

## Rating Methodology

# Moody's Global Sovereign

September 2008

## Sovereign Bond Ratings

### Summary

The purpose of this report is to explain how Moody's determines sovereign bond ratings in both local and foreign currency, thereby increasing transparency and providing market participants with deeper insight into the factors that we consider to be the most important to our ratings.

There is no quantitative model that can adequately capture the complex web of factors that lead a government to default on its debt. The task of rating sovereign entities requires an assessment of a combination of quantitative and qualitative factors whose interaction is often difficult to predict. In addition, by the very nature of sovereignty, a government may decide not to repay its debt despite having the resources to do so.

For these reasons, a mechanistic approach based on quantitative factors alone is unable to capture the complexity of the interaction between political, economic, financial and social factors that define the degree of danger, for creditors, of a sovereign credit.

This methodology therefore provides a conceptual framework in which both quantitative and qualitative parameters are used in a disciplined fashion, and where risk scenarios are combined with comparative metrics. This step-by-step approach produces a narrow rating range. In some instances, however, the final rating may diverge from this range – in other words, the unusual characteristics of a sovereign credit may not be fully captured by the approach.

This report presents our analytical approach based on decades of experience, and a road map to the use of Moody's risk indicators that are updated in our semi-annual statistical handbook.

### Table of Contents:

|   |    |
|---|----|
| Summary   | 1  |
| Sovereign Bond Rating:<br>A Three-Stage Process | 2  |
| Introduction                                    | 4  |
| Step 1: Country economic resiliency             | 7  |
| Step 2: Government financial robustness         | 10 |
| Step 3: Determining the sovereign rating        | 18 |
| Moody's Related Research                        | 19 |

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## Sovereign Bond Ratings

### Summary

#### Introduction

#### Step 1: Country economic resiliency

- ◆ Factor 1
- ◆ Factor 2

#### Step 2: Government financial robustness

- ◆ Factor 3
- ◆ Factor 4

#### Step 3: Determining the rating

## Sovereign Bond Rating: A Three-Stage Process

There are three stages in the sovereign bond rating analytical process that leads to a rating decided in a Rating Committee.

### Step 1: Country economic resiliency

The first step consists in determining the shock-absorption capacity of the country, based on the combination of two key factors:

- Factor 1: the country's economic strength, captured in particular by the GDP per capita – the single best indicator of economic robustness and, in turn, shock-absorption capacity.
- Factor 2: the institutional strength of the country, the key question being whether or not the quality of a country's institutional framework and governance – such as the respect of property right, transparency, the efficiency and predictability of government action, the degree of consensus on the key goals of political action – is conducive to the respect of contracts.

Combining these two indicators helps determine the degree of resiliency, and position the country in the rating scale: very high, high, moderate, low or very low.

### Step 2: Government financial robustness

The second step focuses directly on debt matters, and especially the combination of two other factors:

- Factor 3: the financial strength of the government. The question is to determine what must be repaid (and how “tolerable” the debt is) and the ability of the government to mobilize resources: raise taxes, cut spending, sell assets, obtain foreign currency...
- Factor 4: the susceptibility to event risk – that is the risk of a direct and immediate threat to debt repayment, and, for countries higher in the rating scale, the risk of a sudden multi-notch downgrade. The issue is to determine whether the debt situation may be (further) endangered by the occurrence of adverse economic, financial or political events.

Combining these two indicators helps determine degrees of financial robustness and refine the positioning of the country on the rating scale.

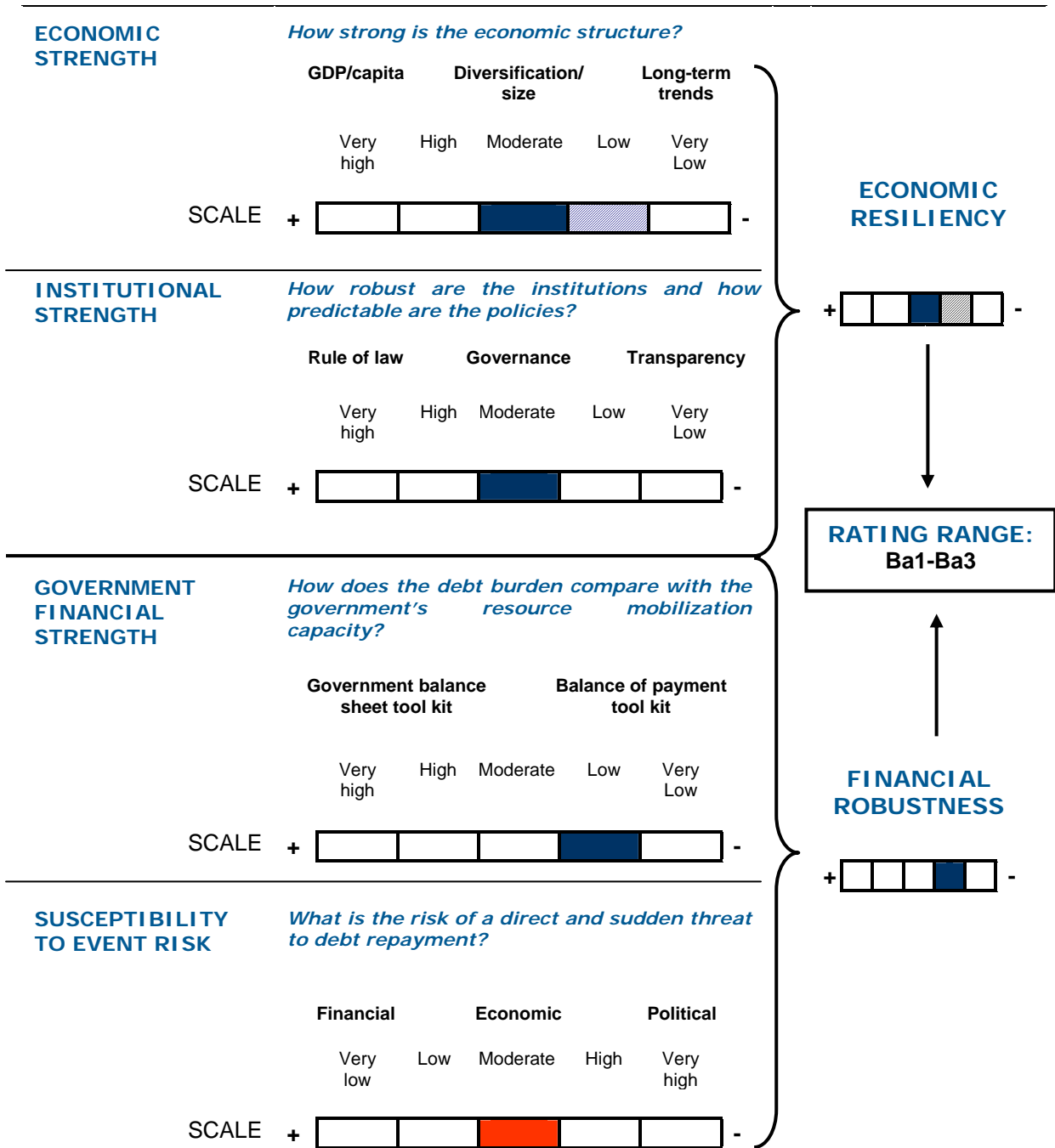
### Step 3: Determining the rating

The third stage consists in adjusting the degree of resiliency to the degree of financial robustness. This results in the identification of a rating range.

The determination of the exact rating is done on the basis of a peer comparison, and weighting additional factors that may not have been adequately captured earlier.

Sovereign Bond Ratings

Sovereign rating mechanics: Example of country A



## Sovereign Bond Ratings

### Summary

#### Introduction

Step 1: Country economic resiliency

- ◆ Factor 1
- ◆ Factor 2

Step 2: Government financial robustness

- ◆ Factor 3
- ◆ Factor 4

Step 3: Determining the rating

## Introduction

### Focus on the sovereign bond rating

#### Moody's sovereign rating characteristics

**Aaa** – Exceptional economic, financial and institutional strengths resulting in unquestioned access to finance. No shock can conceivably disrupt payment capacity.

**Aa** – Very high economic, institutional or government financial strength and no material medium-term repayment concern.

**A** – High economic, financial or institutional strength and no material medium-term repayment concern.

**Baa** – At Baa, a government would have the capacity to sustain a coherent economic policy framework and avoid any near-term debt repayment problems if confronted with a severe shock to public finances.

**Ba** – No clear and present repayment concern and tangible adjustment capacity in a context of potentially severe economic, financial or political shocks.

**B** – One shock away from default, and/or material concerns about willingness to pay.

Sovereign bond ratings are one of the products of Moody's Sovereign Risk Group, along with the determination of various country ceilings, which assess the degree of interference that comes from government actions on private agents' activity. This report does not cover the determination of these ceilings.

Moody's sovereign bond ratings express opinions on credit risk: the risk facing an investor who holds the debt securities of a given government. While Moody's sovereign bond rating process takes into consideration a number of economic, financial, social and political parameters that may affect a government's creditworthiness, the outcome – the rating – is strictly construed to assess credit risk.

Often devastating in terms of economic and financial impact, sovereign defaults have become less frequent in recent years. However, this hides a long-term cyclical pattern whereby, since the Napoleonic wars, every fifty years close to 50% of independent countries have been in default or restructuring.<sup>1</sup>

### Local currency debt and foreign currency debt

#### Local currency bond ratings

Local currency sovereign bond ratings reflect Moody's opinion on the capacity and willingness of a government to raise resources in its own currency to repay its debt to bondholders on a timely basis. The key question is the extent to which a government is able and willing to alter – if and when necessary – its balance of income and spending in order to generate enough resources to repay the debt on time.

Therefore, assessing default risk lies first on a cost-benefit analysis of repaying the debt, and, secondarily, requires an evaluation of the government's resources (solvency risk), as well as its ability to mobilize these resources in a timely fashion (liquidity risk). To determine whether a government will repay its debt punctually, it is therefore necessary to assess the possibility and associated costs of (1) raising additional taxes or cutting spending – which both expose the government to the risk of dampening growth and fueling social discontent; (2) liquidating assets at the risk of depleting productive national resources; or (3) obtaining financing from the central bank at the risk of undermining the monetary authority's credibility and fueling inflation.

<sup>1</sup> "This Time is Different: a Panoramic View of Eight Centuries of Financial Crises" by C. Reinhart and K. Rogoff, 2008.

## Sovereign Bond Ratings

### Foreign currency bond ratings

Foreign currency sovereign bond ratings reflect the capacity of a government to mobilize foreign reserves to repay its debt on a timely basis. Note that, as a first step, the government needs to raise the resources in local currency (see above). However, it then needs to ensure that there is an economic agent in place that is prepared to exchange foreign currency for the local currency. Repaying foreign currency debt thus entails an additional step in the debt repayment sequence.

There is one important complication in determining foreign currency as compared to local currency sovereign bond ratings. While local currency creditworthiness depends exclusively on the government's capacity and willingness to raise finance in its own currency to repay such debt, a government's default in foreign currency can also be precipitated by strains in private agents' debt-servicing capacities. While there is one balance sheet for each economic agent, including the government, there is only one balance of payment for all the economic agents of a country.

Until the late 1980s, governments were often the countries' main foreign currency borrower. There was, then, a direct link between a balance-of-payment crisis – triggered by a current account deficit that is difficult to finance – and a government's default in foreign currency. This link has weakened with financial liberalization and the move towards currency convertibility.

In a country where a high current account deficit would be associated with a high level of private sector foreign debt, a confidence crisis – fueling further capital outflows – may well lead to a currency crisis. This currency crisis will in turn impact the government's creditworthiness in two possible ways: the government's own foreign currency-denominated debt burden will mechanically increase, and the foreign currency resources it could mobilize – for instance, the foreign exchange reserves – may have already been depleted. It follows that, in the assessment of a government's foreign currency credit risk, the strength of the whole country's external position must be taken into account.

### Default risk and expected losses

Moody's long-term debt ratings provide ordinal rankings of credit, both within and across sectors, industries, asset classes, and geographies. They are relative rankings of credit risk. In addition, over time, they have become associated with approximate levels of expected loss.

There are a few features that make sovereigns "special": the exorbitant privilege of taxation, a very high probability of survival (countries rarely disappear), a lack of superior judiciary authority to make debt resolution predictable and a limited sample skewed towards very high ratings for which there is almost no experience of default.

As a result, it is difficult to deconstruct what is "pure" probability of default and what is pure "loss severity" at times of default. In fact, this is almost impossible for countries that are high in the rating spectrum (unless there is a clearly discernible, yet unlikely, default scenario).

In speculative-grade rating territory and this is certainly the case for countries very low on the rating spectrum, the probability of a default becomes less immaterial and the conditions in which a government may default are more easily identifiable. In this case, it may become possible to analyze separately the probability of the default occurring and the severity of the default for bondholders.

This is why some governments may remain in the low B range even though the likelihood of a credit event is very high – simply because the loss-given-default will likely be mild. Alternatively, some countries that may warrant a high B or even low Ba rating from a pure default risk perspective will have a low B rating based on the potentially devastating impact of a default. This is the case when indexation is pervasive and the banking system is highly vulnerable to exchange rate devaluation and/or government default.

## Sovereign Bond Ratings

### Combining quantitative and qualitative parameters in a disciplined way

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Moody's approach to rating sovereigns' creditworthiness combines quantitative and qualitative parameters.

While there have been continuous efforts to make the analysis more quantitative,<sup>2</sup> it is our view that no quantitative model is able to fully capture the variety of situations and interference of political factors that characterize sovereign risk. In contrast with non-sovereign economic agents that are forced to default because they no longer have the resources to repay their debt, governments, by the singular nature of sovereignty – i.e., the freedom from a higher authority – can make the deliberate choice to not repay their debt. There is no way to compel them to do so, and nor there is a way for a sovereign to commit to hand over its assets if it defaults – which explains why sovereign debt is typically unsecured.

There is a point at which a government will decide that the economic, social and political costs of repaying the debt are higher than those of not repaying it. There are no quantitative-based approaches that satisfactorily replace analysts' disciplined judgment on this question.

The following sections will show how the rating process ensures that qualitative elements are integrated within a structured and disciplined framework so that subjectivity is constrained.

### A step-by-step approach

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This report presents in detail the different steps that lead to the assignment of a rating of a government's local currency and foreign currency bonds. The existence of several steps reflects the fact that, while ratings speak to the risk of default on public debt, there is no debt risk indicator that will, by itself, unambiguously position the sovereign in one or other rating category. For instance, a frequently used indicator such as the ratio of public debt to GDP is not *directly* correlated with a rating level: a level of 60% will be found in Aaa-rated economies as well as those in the B categories.

In fact, quantitative debt risk indicators, however crucial, are not always decisive in assessing the rating range. This suggests that debt sustainability indicators are, literally speaking, of second order in determining whether or not a country will repay its debt.

The first-order indicators are those that aim at assessing the country's resilience or shock-absorption capacity. This helps determine the rating range. For instance, Germany at the time of the reunification or the US at the beginning of this century were able to withstand shocks of significant magnitude that weaker countries – even those with much lower initial debt levels – would not have been able to absorb without major financial strains and economic dislocations. Therefore, what dominates sovereign risk analysis, before turning to debt dynamics, is the ability of the sovereign to face adverse economic, financial and political events without having to impose an intolerable economic sacrifice on its population.

Naturally, debt indicators will carry more weight in determining the rating level when the level of the country's resilience will be "moderate" (and therefore not discriminating), which is the case of most emerging market economies.

The following sections explain how Moody's approaches the question of intrinsic resiliency, then combine it with public debt dynamics to determine the rating.

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<sup>2</sup> See Moody's special report called: "[A Quantitative Model for Foreign Currency Government Bond Ratings](#)"

## Sovereign Bond Ratings

## Summary

## Introduction

## Step 1: Country economic resiliency

- ◆ Factor 1
- ◆ Factor 2

## Step 2: Government financial robustness

- ◆ Factor 3
- ◆ Factor 4

## Step 3: Determining the rating

## Step 1: Country economic resiliency

A country's resiliency or shock-absorption capacity is, for the purpose of our ratings, defined as the degree to which, confronted with an economic, financial or political shock, a sovereign will be able and willing to face its obligations without having to impose an extreme burden on the population's income and wealth.

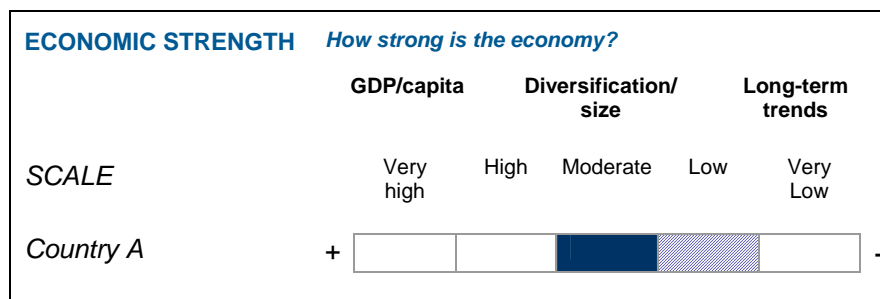
From the perspective of a rating agency, there are two components that need to be combined: the intrinsic strength of the country and the degree of institutional strength. This combination is based on a medium-term assessment and help position the country on the rating scale, in terms of broad range.

## Factor 1: Economic strength

*Economic strength is primarily reflected in GDP per capita. Moody's complements this assessment by looking at the degree of diversification in the economy – or its scale – as well as structural factors that point to long-term robustness.*

We first look at income per capita. Then comes diversification or country scale as a proxy for economic robustness, and ultimately – to help refine the analysis – elements that point to long-term economic resiliency such as the degree of investment in "human capital", the level of innovation or the participation in an integrated economic area – which makes economic downturns generally milder.

Economic strength is scaled into five categories, from "very high" to "very low".



## Primary indicator: GDP per capita

GDP per capita is the single best – albeit imperfect – indicator of economic strength, a key parameter used to evaluate capacity and willingness to pay. For example, there are no instances of sovereign defaults by countries with a GDP per capita higher than US\$11,000.<sup>3</sup> Dividing the measure of economic activity in a country by the population gives an idea of both the relative wealth in the country and its productivity. Both intuitively and statistically, these are strongly correlated with the risk of default.

To smooth pure cyclical effects, Moody's looks at multi-year averages (3-5 years in practice). One conclusion is that long periods of global economic prosperity are – and should be – associated with higher sovereign ratings. Moody's Country Credit Statistical Handbook presents different measures of GDP per capita. For the purpose of assessing economic strength, measuring the GDP on a purchasing power parity (PPP) basis is more representative for cross-country comparison purposes, even though the data are lagged and their measurement is fraught with difficulties. Still, GDP on a PPP basis comes closest to measuring the population's true relative standard of living.

With a great number of countries on an income convergence path, per capita income grows across the board. As a result, some developing countries will reach GDP per capita levels that were associated in the past with very high ratings. In extremis, if the GDP per capita were to be a rigid threshold, most of the countries would be rated Aaa. Yet, by their nature, our ratings are primarily ordinal. They are supposed to rank order.

<sup>3</sup> One cannot infer from this statement that all the countries with a GDP per capita higher than US\$10,000 should be rated Aaa. The relative strength of governments' balance sheets should be reflected in the ratings (even on a compressed rating space). Besides, although some "rich" countries can withstand a first round of economic and financial shocks, their strength can be eroded to a point justifying a downgrade.

## Sovereign Bond Ratings

Therefore, both the absolute level (GDP per capita) and the comparison with other countries must be taken into account. This means that there will be an expansion of the scale over time, with the highest bucket (see below) no longer being US\$20,000 and above, but US\$30,000 and above, for instance.

### Secondary indicators

We complement this primary indicator of economic strength with an evaluation of the country's diversification, indirectly measured by the long-term volatility of nominal output or by the scale of the economy. The reason is that GDP per capita can be flattered by a propitious cycle (commodity exporters for instance) and also because scale matters in terms of creditworthiness: a very small but very rich country can be subject to abrupt changes of fortunes. At the same time, China's sheer size – and thus diversity – and economic momentum can be considerably underestimated by GDP per capita measures.

In addition, to help categorize a country that would be on the border between two buckets, we look at long-term structural factors such as the level of innovation (measured by the World Economic Forum in its Global Competitiveness Report) as well as the level of investment into human capital (measured for instance as % of relevant age group in primary and secondary education). Last, a country's integration into economic and trade zones, which helps dampen the severity of downturns, may be used to refine the classification. This is, for instance, the EU "halo effect" or the role played by NAFTA for Mexico.

### Factor 2: Institutional strength

From the perspective of sovereign risk, a key question is whether the institutions in the country – such as the respect of property rights, the efficiency and predictability of government action, transparency and the degree of consensus on the main political goals – are conducive to the respect of contracts.

Analyzed in tandem with economic strength, the quality of a country's institutional framework and governance is a key consideration in the rating process. The role of institutions in guiding economic development has been widely acknowledged over the last decade. While qualitative in nature, this parameter is highly correlated with sovereign risk as ranked by Moody's ratings. Indeed, unstable and/or immature economic and political institutions increase the risk of unpredictable behavior in times of stress, inviting negative credit implications. This factor considers the extent to which a nation's political, social, and legal institutions act as a constraint on sudden and adverse changes in a country's ability and willingness to repay its debt. The stronger the institutions, the greater the constraint.

Monitoring "institutional strength" does not entail a value judgment about the type of government in any given country – democracies as well as autocracies or other political regimes default alike. Rather, this assessment constitutes an informed opinion about the effectiveness of governance and the extent to which certain situations can degenerate into credit disruptions at times of stress.

"Institutions" are defined as the set of formal rules and informal conventions that provide the framework for human interaction and shape society's incentives.<sup>4</sup> From the perspective of sovereign risk, what matters is whether a country's institutions – and such characteristics as respect for property rights, the efficiency and predictability of government action, the level of policy transparency, and the degree of consensus on the key goals of political action – are conducive to honoring contracts. The last point is particularly important: adjustment efforts such as raising taxes or cutting public expenditures will be easier in countries that exhibit a high level of political consensus – which is itself dependent on political participation, accountability and income distribution.

Key examples of the importance of institutions have been the improvements witnessed in those Central and Eastern European countries that have joined the European Union. The EU convergence process – implementing the "acquis communautaire" – has considerably improved the quality of governance in those countries. On the global stage, the independence of central banks, the improvement in the regulatory and

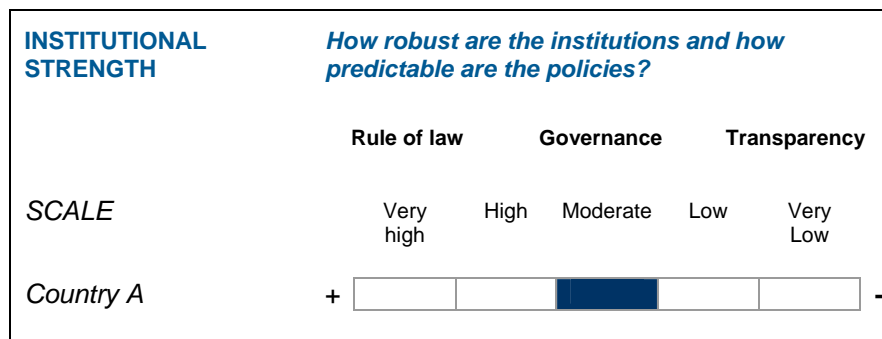
<sup>4</sup> North, Douglas 1991: « Institutions », Journal of Economic Perspectives.

## Sovereign Bond Ratings

supervisory frameworks of the financial system, and increased transparency have improved the quality of governance in many countries.

Moody's monitors a number of indicators that measure government effectiveness, with the starting point being those indexes developed by the World Bank: Rule of Law, Government Effectiveness Index. Such indicators offer the advantage of already being widely accepted as a reference for such parameters, ones that Moody's analysts can refine, if necessary. Moody's Sovereign Risk Group has, through its Statistical Handbook,<sup>5</sup> gained over time a valuable experience in assessing governments' transparency. This, along with analysts' judgments on the predictability of policies, is factored into the assessment of institutional strength. We do not derive any direct rating implications from marginal changes in governance structure. Rather, we aim to evaluate whether institutional changes are more or less conducive to policy predictability.

Institutional strength is scaled into five categories, from "very high" to "very low".



### Factor 1 + Factor 2 = resiliency levels

Combining quality of institutions and economic strength gives an idea of the shock-absorption capacity of a country. Note that these two parameters are interrelated. Much economic research has indeed pointed to the fact that income disparities between countries are due to the quality of institutions – especially through their impact on total factor productivity. However, combining these aspects adds information: a wealthy country with weak institutions may be an unpredictable debtor, whereas a rather poor country with strong institutions may attach a relatively high importance to the respect of contracts.

| Assessing Resiliency         |           | Factor 2 – Institutional strength |          |          |      |           |
|------------------------------|-----------|-----------------------------------|----------|----------|------|-----------|
|                              |           | Very low                          | Low      | Moderate | High | Very High |
| Factor 1 – Economic strength | Very high |                                   |          |          |      |           |
|                              | High      |                                   |          |          |      |           |
|                              | Moderate  |                                   |          |          |      |           |
|                              | Low       |                                   |          |          |      |           |
|                              | Very low  |                                   |          |          |      |           |
| <b>Economic resiliency</b>   |           |                                   |          |          |      |           |
| Very Low                     |           | Low                               | Moderate |          | High | Very high |

## Sovereign Bond Ratings

### Summary

#### Introduction

#### Step 1: Country economic resiliency

- ◆ Factor 1
- ◆ Factor 2

#### Step 2: Government financial robustness

- ◆ Factor 3
- ◆ Factor 4

#### Step 3: Determining the rating

## Step 2: Government financial robustness

### Introduction

After the first stage, which consisted in evaluating the country's intrinsic resiliency, the second stage involves an in-depth analysis of the financial robustness of the government, and is focused on debt dynamics. The objective is to determine the degree of vulnerability of public finances.

Robustness mainly answers two questions:

- How strong or weak are a government's finances (**Factor 3**)? The objective here is to quantify the capacity of the government to mobilize resources to repay its debt.
- How susceptible is a government to event risk (**Factor 4**)? The answer to this question lies in determining whether the debt situation is at risk of being (further) endangered by the occurrence of adverse economic, financial or political events.

The rationale behind this approach is that sovereign risk must be assessed in a dynamic context, taking into account public debt dynamics under non-static stress scenarios. By combining an assessment of the government's balance sheet with an assessment of its susceptibility to event risks, we can gauge the degree of vulnerability of a given country's public finances.

### Factor 3: Government's financial strength

*This is an assessment of what must be repaid against what money is available, entailing a comparison of debt service requirements and balance-sheet flexibility. This requires a quantitative as well as a qualitative appraisal; for instance, the estimated ability of the government to compress spending and/or raise taxes. An additional complexity stems from the fact that countries are not vulnerable to the same kind of strains: those in the early stages of financial liberalization and openness cannot be rated with precisely the same tool kit as highly developed and financially sophisticated countries – hence, the need to choose the right analytical approach.*

### Assessing financial strength – the challenges of sovereign risk analysis

There are two key analytical complexities in assessing government financial strength.

The first is the need to go “beyond” headline debt metrics. It is essential to shift the emphasis from a sole focus on debt metrics to an assessment of a government's reaction function. The question is not so much whether the headline debt measures (such as debt/GDP or debt/revenues) are “high” or “low”, but whether the debt is affordable or not, given all the other demands on public financial resources.

The task of assessing the financial strength of a government consists in asking two questions:

- (1) To what degree are a government's policy choices constrained by its debt repayment obligations?
- (2) How easy is it for a government to generate the money necessary to repay the debt, whether through refinancing (which does not change debt levels but eases liquidity constraints), asset mobilization (which does not change a government's net worth) or fiscal adjustment (raising taxes and cutting spending)?

The next section details this analytical framework.

The second area of complexity in sovereign analysis derives from balance of payment considerations – which heavily dominated ratings for emerging economies in the past.

Some governments used to borrow predominantly in foreign currency. There are many reasons for this, primarily the fact that external creditors were unwilling to take the exchange rate or convertibility risk. As a

## Sovereign Bond Ratings

result, one of the key rating constraints for these countries was their difficulties in generating the hard currency (the dollars) necessary to repay the debt.

Consequently, traditional sovereign risk analysis used to focus on balance of payment risk metrics, when the external constraint was the immediately binding credit constraint for a country facing a scarcity of foreign reserves – and an inability to exchange local currency resources against hard currencies.

This overshadowed the fact that sovereign risk analysis always starts with an assessment of the strength of the government's balance sheet – the way governments generate the resources necessary to repay debt, through spending compression, tax increases, or asset sales.

When and how balance of payment pressures should take precedence in the assessment of a government's financial strength depends on the following considerations.

To repay its debt, a government needs to generate resources. For its local currency debt, it will raise taxes, cut spending or liquidate assets (privatizations). To repay its foreign currency debt, it will do much the same, and then exchange the local currency against “dollars” on the foreign exchange market. Or, if there is limited appetite in the foreign exchange market for the local currency, it will go directly to the central bank and obtain foreign exchange reserves, either against the local currency or in exchange for a local currency loan from the central bank. In the former case, public debt will decline; in the latter, the government will have simply substituted a local currency debt for a foreign currency debt, at the risk of fueling inflation.

Balance of payment considerations will play a role in the assessment of the government's financial strength through the foreign exchange channel, either because of price effects or because of quantity/scarcity effects:

- Price effects: balance of payment dynamics will matter because of the risk that a sharp exchange rate depreciation poses to the balance sheet of the government. This can happen directly through an increase in the cost of repaying debt (if there is some foreign currency debt, the government will need to raise more resources in local currency) or indirectly because of contingent liabilities that could crystallize as a result of the depreciation (state-owned companies, financial dollarization in the banking system). As a mitigating factor, a country with large foreign exchange reserves will be able to intervene on the market and limit the risk of a sharp depreciation.
- Quantity/scarcity effects: a government with limited access to the foreign exchange market and low reserves in comparison to the external debt of the country (beyond its own foreign currency debt) can be pushed into default. This used to be the logic behind traditional sovereign analysis, for countries with limited access to international capital markets.

If most countries are vulnerable (to a lesser or a greater extent) to the price effect, the analysis centered on the quantity effect will be limited to those countries that either are not integrated into global capital markets or can abruptly lose access to capital markets (“sudden stops”). A country that is “external liquidity constrained” can squeeze the taxpayer as much as is politically and socially acceptable; however, its ability to obtain hard currencies will be a binding constraint. In such a case, balance of payment considerations centered on external liquidity will take precedence over other considerations in determining the ratings.

Therefore, Factor 3 (and ultimately the rating) will be influenced by an analysis centered on the balance sheet of the government (including the price effect of the balance of payment channel), except in some specific cases where external liquidity considerations will take precedence.

### The “government balance-sheet” tool kit

#### *What must be repaid: how easy is it to “live with the debt”?*

The analytical problem: a critical step in sovereign credit risk analysis is to acknowledge that not all debt is created equal. For example, should one dollar of bonded debt “count” for as much as one dollar of a future public pension shortfall? Or as one dollar of a potential bank bail-out? And, even on the bonded debt, should one dollar to be repaid tomorrow be counted the same as one dollar to be repaid in 10 years' time? Should

## Sovereign Bond Ratings

(the equivalent of) one dollar to be repaid in local currency count as much as one US dollar given that the government has no way to create dollars? Should one dollar of public debt owned by the central bank or even the banking system count the same as one dollar owned by foreign hedge funds?

Our solution: we assess the degree to which public debt is constraining on the basis of two key questions:

- **Question 1: how “affordable” is the debt?**

The first question to consider is how burdensome the government's debt is. The same level of debt can create different levels of discomfort for two indebted countries (even if they have identical GDPs). In one case, interest payments may absorb 50% of total revenues – half of the taxes go to pay interest on the debt before paying for schools, bridges, etc. In the case of the other country, interest costs may only preempt 10%.

The debt burden in Japan, for instance, is moderate notwithstanding its magnitude. Likewise, several EU countries benefited from a relaxation of the debt burden through interest rate convergence towards German rates in the process of joining the Eurozone in the late 1990s.

Therefore, as a starting point, we will look at interest payment/revenues and also the size of the gross borrowing requirement.

- **Question 2: how adverse (or potentially adverse) are the debt dynamics?**

This question itself depends on two main issues:

*How likely is the debt to rise abruptly due to a shock or crisis of some kind?* The structure of the debt matters, especially from a liquidity risk standpoint. We attempt to differentiate between dangerous and benign debt structures. Dangerous debt structures are characterized by a lack of granularity (front-loaded debt, or a very uneven repayment schedule), and different types of indexation (to interest rates or exchange rates).

Likewise, debt can rise abruptly when, for instance, a government has to take the cost of a banking crisis onto its balance sheet. It is therefore important to assess the degree of conditionality of liabilities – actual financial debt obligations should be weighted much more heavily than contingent ones (such as the risk of a banking sector bail-out) or even more implicit, longer-term liabilities (such as unfunded pension liabilities). Indeed, contingent liabilities must be discounted by their likelihood of materialization – which is easier said than done – and future liabilities should be taken into account only in so far as we can appreciate their cash impact.

The point here is that we take into account implicit liabilities such as public pension system deficits only to the extent that they will materialize into an actual debt or payment obligation; governments have many ways to alter the net present value of pension liabilities, such as postponing retirement age, increasing contributions and lowering pensions.

*Is the debt on a long-term rising path?* Another discriminating parameter is whether debt is on a stable, a declining, or an explosive growth path. Note that this is an important factor, but more helpful in terms of the direction of the rating than for its level. After all, a country with an explosive debt dynamic but negligible debt will, all things being equal, be rated more highly than a country with a stable debt dynamic but a high initial debt level.

### *How can it be repaid: assessing a sovereign's ability to generate resources*

The second part of the analysis consists in evaluating the ability of a government to adjust and mobilize resources both through further financing, realization of existing assets and through higher revenues and/or lower spending. This last point is one of the most complex economic policy questions – one that often has its roots in political economic analysis.

## Sovereign Bond Ratings

### ■ Question 1: is there a large and/or pliant pool of financing?

The first thing a government can do to repay its debt is obviously raise more debt. This clearly does not improve its solvency but it may allay liquidity concerns. Therefore, all things being equal, countries that have access to a deep and diversified pool of finance are in a better situation than those whose private savings are low and whose financial system is repressed.

For this reason, financial depth (such as M3/GDP or the aggregation of banks' balance sheets and marketable financial instruments as a percentage of GDP) can be a useful indicator of government financial flexibility.

A related question is the extent to which the debt is owned by a captive set of local investors or by foot-loose foreign investors, for instance. In extremis, the public debt that is owned by the central bank may have ultimately to be repaid – when it is not inflated away – but the risk that the central bank is going to bankrupt the government is negligible. Therefore, even though it is often hard to know in detail who owns the debt, the nature of this ownership is a parameter that has to be taken into account. Japan is a case in point, where the debt is largely held by resident banks, companies and individuals with a deeply held home bias. Any debtor benefiting from such a dedicated investor base has a lower degree of vulnerability.

### ■ Question 2: can the government sell assets?

Another means governments can use to meet their debt obligations is to sell assets. Indeed, governments have assets as well as liabilities, such as public companies, deposits in the banking system, and a privileged claim on central banks' foreign currency reserves for the external debt.

The extent to which these assets can cancel out or mitigate liabilities ultimately depends on whether the country is subject to liquidity risk. If yes, then only liquid assets should be taken into account. Note that, as noted above, what defines an advanced economy is its quasi-immunity to liquidity shocks. Therefore, for these countries, we take a liberal view of their assets.

For countries that are not subject to liquidity risk such as Aaa countries, the use of privatization proceeds to repay debt does not improve creditworthiness – barring massive expected productivity gains. Indeed, this results in both the liability and asset sides of the government's balance sheet diminishing.

### ■ Question 3: what is the government's adjustment capacity?

In assessing the "adjustment" capacity of a government, we commonly use the debt/revenue metric. A low ratio will be reflective of a high "coverage" of the debt by annual tax receipts.

However, this ratio does not deliver unambiguous results, because it is unclear whether a low revenue/GDP ratio reflects a high ability to raise taxes (a credit strength) or whether it reflects a low tolerance for taxation (a credit weakness). Likewise, a high ratio can either reflect the ability of the government to preempt a large portion of the residents' income (a credit strength) or represent an intrinsic constraint to further taxation.

There is no single quantitative indicator that measures the "adjustment capacity" of a government in the face of challenging events. The ability of Canada in the 1990s or, much lower in the rating spectrum, of Turkey or Brazil in the current decade to produce primary surpluses was notable. Other countries seem to face more difficulties, either because the "urge" to adjust does not seem compelling (cf. some continental European countries) or because of difficulties in adjusting (e.g. political fractiousness, lack of determined leadership, difficulties in reforming including "reform fatigue").

## The "balance of payments" tool kit

As said earlier, for some countries, it is not sufficient to be able to mobilize resources in local currency. To repay foreign-currency denominated debt, countries do need to go the extra step of obtaining hard currency in exchange for their local currency funds.

## Sovereign Bond Ratings

Countries that do not spontaneously generate hard currencies because they have a current account deficit and/or net capital outflows experience a shortage of hard currency – reflected in a depreciating exchange rate and diminishing official foreign reserves. These countries are “balance of payment constrained” irrespective of whether or not the government can easily mobilize local currency funding to repay the debt.

Therefore, this constraint has two characteristics: (1) it is additional to the primary constraint of being able to generate the local currency funding; and (2) it is not circumscribed to the government's action – the shortage of hard currency may originate in chronic current account deficits that have little to do with fiscal policy, but will impact the government anyway.

The most useful indicators here are those that measure external financing strains: current account deficit, debt/exports metrics, the nature of the balance of payment financing, and, most importantly, external liquidity indicators based on foreign exchange reserves. These indicators constitute the balance of payments tool kit.

### Why are there “rating gaps”?

In some cases, the local currency bond rating of the government differs from the foreign currency bond rating – with the local currency bond rating generally being higher.

The reason is the combination of three dominant factors.

First, a low degree of capital mobility such that the risk of a spillover from local currency debt to foreign currency debt is limited. Such a low degree of spillover risk results from either legal barriers to capital mobility (such as capital controls) or psychological barriers (that explain investors' home bias, for instance).

The second factor is the binding character of the external liquidity constraint. Let's imagine a country with a reasonable ability to raise resources in local currency through tax increases and spending cuts. This country may yet face a severe hurdle when it needs to obtain hard currency to repay the debt.

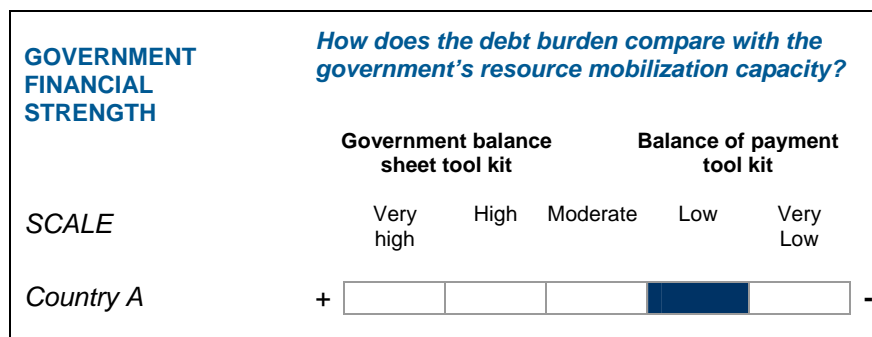
The last factor is the readiness of the government to allow for a differential treatment between creditors, based on the denomination of the debt. But this could happen, in the case presented above, if there is just not enough hard currency available.

In this example, a rating gap could open up. This will mean that we consider the risk of a default in local currency obligations to be lower than the risk of default in foreign currency.

It is likely that over time, as countries become more immersed in the global capital markets, rating gaps will become much more infrequent.

### Summing up government financial strength assessments

The assessment of the government's financial strength (what must be repaid against the money available) based on these two analytical spheres is scaled into five categories, from “very high” to “very low”. The analysts have to answer the question: given the level of constraint posed by the debt, how much balance-sheet flexibility does the government have? For instance, a country with low debt pressure and ample resources in terms of financial depth, tax flexibility and/or ability to compress spending will be in the “very high” category. A country subject to high debt pressure (in terms of affordability or inflammability) and with a limited resource mobilization capacity will be in the “very low” category.



## Sovereign Bond Ratings

## Summary

| Intensity of the Debt Constraint  | Ability to Generate Resources   |
|---|---|
| External Liquidity Risk Analysis  |   |
| <p><b>Does the government face a severe external liquidity constraint?</b></p> <ul style="list-style-type: none"> <li>■ External Vulnerability Indicator</li> </ul>   | <p><b>Does the government have access to a deep pool of external financing?</b></p> <ul style="list-style-type: none"> <li>■ Easy access to international capital markets</li> <li>■ External support (official or private sector)</li> </ul>   |
| Sovereign Balance Sheet Analysis  |   |
| <p><b>How affordable is the debt?</b></p> <ul style="list-style-type: none"> <li>■ Interest payment/revenues</li> </ul> <p><b>Could unfavorable debt dynamics raise the intensity of the debt constraint?</b></p> <ul style="list-style-type: none"> <li>■ Debt dynamic: on which trajectory is the debt? <ul style="list-style-type: none"> <li>• Primary balance and interest rate gap ("natural drift")</li> <li>• Impact of ageing</li> </ul> </li> <li>■ Debt affordability under stress: could debt constraint increase abruptly? <ul style="list-style-type: none"> <li>• Interest rate risk</li> <li>• Exchange rate risk (Balance of payment channel, mitigated by the size of FX reserves)</li> <li>• Contingent liabilities under stressful but plausible scenarios</li> </ul> </li> </ul> | <p><b>Does the government enjoy high market access?</b></p> <ul style="list-style-type: none"> <li>■ Measures of financial depth</li> </ul> <p><b>What is the government's adjustment capacity?</b></p> <ul style="list-style-type: none"> <li>■ Adjusted Revenues/GDP</li> <li>■ Capital Expenditure/total expenditure</li> </ul> <p><b>Can the government mobilize assets (privatizations)?</b></p> |

## Sovereign Bond Ratings

### Factor 4: Country's susceptibility to event risk

The last factor to consider is the country's (not just the government's) susceptibility to event risk. Combined with the analysis of the government's financial strength, this gives an indication of the potential stress weighing on government debt repayment. Indeed, whilst Factors 1 and 2 aim at assessing the government's ability to withstand shocks from a medium-term perspective, this last factor denotes the intensity of the risk that external events may strain the finances of the public and private sector alike.

This fourth factor reflects the "combustibility" of a country's debt in response to external events. The events can be of a different nature: economic (e.g. earthquakes, hurricanes), financial (e.g. speculative crises) and/or political (e.g. war, political chaos, deliberate decisions to hurt creditors), but they should be somehow connected to the risk of debt default.

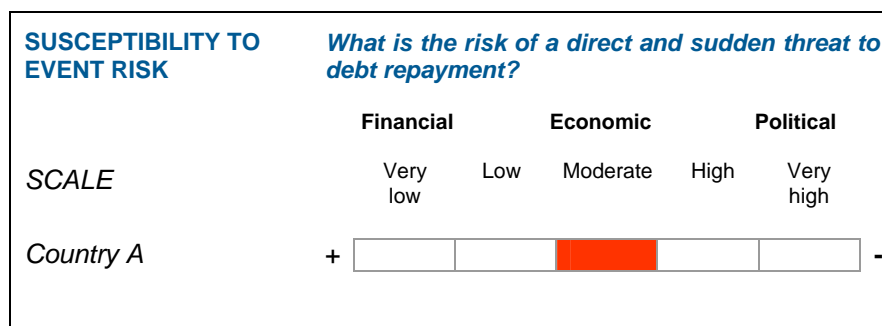
The fourth factor answers the question: is there a risk of a "direct and immediate threat" that would either lead to an actual default, or materially raise the risk of default in a way that would justify a multiple-notch downgrade? Although a number of vulnerabilities have already been assessed (terms of trade shocks in Factor 1, policy unpredictability in Factor 2, sensitivity of the debt to interest rate shock in Factor 3), Factor 4 evaluates the vulnerability to a sudden threat – the plausible worst-case scenario.

For most countries Factor 4 will be rating-neutral. The susceptibility to event risk will be "very low" or "low". However, this factor will help in particular differentiate those countries that are "one shock away" from default from others.

In the end, the combination of the country's resilience to shocks and the risk of potential shocks on public finances will help determine the sovereign rating. The susceptibility to event risk weighs the probability of the event by its severity in terms of rating migration – and ultimately defaults for those countries that are at the lower end of the rating scale.

The analysis here will consist in determining whether the country's susceptibility to event risk is:

- Very low: very low risk of a sudden and abrupt downgrade due to event risk.
- Low: low risk of a sudden and abrupt downgrade due to event risk.
- Moderate: a possible risk of a sudden and abrupt downgrade due to event risk.
- High: a plausible risk of a sudden and abrupt downgrade due to event risk.
- Very high: a probable risk of a sudden and abrupt downgrade due to event risk.



## Sovereign Bond Ratings

### Factor 3 + Factor 4 = Financial robustness

As described above, combining the evaluation of the strength of a government's finances to withstand intense event risk helps to determine whether the degree of vulnerability attached to public finances is low, moderate or high.

The table below reads as follows: weak public finances (or external finances if the balance of payments tool kit is used) and a low susceptibility to event risk will be suggestive of a "moderate" level of financial vulnerability.

| Assessing Financial Robustness                    |           | Factor 4 – Susceptibility to event risk |     |          |      |           |  |           |  |
|---|-----------|---|-----|----------|------|-----------|--|-----------|--|
|   |           | Very low                                | Low | Moderate | High | Very High |  |           |  |
| Factor 3 –<br>Government<br>Financial<br>strength | Very high |   |     |          |      |           |  |           |  |
|   | High      |   |     |          |      |           |  |           |  |
|   | Moderate  |   |     |          |      |           |  |           |  |
|   | Low       |   |     |          |      |           |  |           |  |
|   | Very low  |   |     |          |      |           |  |           |  |
| <b>Financial Robustness</b>                       |           |   |     |          |      |           |  |           |  |
| Very Low  |           | Low                                     |     | Moderate |      | High      |  | Very high |  |

## Sovereign Bond Ratings

Summary

Introduction

Step 1: Country economic resiliency

- ◆ Factor 1
- ◆ Factor 2

Step 2: Government financial robustness

- ◆ Factor 3
- ◆ Factor 4

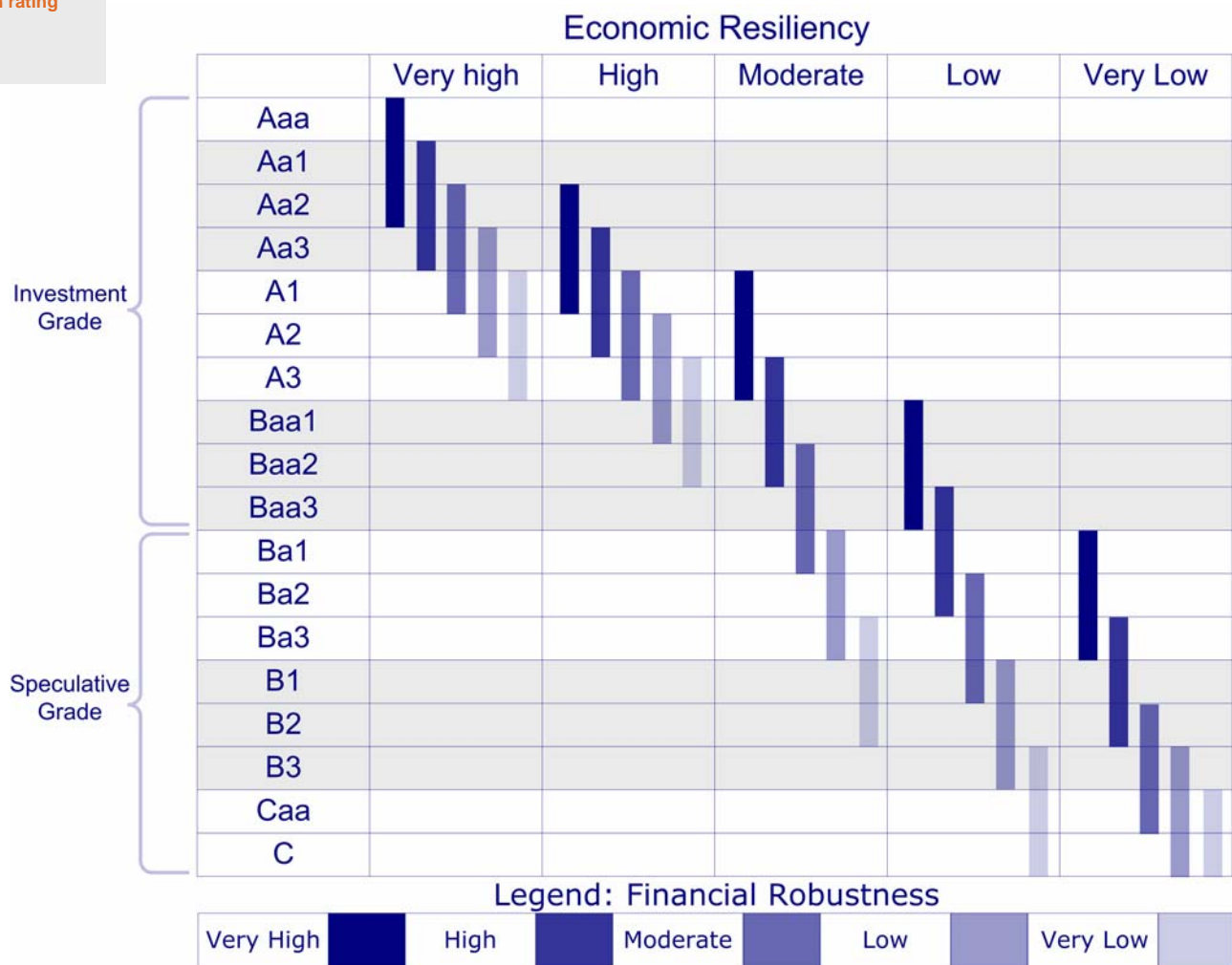
**Step 3: Determining the sovereign rating**

### Step 3: Determining the sovereign rating

The final determination of the sovereign bond rating is based on the output of the "rating road map" (see below), combined with all additional information that a rating committee will deem relevant to assess the creditworthiness of a government.

Indeed, the analytical process thus far, based on the interplay between the four key factors, has produced a rating range (A, for instance) rather than an exact rating (A2). The reason is that calibrating the approach through a few categories such as very weak, weak, moderate, high or very high may be insufficiently precise and entail some information loss. Also, the rating process is deliberative and not mechanical: it depends on peer comparisons and should leave room for exceptional risk factors to be taken into account.

#### Sovereign bond rating road map



The road map above shows how the combination of the four key factors translates into a rating range. The slope of the curve (how the ranges or rating bars overlap) is based on a deductive as well as a normative process. The deduction comes from Moody's decades of experience in risk rating; the normative process comes from comparative economic and financial analysis (what makes a government a better "credit"), which is especially useful when there is little empirical record of default on debt. The rating bars overlap rather less down the rating spectrum than at the higher end. This reflects a lower tolerance for rating volatility for highly rated countries.

## Sovereign Bond Ratings

## Moody's Related Research

- Moody's Sovereign Rating Lists

## Special Comments:

- A Guide to Moody's Sovereign Ratings, July 2006 (98177)
- A Quantitative Model for Local Currency Government Bond Ratings, September 2003 (79404)
- A Quantitative Model for Foreign Currency Government Bond Ratings, February 2004 (81176)
- Anchors in the Storm: Aaa Governments and Bank Bail-Outs, March 2008 (108164)
- What Does It Mean To Be A Triple-A Sovereign? May 2008 (109129)
- Sovereign Defaults and Interference: Perspectives on Government Risks August 2008 (110114)

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