An Analysis of the Degree, Changes and Source of Moody's Judgement

This paper analyses Moody's sovereign credit ratings and finds that the rating agency applies judgement to varying degrees across regions, income, rating levels and other factors.

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This paper studies the sovereign ratings of 74 countries from 2003 to 2016, disentangling rating drivers into a 'fundamental' and 'judgement' component based on Moody's methodology. We show that the agency applies judgement inconsistently across regions, income, rating levels and factors, time and the direction of rating changes. While downgrades are significantly linked to contemporaneous negative fundamental developments, such as weakening public finances, for upgrades we find evidence of a lagged or 'catching-up' effect. Out of the 29 tested explanatory variables, judgement applied by the rating committee is best explained through government bond yields, real GDP growth, the debt trend and interest payments relative to revenues.

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Disclaimer

Sovereign Ratings:

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Abstract

This paper studies the sovereign ratings of 74 countries from 2003 to 2016, disentangling rating drivers into a 'fundamental' and 'judgement' component based on Moody's methodology. We show that the agency applies judgement inconsistently across regions, income, rating levels and factors, time and the direction of rating changes. While downgrades are significantly linked to contemporaneous negative fundamental developments, such as weakening public finances, for upgrades we find evidence of a lagged or 'catching-up' effect. Out of the 29 tested explanatory variables, judgement applied by the rating committee is best explained through government bond yields, real GDP growth, the debt trend and interest payments relative to revenues.

JEL-codes: F34, G15, G24, H63

Keywords: Credit rating agencies, sovereign risk, sovereign rating

1 **Introduction**

Sovereign ratings are the credit rating agencies' assessments of a central government's ability and willingness to service non-official debt in full and on time. Market participants, regulators, legislators and supervisory policies rely on this assessment of about USD 60 trillion in outstanding sovereign debt (Sy 2009; Financial Stability Board 2010; European Commission 2010). Sovereign ratings usually also serve as a benchmark for local securities or entities (local governments, financial institutions, corporates and structured finance products), amplifying the relevance for capital markets (ESRB 2015).

The drivers and impact of sovereign ratings interest policymakers, market participants and researchers. The literature has mostly focused on explaining sovereign ratings through macro-economic and institutional variables, including per capita income, GDP growth, inflation, real exchange rate changes, external debt, external reserves, economic development, default history, government effectiveness indicators, and corruption (Cantor and Packer (1996), Afonso (2003), Mellios and Paget (2006), Afonso et. al (2007), Afonso et. al (2010)). However, we focus on studies which explain sovereign ratings through both macroeconomic and public finance fundamentals as well as agencies' judgement. This conceptual split is justified by the agencies' methodologies, which have become more transparent since the great financial crisis. For example, Moody's (2016) states that '*rating analyses incorporate forward-looking expectations*', which are inherently subjective, and that '*the four rating factors in the scorecard may not in all cases constitute an exhaustive treatment of the considerations that are important for a particular sovereign rating, and the rating may differ from the one implied by the scorecard range.*'

Literature on how judgement drives sovereign ratings has mostly focused on two crises: the East Asian crisis in the late 1990s and the euro area crisis. In response to the East Asian crisis, Ferri, Liu and Stiglitz (1999) use an econometric model to compare the model-generated ratings for 17 countries from 1989 to 1998 with the actual ratings assigned by the rating agencies. In a critique of the agencies, they conclude that before the East Asian financial crisis, the actual ratings assigned to the four high-growth dynamic East Asian economies were consistently higher than economic fundamentals would warrant and after the crisis actual ratings dropped more sharply than model-predicted ratings, implying that rating downgrades were larger than the economic fundamentals would suggest. Investigating these views, Mora (2006) confirms that predicted ratings were indeed lower than assigned ratings before the crisis, but not higher during the crisis.

Looking at the euro area crisis, Gärtner et. al (2011) divide actual ratings into a predicted part attributed to economic and structural variables and an unexplained remainder for 26 OECD countries for the period 1999-2010. They find Portugal, Ireland, Greece and Spain were rated worse during the crisis compared to all other countries in their sample and that the rating markdown due to the unexplained remainder led to higher interest rates on government bonds, thus aggravating the European debt crisis. Similarly, Vernazza and Nielsen (2015) divide the sovereign ratings of the 'Big Three' rating agencies into an 'objective' component which is the fitted value from an ordinary least squares (OLS) regression of ratings on 10 explanatory variables, and a 'subjective' component (i.e. the corresponding residuals) using data for advanced and emerging economies over the period 1996–2013. Their study shows that the euro area periphery was downgraded far too heavily during the 2009–2011 sovereign debt crisis as the rating committees repeatedly overruled signals coming from fundamentals. Similarly, D'Agostino and Lennkh (2016) show that for their sample of 19 euro area Member States from 2005 to 2015, judgement was applied inconsistently, both across countries and over time, and in particular, that the ratings of 'Crisis Countries' experienced more severe deviations from those suggested by their respective fundamentals, before, during and after the crisis. Finally, Bruha et. al (2017) find that

the downgrades of a number of euro area sovereigns since 2010 may, to a certain extent, be explained by the correction of excessive optimism in the pre-crisis period, when the default of a euro area country was treated as a very low probability event. According to the authors, the size of the downgrades of euro area sovereigns was in line with the worsening in these countries' economic fundamentals, and consequently, current ratings may thus better reflect the significant vulnerabilities and risks of several euro area countries.

Against this background, we build on the approach described in D'Agostino and Lennkh (2016), whereby we break down the drivers of sovereign ratings into a 'fundamental' and 'judgemental' component. We derive the 'fundamental' component exclusively from reverse-engineering Moody's methodology based on a real-time dataset of the quantitative credit metrics cited in the agency's methodology. We base our analysis on Moody's methodology as, compared to other agencies' methodologies, Moody's publication as early as September 2013 was transparent enough to allow for a relatively simple replication of its fundamental scorecard.

Overall, Moody's methodology is comprised of four rating factors: 'F1 Economic Strength', 'F2 Institutional Strength', 'F3 Fiscal Strength' and 'F4 Susceptibility to Event Risk'. We derive quantitatively scores for each rating factor, and, based on Moody's published mapping of the four factors into a rating-range, determine the final scorecard-implied rating. The difference between the actual and our derived fundamental rating, the residual, is what we call judgement. We do this for 74 countries over the 2003-16 time-period.

We also disentangle Moody's judgement into two broad categories, namely, adjustments in the scorecard and opinions at the rating committee level. To this end we compare our derived factor score assessments with the published factor scores of each sovereign for the 2012-16 time-period. This allows us to identify the extent to which judgement is applied at each of the four factors. Finally, using Moody's published factor scores, we are able to determine the agency's scorecard-implied rating. This rating thus already includes the agency's adjustments in the scorecard. The remaining residual between the actual sovereign rating and the rating derived using Moody's published factor scores is the component that we identify as the judgement at the rating committee level.

The main advantage of this methodology is that the 'fundamental' assessment, which is the most relevant component of the final rating, is built by tracking the approach established by Moody's. The main caveat of our analysis is that we derive the 'fundamental' rating based on Moody's 2013 methodology, due to limitations related to the agency's transparency prior to 2013[4]. This implies that we derive fundamental ratings for the 2003-13 time-period, based on thresholds published in September 2013. Our analysis implicitly back-tests the predictive power of the agency's methodology.

With this caveat in mind, our approach allows us to contribute to the existing literature by identifying 1) the degree of judgement applied across regions, income, rating levels as well as whether judgement is applied in Moody's scorecard or at the rating committee, 2) the extent to which changes in fundamentals or judgement determine changes in rating and factor score levels, and 3) the source of judgement, that is, the extent to which control-variables explain the agency's judgement, overall as well as across the four rating factors of its scorecard and at the rating committee level.

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[4] The first Moody's sovereign methodology was published in 2008; however, it was only since September 2013 that the agency has published weights and thresholds for the respective variables in their methodology. While the thresholds were updated in December 2016, the methodological approach has remained largely unchanged since 2008. In annex A12 we provide robustness checks applying the more recent methodology.

Overall, our main results show that the degree of judgement applied varied significantly across regions, time-periods, income and rating levels. Specifically, we find that, on average, European sovereign ratings deviated positively from the scorecard up until 2012, and slightly negatively thereafter. On the other hand, the ratings of Central and Eastern European sovereigns were on average lower than their scorecard-implied ratings, particularly since 2012. Most notably, sovereigns in Latin America and Africa were on average 2-3 notches below their respective scorecard-implied ratings throughout the 13-year period of observation. Conversely, ratings for Asian-Pacific countries were mostly in line with their fundamentals whereas those for Anglo-Saxon sovereigns exceeded their scorecard-implied ratings by 1-2 notches throughout the period. From an income perspective, we find that sovereigns with higher (lower) GDP per capita levels were rated higher (lower) than their scorecard-implied ratings – which already take the wealth level into account – would suggest. Similarly, from a rating level perspective, we observe that, on average, the actual ratings of higher (lower) rated sovereigns are higher (lower) than their respective scorecard-implied ratings would suggest.

We find a statistically significant relationship between negative fundamental developments and rating downgrades, whereas in the case of upgrades, it is not a contemporaneous change in fundamentals, but rather the level of judgement in the previous year that increases the likelihood of a positive rating action. Specifically, for our full sample and time-period, we observe that a 1-notch decrease in fundamentals increases the likelihood of a negative rating action by 10pp (significant at the 1% level). However, we do not observe a statistically significant relationship between contemporaneous changes in fundamentals and positive rating actions. A higher level of judgement in the previous year increases the likelihood of a rating action by 10pp for positive and by 4pp for negative rating actions (both significant at the 1% level). We interpret this finding as evidence for a 'catching-up effect' with fundamentals over a 1-year time horizon.

Looking at the source of overall judgement, we find that real GDP growth and the debt trend have significant explanatory power, even though these variables are already considered within the quantitative scorecard. In addition, based on our Arellano-Bond robustness check, we find that 'interest payments/ revenues' is statistically significant in explaining Moody's judgement. Finally, we find that on average a 1 percentage point increase in the government bond yield reduces the rating level by more than 1.5 notches for the euro area and a bit less than 1 notch for our full sample (significant at the 1% level).

More granularly, at the factor level, our main results show that the degree of judgement applied varied significantly across factors and regions. Specifically, we observe no significant homogenous adjustment across our country groups for 'F1 Economic Strength' and 'F2 Institutional Strength'. We find that most of the adjustments in the scorecard take place in 'F3 Fiscal Strength' where negative adjustments of about 3 notches were made for Latin American, African, and Central and Eastern European sovereigns. For 'F4 Susceptibility to Event Risk', we observe that for Anglo-Saxon sovereigns, Moody's assessment was, on average, 2-3 notches more benign than our derived F4 score. With regard to opinions expressed at the rating committee level, we find that compared to the rating implied by Moody's published factor scores, Anglo-Saxon sovereigns benefited, on average, 1.5 notches.

Looking at the extent to which either fundamentals or judgement explain changes at the factor level, we find that weakening public finances as measured via Moody's quantitative 'F3 Fiscal Strength' metrics, are, to a certain extent, immediately reflected in Moody's F3 assessment. However, fundamental changes in Factors 1, 2 and 4, are only reflected at least 1 year after the incident. For improving fundamentals, there is no apparent immediate link to better factor scores.

Finally, changes in opinion expressed at the rating committee are equally likely to affect rating levels either upwards or downwards.

Looking at the variables explaining the source of judgement at the factor level, we find that, overall, the variables used in Moody's scorecard do not explain the adjustments we observe at the factor level which means that, in line with Moody's methodology, other variables are used to adjust the scorecard. However, for our full sample and time-period, looking at the opinions expressed at the rating committee level, we note that real GDP growth and 'interest payments/ revenues' are statistically significant at the 5% level in explaining judgement. This finding is also robust for collinearity. Finally, of the external variables, we find that a 1 percentage point increase in the government bond yield reduces the judgement applied at the rating committee level by almost 1 full rating notch (1% significance level).

The rest of the paper is organised as follows: Section 2 explains our approach of disentangling the drivers of sovereign ratings into a 'fundamental' and 'judgement' component based on Moody's methodology and our choice for assessing this data. Section 3 shows our results for the degree, changes and source of Moody's judgement, first at the overall rating and then at the factor level. Section 4 concludes.

2 **Methodology**

2.1 **Definition of Judgement**

Moody's relies on quantitative metrics and judgement to assess the creditworthiness of a sovereign to assign a final sovereign credit rating. The methodology, first published in 2008, and subsequently refined in September 2013, December 2015 and December 2016, describes how the agency derives a three-notch scorecard-implied rating range, aggregating 23 (25 since 2016) quantitative indicators and numerous qualitative concepts. For the quantitative indicators Moody's is specific about the standardization process, providing thresholds to transform continuous indicators such as Gross Domestic Product per capita to a discrete scale of 15 categories ranging from 'Very Low (-)' to 'Very High (+)'. The additional qualitative concepts are described, but not reproducible. The standardized indicators are aggregated to the four 'factors':

> F1. Economic Strength
>
> F2. Institutional Strength
>
> F3. Fiscal Strength
>
> F4. Susceptibility to Event Risk

Factors one to three are a linear combination of the standardized scores of associated indicators, with the weights explicitly provided by Moody's. Factor-four indicators are aggregated following a maximum function whereby as soon as one of the four areas of risk within the factor warrants an assessment of elevated risk, the country's overall F4 factor is scored at that specific, elevated risk. It serves as a constraint, which can only lower the indicative rating with increasing severity as the F4 risk assessment rises.

To derive the overall scorecard-implied rating, Moody's aggregates the four factors, applying a non-linear function that overly penalizes weak performances in individual factors as compared to a simple linear average. A stylised depiction of Moody's scorecard can be seen in annex A1. Additionally to the judgement already applied to each factor in the scorecard through the qualitative concepts, the overall scorecard-rating is discussed and potentially altered[5] in the rating committee to ultimately derive the publicly announced sovereign credit rating.

For this paper we calculate the 'fundamental' rating, assessing the explicit quantitative aspects of Moody's scorecard-implied rating, and consequentially define overall judgement as the residual to the actual credit rating. More granularly, in our analysis, judgement is comprised of 1) the qualitative adjustments at the factor level in the scorecard, which we derive as the residual to the published factor scores, and 2) the opinions at the rating committee level, which we derive as the residual between the actual credit rating and the scorecard-implied rating using Moody's published factor scores.

According to Moody's (2016): *'The scorecard is a summary, and as such, does not include every rating consideration. The weights shown for each factor and sub-factor in the scorecard represent an approximation of their importance for rating decisions, but actual importance may vary significantly. In addition, the illustrative quantification of various factor and sub-factor variables is generally derived from historical data, while our rating analyses also consider forward-looking expectations. As a result, the scorecard-indicated rating ranges may not include the actual rating of*

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[5] The rating committee is encouraged to apply judgement by the fact that the scorecard proposes a three-notch rating range.

each entity.' Our analysis allows us to assess the extent to which methodological differences are applied across countries, income and rating levels, time-periods and rating factors.

2.2 Data

To obtain a 'fundamental' rating, free of adjustments and opinion, we reverse-engineer Moody's scorecard-implied ratings with data sourced mainly from the IMF's semi-annual World Economic Outlook (WEO) publications. Additionally for certain indicators we refer to IMF Article IV reports, IMF BOP and IFS databases, the World Bank, the European Central Bank, and the World Economic Forum. Using WEO data allows us to calibrate the relevant credit rating metrics for each WEO publication. We thus obtain two scorecard-implied ratings per year per country (one in April, the other one in September/ October depending on the date of the WEO publication) based on the data available at that time (i.e. real-time dataset without the benefit of data revisions).

In the earliest WEO vintages a few indicators were not covered. These missing data points are complemented with data from the first subsequent vintage for which they became available. The sample is semi-annual and covers the period October 2003 – April 2016. The starting date is selected for data availability reasons; in particular, the IMF's World Economic Outlook database. Importantly, for the World Economic Forum's Competitiveness Index which cannot be reconstructed prior to 2005[6], we assume a constant value for the years 2003-2005.

The variables in Moody's methodology refer to annual data only. Importantly, we also use real-time data for the two forward-looking variables, namely real GDP growth and the inflation rate. Since the IMF's WEO publication only started forecasting for a 5-year period as of its April 2008 publication, for the years 2003-07, we use the IMF WEO's 2-year forecasts and then calculate a forecast using the moving average based on five years of historical data and forecasts available at that time. With regard to the World Bank Governance Indicators, we are mindful of the two-year publication lag.

While factors one to three are rather straightforward to compute, several assumptions needed to be made for 'F4 Susceptibility to Event Risk'[7]. It is defined as the value of the sub-factor indicating the most elevated of the below four risks:

(i)   'Political Risk', we assess in line with the thresholds provided by Moody's 2016 methodology for the World Bank Voice and Accountability Index and the GDP per capita percentile[8];

(ii)   'Government Liquidity Risk', we assess by combining the scores obtained for the variables 'Gross Borrowing Requirements/ GDP' (based on real-time as per the IMF's Article IV and mission reports) and the 'Non-Resident Share of General Government Debt' (using BIS data lagged by two quarters to account for publication lag). We do not use Moody's Market Implied Ratings as provided by the agency's website to assess 'Market Funding Stress' given that i) we want to explain the ratings with publicly available data only and ii) it is unclear how market indicators like the yield or spread actually translate into Moody's Implied Ratings[9].

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[6] The Global Competitiveness Report 2003/2004 shows the ranking but not the associated scores which are needed to assess the sovereigns' competitiveness according to Moody's methodology.

[7] In annex A4 we show country-specific charts, comparing actual rating, fundamental rating and fundamental rating assuming the actual 'F4' factor score.

[8] The 2013 methodology, which serves as our base dataset, did not provide these thresholds.

[9] Based on the information published by Moody's Analytics (2011) it is not possible to replicate market implied ratings with publicly available data on yields or spreads.

(iii) 'Banking Sector Risk', we do not estimate. Importantly, while we are able to estimate 'Total Domestic Bank Assets/ GDP' (with IFS data) we cannot use it to construct its impact on the F4 score given that Moody's aggregates th*e 'combined score of the Strength of the Banking System (measured by the average Bank Baseline Credit Assessment) and the Size of the Banking System in a way that reflects that a simultaneously weak and large banking system represents a significant banking sector risk.'* As we are unable to replicate Moody's assessment of banking sector strength, the size of the banking sector on its own cannot be used to assess 'Banking Sector Risk', according to Moody's methodology. Given the importance of this indicator for this sub-factor, we choose to exclude 'Banking Sector Risk' from our derivation of the 'fundamental' rating. Consequently, our 'fundamental' rating will be too high for those countries and time-periods where the F4 scores were actually driven by 'Banking Sector Risk'.

(iv) 'External Vulnerability Risk', we approximate by using the highest assessed risk of two variables: (1) (Current Account Balance + FDI Inflows)/ GDP, using IMF figures lagged by one year. (2) 'Net International Investment Position/ GDP', based on IMF figures lagged by two quarters (if available on a quarterly basis) otherwise lagged by one year. Importantly, for sovereigns not classified as Advanced Economies by *Moody's Statistical Handbook*, the agency also calculates the sovereign's 'External Vulnerability Indicator (EVI)'. This is defined as the stock of official foreign reserves in the previous year as the denominator, and the residual maturity short-term debt, including original maturity short-term debt and principal payments on long-term debt, as well as deposits in domestic banks by non-residents with a maturity greater than one year, in the numerator. When calculating this figure and comparing our values with those published in *Moody's Statistical Handbook*, significant differences emerged. This encouraged us to drop this value from our analysis given that our derived indicator exhibits hardly any time variance. As a robustness check we selectively control for Moody's published EVI scores in the context of our "Source of Judgement" analysis.

We rescale the above described real-time data applying the thresholds provided in Moody's September 2013 methodology. We caution that our results are likely to be influenced by the fact that we are using thresholds published in 2013 to a panel starting in 2003. While Moody's may have used different thresholds in the past, these were never publicly disclosed. In annex A4 and A12 we provide comparative analysis referring to Moody's December 2016 methodology.

As a final step, we use our derived factor assessments and the rating-range grids provided in Moody's methodology to determine the adjustment-free scorecard-implied rating. Thus, contrary to the fundamental benchmarks derived in the literature to date, our derived 'fundamental' rating component is free of an estimation error, subject to the abovementioned data-related limitations. A complete description of our data and variables can be found in annex A2.

With regard to the actual rating, we use the rating as observed on the last day of the month during which the IMF WEO database was published, either the 30th of April or 31st of October, which implies that the rating at that point in time will have reflected the updated macro-economic and public finance figures. Finally, for further granularity, we use Moody's factor score assessments which are publicly available since 2008 on an annual basis.

For the section estimating the source of judgement, we also use external variables including the VIX (Chicago Board Options Exchange Volatility Index), the nominal and real effective exchange rate as well as the government bond yield (Bloomberg).

In our sample we identify six default cases – Uruguay 2003, Nicaragua 2003 and 2008, Ecuador 2009, Greece 2012 and 2013, Cyprus 2013 and Argentina 2014 – according to Moody's sovereign default study (2015). We remove two observations prior to and after the identified default periods (total of 2.5 years) from our data to minimize outlier effects. Finally, in annex A5 we explicitly analyse these cases. It is clear that the scorecard in itself would have falsely signalled a much higher creditworthiness than warranted by the severe distress and the actual defaults.

2.3 Assessment criteria

We assess our data from three angles. We analyse:

1) the overall degree of judgement applied (descriptive statistics),
2) the extent to which changes in our fundamental assessment explain changes in rating actions and
3) the source of judgement, that is, the extent to which certain variables can explain the agency's judgement.

For more granularity we slice the data by:

1) Type of rating: overall credit rating, outlook changes, factor scores
2) Region: euro area, CEE, Latin America, Africa, Asia-Pacific, Anglo Saxon[10]
3) Time: from October 2003 to April 2008 (before Lehman), from October 2008 to April 2012 (before the ECB clarified its position through its president's 'whatever it takes' statement), and from October 2012 until April 2016. For our analysis at the factor level, we consider only the last time-period, due to data availability and quality issues[11].

2.3.1 Degree of Judgement

To assess the degree of judgement, we compare the average and standard deviation of the difference between Moody's actual ratings and published factor scores vis-a-vis our fundamental assessments. For the degree of judgement at the rating committee level, we assess the difference between actual ratings and Moody's published factor score implied ratings.

2.3.2 Changes in Judgement

To assess changes in judgement we use a probit model. We estimate the probability of observing a change in rating assessment, resulting from a change in our fundamental assessment. We conduct the exercise repeatedly for different rating types (i.e. change in outlook, rating level or factor score) and symmetrically, once for positive and once for negative rating changes. We use the following regression:

Eq1

$$P(\Delta y_{it} = 1 | x_{it}) = \Phi(\beta_1 \Delta x_{it} + \beta_2 J_{it-1} + u_{it}) \qquad i = 1, \dots, N \ and \ t = 1, \dots T$$

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[10] EA (EA 19), CEE (EE, LV, LT, SK, SI, BG, HR, CZ, HU, PL, RO, RU), LatAm (AR, BO, BR, CL, CO, CR, EC, MX, PE, UY, VE, HN, NI), Africa (ZA, CI, ET, GH, MZ, SN, UG, ZM, KE, NG), Asia-Pacific (AU, NZ, CN, IN, ID, JP, KR, MY, PH, SG, TH, VN), Anglo-Saxon (AU, NZ, GB, CA, US). See annex A3 for a more detailed overview of covered countries.

[11] Moody's started publishing factor scores as of 2008. However, we only report results for the 2012-2016 time-period which are methodologically the most accurate. When analysing the results for the 2008-2012 time-period we noted that some of these were affected by the application of a broader scale of ranking categories before 2013. For instance, Sweden's 'F2 Institutional Strength' assessment was 'VH' until 2012 and has been 'VH+' thereafter. Both assessments corresponded to the highest possible ranking. Given our constant derived fundamental assessment of 'VH+' for the whole time-period, Sweden would have been attributed a negative judgement of 1 notch until 2013 for 'F2 Institutional Strength'.

Where depending on the specification, Δy_{it} refers to having observed either an outlook change, a rating action or a change of Moody's published factor score over a one-year period. Δx_{it} equals one if the respective fundamental score changed in the same direction contemporaneously. The lagged judgement term J_{it-1} equals one if fundamental and actual rating were unequal one year before and the assessed actual rating change would be closing that gap. Φ refers to the cumulative distribution function of the standard normal distribution[12]. For ease of interpretation in the output tables we are reporting marginal effects of binary changes of our explanatory variables at their mean on the dependent variable.

2.3.3 Source of Judgement

To identify the source of judgement, for a large set of variables x_{it} we run dynamic panel regressions to test if, controlling for the derived fundamental rating f_{it}, this variable x_{it} exhibits additional explanatory power for Moody's actual rating y_{it}. We consider all variables mentioned in Moody's methodology to assess if any of them is implicitly over- or underweighted in the scorecard, and additionally a set of external control variables which are not considered in Moody's quantitative assessment.

In our baseline specification Eq2 we perform a country and time-fixed effects regression with robust standard errors. We include the lag of the actual rating as an explanatory variable to capture 'hysteresis' effects: Rating agencies are reluctant to change their assessment frequently and rather aim for a stable rating pattern.

We include the quantitative scorecard indicators in their standardized form to guarantee the same linear scale between dependent and independent variables as well as to ensure a homogeneous interpretation of signs. A higher coefficient β_3 consistently corresponds to a higher rating. This could be the result of Moody's either applying different thresholds to or weights on the selected variables compared to the published ones. The coefficients of the set of external control variables follow their individual scales.

Eq2

$$y_{it} = c_i + t_t + \beta_1 y_{it-1} + \beta_2 f_{it} + \beta_3 x_{it} + u_{it} \quad i = 1, \dots, N \text{ and } t = 1, \dots T$$

Robustness checks (Annex)

By controlling for the lagged dependent variable we are violating exogeneity, because the dependent variable is necessarily correlated with the idiosyncratic error term. As a robustness check in annex A10 we apply the 1-step Arellano Bond estimator with robust standard errors (Eq3). Country-specific effects are considered by taking the first difference of the estimation equation. The Arellano Bond estimator requires that the differenced lag term of the dependent variable Δy_{it-1} is instrumented by all available deeper lags of the dependent variable. Performing the Arellano-Bond test for zero autocorrelation, we can indeed reject the null hypothesis of no serial correlation in the first-differenced error at order zero, but not at higher orders, passing this test of model-misspecification. The results are very similar to those reported under the baseline.

Eq3

$$y_{it} = c_i + \beta_1 y_{it-1} + \beta_2 f_{it} + \beta_3 x_{it} + u_{it} \quad i = 1, \dots, N \text{ and } t = 1, \dots T$$
$$\Delta y_{it} = \beta_1 \Delta y_{it-1} + \beta_2 \Delta f_{it} + \beta_3 \Delta x_{it} + \Delta u_{it}$$

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[12] Estimating a Logit model yielded broadly the same results.

In annex A11 we present the results of a modification to the baseline, removing the time-fixed effects (Eq4).

Eq4

$$y_{it} = c_i + \beta_1 y_{it-1} + \beta_2 f_{it} + \beta_3 x_{it} + u_{it} \qquad i = 1, \dots, N \text{ and } t = 1, \dots T$$

3 Results

We have structured our results into two sub-sections reflecting the level of our analysis. At the rating level we compare our derived overall fundamental rating with Moody's actual rating. More granularly, at the factor level, we compare our derived factor scores with Moody's published factor scores. For both levels of analysis we aim to 1) show the overall degree of judgement applied (descriptive statistics), 2) identify the extent to which changes in our fundamental assessment explain changes in rating actions and 3) explain the source of judgement, that is, the extent to which certain variables can explain the agency's judgement.

3.1 Overall Rating Level

This analysis compares our overall 'fundamental' rating with Moody's actual sovereign ratings between 2003 and 2016.

3.1.1 Degree of Judgement

Figures 1 and 2 report the difference between Moody's actual and our derived 'fundamental' rating for several selected geographic regions, income and rating levels. Since the 'fundamental' scorecard-implied rating refers to the mid-point of a rating range, differences of one notch are meaningless.

Figure 1: Actual vs 'Fundamental' Rating – Geography
Average difference between the actual and 'fundamental' rating and standard deviation (in rating notches)
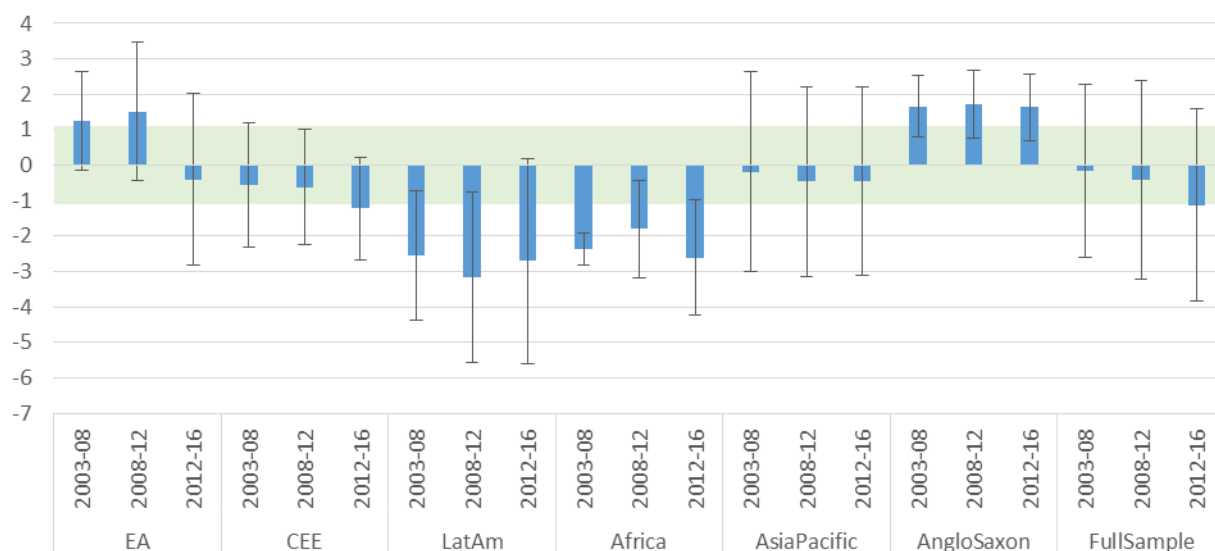
Notes: The green area refers to the +/- one-notch range of the 'fundamental' rating. For a detailed breakdown per country and indicator refer to annex A3.

Figure 1 shows that, on average, European sovereign ratings deviated positively from the scorecard up until 2012, and slightly negatively thereafter. On the other hand, the ratings of Central and Eastern European sovereigns were on average lower than their scorecard-implied ratings, particularly since 2012. Most notably, sovereigns in Latin America and Africa were on average 2-3 notches below their respective scorecard-implied ratings throughout the 13-year period of observation. Conversely, ratings for Asian-Pacific countries were mostly in line with their fundamentals whereas those for Anglo-Saxon sovereigns exceeded their scorecard-implied ratings by 1-2 notches throughout the period.

Figure 2: Actual vs 'Fundamental' Rating
Average difference between the actual and 'fundamental' rating and standard deviation (in rating notches)
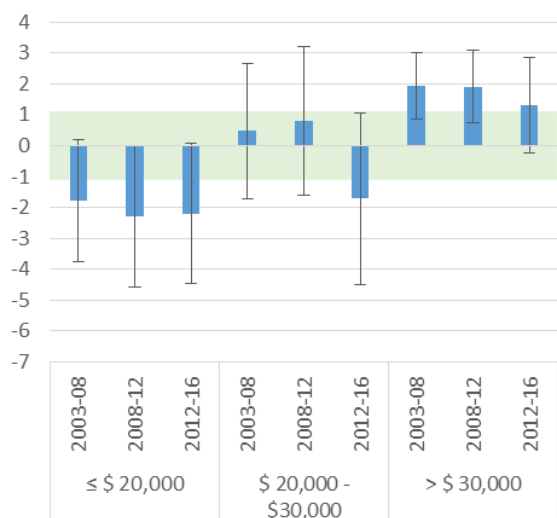
Income Level   **Rating Level**
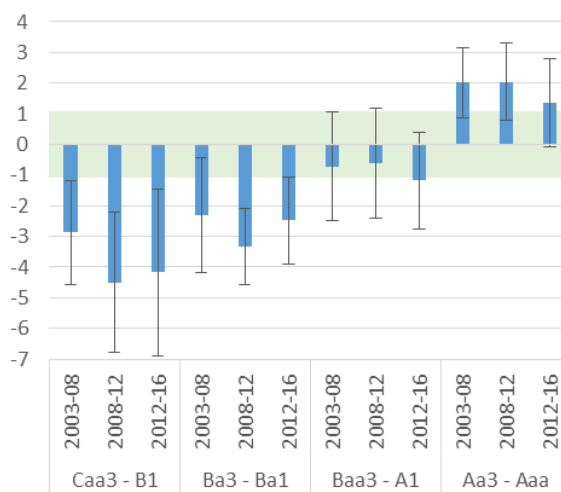
Notes: Classifications per GDP per capita (Purchasing power parity on USD). Sample defined by average GDP per capita over the 13-year period. The green area refers to the +/- one-notch range of the 'fundamental' rating.

Figure 2 shows that, on average, sovereigns with a GDP per capita level below $20,000 were rated 1-2 notches below their scorecard-implied ratings through the 13-year period of observation. There was a marked change in judgement for sovereigns with a GDP per capita income level between $20,000 and $30,000 as the previous positive deviation from fundamentals in the period up to 2008, reversed to negative since 2012. Conversely, sovereigns with a GDP per capita level above $30,000 have, on average, a positive deviation between their actual and scorecard-implied ratings, albeit this deviation has been falling over time.

From a rating level perspective, we observe that, on average, the actual ratings of lower-rated sovereigns are lower than their respective scorecard-implied ratings would suggest. For 'Caa3-B1' rated sovereigns the difference is in the magnitude of 3-4 notches while for those rated 'Ba3-Ba1' it is somewhat lower at 2-3 notches. For investment-grade rated sovereigns in the 'Baa3-A1' rating range, the difference is approximately 1 notch. Conversely, sovereigns rated 'Aa3' or above are, on average, rated 1-2 notches above their scorecard-implied ratings.

We note the inherent relatedness between income and rating level. The two classifications are highly correlated and GDP per capita is also part of Moody's rating assessment. Country-specific charts, which include our robustness checks for our sample of 74 sovereigns can be found in annex A4.

3.1.2 Changes in Judgement

This section aims to assess the extent to which Moody's overall judgement can have an impact on rating changes. We show this in two steps: First, by means of analysing how often rating changes were accompanied by changes in our fundamental score over a one-year horizon. Second, using our probit model (Eq1), we estimate the probability of a one-notch change in our fundamental score impacting an actual rating change. For the purpose of this analysis, we distinguish between positive and negative rating changes as well as between rating actions and outlook changes.

For our full sample (details see table 1 in annex A6) of the 93 upgrades Moody's made between 2003 and 2016, 17 were accompanied by improvements in fundamentals (18%) whereas of the 73 downgrades, 22 were accompanied by a deterioration in fundamentals (30%). In the case of

the euro area, Moody's assigned 27 positive outlooks between 2003 and 2016, of which 6 were accompanied by a positive development in the fundamentals[13] over the previous 1-year horizon (22%). As regards upgrades, the figures are 20 and 7 respectively (35%) whereas of the 35 downgrades, 9 were accompanied by a deterioration of fundamentals (26%). Figure 3 shows the respective ratios for our regions over the 2003-2016 time-period.

Figure 3: Ratio of rating & outlook changes co-moving with fundamentals (%)
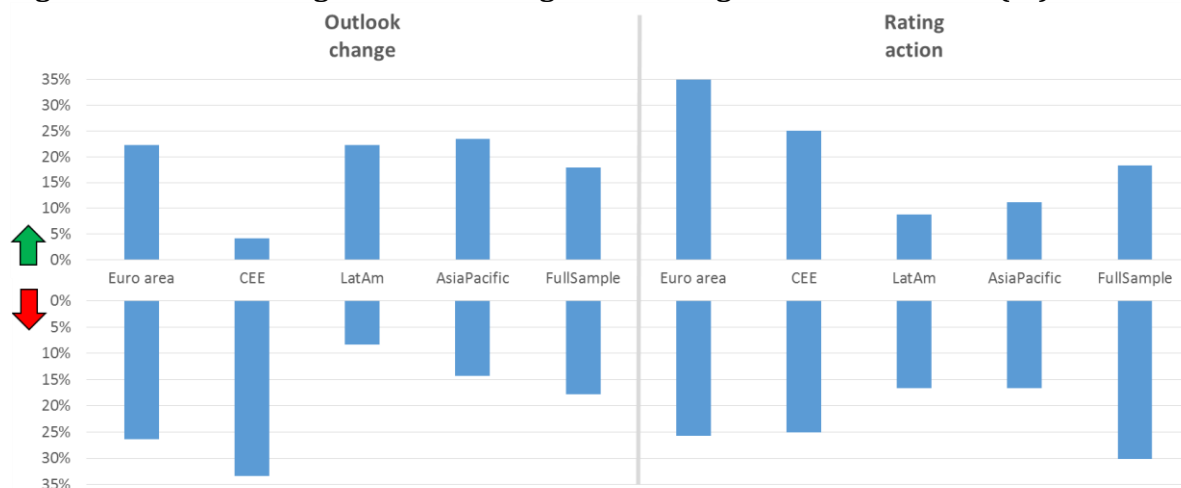
Notes: The upper (lower) half of the chart refers to positive (negative) rating changes. The left (right) half refers to outlook changes only (full rating actions). The sample period covers the full time horizon. Africa and Anglo-Saxon groups were dropped due to missing or low numbers of rating changes.

Overall figure 3 shows that for our full sample and time-period, downgrades were more often accompanied by worsening fundamentals than upgrades (with positive changes in fundamentals). For outlook changes overall the co-movement was more symmetric.

Slicing our dataset by time-period, we note that for the 2003 – 2008 period, rating actions were mostly positive. From 2008 – 2012, rating actions were mostly negative and indeed often accompanied by a worsening in fundamentals, especially in the euro area. Some of the positive rating actions in LatAm and Asia-Pacific were also accompanied with improvements in fundamentals. Finally, from 2012 – 2016, positive rating actions in Europe were sometimes accompanied by improvements in fundamentals whereas no fundamental improvement was observed in LatAm and Asia-Pacific despite 10 and 6 upgrades respectively. Conversely, we observe negative rating actions were sometimes accompanied by worsening fundamentals, especially in Africa but also in CEE. Details can be found in tables 2-4 in annex A6.

In order to assess whether changes in fundamentals or past judgement had a statistically significant impact on the probability of a rating action, we turn to our marginal effects estimators, columns 3 and 4 in our tables in annex A6.

Our fundamental marginal effects estimator (mfx fund) indicates the probability of a change in outlook or full rating action conditional on a change in our overall fundamental rating over a 1-year horizon. Similarly, our judgement marginal effects estimator (mfx judg) indicates the probability of a change in outlook or full rating action conditional on the agency's judgement (the difference between Moody's actual and our fundamental rating) one year ago. All dependent and

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[13] To avoid double-counting, we only count observations where there was a positive rating action over a 6-month horizon. A larger number of changes in fundamentals compared to changes in actual ratings is explained by an alternating development in the actual rating over two consecutive 6-month periods.

explanatory variables are in binary form and we present results separately for positive and negative rating changes. Consequently, the lagged judgement term equals one if the fundamental and actual rating were unequal one year before and the assessed actual rating change would be closing that gap[14].

On the whole, we identify a statistically significant relationship between contemporaneous changes in fundamentals as well as lagged judgement by one year with full rating actions rather than changes in outlooks. For our full sample and time-period, we observe that a 1-notch decrease in fundamentals increases the likelihood of a negative rating action by 10pp (significant at the 1% level). However, we do not observe a statistically significant relationship between contemporaneous changes in fundamentals and positive rating actions (table 1, annex A6).

Conversely, the negative and positive level of judgement in the previous year increases the likelihood of a rating action by 10pp for positive and by 4pp for negative rating actions (both significant at the 1% level) respectively. In the case of positive outlooks, the probability is 5pp. We interpret this finding as evidence for a 'catching-up effect' with fundamentals over a 1-year time horizon.

Looking at our three distinct time-periods, we observe that for 2003–2008 (table 2, annex A6), the level of judgement in the previous year increases the likelihood of a positive outlook and upgrade.

2008 – 2012 (table 3, annex A6) is a time-period with mostly negative rating actions. We observe that the level of judgement in the previous year increases the probability of a positive outlook by 7pp, an upgrade by 9pp and a downgrade by 12pp (all significant at the 1% level). Conversely, there is only a very weak statistically significant relationship between changes in fundamentals and the probability of a rating action. Specifically, a 1-notch decrease in fundamentals increases the probability of a downgrade by 8pp at the 10% level. For this time-period, the negative rating actions in the euro area and the positive rating actions in LatAm and Asia-Pacific cannot be explained by changes in fundamentals.

From 2012-2016 (table 4, annex A6) we find no significant relationship of either changes in fundamentals and the level of judgement in the previous year with changes in the rating outlook. However, for our full sample we observe that changes in fundamentals increase the probability of a negative rating action by 10pp (significant at the 5% level) whereas a negative level of judgement one year ago (catching-up effect) increases the probability of positive rating actions by 9pp (significant at the 1% level).

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[14] For instance, if in t_0, our fundamental rating is Baa1 and Moody's is Baa3-, our measure of judgement would be 2 notches. If subsequently in t_1, our fundamental rating remained stable at Baa1 but Moody's upgraded the sovereign to Baa2, our measure of judgement would be 1 notch. We refer to this scenario as catching-up with fundamentals.

Figure 4: Impact on the probability of a rating action or outlook change (2003 – 2016)
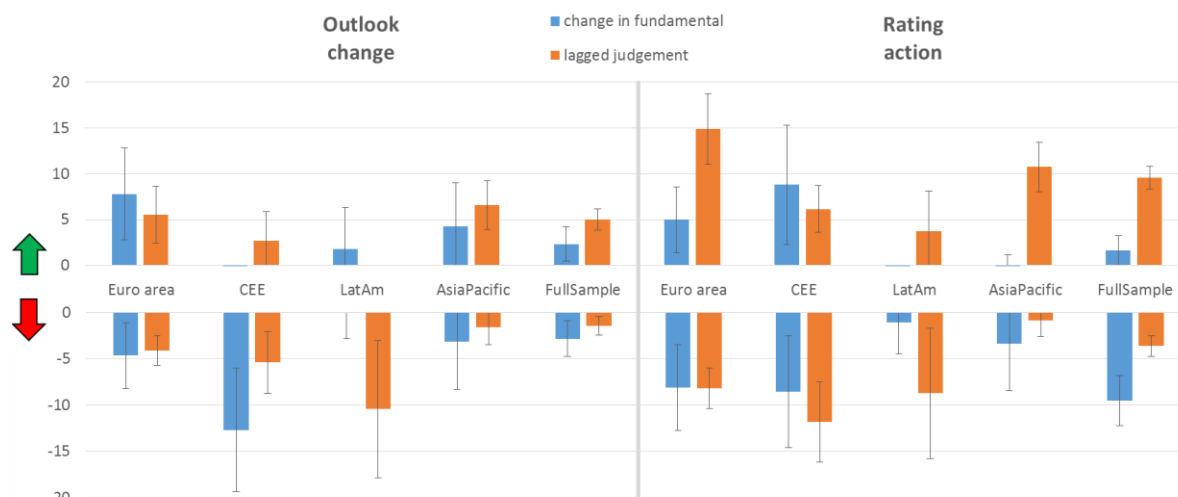
Notes: The values indicate the marginal effect at the mean a binary contemporaneous change in fundamental or judgement in the previous period has on the probability of a rating change. The upper (lower) half of the chart refers to drivers of positive (negative) rating changes. The left (right) half refers to outlook changes only (full rating actions). The estimation period covers the full time horizon. The error bar refers to the standard error of the marginal effect. Africa and Anglo-Saxon groups were dropped due to missing or low numbers of rating changes. No estimation result for LatAm positive outlook change judgement coefficient. Charts are truncated at 0.

Our analysis therefore supports the conclusion that, on the whole, there is a statistically significant relationship between negative fundamental developments and rating downgrades. Conversely, in the case of upgrades, it is not a contemporaneous change in fundamentals, but rather the negative judgement in the previous year that increases the likelihood of a rating action. We interpret this asymmetric result as a 'catching-up' effect with fundamentals in the case of positive rating actions.

3.1.3 Source of Judgement

We run the regression (Eq2, chapter 2.3.3) for 29 explanatory variables (23 indicators from the scorecard, 2 indicators that were added to the scorecard in the December 2016 revision and 4 external indicators), for our full sample, 6 identified geographic regions and three time-periods, for a total of 290 regressions.

Figure 5: Source of Judgement

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	<2008	<2012	>2012	FullSample
Economic	Average Real GDP Growth[t-4 to t+5]	0.02	0.05*	0.09**	0.06	0.03	0.02	0.04	0.04	0.06**	**0.05***
	Volatility in Real GDP Growth[t-9 to t]	0	0.02	0.02	0.07	0	0.03**	0	0.05	0.01	0.01
	WEF Global Competitiveness Index[t]	0.04	0.02	0.05*	0.15	0	...	-0.02	0.08	0.02	0.03
	Nominal GDP (US$)[t-1]	-0.11	0.01	0	0.14	0.01	0.02	-0.01	-0.01	0.05	-0.02
	GDP per capita (PPP, $US)[t-1]	-0.05	-0.04	-0.04	-0.01	0	0	0.02	-0.11	-0.03	-0.06**
Institutional	Worldwide Government Effectiveness Index	0.08	0.06	0.06*	0.08	-0.01	...	0	-0.05	-0.02	0.03
	Worldwide Rule of Law Index	0.08	0	-0.04	0.19	0	...	-0.02	0.08	0.05	0
	Worldwide Control of Corruption Index	0.11*	-0.02	0	0.08	-0.05	...	-0.04	-0.01	0.06	0.01
	Inflation Level[t-4 to t+5]	0.01	-0.02	0.02	-0.1	-0.01	0.05	0.03	0.04	0	-0.02
	Inflation Volatility[t-9 to t]	-0.01	-0.01	0	-0.03	0.01	0.01	0.01	-0.01	-0.04	-0.01
Fiscal	General Government Debt/GDP[t]	0.05	0.04	0.02	0.16	0.03	0.02*	0.08*	0.19**	-0.03	0.03*
	General Government Debt/Revenues[t]	0.11**	0.04	0.03	0.14	0.01	0.02	0.03	0.17*	0.03	0.04*
	General Government Interest Payments/Revenue[t]	0.05	-0.07	0	0.07	0.02	-0.01*	0.01	0.18*	0.06	0.03
	General Government Interest Payments/GDP[t]	0.04	0.01	-0.01	0.14	0.07	0	0.01	0.15	0.03	0.02
	°Debt Trend[t-4 to t+1]	0.17**	0.22	0	0.35	-0.05	0.01	0.08	0.25	0.03	**0.14***
	°Government Foreign Currency Debt/Total Debt (%)	**-0.33***	-0.03	-0.05	...	...	...	0	0.33	-0.18	-0.04
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	-0.06**	**-0.12***	...	0.03	...	-0.05	0.01	-0.15	**-0.07***
	GDP per capita (Percentile)	...	...	0	...	0	...	...	-0.03	0.04	0.02
	Gross Borrowing Requirements/GDP (%)	0.01	0.02	-0.01	0.12	-0.06	0	0	-0.01	-0.01	-0.02
	Non-Resident Share of General Government Debt (%)	0.08*	0.02	-0.06*	0.17**	0.02	0	-0.01	0.15*	0.16*	0.04
	Total Domestic Bank Assets/GDP (%)	0.12	-0.08	-0.21	...	0.06	0.02	0.01	-0.04	-0.19	-0.04
	Banking System Loan-to-Deposit Ratio (%)	-0.04	-0.1	-0.25	-0.21	-0.04	0.04	-0.15	-0.19*	-0.18**	-0.05
	(Current Account Balance + FDI Inflows)/GDP	-0.05	-0.05*	-0.03	**-0.12***	0.01	0	-0.02	-0.07	-0.06**	**-0.07***
	External Vulnerability Indicator (EVI) (source: Moodys)	...	0.02	0	-0.06	-0.02	...	0.02	0.02	-0.01	0
	Net International Investment Position/GDP (%)	-0.06	-0.02	0.06	-0.1	0.01	0.01	0.03	-0.06	0.02	-0.03
Other indicators	Government bond yield (log)	**-1.72***	-0.7**	-0.51**	-1.61	-0.31	0.26	0.11	**-2.18***	-0.64***	-0.66***
	Real effective exchange rate Growth (%)	-0.06**	0	-0.01	0.02	0	0	0.01	0	-0.01	0
	Nominal effective exchange rate Growth (%)	-0.04*	0.01	0	0.02	0	0	0.01	0	0	0.01
	CBOE Volatility Index (VIX)	-0.04	-0.13*	-0.22	-0.43*	-0.14	-0.01	0	0	0.1	-0.11**

*Notes: Values refer to coefficients of a set of indicators in a time and country-fixed effect panel regression, explaining the actual rating, controlling for the calculated fundamental rating and the lagged actual rating. *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively. The columns refer to slicing of the panel by countries, by time and the full sample. Scorecard indicators and actual rating have the same scale, i.e. a positive coefficient of 1 would imply that apart from the fundamental rating, an increase of this indicator by one notch would trigger a positive rating action of one notch. For other indicators this doesn't apply, e.g. a larger government bond yield would be expected to have a negative impact on the actual rating. Fiscal indicators marked with ° were only specified in the Moody's methodology December 2016 revision. EVI indicator refers to numbers as published by Moody's (not as derived according to the published Methodology), as our derived figures do not match the published ones and the coefficients of the derived indicator were not representative due to very low variance in its standardized form. Annex A9 reports the coefficients of the remaining covariates, annex A10 presents a robustness check using an Arellano Bond estimator, and annex A11 displays the result excluding time-fixed effects.*

The interpretation of Figure 5 is as follows:

Overall, for scorecard indicators a positive (negative) sign implicitly indicates that a specific variable is under-weighted (over-weighted) in Moody's scorecard for the identified region/ time. The purely quantitative signals from the scorecard were 'corrected' by adjustments of the agency.

Thus, for our full sample we conclude that real GDP growth and the debt trend[15] were attributed greater weight by Moody's compared to the weight assigned in the scorecard. Conversely, signals from the Voice and Accountability Index and the (Current account balance + FDI Inflows)/GDP variable were overruled by Moody's judgement, that is, they were attributed less weight compared to the weight assigned in the scorecard. This could also reflect the non-linear

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[15] Debt trend was only added in December 2016. A positive coefficient implies that this indicator was considered even though it was not yet part of the methodology.

aggregation scheme of Factor 4 (see chapter 2.2). These findings are robust at the 1% level. In addition, our Arellano-Bond robustness check (see annex A10) confirms that the identified variables stand out. However, arguably more plausible, with that specification, 'interest payments/ revenues' is statistically significant in explaining Moody's judgement, as opposed to the Voice & Accountability index. Real GDP growth and the debt trend are statistically significant as well.[16]

In addition, among the selected external variables, only the government bond yield is significant in explaining Moody's judgement. We note that on average a 1 percentage point increase in the government bond yield reduces the rating by more than 1.5 notches for the euro area and roughly a ⅔-notch for our full sample (significant at the 1% level).

3.2   Results at Factor Level

As stated in Moody's methodology, to determine the final rating, adjustments are applied to the scorecard, and in addition, further opinions are expressed in the rating committee. Analytically therefore, there are five areas where Moody's can apply judgement compared to our fundamental rating: Factors 1 to 4 and the rating committee. In order to identify where exactly Moody's applies its judgement, we compare our derived factor score assessments with the published factor scores of Moody's for the 2012-16 time-period.[17]

3.2.1   Degree of Judgement

In figure 6 we identify, across various geographies, to what extent judgement is applied within the scorecard and at the rating committee. Specifically, we show the extent of judgement i) in total, defined as the difference between Moody's actual and our fundamental rating, ii) across the four factors in the scorecard, defined as the difference between Moody's published and our derived factor score assessments, and iii) applied at the rating committee level, defined as the difference between Moody's actual rating and the rating derived from using Moody's published factor score assessments.

Figure 6: Origin of Judgement (2012-2016)

Average difference between the published and 'fundamental' (derived) score and standard deviation (in rating notches)

Region	Observations (total/factor)	Degree of Judgement (total)	Origin of Judgement				
			Scorecard				Rating Committee
			F1	F2	F3	F4	
EA	143 / 142	-0.4 ±2.4	0.2 ±1.5	-0.7 ±1.5	-1.3 ±2.0	0.4 ±2.2	0.4 ±1.2
CEE	96 / 96	-1.2 ±1.5	0.2 ±1.4	-0.5 ±1.5	**-2.9 ±1.8**	0.3 ±2.1	0.2 ±1.2
LatAm	98 / 99	-2.7 ±2.9	-1.0 ±1.5	-0.4 ±1.7	**-3.3 ±3.1**	-1.8 ±3.4	0.1 ±1.2
Africa	63 / 59	**-2.6 ±1.6**	-0.3 ±1.3	-0.6 ±1.1	**-3.0 ±2.3**	-1.2 ±2.2	-0.2 ±1.0
Asia Pacific	96 / 96	-0.5 ±2.7	-0.5 ±1.5	-0.4 ±1.3	-1.0 ±3.0	-0.2 ±3.3	0.7 ±1.2
Anglo-Saxon	40 / 40	**1.6 ±0.9**	0.6 ±0.7	-0.4 ±0.5	-0.4 ±2.0	**3.0 ±1.5**	**1.4 ±0.8**
Full Sample	554 / 551	-1.1 ±2.7	-0.2 ±1.5	-0.7 ±1.6	-2.0 ±2.7	-0.6 ±3.1	0.4 ±1.3

Notes: Values in bold highlight instances where the absolute average judgement is larger than its standard deviation. Number of observations for individual factors may be higher than for the total in cases of sufficient data for deriving individual factor scores but not for all four. The total observations may be larger in cases of limited availability of published actual factor scores. For a detailed breakdown per country and indicator refer to annex A3. F1 = Economic Strength, F2 = Institutional Strength, F3 = Fiscal Strength, F4 = Susceptibility to Event Risk

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[16] The statistically significant positive coefficient on foreign-currency debt for the EA suggests that, in the context of the monetary union, Moody's overruled signs from this indicator, possibly to account for the fact that most EA countries hedge their foreign-currency exposure back to euro.

[17] See Footnote 11.

The following observations are based on those cases where the standard deviation is smaller than the average difference between our and Moody's assessments, hinting that judgement may be applied homogeneously within this group. For completion, we note that due to the methodology's aggregation of the four rating factors, judgement applied at the rating committee level has an overall greater impact on the final rating compared to judgement applied at the factor level.

- For 'F1 Economic Strength', we observe no significant homogenous adjustment across our country groups.
- With regard to 'F2 Institutional Strength', we also do not observe significant homogenous adjustment across our country groups.
- Most of the adjustments in the scorecard take place in 'F3 Fiscal Strength'. We find that negative adjustments of about 3-notches were made for Latin American, African, and Central and Eastern European sovereigns.
- For 'F4 Susceptibility to Event Risk', we are mindful of the reversed scale in Moody's methodology (high score is credit negative), however we invert the signs for ease of interpretation. As our fundamental score excludes Banking Sector Risk, any exposure in this sub-factor is implicitly attributed to its factor level judgement. We observe that for Anglo-Saxon sovereigns, Moody's assessment was, on average, 3 notches more benign than our derived F4 score, even though our analysis excludes Banking Sector Risk, which, in case it were to drive our F4 score, would further amplify this difference.
- With regard to opinions expressed at the rating committee level, Anglo-Saxon sovereigns benefited, on average, 1.4 notches.

3.2.2 Changes in Judgement

Having identified the degree of judgement applied to Factors 1 to 4 and at the rating committee level, this section explores the extent to which changes in fundamental factor scores explain adjustments observed in the actual factor score as well as to what extent rating committee opinion changes trigger outlook changes and rating actions. See annex A7 for detailed tables.

For our 2012-2016 sample comprising all countries, of the 67 positive changes in Moody's F1 assessment over a 1-year horizon, 31 were accompanied by an improvement in our fundamental F1 score (ratio of 46%). At the other end of the spectrum, we note that of the 48 negative changes in Moody's F4 assessment, only two were accompanied by a deterioration in our fundamental F4 score (4%). Figure 7 shows the respective ratios for positive and negative changes in Moody's assessments of the four factors.

Figure 7: Ratio of factor score changes co-moving with fundamentals (2012-2016, %)

Notes: The upper (lower) half of the chart refers to positive (negative) factor score changes. The sample period covers the period since mid-2012. The bars for RC (rating committee) compare the aggregated factor scores (incl. judgement) as published by Moody's with actual rating actions and outlook changes.

Overall, we find some co-movement between fundamentals and the factor scores for F1 and F3, and to a lesser extent to F2. We find virtually no relationship between changes in Moody's F4 factor score assessment and fundamental developments of that factor, which may reflect a combination of either more judgement being applied to that factor or our limitations of measuring that factor. Looking at rating actions, we find that changes in Moody's published factor scores co-move more significantly with upgrades as opposed to downgrades. Again, these results are only for the 2012-2016 time-period.

In order to assess whether changes in fundamentals or the level of judgement in the previous year had a statistically significant impact on the probability of a change in Moody's assessment of each of the four rating factors, we turn to our marginal effects estimators, columns 3 and 4 in our tables in annex A7.

For factors 1, 2 and 3 we find that the level in judgement in the previous year has a statistically significant impact, at the 1% level, on the probability of either a positive or negative adjustment at the factor level. This means that at least one year after a certain development is observed quantitatively via changes in fundamentals, Moody's tends to adjust its factor score assessment.

For Factor 1, we note that in the case of euro area sovereigns, a negative level of judgement in the previous year increases the probability of a positive adjustment by 14pp (at 5% level significance). For Asia-Pacific sovereigns it is a contemporaneous change in fundamentals which increases the probability of a positive adjustment by 29pp (at 1% level significance).

The same pattern can be observed at Factor 2 for euro area and Asia-Pacific sovereigns. In the case of euro area sovereigns, the negative level of judgement in the previous year increases the probability of a positive adjustment by 15pp (at 10% level significance). Again, for Asia-Pacific it is a contemporaneous change in fundamentals which increases the probability of a positive adjustment by 29pp (at 1% level significance). For Factor 4 we observe that in the case of euro area sovereigns, the positive judgement in the previous year increases the probability of a 1-notch negative adjustment by 15pp (significant at the 5% level).

Conversely, for Factor 3 in the full sample, we observe that a contemporaneous 1-notch worsening in fundamentals increases the likelihood of a negative factor score adjustment by 8pp (significant at the 5% level) whereas, in the case of positive adjustments, it is not an improvement

in fundamentals but again rather the negative judgement in the previous year that increases the probability by 14pp (significant at the 1% level). These results are summarized in figure 8.

Figure 8: Impact on the probability of a factor adjustment (2012-2016)
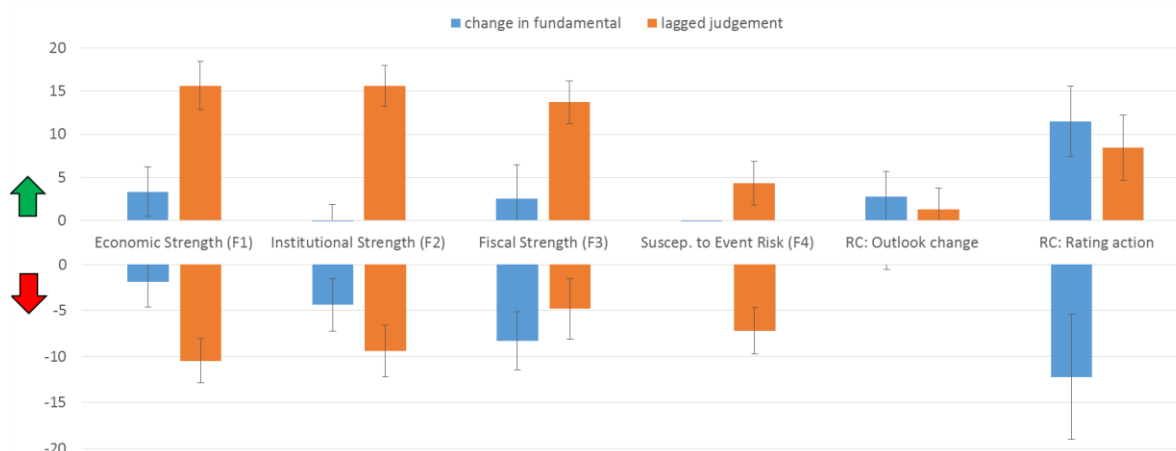
Notes: The values indicate the marginal effect at the mean, a contemporaneous change in fundamental or judgement in the previous period has on the probability of a factor score adjustment. The upper (lower) half of the chart refers to drivers of positive (negative) factor adjustments. The estimation period covers the period since mid-2012. The error bar refers to the standard error of the marginal effect. Charts are truncated at 0. The bars for RC (rating committee) compare the aggregated factor scores (incl. judgement) as published by Moody's with actual rating actions and outlook changes.

These findings therefore support the conclusion that weakening public finances as measured via Moody's quantitative factor 3 metrics, are to a certain extent immediately reflected in Moody's Factor 3 assessment. However, fundamental changes in factors 1 and 4, are only reflected at least one year after the incident. For improving fundamentals there is no apparent immediate link to better factor scores. Finally, changes in opinion expressed at the rating committee trigger in 12% of cases a change in the rating level, either upwards or downwards. We find no evidence that changes in opinion at the rating committee trigger a corresponding change in outlooks.

3.2.3 Source of Judgement

We run the regression (Eq2) for 29 explanatory variables (23 indicators from the scorecard, 2 indicators that were added to the scorecard in the December 2016 revision and 4 external indicators), for each of the five judgement components (Factors 1 through 4 as well as the judgement Moody's applied at the rating committee level) for our full sample and 6 regions, for a total of 1015 (29×5×7) regressions.

The interpretation of Figure 9 is as follows (see annex A8 for detailed tables):

Overall, for scorecard indicators a positive (negative) sign implicitly indicates that a specific variable is under-weighted (over-weighted) in Moody's scorecard for the identified region/ time. The purely quantitative signals from the scorecard were 'corrected' by adjustments of the agency.

In general, the variables used in Moody's scorecard do not explain the adjustments we observe at the factor level which means that, in line with its methodology, other variables are used to adjust the scorecard. However, looking at the opinions applied at the Rating Committee level, we note that real GDP growth and 'interest payments/ revenues' are statistically significant at the 5% level in explaining judgement for our full sample and time-period. This finding is also robust for collinearity, given that the coefficients for the lagged rating and the fundamental rating are hardly affected by the inclusion of this additional explanatory indicator (annex A8). On the contrary for the inclusion of the loan-to-deposit ratio as an explanatory variable, our robustness check table

signals a strong correlation with the past rating. Consequentially we do not attribute much attention to the statistically significant result as shown in figure 9 for this variable. Of the external variables, we find that a 1 percentage point increase in the government bond yield reduces the judgement applied at the rating committee level by almost one full rating notch (1% significance level).

For Factor 1, we find that the external competitiveness indicators (real and nominal effective exchange rate) have the right sign and are statistically significant in explaining applied adjustments, as does the Voice and Accountability index. None of the variables explains adjustments applied to factors 2 and 3. For Factor 4, we find that Voice & Accountability as well as the GDP per capita (indicators for measuring domestic political risk) explain adjustments applied to Factor 4. These results need to be interpreted with caution, not least given the fact that the thresholds for these two indicators were only added in 2016 to the methodology.

Finally, the fact that almost all other variables are not statistically significant suggests that Moody's looks at other variables to inform their factor level adjustments and rating committee discussion. In this sense, the output of the scorecard is broadly taken at face value for all sovereigns.

Figure 9: Drivers of Judgement for the Scorecard and Rating Committee

		F1	F2	F3	F4	RC
Economic	Average Real GDP Growth$_{t-4 \text{ to } t+5}$	-0.05	0.03	-0.03	-0.03	0.07**
	Volatility in Real GDP Growth$_{t-9 \text{ to } t}$	-0.05	0.01	0.11	-0.04	0.02
	WEF Global Competitiveness Index$_t$	0.06	-0.01	0.12*	0.1	0.04
	Nominal GDP (US$)$_{t-1}$	0.26*	-0.07	0.26	-0.12	0.08
	GDP per capita (PPP, $US)$_{t-1}$	0.04	0	0.18	0.11	-0.04
Institutional	Worldwide Government Effectiveness Index	-0.05	0.16	-0.02	0.02	0.01
	Worldwide Rule of Law Index	0.15	-0.07	-0.04	0.1	0.06
	Worldwide Control of Corruption Index	0.16	0.1	0.04	0.11	0.1
	Inflation Level$_{t-4 \text{ to } t+5}$	0.01	0	0.08*	-0.01	0
	Inflation Volatility$_{t-9 \text{ to } t}$	0	-0.07*	0.05	-0.02	-0.03
Fiscal	General Government Debt/GDP$_t$	0.05	0.03	0.08	0.03	0.02
	General Government Debt/Revenues$_t$	-0.02	0.05	0.22*	-0.04	0.07
	General Government Interest Payments/Revenue$_t$	0.01	0.01	-0.11	-0.02	0.08**
	General Government Interest Payments/GDP$_t$	0.02	-0.02	-0.1	0.02	0.06*
	°Debt Trend$_{t-4 \text{ to } t+1}$	-0.09	0.02	-0.16	-0.06	0.08
	°Government Foreign Currency Debt/Total Debt (%)	-0.13	0.15	0.03	0.27	-0.14
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	**0.11*****	-0.13**	0.14*	**0.48*****	-0.16
	GDP per capita (Percentile)	0.09	-0.07	0.03	**0.11*****	0.03
	Gross Borrowing Requirements/GDP (%)	-0.06	-0.06	-0.02	0.02	-0.03
	Non-Resident Share of General Government Debt (%)	0	0.02	-0.04	-0.12*	0.15*
	Total Domestic Bank Assets/GDP (%)	0.05	-0.27**	0.15	0.31	-0.23
	Banking System Loan-to-Deposit Ratio (%)	-0.03	-0.13	-0.11	-0.06	**-0.19*****
	(Current Account Balance + FDI Inflows)/GDP	-0.03	0.06	0.03	0	-0.07**
	External Vulnerability Indicator (EVI) (source: Moodys)	0.04	0.03	-0.01	0.02	0
	Net International Investment Position/GDP (%)	0.05	-0.07	-0.07	-0.22*	0.02
Other indicators	Government bond yield (log)	0.06	-0.18	0.2	0.57**	**-0.68*****
	Real effective exchange rate Growth (%)	**-0.01*****	0	-0.01*	0	-0.01
	Nominal effective exchange rate Growth (%)	**-0.02*****	0.01	-0.02	0	0
	CBOE Volatility Index (VIX)	0.16	0.56**	0.47*	0.01	0.04

*Notes: the sample includes all countries, but starting in the second half of 2012 only. *, ** and *** refer to the statistical significance at the 10, 5 and 1 % levels respectively. F1 = Economic Strength, F2 = Institutional Strength, F3 = Fiscal Strength, F4 = Susceptibility to Event Risk, RC = Rating Committee*

4   <u>Conclusion and Limitations</u>

As a contribution to research into drivers of sovereign ratings, we disentangle ratings into 'fundamentals' and 'judgement' for 74 countries over 13 years, deriving the 'fundamental' component by reverse-engineering Moody's 2013 methodology using public data sources. We then compare our derived factor score assessments with the agency's published factor scores for the 2012 to 2016 period to identify the rating factor judgements. A major advantage of this paper's approach is that the 'fundamental' assessment, which is the most relevant component of the final rating, is built by tracking the approach established by Moody's. However, due to the agency's lack of transparency before 2013 we cannot exclude having missed methodology revisions in the early years of our sample.

With this caveat in mind, our approach allows us to identify:

- The judgement applied across regions, income and ratings, and whether that judgement is applied in Moody's scorecard or at the rating committee.
- The extent to which changes in fundamentals or judgement determine changes in ratings and factor scores.
- The source of any judgement and the extent to which the control-variables explain the agency's judgement, overall as well as across the four scorecard rating factors and the rating committee.

We summarize our results first for the overall rating and then at a more granular factor level.

Examining the overall rating, our results on judgement show:

- Low income and lower-rated countries, mostly in Latin America and Africa, tend to be rated two or more notches below the level implied by their fundamental rating.
- Countries on the opposite end of the income and rating scale, mostly Anglo-Saxon, tend to receive an up to two notch uplift beyond their fundamentals.
- Other geographies such as the euro area, Central and Eastern Europe and Asia-Pacific, are generally balanced but with high dispersion.

These judgement patterns are broadly constant over time, but with a dip since 2012, particularly in middle-income countries and the euro area.

In the full sample, our probit model identified asymmetric drivers to rating changes. Worsening fundamentals significantly increase the likelihood of a contemporaneous downgrade by 10 percentage points. However, negative judgement in the previous year increases the likelihood of an upgrade by 10 percentage points – possibly as the actual rating would be 'catching-up' with fundamentals. A similar but smaller pattern emerges for drivers to outlook changes. This is mostly observed for the euro area and Central and Eastern Europe.

Using dynamic panel regressions to examine the source of judgement, we find with high significance that real GDP growth, 'interest payments/ revenues', and the debt trend were attributed greater weight by Moody's compared to the scorecard-assigned weighting. Conversely, Moody's judgement overruled signals from the '(Current account balance + FDI Inflows)/GDP' variable, which, however, could also reflect the non-linear aggregation scheme and our omission of Banking Sector Risk in Factor 4. Finally, we find that on average, a one percentage point increase in the government bond yield reduces the rating by more than 1.5 notches for the euro area and about ⅔-notch for the full sample. We did not find other external variables such as the real and nominal effective exchange rate and the VIX, to be significant to explain Moody's judgement.

When comparing our derived factor scores to Moody's for the 2012-2016 period we identified five areas where Moody's could apply judgement compared to our fundamental rating.

- Factor 1 Economic Strength
- Factor 2 Institutional Strength
- Factor 3 Fiscal Strength
- Factor 4 Susceptibility to Event Risk
- The Rating Committee

The degree of judgement applied varied significantly across factors and regions but our analysis found no obvious adjustment similarities across the country groups for either F1 Economic Strength or F2 Institutional Strength. Most scorecard adjustments took place in F3 Fiscal Strength, with 3-notch negative adjustments for Latin American, African, and Central and Eastern European sovereigns. When it came to the Factor 4 Susceptibility to Event Risk, Moody's assessment for Anglo-Saxon sovereigns was, on average, 2-3 notches more benign than our derived F4 score, even though our analysis excluded banking sector risk; if that was driving the F4 score it would tend to amplify the difference. We find that Anglo-Saxon sovereigns on average benefited by 1.4 notches from rating committee opinions.

Our analysis also tried to assess how fundamentals and past judgement might explain factor changes and we identify a link between fundamentals and changes in the factor scores for F1 and F3 - and, to a lesser extent, for F2. However, there was no relationship between changes in Moody's F4 assessment and that factor's fundamental developments; this may reflect a combination of either more judgement applied to that factor or our research limitations in measuring that factor. Looking at rating actions, Moody's published factor scores follow upgrades more closely than downgrades.

For F1 and F2 a negative judgement in the previous year increases the probability of a positive adjustment for euro area sovereigns while a contemporaneous change in fundamentals increases the probability of a positive adjustment for Asia-Pacific sovereigns with a 1-5% significance. For F4 a positive judgement in the previous year increases the probability of a one-notch negative adjustment by 15 percentage points with a five percent significance for euro area sovereigns. By contrast, for F3, we observe that a contemporaneous one-notch change in fundamentals increases the likelihood of a negative factor score adjustment by 8pp (significant at the 5% level) whereas, in the case of positive adjustments, it is not an improvement in fundamentals but rather negative judgement in the previous year that increases the probability of an upwards adjustment by 14pp (significant at the 1% level).

The research findings support the conclusion that Moody's Factor 3 assessment immediately reflects weakening public finances but fundamental changes in Factors 1, 2 and 4 only impact at least a year after an incident. Also, improving fundamentals do not apparently immediately lead to better factor scores. Changes in opinion expressed at the rating committee are equally likely to affect rating changes, either up or down, but we find no evidence that rating committee opinion changes trigger outlook changes.

We find that variables used in Moody's scorecard do not explain the source of judgement at the factor level. In line with Moody's methodology, other variables are used to adjust the scorecard. However, for the full sample and time-period, rating committee judgement is explained through real GDP growth and 'interest payments/revenues', statistically significant at the five percent level and robust for collinearity. Finally, for the external variables, we find that a one percentage point increase in a government bond yield reduces judgement at the rating committee by almost one full rating notch, with a one percent significance.

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A Annex

A1 Moody's Stylized Methodology

See below for our indicative summary of Moody's Sovereign Rating Methodology as of September 2013, which also marks the baseline for this paper's analysis. For all details, please refer to Moody's publication.

Factors 1 and 2 combine approximately equal weight into a construct Moody's calls 'Economic Resiliency'. This in turn is combined following a non-linear function with Factor 3, whereby the weight of Fiscal Strength is highest for countries with moderate 'Economic Resilience', to determine the 'Government Financial Strength'. Finally, Factor 4, can only lower the preliminary rating range as given by combining the first three factors. This will not happen when Event Risk is scored as 'Very Low', but will happen with increasing severity as the risk is assessed from 'Low' to 'Moderate' to 'High' to 'Very High.' We show the rating-grids used to determine the rating range below.

Broad Rating Factor	Rating Sub-Factor		Sub-Factor Indicators
50%	**F1: Economic Strength**	**Growth Dynamics** 50%	Avg. Real GDP Growth $_{(t-4 \text{ to } t+5)}$
			Volatility Real GDP Growth $_{(St. Dev. t-9 \text{ to } t)}$
			WEF Global Competitiveness Index $_{(t)}$
		Scale of the Economy 25%	Nominal GDP (US $ bn)$_{t-1}$
		National Income 25%	GDP per Capita (PPP, US $)$_{t-1}$
		Adjustments 1-6 scores	*Diversification*
			Credit boom
50%	**F2: Institutional Strength**	**Institutional Framework and Effectiveness** 75%	WB Government Effectiveness
			WB Rule of Law
			WB Control of Corruption
		Policy Credibility and Effectiveness 25%	Inflation Level $_{(t-5 \text{ to } t+4)}$
			Inflation Volatility $_{(St. Dev. T-9 \text{ to } t)}$
		Adjustments 1-6 scores	*Track record of default*
Economic Resiliency (F1 x F2)			
Non-linear*	**F3: Fiscal Strength**	**Debt Burden** 50%	General Govt Debt/ GDP$_{(t)}$
			General Govt Debt/ Revenues$_{(t)}$
		Debt Affordability 50%	General Govt Interest Payments/ Revenue$_{(t)}$
			General Govt Interest Payments/ GDP$_{(t)}$
		Adjustments 1-6 scores	*Debt Trend $_{(t-4 \text{ to } t+1)}$*
			Gen. Govt. Foreign Currency Debt/ Gen. Govt. Debt $_{(t)}$
			Other Public Sector Debt/ GDP $_{(t)}$
			Public Sector Financial Assets or Sovereign Wealth Fund/ GDP $_{(t)}$
Government Financial Strength (Economic Resiliency x F3)			
Max. Function	**F4: Susceptibility to Event Risk**	Political Risk Max. Function	Domestic Political Risk
			Geopolitical Risk
		Government Liquidity Risk Max. Function	Gross Borrowing Requirements/ GDP
			Non-Resident Share of General Government Debt
			Market Implied Ratings
		Banking Sector Risk Max. Function	Average Baseline Credit Assessment
			Total Domestic Bank Assets/ GDP
			Banking System Loan-to-Deposit Ratio
		External Vulnerability Risk Max. Function	(Current Account Balance + FDI Inflows)/ GDP
			External Vulnerability Indicator
			Net International Investment Position/ GDP
			Overall F4 Score (Maximum)
Indicative Rating			

Economic Resiliency as a function of Factor 1 and Factor 2

Economic Resiliency		Economic Strength													
		VH+	VH	VH-	H+	H	H-	M+	M	M-	L+	L	L-	VL+	VL	VL-
Institutional Strength	VH+	VH+	VH+	VH+	VH	VH	VH-	VH-	H+	H+	H	H	H-	H-	M+	M
	VH	VH+	VH	VH	VH-	VH-	H+	H+	H	H	H-	H-	M+	M+	M	M-
	VH-	VH+	VH	VH-	VH-	H+	H+	H	H	H-	H-	M+	M+	M	M	L+
	H+	VH	VH-	VH-	H+	H+	H	H	H-	H-	M+	M+	M	M	M-	L+
	H	VH	VH-	H+	H+	H	H	H-	H-	M+	M+	M	M	M-	M-	L
	H-	VH-	H+	H+	H	H	H-	H-	M+	M+	M	M	M-	M-	L+	L
	M+	VH-	H+	H	H	H-	H-	M+	M+	M	M	M-	M-	L+	L+	L-
	M	H+	H	H	H-	H-	M+	M+	M	M	M-	M-	L+	L+	L	L-
	M-	H+	H	H-	H-	M+	M+	M	M	M-	M-	L+	L+	L	L	VL+
	L+	H	H-	H-	M+	M+	M	M	M-	M-	L+	L+	L	L	L-	VL+
	L	H	H-	M+	M+	M	M	M-	M-	L+	L+	L	L	L-	L-	VL
	L-	H-	M+	M+	M	M	M-	M-	L+	L+	L	L	L-	L-	VL+	VL
	VL+	H-	M+	M	M	M-	M-	L+	L+	L	L	L-	L-	VL+	VL+	VL-
	VL	M+	M	M	M-	M-	L+	L+	L	L	L-	L-	VL+	VL+	VL	VL-
	VL-	M	M-	L+	L+	L	L	L-	L-	VL+	VL+	VL	VL	VL-	VL-	VL-

Government Financial Strength as a function of Economic Resilience and Factor 3

Govt. Fin. Strength		Fiscal Strength														
		VH+	VH	VH-	H+	H	H-	M+	M	M-	L+	L	L-	VL+	VL	VL-
Economic Resiliency	VH+	VH+	VH+	VH+	VH+	VH+	VH+	VH+	VH+	VH+	VH	VH	VH	VH	VH	VH-
	VH	VH	VH	VH	VH	VH-	VH-	VH-	VH-	VH-	H+	H+	H+	H+	H+	H
	VH-	VH	VH-	VH-	VH-	VH-	H+	H+	H+	H+	H+	H	H	H	H	H-
	H+	VH-	VH-	H+	H+	H+	H	H	H	H	H-	H-	H-	M+	M+	M
	H	VH-	H+	H+	H	H	H	H-	H-	H-	H-	M+	M+	M+	M	M
	H-	H+	H	H	H	H-	H-	H-	M+	M+	M+	M+	M	M	M	M-
	M+	H+	H	H	H-	H-	M+	M+	M+	M	M	M-	M-	M-	L+	L
	M	H	H-	H-	H-	M+	M+	M	M	M	M-	M-	L+	L+	L+	L
	M-	H	H-	M+	M+	M+	M	M	M-	M-	M-	L+	L+	L	L	L-
	L+	M+	M	M	M	M-	M-	M-	M-	L+	L+	L+	L+	L	L	L-
	L	M	M-	M-	M-	M-	L+	L+	L+	L+	L	L	L	L	L-	L-
	L-	M-	M-	L+	L+	L+	L+	L	L	L	L	L-	L-	L-	L-	VL+
	VL+	L-	L-	L-	L-	L-	L-	L-	L-	VL+	VL+	VL+	VL+	VL+	VL+	VL+
	VL	VL+	VL+	VL+	VL+	VL+	VL+	VL+	VL+	VL+	VL	VL	VL	VL	VL	VL
	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-	VL-

Scorecard rating range as a function of Government Financial Strength and Factor 4

Rating Range		Government Financial Strength														
		VH+	VH	VH-	H+	H	H-	M+	M	M-	L+	L	L-	VL+	VL	VL-
		Aaa-Aa2	Aa1-Aa3	Aa2-A1	Aa3-A2	A1-A3	A2-Baa1	A3-Baa2	Baa1-Baa3	Baa2-Ba1	Baa3-Ba2	Ba1-Ba3	Ba2-B1	Ba3-B2	B1-B3	B2-Caa
Susceptibility to Event Risk	VL-	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3
	VL	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3
	VL+	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3
	L-	Aa1	Aa2	Aa3	A1	A2	A3	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1
	L	Aa1	Aa2	Aa3	A1	A2	A3	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1
	L+	Aa1	Aa2	Aa3	A1	A2	A3	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa2
	M-	Aa2	Aa3	A1	A2	A3	Baa1	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2
	M	Aa2	Aa3	A1	A2	A3	Baa1	Baa3	Ba1	Ba2	B1	B2	B3	Caa1	Caa2	Caa3
	M+	Aa3	A1	A2	A3	Baa1	Baa2	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3
	H-	Aa3	A1	A2	A3	Baa1	Baa2	Ba1	Ba2	Ba3	B2	B3	Caa1	Caa2	Caa3	Caa3
	H	A1	A2	A3	Baa1	Baa2	Baa3	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Caa3
	H+	A1	A2	A3	Baa1	Baa2	Baa3	Ba2	Ba3	B1	B3	Caa1	Caa2	Caa3	Caa3	Caa3
	VH-	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Caa3	Caa3
	VH	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba3	B1	B2	Caa1	Caa2	Caa3	Caa3	Caa3	Caa3
	VH+	A3	Baa1	Baa2	Baa3	Ba1	Ba2	B1	B2	B3	Caa1	Caa2	Caa3	Caa3	Caa3	Caa3

A2 Data Sources

We construct a real-time semi-annual cross country panel. We cover 74 countries, across where available 26 time-periods starting in April 2003 up to April 2016. Semi-annual observations are in line with IMF WEO publications in April and October.

(*) refers to indicators for which the thresholds were revised in December 2016. (N) refers to indicators that were first introduced in December 2016.

Dependent Variables

	Name	Description/ Source
	Actual Moody's Rating	As published by April and October of that year
	Factor 1: Economic Strength	
	Factor 2: Institutional Strength	Components to overall rating as published by
	Factor 3: Fiscal Strength	Moody's annually since 2008.
	Factor 4: Susceptibility to Event Risk	

Factor 1: Economic Strength

	Name	Description/ Source
	Average Real GDP growth$_{t-4 \text{ to } t+5}$	WEO data
*	Volatility in Real GDP growth$_{t-9 \text{ to } t}$	WEO data
*	WEF Global Competitiveness Index$_t$	Annual data lagged by 6 months due to publication lag. Data assumed constant before 2005.
*	Nominal GDP (US$)$_t$	WEO data
*	GDP per capita (PPP, US$)$_t$	WEO data, where 2003 vintage missing use 2004 vintage.

Factor 2: Institutional Strength

	Name	Description/ Source
*	Worldwide Government Effectiveness Index	World Bank. Annual data lagged by two years due to publication lag.
*	Worldwide Rule of Law Index	
*	Worldwide Control of Corruption Index	
	Inflation Level$_{t-4 \text{ to } t+5}$	WEO data
	Inflation Volatility$_{t-9 \text{ to } t}$	WEO data

Factor 3: Fiscal Strength

	Name	Description/ Source
	General Government Debt/GDP$_t$	
	General Government Debt/Revenues$_t$	
	General Government Interest Payments/Revenue$_t$	WEO data, where vintage missing use subsequent available.
*	General Government Interest Payments/GDP$_t$	
N	Debt Trend$_{t-4 \text{ to } t+1}$	WEO data, where vintage missing use subsequent available. 5YR Government Debt/GDP change.
N	General Government Foreign Currency Debt/General Government Debt (%)	Annual data lagged by one year due to publication lag. Where available ECB source (GFS database) and World bank/IMF (QPSD database) otherwise.

Factor 4: Susceptibility to Event Risk

	Name	Description
	Worldwide Voice and Accountability Index (Percentile)	World Bank. Annual data lagged by two years due to publication lag.
	GDP per capita (Percentile)	WEF data, based on the country rank as published in the Global Competitiveness Index.
	Gross Borrowing Requirements/GDP (%)	Gross financing needs from IMF Article IV or programme reports published before April and October respectively. If real-time data is not available, refer to ECB data of lagged government debt (Maastricht debt if available or bonds otherwise) with short-term residual maturity net of primary balance. If not available, refer to IMF Fiscal Monitor or historic data from Article IV and programme reports.
	Non-Resident Share of General Government Debt (%)	Annual data lagged by one year due to publication lag. Source World bank/IMF (QPSD database).
*	Total Domestic Bank Assets/GDP (%)	Quarterly IMF data (IFS database) lagged by 2 quarters, using Q4 from the previous year and Q2 data for April and October respectively.
*	Banking System Loan-to-Deposit Ratio (%)	
*	(Current Account Balance + FDI Inflows)/GDP	Where available, quarterly data lagged by 2 quarters, otherwise annual data lagged by one year due to publication lag. Source IMF (BOP database).
	External Vulnerability Indicator (EVI)	Moody's statistical handbook[18]
	Net International Investment Position/GDP (%)	Where available, quarterly data lagged by 2 quarters, otherwise annual data lagged by one year due to publication lag. Source IMF (BOP database).

Complementary Indicators

	Name	Description
	Government bond yield (log)	ECB, IMF, Bloomberg. 10 years maturity preferred. Average monthly data for April and October.
	Nominal effective exchange rate	ECB, IMF. 1 year growth rate. Average monthly data for April and October.
	Real effective exchange rate	ECB, IMF. 1 year growth rate. Average monthly data for April and October.
	CBOE Volatility Index	Chicago Board Options Exchange. Fixed across countries.

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[18] We were not able to replicate Moody's values by a significant margin. We used the following sources for our attempt: GFN as defined above plus General Government balance source IMF (WEO) plus long-term external debt from World bank/IMF (QPSD database) over lagged reserves as calculated by the IMF (IFS database)

A3   Country-Specific Data

In the following two tables we summarize the database built for the analysis in this paper. We show the average of standardized scores and the number of observations by geographical region and indicator. Data refers to the full time horizon.

Rows for regional aggregates exclude default periods (annex A5); for individual countries they are included. Some countries are part of several defined regional aggregates. Countries corresponding to no region (...) are only included in the Full Sample aggregate. Countries are assigned to no region (...) either because the logical regional aggregates would contain too few countries (e.g. Middle East) or because the countries are only included for factor score assessment, because there is not enough macroeconomic data to construct the overall fundamental score (Congo and Congo DR). In our analysis we only consider Moody's rated countries as we would otherwise be unable to construct the 'judgement' component as the residual between actual and fundamental rating. The row 'Full Sample' however also includes data from non-rated (mostly African) countries for which we have enough data to construct a time series of fundamental scores. The fundamental scores of these non-rated 17 countries (Benin, Burkina Faso, Burundi, Cameroon, Chad, Gambia, Guinea, Guyana, Haiti, Lesotho, Madagascar, Malawi, Mali, Mauritania, Rwanda, Sierra Leone and Tanzania) are visualized in the last section of annex A4)

Indicators are composed of two main types 1) indicators published by Moody's and 2) indicators derived from raw data in line with Moody's methodology. Indicators are standardized according to Moody's September 2013 methodology, with the exception of indicators marked with °, which were added in the December 2016 revision. These recent additions also follow an inverted scale, being expressed as "negative modifiers". Overall rating (published by Moody's) and overall fundamental rating is defined on a scale from 1 to 19, higher is better. Factor scores and their composing indicators are scaled from 1 to 15. Also for these, higher is better, with the exception of all indicators relating to Factor 4 which is defined on an inversed scale.
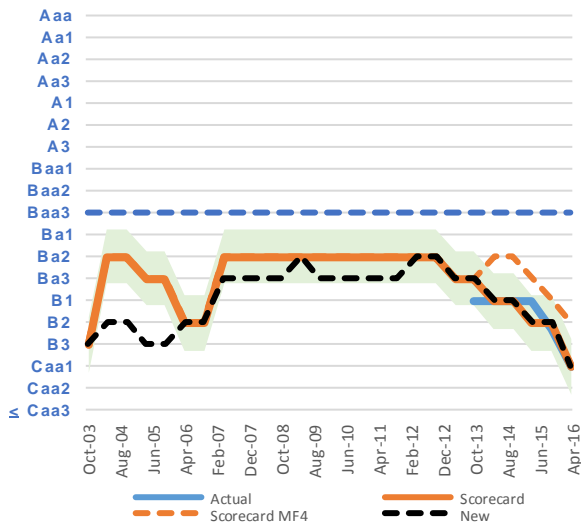
Average standardized score

		Moody's publication						F1: Economic Strength						F2: Institutional Strength						F3: Fiscal Strength							F4: Susceptibility to Event Risk									
Region	Country	Overall rating + Outlook	Factor 1	Factor 2	Factor 3	Factor 4	Overall fundamental rating	F1 Total	Average Real GDP Growth	Volatility in Real GDP Growth	W.E.F. Global Competitiveness Index	Nominal GDP (US$)	GDP per capita (PPP, US$)	F2 Total	Worldwide Government Effectiveness Index	Worldwide Rule of Law Index	Worldwide Control of Corruption Index	Inflation Level	Inflation Volatility	F3 Total	General Government Debt/GDP	General Government Debt/Revenues	General Government Interest Payments/Revenue	General Government Interest Payments/GDP	"Government Foreign Currency Debt/Total Debt	"Debt Trend	F4 Total	Worldwide Voice and Accountability	Non-Resident Currency Debt/Total Debt	Gross Borrowing Requirements	Total Domestic Share of General Government Debt (Percentile)	Banking System Loan-to-Deposit Ratio	(Current Account Balance + FDI Inflows)/GDP	External Vulnerability Indicator (EVI)	Net International Investment Position/GDP	GDP per capita
EA	EA	15.7	10.9	12.8	10.6	6.0	14.9	10.5	7.6	10.0	12.8	8.4	13.2	13.6	13.8	13.8	13.6	14.1	12.6	11.9	8.8	12.5	13.9	11.6	-0.7	0.0	7.1	3.0	3.0	3.7	7.2	14.1	7.3	2.1	...	6.3
CEE	CEE	12.5	8.8	10.2	10.0	7.0	13.3	8.5	10.9	6.8	9.2	5.8	10.1	10.3	10.6	10.5	10.1	12.4	7.4	13.8	12.6	14.4	14.6	13.4	-0.5	-0.3	7.6	3.2	3.0	2.7	5.9	8.5	6.9	1.9	1.0	7.5
LA	LatAm	7.6	7.1	6.4	7.8	8.4	10.4	7.8	12.7	9.2	5.4	6.9	5.8	6.8	6.1	5.3	7.1	9.9	7.2	11.3	11.6	12.1	11.6	11.2	-0.2	-3.0	6.2	3.2	3.1	2.2	3.9	3.8	5.9	1.3	1.0	6.2
AF	Africa	7.8	6.1	5.3	7.5	7.4	8.7	5.8	14.0	10.9	2.2	3.6	1.7	5.0	3.7	4.5	4.5	9.5	5.5	10.6	11.2	10.4	11.7	12.9	-0.3	-1.8	6.2	4.1	5.8	2.9	3.9	1.0	5.0	3.2	1.0	7.0
AP	AsiaPacific	13.4	10.6	9.9	10.4	5.6	13.8	10.9	13.0	10.8	12.4	11.2	8.0	10.4	10.8	9.9	9.3	12.0	11.2	12.0	10.5	9.6	12.6	13.3	-0.4	-3.8	5.7	3.9	3.3	3.5	2.6	10.8	5.2	1.4	1.0	5.3
AS	AngloSaxon	18.9	13.8	14.4	13.0	3.6	17.3	13.2	9.1	13.7	15.0	13.2	14.5	14.9	15.0	15.0	15.0	14.6	14.9	13.5	9.9	11.9	14.7	14.2	-0.8	0.0	6.8	3.0	3.0	4.0	2.4	8.2	5.4	2.3	...	6.8
FULL	FullSample	12.8	9.7	9.9	9.8	6.7	11.8	8.4	11.5	9.5	7.8	6.3	6.8	8.4	7.5	7.7	7.9	11.5	8.6	11.0	9.9	10.9	12.8	12.5	-0.4	-0.6	6.2	4.3	4.3	3.0	4.8	10.2	6.3	2.9	1.0	6.3
EA	Austria	18.9	13.6	14.4	12.7	4.6	16.6	12.5	6.2	13.5	15.0	12.1	14.9	15.0	15.0	15.0	15.0	15.0	15.0	11.9	6.8	13.3	15.0	12.7	-0.2	0.0	6.8	3.0	3.0	3.3	10.6	15.0	7.8	1.1	...	5.7
EA	Belgium	17.3	13.4	14.3	11.5	6.1	17.0	12.6	5.5	14.0	14.9	12.9	14.7	15.0	15.0	15.0	15.0	15.0	14.8	8.7	3.9	10.9	13.2	6.7	-0.2	0.0	6.0	3.0	3.0	5.6	6.3	15.0	6.3	2.0	...	1.5
EA	Cyprus	10.8	6.0	8.7	5.2	14.0	13.1	8.8	8.0	11.5	10.8	2.0	13.1	14.4	14.7	14.0	14.2	14.5	14.5	10.8	6.7	11.4	14.1	11.1	-1.1	0.0	8.9	3.0	3.0	4.8	3.9	15.0	7.7	4.1	...	7.6
EA	Finland	19.0	12.7	14.4	14.4	3.2	15.8	11.2	6.7	8.7	15.0	9.9	14.7	15.0	15.0	15.0	15.0	14.9	15.0	14.0	11.0	15.0	15.0	13.1	-0.5	0.0	7.4	3.0	3.0	1.8	12.9	14.0	9.9	1.4	...	5.4
EA	France	18.6	13.3	14.7	11.9	5.7	17.7	13.1	5.5	14.0	14.9	15.0	14.5	15.0	15.0	14.9	15.0	14.8	15.0	12.9	5.9	12.7	15.0	11.5	-0.8	0.0	6.3	3.0	3.0	3.1	6.8	15.0	8.8	1.1	...	5.9
EA	Germany	19.0	13.7	14.3	14.0	3.7	17.3	12.6	4.5	11.9	15.0	15.0	14.6	14.9	15.0	15.0	15.0	14.9	15.0	13.1	6.4	12.5	15.0	12.0	-0.2	0.0	5.2	3.0	3.0	3.2	5.1	15.0	7.7	1.0	...	3.4
EA	Greece	9.1	6.9	4.8	2.3	13.1	9.6	9.5	6.8	8.9	6.3	10.6	12.8	11.7	11.2	12.2	10.2	13.2	13.1	5.1	2.5	5.9	8.1	3.8	-1.6	0.0	9.6	3.0	3.0	6.7	9.8	13.4	6.7	6.0	...	9.2
EA	Ireland	15.1	11.2	12.9	6.3	8.6	14.5	11.2	9.2	6.0	14.7	9.7	15.0	14.5	15.0	15.0	15.0	13.1	13.1	10.5	8.2	10.0	12.7	11.1	-1.7	0.0	8.0	3.0	3.0	2.8	8.3	14.9	...	1.1	...	8.7
EA	Italy	14.8	12.1	11.2	7.7	7.2	13.1	11.5	2.4	13.0	10.2	15.0	14.5	11.8	10.6	10.6	11.0	14.9	15.0	6.5	2.9	7.9	10.5	4.2	-0.7	0.0	6.5	3.0	3.0	8.2	3.2	13.7	9.1	1.6	...	6.4
EA	Luxembourg	19.0	12.7	14.3	13.6	2.8	16.8	10.1	10.0	8.0	14.8	3.6	15.0	15.0	15.0	15.0	15.0	15.0	14.8	15.0	15.0	15.0	15.0	15.0	-0.4	0.0	4.4	3.0	3.0	1.0	1.8	15.0	3.9	1.0	...	4.2
EA	Malta	13.6	9.1	12.2	9.7	5.1	14.0	8.4	7.7	11.5	10.8	1.1	12.3	14.4	14.2	15.0	13.6	14.9	14.9	9.7	7.0	12.2	12.2	7.7	-0.1	0.0	4.8	3.0	3.0	4.6	1.0	15.0	4.0	1.5	...	2.9
EA	Netherlands	19.0	13.4	14.6	12.8	3.1	17.2	12.7	5.2	13.2	15.0	14.8	14.7	15.0	15.0	15.0	15.0	15.0	14.8	12.2	7.8	12.5	15.0	14.1	-0.6	0.0	6.2	3.0	3.0	4.0	8.2	15.0	...	1.0	...	4.4
EA	Portugal	13.1	9.3	12.1	6.9	8.2	12.2	10.1	2.8	13.7	12.3	9.3	11.9	14.2	13.9	14.2	14.2	14.6	14.3	9.0	5.3	9.9	12.7	8.0	-1.5	0.0	10.0	3.0	3.0	7.5	10.2	14.9	8.8	4.5	...	9.2
EA	Spain	15.9	11.6	13.1	9.9	6.2	14.8	12.5	6.6	12.1	13.8	14.8	13.6	14.3	14.0	14.2	14.4	14.2	14.7	11.8	8.6	11.9	14.3	12.5	-1.5	0.0	8.6	3.0	3.0	4.5	5.2	15.0	7.9	3.0	...	8.6
EA|CEE	Estonia	15.0	8.8	13.0	12.0	5.8	14.3	8.1	11.3	3.8	14.2	2.0	9.9	13.5	13.8	13.8	13.8	15.0	15.0	15.0	15.0	15.0	15.0	15.0	0.0	...	8.1	3.0	3.0	1.0	9.9	10.5	8.3	1.5	...	8.1
EA|CEE	Latvia	12.3	8.0	11.6	10.2	8.9	13.3	7.3	10.8	5.2	9.7	2.5	9.4	10.4	11.5	12.1	10.2	12.3	3.5	14.7	13.8	15.0	15.0	15.0	-0.9	-0.2	8.0	3.0	3.0	2.0	9.6	12.0	5.5	3.8	...	7.9
EA|CEE	Lithuania	12.8	8.6	11.9	8.4	7.1	13.6	7.7	11.7	3.6	11.5	2.8	10.3	11.1	11.9	11.9	10.8	13.6	5.8	14.5	13.7	14.8	15.0	14.4	-0.8	0.0	7.7	3.0	3.0	2.0	10.1	3.0	7.7	3.2	...	7.4
EA|CEE	Slovakia	14.3	9.8	11.4	12.3	4.8	13.8	8.7	13.0	7.1	9.1	4.3	11.3	11.3	12.5	10.5	11.2	14.8	12.8	13.4	13.2	14.1	15.0	14.0	-0.8	0.0	7.6	3.0	3.0	2.5	4.2	8.0	5.5	1.5	...	7.6
EA|CEE	Slovenia	14.3	8.6	11.1	10.0	6.6	14.5	8.6	8.6	8.2	11.3	3.1	12.8	13.2	13.5	13.8	13.5	13.4	10.8	13.4	11.8	13.0	14.7	13.3	-1.2	-0.1	6.9	3.0	3.0	5.0	...	...	...	1.4	...	6.7
CEE	Bulgaria	10.2	7.4	8.3	10.4	8.0	12.3	6.5	11.4	5.7	6.0	3.2	7.5	8.0	8.6	7.3	7.8	11.4	4.6	14.8	14.5	15.0	15.0	14.9	-0.2	-1.6	8.2	3.0	3.0	1.1	5.9	...	...	1.2	1.0	8.2
CEE	Croatia	9.7	7.2	8.8	8.9	7.7	11.7	7.0	8.3	8.7	5.3	3.5	9.6	10.8	10.8	9.3	9.7	13.3	6.6	11.2	11.2	13.8	14.2	11.7	-0.9	0.0	8.4	3.0	3.0	4.0	5.2	11.1	7.6	1.5	1.0	8.4
CEE	Czech Republic	15.1	10.7	11.2	11.9	5.4	15.2	10.4	10.1	9.2	13.0	8.1	12.2	12.6	13.1	13.4	11.5	14.7	10.5	14.5	13.2	12.6	15.0	15.0	-0.0	0.0	6.7	3.0	3.0	2.9	1.3	10.2	4.1	1.3	1.0	6.7
CEE	Hungary	11.9	8.7	10.0	5.1	9.0	11.7	9.0	8.2	10.1	9.8	6.5	10.8	11.8	12.1	13.2	12.2	11.5	8.4	9.5	6.7	12.5	12.3	6.4	-0.5	0.0	9.0	3.0	3.0	6.3	6.2	...	...	2.3	1.0	9.0
CEE	Poland	14.0	11.7	11.7	9.7	6.7	14.2	11.7	13.0	13.9	9.4	12.5	10.8	11.0	14.0	14.1	14.1	10.0	8.9	12.3	13.0	14.1	14.1	15.0	-0.2	-0.1	7.6	3.0	3.0	3.8	4.5	7.5	7.7	...	1.0	7.6
CEE	Romania	9.5	7.7	8.1	8.7	7.3	12.2	7.0	12.0	3.1	5.2	7.2	7.3	6.8	5.0	8.1	7.3	9.9	3.8	14.6	14.0	14.8	14.9	14.6	-0.7	-0.8	7.3	3.0	3.0	2.0	5.5	3.9	6.8	2.8	1.0	7.3
CEE	Russia	11.1	8.5	4.6	12.1	6.7	12.8	9.5	12.0	3.3	6.5	14.5	8.9	3.2	3.6	1.7	1.6	7.8	3.8	15.0	15.0	15.0	15.0	15.0	0.0	...	5.0	5.1	3.0	1.1	3.4	6.2	8.9	1.0	1.0	5.0
LA	Argentina	3.7	8.1	1.7	8.1	11.5	9.6	8.2	11.9	2.6	3.8	11.5	9.2	5.1	6.3	3.0	3.3	5.5	0.7	...	8.4	11.0	9.2	6.5	-0.7	...	4.8	3.0	3.0	2.5	3.2	1.0	3.6	1.0	...	4.7
LA	Bolivia	5.3	5.6	4.9	7.3	10.3	8.9	5.9	14.0	14.0	1.4	2.0	2.0	4.5	3.3	2.2	4.2	10.6	6.1	12.2	11.4	13.8	12.8	-0.1	-6.0	...	5.6	3.0	1.7	3.7	...	...	...	1.0	...	5.7
LA	Brazil	9.0	9.7	8.0	5.8	6.0	9.5	10.4	11.4	12.0	7.0	14.6	6.7	7.9	6.9	6.7	8.9	9.9	8.0	6.5	7.0	11.0	5.2	2.6	-0.1	0.0	6.8	3.0	3.0	5.7	1.0	7.5	4.9	1.0	1.0	6.8
LA	Chile	14.6	9.1	14.3	12.7	5.5	16.7	11.0	14.0	11.9	14.0	8.2	11.7	14.3	14.7	15.0	15.0	13.7	13.7	15.0	15.0	15.0	15.0	15.0	0.0	...	6.2	3.0	3.0	1.0	2.9	...	...	1.0	1.0	6.2
LA	Colombia	9.2	8.6	8.0	8.0	7.7	12.2	9.0	13.7	11.6	6.5	9.1	5.6	7.0	6.4	4.3	7.0	11.4	9.0	12.5	13.5	11.8	11.4	-0.1	-1.7	...	6.3	3.0	3.0	1.7	2.4	...	...	1.1	1.0	6.3
LA	Costa Rica	9.3	8.3	8.3	7.6	6.4	11.7	7.6	13.6	9.4	7.8	2.7	7.2	10.4	9.6	10.7	12.6	9.0	8.1	10.6	13.3	10.5	8.3	10.2	-0.4	-2.9	6.4	3.0	3.0	4.1	1.2	...	...	1.1	1.0	6.8
LA	Ecuador	2.8	5.7	2.0	7.3	10.5	9.6	6.0	12.4	8.8	2.5	3.9	4.2	3.5	1.5	1.4	2.7	3.9	1.7	12.7	12.8	14.4	14.0	14.2	-0.2	...	6.7	3.0	3.0	1.4	7.7	...	...	1.2	1.0	6.5
LA	Honduras	4.8	3.1	4.5	5.3	8.7	8.3	5.3	12.5	11.4	2.6	1.7	1.7	3.7	2.2	1.5	2.2	9.3	9.0	12.7	12.4	12.6	15.0	13.0	-0.3	-6.0	6.6	3.0	3.0	1.4	...	...	2.2	...	...	7.3
LA	Mexico	12.0	9.3	10.3	9.3	5.0	11.2	10.4	11.2	8.7	8.5	14.5	8.0	7.7	9.2	4.6	6.6	11.8	9.2	10.1	11.8	10.5	8.5	9.7	0.0	-0.1	7.0	3.0	3.0	3.1	1.3	1.0	7.0	1.0	1.0	7.0
LA	Nicaragua	3.5	3.3	4.7	6.5	10.8	5.2	5.2	12.8	13.4	1.2	1.3	1.1	3.3	1.2	2.3	3.1	3.9	3.3	10.4	10.7	8.2	14.5	14.5	0.0	-6.0	9.5	3.0	4.2	1.8	11.3	...	...	5.2	1.0	9.5
LA	Peru	9.5	8.5	8.0	12.3	6.1	12.3	7.9	14.6	9.0	5.8	6.9	5.1	6.7	4.3	3.1	6.6	14.6	11.3	13.8	14.2	13.0	13.5	14.0	0.0	-4.4	6.7	3.0	3.0	1.7	2.6	6.9	1.0	1.0	...	6.7
LA	Uruguay	7.5	8.1	9.7	7.1	6.7	11.0	6.7	12.8	5.4	5.3	2.8	8.4	10.9	10.6	11.3	14.4	8.7	5.5	8.5	7.7	10.0	9.2	7.1	-0.1	...	6.0	3.0	3.0	2.4	5.9	...	3.2	1.0	...	6.0
LA	Venezuela	4.2	7.1	1.7	8.1	11.0	6.7	5.9	8.8	1.0	1.3	9.6	6.8	1.2	1.0	1.0	1.1	12.4	-0.6	...	12.8	12.5	13.1	13.1	12.4	-0.6	...	2.5	5.1	3.0	...	...	...	1.3	...	2.2
AF	Cote d'Ivoire	6.4	5.0	3.5	8.5	8.0	5.5	4.0	10.6	7.2	1.2	2.2	1.0	4.2	1.0	1.1	1.6	14.2	12.0	7.0	6.0	8.1	11.7	14.1	0.0	...	5.7	7.4	5.1	...	5.9	...	...	...	...	6.9
AF	Ethiopia	6.0	6.0	2.5	9.0	9.0	6.9	4.4	14.9	5.0	1.1	2.5	1.0	3.3	2.4	2.7	3.9	7.2	1.0	10.0	11.4	8.7	14.8	15.0	-0.1	...	6.0	8.0	9.3	3.5	9.4	...	...	5.1	...	...
AF	Ghana	4.8	5.7	4.6	9.4	9.4	8.3	5.5	15.0	11.7	1.1	2.2	1.0	7.1	7.0	8.3	7.9	7.0	2.2	8.1	8.2	8.7	10.7	7.9	-0.6	...	6.3	3.0	5.9	4.7	...	3.8	3.1	...	...	7.2
AF	Kenya	6.0	6.7	4.2	5.8	8.0	8.5	5.7	13.9	13.0	1.7	2.8	1.0	3.1	2.8	1.7	1.3	8.9	4.5	10.1	10.4	9.7	10.7	11.7	-0.1	-4.4	5.0	3.2	5.9	3.5	5.0	...	4.3	4.5	1.0	...
AF	Mozambique	5.3	5.6	3.4	5.8	7.4	6.9	5.0	15.0	10.8	1.0	1.3	1.0	4.3	2.8	3.5	4.9	8.7	3.0	10.9	10.7	11.1	15.0	14.9	-0.3	...	8.4	3.0	3.0	...	...	...	4.5	...	...	10.0
AF	Nigeria	6.9	8.7	1.5	10.8	9.9	9.8	6.5	14.8	8.0	1.1	8.5	1.4	2.3	1.0	1.0	1.5	1.5	4.0	14.3	14.3	14.3	13.0	14.0	0.0	...	4.8	3.8	3.0	1.4	...	...	3.1	1.0	...	5.7
AF	Senegal	6.1	3.9	7.2	5.5	5.5	10.7	5.6	14.0	14.0	1.1	1.7	1.0	7.8	4.5	7.2	6.9	14.5	10.8	11.9	12.2	11.5	14.4	14.6	-0.6	...	6.4	5.5	2.3	...	6.1	...	...	...	...	7.1
AF	South Africa	12.0	8.8	9.2	10.0	5.6	13.8	10.6	11.9	13.7	11.0	10.9	7.0	10.1	10.5	9.5	10.7	9.9	9.8	11.3	13.0	13.6	10.0	8.8	-0.4	...	6.1	3.0	3.0	2.2	1.2	11.5	2.9	1.0	...	6.1
AF	Uganda	6.0	6.0	7.8	8.6	7.7	7.7	5.6	15.0	13.3	1.0	1.7	1.1	4.3	3.1	5.0	4.2	7.4	...	11.5	12.0	12.4	11.8	12.8	-0.4	...	7.1	3.6	6.0	7.3	...	3.2	2.8	1.0	...	7.1
AF	Zambia	5.5	4.7	5.0	8.5	8.0	8.3	5.6	14.9	12.5	1.5	1.8	1.1	3.9	1.5	5.0	4.2	7.4	2.7	11.5	12.0	11.6	10.8	12.8	-0.4	...	6.3	3.0	4.3	3.6	...	5.9	1.9	...	...	6.1
AP	China	15.2	11.5	8.2	14.3	5.4	14.9	12.0	15.0	13.6	13.8	15.0	4.6	7.6	8.2	5.3	5.1	13.8	10.0	14.8	14.5	14.6	15.0	15.0	-0.1	...	3.3	8.4	3.0	2.0	1.0	...	1.0	1.0	...	3.3
AP	India	10.0	9.2	5.6	11.0	5.6	9.4	10.4	15.0	13.4	9.9	14.6	5.0	7.6	7.1	3.8	5.9	9.7	8.7	5.8	6.3	4.3	2.7	1.0	8.9	...	5.8	3.0	4.3	2.7	1.0	6.0	1.5	1.4	1.0	6.0
AP	Indonesia	7.8	9.6	4.8	8.2	10.6	10.6	9.5	14.9	9.5	9.5	12.8	2.4	4.4	4.6	2.9	3.0	9.3	5.0	12.3	13.5	11.2	10.9	13.7	-0.0	-4.0	7.0	3.0	3.0	1.1	6.4	2.4	6.1	1.0	...	7.0
AP	Japan	17.4	12.4	14.1	8.0	3.6	15.5	12.6	4.8	11.6	15.0	15.0	14.6	13.7	14.9	14.8	14.8	5.5	15.0	13.6	1.0	1.0	15.0	15.0	-2.5	...	7.5	3.0	3.0	13.6	1.0	...	...	1.0	...	1.3
AP	Korea	14.5	13.4	12.5	7.9	7.0	17.0	13.2	13.5	9.5	15.0	14.4	13.9	14.6	15.0	14.1	15.0	15.0	14.0	13.6	10.1	10.8	15.0	15.0	-0.2	0.0	5.8	3.0	3.0	1.8	1.0	12.5	7.5	1.0	1.0	5.8
AP	Malaysia	12.9	9.1	9.2	10.7	5.2	15.1	10.8	14.8	7.8	14.9	9.2	8.8	12.5	14.1	10.8	10.8	14.5	14.0	12.0	10.2	10.2	13.7	14.0	-0.1	0.0	5.6	3.0	3.0	2.6	1.0	14.0	...	1.0	...	5.6
AP	Philippines	7.9	7.2	8.1	5.8	5.1	9.0	8.3	14.7	13.9	5.8	8.0	2.1	6.9	7.6	4.6	4.2	11.1	11.4	7.4	10.7	6.6	4.1	8.1	0.0	-6.0	7.0	3.0	3.0	5.4	2.3	5.6	3.6	1.0	...	6.4
AP	Singapore	19.0	13.6	14.4	13.3	4.8	18.3	11.1	14.0	2.9	15.0	8.7	14.6	14.6	15.0	15.0	13.9	12.8	12.8	9.2	3.8	3.0	15.0	15.0	-0.2	...	1.2	3.0	1.6	...	14.7	4.9	1.0	1.0	...	...
AP	Thailand	11.9	8.6	8.5	12.2	6.4	13.7	9.7	14.0	6.1	13.6	10.4	5.8	9.3	9.5	8.2	6.8	14.1	11.3	12.6	10.8	10.5	14.3	14.7	-0.6	...	6.3	3.0	3.0	2.2	1.0	10.0	...	1.0	...	6.3
AP	Viet Nam	6.3	6.6	4.3	6.4	8.4	11.3	7.6	15.0	14.0	6.7	5.4	1.4	5.0	4.8	5.2	4.2	9.3	2.5	12.6	10.8	10.5	14.3	14.7	-0.6	...	2.3	8.0	4.7	2.0	...	1.5	...	...	...	...
AP|AS	Australia	19.0	11.7	14.4	14.3	2.7	17.0	14.0	11.4	14.0	15.0	14.4	14.6	14.9	14.7	15.0	15.0	15.0	15.0	14.8	14.3	15.0	15.0	15.0	-0.5	...	7.7	3.0	3.0	1.5	3.5	14.6	...	2.2	...	7.7
AP|AS	New Zealand	19.0	11.7	14.4	14.3	3.8	15.9	11.3	9.0	13.8	15.0	6.8	13.2	14.9	15.0	15.0	14.4	15.0	14.0	14.8	14.8	15.0	15.0	15.0	0.0	...	8.2	3.0	3.0	2.1	9.3	...	3.5	...	...	8.2
AS	Canada	19.0	14.4	14.3	13.7	3.8	18.0	13.7	8.7	14.0	15.0	14.8	14.9	15.0	15.0	15.0	15.0	15.0	15.0	13.4	5.6	10.5	15.0	14.3	-1.4	0.0	5.8	3.0	3.0	3.8	1.0	12.0	1.2	...	...	5.8
AS	United Kingdom	18.7	13.8	14.3	12.7	3.8	17.9	13.2	7.2	12.7	15.0	15.0	14.6	15.0	15.0	15.0	14.8	15.0	15.0	13.4	7.9	11.5	14.5	13.2	-1.4	0.0	6.0	3.0	3.0	2.7	1.3	15.0	5.8	1.6	...	6.4
AS	United States	19.0	14.3	14.3	12.0	3.6	17.5	13.9	9.1	14.0	15.0	15.0	15.0	14.9	15.0	15.0	14.7	14.8	14.8	12.8	5.2	7.7	14.2	12.8	-1.4	0.0	6.5	3.0	3.0	7.5	1.5	1.0	4.2	2.8	...	6.4
...	Congo	6.6	5.8	2.8	9.8	8.0	...	...	14.5	6.6	...	1.5	13.8	3.8	1.0	1.2	13.2	10.5	...	10.0	8.9	11.0	12.9	11.3	-0.3	...	1.3	7.6	...	...	5.9	...	...	4.9	...	6.9
...	Congo DR	4.0	6.0	1.3	7.3	9.0	...	...	14.7	7.6	...	1.8	1.0	1.6	1.0	1.0	1.2	6.0	1.0	7.7	7.7	7.8	7.7	9.6	0.0	...	4.0	9.0	...	2.4	...	...	4.9	...	...	...
...	Denmark	19.0	13.3	14.5	14.5	5.5	17.2	12.0	5.0	12.5	15.0	11.3	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.1	11.4	15.0	15.0	15.0	-0.2	0.0	4.6	3.0	2.1	3.4	15.0	14.9	1.0	...	...	4.2
...	Iceland	13.8	8.1	12.2	5.4	8.8	10.9	8.8	6.7	14.5	12.9	2.0	9.7	15.0	15.0	15.0	15.0	15.0	15.0	8.7	7.9	11.6	11.6	9.7	-1.3	...	12.2	3.0	3.4	5.8	...	...	3.8	1.1	...	12.2
...	Israel	14.7	11.9	11.6	11.3	8.0	15.1	12.0	10.9	14.9	8.8	13.7	13.5	14.8	13.5	13.4	14.6	10.2	8.7	10.8	11.6	6.7	...	...	...	...	4.9	3.0	4.0	1.0	11.8	5.3	1.0	1.0	...	7.2
...	Norway	19.0	13.8	14.2	14.2	2.8	17.2	12.8	7.3	14.0	15.0	12.2	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	11.0	15.0	15.0	15.0	-0.4	...	5.6	3.0	3.0	1.0	6.2	...	...	1.0	...	4.9
...	Saudi Arabia	14.6	11.0	13.5	10.5	4.1	15.5	12.4	13.5	10.5	14.1	12.5	11.6	13.5	14.8	13.7	14.5	14.5	11.0	14.8	15.0	15.0	15.0	15.0	0.0	...	1.3	10.5	3.0	1.9	...	6.7	4.4	1.0	1.0	...
...	Sweden	19.0	13.7	14.4	14.4	2.8	17.3	12.6	9.0	14.0	15.0	12.9	14.5	15.0	15.0	15.0	15.0	14.9	14.9	14.2	11.8	14.8	15.0	15.0	-0.1	0.0	5.5	3.0	2.2	3.8	...	...	1.0	...	...	6.0
...	Switzerland	19.0	14.0	14.2	14.2	4.8	17.3	12.8	6.1	14.0	15.0	13.1	14.9	14.2	15.0	15.0	15.0	8.6	15.0	14.8	11.2	13.8	15.0	15.0	0.0	...	1.1	3.0	1.5	1.0	15.0	6.5	1.0	1.0	...	1.0
...	Turkey	7.9	9.0	8.1	8.1	9.3	11.0	9.0	13.5	2.0	7.4	13.1	7.6	8.3	9.2	9.3	8.8	7.5	4.6	10.1	12.0	13.7	8.6	6.2	0.0	...	7.2	3.0	3.0	4.1	1.3	8.3	5.9	3.7	1.0	7.2

Total number of observations

Column groups — **Moody's publication**: Overall rating + Outlook, Factor 1, Factor 2, Factor 3, Factor 4, Overall fundamental rating. **F1: Economic Strength**. **F2: Institutional Strength**. **F3: Fiscal Strength**. **F4: Susceptibility to Event Risk**.

Region	Country	Overall rating + Outlook	Factor 1	Factor 2	Factor 3	Factor 4	Overall fundamental rating	F1 Total	Average Real GDP Growth	Volatility in Real GDP Growth	WEF Global Competitiveness Index	Nominal GDP (US$)	GDP per capita (PPP, US$)	F2 Total	Worldwide Government Effectiveness Index	Worldwide Rule of Law Index	Worldwide Control of Corruption Index	Inflation Level	Inflation Volatility	F3 Total	General Government Debt/GDP	General Government Debt/Revenues	General Government Interest Payments/Revenue	"Debt Trend"	Government Foreign Currency Debt/Total Debt	General Government Interest Payments/GDP	F4 Total	Worldwide Voice and Accountability	Non-Resident Currency Debt/Total Debt	GDP per capita	Gross Borrowing Requirements/GDP	Total Domestic Share of General Government Debt	Banking System Loan-to-Deposit Ratio	(Current Account Balance + FDI Inflows)/GDP	External Vulnerability Indicator (EVI)	Net International Investment Position/GDP
EA	EA	**482**	244	244	244	244	**482**	**482**	482	482	482	482	482	**482**	482	482	482	482	482	**482**	482	482	482	482	480	482	**482**	482	482	462	453	243	239	477	0	472
CEE	CEE	**312**	173	173	173	173	**312**	**312**	312	312	312	312	312	**312**	312	312	312	312	312	**312**	312	312	312	312	296	275	**312**	312	312	312	292	105	130	312	165	312
LA	LatAm	**318**	156	156	156	156	**317**	**318**	318	318	318	318	318	**317**	318	318	318	318	317	**317**	318	318	318	318	293	103	**318**	318	318	257	243	55	59	317	205	310
AF	Africa	**84**	64	64	64	64	**260**	**260**	260	260	260	260	260	**260**	260	260	260	260	260	**260**	260	260	260	260	253	22	**260**	260	260	229	56	27	100	228	40	166
AP	AsiaPacific	**312**	168	168	168	168	**312**	**312**	312	312	312	312	312	**312**	312	312	312	312	312	**312**	312	312	312	312	308	32	**312**	312	312	263	168	110	62	311	105	282
AS	AngloSaxon	**130**	64	64	64	64	**130**	**130**	130	130	130	130	130	**130**	130	130	130	130	130	**130**	130	130	130	130	130	52	**130**	130	130	102	111	72	51	130	0	130
FULL	FullSample	1708	898	898	898	898	2337	2350	2641	2619	2366	2652	2652	2610	2678	2678	2678	2630	2610	2624	2624	2624	2643	2643	2494	914	2678	2678	2366	2342	1402	675	740	2409	590	2081
EA	Austria	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	25	12	12	26	0	22
EA	Belgium	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	25	19	19	26	0	26
EA	Cyprus	**26**	9	9	9	9	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	15	15	15	26	0	26
EA	Finland	**26**	13	13	13	13	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	22	22	26	0	26
EA	France	**26**	7	7	7	7	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	12	8	26	0	26
EA	Germany	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	15	15	26	0	26
EA	Greece	**26**	9	9	9	9	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	25	26	**26**	26	26	19	25	14	15	26	0	26
EA	Ireland	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	12	0	21	0	21
EA	Italy	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	20	20	26	0	26
EA	Luxembourg	**26**	16	16	16	16	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	13	26	14	14	26	0	26
EA	Malta	**26**	13	13	13	13	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	15	19	22	26	0	25
EA	Netherlands	**26**	9	9	9	9	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	25	16	26	0	26
EA	Portugal	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	18	18	26	0	26
EA	Spain	**26**	16	16	16	16	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	21	21	26	0	26
EA|CEE	Estonia	**26**	16	16	16	16	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	16	11	15	26	0	26
EA|CEE	Latvia	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	25	3	10	26	0	26
EA|CEE	Lithuania	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	25	26	**26**	26	26	26	25	1	15	26	0	26
EA|CEE	Slovakia	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	25	10	10	26	0	26
EA|CEE	Slovenia	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	0	0	26	0	26
CEE	Bulgaria	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	25	26	**26**	26	26	26	21	0	0	26	21	26
CEE	Croatia	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	21	15	**26**	26	26	26	20	0	20	26	0	26
CEE	Czech Republic	**26**	13	13	13	13	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	18	18	26	26	26
CEE	Hungary	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	0	0	26	0	26
CEE	Poland	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	15	15	26	0	26
CEE	Romania	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	17	26	**26**	26	26	26	15	12	12	26	15	26
CEE	Russia	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	0	**26**	26	26	26	25	15	15	26	25	26
LA	Argentina	**26**	15	15	15	15	**21**	**26**	26	26	26	26	26	**21**	26	26	26	26	23	**21**	26	26	26	26	26	0	**26**	26	26	11	25	7	8	26	0	26
LA	Bolivia	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	25	2	**26**	26	26	26	19	0	0	25	19	25
LA	Brazil	**26**	13	13	13	13	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	25	13	**26**	26	26	13	25	22	18	26	11	26
LA	Chile	**26**	12	12	12	12	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	0	0	26	0	26
LA	Colombia	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	15	**26**	26	26	26	25	0	0	26	25	26
LA	Costa Rica	**26**	8	8	8	8	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	25	13	**26**	26	26	26	25	0	0	26	25	22
LA	Ecuador	**26**	13	13	13	13	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	23	0	**26**	26	26	22	0	0	26	21	26
LA	Honduras	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	19	**26**	26	26	23	0	0	26	0	23
LA	Mexico	**26**	9	9	9	9	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	19	**26**	26	26	26	22	22	26	26	26	26
LA	Nicaragua	**26**	12	12	12	12	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	15	11	**26**	26	26	26	9	0	0	26	9	26
LA	Peru	**26**	12	12	12	12	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	13	11	**26**	26	26	26	25	9	11	26	5	26
LA	Uruguay	**26**	10	10	10	10	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	23	0	**26**	26	26	26	25	0	5	26	25	26
LA	Venezuela	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	0	**26**	26	26	26	25	15	15	26	25	26
AF	Cote d'Ivoire	**4**	4	4	4	4	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	0	**26**	26	26	0	11	0	0	18	0	18
AF	Ethiopia	**4**	4	4	4	4	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	0	**26**	26	26	26	5	0	0	16	0	0
AF	Ghana	**7**	7	7	7	7	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	25	0	**26**	26	26	25	0	0	16	26	0	18
AF	Kenya	**7**	6	6	6	6	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	9	**26**	26	26	26	1	0	20	25	1	0
AF	Mozambique	**6**	5	5	5	5	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	0	**26**	26	26	26	0	0	0	26	0	21
AF	Nigeria	**7**	6	6	6	6	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	13	**26**	26	26	26	4	11	18	25	4	20
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AF	South Africa	**26**	10	10	10	10	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	16	16	26	26	26
AF	Uganda	**5**	5	5	5	5	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	0	**26**	26	26	23	9	0	22	26	9	26
AF	Zambia	**7**	6	6	6	6	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	23	**26**	26	26	26	0	0	8	26	0	18
AP	China	**26**	15	15	15	15	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	1	0	0	26	1	23
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AS	United States	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	25	14	14	26	0	26
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...	Congo DR	**6**	6	6	6	6	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	21	0	0	0	21	0	0	0
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...	Iceland	**26**	14	14	14	14	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	26	26	**26**	26	26	26	26	26	26	26	0	26
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...	Saudi Arabia	**26**	5	5	5	5	**26**	**26**	26	26	26	26	26	**26**	26	26	26	26	26	**26**	26	26	26	26	9	0	**26**	26	26	9	0	7	14	0	0	17
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A4 Country-Specific Charts

The below charts compare for each country Moody's actual rating (Actual) with the scorecard-implied ratings based on i) the September 2013 methodology (Scorecard), ii) the September 2013 methodology using Moody's published F4 score, thus including Political and Banking Sector risk which is excluded in our baseline 'Scorecard' assessment and iii) the December 2016 methodology, including the updated thresholds and adjustment factors (New).

Group: Africa

Cote d'Ivoire

Ethiopia

Ghana

Kenya

Mozambique

Nigeria

Senegal

South Africa
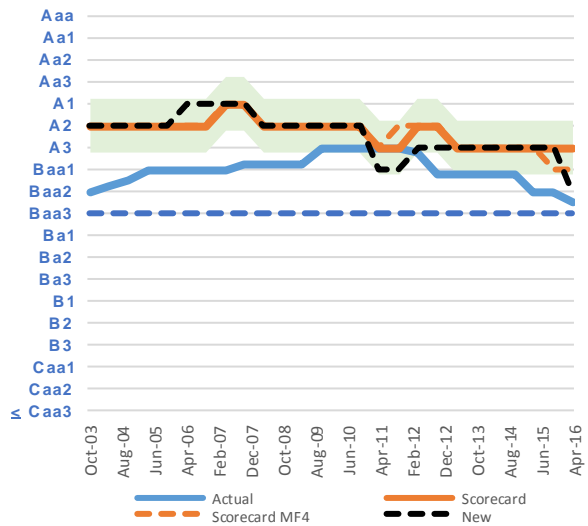
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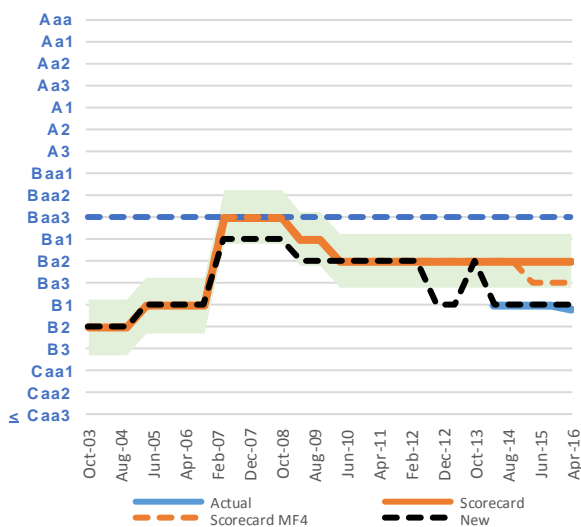
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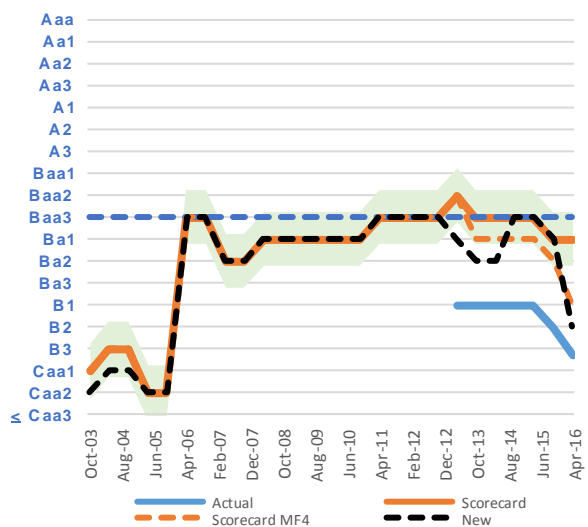
Group: Anglo-Saxon

Australia
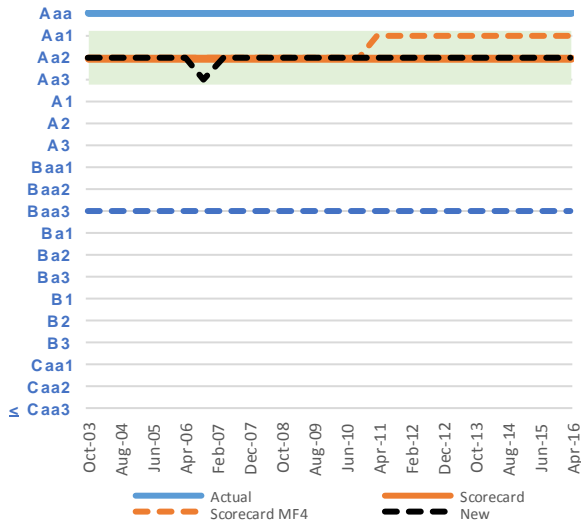
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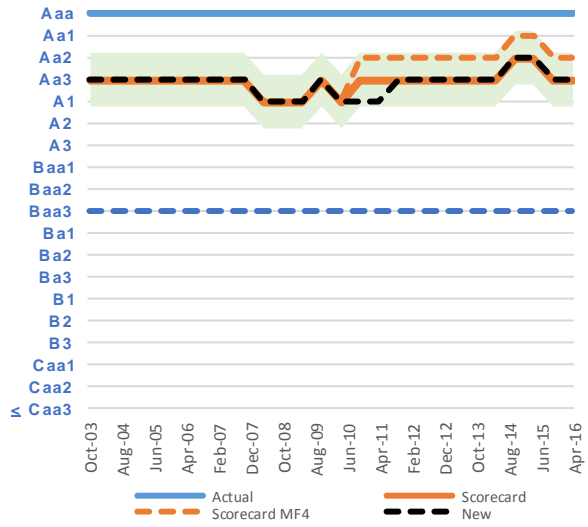
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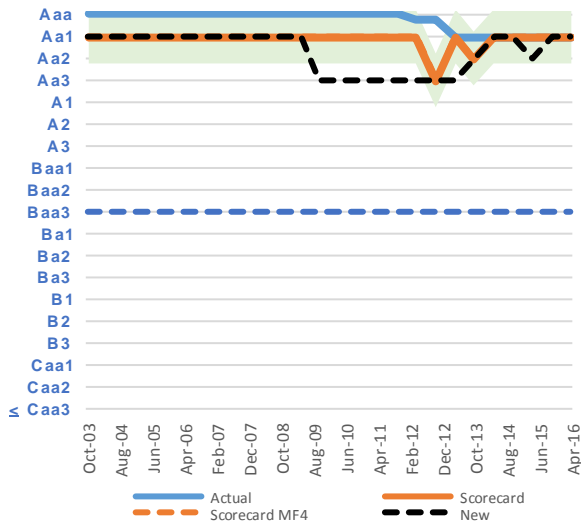
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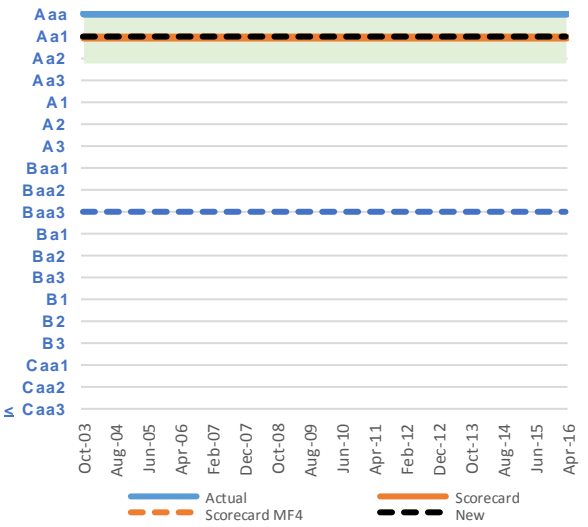
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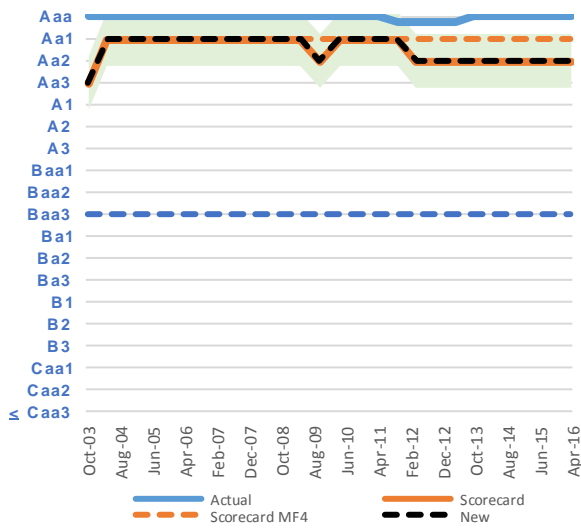
Group: Asia-Pacific (excl. Anglo-Saxon)

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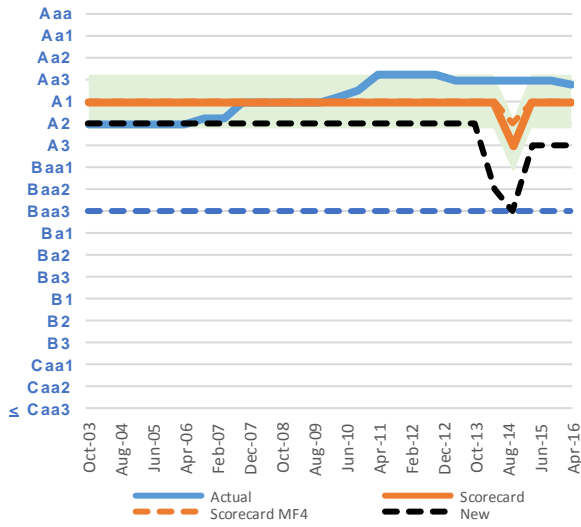
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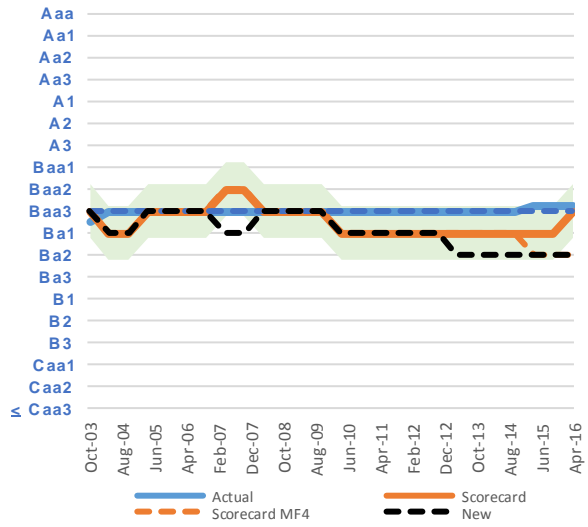
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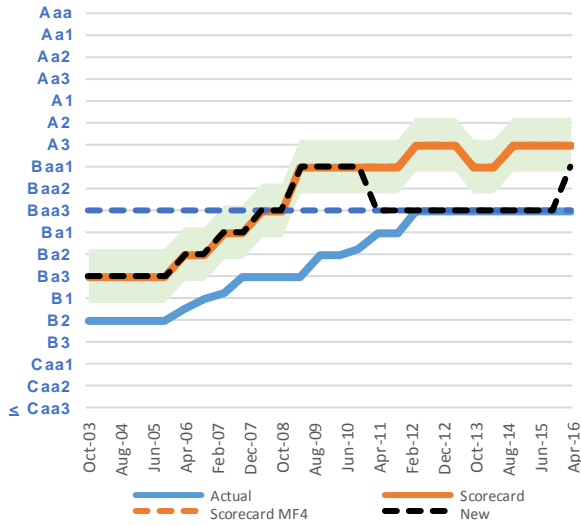
Japan

Korea

Malaysia

37
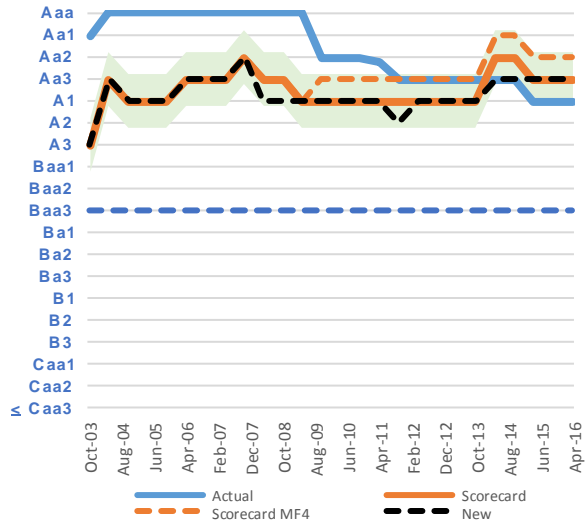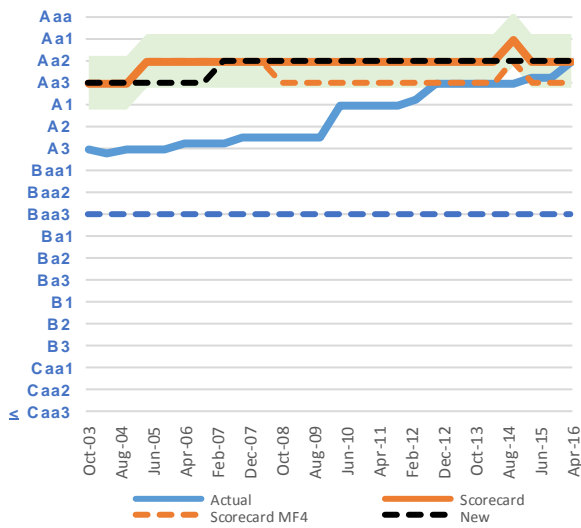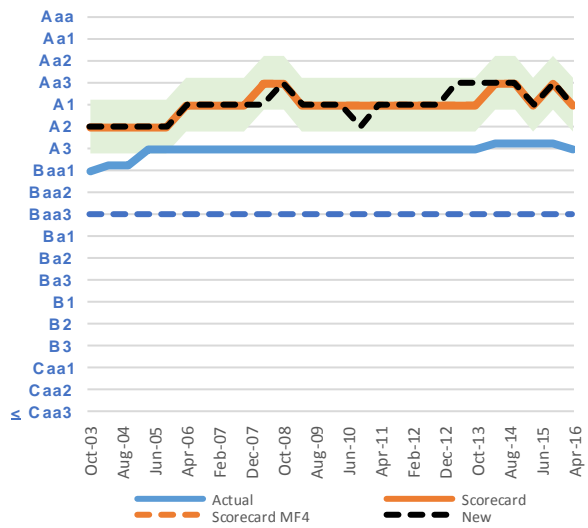
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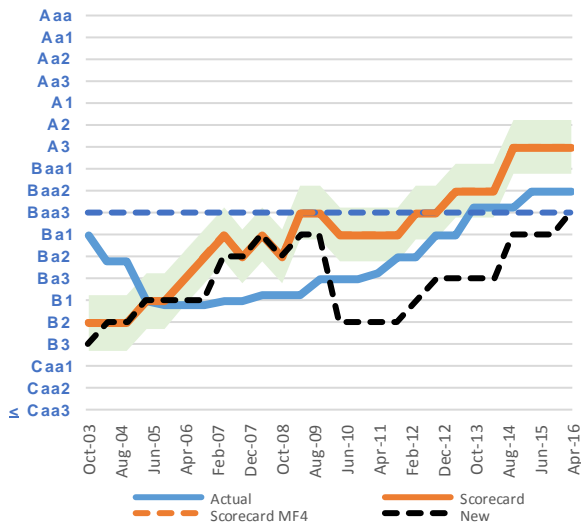
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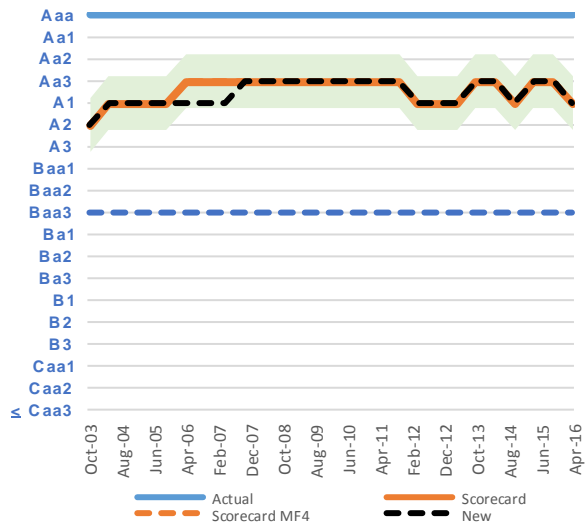
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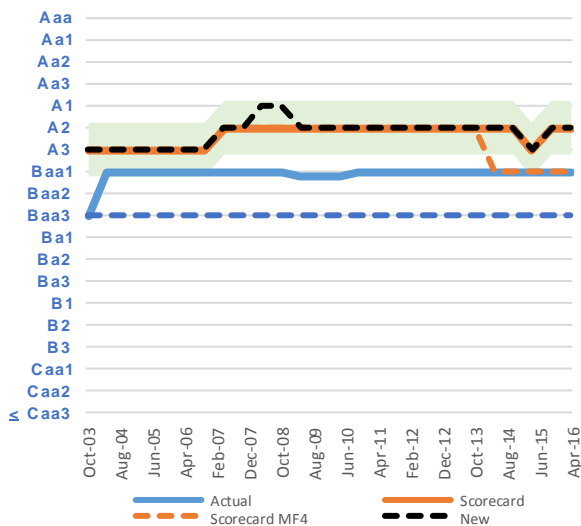
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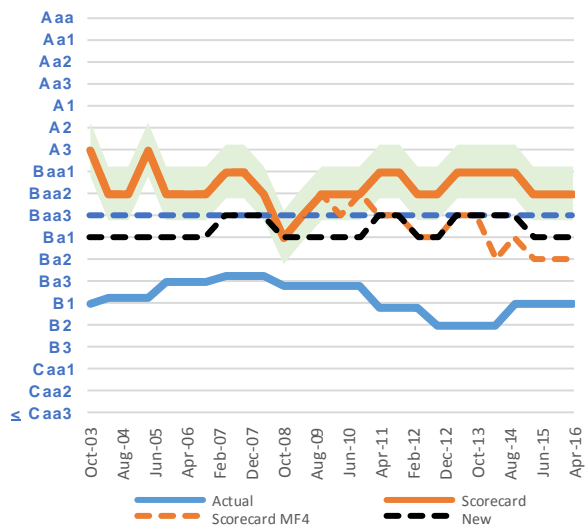
Group: Latin America

Argentina

Bolivia

38
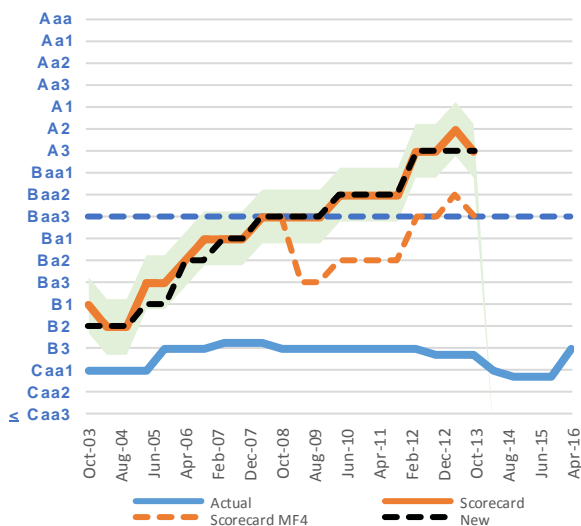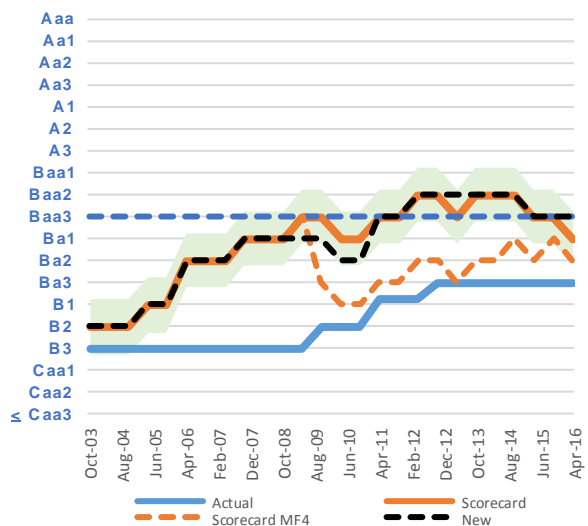
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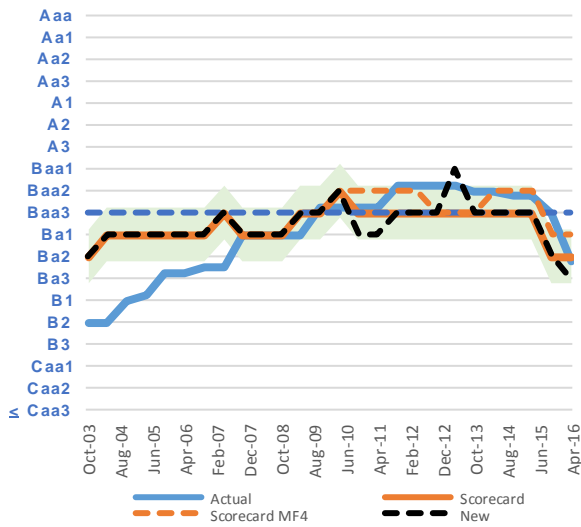
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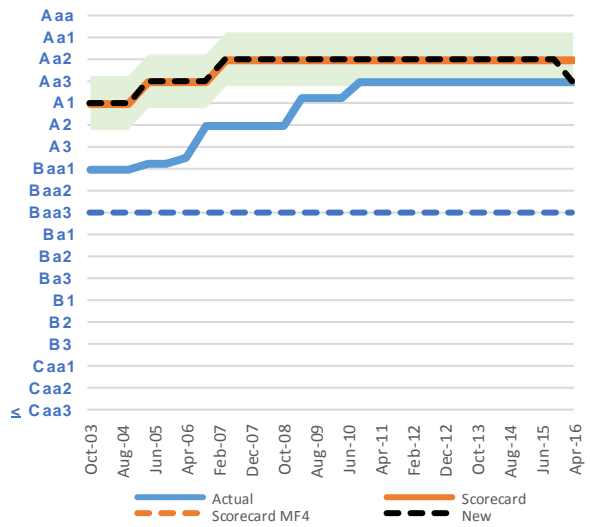
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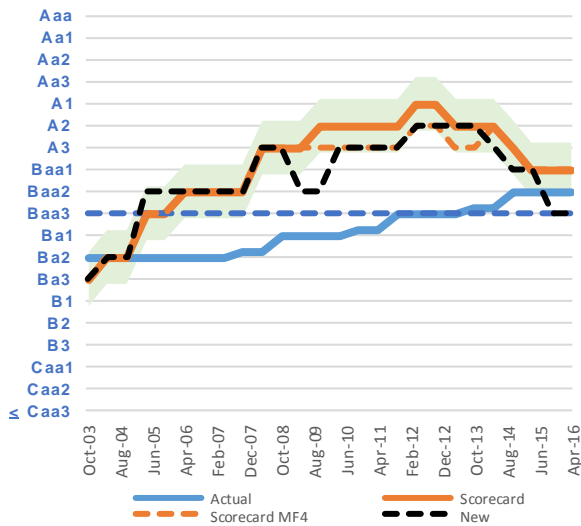
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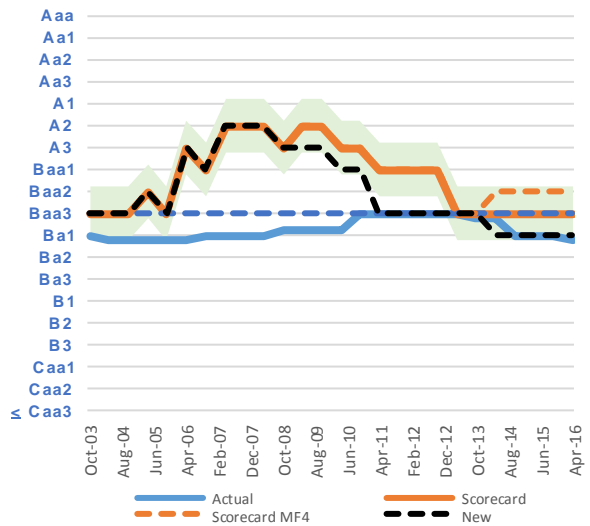
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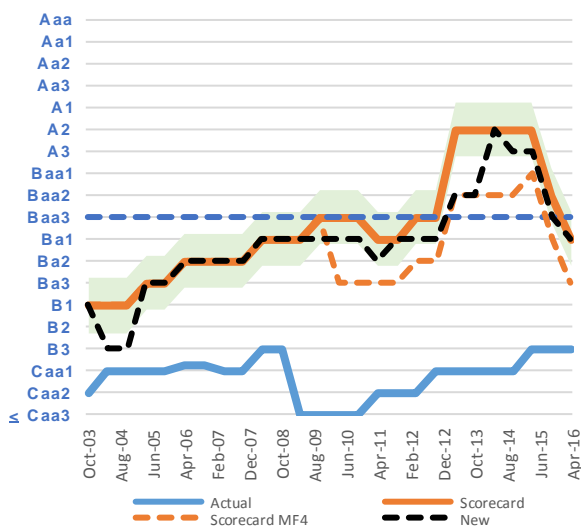
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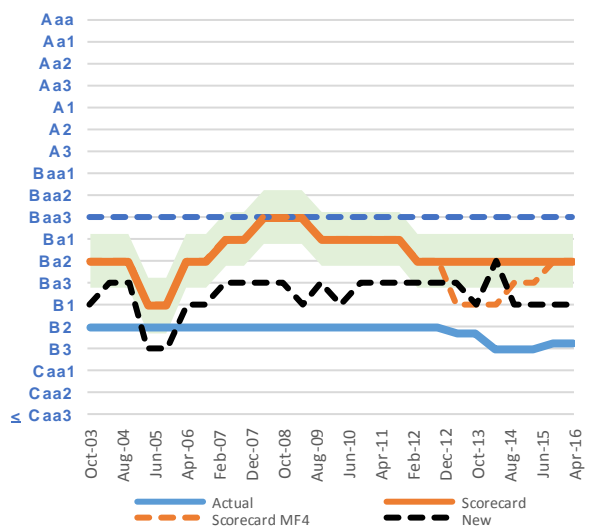
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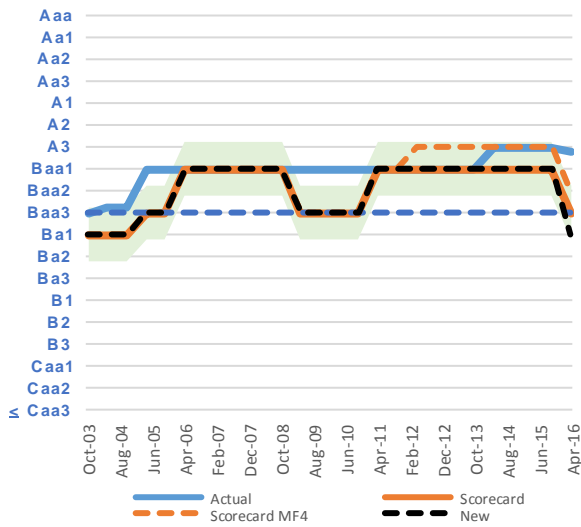
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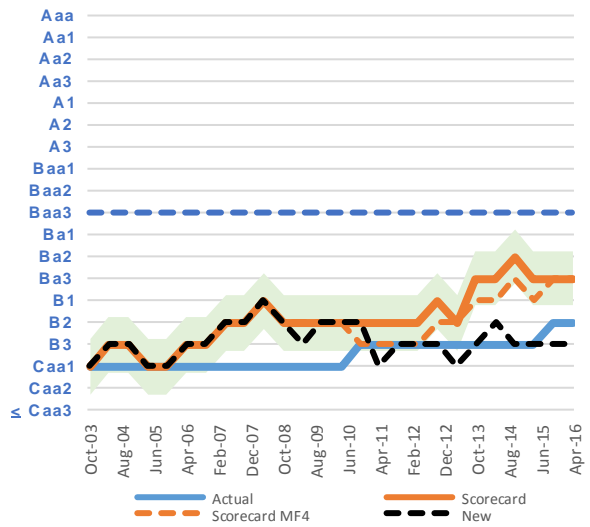
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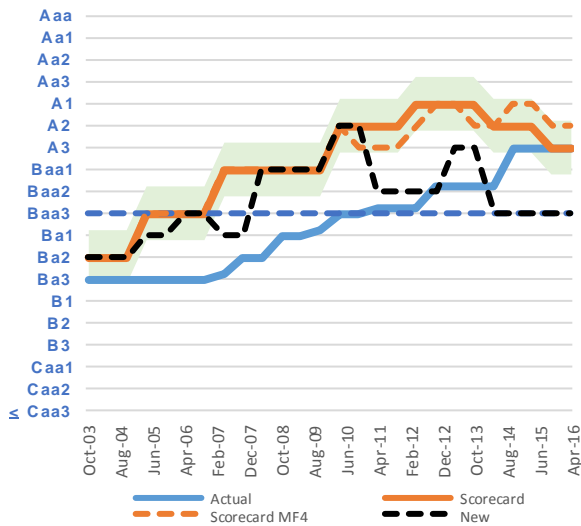
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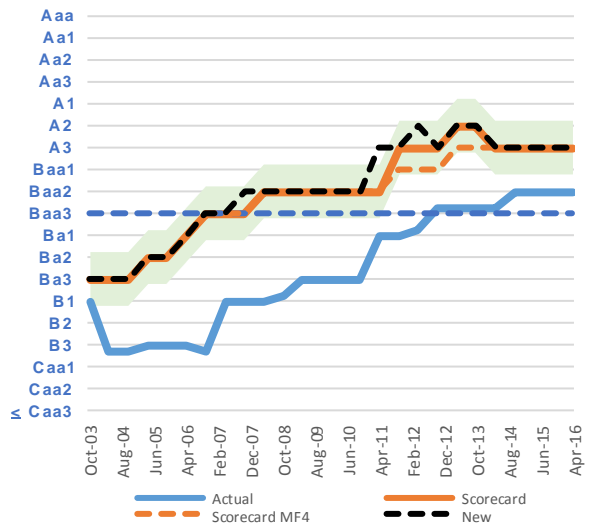
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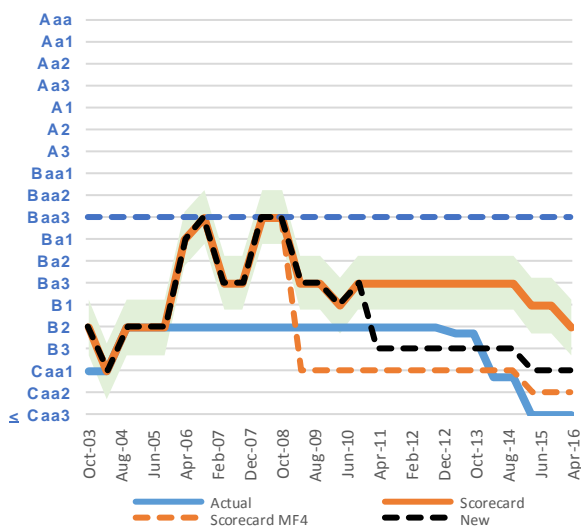
Group: Central & Eastern Europe

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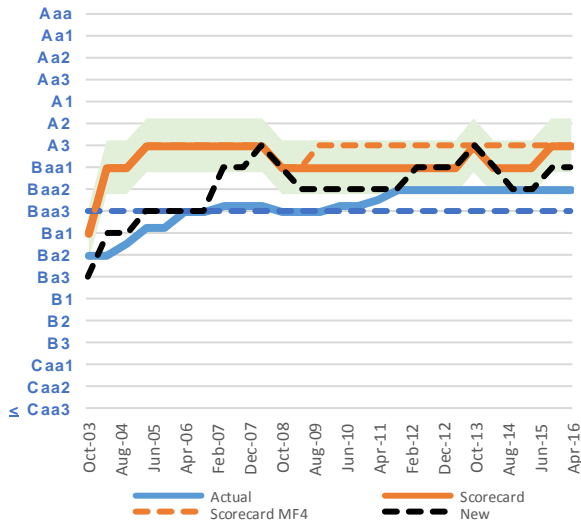
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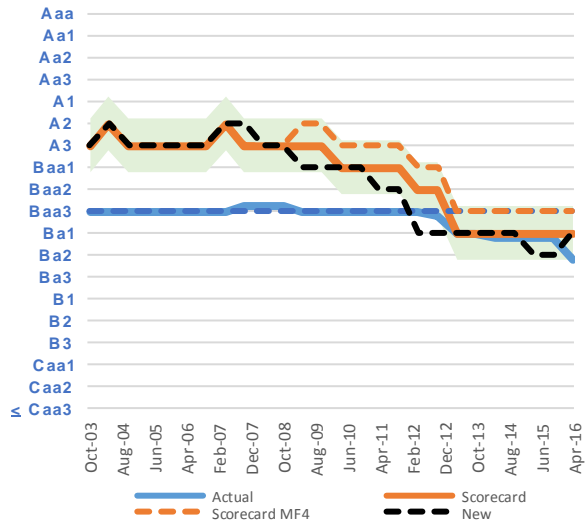
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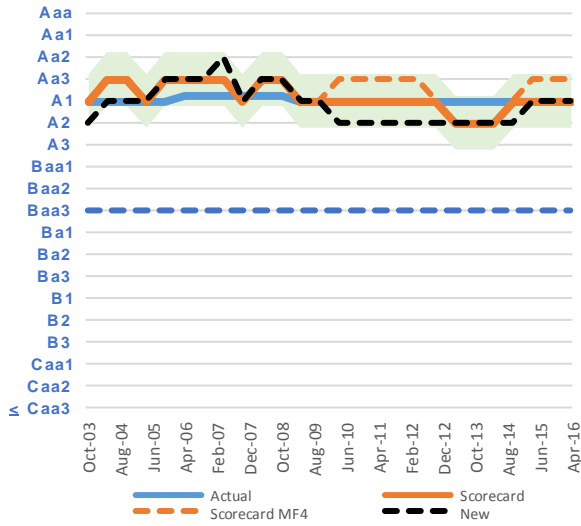
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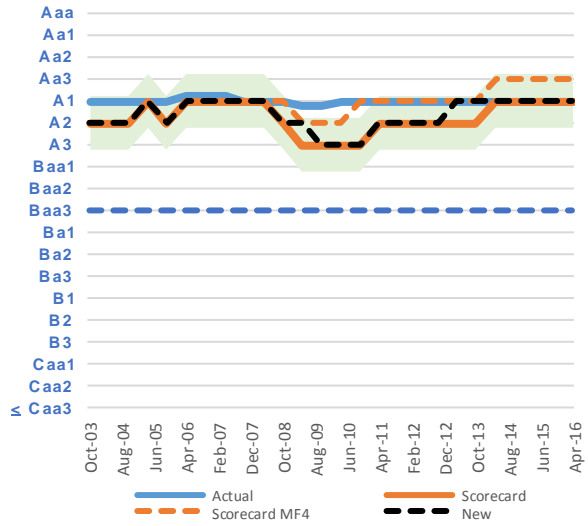
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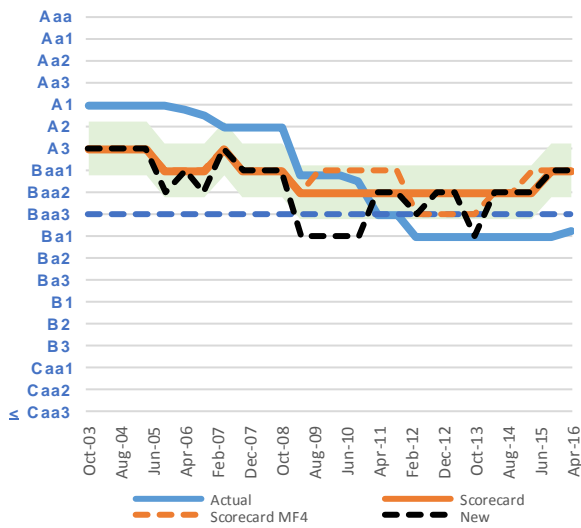
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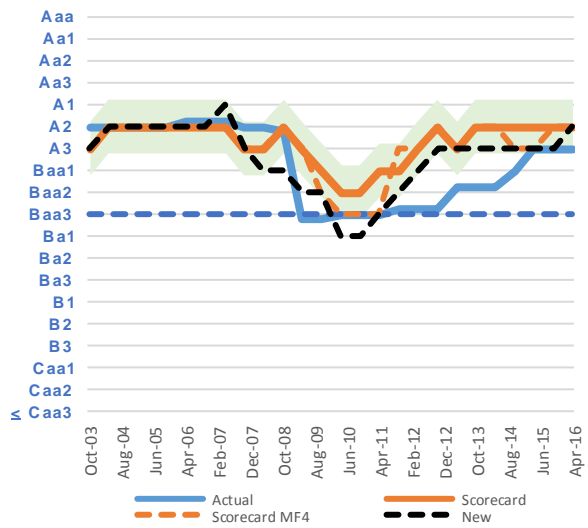
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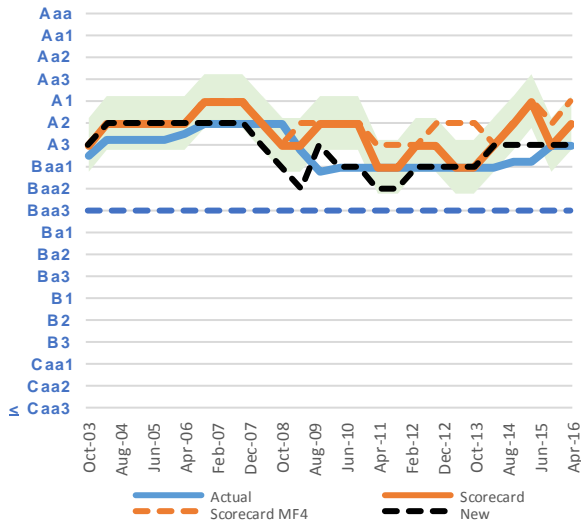
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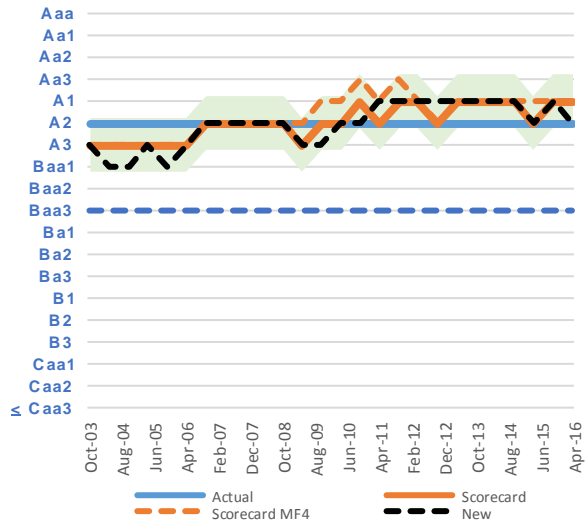
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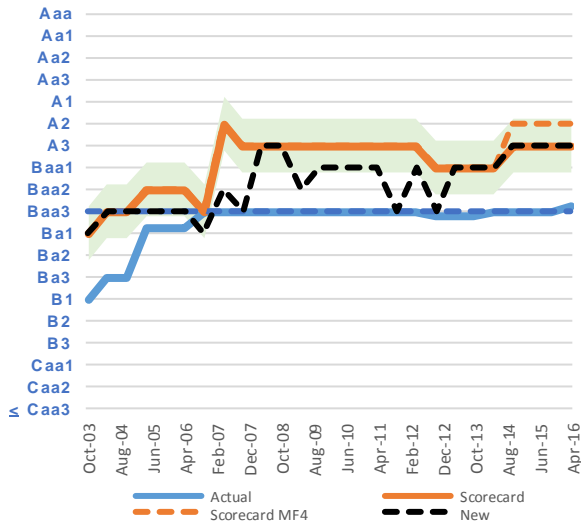
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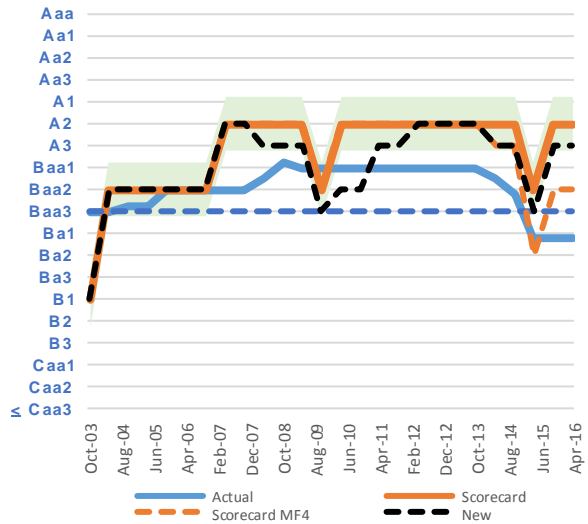
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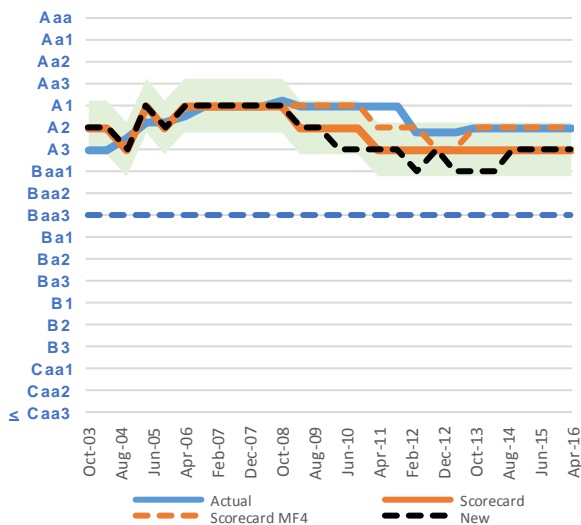
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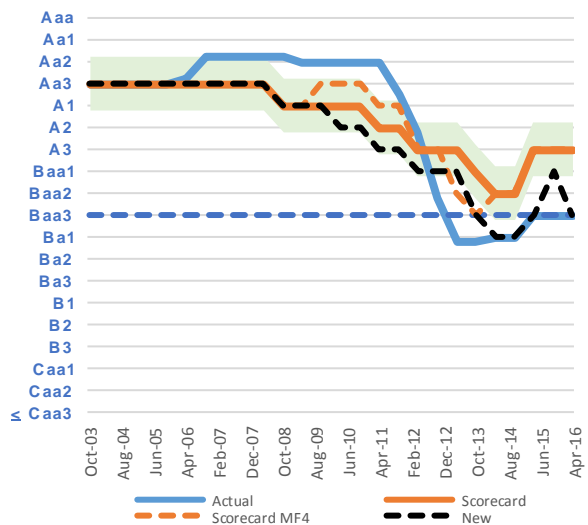
Group: Euro area (excl. CEE)

Austria
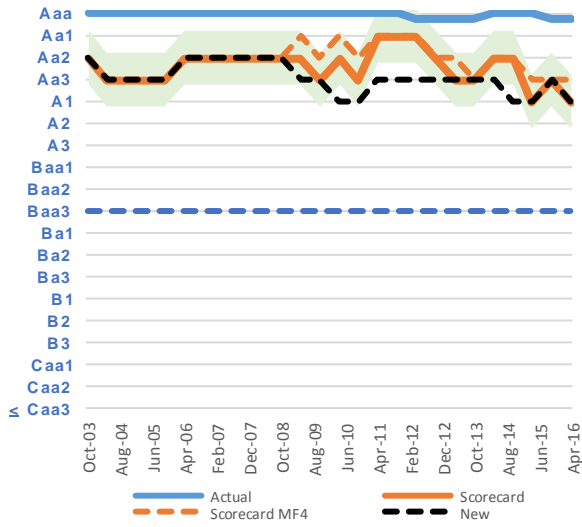
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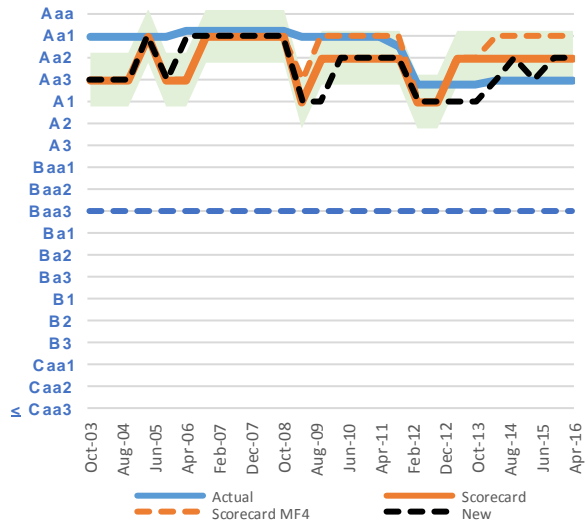
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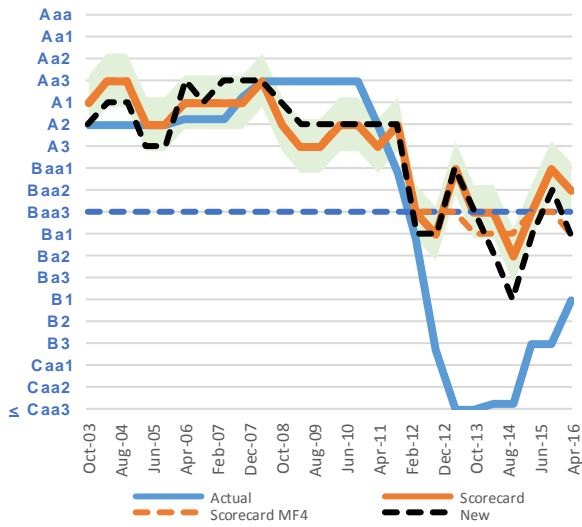
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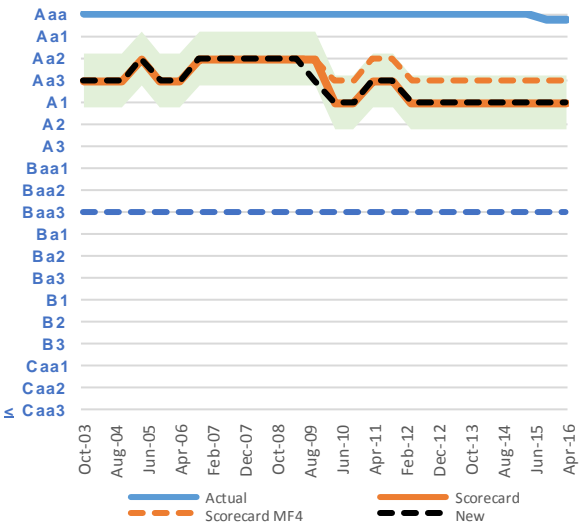
France
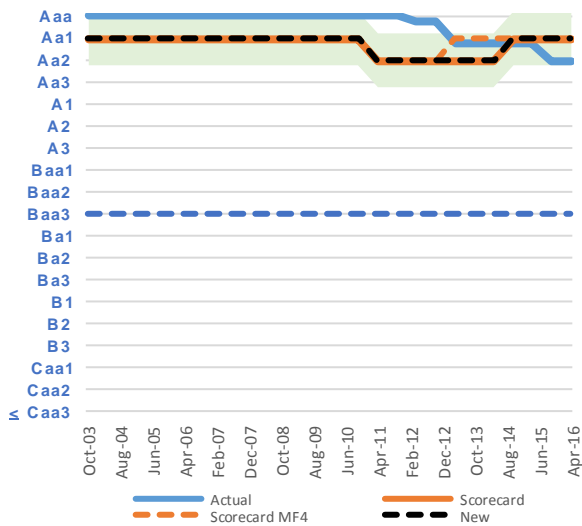
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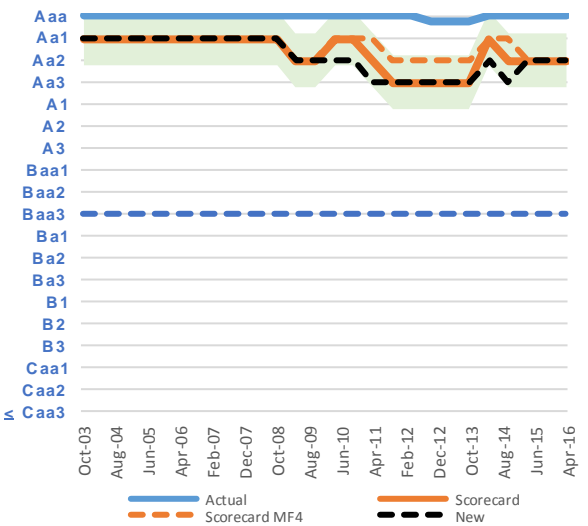
Greece
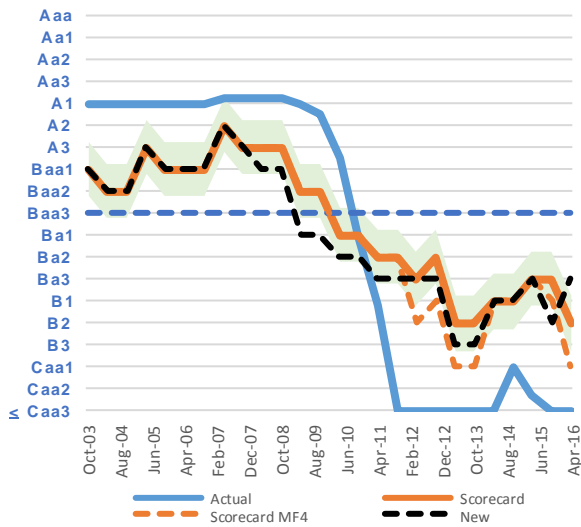
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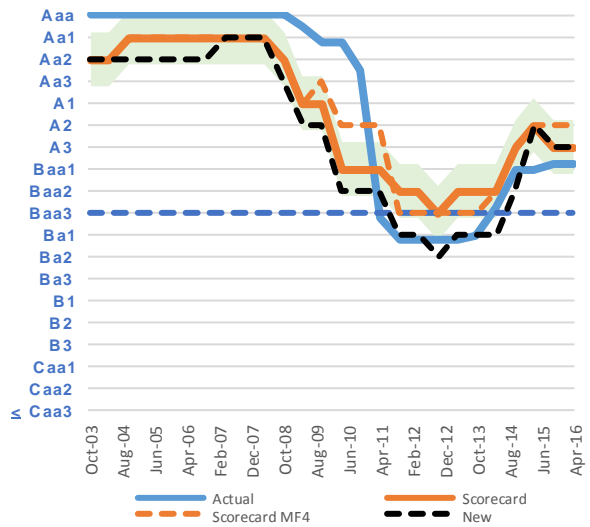
Italy
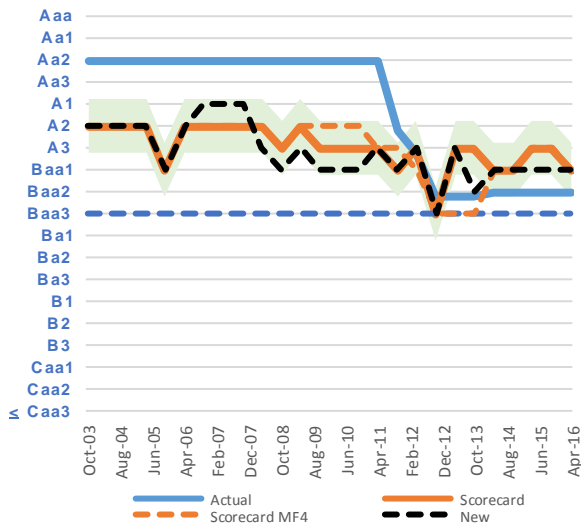
Luxembourg
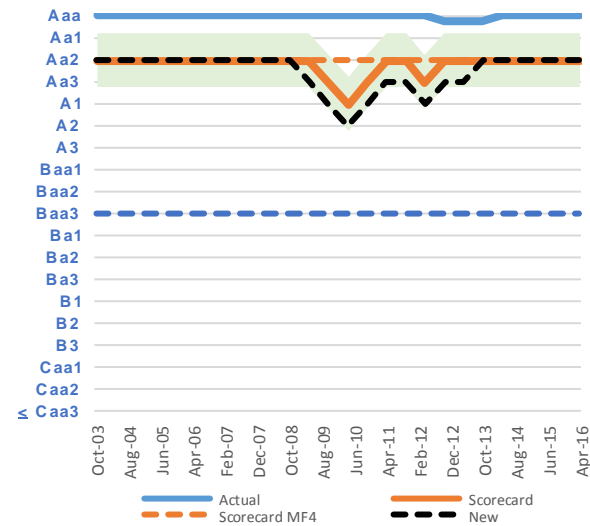
Malta
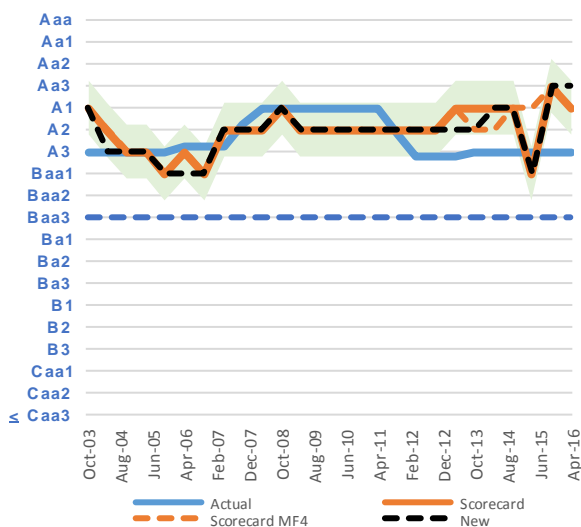
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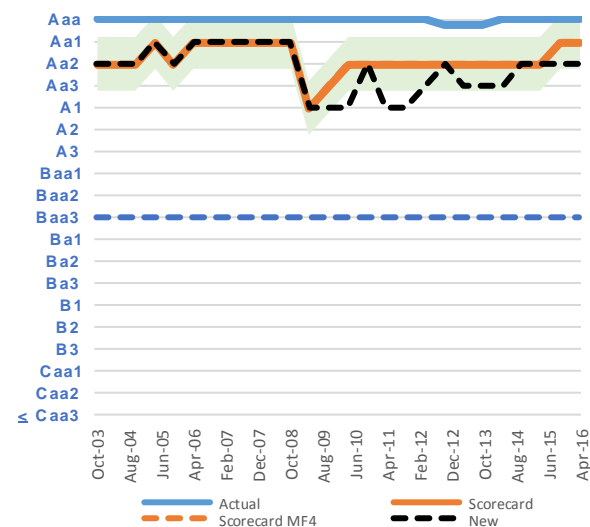
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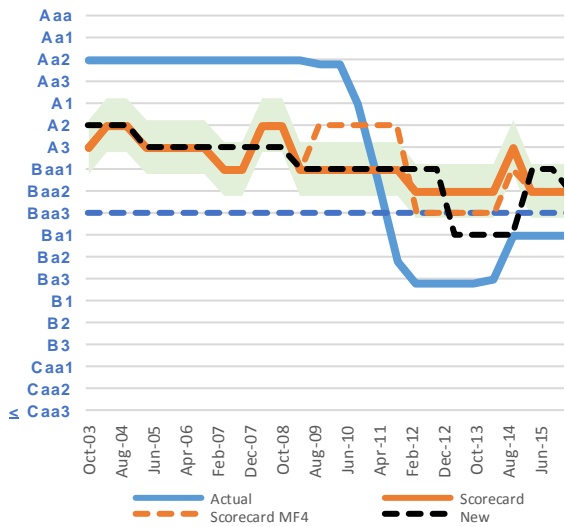
Spain
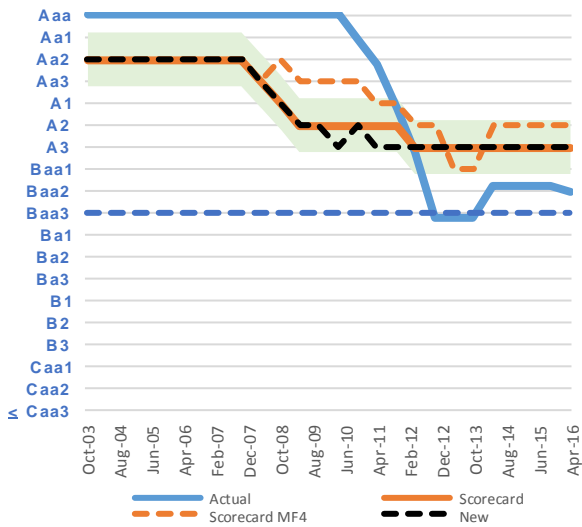
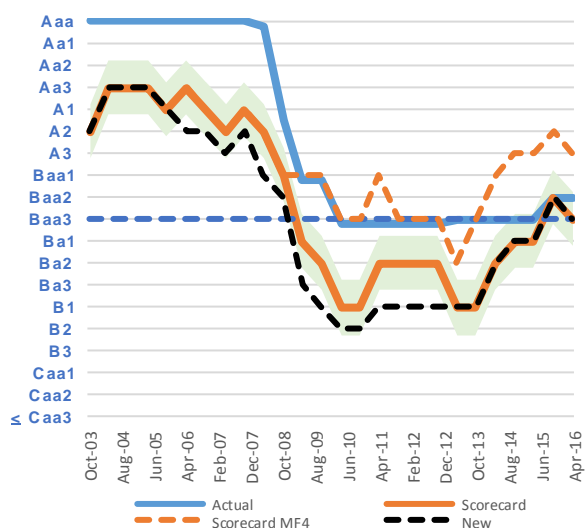

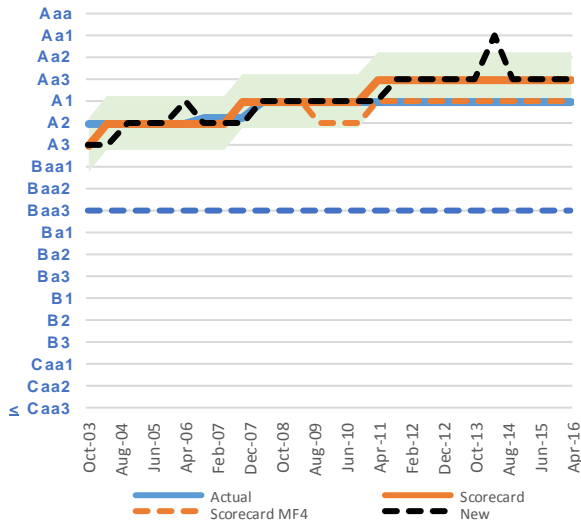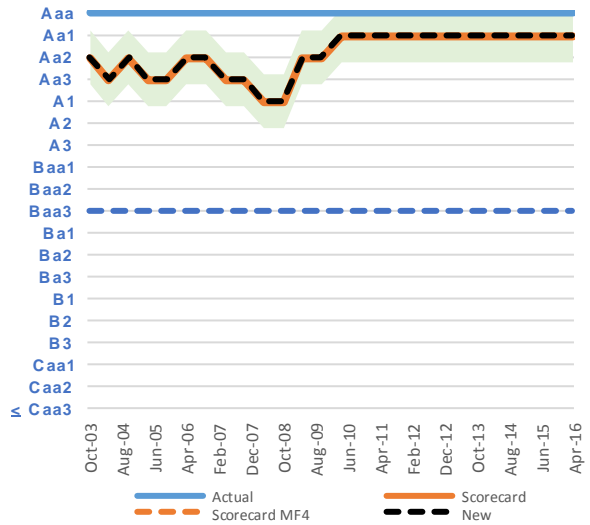**Group: Not assigned to any aggregate other than Full Sample**

Congo
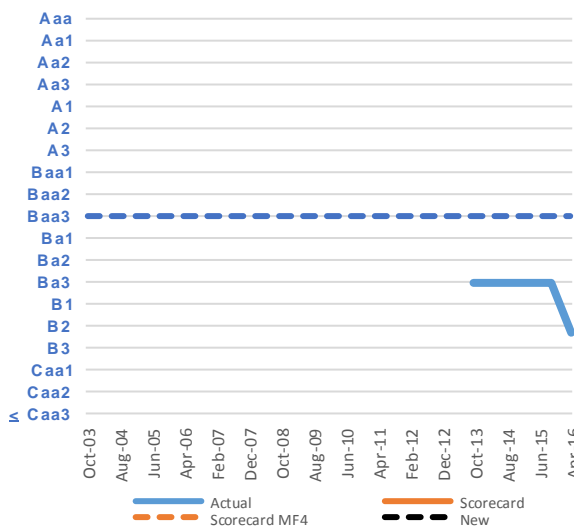
Congo DR
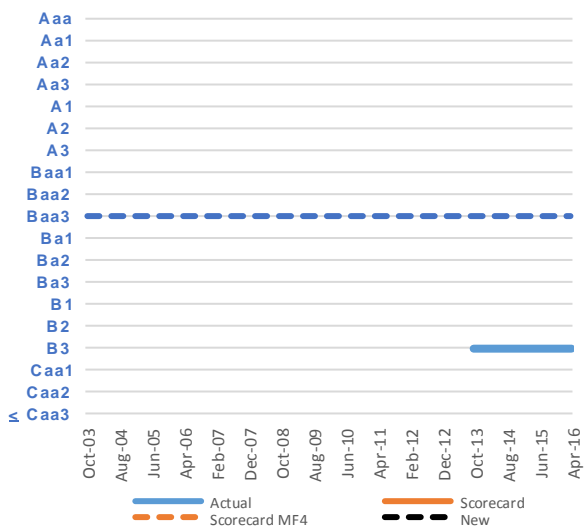
Denmark
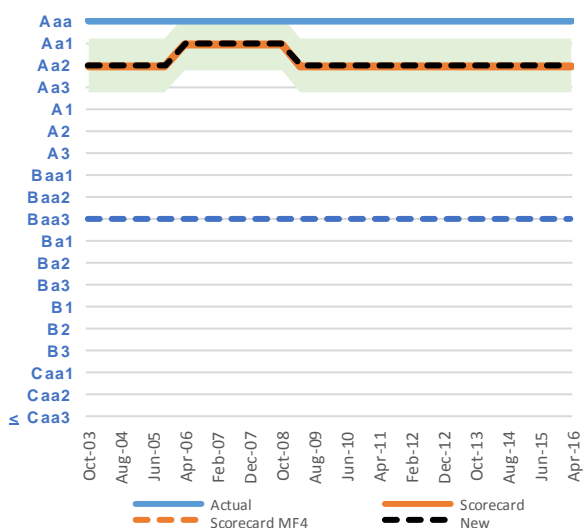
Iceland
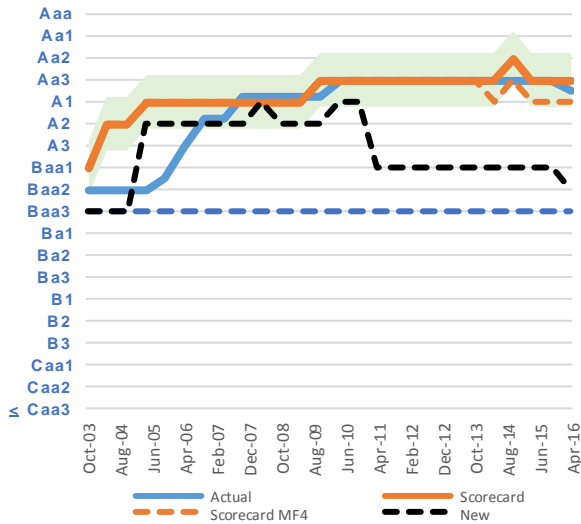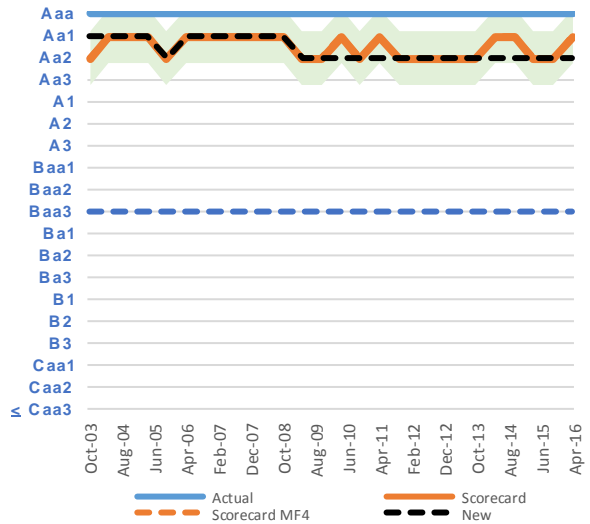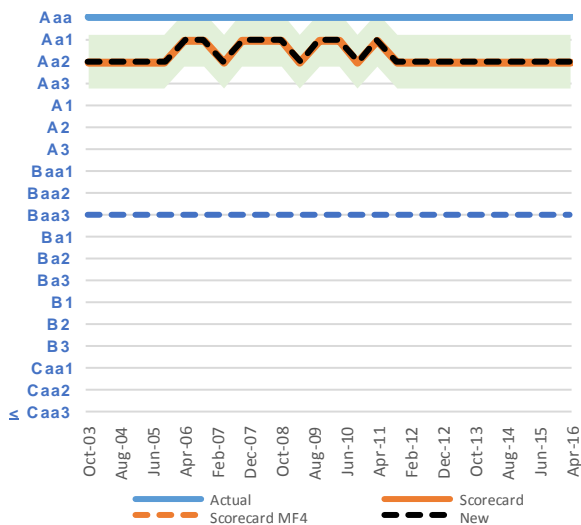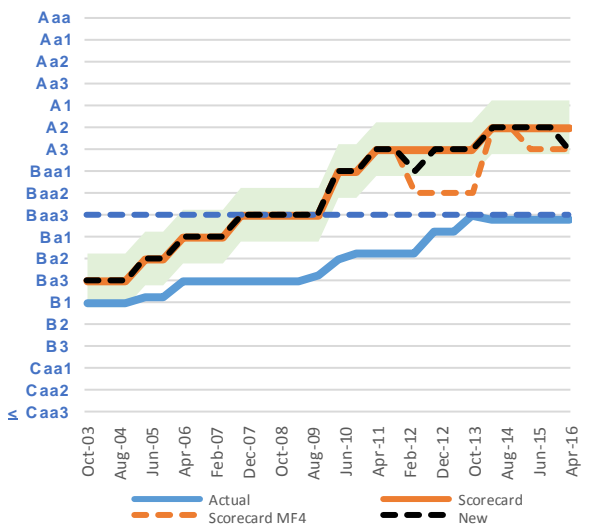
Israel

Norway

Saudi Arabia

Sweden

Switzerland

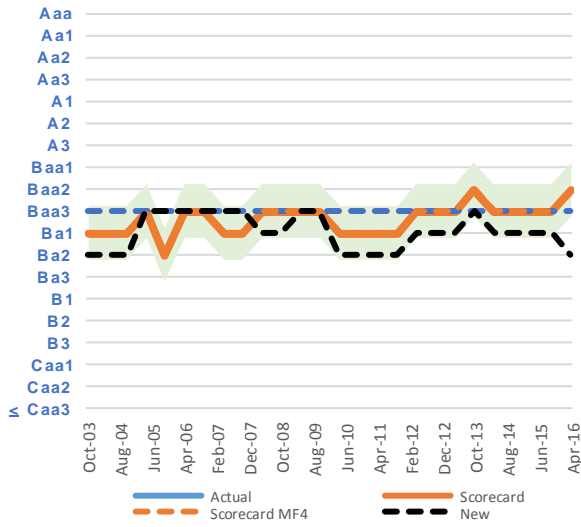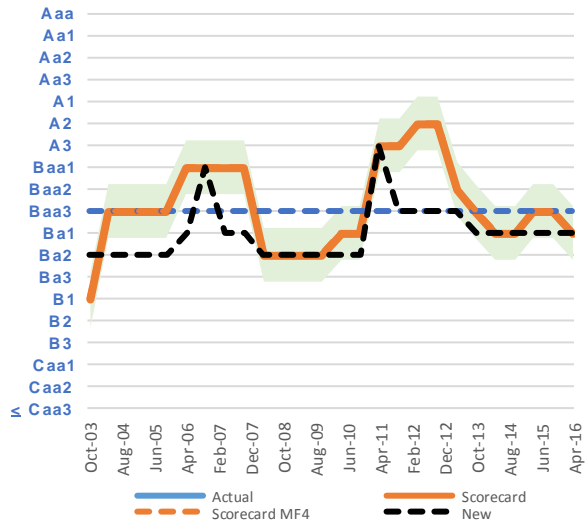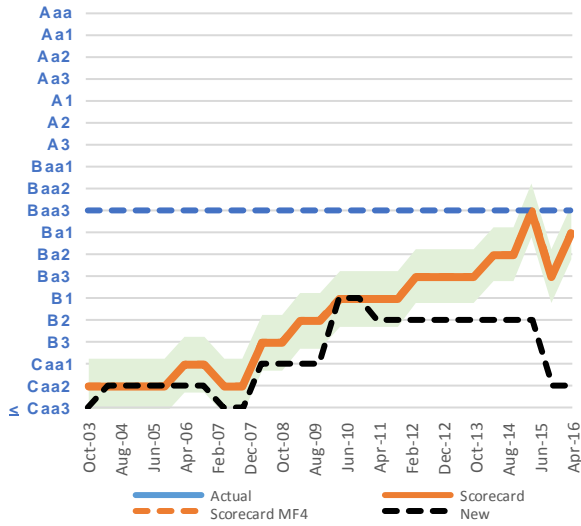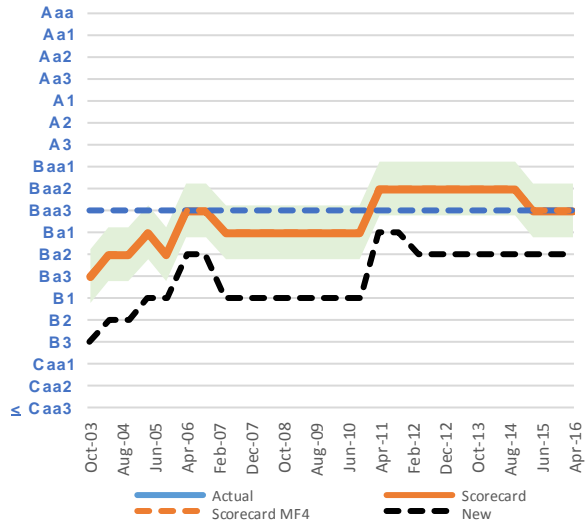Turkey

46

Group: No actual rating

Benin

Burkina Faso
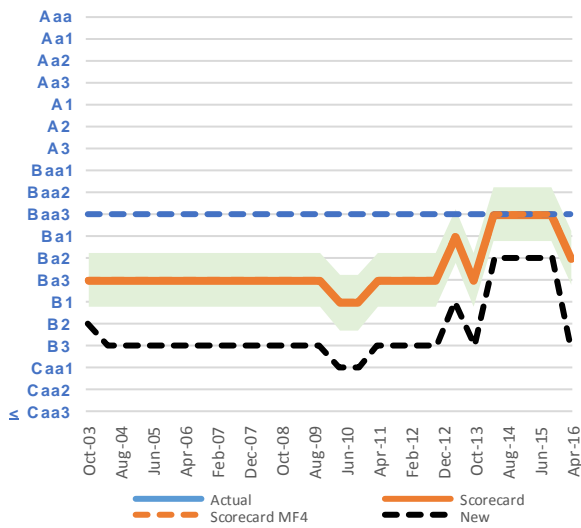
Burundi

Cameroon

Chad

Gambia
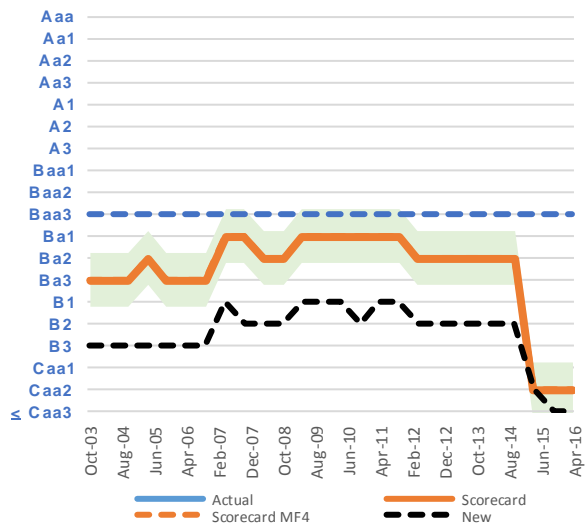
Guinea
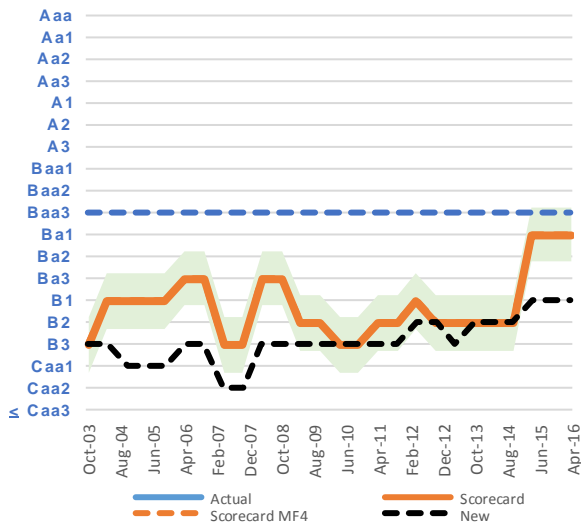
Guyana
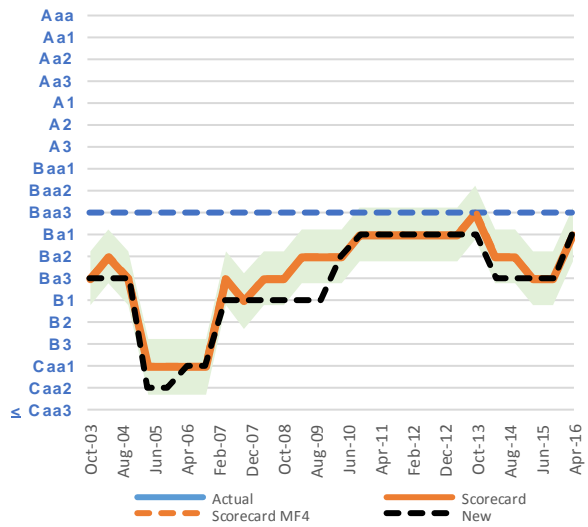
Haiti
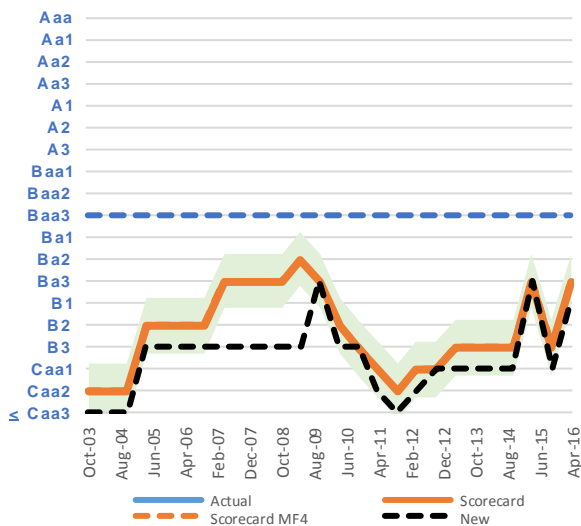
Lesotho
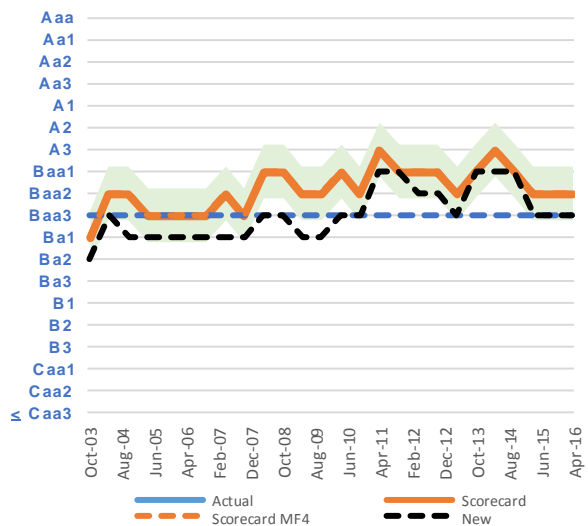
Madagascar
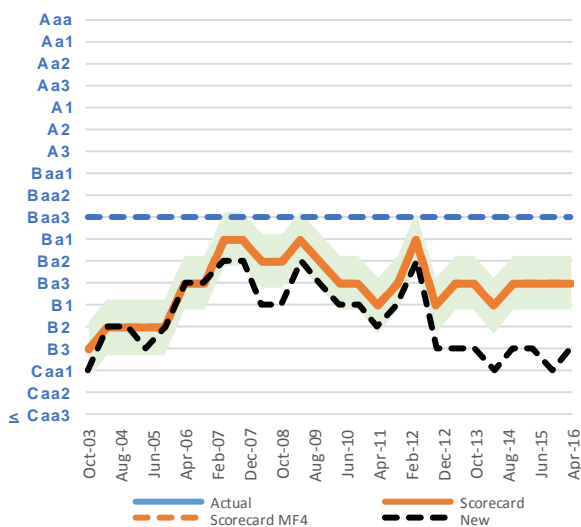
Malawi
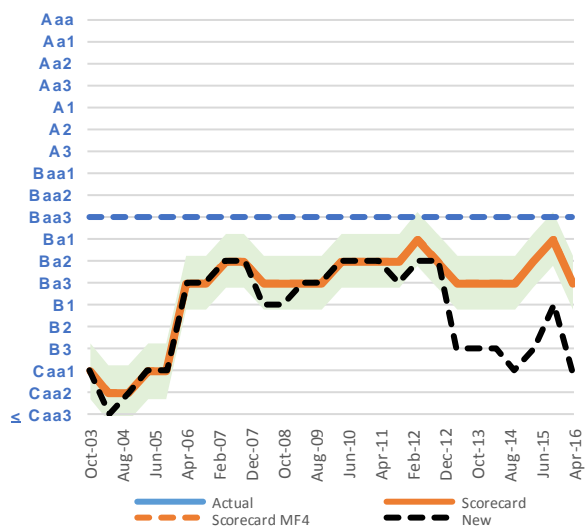
Mali
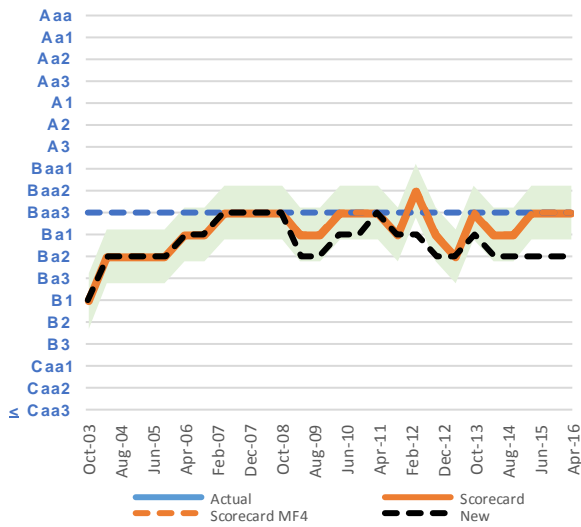
Mauritania
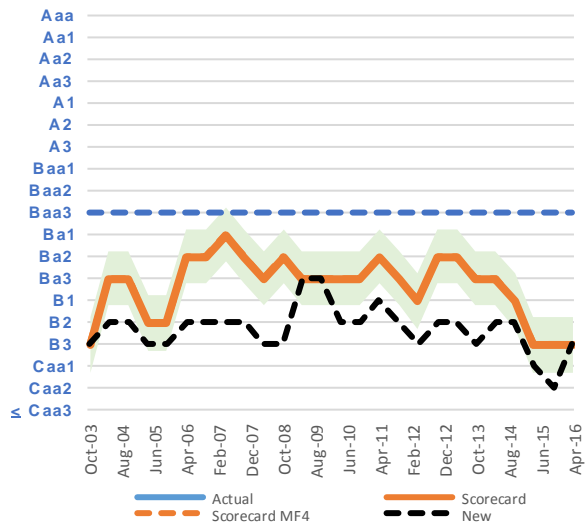
Rwanda
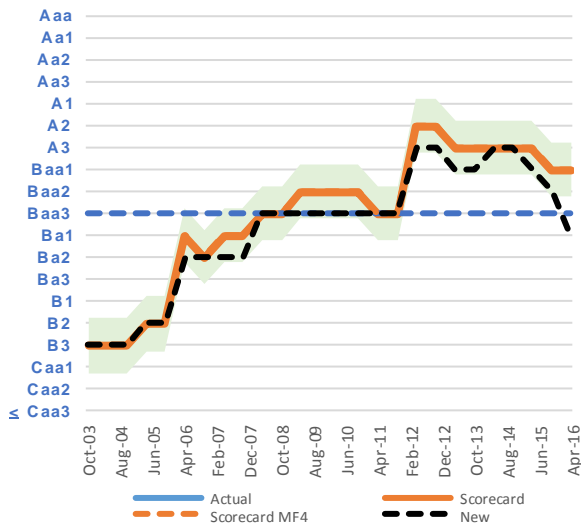
Sierra Leone
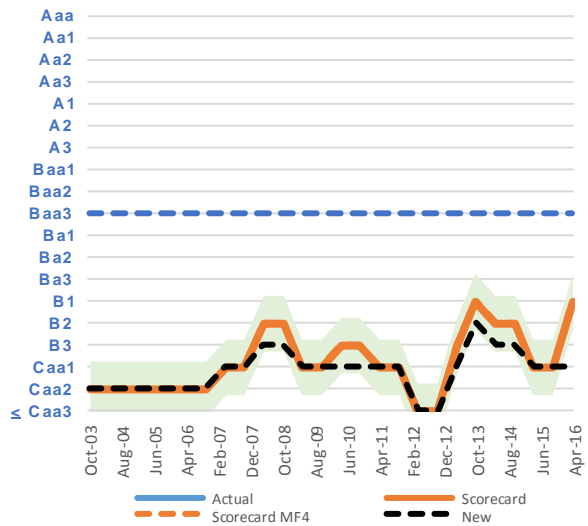
Tanzania
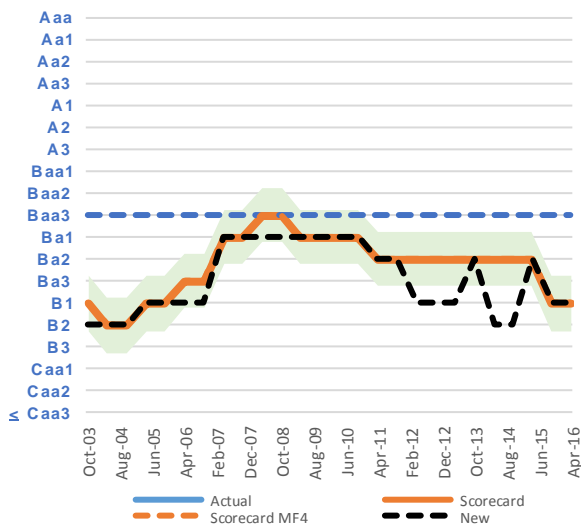
A5   Cases of Default

In this sub-section we highlight the cases of the six sovereigns in Latin America and the euro area which defaulted at least once during our period of observation[19]. It is clear that the scorecard in itself would have falsely signalled a much higher creditworthiness than warranted by the severe distress and the actual defaults.

The case of **Argentina** needs to be viewed with caution for two reasons: First, the indicated period of default reflects the non-payment of debt obligations to creditors after the 30-day grace period despite Argentina having deposited the required funds into a trustee account in a timelymanner. The default was thus neither due to the inability or unwillingness of Argentina to honour its debt obligation but rather the legal proceedings in the US which impeded disbursements of these funds by the trustee. Second, reliable data availability is a real concern.

The case of **Ecuador**, which missed interest payments in November 2008 and February 2009, shows that the scorecard-implied rating at the time of default was in the Ba2-range, and continues to be multiple-notches above the current B3 rating level. **Nicaragua**, which completed distressed exchanges of bonds in July 2003 and again in June 2008, reducing interest payments and extending maturities, shows that the scorecard would in fact have signalled an improvement despite defaulting on bondholders. However, the scorecard-implied rating based on the revised 2016 methodology now fully explains the current rating level. **Uruguay** shows that the scorecard would have signalled a much higher rating than warranted given the contagion from the Argentina debt crises in 2001. In this context, Uruguay was pushed to complete a distressed exchange with bondholders leading to an extension of maturity by five years. Over the past 10 years, the actual rating has slowly caught up with fundamentals implied by the scorecard.

The relatively **recent European defaults of Greece and Cyprus** also indicate the meaningful deviation between the scorecard and the actual rating level, both before and during the default period. Overall, these deviations suggest the presence of non-linearities for sovereigns under distress as well as the need to apply judgement to the methodology during episodes of default.

Default episodes

Argentina (July 2014)   Ecuador (December 2008)
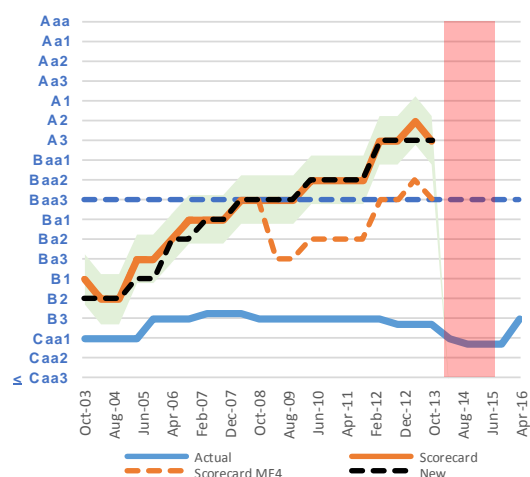
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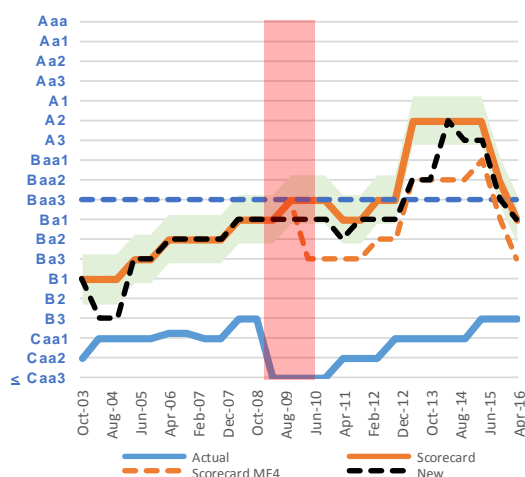
[19] We identify the default cases based on Moody's sovereign default and recovery rates study (2015).

Nicaragua (July 2003, June 2008)
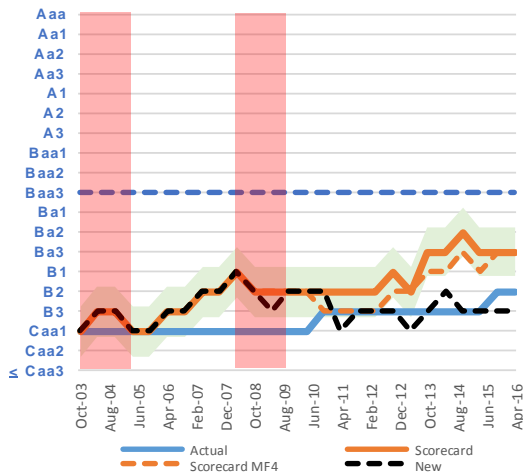
Uruguay (May 2003)
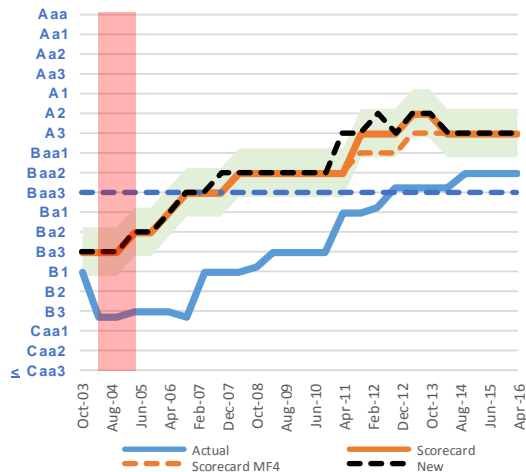
Cyprus (July 2013)
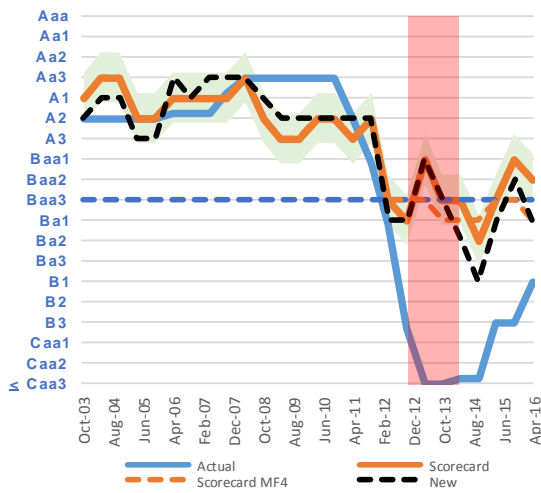
Greece (March 2012, December 2012)
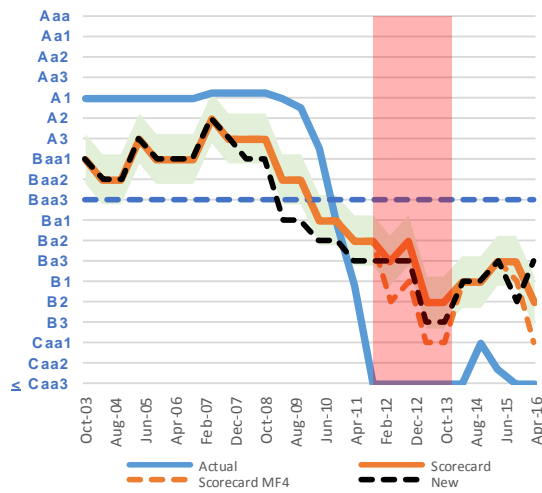
Notes: The blue line refers to Moody's actual rating. The orange line is our derived scorecard-rating based on the 2013 methodology. The dotted orange line addresses our limitations with regard to Moody's F4 assessment whereby we use Moody's published F4 score, which, contrary to our derived rating, includes political and banking sector risk. Finally, the dotted black line is our derived scorecard-rating based on Moody's revised 2016 methodology.

A6 Changes in Judgement – Tables

This annex presents the tabulated results described in chapter 3.1.2, the extent to which fundamentals change at the same period as Moody's rating. Co-moving changes are counted over a one-year horizon, adjusting for double counting (see footnote 13). Columns 1 (Ratio) and 2 (%) show the numbers and corresponding fraction of the above described relationship. Columns 3 (mfx fund) and 4 (mfx judg) show the marginal effects estimated in the probit model (Eq1) (see chapter 2.3.2). For the purpose of this analysis, we distinguish between positive and negative rating changes as well as between rating actions and outlook changes.

Full time horizon

		Overall							
		Outlook only				Rating action			
		Ratio	%	mfx fund	mfx judg	Ratio	%	mfx fund	mfx judg
EA	Pos	6/27	22%	8pp*	6pp*	7/20	35%	5pp*	**15pp***
	Neg	5/19	26%	5pp	4pp*	9/35	26%	8pp*	8pp**
CEE	Pos	1/24	4%	-5pp	3pp	4/16	25%	9pp	6pp*
	Neg	5/15	33%	13pp**	5pp	4/16	25%	9pp	**12pp***
LatAm	Pos	4/18	22%	2pp	...	3/34	9%	-7pp	4pp
	Neg	1/12	8%	-1pp	10pp*	1/6	17%	1pp	9pp*
Africa	Pos	0/3	0%	...	...	0/3	0%	...	...
	Neg	0/4	0%	...	...	3/9	33%	1pp	...
AsiaPacific	Pos	4/17	24%	4pp	7pp*	2/18	11%	-1pp	11pp**
	Neg	1/7	14%	3pp	2pp	1/6	17%	3pp	1pp
AngloSaxon	Pos	0/1	0%	...	...	0/0	...	...	...
	Neg	0/2	0%	...	...	0/1	0%	...	...
Full Sample	Pos	15/84	18%	2pp	**5pp***	17/93	18%	2pp	**10pp***
	Neg	10/56	18%	3pp	1pp	22/73	30%	**10pp***	**4pp***

Before 2008 H1

		Overall							
		Outlook only				Rating action			
		Ratio	%	mfx fund	mfx judg	Ratio	%	mfx fund	mfx judg
EA	Pos	2/11	18%	6pp	8pp	4/8	50%	16pp*	15pp**
	Neg	1/3	33%	8pp	...	0/0	...	...	...
CEE	Pos	0/13	0%	...	...	3/10	30%	19pp	9pp
	Neg	2/6	33%	15pp*	13pp*	0/1	0%	...	...
LatAm	Pos	4/12	33%	3pp	...	1/11	9%	-9pp	4pp
	Neg	0/3	0%	...	...	0/0	...	...	...
Africa	Pos	0/2	0%	...	...	0/1	0%	...	...
	Neg	0/0	...	...	...	0/0	...	...	...
AsiaPacific	Pos	3/8	38%	20pp	...	1/5	20%	3pp	...
	Neg	1/2	50%	27pp*	2pp	0/1	0%	...	...
AngloSaxon	Pos	0/0	...	...	...	0/0	...	...	...
	Neg	0/0	...	...	...	0/0	...	...	...
Full Sample	Pos	10/42	24%	3pp	**9pp***	9/37	24%	2pp	**11pp***
	Neg	3/12	25%	6pp*	1pp	1/3	33%	5pp	...

Between 2008 H2 and 2012 H1

		Overall							
		Outlook only				Rating action			
		Ratio	%	mfx fund	mfx judg	Ratio	%	mfx fund	mfx judg
EA	**Pos**	0/3	0%	…	…	0/0	…	…	…
	Neg	4/10	40%	7pp	4pp	8/28	29%	6pp	15pp
CEE	**Pos**	0/5	0%	…	…	0/1	0%	…	…
	Neg	2/5	40%	14pp	3pp	2/9	22%	6pp	22pp**
LatAm	**Pos**	0/4	0%	…	…	2/13	15%	-1pp	-2pp
	Neg	0/0	…	…	…	0/0	…	…	…
Africa	**Pos**	0/0	…	…	…	0/1	0%	…	…
	Neg	0/1	0%	…	…	0/0	…	…	…
AsiaPacific	**Pos**	1/6	17%	3pp	4pp	1/7	14%	-1pp	12pp
	Neg	0/2	0%	…	…	0/3	0%	…	…
AngloSaxon	**Pos**	0/0	…	…	…	0/0	…	…	…
	Neg	0/2	0%	…	…	0/0	…	…	…
Full Sample	**Pos**	1/17	6%	-2pp	**7pp***	4/24	17%	1pp	**9pp***
	Neg	5/18	28%	4pp	3pp	12/39	31%	8pp*	**12pp***

After 2012 H2

		Overall							
		Outlook only				Rating action			
		Ratio	%	mfx fund	mfx judg	Ratio	%	mfx fund	mfx judg
EA	**Pos**	4/13	31%	14pp	0pp	3/12	25%	10pp	…
	Neg	0/6	0%	…	…	1/7	14%	4pp	5pp
CEE	**Pos**	1/6	17%	3pp	0pp	1/5	20%	7pp	…
	Neg	1/4	25%	7pp	…	2/6	33%	22pp*	10pp
LatAm	**Pos**	0/2	0%	…	…	0/10	0%	…	…
	Neg	1/9	11%	-4pp	24pp*	1/6	17%	0pp	16pp
Africa	**Pos**	0/1	0%	…	…	0/1	0%	…	…
	Neg	0/3	0%	…	…	3/9	33%	-1pp	…
AsiaPacific	**Pos**	0/3	0%	…	…	0/6	0%	…	…
	Neg	0/3	0%	…	…	1/2	50%	14pp	…
AngloSaxon	**Pos**	0/1	0%	…	…	0/0	…	…	…
	Neg	0/0	…	…	…	0/1	0%	…	…
Full Sample	**Pos**	4/25	16%	3pp	0pp	4/32	13%	1pp	**9pp***
	Neg	2/26	8%	-2pp	1pp	9/31	29%	10pp**	-1pp

*Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.*

A7 Changes in Judgement – Factor Level

This annex presents the tabulated results described in chapter 3.2.2, the extent to which fundamental factor scores change at the same period as Moody's reported factor scores. The format is in-line with the tables described in annex A6. All results refer to data after 2012 H2.

		Economic Strength (F1)				Institutional Strength (F2)			
		Ratio	%	mfx fund	mfx judg	Ratio	%	mfx fund	mfx judg
EA	Pos	3/11	27%	-3pp	14pp**	3/19	16%	-3pp	15pp*
	Neg	4/17	24%	1pp	14pp*	2/5	40%	1pp	4pp
CEE	Pos	7/9	78%	9pp*	21pp**	3/13	23%	9pp*	18pp*
	Neg	4/11	36%	9pp	13pp	2/5	40%	9pp	10pp*
LatAm	Pos	5/15	33%	-9pp	...	1/5	20%	-9pp	...
	Neg	4/6	67%	11pp	8pp	4/8	50%	11pp	8pp
Africa	Pos	2/8	25%	4pp	17pp	1/5	20%	4pp	...
	Neg	0/2	0%	...	...	2/6	33%	...	...
AsiaPacific	Pos	14/18	78%	**29pp***	7pp	5/13	38%	**29pp***	15pp*
	Neg	1/2	50%	9pp	...	1/6	17%	9pp	14pp*
AngloSaxon	Pos	1/6	17%	-9pp	4pp	0/5	0%	-9pp	...
	Neg	0/1	0%	...	...	0/0	...	...	...
Full Sample	Pos	31/67	46%	3pp	**16pp***	13/65	20%	3pp	**16pp***
	Neg	12/43	28%	2pp	**10pp***	10/31	32%	2pp	**9pp***

		Fiscal Strength (F3)				Susceptibility to Event Risk (F4)			
		Ratio	%	mfx fund	mfx judg	Ratio	%	mfx fund	mfx judg
EA	Pos	3/16	19%	-4pp	15pp*	0/16	0%	...	...
	Neg	4/14	29%	7pp	10pp	2/14	14%	0pp	15pp**
CEE	Pos	4/14	29%	11pp	...	0/7	0%	...	...
	Neg	2/6	33%	6pp	32pp	1/13	8%	-7pp	18pp*
LatAm	Pos	1/14	7%	-8pp	...	0/7	0%	...	...
	Neg	3/5	60%	2pp	22pp*	0/12	0%	...	...
Africa	Pos	0/6	0%	...	...	0/6	0%	...	...
	Neg	6/8	75%	13pp	...	0/1	0%	...	...
AsiaPacific	Pos	2/14	14%	1pp	11pp	1/8	13%	16pp	7pp
	Neg	3/5	60%	9pp	-1pp	0/5	0%	...	...
AngloSaxon	Pos	1/4	25%	18pp	...	0/2	0%	...	...
	Neg	0/3	0%	...	...	0/4	0%	...	...
Full Sample	Pos	15/74	20%	3pp	**14pp***	1/46	2%	-6pp	4pp
	Neg	19/42	45%	8pp**	5pp	2/48	4%	-6pp	7pp**

		Rating committee							
		Outlook only				Rating action			
		Ratio	%	mfx fund	mfx judg	Ratio	%	mfx fund	mfx judg
EA	Pos	5/13	38%	14pp	-4pp	4/12	33%	12pp	14pp*
	Neg	0/5	0%	...	...	1/6	17%	11pp	-5pp
CEE	Pos	0/6	0%	...	...	2/5	40%	10pp	15pp*
	Neg	1/4	25%	10pp	-1pp	2/6	33%	24pp*	-1pp
LatAm	Pos	1/2	50%	5pp	...	6/11	55%	33pp**	14pp
	Neg	0/9	0%	...	...	0/6	0%	...	...
Africa	Pos	0/1	0%	...	...	0/1	0%	...	...
	Neg	0/3	0%	...	...	2/9	22%	14pp	-5pp
AsiaPacific	Pos	0/3	0%	...	...	2/6	33%	7pp	11pp
	Neg	0/3	0%	...	...	1/2	50%	32pp*	0pp
AngloSaxon	Pos	0/1	0%	...	...	0/0	...	...	...
	Neg	0/0	...	...	...	0/1	0%	...	...
Full Sample	Pos	6/25	24%	3pp	1pp	13/33	39%	**11pp*****	8pp**
	Neg	1/26	4%	-2pp	-4pp*	6/31	19%	12pp*	-6pp**

*Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.*

A8 Source of Judgement – Factor Level

While in chapter 3.2.3 we only present the factor level coefficients of specification Eq2 for the Full Sample, in this annex we provide the breakdown by geographical area. Again all results refer to the periods after 2012 H2.

Factor 1

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	FullSample
Scorecard indicators / Economic	Average Real GDP Growth$_{t-4\ to\ t+5}$	0.06	-0.02	0.1	-0.03	-0.12	-0.34	-0.05
	Volatility in Real GDP Growth$_{t-9\ to\ t}$	-0.19**	-0.4**	-0.2	-0.11	-0.04	0.07	-0.05
	WEF Global Competitiveness Index$_t$	-0.03	0.06	0.03	-0.12*	0.32	...	0.06
	Nominal GDP (US$)$_{t-1}$	-0.22	0.24	0.73*	0.21	0.11	0.66*	0.26*
	GDP per capita (PPP, $US)$_{t-1}$	0.36	0.43*	-0.65	0.28	-0.04	0.45	0.04
Institutional	Worldwide Government Effectiveness Index	0.03	0.08	0.36*	0.22	-0.26	...	-0.05
	Worldwide Rule of Law Index	-0.09	0.08	0.14	0.12	0.03	...	0.15
	Worldwide Control of Corruption Index	0.1	0.23	-0.02	0.38**	0.47*	...	0.16
	Inflation Level$_{t-4\ to\ t+5}$	0.01	0.16	0.39	-0.24*	-0.14	-0.48	0.01
	Inflation Volatility$_{t-9\ to\ t}$	-0.09	0.03	-0.15**	-0.02	0.01	...	0
Fiscal	General Government Debt/GDP$_t$	0.28*	0.36*	0.06	0.09	-0.07	0.24	0.05
	General Government Debt/Revenues$_t$	0.06	0.18	0.06	-0.05	-0.07	0.22	-0.02
	General Government Interest Payments/Revenue$_t$	0.13	0.38	0.2	-0.06	-0.04	0.03	0.01
	General Government Interest Payments/GDP$_t$	0.09	0.33**	0.16	0.14	-0.15	0.01	0.02
	°Debt Trend$_{t-4\ to\ t+1}$	0.09	0.17	-0.62**	0.24	-0.06	-0.07	-0.09
	°Government Foreign Currency Debt/Total Debt (%)	-0.15	-0.22	-0.16	...	...	...	-0.13
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	0.33*	...	...	0.04	...	**0.11***
	GDP per capita (Percentile)	...	...	-0.19**	...	0.14	...	0.09
	Gross Borrowing Requirements/GDP (%)	-0.11	**-0.31***	-0.02	-0.23	0.06	-0.01	-0.06
	Non-Resident Share of General Government Debt (%)	0.12	0.01	0.35*	-0.07	-0.15	-0.13	0
	Total Domestic Bank Assets/GDP (%)	-0.08	0.32	0.06	...	0.1	-0.08	0.05
	Banking System Loan-to-Deposit Ratio (%)	-0.05	-0.02	0.65	0.23	-0.61**	0.45	-0.03
	(Current Account Balance + FDI Inflows)/GDP	-0.1**	-0.27	0.03	-0.03	-0.14	-0.27	-0.03
	External Vulnerability Indicator (EVI) (source: Moodys)	...	0.11	0.04	-0.15	0.39	...	0.04
	Net International Investment Position/GDP (%)	0	0.05	0.01	-0.06	-0.2	0.11	0.05
Other indicators	Government bond yield (log)	-0.98	0.1	-4.2**	-1.26	-1.16	-0.03	0.06
	Real effective exchange rate Growth (%)	0.04	-0.08**	**-0.02***	-0.01	0	-0.01	**-0.01***
	Nominal effective exchange rate Growth (%)	0.02	-0.08**	-0.02*	-0.01	0	-0.01	**-0.02***
	CBOE Volatility Index (VIX)	-0.99	-1.33	1	3.39*	1.01	0.44	0.16

*Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.*

Factor 2

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	FullSample
Economic	Average Real GDP Growth$_{t-4\ to\ t+5}$	-0.01	0.06	-0.04	-0.31*	0.23	0.06	0.03
	Volatility in Real GDP Growth$_{t-9\ to\ t}$	-0.01	0.15*	-0.07	0.18	0.03	0.06	0.01
	WEF Global Competitiveness Index$_t$	0.16	0.01	-0.04	-0.25*	-0.09	...	-0.01
	Nominal GDP (US$)$_{t-1}$	-0.17	0.15	0.07	-0.52**	-0.11	0.24**	-0.07
	GDP per capita (PPP, $US)$_{t-1}$	-0.03	0.12	0.09	-0.07	0.03	-0.07	0
Institutional	Worldwide Government Effectiveness Index	0.37	0.28	0.33	0.08	0.27	...	0.16
	Worldwide Rule of Law Index	0	-0.4	0.02	0.21	-0.24	...	-0.07
	Worldwide Control of Corruption Index	0.15	-0.11	-0.06	-0.2	0.24	...	0.1
	Inflation Level$_{t-4\ to\ t+5}$	-0.22*	0.2	-0.04	-0.05	-0.09	0.17	0
	Inflation Volatility$_{t-9\ to\ t}$	-0.02	-0.11*	-0.04	0.05	-0.11	-0.17	-0.07*
Fiscal	General Government Debt/GDP$_t$	0.08	-0.03	0.03	0.07	-0.01	0.05	0.03
	General Government Debt/Revenues$_t$	0.11	-0.05	-0.01	0.09	0.02	0.11*	0.05
	General Government Interest Payments/Revenue$_t$	-0.01	0.07	0.02	0.08	-0.03	0.08	0.01
	General Government Interest Payments/GDP$_t$	-0.01	-0.01	0.02	-0.02	-0.25	0.04	-0.02
	°Debt Trend$_{t-4\ to\ t+1}$	0.09	0.02	-0.08	0.29	-0.11	0.09	0.02
	°Government Foreign Currency Debt/Total Debt (%)	0.43	0.14	0.07	...	...	...	0.15
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	-0.23**	...	...	-0.1	...	-0.13**
	GDP per capita (Percentile)	...	...	0.01	...	...	...	-0.07
	Gross Borrowing Requirements/GDP (%)	-0.01	0.01	-0.31	**0.39***	-0.12	-0.07	-0.06
	Non-Resident Share of General Government Debt (%)	-0.04	-0.16*	-0.07	0	0.25	0.01	0.02
	Total Domestic Bank Assets/GDP (%)	0.07	-0.24	0.37	...	-0.31	-0.06**	-0.27**
	Banking System Loan-to-Deposit Ratio (%)	-0.02	0.07	...	-0.5	0.28	0.13	-0.13
	(Current Account Balance + FDI Inflows)/GDP	0	-0.07	0.06	-0.11*	**0.31***	0.07	0.06
	External Vulnerability Indicator (EVI) (source: Moodys)	...	-0.06	0.01	0.11	-0.02	...	0.03
	Net International Investment Position/GDP (%)	0	-0.14	0.15	0.27	0.05	0.14**	-0.07
Other indicators	Government bond yield (log)	-0.38	0	-0.48	-2.08	0.3	-0.47	-0.18
	Real effective exchange rate Growth (%)	0.01	0.03	0	0.03*	0.01	0	0
	Nominal effective exchange rate Growth (%)	-0.04	0.03	0	0.03	0.01	0	0.01
	CBOE Volatility Index (VIX)	1.19*	0.48	-0.44	1.62	0.64	1.43**	0.56**

Factor 3

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	FullSample
Economic	Average Real GDP Growth$_{t-4\ to\ t+5}$	0.06	0	-0.03	-0.14	-0.19	-0.3	-0.03
	Volatility in Real GDP Growth$_{t-9\ to\ t}$	0.05	0.16	0.04	0.39**	0	0	0.11
	WEF Global Competitiveness Index$_t$	0.1	0.19	0.05	0.22	**0.46***	...	0.12*
	Nominal GDP (US$)$_{t-1}$	-0.03	0.57	0.1	1.01*	0.27*	1.11	0.26
	GDP per capita (PPP, $US)$_{t-1}$	0.42	0.2	-0.07	1.61**	-0.07	1.23	0.18
Institutional	Worldwide Government Effectiveness Index	-0.31	-0.1	0.23	-0.14	0.17	...	-0.02
	Worldwide Rule of Law Index	0.02	0.21	-0.06	-0.13	0.06	...	-0.04
	Worldwide Control of Corruption Index	0.22	0.27	0.02	0.07	-0.01	...	0.04
	Inflation Level$_{t-4\ to\ t+5}$	0.18**	0.07	0.32	0.22	-0.08	-0.57	0.08*
	Inflation Volatility$_{t-9\ to\ t}$	0	-0.02	-0.05	0.6**	-0.12*	0.27	0.05
Fiscal	General Government Debt/GDP$_t$	-0.05	0.09	-0.13	0.72*	-0.14	0.13	0.08
	General Government Debt/Revenues$_t$	0.12	0.54	0.26**	-0.78*	-0.29	0.76*	0.22*
	General Government Interest Payments/Revenue$_t$	0.08	-0.3	0.02	-0.32	0.2	-1.27	-0.11
	General Government Interest Payments/GDP$_t$	-0.08	-0.31	-0.09	0.17	0.39	0.24	-0.1
	°Debt Trend$_{t-4\ to\ t+1}$	0.02	0.18	-0.41	-0.13	-0.02	-0.7*	-0.16
	°Government Foreign Currency Debt/Total Debt (%)	0.43	0.3	-0.28	...	...	...	0.03
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	**0.19***	...	...	-0.02	...	0.14*
	GDP per capita (Percentile)	...	...	0.09	...	0.02	...	0.03
	Gross Borrowing Requirements/GDP (%)	0.15	-0.09	-0.35	-0.86*	0.08	0	-0.02
	Non-Resident Share of General Government Debt (%)	0.05	-0.14	-0.13	-0.01	-0.13	-0.27	-0.04
	Total Domestic Bank Assets/GDP (%)	0.11	0.11	-1.07	...	-0.12	-1.06*	0.15
	Banking System Loan-to-Deposit Ratio (%)	-0.19*	0.03	0.71	0.03	-0.12	-0.83	-0.11
	(Current Account Balance + FDI Inflows)/GDP	-0.02	0.08	0.09	0.31	0.07	-0.53	0.03
	External Vulnerability Indicator (EVI) (source: Moodys)	...	0.13	-0.01	0.15	-0.18**	...	-0.01
	Net International Investment Position/GDP (%)	-0.04	0.14	-0.23	-0.95	0.21	0.34*	-0.07
Other indicators	Government bond yield (log)	0.21	0.28	-0.29	0.04	-0.33	1.95	0.2
	Real effective exchange rate Growth (%)	0.01	0.02	-0.01	-0.07	-0.01	-0.04	-0.01*
	Nominal effective exchange rate Growth (%)	0.09	0.01	-0.02	-0.08	0	-0.04	-0.02
	CBOE Volatility Index (VIX)	-0.13	1.45*	1.62*	0.01	1.34**	-1.1	0.47*

Factor 4

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	FullSample
Scorecard indicators	Economic							
	Average Real GDP Growth$_{t-4 \text{ to } t+5}$	0.11	-0.07	-0.02	-0.14**	-0.11	-0.25	-0.03
	Volatility in Real GDP Growth$_{t-9 \text{ to } t}$	0	-0.47	0	0.07	0.11	0.05*	-0.04
	WEF Global Competitiveness Index$_t$	0.31*	0.26	0.04	-0.09	-0.11	...	0.1
	Nominal GDP (US$)$_{t-1}$	-0.18	-0.2	-0.17	-0.17	-0.08	-0.41	-0.12
	GDP per capita (PPP, $US)$_{t-1}$	-0.17	0.35	0.23	0	0.12	-0.1	0.11
Institutional	Worldwide Government Effectiveness Index	0.17	0.24	0.19	-0.18	-0.11	...	0.02
	Worldwide Rule of Law Index	0.32	0.52*	0.08	0.02	-0.06	...	0.1
	Worldwide Control of Corruption Index	0.54	0.51*	0.06	-0.03	-0.12	...	0.11
	Inflation Level$_{t-4 \text{ to } t+5}$	0.04	0.09	-0.05	0.16	-0.19**	-0.63	-0.01
	Inflation Volatility$_{t-9 \text{ to } t}$	-0.04	-0.05	-0.12	-0.02	0.11	0.21	-0.02
Fiscal	General Government Debt/GDP$_t$	0.25	0.07	0.08	0.08	-0.18	-0.46*	0.03
	General Government Debt/Revenues$_t$	0.07	-0.03	0.02	0.06	-0.11	-0.49	-0.04
	General Government Interest Payments/Revenue$_t$	-0.15	0	0.02	0.09	-0.08	-0.04	-0.02
	General Government Interest Payments/GDP$_t$	0.01	0.04	0.05	0.09	-0.04	0.01	0.02
	°Debt Trend$_{t-4 \text{ to } t+1}$	0.19	0.13	0.02	0.24	-0.28	-0.42	-0.06
	°Government Foreign Currency Debt/Total Debt (%)	0.8	0.11	0.45	...	...	...	0.27
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	**0.69***	...	...	0.16	...	**0.48***
	GDP per capita (Percentile)	...	...	0.05	...	0.13*	...	**0.11***
	Gross Borrowing Requirements/GDP (%)	-0.04	0.06	-0.15	0.11	0.11	-0.12	0.02
	Non-Resident Share of General Government Debt (%)	-0.36**	-0.06	-0.29	-0.12	-0.19	-0.43	-0.12*
	Total Domestic Bank Assets/GDP (%)	0.57	0.57	0.43	...	-0.07	-1.3	0.31
	Banking System Loan-to-Deposit Ratio (%)	0.02	-0.14	-3.36*	0.06	-0.13	-0.99	-0.06
	(Current Account Balance + FDI Inflows)/GDP	0.02	-0.07	0.11	-0.07	-0.37**	-0.16	0
	External Vulnerability Indicator (EVI) (source: Moodys)	...	0.06	0.02	-0.08	0.01	...	0.02
	Net International Investment Position/GDP (%)	-0.37	-0.63	0.25	-1.29*	-0.35*	0.21**	-0.22*
Other indicators	Government bond yield (log)	1.75**	1.04	-0.85	-1.89	-0.82	...	0.57**
	Real effective exchange rate Growth (%)	0.03	-0.06	0	0.04**	-0.02	-0.04*	0
	Nominal effective exchange rate Growth (%)	0.03	-0.1*	0	0.04*	-0.02	-0.03*	0
	CBOE Volatility Index (VIX)	0.16	-1.33	-0.38	**1.42***	0.39	-0.19	0.01

Rating Committee

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	FullSample
Scorecard indicators	Economic							
	Average Real GDP Growth$_{t-4 \text{ to } t+5}$	0.03	0.12*	0.09	0.01	0	0.03	0.07**
	Volatility in Real GDP Growth$_{t-9 \text{ to } t}$	-0.07	0.05	0.06	0.07	0.01	-0.02*	0.02
	WEF Global Competitiveness Index$_t$	0.1	-0.13	0.12	0.14	0.09	...	0.04
	Nominal GDP (US$)$_{t-1}$	0	-0.08	0.22	0.13	0.18*	0	0.08
	GDP per capita (PPP, $US)$_{t-1}$	0.15	-0.24	-0.11	0.05	0.01	0.02	-0.04
Institutional	Worldwide Government Effectiveness Index	0.28	-0.03	-0.08	0.08	-0.06	...	0.01
	Worldwide Rule of Law Index	0.23	0.04	0.02	0.18	0.08	...	0.06
	Worldwide Control of Corruption Index	-0.14	-0.05	0.17	0.07	0.07	...	0.1
	Inflation Level$_{t-4 \text{ to } t+5}$	0.09	-0.02	0.07	-0.1	0.01	0.05	0
	Inflation Volatility$_{t-9 \text{ to } t}$	-0.06	0.06	0	-0.01	0.01	-0.01	-0.03
Fiscal	General Government Debt/GDP$_t$	0.02	-0.11	-0.05	0.13	0	0.04	0.02
	General Government Debt/Revenues$_t$	0.02	-0.13	0.01	0.13	-0.05	0.15	0.07
	General Government Interest Payments/Revenue$_t$	0.04	-0.26	0.07	0.07	-0.03	-0.05	0.08**
	General Government Interest Payments/GDP$_t$	-0.01	-0.1	0.06	0.14*	0	-0.06	0.06*
	°Debt Trend$_{t-4 \text{ to } t+1}$	0.23*	0.11	-0.2	0.32	-0.17	0.01	0.08
	°Government Foreign Currency Debt/Total Debt (%)	-0.55*	-0.16	-0.16	...	...	...	-0.14
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	**-0.32***	...	...	0.01	...	-0.16
	GDP per capita (Percentile)	...	...	-0.08**	...	0.1	...	0.03
	Gross Borrowing Requirements/GDP (%)	0.03	0.13*	0.08	0.12	0.02	0.03	-0.03
	Non-Resident Share of General Government Debt (%)	0.05	0.05	0	0.17	0.04	0.02	0.15*
	Total Domestic Bank Assets/GDP (%)	-0.13	-0.24	-0.5	...	0.06	0.02	-0.23
	Banking System Loan-to-Deposit Ratio (%)	-0.28**	-0.11	-3.72**	-0.21	0.06	0.29	**-0.19***
	(Current Account Balance + FDI Inflows)/GDP	-0.01	-0.01	-0.06	**-0.12***	-0.04	0.01	-0.07**
	External Vulnerability Indicator (EVI) (source: Moodys)	...	-0.07	0.02	-0.03	...	...	0
	Net International Investment Position/GDP (%)	0.08	0.19	0.4*	-0.23	-0.08	0.01	0.02
Other indicators	Government bond yield (log)	-1.09**	-1.04*	-0.37	0.08	-0.38	0.07	**-0.68***
	Real effective exchange rate Growth (%)	0.01	0.04	-0.01	0.02	0	0	-0.01
	Nominal effective exchange rate Growth (%)	0	0.05*	-0.01*	0.02	0	0	0
	CBOE Volatility Index (VIX)	1.12**	0.21	-0.78	0.18	-0.06	-0.03	0.04

A9 Source of Judgement – Other coefficients

In chapters 3.1.3 and 3.2.3, describing the source of judgement in the overall rating and at factor level, we present estimated coefficients for β_3 of our baseline regression. In this annex we cover the remaining coefficients of interest:

- lagged actual rating (β_1)
- fundamental rating (β_2)

Eq2

$$y_{it} = c_i + t_t + \beta_1 y_{it-1} + \beta_2 f_{it} + \beta_3 x_{it} + u_{it} \quad i = 1, \dots, N \text{ and } t = 1, \dots T$$

The structure of the tables is in line with the main section of this paper. For the overall rating we display a breakdown by geographical region, time and the Full Sample results. For the factor level results we refer to Full Sample geographical region and the time-period since 2012 H2.

The coefficient for the lagged actual rating (β_1)

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	<2008	<2012	>2012	FullSample
Scorecard indicators	**Economic**										
	Average Real GDP Growth$_{t-4\ to\ t+5}$	0.88***	0.89***	0.9***	0.93*	0.9***	0.98***	0.73***	0.91***	0.58***	0.89***
	Volatility in Real GDP Growth$_{t-9\ to\ t}$	0.89***	0.9***	0.94***	0.98**	0.91***	0.94***	0.74***	0.92***	0.61***	0.91***
	WEF Global Competitiveness Index$_t$	0.88***	0.89***	0.93***	0.97**	0.91***	0.98***	0.74***	0.92***	0.6***	0.9***
	Nominal GDP (US$)$_{t-1}$	0.89***	0.9***	0.94***	0.95**	0.91***	0.96***	0.74***	0.92***	0.6***	0.91***
	GDP per capita (PPP, $US)$_{t-1}$	0.89***	0.91***	0.95***	0.97**	0.91***	0.98***	0.73***	0.93***	0.61***	0.92***
Institutional	Worldwide Government Effectiveness Index	0.88***	0.89***	0.94***	0.93***	0.91***	0.98***	0.74***	0.92***	0.61***	0.91***
	Worldwide Rule of Law Index	0.88***	0.9***	0.95***	0.97***	0.91***	0.98***	0.74***	0.92***	0.61***	0.91***
	Worldwide Control of Corruption Index	0.88***	0.9***	0.94***	0.86**	0.91***	0.98***	0.74***	0.92***	0.61***	0.91***
	Inflation Level$_{t-4\ to\ t+5}$	0.89***	0.91***	0.94***	0.9**	0.9***	0.96***	0.73***	0.92***	0.61***	0.91***
	Inflation Volatility$_{t-9\ to\ t}$	0.89***	0.9***	0.94***	0.96**	0.9***	0.98***	0.74***	0.92***	0.61***	0.91***
Fiscal	General Government Debt/GDP$_t$	0.88***	0.89***	0.94***	0.97**	0.91***	0.91***	0.72***	0.89***	0.61***	0.9***
	General Government Debt/Revenues$_t$	0.85***	0.9***	0.94***	1***	0.91***	0.92***	0.74***	0.9***	0.6***	0.9***
	General Government Interest Payments/Revenue$_t$	0.88***	0.9***	0.94***	0.97***	0.9***	0.97***	0.74***	0.89***	0.58***	0.91***
	General Government Interest Payments/GDP$_t$	0.87***	0.9***	0.94***	0.88**	0.9***	0.98***	0.74***	0.89***	0.6***	0.91***
	°Debt Trend$_{t-4\ to\ t+1}$	0.87***	0.9***	0.93***	1.01***	0.91***	0.98***	0.77***	0.93***	0.6***	0.91***
	°Government Foreign Currency Debt/Total Debt (%)	0.89***	0.91***	1.02***	...	0.46	0.86***	0.8***	0.95***	0.49***	0.91***
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	0.89***	0.9***	0.92***	0.97**	0.91***	0.98***	0.73***	0.92***	0.6***	0.91***
	GDP per capita (Percentile)	0.89***	0.9***	0.94***	0.97**	0.91***	0.98***	0.74***	0.92***	0.61***	0.91***
	Gross Borrowing Requirements/GDP (%)	0.88***	0.91***	0.93***	0.98**	0.91***	0.96***	0.68***	0.92***	0.57***	0.9***
	Non-Resident Share of General Government Debt (%)	0.87***	0.92***	0.9***	0.64	0.94***	0.96***	0.66***	0.87***	0.56***	0.9***
	Total Domestic Bank Assets/GDP (%)	0.82***	0.8***	1**	...	0.68***	0.9***	0.67***	1.06***	0.53***	0.85***
	Banking System Loan-to-Deposit Ratio (%)	0.86***	0.84***	0.87***	0.66*	0.59**	0.81*	0.57*	1.04***	0.51***	0.87***
	(Current Account Balance + FDI Inflows)/GDP	0.9***	0.91***	0.94***	1.14**	0.91***	0.97***	0.74***	0.93***	0.61***	0.92***
	External Vulnerability Indicator (EVI) (source: Moodys)	...	0.88***	0.93***	0.95**	0.85***	...	0.63***	0.54***	0.84***	0.87***
	Net International Investment Position/GDP (%)	0.88***	0.91***	0.94***	0.78	0.9***	0.98***	0.69***	0.92***	0.6***	0.9***
Other indicators	Government bond yield (log)	0.74***	0.87***	0.96***	0.35	0.89***	0.94***	0.66***	0.74***	0.55***	0.88***
	Real effective exchange rate Growth (%)	0.89***	0.9***	0.92***	0.81	0.9***	0.98***	0.74***	0.92***	0.57***	0.91***
	Nominal effective exchange rate Growth (%)	0.89***	0.9***	0.94***	0.84	0.9***	0.98***	0.74***	0.93***	0.6***	0.91***
	CBOE Volatility Index (VIX)	0.89***	0.9***	0.94***	0.97**	0.91***	0.98***	0.74***	0.92***	0.61***	0.91***

		F1	F2	F3	F4	RC
Scorecard indicators	**Economic**					
	Average Real GDP Growth$_{t-4\ to\ t+5}$	0.67***	0.63***	0.63***	0.6***	0.56***
	Volatility in Real GDP Growth$_{t-9\ to\ t}$	0.68***	0.65***	0.65***	0.6***	0.6***
	WEF Global Competitiveness Index$_t$	0.69***	0.65***	0.63***	0.6***	0.6***
	Nominal GDP (US$)$_{t-1}$	0.67***	0.65***	0.63***	0.6***	0.59***
	GDP per capita (PPP, $US)$_{t-1}$	0.68***	0.65***	0.62***	0.6***	0.6***
Institutional	Worldwide Government Effectiveness Index	0.69***	0.64***	0.64***	0.6***	0.6***
	Worldwide Rule of Law Index	0.68***	0.65***	0.64***	0.6***	0.6***
	Worldwide Control of Corruption Index	0.68***	0.65***	0.64***	0.6***	0.59***
	Inflation Level$_{t-4\ to\ t+5}$	0.69***	0.65***	0.63***	0.6***	0.6***
	Inflation Volatility$_{t-9\ to\ t}$	0.69***	0.63***	0.63***	0.6***	0.6***
Fiscal	General Government Debt/GDP$_t$	0.69***	0.64***	0.63***	0.61***	0.6***
	General Government Debt/Revenues$_t$	0.69***	0.64***	0.63***	0.6***	0.58***
	General Government Interest Payments/Revenue$_t$	0.69***	0.65***	0.63***	0.6***	0.57***
	General Government Interest Payments/GDP$_t$	0.69***	0.65***	0.64***	0.61***	0.58***
	°Debt Trend$_{t-4\ to\ t+1}$	0.68***	0.65***	0.62***	0.6***	0.59***
	°Government Foreign Currency Debt/Total Debt (%)	0.66***	0.59***	0.63***	0.47***	0.53***
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	0.69***	0.64***	0.63***	0.58***	0.59***
	GDP per capita (Percentile)	0.69***	0.65***	0.64***	0.6***	0.6***
	Gross Borrowing Requirements/GDP (%)	0.68***	0.63***	0.64***	0.6***	0.58***
	Non-Resident Share of General Government Debt (%)	0.67***	0.63***	0.64***	0.61***	0.57***
	Total Domestic Bank Assets/GDP (%)	0.68***	0.58***	0.62***	0.58***	0.58***
	Banking System Loan-to-Deposit Ratio (%)	0.68***	0.52***	0.63***	0.54***	0.53***
	(Current Account Balance + FDI Inflows)/GDP	0.68***	0.64***	0.64***	0.6***	0.61***
	External Vulnerability Indicator (EVI) (source: Moodys)	0.64***	0.72***	0.58***	0.64***	0.8***
	Net International Investment Position/GDP (%)	0.68***	0.64***	0.64***	0.6***	0.6***
Other indicators	Government bond yield (log)	0.68***	0.59***	0.62***	0.59***	0.56***
	Real effective exchange rate Growth (%)	0.68***	0.64***	0.64***	0.61***	0.59***
	Nominal effective exchange rate Growth (%)	0.68***	0.64***	0.62***	0.61***	0.61***
	CBOE Volatility Index (VIX)	0.69***	0.65***	0.64***	0.6***	0.6***

*Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.*

The coefficient for the fundamental rating (β_2)

	EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	<2008	<2012	>2012	FullSample
Economic										
Average Real GDP Growth$_{t-4\ to\ t+5}$	0.14**	0.04	0.02	-0.01	0.11*	-0.04	0.07	0.15*	0.05	**0.08***
Volatility in Real GDP Growth$_{t-9\ to\ t}$	**0.16*****	0.08**	0.04	-0.02	0.11	-0.03	0.09*	0.12	0.09*	**0.11***
WEF Global Competitiveness Index$_t$	0.15**	0.08*	0.05*	-0.02	0.11*	-0.02	0.1*	0.13	0.09*	**0.11***
Nominal GDP (US$)$_{t-1}$	0.16**	0.09**	0.06*	-0.04	0.11*	-0.04	0.09*	0.16*	0.09*	**0.13***
GDP per capita (PPP, $US)$_{t-1}$	0.16**	0.1*	0.06*	-0.02	0.11*	-0.03	0.09*	0.17*	0.1*	**0.13***
Institutional										
Worldwide Government Effectiveness Index	0.15**	0.1**	0.05*	-0.02	0.11*	-0.02	0.09*	0.16*	0.1*	**0.12***
Worldwide Rule of Law Index	0.15**	0.1**	0.06*	-0.05	0.11*	-0.02	0.09*	0.15*	0.09*	**0.12***
Worldwide Control of Corruption Index	0.15**	0.1**	0.06*	-0.02	0.12*	-0.02	0.1*	0.16*	0.08*	**0.12***
Inflation Level$_{t-4\ to\ t+5}$	**0.16*****	0.1**	0.06*	-0.02	0.12*	-0.03	0.09*	0.16*	0.1*	**0.12***
Inflation Volatility$_{t-9\ to\ t}$	0.16**	0.1**	0.06*	0	0.11	-0.03	0.09*	0.16*	0.1*	**0.13***
Fiscal										
General Government Debt/GDP$_t$	0.12*	0.07	0.05*	-0.1	0.1*	-0.04	0.04	0.09	0.11*	**0.1***
General Government Debt/Revenues$_t$	0.12**	0.08*	0.03	-0.08	0.11*	-0.05	0.08*	0.08	0.08	**0.1***
General Government Interest Payments/Revenue$_t$	0.14**	0.11*	0.06*	0.01	0.1*	-0.02	0.09	0.07	0.07	**0.1***
General Government Interest Payments/GDP$_t$	0.14**	0.09	0.07*	-0.01	0.07*	-0.03	0.09	0.08	0.08	**0.11***
°Debt Trend$_{t-4\ to\ t+1}$	0.13**	0.04	0.05*	-0.09	0.12*	-0.02	0.08*	0.13	0.09*	**0.1***
°Government Foreign Currency Debt/Total Debt (%)	0.15**	0.1*	0.1*	...	0.32	-0.17***	0.02	0.21	0.11	**0.16***
Susceptibility to Event Risk										
Worldwide Voice and Accountability Index (Percentile)	0.16**	0.11**	0.05*	-0.02	0.12*	-0.02	0.1*	0.16*	0.09*	**0.12***
GDP per capita (Percentile)	0.16**	0.1**	0.06*	-0.02	0.11*	-0.02	0.09*	0.16*	0.1*	**0.12***
Gross Borrowing Requirements/GDP (%)	0.16**	0.1*	0.06**	0.01	0.07**	-0.06	0.12*	0.18*	0.1*	**0.13***
Non-Resident Share of General Government Debt (%)	**0.19*****	0.12*	0.03	-0.37	0.03	-0.05	0.14*	0.22**	0.11*	**0.13***
Total Domestic Bank Assets/GDP (%)	0.14	0.17*	0.12	...	0.2*	-0.08	-0.01	0.17	0.17**	**0.16***
Banking System Loan-to-Deposit Ratio (%)	0.06	0.12	0.14	0.09	0.29	-0.11*	0.12	0.14	0.13*	**0.13****
(Current Account Balance + FDI Inflows)/GDP	0.14**	0.1*	0.06*	-0.07	0.11*	-0.02	0.09*	0.15*	0.08	**0.11***
External Vulnerability Indicator (EVI) (source: Moodys)	...	0.11*	0.05*	-0.02	0.09	...	0.17	0.06	0.07	**0.1****
Net International Investment Position/GDP (%)	0.14**	0.09*	0.07*	0.03	0.13*		0.11**	0.16	0.1*	**0.12***
Other indicators										
Government bond yield (log)	0.1*	0.1	0.07	0.32**	0.11*	-0.03	0.11	0.16*	0.07	**0.13***
Real effective exchange rate Growth (%)	0.16**	0.1**	0.07*	0.08	0.12*	-0.02	0.09*	0.17*	0.09*	**0.12***
Nominal effective exchange rate Growth (%)	0.16**	0.1**	0.07*	0.08	0.12*	-0.02	0.08*	0.17*	0.11**	**0.13***
CBOE Volatility Index (VIX)	0.16**	0.1**	0.06*	-0.02	0.11*	-0.02	0.09*	0.16*	0.1*	**0.12***

	F1	F2	F3	F4	RC
Economic					
Average Real GDP Growth$_{t-4\ to\ t+5}$	0.39**	0.11	0.17**	-0.02	0.02
Volatility in Real GDP Growth$_{t-9\ to\ t}$	0.29**	0.12	0.14**	-0.02	0.03
WEF Global Competitiveness Index$_t$	0.18	0.13	0.14**	-0.02	0.02
Nominal GDP (US$)$_{t-1}$	0.17*	0.14	0.14**	-0.02	0.03
GDP per capita (PPP, $US)$_{t-1}$	0.21*	0.13	0.16**	-0.02	0.04
Institutional					
Worldwide Government Effectiveness Index	0.24**	0	0.15**	-0.02	0.03
Worldwide Rule of Law Index	0.2*	0.17	0.15**	-0.02	0.03
Worldwide Control of Corruption Index	0.17	0.02	0.15**	-0.01	0.03
Inflation Level$_{t-4\ to\ t+5}$	0.21*	0.12	0.14**	-0.02	0.04
Inflation Volatility$_{t-9\ to\ t}$	0.23**	0.22*	0.16**	-0.02	0.03
Fiscal					
General Government Debt/GDP$_t$	0.21*	0.12	0.09	-0.01	0.03
General Government Debt/Revenues$_t$	0.23**	0.13	-0.04	-0.02	0.02
General Government Interest Payments/Revenue$_t$	0.22**	0.13	0.24**	-0.02	0.02
General Government Interest Payments/GDP$_t$	0.21**	0.13	0.24**	-0.02	0.02
°Debt Trend$_{t-4\ to\ t+1}$	0.25**	0.15	**0.18***	-0.02	0.04
°Government Foreign Currency Debt/Total Debt (%)	0.24*	0.21*	0.17*	-0.1	-0.05
Susceptibility to Event Risk					
Worldwide Voice and Accountability Index (Percentile)	0.23**	0.12	0.15**	-0.03	0.03
GDP per capita (Percentile)	0.22**	0.13	0.15**	-0.01	0.02
Gross Borrowing Requirements/GDP (%)	0.17*	0.15	0.14**	-0.03	0.01
Non-Resident Share of General Government Debt (%)	0.17*	0.18	0.13*	-0.08	0
Total Domestic Bank Assets/GDP (%)	0.24*	0.24**	0.03	-0.12*	-0.03
Banking System Loan-to-Deposit Ratio (%)	0.22**	0.2*	0.08	-0.1	-0.01
(Current Account Balance + FDI Inflows)/GDP	0.24**	0.16	0.16**	-0.01	0.02
External Vulnerability Indicator (EVI) (source: Moodys)	0.24*	0.08	0.19**	0.08	0.05
Net International Investment Position/GDP (%)	0.23**	0.21*	0.14**	0.04	0.03
Other indicators					
Government bond yield (log)	0.33**	0.13	0.12	-0.02	-0.01
Real effective exchange rate Growth (%)	0.18*	0.16*	0.18**	-0.01	0
Nominal effective exchange rate Growth (%)	0.25**	0.18*	**0.21***	-0.01	0
CBOE Volatility Index (VIX)	0.22**	0.12	0.15**	-0.02	0.03

*Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.*

A10 Source of Judgement – Arellano Bond estimator (model Eq3)

As a robustness check, this annex reproduces the tables from chapters 3.1.3 and 3.2.3, applying the Arrelano Bond instead of the OLS estimator. Overall the results differ only marginally from the baseline specification. The model specification (Eq3) is defined in detail in chapter 2.3.3. The factor level results refer to data after 2012 H2 only.

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	<2008	<2012	>2012	FullSample
Scorecard indicators / Economic	Average Real GDP Growth_{t-4 to t+6}	...	0.05*	0.1***	...	0.01	0.03*	0.06*	0.06*	0.08**	**0.08*****
	Volatility in Real GDP Growth_{t-9 to t}	...	0.02	0.03*	0.07	0	0	0.01	0.02	0.03	0.03
	WEF Global Competitiveness Index_t	...	0.03	0.06**	0.11	0	...	0	0.06	0.04	0.07*
	Nominal GDP (US$)_{t-1}	...	0	0.02	0.07	0.03	0	0.01	-0.02	0.02	-0.03
	GDP per capita (PPP, $US)_{t-1}	...	...	-0.02	...	0	0.01	0.01	-0.04	-0.01	0.02
Institutional	Worldwide Government Effectiveness Index	...	0.06	**0.09*****	0.15	0.01	...	0.04	-0.03	-0.02	0.02
	Worldwide Rule of Law Index	...	0	-0.04	**0.21*****	0.02	...	0.02	-0.02	-0.01	-0.04
	Worldwide Control of Corruption Index	...	0.01	0	**0.09*****	-0.04*	...	0.02	-0.08	0.04	-0.03
	Inflation Level_{t-4 to t+6}	...	...	0.06	-0.15	0	...	0.01	0.08	0.01	0.01
	Inflation Volatility_{t-9 to t}	...	-0.01	0	-0.04	0	-0.01	0.01	-0.01	-0.03	0
Fiscal	General Government Debt/GDP_t	...	0.04	0.01	0.12	0.04*	0.03**	0.05*	**0.16*****	-0.07	0.04
	General Government Debt/Revenues_t	...	0.02	0.02	0.13*	0.01	0.02	0.05	**0.16*****	0.02	0.06*
	General Government Interest Payments/Revenue_t	...	-0.1	0.02	0.04	0	-0.04	0.05	0.1	0.09**	**0.08*****
	General Government Interest Payments/GDP_t	...	-0.01	0	0.07	0.06	-0.04**	0.03	0.05	0.05*	0.04
	°Debt Trend_{t-4 to t+1}	...	...	-0.02	0.28*	-0.03	0.02	0.02	0.24*	0.03	0.11**
	°Government Foreign Currency Debt/Total Debt (%)	...	-0.01	...	0.1*	...	...	0.21**	0.35	-0.1	0.09
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	**-0.06*****	**-0.11*****	0.26	0.01	...	0.07	0.06	-0.16	-0.01
	GDP per capita (Percentile)	...	...	-0.01	0.14	0.01	...	...	0.04	0.03	0.08
	Gross Borrowing Requirements/GDP (%)	...	...	0.02	0.05	-0.05	0	-0.02	0.01	-0.02	-0.05*
	Non-Resident Share of General Government Debt (%)	...	0.04	-0.05	...	-0.02	0	-0.04*	-0.02	0.17**	0.05
	Total Domestic Bank Assets/GDP (%)	...	-0.08	-0.21*	...	0.06	...	...	-0.04	-0.18	...
	Banking System Loan-to-Deposit Ratio (%)	-0.22*	-0.1*	-0.59**	0.05	-0.04	...	...	-0.33*	**-0.19*****	...
	(Current Account Balance + FDI Inflows)/GDP	...	-0.05*	-0.02	**-0.12*****	0.02	0	-0.04*	-0.05	**-0.07*****	**-0.08*****
	External Vulnerability Indicator (EVI) (source: Moodys)	...	...	0.01	...	-0.02	...	-0.01	0.02	-0.01	0
	Net International Investment Position/GDP (%)	...	-0.01	0.15**	-0.1	-0.05	...	0.01	0.13	0.02	0.08*
Other indicators	Government bond yield (log)	...	...	-0.71*	**-1.61*****	-0.17	0.24*	0.18	-0.73**	**-0.61*****	**-0.76*****
	Real effective exchange rate Growth (%)	...	0.01	0	0.02	0	0*	0.01	0	-0.01	0
	Nominal effective exchange rate Growth (%)	...	...	0	0.02*	...	0*	0.01	0	0.01	0.01
	CBOE Volatility Index (VIX)	...	-0.02**	0	0	0	0	0	0	-0.03*	-0.01*

		F1	F2	F3	F4	RC
Scorecard indicators / Economic	Average Real GDP Growth_{t-4 to t+6}	-0.05	0.05	-0.03	0.05	**0.09*****
	Volatility in Real GDP Growth_{t-9 to t}	0.04	0.01	**0.28*****	0.02	0.05
	WEF Global Competitiveness Index_t	0.08	-0.06	0	0.03	0.06
	Nominal GDP (US$)_{t-1}	0.08	-0.07	0	-0.21*	0.04
	GDP per capita (PPP, $US)_{t-1}	-0.12	-0.12	0.19	-0.03	-0.04
Institutional	Worldwide Government Effectiveness Index	-0.09	0.11	-0.15	0.05	0.02
	Worldwide Rule of Law Index	0.08	0.03	-0.15	0.15	0.01
	Worldwide Control of Corruption Index	0.16	0.1	0.02	0.1	0.08
	Inflation Level_{t-4 to t+6}	0.05	-0.05	0.05	0.01	0
	Inflation Volatility_{t-9 to t}	-0.02	-0.04	0.12	-0.02	-0.04*
Fiscal	General Government Debt/GDP_t	0.08	0.06	0.04	0.01	-0.01
	General Government Debt/Revenues_t	-0.07	0.08	0.22	-0.04	0.07
	General Government Interest Payments/Revenue_t	0.05	0.04	-0.09	-0.03	**0.11*****
	General Government Interest Payments/GDP_t	0.04	0.01	-0.14	0.03	**0.07*****
	°Debt Trend_{t-4 to t+1}	0.07	0.18**	0.05	0.16	0.08
	°Government Foreign Currency Debt/Total Debt (%)	-0.19	-0.09	0.04	0.31	-0.09
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	0.23**	**-0.18*****	0.11	**0.55*****	-0.18
	GDP per capita (Percentile)	0	0.02	0.1	0.04	0.02
	Gross Borrowing Requirements/GDP (%)	-0.1	-0.01	-0.04	0.09	-0.04
	Non-Resident Share of General Government Debt (%)	0.1	0.11	0.06	-0.12*	0.16*
	Total Domestic Bank Assets/GDP (%)	0.07	-0.2	0.04	0.38**	-0.18
	Banking System Loan-to-Deposit Ratio (%)	-0.23	-0.08	-0.01	-0.1	**-0.19*****
	(Current Account Balance + FDI Inflows)/GDP	-0.06	0.05	0.02	0.02	**-0.07*****
	External Vulnerability Indicator (EVI) (source: Moodys)	0.02	0.02	-0.01	0.02	-0.01
	Net International Investment Position/GDP (%)	0.03	-0.08	-0.12	-0.33**	0.02
Other indicators	Government bond yield (log)	-0.23	-0.15	0.23	0.61**	**-0.68*****
	Real effective exchange rate Growth (%)	-0.01*	0.01	-0.02**	0.01	-0.01*
	Nominal effective exchange rate Growth (%)	-0.01**	0.02*	-0.02*	0.01	0
	CBOE Volatility Index (VIX)	-0.04	-0.06**	-0.06*	0.05**	-0.03*

*Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.*

A11 Source of Judgement – No time-fixed effects (model Eq4)

As a robustness check, this annex reproduces the tables from chapters 3.1.3 and 3.2.3, removing the time-fixed effects. We see that in particular those indicators with a persistent time trend across countries (such as GDP per capita) are now significant. We conclude that this specification is inferior to the baseline model. The model specification (Eq4) is defined in chapter 2.3.3. The factor level results refer to data after 2012 H2 only.

		EA	CEE	LatAm	Africa	AsiaPacific	AngloSaxon	<2008	<2012	>2012	FullSample
Economic	Average Real GDP Growth$_{t-4\ to\ t+5}$	0.05*	0.04*	0.07**	0.07*	0.03	0.01	0.04	0.06	0.07**	**0.06***
	Volatility in Real GDP Growth$_{t-9\ to\ t}$	0.02	0.03*	0.02	0.09	0	0.03*	0	0.05	0	0.02
	WEF Global Competitiveness Index$_t$	0.05	-0.01	0.04*	0.08**	0.01	...	-0.02	0.03	0.04	0.01
	Nominal GDP (US$)$_{t-1}$	-0.14**	-0.1*	-0.02	-0.11*	-0.01	0	0	-0.1*	0.08	**-0.07***
	GDP per capita (PPP, $US)$_{t-1}$	-0.05**	-0.06*	-0.05	-0.16***	-0.02	-0.01	0.02	-0.2	0.01	**-0.06***
Institutional	Worldwide Government Effectiveness Index	0.05	0.05	0.04	0.06	-0.02	...	0	-0.04	-0.02	0.01
	Worldwide Rule of Law Index	0.02	-0.05	-0.02	0.01	0	...	-0.02	0	0.02	-0.01
	Worldwide Control of Corruption Index	0.13*	0.01	0.01	0.08	-0.05	...	-0.04	0.03	0.06	0.03
	Inflation Level$_{t-4\ to\ t+5}$	-0.01	-0.04	-0.01	-0.01	-0.01	0.03	0.03	0.08	0.01	-0.02
	Inflation Volatility$_{t-9\ to\ t}$	-0.01	-0.03*	-0.01	-0.05	0	0	0.01	-0.03	-0.03	-0.02**
Fiscal	General Government Debt/GDP$_t$	0.07*	0.06	0.02	0.15*	0.03	0.02	0.08*	0.19**	-0.03	0.04**
	General Government Debt/Revenues$_t$	**0.12***	0.08*	0.04	0.14*	0.01	0.01	0.03	0.18**	0.02	0.04*
	General Government Interest Payments/Revenue$_t$	0.04	-0.06	0.02	0.09*	0.03	0	0.01	0.17	0.05	0.01
	General Government Interest Payments/GDP$_t$	0.03	0.02	0	0.13**	0.08*	0	0.01	0.16	0.02	0.01
	°Debt Trend$_{t-4\ to\ t+1}$	**0.23***	0.24*	0.04	0.43**	-0.06	0.01	0.08	0.29*	0.05	**0.18***
	°Government Foreign Currency Debt/Total Debt (%)	**-0.35***	-0.09	-0.02	...	...	...	0	0.03	-0.24	-0.09
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	...	-0.09***	-0.12***	...	0.02	...	-0.05	-0.02*	-0.13	**-0.08***
	GDP per capita (Percentile)	...	...	0.02***	...	-0.01	...	...	-0.05	0.04	0
	Gross Borrowing Requirements/GDP (%)	-0.01	0.04	-0.01	0	-0.06	-0.01	0	-0.01	-0.01	-0.03
	Non-Resident Share of General Government Debt (%)	0.08*	0.03	-0.06*	0.08	0	-0.01	-0.01	0.15*	0.15*	0.05*
	Total Domestic Bank Assets/GDP (%)	-0.01	-0.07	-0.19*	...	0.04	0	0.01	-0.04	-0.16	-0.05
	Banking System Loan-to-Deposit Ratio (%)	-0.04	-0.08	-0.22	0.12	-0.01	0.01	-0.08	-0.17	-0.2*	-0.07*
	(Current Account Balance + FDI Inflows)/GDP	-0.03	-0.06**	-0.04***	-0.07	0	0	-0.02	-0.06	-0.06**	**-0.07***
	External Vulnerability Indicator (EVI) (source: Moodys)	...	0.02	0.01	0.04	-0.02	...	0.03	0	0	0.01
	Net International Investment Position/GDP (%)	-0.06	-0.11	0.06	-0.04	0.02	0	0.03	-0.03	0.01	-0.04
Other indicators	Government bond yield (log)	-0.38**	-0.24*	-0.29	-0.09	-0.12	0.06	0.08	**-1.34***	**-0.5***	-0.28**
	Real effective exchange rate Growth (%)	-0.01	0.01	-0.01*	0.01*	0	0	0.01	0	-0.01	0
	Nominal effective exchange rate Growth (%)	0	0.02	0	0.02*	0	0	0.01	0	0	0.01*
	CBOE Volatility Index (VIX)	-0.01	-0.02*	0	0	0*	0	0	0	-0.02	-0.01**

		F1	F2	F3	F4	RC
Economic	Average Real GDP Growth$_{t-4\ to\ t+6}$	-0.05	0.05*	0	-0.05	0.07**
	Volatility in Real GDP Growth$_{t-9\ to\ t}$	-0.07	0.01	0.12*	-0.04	0.02
	WEF Global Competitiveness Index$_t$	0.04	0.04	0.16**	0.08	0.04
	Nominal GDP (US$)$_{t-1}$	0.23*	0.02	0.32*	-0.15	0.11
	GDP per capita (PPP, $US)$_{t-1}$	0.07	0.13*	0.25**	0.01	-0.02
Institutional	Worldwide Government Effectiveness Index	-0.05	0.18*	0.01	0.01	0.01
	Worldwide Rule of Law Index	0.13	-0.09	-0.07	0.1	0.03
	Worldwide Control of Corruption Index	0.13	0.08	0.04	0.13	0.1
	Inflation Level$_{t-4\ to\ t+5}$	0	0.02	0.1**	-0.01	0.01
	Inflation Volatility$_{t-9\ to\ t}$	-0.01	-0.07*	0.04	-0.01	-0.03
Fiscal	General Government Debt/GDP$_t$	0.04	0	0.07	0.03	0.02
	General Government Debt/Revenues$_t$	-0.04	0.01	0.17	-0.03	0.06
	General Government Interest Payments/Revenue$_t$	0	-0.01	-0.11	-0.01	0.08**
	General Government Interest Payments/GDP$_t$	0.02	-0.03	-0.08	0.02	0.05*
	°Debt Trend$_{t-4\ to\ t+1}$	-0.08	0.08*	-0.02	-0.09	0.1
	°Government Foreign Currency Debt/Total Debt (%)	-0.14	0.03	-0.03	0.38	-0.2
Susceptibility to Event Risk	Worldwide Voice and Accountability Index (Percentile)	**0.13***	-0.07**	0.19*	**0.44***	-0.14
	GDP per capita (Percentile)	0.08	-0.04	0.04	0.11**	0.04
	Gross Borrowing Requirements/GDP (%)	-0.06	-0.05	-0.03	0.02	-0.02
	Non-Resident Share of General Government Debt (%)	-0.01	0.06	-0.01	-0.1*	0.14*
	Total Domestic Bank Assets/GDP (%)	0.07	-0.11	0.22	0.26	-0.19
	Banking System Loan-to-Deposit Ratio (%)	-0.03	-0.2	-0.18	-0.02	-0.21**
	(Current Account Balance + FDI Inflows)/GDP	-0.03	0.05	0.03	0	-0.07**
	External Vulnerability Indicator (EVI) (source: Moodys)	0.03	0.02	-0.03	0.03	0
	Net International Investment Position/GDP (%)	0.04	-0.09	-0.1	-0.19*	0.02
Other indicators	Government bond yield (log)	-0.04	-0.44**	-0.16	0.47**	**-0.57***
	Real effective exchange rate Growth (%)	**-0.01***	0	-0.01	0	-0.01
	Nominal effective exchange rate Growth (%)	**-0.02***	0.01	-0.02	0	0
	CBOE Volatility Index (VIX)	0.03	-0.01	0	-0.01	-0.03*

*Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.*

A12 Moody's Revised Methodology

In December 2015, Moody's published a slightly revised methodology which essentially altered the thresholds of very few indicators. In December 2016, Moody's again published a slightly more transparent methodology, which, for the first time included quantitative assessments for a few qualitative adjustment factors. In this section we assess whether this revised methodology better explains Moody's actual ratings. The charts in annex A3 show Moody's scorecard-implied rating for each sovereign according to the September 2013 and December 2016 methodologies.

Would the new methodology have signalled turning points adequately? To answer that question, we compute the fundamental rating (overall and factor scores) according to the December 2016 methodology (f_{it}^{NEW}) and assess whether its difference vis-à-vis the fundamental rating according to the September 2013 methodology (f_{it}^{OLD}), would be able to explain the judgement under the September 2013 methodology ($y_{it} - f_{it}^{OLD}$). We estimate the coefficient β_1 in a country-fixed effects OLS regression. A significant and positive β_1 indicates that the new methodology does add explanatory power to the rating movements, previously only expressed through judgement.

R5

$$y_{it} - f_{it}^{OLD} = c_i + \beta_1\big(f_{it}^{NEW} - f_{it}^{OLD}\big) + u_{it} \qquad i = 1, \dots, N \text{ and } t = 1, \dots T$$

The below table presents the coefficient β_1 of specification R5, across regions, time horizon and rating levels.

		Overall	F1	F2	F3	F4
	2003 - 2008	0.43*	...	...	...	...
EA	2008 - 2012	0.47	0.16	0.26	-0.10	...
	2012 - 2016	**0.41***	0.42	-0.28	-0.37	-0.32
	2003 - 2008	0.24	...	...	...	...
CEE	2008 - 2012	-0.13	0.24	0.35	-0.18	0.16
	2012 - 2016	0.36	0.90	1.33	0.67	**1.51***
	2003 - 2008	0.19	...	...	...	...
LatAm	2008 - 2012	0.19	-0.10	1.02*	-0.09*	**0.09***
	2012 - 2016	0.27	0.19	0.25	-0.32	**...**
	2003 - 2008	...	...	...	...	...
Africa	2008 - 2012	0.28	0.32	0.03	...	...
	2012 - 2016	**0.67**	0.03	-1.23	-1.02*	**1.20***
	2003 - 2008	**0.69***	...	...	...	...
Asia Pacific	2008 - 2012	-0.27	0.00	0.54	-0.16	1.59**
	2012 - 2016	0.21	-0.58	0.22	-0.67	0.61
	2003 - 2008	...	...	...	...	...
Anglo-Saxon	2008 - 2012	0.13	-0.03	...	...	...
	2012 - 2016	**0.36***	1.42	...	-1.60**	**0.43***
	2003 - 2008	**0.36***	...	...	...	...
Full Sample	2008 - 2012	0.08	0.15	0.48**	-0.13	0.32
	2012 - 2016	**0.36***	0.41	0.12	-0.60**	**1.00***

Notes: *, ** and *** refer to the robust statistical significance at the 10, 5 and 1 % levels respectively.

The regression results for the overall rating on the full sample as well as the subset of euro area countries suggest that the new methodology would have better explained rating movements prior to 2008 as well as since the second half of 2012. For the recent period that could be explained by Moody's already transitioning to the new methodology before its official publication. For the early period, this could be explained by the generally improved coverage of indicators included in the new methodology as well as a learning effect in revising the methodology. However, even the revised methodology is not able to explain any deviations from the quantitative scorecard in the crisis years 2008-2012 across regions. A similar assessment holds for the remaining regions, but to a degree of lower significance.

At the factor level we find that for Factor 1 and Factor 2 the new methodology did not add much explanatory power. This is to be expected, because the revision only consisted in slightly modifying the thresholds, but no new indicators were added. Factor 3, with its added indicators on debt trend and foreign currency debt in the new methodology, has counterintuitively negative coefficients, albeit only significant at the 5% level and mainly driven by Anglo-Saxon countries. This is probably an artefact of Anglo-Saxons only having one single observation with a Factor 3 score changing at all since 2012. The improvements in explaining Moody's Factor 4 are due to the tighter thresholds applied to the 'current account + FDI inflows' variable, whereby lower deficits are now assessed with a higher risk score compared to the previous methodology, affecting especially CEE and African sovereigns.

The below table summarizes the impact of the new methodology on the rating level of countries based on the latest data point, the first half of 2016. It groups the countries into categories, depending on how many notches the fundamental scorecard rating is adjusted solely by moving from the September 2013 to the December 2016 methodology.

Table: Change in fundamental rating old vs new methodology (notches)

	<= -3	-2	-1	0	>= 1
EA	SI	CY	LT,NL	EE,LV,SK,AT,BE,FI,FR, DE,IE,IT,LU,PT,ES	GR,MT
CEE	SI		BG,LT,PL,RU	HR,CZ,EE,HU,LV,RO,SK	
LatAm	NI,PE	CO,HN,VE	BR,CL,CR,MX	EC,UY	BO
Africa	ET,KE,ZM	SN,ZA,UG	CI,	GH,MZ,NG	
Asia-Pacific	PH	CN,IN,VN	ID	JP,KR,MY,SG,TH	
Anglo-Saxon				AU,NZ,GB,CA,US	

A13 Leads and lags

Looking at the extent to which the actual rating explains, or conversely, is explained by fundamentals, we conduct a regression, including time and country-fixed effects. In case no judgement were applied, we would expect contemporaneous co-movement between the two variables, that is, the column (0) would be the only statistically significant one with a coefficient of 1. Significant coefficients for positive leads/ lags imply that Moody's ratings, including the agency's judgement, anticipate fundamental developments. Conversely, the columns left of the contemporaneous column (with the negative numbers), refer to the time-periods where fundamentals anticipate Moody's actual ratings.

We observe that in the case of Europe, actual ratings are both leading and lagging fundamentals up to two time-periods in both directions, whereas in CEE and developing countries, ratings are mostly lagging. There is no clear relationship for sovereigns in LatAm, Africa and Asia-Pacific. Finally, during the period 2008-12, Moody's ratings anticipated developments in fundamentals (0.19***) whereas for the period 2012-16 judgement coincided or indeed lagged fundamentals by 6 months (0.17***)[20].

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[20] For smoothing purposes we compare actual rating and fundamental changes over a 1-year period.

Figure 9: Leads and lags

Lags/leads (years)		-4	-3	-2	-1	0	1	2	3	4	
Overall	EA	0.08	0.10	0.14*	0.14*	0.18**	**0.26***	**0.20***	0.02	-0.08	
	CEE	0.10	0.19**	0.16**	0.12*	0.14*	0.14*	0.11	0.11*	0.01	
	LatAm	0.06	0.00	-0.03	-0.01	0.02	0.03	0.03	0.04	-0.01	
	Africa	0.19	0.02	-0.13	-0.14	0.05	0.08	0.02	0.02	-0.18	
	AsiaPacific	0.01	-0.04	0.00	0.09*	0.03	-0.06	0.05	0.06	-0.04	
	AngloSaxon	0.01	-0.04	0.04	0.06*	-0.01	0.00	-0.05	-0.03	0.00	
	<2008	0.06*	0.06*	0.04	0.03	0.05*	0.05*	0.05*	0.05*	0.00	
	<2012	0.07	0.00	0.03	0.06	0.10	**0.19***	0.12*	-0.01	-0.06	
	>2012	0.01	-0.03	0.01	**0.17***	**0.17***	0.09*	0.10*	0.16**	0.07	
	FullSample	0.10**	0.09**	**0.11***	**0.16***	**0.16***	**0.13***	**0.11***	0.08**	-0.02	
Economic (F1)	EA	0.04	0.39	0.36	-0.21	-0.13	0.80*	0.62	0.03	-0.64	
	CEE	0.34	0.05	0.40	0.69*	0.35	-0.35	-0.62	0.01	-0.01	
	LatAm	0.19	0.77	1.08**	0.78*	0.09	-0.62*	-0.65*	0.06	0.27	
	Africa	-0.76	-0.72	1.04	1.52**	-0.82	-1.52**	-1.46	5.79	3.64	
	AsiaPacific	-0.32	0.40	0.27	-0.01	0.42	0.28	0.40	0.75	-0.87	
	AngloSaxon	0.85	0.79	1.07*	0.49	-0.14	-0.81	-0.69	-0.48	-0.34	
	FullSample	0.34*	**0.66***	**0.64***	0.33**	0.02	-0.24	-0.31	0.22	0.21	
Institutional (F2)	EA	-0.19	-1.26**	-0.16	0.91*	**1.18***	0.29	-1.11**	-0.79	-0.27	
	CEE	0.24	-0.61	-0.23	0.65	0.71	0.08	-1.00*	-1.23**	0.04	
	LatAm	0.05	-0.16	-0.42*	-0.18	0.25	0.10	-0.37	-1.04**	-0.25	
	Africa	0.26	-0.84*	-0.92*	-0.80	-0.35	-0.26	0.41	1.37	1.15	
	AsiaPacific	0.65	-0.04	-0.56	-0.46	0.09	0.54	0.71	-0.10	-0.71	
	AngloSaxon	0.42	-0.18	0.33	-0.16	-0.29	0.45	-0.49	-0.71	0.70	
	FullSample	-0.03	-0.31*	-0.20	0.27	0.28*	0.05	-0.24	-0.43*	-0.20	
Fiscal Strength (F3)	EA	-0.21	-0.07	0.35*	0.50*	0.07	-0.30	-0.08	-0.29	-0.63	
	CEE	0.43	0.41	0.64*	0.27	-0.38	-0.73*	-0.53	-0.48	-0.04	
	LatAm	0.20	0.26	0.16	0.01	0.05	-0.29	-0.31	-0.11	-0.02	
	Africa	0.20	-0.72	-0.16	0.12	0.06	-0.54	-0.95	-2.06	-0.73	
	AsiaPacific	0.80**	0.05	-0.03	0.01	-0.13	-0.03	-0.31	0.30	0.28	
	AngloSaxon	-0.22	-1.01*	0.34	0.86**	-0.34	-0.67	0.05	0.26	0.04	
	>2012	0.14	0.01	0.17	0.22*	0.09	-0.13	-0.12	-0.10	-0.02	
	FullSample	0.14	0.01	0.17	0.22*	0.09	-0.13	-0.12	-0.10	-0.02	
Susceptibility (F4)	EA	-0.13	0.21	0.18	0.02	-0.14	-0.11	0.21	0.21	-0.14	
	CEE	-0.25	0.35	0.41	0.04	-0.54	-0.70*	0.23	0.78*	0.23	
	LatAm	0.47	0.15	-0.21	-0.07	0.21	0.36	0.12	-0.15	-0.09	
	Africa	0.41*	0.05	-0.24	-0.11	0.02	0.02	-0.10	0.02	0.00	
	AsiaPacific	-0.27	0.08	-0.26	-0.11	0.34**	-0.02	-0.23	-0.05	-0.14	
	AngloSaxon	-0.09	-0.16	-0.47	-0.22	-0.22	-0.58	-0.81	-0.33	0.75	
	FullSample	0.10	0.13	0.00	-0.05	0.03	0.01	0.02	0.08	-0.09	
Rating Committee	EA	-0.10*	-0.03	-0.05	0.04	**0.26***	**0.42***	0.23**	-0.31*	-0.24	
	CEE	-0.20	-0.17	-0.22*	-0.06	0.20*	0.33**	0.22	0.12	0.09	
	LatAm	0.05	-0.05	-0.08	0.02	0.16**	0.11*	0.00	-0.10	-0.08	
	Africa	-0.25	-0.12	-0.25*	-0.26*	-0.03	0.16	0.19	-0.03	-0.28*	
	AsiaPacific	0.16*	0.12	-0.03	-0.02	0.09*	0.06	0.06	0.07	-0.05	
	AngloSaxon	0.12	0.07	0.00	-0.03	-0.02	0.08	0.06	-0.09	-0.03	
	FullSample	-0.09**	-0.05	-0.03	0.07**	**0.21***	**0.32***	**0.28***	0.03	-0.06	

*Notes: *, ** and *** refer to the statistical significance at the 10, 5 and 1 % levels respectively. Factor level refers to the sample starting in the second half of 2012 only.*

A14 Rating Key

For our analysis we transform the ratings to numeric values using the following key.

	Rating	Rating Key
Investment-Grade	Aaa	19
	Aa1	18
	Aa2	17
	Aa3	16
	A1	15
	A2	14
	A3	13
	Baa1	12
	Baa2	11
	Baa3	10
Non-investment Grade	Ba1	9
	Ba2	8
	Ba3	7
	B1	6
	B2	5
	B3	4
	Caa1	3
	Caa2	2
	≤ Caa3	1

Outlook	Outlook Key
Positive	0.25
Stable	0.00
Negative	-0.25
On Watch Upgrade	0.50
On Watch Negative	-0.50
Developing	0.00