notches)											% Correctly predicted	% Within 1 notch *	% Within 2 notches **
			5	4	3	2	1	0	-1	-2	-3	-4	-5			
Moody's	OLS	557	0	5	12	42	**88**	**209**	**141**	58	2	0	0	37.5%	78.6%	96.6%
	RE with ε_i	557	0	0	1	17	**78**	**361**	**91**	8	1	0	0	64.8%	95.2%	99.6%
	RE without ε_i	557	0	6	15	49	**92**	**188**	**141**	53	12	1	0	33.8%	75.6%	93.9%
	Ordered Probit	557	4	4	14	35	**99**	**259**	**86**	46	10	0	0	46.5%	79.7%	94.3%
	RE Ordered Probit	557	0	8	23	59	**106**	**244**	**71**	34	11	1	0	43.8%	75.6%	92.3%
S&P	OLS	568	0	3	15	34	**104**	**218**	**147**	41	6	0	0	38.4%	82.6%	95.8%
	RE with ε_i	565	0	0	1	6	**80**	**392**	**83**	2	1	0	0	69.4%	98.2%	99.6%
	RE without ε_i	565	0	5	12	39	**98**	**216**	**133**	52	10	0	0	38.2%	79.1%	95.2%
	Ordered Probit	565	0	10	14	28	**99**	**262**	**118**	23	10	1	0	46.4%	84.8%	93.8%
	RE Ordered Probit	565	1	12	13	41	**115**	**218**	**130**	29	6	0	0	38.6%	81.9%	94.3%
Fitch	OLS	481	1	3	6	32	**87**	**196**	**113**	43	0	0	0	40.7%	82.3%	97.9%
	RE with ε_i	481	0	1	2	4	**63**	**339**	**71**	1	0	0	0	70.5%	98.3%	99.4%
	RE without ε_i	481	1	3	7	39	**93**	**174**	**106**	57	1	0	0	36.2%	77.5%	97.5%
	Ordered Probit	481	1	0	16	32	**91**	**209**	**95**	31	6	0	0	43.5%	82.1%	95.2%
	RE Ordered Probit	553	1	3	25	53	**115**	**191**	**121**	36	8	0	0	34.5%	77.2%	93.3%

Notes: * - prediction error within +/- 1 notch. ** - prediction error within +/- 2 notches.

Table 16 – Upgrades and downgrades prediction

		Sample Upgrades	Predicted Upgrades	Upgrades correctly predicted at time		Sample Downgrades	Predicted Downgrades	Downgrades correctly predicted at time	
				t	t+1			t	t+1
Moody's	OLS	60	95	23	20	34	55	20	10
	RE with ε_i	60	87	28	17	34	51	16	12
	RE without ε_i	60	89	23	16	34	51	17	8
	Ordered Probit	60	127	31	25	34	72	20	8
	RE Ordered Probit	60	101	23	23	34	65	18	8
S&P	OLS	79	79	32	17	41	50	16	15
	RE with ε_i	79	79	31	14	41	52	18	12
	RE without ε_i	79	90	34	15	41	61	19	14
	Ordered Probit	79	102	38	14	41	64	20	13
	RE Ordered Probit	79	90	31	15	41	68	20	12
Fitch	OLS	68	74	28	19	25	35	13	3
	RE with ε_i	68	67	25	19	25	34	15	7
	RE without ε_i	68	89	24	20	25	53	15	5
	Ordered Probit	69	115	30	24	25	71	15	5
	RE Ordered Probit	89	154	43	29	26	77	13	7

Note: ε_i - estimated country specific effect.

Table 17 – Example of country analysis: variables' contribution to expected rating changes

17a – European countries

		Portugal			Spain			Greece			Italy			Ireland		
		1998		2005	1998		2005	1998		2005	1998		2005	1998		2005
Rating$	Moody's	Aa2 (15)		Aa2 (15)	Aa2 (15)		Aaa (17)	Baa1 (10)		A1 (13)	Aa3 (14)		Aa2 (15)	Aaa (17)		Aaa (17)
	S&P	AA (15)		AA- (14)	AA (15)		AAA (17)	BBB (9)		A (12)	AA (15)		AA- (14)	AA+ (16)		AAA (17)
	Fitch	AA (15)		AA (15)	AA (15)		AAA (17)	BBB (9)		A (12)	AA- (14)		AA (15)	AAA (17)		AAA (17)
Moody's	Macro contribution	0.53	0.73	0.93	1.69	1.98	2.28	1.33	1.52	1.70	0.91	1.08	1.26	1.46	1.83	2.20
	Gov. contribution	-0.69	-0.46	-0.23	0.27	0.65	1.03	-0.05	-0.01	0.02	-0.03	0.14	0.31	0.20	0.39	0.58
	External contribution	0.09	0.12	0.15	0.22	0.31	0.39	0.18	0.24	0.31	0.17	0.24	0.30	0.15	0.21	0.26
	European Union	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Overall change	**-0.07**	**0.39**	**0.86**	**2.19**	**2.95**	**3.70**	**1.46**	**1.75**	**2.03**	**1.05**	**1.46**	**1.87**	**1.81**	**2.43**	**3.05**
S&P	Macro contribution	0.42	0.57	0.73	0.94	1.07	1.20	0.99	1.13	1.27	0.56	0.67	0.77	0.91	1.15	1.38
	Gov. contribution	-1.06	-0.88	-0.70	0.48	0.77	1.06	-0.13	-0.10	-0.08	0.07	0.21	0.34	0.83	0.98	1.14
	External contribution	0.03	0.05	0.08	0.07	0.14	0.21	0.06	0.11	0.16	0.05	0.11	0.16	0.05	0.09	0.14
	European Union	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Overall change	**-0.61**	**-0.25**	**0.11**	**1.49**	**1.98**	**2.47**	**0.91**	**1.14**	**1.36**	**0.69**	**0.98**	**1.26**	**1.78**	**2.22**	**2.66**
Fitch	Macro contribution	0.90	0.99	1.08	1.78	2.01	2.25	1.43	1.56	1.69	1.06	1.18	1.30	1.92	2.14	2.35
	Gov. contribution	-1.26	-1.05	-0.85	-0.46	-0.13	0.19	-0.11	-0.08	-0.06	-0.45	-0.29	-0.14	0.15	0.31	0.47
	External contribution	-0.06	-0.03	-0.01	-0.16	-0.09	-0.02	-0.13	-0.07	-0.01	-0.12	-0.07	-0.01	-0.11	-0.06	-0.01
	European Union	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Overall change	**-0.42**	**-0.10**	**0.23**	**1.16**	**1.79**	**2.42**	**1.19**	**1.40**	**1.62**	**0.49**	**0.81**	**1.14**	**1.97**	**2.39**	**2.81**

17b – European countries

		Czech Republic			Hungary			Poland			Slovakia			Slovenia		
		1998		2005	1998		2005	1998		2005	1998		2005	1998		2005
Rating$	Moody's	Baa1 (10)		A1 (13)	Baa3 (10)		A1 (13)	Baa3 (10)		A2 (12)	Ba1 (7)		A2 (12)	A3 (11)		Aa3 (14)
	S&P	A- (11)		A- (11)	BBB (9)		A- (11)	BBB- (8)		BBB+ (10)	BB+ (7)		A (12)	A (12)		AA- (14)
	Fitch	BBB+ (10)		A (12)	BBB (9)		BBB+ (10)	BBB+ (10)		BBB+ (10)	BB+(7)		A (12)	A- (11)		AA- (14)
Moody's	Macro contribution	1.43	1.76	2.08	2.08	2.36	2.65	0.59	0.90	1.21	1.30	1.57	1.84	1.07	1.22	1.38
	Gov. contribution	-0.75	-0.59	-0.43	-0.39	-0.29	-0.19	-0.61	-0.42	-0.23	-0.32	-0.11	0.10	-0.23	-0.10	0.02
	External contribution	-0.08	-0.05	-0.01	0.00	0.09	0.17	-0.34	-0.23	-0.13	-0.04	0.26	0.56	0.13	0.17	0.22
	European Union	1.42	1.60	1.77	1.42	1.60	1.77	1.42	1.60	1.77	1.42	1.60	1.77	1.42	1.60	1.77
	Overall change	**2.03**	**2.72**	**3.41**	**3.11**	**3.76**	**4.41**	**1.06**	**1.85**	**2.63**	**2.37**	**3.32**	**4.28**	**2.39**	**2.89**	**3.39**
S&P	Macro contribution	1.24	1.46	1.68	1.48	1.69	1.89	0.86	1.03	1.19	1.23	1.39	1.55	0.76	0.87	0.99
	Gov. contribution	-1.05	-0.93	-0.80	-0.25	-0.18	-0.11	-0.63	-0.49	-0.35	-0.45	-0.28	-0.11	-0.18	-0.08	0.02
	External contribution	-0.02	0.00	0.03	0.02	0.08	0.15	-0.09	-0.01	0.07	-0.28	-0.02	0.23	0.01	0.04	0.07
	European Union	0.07	0.19	0.31	0.07	0.19	0.31	0.07	0.19	0.31	0.07	0.19	0.31	0.07	0.19	0.31
	Overall change	**0.23**	**0.73**	**1.22**	**1.31**	**1.77**	**2.24**	**0.20**	**0.72**	**1.23**	**0.58**	**1.28**	**1.97**	**0.66**	**1.02**	**1.38**
Fitch	Macro contribution	1.53	1.73	1.92	2.24	2.48	2.71	0.95	1.17	1.39	1.51	1.73	1.95	1.20	1.32	1.44
	Gov. contribution	-0.80	-0.67	-0.54	-0.35	-0.27	-0.19	-0.88	-0.72	-0.55	0.20	0.38	0.57	0.13	0.24	0.35
	External contribution	0.05	0.10	0.15	-0.10	-0.02	0.05	0.11	0.24	0.38	0.27	0.73	1.19	-0.08	-0.04	-0.01
	European Union	0.08	0.22	0.36	0.08	0.22	0.36	0.08	0.22	0.36	0.08	0.22	0.36	0.08	0.22	0.36
	Overall change	**0.86**	**1.37**	**1.89**	**1.88**	**2.40**	**2.93**	**0.26**	**0.92**	**1.58**	**2.06**	**3.06**	**4.07**	**1.33**	**1.73**	**2.14**

Notes: The block contributions were calculated using the changes in the variables multiplied by the short-run coefficients estimated by random effects ordered probit, and then aggregated. The only exception was unemployment, for which we used the long-run coefficient. The upper and lower bounds where calculated using plus and minus one standard deviation.
$ The quantitative rating scale is in brackets.

17c – Emerging economies

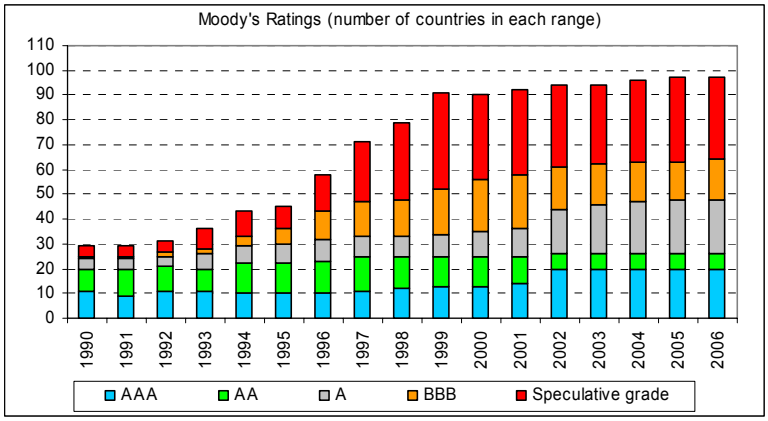
		Brazil			Malaysia			Mexico			South Africa			Thailand		
		1998		2005	1998		2005	1998		2005	1998		2005	1998		2005
Rating[$]	Moody's	B2(3)		Ba3 (5)	Baa3 (8)		A3 (11)	Ba2 (7)		Baa1 (10)	Ba1 (7)		Baa1 (10)	Baa3 (8)		Baa1 (10)
	S&P	BB- (5)		BB- (5)	BBB- (8)		A- (11)	BB (6)		BBB (9)	BBB- (8)		BBB+ (10)	BB+ (7)		BBB+ (10)
	Fitch	B+ (4)		BB- (5)	BB (6)		A- (11)	BB (6)		BBB (9)	BB+ (7)		BBB+ (10)	BB (6)		BBB+ (10)
Moody's	Macro contribution	-0.59	-0.49	-0.39	1.00	1.19	1.37	0.95	1.17	1.39	0.79	1.03	1.27	0.91	1.19	1.47
	Gov. contribution	-0.37	-0.16	0.06	-1.06	-0.79	-0.53	0.26	0.45	0.64	0.34	0.61	0.88	-0.31	-0.14	0.04
	External contribution	-0.15	0.18	0.50	-0.70	-0.35	-0.01	0.13	0.26	0.38	0.28	0.38	0.48	-0.36	-0.12	0.12
	Overall change	**-1.11**	**-0.47**	**0.17**	**-0.76**	**0.04**	**0.83**	**1.34**	**1.88**	**2.42**	**1.41**	**2.02**	**2.64**	**0.24**	**0.94**	**1.64**
S&P	Macro contribution	-0.19	-0.16	-0.13	0.77	0.91	1.05	0.71	0.88	1.05	0.86	0.99	1.13	0.70	0.92	1.13
	Gov. contribution	-1.01	-0.84	-0.67	-0.93	-0.73	-0.53	0.25	0.40	0.54	0.75	0.96	1.17	-0.68	-0.54	-0.40
	External contribution	-0.22	0.06	0.34	-0.56	-0.28	0.00	-0.06	0.04	0.15	0.00	0.08	0.17	-0.15	0.06	0.26
	Overall change	**-1.42**	**-0.94**	**-0.45**	**-0.71**	**-0.10**	**0.52**	**0.90**	**1.32**	**1.73**	**1.61**	**2.04**	**2.46**	**-0.13**	**0.43**	**0.99**
Fitch	Macro contribution	-0.56	-0.49	-0.41	1.04	1.14	1.25	1.26	1.39	1.52	0.92	1.09	1.25	0.80	0.89	0.97
	Gov. contribution	-0.46	-0.28	-0.11	-0.61	-0.40	-0.18	-0.08	0.08	0.24	0.91	1.14	1.37	-0.18	-0.03	0.12
	External contribution	0.72	1.36	2.01	0.12	0.52	0.91	0.13	0.35	0.56	-0.06	0.07	0.20	0.43	0.86	1.28
	Overall change	**-0.30**	**0.60**	**1.49**	**0.55**	**1.26**	**1.97**	**1.31**	**1.82**	**2.32**	**1.76**	**2.30**	**2.83**	**1.06**	**1.72**	**2.38**

Notes: The block contributions were calculated using the changes in the variables multiplied by the short-run coefficients estimated by random effects ordered probit, and then aggregated. The only exception was unemployment, for which we used the long-run coefficient. The upper and lower bounds where calculated using plus and minus one standard deviation.

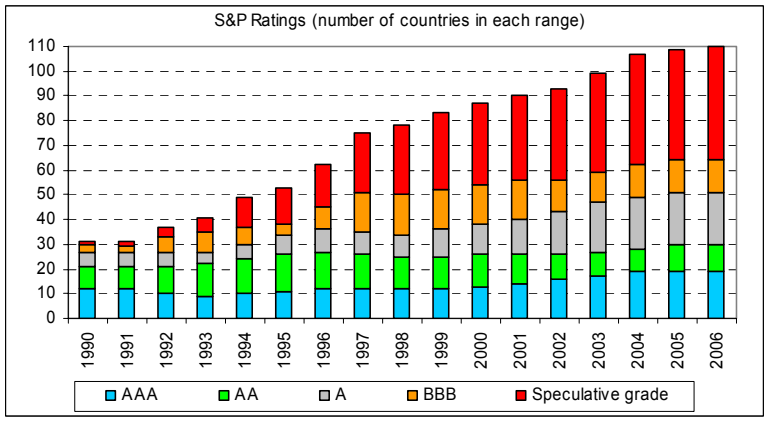
[$] The quantitative rating scale is in brackets.

Figure 1 – Number of countries rated and rating categories

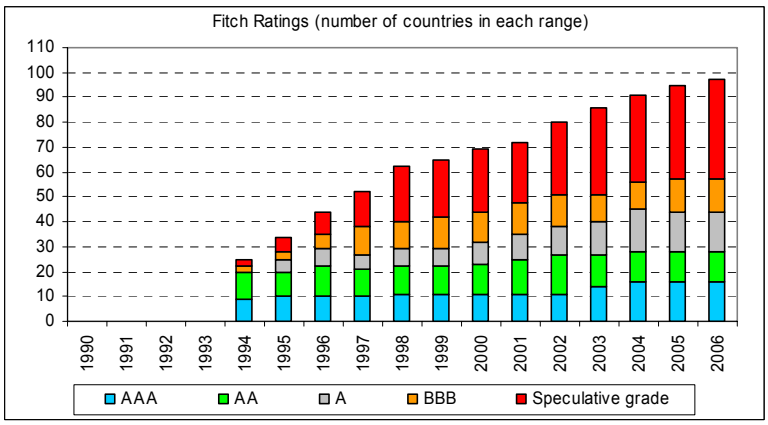
1a



1b



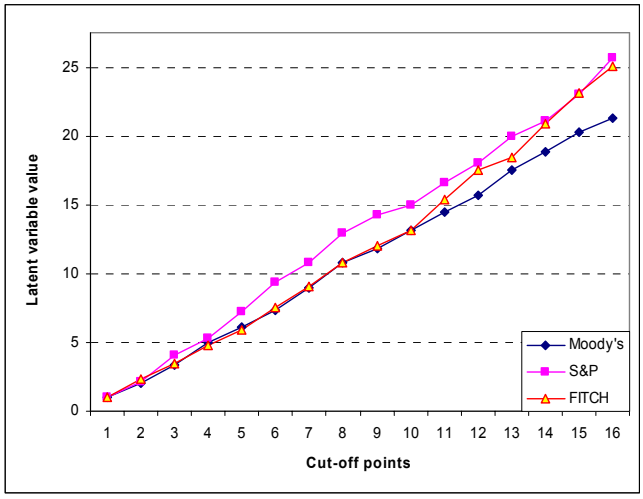
1c



Note: Data as of year-end (June for 2006).

Figure 2 – Random effects ordered probit cut-off points for the three agencies

2a – Estimated cut-off points



2b- Estimated cut-off points normalized to 1-17

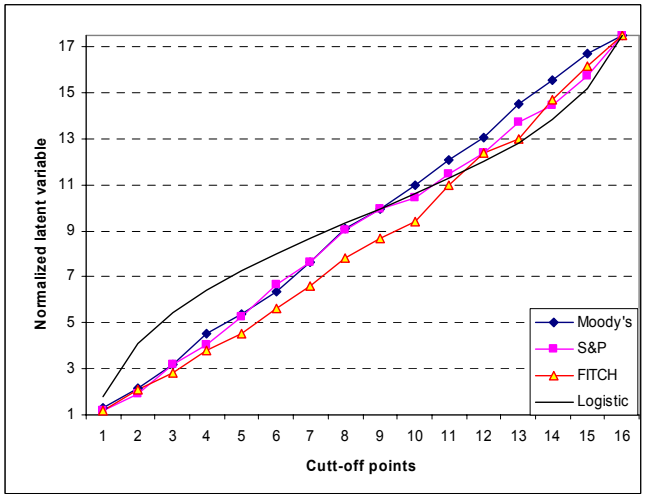


Figure 3 – Prediction for Moody's

3a – OLS

Predicted \ Actual	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	≤Caa1
Aaa	**86**	6	0	0	0												
Aa1	50	**6**	3	6	0	0											
Aa2	11	11	**22**	2	2	0	4										
Aa3	1	3	3	**0**	0	2	3	0									
A1		0	1	6	**5**	3	1	3	0								
A2			0	0	4	**0**	0	0	0	0							
A3				0	2	2	**2**	1	0	0	0						
Baa1					0	8	2	**11**	5	2	0	0					
Baa2						0	8	9	**13**	10	7	0	0				
Baa3							1	0	5	**19**	13	3	0	0			
Ba1								0	3	14	**8**	4	1	4	0		
Ba2									0	12	10	**3**	6	5	0	1	
Ba3										0	1	11	**8**	8	3	1	0
B1											0	2	3	**7**	13	5	1
B2												0	2	2	**5**	7	5
B3													0	4	6	**3**	7
≤Caa1														0	1	3	**11**

3b – Random effects estimation without country specific error

Predicted \ Actual	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	≤Caa1
Aaa	**86**	6	1	0	0												
Aa1	40	**8**	3	6	0	0											
Aa2	16	8	**21**	2	2	0	4										
Aa3	5	0	3	**0**	4	3	2	1									
A1	1	4	1	6	**0**	2	2	2	0								
A2		0	0	0	5	**1**	2	0	0	0							
A3			0	0	2	3	**0**	5	0	0	0						
Baa1				0	0	6	1	**6**	5	1	2	0					
Baa2					0	0	9	9	**13**	12	5	1	0				
Baa3						0	1	1	5	**8**	13	3	0	0			
Ba1							0	0	3	27	**9**	5	1	4	0		
Ba2								0	0	8	9	**6**	7	8	1	1	
Ba3									0	1	0	4	**4**	7	5	3	0
B1										0	1	4	7	**5**	6	6	0
B2											0	0	1	6	**9**	3	6
B3												0	0	0	5	**4**	10
≤Caa1													0	0	2	3	**8**

3c – Ordered Probit

Predicted \ Actual	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	≤Caa1
Aaa	**139**	15	2	6	0	0											
Aa1	3	**1**	14	1	1	0	4										
Aa2	3	6	**11**	1	1	0	0	0									
Aa3	3	2	1	**0**	2	2	0	0	0								
A1		2	1	1	**4**	1	4	1	0	0							
A2			0	5	4	**2**	1	2	0	0	0						
A3				0	1	4	**1**	2	0	0	0	0					
Baa1					0	6	2	**9**	5	4	1	0	0				
Baa2						0	6	10	**13**	5	3	0	0	0			
Baa3							3	0	6	**25**	17	2	0	3	0		
Ba1								0	2	21	**8**	6	1	4	0	0	
Ba2									0	2	5	**1**	7	3	0	0	0
Ba3										0	4	7	**6**	4	2	1	1
B1											1	6	2	**10**	8	4	0
B2												1	4	5	**10**	5	4
B3													0	1	5	**6**	6
≤Caa1														0	3	4	**13**

3d – Random effects ordered Probit

Predicted \ Actual	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	≤Caa1
Aaa	**139**	15	5	6	0												
Aa1	3	**7**	14	1	1	0											
Aa2	0	0	**8**	1	1	0	4										
Aa3	5	2	2	**1**	4	3	0	0									
A1	1	2	0	5	**6**	4	5	3	0								
A2		0	0	0	1	**4**	1	0	0	0							
A3			0	0	0	3	**0**	9	0	1	0						
Baa1				0	0	1	4	**10**	15	4	3	0					
Baa2					0	0	7	2	**5**	8	10	0	0				
Baa3						0	0	0	6	**18**	9	4	0	3			
Ba1							0	0	0	19	**14**	5	7	4	0		
Ba2								0	0	5	1	**3**	2	5	0	1	
Ba3									0	2	1	5	**1**	5	5	4	0
B1										0	1	5	5	**6**	6	6	1
B2											0	1	5	4	**6**	1	3
B3												0	0	3	6	**3**	7
≤Caa1													0	0	5	5	**13**

Note: observations above (below) the diagonal are predicted by the model above (below) the actual rating.

Figure 4 – Prediction for S&P

4a – OLS

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**67**	16	0	1	1												
AA+	35	**26**	7	0	6	0											
AA	15	12	**11**	1	2	0	0										
AA-	3	0	1	**4**	2	5	0	0									
A+		0	7	4	**2**	6	2	0	0								
A			1	0	1	**1**	2	0	1	2							
A-				0	0	1	**12**	1	0	0	0						
BBB+					0	3	11	**6**	2	1	0	0					
BBB						0	3	4	**11**	12	2	0	0				
BBB-							0	3	18	**21**	9	0	0	0			
BB+								0	1	16	**7**	15	8	0	0		
BB									0	1	15	**19**	4	0	3	0	
BB-										0	4	13	**8**	7	6	1	0
B+											0	0	7	**9**	12	2	3
B												0	0	3	**5**	4	6
B-													2	4	3	**5**	4
≤CCC+														0	0	3	**4**

4b – Random effects estimation without country specific error

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**70**	15	0	1	2												
AA+	31	**29**	10	0	5	0											
AA	16	6	**4**	0	3	0	0										
AA-	3	4	4	**3**	2	8	0	0									
A+		0	4	2	**1**	3	2	0	1								
A			5	4	0	**1**	3	0	0	2							
A-				0	1	1	**6**	0	0	0	0						
BBB+					0	2	10	**3**	1	1	0	0					
BBB						1	6	10	**16**	11	1	0	0				
BBB-							0	1	13	**21**	9	1	0	0			
BB+								0	2	16	**9**	17	8	0	0		
BB									0	2	14	**19**	4	0	4	0	
BB-										0	4	8	**6**	7	6	1	0
B+											0	2	9	**10**	10	2	1
B												0	1	3	**7**	3	7
B-													1	3	2	**5**	3
≤CCC+														0	0	4	**6**

4c – Ordered Probit

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**96**	26	1	1	6												
AA+	21	**21**	13	1	2	1											
AA	2	7	**4**	2	1	3	0										
AA-	1	0	0	**0**	1	0	0	0									
A+	0	0	3	2	**3**	4	0	0	0								
A		0	5	4	1	**4**	4	0	1	0							
A-			1	0	0	2	**13**	2	0	3	0						
BBB+				0	0	2	5	**4**	2	0	0	0					
BBB					0	0	5	6	**12**	3	0	0	0				
BBB-						0	0	2	17	**35**	9	0	0	0			
BB+							0	0	1	12	**11**	15	8	0	2		
BB								0	0	0	15	**20**	5	2	2	0	
BB-									0	0	2	12	**9**	4	6	2	1
B+										0	0	0	5	**10**	5	1	0
B											0	0	0	3	**11**	3	8
B-												0	2	2	3	**2**	1
≤CCC+													0	2	0	7	**7**

4d – Random effects ordered Probit

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**83**	32	3	1	7	0											
AA+	35	**19**	10	0	3	0	0										
AA	2	3	**5**	3	2	5	0	0									
AA-	0	0	6	**2**	0	4	0	0	0								
A+		0	3	2	**1**	2	2	0	1	1							
A			0	2	1	**2**	3	0	0	1	0						
A-				0	0	3	**13**	1	2	1	0	0					
BBB+					0	0	2	**1**	2	0	0	0	0				
BBB						0	6	10	**9**	10	1	0	0	0			
BBB-							1	2	19	**27**	13	1	0	0	0		
BB+								0	0	11	**6**	13	8	0	2	0	
BB									0	2	12	**21**	4	2	2	0	0
BB-										0	5	11	**9**	6	7	0	1
B+											0	1	1	**4**	9	3	1
B												0	5	8	**8**	4	6
B-													2	0	0	**2**	3
≤CCC+														3	1	6	**6**

Note: observations above (below) the diagonal are predicted by the model above (below) the actual rating.

Figure 5 – Prediction for Fitch

5a – OLS

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**63**	12	0	2	0	0											
AA+	35	**10**	12	7	0	0	0										
AA	20	8	**18**	4	0	2	0	0									
AA-		0	9	**2**	0	6	0	0	0								
A+			2	6	**1**	6	1	1	2	1							
A				0	0	**0**	2	0	0	0	0						
A-					0	0	**10**	1	0	0	0	0					
BBB+						0	6	**8**	4	0	0	1	0				
BBB							8	8	**10**	3	1	0	0	0			
BBB-								0	5	**33**	9	4	0	0	0		
BB+									3	6	**13**	10	0	0	0	0	
BB										1	11	**9**	3	6	0	0	0
BB-											8	8	**8**	6	2	0	0
B+												1	5	**5**	6	3	1
B													0	2	**2**	6	2
B-														0	1	**0**	3
≤CCC+															0	3	**4**

5b – Random effects estimation without country specific error

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**51**	13	0	2	0	0	0										
AA+	32	**11**	16	7	0	0	0	0									
AA	31	6	**16**	5	0	3	0	0	0								
AA-	1	0	6	**1**	1	9	0	0	0	0							
A+	0	0	3	6	**0**	2	1	1	2	1	0						
A	0	0	0	0	0	**0**	4	0	0	0	0	0					
A-	0	0	0	0	0	0	**7**	0	0	0	0	0	0				
BBB+		0	0	0	0	0	7	**7**	4	0	0	1	0	0			
BBB			0	0	0	0	8	10	**6**	11	1	0	0	0	0		
BBB-				0	0	0	0	0	9	**25**	8	3	0	0	0	0	
BB+					0	0	0	0	3	6	**16**	11	0	0	0	0	0
BB						0	0	0	0	1	9	**8**	2	8	0	0	0
BB-							0	0	0	0	8	7	**8**	4	4	0	0
B+								0	0	0	0	3	6	**7**	3	3	1
B									0	0	0	0	0	0	**3**	6	3
B-										0	0	0	0	0	1	**2**	3
≤CCC+											0	0	0	0	0	1	**1**

5c – Ordered Probit

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**85**	18	7	5	0	0											
AA+	24	**6**	11	4	0	0	0										
AA	9	6	**14**	4	0	5	0	0									
AA-	0	0	4	**2**	0	6	0	0	0								
A+		0	0	0	**1**	1	0	0	0	0							
A			5	6	0	**2**	0	1	1	0	0						
A-				0	0	0	**17**	3	1	1	0	1					
BBB+					0	0	6	**5**	4	0	0	0	0				
BBB						0	3	7	**4**	4	1	0	0	0			
BBB-							1	2	13	**32**	9	5	0	0	0		
BB+								0	1	7	**17**	12	0	2	0	0	
BB									0	0	10	**6**	5	5	1	0	0
BB-										0	5	5	**5**	4	0	0	0
B+											0	4	6	**5**	6	1	1
B												0	0	2	**2**	6	1
B-													0	1	2	**2**	4
≤CCC+														0	0	3	**4**

5d – Random effects ordered Probit

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**69**	20	5	3	0	0	0										
AA+	45	**8**	11	10	0	0	0	0									
AA	7	7	**11**	0	0	0	0	0	0								
AA-	0	0	14	**8**	1	6	0	0	0	0							
A+	0	0	0	0	**0**	5	0	0	0	0	0						
A	0	0	0	2	1	**3**	7	1	2	1	0	0					
A-		0	0	0	4	8	**20**	8	4	3	0	1	0				
BBB+			0	0	0	2	9	**12**	2	1	1	0	0	0			
BBB				0	0	0	8	1	**8**	16	2	0	0	0	0		
BBB-					0	0	2	0	7	**21**	15	7	2	0	0	0	
BB+						0	0	0	2	6	**8**	11	2	7	0	0	1
BB							0	0	1	1	10	**8**	7	7	2	1	0
BB-								0	0	0	5	6	**6**	4	3	3	1
B+									0	0	5	4	5	**2**	5	3	2
B										0	0	0	0	0	**0**	2	2
B-											0	0	0	0	0	**3**	1
≤CCC+												0	0	0	1	2	**4**

Note: observations above (below) the diagonal are predicted by the model above (below) the actual rating.

Figure 6 – Random effects estimation including country specific errors

6a –Moody's

Predicted \ Actual	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	≤Caa1
Aaa	**122**	3	0	0													
Aa1	24	**23**	10	1	0												
Aa2	2	0	**18**	6	0	0											
Aa3	0	0	1	**7**	2	0	0										
A1		0	0	0	**5**	0	1	0									
A2			0	0	6	**8**	3	1	0								
A3				0	0	7	**13**	2	0	0							
Baa1					0	0	2	**17**	0	2	1						
Baa2						0	2	4	**18**	5	1	0					
Baa3							0	0	8	**39**	12	1	0				
Ba1								0	0	8	**14**	5	1	0			
Ba2									0	2	11	**11**	1	1	0		
Ba3										1	0	5	**15**	9	0	0	
B1											0	1	3	**15**	5	4	0
B2												0	0	5	**17**	8	4
B3													0	0	5	**6**	7
≤Caa1														0	1	2	**13**

6b – S&P

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**109**	5	0	0													
AA+	11	**45**	9	0	0												
AA	0	4	**16**	7	0	0											
AA-	0	0	2	**3**	1	0	0										
A+		0	0	0	**8**	1	0	0									
A			0	0	4	**8**	4	0	0								
A-				0	1	7	**16**	1	1	0							
BBB+					0	0	7	**8**	5	3	0						
BBB						0	0	5	**21**	9	0	0					
BBB-							0	0	5	**33**	5	0	0				
BB+								0	0	7	**23**	7	1	0			
BB									1	1	9	**35**	2	0	0		
BB-										0	0	5	**20**	2	0	0	
B+											0	0	6	**14**	9	0	1
B												0	0	7	**19**	4	1
B-													0	0	1	**8**	9
≤CCC+														0	0	3	**6**

6c – Fitch

Predicted \ Actual	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<CCC+
AAA	**106**	0	0	0	0												
AA+	12	**27**	6	0	0	0											
AA	0	3	**34**	7	0	0	0										
AA-		0	1	**14**	0	0	0	0									
A+			0	0	**0**	0	0	0	0								
A				0	0	**11**	2	0	0	0							
A-					1	3	**19**	2	2	1	0						
BBB+						0	6	**13**	3	0	0	0					
BBB							0	3	**11**	2	0	1	0				
BBB-								0	8	**29**	8	0	0	0			
BB+									0	12	**27**	10	0	0	0		
BB										0	7	**19**	2	0	0	0	
BB-											0	3	**9**	8	0	0	1
B+												0	5	**8**	6	0	0
B													0	3	**2**	5	2
B-														0	3	**5**	2
≤CCC+															0	2	**5**

Note: observations above (below) the diagonal are predicted by the model above (below) the actual rating.

Appendix 1 – Data sources

Variable	Description	Source	Codename
Per Capita GDP	Per capita nominal GDP in US dollars (logs)	IMF (WEO)	NGDPDPC
GDP Growth	Annual growth rate of real GDP	IMF (WEO)	NGDP_R
Unemployment Rate	Unemployment Rate	IMF (WEO)	LUR
Inflation	Annual growth rate of Consumer Price Index	IMF (WEO)	PCPI
Government Debt	Central Government Debt over GDP	Jaimovich, Panizza (2006)	
Government balance	General government balance as percentage of GDP	IMF (WEO)	GGB, NGDP
Government Effectiveness	Aggregate Governance Indicators 1996-2006	WB(AGI)	
External Debt	Total debt as share of exports of goods and services	WB (GDF)	
Current Account	Current account balance as percentage of GDP	IMF (WEO)	BCA, NGDPD
Reserves	Reserves to Imports ratio	IMF (WEO, IFS)	BM, .0.01.D$S.Z.F.$$$
DEF 1	Dummy: 1 if country has defaulted since 1980	S&P	
DEF 2	Years since last default	S&P	
EU	Dummy: 1 If country belongs to European Union		
IND	Dummy: 1 if Industrial Countries	WB	
LAC	Dummy: 1 if Latin America and Caribbean	WB	
Other variables used			
Investment	Gross capital formation as percentage of GDP	IMF (WEO)	NI_R, NGDP_R
OIL balance	Oil trade balance as percentage of GDP	IMF (WEO)	TBO, NGDPD
Government Expenditure	General government total expenditure as percentage of GDP	IMF (WEO)	GGEI, NGDP
Government Interest Expenditure	General government interest expenditure as percentage of GDP	IMF (WEO)	GGRG, NGDP
Government Revenue	General government total revenue as percentage of GDP	IMF (WEO)	GGENL, NGDP
Trade openness	Total Exports plus total Imports as percentage of GDP	IMF (WEO)	BM, BX NGDPD
Exports Growth	Annual growth rate of real exports	IMF (WEO)	NX_R
Domestic Credit Growth	Annual growth rate of Domestic credit	IMF (IFS)	.3.12.$$$.Z.F.$$$
Interest over Exports	Interest paid as percentage of total exports of goods and services	WB (GDF)	
Reserves over total debt	Reserves as percentage of total debt	WB (GDF)	
Short-term debt	Short-term debt as percentage of total debt	WB (GDF)	
Total debt	Total debt as share of gross national income	WB (GDF)	
Voice and Accountability	Aggregate Governance Indicators 1996-2004	WB(AGI)	
Political Stability	Aggregate Governance Indicators 1996-2005	WB(AGI)	
Regulatory Quality	Aggregate Governance Indicators 1996-2007	WB(AGI)	
Rule of Law	Aggregate Governance Indicators 1996-2008	WB(AGI)	
Control of Corruption	Aggregate Governance Indicators 1996-2009	WB(AGI)	
AGI Compound index	Aggregate Governance Indicators 1996-2010: sum of 6 categories	WB(AGI)	
Corruption Perception Index		Transparent International	
EAP	Dummy: 1 if East Asia and Pacific	WB	
ECA	Dummy: 1 if Europe and Central Asia	WB	
MNA	Dummy: 1 if Middle East and North Africa	WB	
SAS	Dummy: 1 if South Asia	WB	
SSA	Dummy: 1 if Sub-Saharan Africa	WB	

Notes: WEO –World Economic Outlook; AGI – Aggregate Governance Indicators; GDF – Global Development Finance; IFS – International Financial Statistics; WB – World Bank; IMF – International Monetary Fund .

Appendix 2 – Countries and years in most extensive rating sample

Country	Years	Obs.	Country	Years	Obs.	Country	Years	Obs.
Andorra	4	4	Greece	19	42	Nicaragua	9	9
Argentina	21	45	Grenada	5	5	Nigeria	1	2
Aruba	5	5	Guatemala	10	17	Norway	32	73
Australia	36	79	Honduras	8	8	Oman	11	21
Austria	32	75	Hong Kong	21	56	Pakistan	13	26
Azerbaijan	7	7	Hungary	15	34	Panama	10	29
Bahamas	10	14	Iceland	18	43	Papua New Guinea	9	25
Bahrain	11	23	India	17	32	Paraguay	11	20
Barbados	12	20	Indonesia	15	38	Peru	10	26
Belgium	19	51	Iran	5	5	Philippines	14	36
Belize	8	15	Ireland	20	52	Poland	12	36
Benin	4	7	Isle of Man	7	7	Portugal	21	53
Bermuda	13	38	Israel	19	43	Qatar	11	19
Bolivia	9	21	Italy	21	53	Romania	11	32
Bosnia and Herzegovina	3	3	Jamaica	8	13	Russia	11	33
Botswana	6	12	Japan	31	70	San Marino	6	6
Brazil	21	47	Jordan	12	23	Saudi Arabia	11	18
Bulgaria	11	29	Kazakhstan	11	33	Senegal	7	7
Burkina Faso	3	3	Korea	19	39	Serbia	3	5
Cameroon	4	8	Kuwait	12	33	Singapore	18	45
Canada	36	85	Latvia	10	27	Slovakia	13	33
Cape Verde	4	4	Lebanon	10	30	Slovenia	11	33
Chile	15	36	Lesotho	5	5	South Africa	13	39
China	19	43	Liechtenstein	11	11	Spain	19	51
Colombia	14	41	Lithuania	11	31	Sri Lanka	2	4
Cook Islands	10	10	Luxembourg	18	44	Suriname	8	14
Costa Rica	10	29	Macao	10	10	Sweden	30	61
Croatia	10	30	Macedonia	3	5	Switzerland	26	58
Cuba	8	8	Madagascar	3	3	Taiwan	18	37
Cyprus	13	27	Malawi	4	4	Thailand	18	45
Czech Republic	14	40	Malaysia	21	48	Trinidad and Tobago	14	25
Denmark	36	75	Mali	3	6	Tunisia	12	22
Dominican Republic	10	22	Malta	13	37	Turkey	15	43
Egypt	10	26	Mauritius	11	11	Turkmenistan	10	10
El Salvador	11	32	Mexico	17	44	Uganda	2	2
Ecuador	10	22	Moldova	10	19	Ukraine	9	21
Estonia	10	25	Mongolia	8	10	United Arab Emirates	11	11
Fiji Islands	8	8	Montenegro	3	3	United Kingdom	29	71
Finland	30	73	Montserrat	3	3	United States of America	37	86
France	32	60	Morocco	9	17	Uruguay	14	39
Gambia	5	5	Mozambique	4	7	Venezuela	30	60
Georgia	2	2	Namibia	2	2	Vietnam	5	12
Germany	24	58	Netherlands	21	52			
Ghana	4	8	New Zealand	37	73			

Note: For instance, for 2005 the total number of rated countries was 130 (Fitch, 98; S&P, 110; Moody's, 98). Countries with 3 ratings: 78.

Appendix 3 – A logistic transformation

One alternative way to overcome the criticism of assuming that the distance between two notches is equal for every combination of sequential notches is to apply alternative transformations besides the usual linear one. For instance, one could use either a logistic or an exponential transformation.

The idea underlying the use of a logistic transformation is that at the middle of the scale, ratings can rise rather quickly, as the sovereigns deliver some improvements. Both at the bottom and top end of the rating scale, however, the increase of an additional notch is slower, since the requisites of sovereign debt quality are more demanding.

If one assumes that the functional form that describes the relationship between the creditworthiness rating, R_i, normalized to grade each of the countries on a scale of zero to one, with zero representing the least creditworthy countries and one representing the most creditworthy countries, and the set of explanatory variables, X, is the standard conventional logistic form

$$R = \frac{e^{\beta' X}}{1 + e^{\beta' X}}, \qquad \text{(A3.1)}$$

where the vector β includes the parameters of the exogenous variables. The logistic transformation then becomes

$$L_i = \ln[R_i / (1 - R_i)] = \beta' X, \qquad \text{(A3.2)}$$

where L_i is the logit of R_i.[8] This equation is not only linear in X, but also linear in the parameters and can be estimated using ordinary least squares.

Figure A3.1 compares the linear and the logistic transformation and in Table A3.1 we present the values that we used alternatively in the logistic transformation. Table A3.2 reports the estimation results for the three rating agencies using the respective full panel

[8] Where $R_i = (2i - 1)/(2 \times number\ of\ categories)$.

data sample for the random effects specification. As in the main text we present for each rating agency an unrestricted and a restricted model. The overall fit seems very good even though slightly lower than the one obtained with the linear transformation. Again broadly the same core variables are also picked up as relevant determinants of the rating levels: GDP per capita, GDP growth, government debt, government effectiveness indicators, external debt, external reserves, and default history.

Table A3.1 – Logistic transformation

Rating	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	<B-
Linear	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Logistic	3.5	2.34	1.76	1.35	1.02	0.74	0.48	0.24	0	-0.2	-0.5	-0.7	-1	-1.4	-1.8	-2.3	-3.5

Figure A3.1 – Linear and logistic transformations

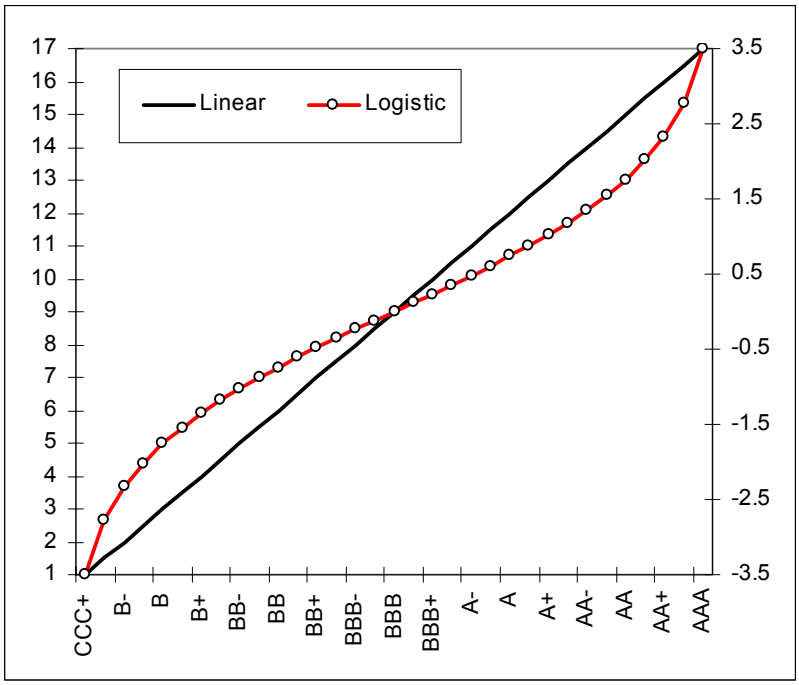


Table A3.2 – Random Effects results, using a logistic transformation

	Moody's		S&P		Fitch	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-1.267	-0.379**	-0.012	-2.157**	-1.050	0.027
	(-0.74)	*(-2.55)*	*(-0.01)*	*(-2.31)*	*(-0.46)*	*(0.11)*
GDP per capita	0.764***	0.788***	0.585***	0.683***	0.654***	0.665***
	(6.39)	*(8.11)*	*(5.60)*	*(10.31)*	*(7.52)*	*(7.92)*
GDP per capita Avg.	0.172		0.183	0.246**	0.100	
	(0.84)		*(0.94)*	*(2.06)*	*(0.38)*	
GDP growth	0.593		0.147		-0.781	
	(0.41)		*(0.13)*		*(-0.65)*	
GDP growth Avg.	-1.388		-5.525		-1.368	
	(-0.25)		(-1.33)		(-0.18)	
Unemployment	-0.028**	-0.024**	0.007		-0.013	
	(-2.11)	*(-1.99)*	*(0.67)*		*(-1.08)*	
Unemployment Avg.	-0.015		-0.004		0.019	
	(-0.84)		*(-0.24)*		*(0.80)*	
Inflation	-0.089***	-0.072*	-0.089***	-0.098***	-0.044	
	(-3.33)	*(-1.88)*	*(-4.35)*	*(-4.54)*	*(-1.21)*	
Inflation Avg.	-0.118		-0.113	-0.102***	-0.016	
	(-1.30)		*(-1.48)*	*(-3.47)*	*(-0.15)*	
Gov Debt	-0.008***	-0.006**	-0.020***	-0.018***	-0.013***	-0.014***
	(-2.94)	*(-2.33)*	*(-8.99)*	*(-11.29)*	*(-4.81)*	*(-6.35)*
Gov Debt Avg.	-0.007***	-0.005*	-0.007**	-0.006***	-0.009**	-0.007**
	(-2.81)	*(-1.92)*	*(-2.24)*	*(-2.93)*	*(-2.10)*	*(-2.18)*
Gov Balance	3.380***	3.070***	1.989**	1.576*	1.910	1.901*
	(2.60)	*(3.11)*	*(2.00)*	*(1.76)*	*(1.63)*	*(1.66)*
Gov Balance Avg.	1.866		-1.946		-1.152	
	(0.57)		*(-0.47)*		*(-0.32)*	
Gov Effectiveness	0.107	0.163*	0.105	0.182***	0.262***	0.229***
	(0.92)	*(1.70)*	*(1.32)*	*(2.62)*	*(2.92)*	*(2.67)*
Gov Effectiveness Avg.	0.714***	1.030***	1.001***	0.910***	0.832***	0.841***
	(3.32)	*(8.42)*	*(4.20)*	*(5.16)*	*(2.93)*	*(4.75)*
External Debt	0.000		-0.001		-0.002**	-0.001*
	(-0.28)		*(-1.08)*		*(-2.12)*	*(-1.66)*
External Debt Avg.	0.000		-0.002		-0.003	-0.003
	(0.12)		*(-1.07)*		*(-1.44)*	*(-1.58)*
Current Account	-2.331**	-1.791**	0.195		0.054	
	(-2.49)	*(-2.47)*	*(0.30)*		*(0.05)*	
Current Account Avg.	1.943	3.980**	3.785**	4.778***	4.955**	5.275**
	(1.09)	*(2.03)*	*(2.09)*	*(3.26)*	*(2.26)*	*(2.44)*
Reserves	0.798***		-0.048		-0.120	
	(3.60)		*(-0.29)*		*(-0.66)*	
Reserves Avg.	0.070	0.597***	0.183		0.753	
	(0.16)	*(3.10)*	*(0.35)*		*(1.51)*	
Def 1	-1.044***	-1.096***	-0.561***	-0.465***	-0.510***	-0.566***
	(-7.24)	*(-8.18)*	*(-3.53)*	*(-4.13)*	*(-2.85)*	*(-3.38)*
Def 2	0.051***	0.047***	0.021		0.072**	0.062***
	(2.12)	*(2.27)*	*(0.70)*		*(2.15)*	*(1.99)*
EU	0.325***	0.234***	0.060		0.109	0.103
	(3.23)	*(2.92)*	*(0.88)*		*(1.30)*	*(1.41)*
IND	1.323***	1.371***	1.255***	0.940***	1.177***	1.277***
	(4.42)	*(6.19)*	*(3.54)*	*(4.76)*	*(2.73)*	*(4.07)*
LAC	-0.304*		-0.003	-0.332**	-0.318	
	(-1.72)		*(-0.01)*	*(-2.16)*	*(-1.28)*	
R^2	0.921	0.910	0.914	0.905	0.902	0.902
Countries	66	73	65	74	58	58
Observations	551	655	564	657	480	481
Hausman Test[$]	15.43 (0.281)	4.33 (0.959)	15.24 (0.293)	11.86 (0.065)	15.24 (0.292)	9.01 (0.342)

Notes: White diagonal standard errors & covariance (d.f. corrected). The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 per cent. [$] The null is that RE estimation is consistent and therefore preferable to fixed effects. The test statistic is to be compared to a Qui-Square with 13, 11, 13, 6, 13, 8 degrees of freedom. The p-value is in brackets

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