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Updated methodology for assigning credit ratings to sovereigns

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Updated Methodology for Assigning Credit Ratings to Sovereigns

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Abstract

The investment of foreign exchange reserves or other asset portfolios requires an assessment of the credit quality of investment counterparties. Traditionally, foreign exchange reserve and other asset managers relied on credit rating agencies (CRAs) as the main source of information for credit assessments. In October 2010, the Financial Stability Board issued principles to reduce reliance on CRA ratings in standards, laws and regulations, in support of financial stability. Moreover, best practices in the asset management industry suggest that investors should understand the credit risks they are exposed to and, more broadly, that they should rely on internal credit assessments to inform investment decisions. In support of these objectives, the Bank of Canada first published its sovereign rating methodology in 2017. It provided a detailed technical description of the process developed to assign internal credit ratings to sovereigns, using only publicly available data.

This publication updates the internal sovereign rating methodology to stay abreast of evolving best practices and leverage internal experience. This updated methodology proposes three key innovations: (i) a new approach to assessing a sovereign's fiscal position, (ii) adjustments to the approach to assessing monetary policy flexibility and (iii) the explicit consideration of climate-related factors.

Bank topics: Credit risk management; Foreign reserves management
JEL codes: G24, G28, G32, F31

Résumé

Le placement des réserves de change ou d'autres portefeuilles d'actifs nécessite au préalable une évaluation de la qualité du crédit des contreparties aux opérations de placement. Par le passé, les gestionnaires de réserves de change et d'autres actifs avaient surtout recours aux notes attribuées par les agences de notation. Pour soutenir la stabilité financière, le Conseil de stabilité financière a publié en octobre 2010 des principes visant à réduire le recours systématique aux notes des agences dans les normes, les lois et les règlements. De plus, selon les pratiques exemplaires du secteur de la gestion des actifs, les investisseurs devraient comprendre les risques de crédit auxquels ils sont exposés et, de manière générale, recourir à des évaluations internes de crédit pour guider leurs décisions de placement. Dans cette optique, la Banque du Canada a publié pour la première fois en 2017 sa méthode de notation des émetteurs souverains. Celle-ci contenait une description technique détaillée du processus mis au point pour attribuer une note de crédit interne aux émetteurs souverains à partir de données publiques uniquement.

Le présent document offre une mise à jour de la méthode de notation interne des émetteurs souverains utilisée par la Banque du Canada visant à l'adapter aux meilleures pratiques et de mettre à profit l'expérience acquise à l'interne. La nouvelle méthode propose trois innovations centrales :

1) une nouvelle approche pour évaluer la situation budgétaire des émetteurs souverains; 2) des modifications au processus d'évaluation de la flexibilité de la politique monétaire; et 3) l'inclusion explicite de facteurs liés aux changements climatiques.

Sujets : Gestion du risque de crédit ; Gestion des réserves de change
Codes JEL : G24, G28, G32, F31

1. Introduction

The sovereign credit rating methodology detailed in this paper provides the basis for analyzing the counterparty credit risk of sovereign debt issuers. In practice, the Bank of Canada uses the sovereign credit rating methodology in its management of Canada's foreign reserves. Canada's foreign exchange reserves form a portfolio of assets consisting primarily of debt instruments issued by foreign governments and their subsidiaries as well as supranational organizations; the foreign exchange reserves are managed jointly by the Bank of Canada and the Department of Finance Canada. As part of its role, the Bank of Canada conducts in-depth credit assessments of investment and trading counterparties and assigns ratings to help inform the decisions of portfolio and risk managers.

Traditionally, foreign exchange reserve managers and other asset managers relied on credit rating agencies (CRAs) as the sole source for credit assessments—CRA ratings are widely recognized and transparent and are a long-standing measure of relative credit risk. However, the *Principles for Reducing Reliance on CRA Ratings,* issued by the Financial Stability Board in October 2010 and subsequently endorsed by the G20, advised against mechanistic reliance on CRA ratings. Instead, they recommended developing internal credit analysis capacity. The aim is to reduce reliance on CRA ratings to lessen the threats to financial stability from the herding and cliff effects that could arise if CRA rating thresholds were strictly integrated into laws, regulations and market practices. Specifically, for central banks and managers of foreign exchange reserves, the principles state that "central banks should reach their own credit judgements on the financial instruments that they will accept in market operations, both as collateral and as outright purchases" and that "central bank policies should avoid mechanistic approaches that could lead to unnecessarily abrupt and large changes in the eligibility of financial instruments" (Principle III.1., Financial Stability Board 2010, 5). Since the publication of these principles, market participants have widely reduced their reliance on CRAs in favour of developing internal credit expertise.

To align with the Financial Stability Board's recommendations and reduce mechanistic reliance on CRAs, the Bank established the Credit Rating Assessment Group in 2013 (renamed the Credit Risk Advisory Office in 2019). The purpose of the office is to evaluate the credit (default) risk of assets and other financial exposures the Bank maintains or manages on behalf of the Government of Canada, as well as to advise on credit risk policy in general. The office prepares analysis and presents credit recommendations to the Credit Rating Committee, which is composed of representatives of the Bank and the Department of Finance Canada and is responsible for assigning ratings to the trading and investment counterparties of the Exchange Fund Account.[1] Internally developed ratings are used to establish the placement of entities within pre-established thresholds, which in turn define specific credit eligibility limits as part of the Bank's and the government's risk-management policies. These policies have been formed for the management of the foreign exchange reserves, which falls under the purview of the joint Bank of Canada–Department of Finance Canada Funds Management Committee (FMC).

To support its analysis, the Credit Risk Advisory Office has developed internal rating methodologies based on the best practices of credit risk practitioners. In addition to the internal sovereign rating methodology,

[1] The Exchange Fund Account is the account that holds Canada's foreign exchange reserves.

the Credit Risk Advisory Office has developed methodologies for rating financial institutions, national banking industries, multilateral development banks, supranational organizations, sub-sovereign bodies and government-related entities.[2] The Credit Risk Advisory Office updates and improves its internal methodologies as expertise and knowledge grow and industry best practices evolve.

The sovereign rating methodology presented in this paper relies on fundamental credit analysis that produces a forward-looking and "through-the-cycle" assessment of a sovereign's capacity and willingness to pay its financial obligations. This framework is flexible enough to accommodate modifications that respond to specific needs of individual sovereigns. The result of a sovereign credit assessment is an opinion on the relative credit standing or likelihood of default of an existing or potential sovereign investment counterparty. This opinion informs the investment decisions of the reserve portfolio managers. This paper provides an update to the technical description of a methodology designed to assign internal credit ratings to sovereigns described in Muller and Bourque (2017). It reflects the outcome of periodic reviews undertaken since 2017 to incorporate evolving best practices and internal experience gained. Relative to Muller and Bourque (2017), this update of our methodology incorporates the following key innovations: (i) a new approach to assessing a sovereign's fiscal position; (ii) adjustments to the approach to assessing monetary policy flexibility; and (iii) the explicit consideration of climate-related factors.

The remainder of this paper is divided into six main sections. Section 2 describes the key constructs used in the development of our internal methodologies. These constructs include the need for a solid governance structure, ratings that are applicable to existing credit risk management policies, the focus on public information, and the confidentiality of ratings to the Bank and the Department of Finance Canada. Section 3 presents the framework of the methodology, including a brief description of each of the five components of the model and an explanation of how individual scores assigned to each component are combined to obtain an opinion on the relative credit standing or likelihood of default of the sovereign being assessed. Section 4 provides a detailed description of each component of the methodology, including the rationale, theory and empirical analysis supporting each risk factor as well as how each was calibrated. Section 5 gives a brief description of an embryonic approach to considering the impact of climate change on credit assessments. Section 6 looks at exceptional adjustments and how they are used in determining a final internal credit rating. The paper concludes with a brief discussion of potential future research and encourages feedback from other practitioners on the applicability of the methodology described.

2. Fundamental constructs of internal rating methodologies

This section describes the key constructs used in the development of our sovereign methodology (these constructs also apply to our other internal methodologies, including those used for multilateral

[2] Government-related entities (GREs) are defined primarily by their roles and functions related to the provision of critical public services; as a result, they are likely to receive government support in the event of financial difficulty. GREs generally include administrative bodies, agencies and public corporations formed, nationalized or controlled by a government. However, some entities with little or no link to government may also be considered GREs based on their systemic importance to the economy or the functioning of government.

development banks, financial institutions and other counterparties). Readers interested in only the technical aspects of the sovereign methodology can proceed directly to section 3.

The overall approach to developing the internal rating methodologies is based on several key fundamental constructs, including:

- relying on a governance process that ensures that ratings are influenced only by considerations related to the credit quality of the entity being assessed
- generating credit ratings that reflect an issuer's relative likelihood of default
- establishing high-quality ratings
- ensuring consistent and transparent assessments based on publicly available data

The ratings remain internal to the Bank of Canada and the Department of Finance Canada and are not shared publicly.

i. Robust governance framework

The Funds Management Committee (FMC)[3] is comprised of senior officials from the Bank of Canada and the Department of Finance Canada; it is the owner of all internal credit rating methodologies. The FMC is responsible for approving methodologies for use and ensuring that they remain of high quality. To this end, all internal methodologies undergo a fundamental review triennially to ensure consistency with industry best practices and internal experience gained; any eventual changes are approved by the FMC or a delegated subcommittee.

Internal credit ratings are assigned by an operationally independent Credit Rating Committee. This committee is composed of representatives from across the Bank and the Department of Finance Canada and is co-chaired by an executive member of the Bank and a senior representative from the Bank's Financial and Enterprise Risk Department.[4] A key consideration for Credit Rating Committee membership is that representation be balanced and that no single business line dominate. Another consideration is to ensure sufficient independence of those assigning credit ratings from those making investment decisions: in a quorum of five voting members, there can be a maximum of one representative involved in making investment decisions.

The Credit Rating Committee is supported by the Credit Risk Advisory Office, which is part of the Bank's Financial and Enterprise Risk Department. From an organizational perspective, the department is independent from the front office operations and reports to the Bank's Chief Risk Officer.[5] The Credit Risk Advisory Office provides the secretariat for the Credit Rating Committee. It is also responsible for making internal credit rating recommendations to the committee and maintaining and improving the internal rating methodologies.

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[3] See the description of the Funds Management Governance Framework for more information on the role of the Funds Management Committee.

[4] See the listing of the Bank's Executive Leadership and Senior Management.

[5] The term "front office" is used here to describe the teams directly involved in the execution or implementation of investment and funding decisions.

The ratings generated with the sovereign methodology presented in the next sections are intended to be used only internally to manage credit risk. The objective is to reduce reliance on CRA opinions, thereby generating benefits for the internal investment decision-making process and promoting global financial stability. Internal ratings are therefore not made public, as publishing them could be counter to the objectives of the G20 and FSB principles, which are to encourage investors to conduct independent credit risk assessments rather than relying on opinions from CRAs, the Credit Rating Committee or any other external sources. Additionally, internal ratings are kept confidential to ensure that rating recommendations and decisions are free of external or reputational considerations and thus fully independent.

ii. Internal ratings reflect likelihood of default

All of the internal credit rating methodologies produce ratings that are used to determine eligibility within predetermined thresholds according to existing credit risk guidelines. The aim of each methodology is to assess a counterparty's capacity and willingness to pay its financial obligations, and the assessment reflects an opinion on an issuer's relative credit standing or likelihood of default. This assessment of default risk in the sovereign rating methodology specifically is a function of both the intrinsic financial strength of the sovereign and the willingness of the government to appropriate the required resources to meet its financial commitments. The definition of default includes both payment default, where the issuer fails to make principal or interest payments on the due date or within a grace period, and distressed exchanges, where the issuer offers new debt for old debt on terms (e.g., coupon maturity) that are less favourable than those for the original instrument.

The internal credit rating methodologies use a rating scale and symbols similar to those used by S&P and Fitch Ratings and a horizon of three to five years. By design, the internal credit rating methodologies produce a through-the-cycle rating using both historical and forecast data, thereby encapsulating a full economic cycle. As a result, their sensitivity to daily market fluctuations and other high-frequency data releases is limited.

iii. Ensuring high quality

The methodology developed to assign an internal credit rating to sovereigns relies on the incorporation of fundamental credit analysis that is forward-looking and considers both qualitative and quantitative factors. The factors used to assess the credit quality of a debt issuer are empirically based, with inferences about debtor behaviour based on data derived from past credit cycles. In developing the internal methodologies, we relied on fundamental credit analysis. We believe that, resources permitting, fundamental credit analysis is usually preferred to market-based measures because qualitative and quantitative factors can be combined to make sound credit judgments.[6]

The aim is to produce ratings that are not affected or perceived to be affected by considerations other than those related to credit quality over a three- to five-year horizon. Internal ratings typically reflect the most recently available relevant information because the internal ratings process is not subject to some of the

[6] We define fundamental credit analysis as the analysis of a debt issuer's capacity and willingness to pay its financial obligations. The analysis results in an opinion of relative credit standing or likelihood of default. Fundamental credit analysis is also forward-looking, considers both qualitative and quantitative factors, and is empirically based.

constraints faced by CRAs. Thus, they are believed to be timelier for internal purposes than the ratings of CRAs. Furthermore, internal ratings are not affected by the inherent conflict within the CRA business model, whereby issuers typically pay to have a CRA assign ratings to their debt securities. Similarly, internal ratings are not subject to the challenge posed by the publication of credit rating decisions.[7] Additionally, CRAs may be influenced by regulatory or political factors. All of these considerations could influence the timing, independence and objectivity of the rating actions.[8]

Development of the internal methodologies began with the creation of credit assessment templates that drew from the work of other credit risk practitioners and relevant research. Using macroeconomic scenarios and credit analysis provided by the Credit Risk Advisory Office, the Credit Rating Committee initially assigned provisional internal ratings to counterparties for at least a year. At the same time, internal investment and other guidelines continued to officially rely on CRA opinions. As expertise and experience grew, the Credit Risk Advisory Office enhanced its credit rating methodologies, modified template components to ensure they aligned with the objectives of internal methodologies, and bolstered models with new components and measures to assign various scores to risk factors. This phased approach was adopted to allow for the accumulation of experience in applying the internal rating methodologies and to strengthen their robustness. Over time, the internal methodologies have continued to evolve from the provisional rating methodologies as industry best practices have shifted and internal expertise has grown.

Since the publication of Muller and Bourque (2017), two comprehensive reviews of the sovereign methodology have resulted in several changes and updates. These changes were generally the result of practical experience. Some revisions addressed issues or challenges consistently identified by the Credit Risk Advisory Office or the Credit Rating Committee during the process of assigning credit ratings. Others were the result of comparisons to CRA methodologies or issues identified in academic literature.

iv. Consistency, transparency and public data

Another objective is to generate internal ratings that can be reproduced consistently by different analysts using the same information. We developed the internal methodologies to be robust by relying as much as possible on quantifiable metrics to guide forward-looking assessments of credit risk of sovereigns. Quantitative metrics are therefore used to the greatest extent possible but are supplemented with qualitative judgments as required.

While the final ratings generated by the Credit Rating Committee are not made public, the sovereign methodology used to create those ratings is published on the Bank of Canada's website. This transparency is intended to promote the objective of producing ratings of the highest quality by allowing the internal methodologies to benefit from comments and suggestions from specialists at the frontier of credit risk assessment methodologies.

Another consideration is to generate ratings that could be explained and justified with public data only. Indeed, it is important to avoid the perception that internally generated ratings are based on sensitive,

[7] Recall from section 2.1 that internal ratings are not disclosed publicly.

[8] Regulations imposed on CRAs have, for instance, limited the timing at which CRAs can take potential rating actions on entities being reviewed to only predetermined days each year.

confidential information obtained by staff in the course of their work at the Bank of Canada or the Department of Finance Canada.

3. Key sovereign risk factors and the overall framework

Sovereigns have several unique characteristics that affect their creditworthiness. These characteristics can make determining a sovereign's credit rating challenging. Sovereigns are the highest authority of a country and have powers that no other entities have, including the ability to raise taxes, create laws, declare war, sign treaties with other sovereigns and control the currency. Furthermore, sovereign issuers have extremely long lifespans and rarely cease to exist, except in exceptional circumstances.

From a creditor's perspective, the ability to collect debt owed by a sovereign relies to some extent on the goodwill of the sovereign for repayment. Since sovereigns are the highest authority of a country, debt holders have limited recourses to force a sovereign government to honour its financial obligations if it chooses not to. An analysis of sovereign creditworthiness must therefore consider not only the sovereign's ability to repay but also its willingness to do so. This approach is in line with current credit rating practices.

Also, in keeping with common practice among credit rating practitioners, the sovereign rating methodology allows for an assessment of the credit quality of all countries. The challenge of this approach is developing a methodology that takes into account countries' different levels and sources of income and wealth, their various political and legal systems, and the monetary policy implemented by their central bank or monetary authority. Obtaining the data to assess a large and diverse group of countries can also often be a challenge.

Since their inception, our internal credit rating methodologies have gone through a series of calibration exercises designed to maintain the robustness of scoring thresholds and improve upon existing practices. This paper presents the 2021 version of the sovereign credit rating methodology.

i. Key risk factors

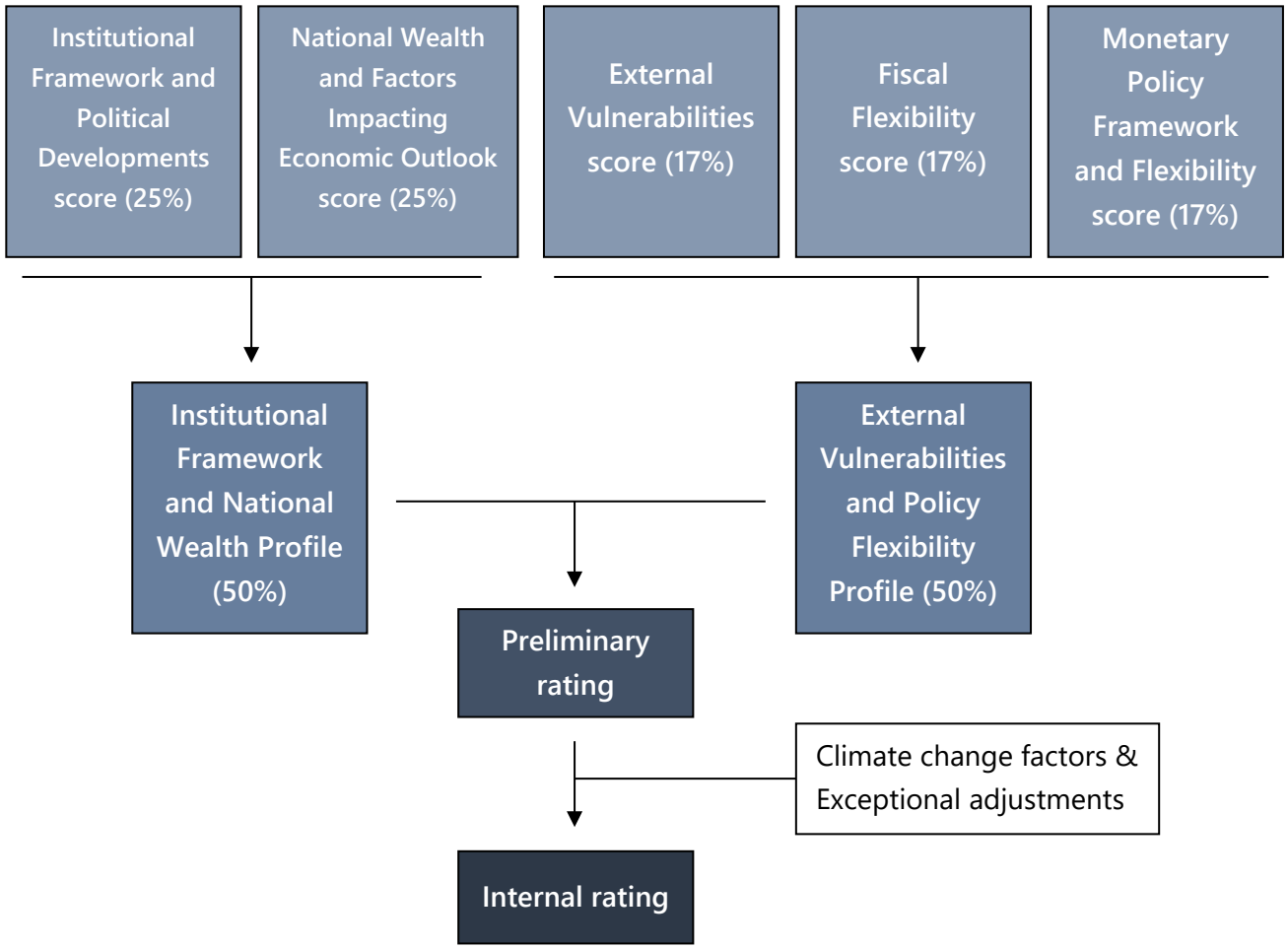
The five key risk factors identified in this document are broadly similar to those used by S&P (**Figure 1**) and all industry practitioners. The risk factors in our sovereign credit rating methodology include the sovereign's:

- institutional strength and political stability
- economic performance, including the presence of credit and asset price imbalances
- external vulnerabilities and competitiveness
- the general government's overall fiscal position, including potential contingent liabilities
- monetary policy flexibility

Specific qualitative and quantitative indicators are identified to measure each factor. These specific indicators are a combination of those used in various practitioners' methodologies, those found in academic

literature, and those proposed by the authors.[9] The scoring categories for each main factor and subfactor range from 1, the strongest possible score, to a maximum of 6, the weakest bracket. The only exception is the Fiscal Flexibility score, which ranges from 1 to 9.

Figure 1: Overview of the sovereign rating methodology



The first key risk factor, the **Institutional Framework and Political Developments score**, captures a country's institutional features and the effectiveness of policy-makers in responding to economic or political events that could affect creditworthiness. This factor assesses the quality of a country's institutions, its social

[9] The following papers, not mentioned elsewhere in this publication, also informed the development or subsequent refinement of the methodology described herein: Antetomaso, Rosa and Roubini (2018); Baas (2010); Beers, Jones and Walsh (2020); Beers et al. (2021); Cavanaugh, Chambers and McGraw (2015); Chalk and Hemming (2000); Correa and Sapriza (2014); DBRS (2019); Fitch Ratings (2020); Hemming and Petrie (2000); DBRS (2019); Kalemli-Ozcan, Reinhart and Rogoff (2016); S&P Global Ratings (2011 and 2014); Moody's Investors Service (2019); Reinhart (2002); Reinhart and Rogoff (2014); Reinhart, Rogoff and Savastano (2003); Reinhart, Reinhart and Rogoff (2015); and Scope Ratings (2020).

cohesiveness or stability, and the ability and willingness of policy-makers to mobilize the funds necessary to repay its financial obligations while maintaining social cohesiveness.[10]

The second key risk factor is the **National Wealth and Factors Impacting the Economic Outlook score**. It captures the wealth and economic growth prospects of a country, which are indicative of the financial resources that sovereigns can draw upon. Wealthy, diversified and flexible economies typically provide a sovereign with a greater potential tax base and therefore a more stable and predictable source of income. Economic growth and its volatility are other important factors in determining sovereign creditworthiness. The ability of economies to generate and sustain growth supports debt servicing and the debt dynamics of the commercial and financial sectors, as well as of the sovereign.

The third key factor captures the various risks of external vulnerabilities of the country in the **External Vulnerabilities score**. These risks are related to external indebtedness and the ability to access external financing and foreign currency to repay external and foreign-currency-denominated obligations. The external risks captured are at the country level as they directly impact not only the sovereign's external debt repayment capacity but also that of the financial and business sectors.

The fourth key factor is an assessment of the general government's fiscal position, which is captured in the **Fiscal Flexibility score**. This score provides an overall assessment for the sustainability and affordability of public finances. It captures short-term dynamics related to public finances, namely the government's ability to manage its deficit and its ability to fund this deficit even in times when access to financial markets may be more challenging. Additionally, it captures a long-term view focusing on assessment of the overall debt level, including potential contingent liabilities, and the debt-servicing costs associated with this debt level. Potential contingent liabilities are considered within this score by assessing potential exposures that could end up on the government's balance sheet—such as the banking sector, government-related entities and other government guarantees—and examining how these could affect a country's debt level.

The fifth key risk factor is the **Monetary Policy Framework and Flexibility score**. It captures a sovereign's ability to use monetary policy to address economic stresses. Monetary authorities' degree of flexibility and sophistication as well as their success in containing inflationary pressures and preventing asset price imbalances are key factors in assessing this score. Other considerations are the credibility of monetary authorities—a necessary requirement for achieving the desired monetary policy goal—and the presence of the necessary financial levers through which monetary authorities can implement desired policies.

ii. Overall rating framework

Figure 1 shows how the five key risk factors combine to create the preliminary rating. The score of the first two factors (Institutional Framework and Political Developments score and National Wealth and Factors Impacting Economic Outlook score) are summed to determine the Institutional Framework and National

[10] Throughout this document, we make the distinction between "sovereign risk" and "country risk." The former refers to the risk of a sovereign government defaulting on its contractual financial obligations, such as issued and guaranteed debt. Country risk comprises a broader set of risks related to doing business in the country; it encompasses all the various factors that would impact public and private borrowers' ability to pay and to operate.

Wealth profile. The other three factors (External Vulnerabilities, Fiscal Flexibility, and Monetary Policy Framework and Flexibility) are summed to determine the External Vulnerabilities and Policy Flexibility profile. Both are then used to determine the preliminary rating of the sovereign per the matrix in **Figure 2**.

Given the challenges highlighted previously in designing models that would fit the diverse economic, political and legal profiles of all the countries, the methodology includes the flexibility to adjust the preliminary rating through the use of exceptional adjustments. These adjustments aim to capture the risks that fall outside model design, and their use relies on insight and expertise by credit analysts. See section 6 for more details.

Figure2: Determination of the preliminary rating

External Vulnerabilities and Policy Flexibility Profile	2	3	4	5	6	7	8	9	10	11	12
16–18	NA	bb+	bb	bb-	b+	b	b	b-	b-	c	c
15–16	NA	bbb	bbb-	bb+	bb	bb-	b+	b	b	b-	b-
13–15	A	a-	bbb+	bbb	bb+	bb	bb-	b+	b	b-	b-
11.5–13	aa-	a+	a	bbb+	bbb	bb+	bb	bb-	b+	b	b
10–11.5	aa	aa-	a+	a	bbb+	bbb-	bb+	bb	bb-	b+	b
8.5–10	aa+	aa	aa-	a+	a-	bbb	bbb-	bb+	bb	bb-	b+
7–8.5	aaa	aa+	aa	aa-	a	a-	bbb+	bbb	bb+	bb	b+
5.5–7	aaa	aaa	aa+	aa	aa-	a	a-	bbb+	bbb	bb+	bb-
3–5.5	aaa	aaa	aaa	aa+	aa	a+	a	a-	bbb+	NA	NA

Institutional Framework and National Wealth Profile

iii. Calibration exercise

Some of the quantitative thresholds and scoring matrices presented in this paper were selected from the literature on sovereign debt crises and from the published credit rating methodologies of practitioners. In most cases, however, the thresholds and matrices were determined as the result of calibration work, including back-testing and comparison with benchmarks used by other credit practitioners. Additional details on the exact sources of data are provided in the respective section describing each indicator selected in the methodology.

iv. Data

As indicated above, the fundamental credit analysis incorporated in our sovereign credit rating methodology is forward-looking wherever possible and considers both qualitative and quantitative factors. When forward-looking variables are required, we predominantly use forecasts from the latest International Monetary Fund (IMF) World Economic Outlook (WEO) database and, in one case, the Organisation for Economic Co-operation and Development (OECD) Economic Outlook publication.[11]

4. Preliminary rating

i. Institutional Framework and Political Developments score

The Institutional Framework and Political Developments score is intended to capture a country's institutional features and the effectiveness and ability of the civil service and policy-makers to respond to events that could affect a sovereign's creditworthiness. This includes the sovereign's ability and its willingness to meet current financial obligations, as well as to make decisions that further economic, fiscal and political stability and support its ongoing ability to meet financial obligations. The score should not be construed as an evaluation of a country's current government; rather, it should take a broader view of the political system as a whole, including parties that have historically been in government, the social cohesiveness and domestic tranquility required to maintain stable and consistent governance, and the potential influence of neighbouring or otherwise influential sovereigns. Changes in government or policy should influence the Institutional Framework and Political Developments score only if they represent a decisive break with the past and systematically modify the character or quality of the political system.

The significance of the Institutional Framework and Political Developments score rests in the growing consensus, among credit rating practitioners and in academia alike, that an inverse relationship exists between the quality of a country's institutions and a sovereign's willingness to default on its debt.[12] Including institutional factors allows for a more robust framework in determining the likelihood of sovereign debt crises than using macroeconomic indicators could alone. We also view a predictable policy environment with strong, effective institutions as supportive of economic growth, which, in turn, also enhances creditworthiness.

Based on research conducted by credit rating agencies and other credit rating practitioners, we constructed a model that encompasses two subfactors in its initial scoring: the institutional framework (80 percent) and interconnectedness (20 percent). For each of these subfactors, quantitative data is obtained from public-facing external sources, namely the World Bank Governance Indicators (WBGI) and IMF Direction of Trade data.

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[11] For the data, see the IMF WEO database and the OECD Economic Outlook.

[12] See Manasse and Roubini (2005); Kraay and Nehru (2006); Ozturk (2016); and the sovereign rating methodologies of Moody's Investors Service (2012, 2013); Fitch Ratings (2012, 2014a, 2014b); Standard & Poor's (2011); DBRS (2015); and Scope Ratings (2015).

To determine the Institutional Framework and Political Developments score, we use the three-step process described in **Figure 3**. First, we calculate an initial score for the sovereign based on the two subfactors listed above. Second, we qualitatively assess the sovereign both broadly and by evaluating specific concerns. This step is meant to capture risks omitted by the initial score. Third, we proceed with a final category verification in which we consider the assigned score's category description; we ensure it is consistent with our assessment, and if it is not consistent, we potentially adjust the score. The score descriptions are available in section 4.1.3.

Figure 3: Institutional Framework and Political Developments score

Step 1

Initial score

1. Implied political performance is computed for all sovereigns based on the following formula:

$$\begin{aligned} &Implied\ Political\ Performance \\ &= WGBI\ Aggregate\ Rank \times 0.8 \\ &+ Trade\ Weighted\ Aggregate\ WGBI \\ &\qquad Rank\ of\ Trade\ Partners \times 0.2 \end{aligned}$$

2. Sovereigns are then ranked ordinally and assigned scores between 1 and 6 based on the following matrix:

Initial score	
Implied political performance rank	Score
1 to 17	1
18 to 29	2
30 to 43	3
44 to 88	4
89 to 110	5
More than 110	6

Step 2

Additional considerations

Adjustments are subject to analyst judgment.

Step 3

Category verification

- **Category 1**: Robust political framework with a proven, consistent track record
- **Category 2**: Strong political framework with a good policy track record
- **Category 3**: Good political framework with a mixed policy track record
- **Category 4**: Adequate political framework with a difficult-to-predict policy track record
- **Category 5**: Weak political framework with frequent lapses in its policy record
- **Category 6**: Poor political framework with no positive, sustainable policy track record

Step 1: Determination of the initial score

The institutional framework subfactor underpins the Institutional Framework and Political Developments score and focuses on the sovereign's institutional features. The data are collected from the WBGI. All six indicators—political stability, voice and accountability, control of corruption, rule of law, government effectiveness, and regulatory quality—are given equal weight to compute an average indicator for all world countries. The countries are subsequently ranked; this rank represents the data point input into our Institutional Framework and Political Developments model.

We then consider an interconnectedness subfactor. Countries exposed through trade to peers with weaker institutions are considered to be at greater risk of external shocks and instability. The data point input here is the trade-weighted aggregate WBGI rank of trade partners. For example, if a sovereign's shares of trade with Country A and Country B are 30 percent and 70 percent, respectively, and Country A has an aggregate WBGI rank of 10 and Country B of 100, then the data point input will be 73.

Now that the data points used are delineated, we can turn to the formula below to aggregate them into a single implied Institutional Framework and Political Developments score.

$$\begin{aligned} &Implied\ Political\ Performance \\ &\qquad = WGBI\ Aggregate\ Rank \times 0.8 \\ &\qquad + Trade\ Weighted\ Aggregate\ WGBI\ Rank\ of\ Trade\ Partners \times 0.2 \end{aligned}$$

The implied Institutional Framework and Political Developments scores for each sovereign are then ranked, and the score is subsequently brought back to a range of 1 to 6, with 1 being associated with the highest possible creditworthiness. The initial Institutional Framework and Political Developments score is therefore based on an ordinal ranking of all sovereigns globally, with the strongest sovereigns receiving a score of 1 and the weakest a score of 6. The scores are assigned according to the matrix shown in **Figure 3**.

Step 2: Additional considerations

The second step is designed to grant analysts ample leeway in their assessment of the Institutional Framework and Political Developments score. In Muller and Bourque (2017), adjustment categories were clearly delineated:

- confidence in the ability of policy-makers to address sovereign credit issues in a timely manner
- external impact on policy-making
- debt repayment experience
- recent or anticipated developments

Best practices have, however, evolved since to widen the scope of this step and render the adjustments more qualitative and open. In keeping with the highly unique and unquantifiable nature of political systems, analysts should consider a wide array of metrics and issues and, when appropriate, propose to adjust the initial score.

Historically, analysts have considered multiple factors at this step. Recent or anticipated developments are scrutinized, including but not limited to the publication of budgets and other important pieces of legislation, the development and implementation of structural reforms to solve pressing problems, the evolution of coalition building and implications for political stability, and government turnover. Analysts also use this step to ensure the appropriateness of the quantitative indicators that feed into the initial score and to ensure that no structural breaks in political institutions or overall governance have occurred that have not been fully captured by the WBGIs. Other questions asked include the following: Are the WBGIs meaningful as they apply to the given sovereign? Are there specific credit-neutral or credit-positive developments that nevertheless negatively affected quantitative metrics? And finally, how does the sovereign compare relative to peers with similar WBGIs?

Step 3: Category verification

Once the initial score and adjustment factors have been determined, the methodology proposes to adjust the final score if its model-driven result is not broadly aligned with the analyst's assessment, as informed by the associated score's category description listed below.

- ***Category 1: robust political framework with a proven, consistent policy track record***
  A sovereign that has the highest governance indicators; engages in sound, predictable policy-making; has smooth transitions of power; and has virtually no risk of social or political unrest
- ***Category 2: strong political framework with a good policy track record***
  A sovereign that has good governance indicators, typically adopts and implements policies consistent with maintaining or improving sovereign creditworthiness, has smooth transitions of power that may alter policy, and has little risk of social or political unrest
- ***Category 3: good political framework with a mixed policy track record***
  A sovereign that has adequate governance indicators, may not always immediately adopt or implement policies consistent with maintaining or improving sovereign creditworthiness, has transitions of power that might disrupt policy-making, and may experience social or political unrest
- ***Category 4: adequate political framework with a policy track record that is difficult to predict***
  A sovereign that has adequate governance indicators and a policy framework that is difficult to predict, has transitions of power that usually disrupt policy-making, and sometimes experiences social or political unrest
- ***Category 5: weak political framework with frequent lapses in its policy record***
  A sovereign that has weak governance indicators, suffers from frequent lapses in developing or implementing policies consistent with maintaining or improving sovereign creditworthiness, has disruptive changes in leadership, and experiences social or political unrest
- ***Category 6: poor political framework with no positive, sustainable policy track record***
  A sovereign that has poor governance indicators, lacks a focus on policies that would improve sovereign creditworthiness, has disruptive changes in leadership, and often experiences social or political unrest

ii. National Wealth and Factors Impacting the Economic Outlook score

The National Wealth and Factors Impacting the Economic Outlook score captures the wealth and economic prospects of a country, which are reflective of the financial resources upon which sovereigns can draw to repay financial obligations. Wealthy, diversified and flexible economies typically provide a sovereign with a greater potential tax base and therefore a more stable and predictable source of income. While such economies may be just as likely as less developed economies to experience business cycles and shocks, the impact on their sovereign is less likely to result in payment difficulties or defaults on financial obligations.

Growth and its volatility are other important considerations of sovereign creditworthiness. Economic stagnation and abrupt declines in economic activity have been identified by credit assessment practitioners as factors in a number of sovereign defaults and sovereign debt crises. The ability of economies to generate and sustain growth supports debt servicing and the debt dynamics of the commercial and financial sectors and of the sovereign. Even in wealthy countries, protracted periods of low growth or episodes of an unexpected, rapid drop in growth can lead to deteriorating debt ratios, in some cases very quickly, resulting in an increased likelihood of sovereign credit stress.

The financial sector plays an important role in promoting and sustaining growth by contributing to a more efficient reallocation of resources. However, as the 2008–09 global financial crisis clearly demonstrated, the financial sector can also misallocate resources, contributing to credit or asset price imbalances, such as housing bubbles. The correction of these imbalances can have severe consequences for the economies affected. As such, we consider the presence of credit and asset price imbalances in determining the final National Wealth and Factors Impacting the Economic Outlook score. We include a quantitative tool to determine whether a negative adjustment is warranted.

The process to assign the score starts with the determination of an initial score, which is then adjusted to consider the country's economic growth trend relative to peers, the presence of asset price imbalances, and the diversification of the economy (or the volatility of economic growth). The framework of this approach is like that used by other credit rating practitioners, although the indicators selected differ.

Step 1: Determination of the initial score

The initial score estimates the level of wealth in a country. As data on financial and non-financial wealth are sparse in most countries, nominal gross domestic product (GDP) per capita at purchasing power parity is used as a proxy. We use the latest annual GDP[13] data from the IMF WEO to determine the initial score. A higher GDP per capita is associated with a lower risk of default and therefore a better credit rating. As this data series is non-stationary, the thresholds for each category are revised annually to limit a generalized upward rating drift as a result of global inflationary pressures and to reflect the change in the relative level of productivity between countries.

[13] Unless we explicitly state otherwise, the IMF World Economic Outlook is always the source of data for historical and forecasted GDP. This applies to both real and nominal GDP, in local currency, US dollars or at purchasing power parity, GDP per capita and GDP growth rates.

Figure 4: National Wealth and Factors Impacting the Economic Outlook score

Step 1

Initial score

1. Initial score is based on GDP per capita in US dollars at purchasing power parity exchange rates, using the latest data from the International Monetary Fund's World Economic Outlook database.

2. The thresholds below are taken from S&P and are updated semi-annually. They were valid as at the publication of this paper.

Initial score	
GDP per capita in USD	Score
>$42,100	1
$29,900–$42,100	2
$17,700–$29,900	3
$6,100–$17,700	4
$1,200–$6,100	5
<$1,200	6

Step 2

Additional considerations

1. Low or high GDP growth trend
Applied to sovereigns with 10-year real GDP per capita growth trend above or below certain thresholds compared with peers with the same initial score. Thresholds are computed based on initial scores for 180 countries. [±1 notch].

2. GDP growth driven by credit growth
Applied to sovereigns (i) with a rapid increase in non-financial private sector credit growth to GDP growth where the credit-to-GDP ratio is already high (current thresholds are 2.5% growth rate for past three years and 160% credit-to-GDP ratio) or (ii) where there is evidence of asset price imbalances (see Box 1). [-1notch].

3. GDP growth volatility
Very volatile real GDP growth (threshold is currently 10-year standard deviation of more than 4.7%). [-1 notch].

Step 2: Additional considerations

The second step in assigning the National Wealth score is determining whether to adjust the initial score based on the factors described below. These potential adjustment factors are not applied mechanistically, particularly in borderline cases. The decision to apply an adjustment factor relies on the expert judgment of a credit analyst or the Credit Rating Committee and is informed by the quantitative metrics outlined and any additional quantitative and qualitative information relevant to the analysis.

- ***High (low) trend growth relative to peers***
  A sovereign's score can be upgraded (downgraded) by one notch when its trend growth is significantly better (worse) than that of other countries with a similar level of wealth, as measured by the initial score. The method of calculating a country's growth trend and the delineation of peer groups retained for this adjustment are similar to those used by S&P in its 2017 sovereign rating

methodology.[14] However, we propose a different approach to calculate the thresholds for a positive (negative) adjustment. Namely, we set the thresholds using the standard deviation of growth rates for each peer group, which we find allows for an evenly balanced distribution of positive versus negative adjustments across categories and through time.

- ***Credit or asset price imbalances***
  A sovereign's score can receive a one-notch negative adjustment if there is evidence of credit or asset price imbalances (**Box 1)**.[15]

Box 1: Determination of credit or asset price imbalances

Credit imbalances

When credit is expanding at an unsustainable pace, certain indicators used in the evaluation of the National Wealth and Factors Impacting the Economic Outlook score, such as GDP per capita and trend growth, may be overestimated and vulnerable to a correction. This would result in a more favourable assessment of the score than is warranted by fundamental economic conditions. In those cases, a negative adjustment can be applied. The assessment for credit imbalances is informed by non-financial private sector credit growth exceeding nominal GDP growth by a significant margin over the previous three-year period. The formula to determine the pace of credit expansion is $CE = \frac{\frac{1}{3}\sum_{-3}^{-1} C_{t+1}/C_t - 1}{\frac{1}{3}\sum_{-3}^{-1} GDP_{t+1}/GDP_t - 1}$, where *CE* is credit expansion, GDP is nominal gross domestic product in local currency, and *C* is non-financial private sector credit. This criterion is met when *CE* is greater than 2.5. This adjustment applies to economies where the credit-to-GDP ratio is already high, exceeding 160 percent. The threshold we use is the one proposed by the European Union in its 2012 *Alert Mechanism Report*[16] to identify macroeconomic imbalances. A country does not receive a positive adjustment if credit imbalances are deemed to be low. The source of credit data for this adjustment is the Bank for International Settlements (for the non-financial private sector credit).

Table 1-A: Thresholds for credit imbalances—additional considerations

Criterion	Threshold
Credit to GDP (%)	> 160%
Credit expansion (credit growth to GDP growth)	> 2.5 on average for past three years

Asset price imbalances in equity markets

A negative adjustment can be applied when the country's equity market is judged to be overvalued. For the assessment of the equity market, the retained metric is the same one used by S&P in its Banking Industry Country Risk Assessment. A negative adjustment for asset price imbalances can be applied when a country's equity market capitalization is greater than 20 percent of the country's GDP and equity prices (as measured by the country's main equity price index) have increased by an average of 40 percent or more over two consecutive years.

[14] The trend growth is calculated using a 10-year weighted average of historical and forecasted annual growth rates. The forecasted growth rates used in the calculation of a country's trend growth are sourced from the most recent IMF WEO. See S&P Global Ratings (2017).

[15] Note that in cases where both conditions are met, the National Wealth and Factors Impacting the Economic Outlook score would receive a one-notch negative adjustment.

[16] See European Commission (2012).

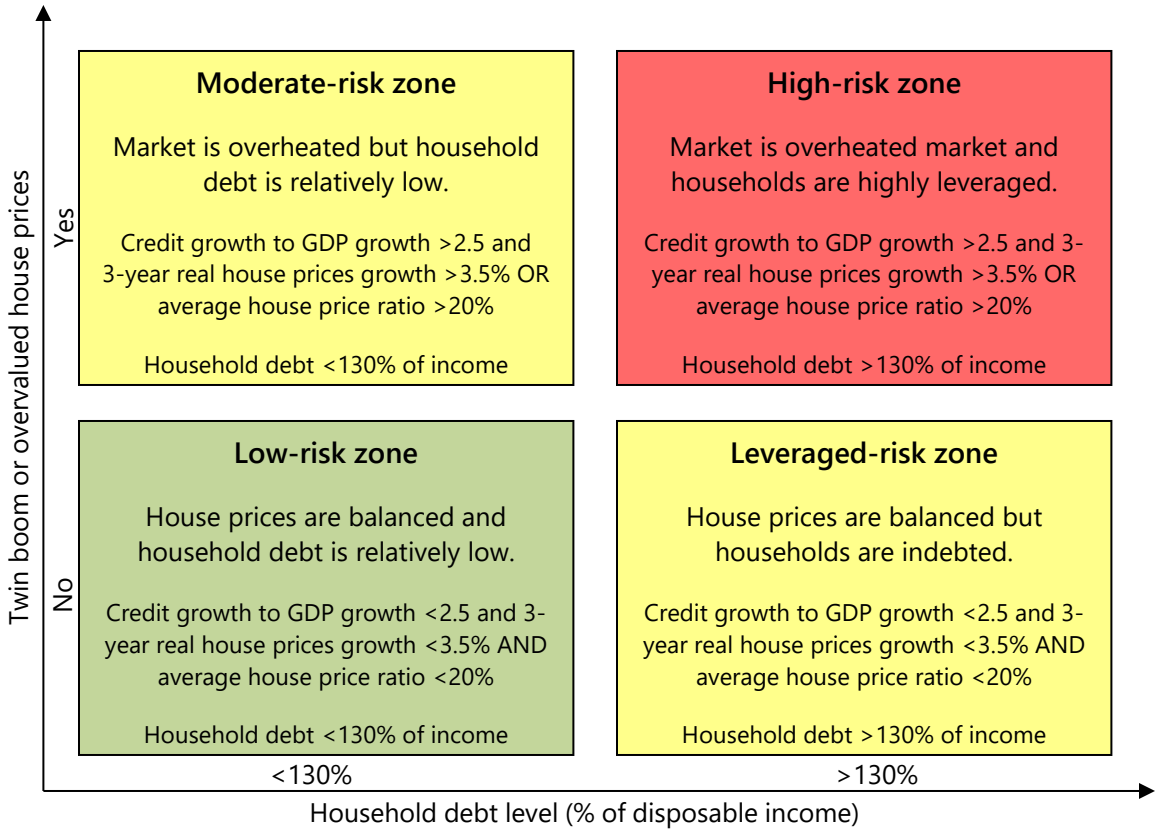
Table 1-B: Thresholds for asset price imbalances—equity markets

Criterion	Threshold
Market capitalization to GDP (%)	> 20%
Change in equity prices, 2-year average (%)	> 40%

Asset price imbalances in the housing sector

For the housing sector, we developed a framework that considers household debt, credit growth, real house price growth, and price-to-income and price-to-rent ratios. When a country's housing sector is in the high-risk zone, a negative adjustment to the National Wealth and Factors Impacting the Economic Outlook score may be applied. Note that a negative adjustment is not automatically applied when a country is deemed to be in the high-risk zone, since various aspects of the country's housing market are also considered before the final determination on an adjustment is made. A country's housing sector is deemed to be in the high-risk zone when (i) household debt is greater than 130 percent of GDP, (ii) the ratio of overall credit growth to nominal GDP growth exceeds a factor of 2.5 on average over the most recent three-year period, and (iii) real housing prices have increased by more 3.5 per cent per year on average over the last three years. Alternatively, a country is also in the high-risk zone if (i) household debt is greater than 130 percent of GDP, and (ii) the average of the OECD price-to-income and price-to-rent ratios are above their long-term trends by more than 20 percent.

Figure 1-A: Determination of housing sector imbalances—housing market risk matrix



The sources of data for this part of the adjustment are the countries' main stock index, the Bank for International Settlements, the International Monetary Fund International Financial Statistics database, the Organisation for Economic Co-operation and Development and national sources.

- ***Volatile GDP growth***
  The score can receive a one-notch negative adjustment if a county's economy is concentrated in a small number of sectors and these sectors are prone to a high degree of volatility. This adjustment will typically be applied to countries where the oil and gas, agricultural or mining sectors represent a significant share of the economy and exports and to countries whose national accounts are particularly complex and volatile for other reasons. To evaluate this adjustment, we look at the 10-year annual real GDP growth rate volatility (from t_{-10} to t_{-1}) and assign a negative adjustment if the standard deviation exceeds 4.54, the threshold used by Moody's to assign its riskiest score ("ca") for this same factor in its economic strength evaluation.

iii. External Vulnerabilities score

The External Vulnerabilities score is intended to capture risks that are related to external indebtedness, including the ability to access external financing and foreign currency to repay external obligations and debt denominated in a foreign currency. As well, this score captures a sovereign's vulnerability to large swings in the value of the national currency. The external risks are analyzed at the country level because they directly impact not only the sovereign's external debt repayment capacity but also that of the financial and business sectors.

While the monetary authorities of a country control the supply of local currency (except for countries that use another country's currency or that are part of a monetary union), contracting debt in foreign currencies requires the country to generate foreign exchange earnings to repay these obligations. Given the relationship between currency crises, financial crises and sovereign debt crises, which is documented by academics and credit rating practitioners,[17] external risks apply not only to the sovereign but also to the financial and business sectors as well. These would also be affected by a shortage of hard currencies. External imbalances and the vulnerability to external shocks have often resulted in sharp currency depreciation or devaluation. This makes the repayment of foreign currency–denominated dues and the import of goods and services—including food, energy, capital goods and inputs in supply chains—more expensive.

A country's challenge to generate foreign currency earnings may come from different sources. Over time, sustained current account deficits can deplete a country's foreign exchange reserves or lead to an accumulation of external debt to finance these shortfalls. Countries with large amounts of short-term external debt are even more exposed to rollover risk from external shocks and a rapid deterioration of the external environment. Another important factor to consider when assessing a country's external

[17] See Manasse and Roubini (2005); Manasse, Roubini and Schimmelpfennig (2003); Kraay and Nehru (2006); Reinhart and Rogoff (2010a and 2010b); and the sovereign rating methodologies of Moody's, Fitch Ratings, S&P, DBRS, and Scope Ratings. Reinhart and Rogoff (2010b) also cite the work of Michael Bordo, Barry Eichengreen, Marc Flandreau, Lindert and Morton, and Alan Taylor as a non-exhaustive list of researchers who have published on this topic.

vulnerability is its overall external financing requirement. Countries with large external financing requirements (often associated with a large banking sector that relies on external wholesale funding) are typically characterized as having a high level of short-term external debt relative to gross external debt and an overall high level of gross external debt relative to GDP.

Another consideration in assessing a country's external vulnerability is the diversification of its export base. Countries with a concentrated export base, such as commodity exporters, are also vulnerable to terms-of-trade shocks from a sudden drop in the global price of a key export commodity. Additionally, significant deterioration or improvement in external competitiveness would also affect local companies' ability to compete with foreign firms. Since this would impact the current account balance, it is also a consideration in our methodology.

Finally, the status of the currency in international capital markets and financial transactions is also considered. Some currencies, such as those held by central banks in their foreign exchange reserves, have historically received greater international investor confidence during times of stress; hence, they are less likely to experience funding stress. This supports these countries' general ability to sustain higher levels of external imbalances.

The process to assign the External Vulnerabilities score starts with the determination of an initial score based on the current account balance and net international investment position, as shown in **Figure 5**. The initial score is then adjusted to reflect the country's currency status in international capital markets, its external financing and liquidity risk, the volatility in its terms of trade, and significant changes in its external competitiveness.

Figure 5: External Vulnerabilities score

Step 1	Step 2
Initial score	Additional considerations
1. Initial score is based on the country's current account balance and net international investment position, both as a percentage of GDP (see **Table 1** for thresholds).	**1. Reserve currency status** Applied to sovereigns with an actively traded or reserve currency. [Up to +3 notches]. **2. External financing or liquidity risk** Applied to sovereigns with a marked risk of deterioration in external financing, typically characterized by having a high level of short-term external debt relative to gross external debt and, additionally, a high level of gross external debt relative to GDP. [-1 notch]. **3. Terms-of-trade volatility** Applied to sovereigns exposed to significant volatility in their terms of trade (higher than the 75th percentile of 10-year standard deviations). [-1 notch]. **4. External competitiveness** The analyst is granted leeway here. Historical practice has been to rely on the country's real effective exchange rate, its unit labour cost and the World Economic Forum competitiveness rankings. [± 1 notch].

Step 1: Determination of the initial External Vulnerabilities score

We determine the initial External Vulnerabilities score based on the current account balance (CAB)—which includes all current cross-border transactions between residents and non-residents—and the annual net international investment position (net IIP)—which indicates the balance between the country's external assets (including foreign exchange reserves) and its external liabilities. Both the CAB and net IIP are expressed as a percentage of GDP. The net IIP includes the country's external debt, but also other external liabilities such as accounts payable. The CAB is a five-year average centred on the current year, while the net IIP is the latest available data. The data source for the CAB is the IMF WEO, and the source for the net IIP is the IMF International Financial Statistics (IFS).

We calibrated the category thresholds for the current account scores based on annual data for 180 countries over 30 years. The CABs, expressed as a percentage of GDP, are ranked and divided into six roughly equal groups, based on percentiles. The group with the highest percentile is defined as Category 1, the second highest as Category 2, and so forth. The category thresholds for net IIP scores are calculated similarly, based

on data for 100 countries over 10 years. The matrix to convert the two data points into an initial score of 1 to 6 is shown in **Table 1**.

Table 1: Determination of the initial score

	Initial score					
	Current account balance (% GDP)					
Net IIP (% GDP)	>3.0%	3.0% to -1.0%	-1.1% to -3.5%	-3.6% to -6.0%	-6.1% to -9.0%	<-9.0%
>10%	1	1	2	3	4	5
10% to -10%	1	2	3	4	5	6
-11% to -30%	2	3	4	5	6	6
-31% to -50%	3	4	5	6	6	6
-51% to -90%	4	5	6	6	6	6
<-90%	5	6	6	6	6	6

Step 2: Additional considerations

The second step in assigning the External Vulnerabilities score is determining whether or not to adjust the initial score based on the factors described below. The use of these adjustment factors relies on the expert judgment of credit analysts or the Credit Rating Committee.

- ***Reserve currency status***
  As discussed previously, this adjustment factor reflects the dominant position of some currencies in international trade settlement, trade financing and foreign exchange reserve portfolios. The initial External Vulnerabilities score can receive an uplift of one to three notches for this factor. A single positive notch is attributed to countries that emit a currency that is considered to be actively traded but without having attained the status of reserve currency. Two or three positive notches are attributed to countries that emit a reserve currency. Sovereigns that are part of a monetary union that emits a reserve currency are granted two notches of uplift only if they are deemed to be systemically important members in the union; otherwise they receive a single notch uplift.

- ***External financing and liquidity risk***
  The initial External Vulnerabilities score can receive a one-notch negative adjustment when the country has a large amount of short-term external debt that is exposed to refinancing or rollover risk. This adjustment typically applies to countries with large banking sectors that rely on external financing to fund their operations. The most recent year of available data is used. The two key variables used to assess this criterion are the ratio of short-term (under one year) external debt to gross external debt and the ratio of gross external debt to GDP. No thresholds are provided, and

the application of the adjustment relies on analyst or Credit Rating Committee judgment. However, the methodology clarifies that these metrics should be *high* for the negative adjustment to be considered.

- ***Terms-of-trade volatility***
  A country's External Vulnerabilities score can receive a negative adjustment if it is exposed to volatile terms of trade. This criterion is applicable predominantly in emerging markets where exports and foreign exchange earnings depend heavily on a limited number of commodities whose prices tend to undergo significant fluctuations throughout the business cycle. The reliance on a narrow export base leaves countries vulnerable to sudden drops in the price of these commodities. As a result, the trade and current account balances will often see a sharp deterioration because imports tend to adjust less quickly than exports. The data for this indicator come from the World Bank's World Development Indicators (WDI) database (net barter terms of trade). The negative adjustment is given if the 10-year standard deviation in the terms of trade is greater than that of 75 percent of the other sovereigns for which the data are available.

- ***External competitiveness***
  A country can be assigned a positive or negative adjustment to its initial External Vulnerabilities score if it is deemed that its external competitiveness is superior or inferior to peers'. The adjustment relies on analyst judgment, since no fixed quantitative thresholds are provided. The assessment can consider the change in the country's real effective exchange rate[18] (REER) and unit labour costs[19] (ULC) relative to peers during the covered period. Further, analysts usually also consider the World Economic Forum's competitiveness rankings.

iv. Fiscal Flexibility score

The Fiscal Flexibility score provides an overall assessment of the sustainability and affordability of public finances. Except where explicitly noted, we use general government fiscal indicators, even though our rating applies to the central government. General government (GG) consists of the combination of the central, state and local governments and all the social security funds that they control. The reason for considering general government fiscal indicators instead of only those of the central government is because arrangements between a central government and sub-national governments for sharing the provision of public services and taxation powers differ quite substantially from country to country. Irrespective of which level of government delivers the public services and which collects the taxes, the overall tax base available to the different levels of government is the same. Therefore, we believe it is appropriate to consider the fiscal situation of all levels of sub-national governments under the central government.

[18] The real effective exchange rate (REER) is a measure of the value of a currency against a weighted average of several foreign currencies (the nominal effective exchange rate) divided by a price deflator or index of costs to represent the relative change in prices or costs between countries.
[19] Unit labour costs (ULC) measure the average cost of labour per unit of output and are calculated as the ratio of total labour costs to real output.

The Fiscal Flexibility score considers both short- and long-term dynamics with regard to debt stocks and flows related to public finance, the sustainability of the current situation, and the projected path going forward. The ability of a government to service its debt depends on various factors beyond the deficit and debt level themselves. For example, because of advanced economies' credit histories (i.e., their long track record of honouring their sovereign debt), the depths of their financial markets, and diversified tax bases, they can carry a much higher level of debt than emerging markets can.

The basis for the Fiscal Flexibility score is the overall gross debt level. This scoring is adjusted to include potential contingent liabilities from the banking sector, government-related enterprises and any other potential sources, such as the government guarantees provided to businesses during the COVID-19 pandemic. Sovereigns with a significant difference in gross and net debt measures may receive an adjustment depending on the nature of the components that are included in the net debt measure, such as the liquidity of the assets. Additionally, the debt level can be adjusted based on the fiscal track record of the sovereign. This is viewed as an indicator of the stability of the current debt load and the government's ability and willingness to take steps to limit debt increases, and as a proxy for the credibility of any fiscal projections. Though the level of the deficit is examined, it is done so within the context of the business cycle and in light of the appropriateness of countercyclical spending in response to a recession or other events that require deficit spending. The impact on debt dynamics through the accumulation of debt under such measures is considered via the current and projected overall debt level. Also considered with regard to short-term debt dynamics is the volatility of the government's revenues, which can always affect its ability to finance operations.

The debt level is then cross-referenced with the debt-servicing costs associated with this debt level. An over-accumulation of debt limits the flexibility of government policy and has been identified by practitioners as a factor that increases sovereign default risk.[20] The ability to service this debt without imposing a heavy tax burden on the economy or jeopardizing the other critical functions of government is also an important consideration in assessing the sustainability of the government's debt level. This is measured by examining general government interest paid as a ratio to general government revenues. This metric serves as a guide, however, rather than as hard thresholds for scoring. Qualitative descriptors are provided to further assess debt sustainability. Additionally, the structure of the debt (maturity profile, currency composition, residence of debt holders, and reliance on the domestic banking sector as a source of funding) is considered, and penalties are possible for features that indicate less sustainability or greater risks, such as a shorter maturity profile or a high proportion of foreign currency debt.

[20] See the sovereign rating methodologies of Fitch Ratings, Moody's, S&P, DBRS and Scope Ratings.

Figure 6: Fiscal Flexibility score

Step 1

Initial score

1. The initial score is computed using gross general government debt as a proportion of GDP and the interest burden (interest payments on general government revenues) according to the following thresholds.

	Initial score							
	Gross general government debt (% GDP)							
Interest burden (payments to revenues)	<40%	40–55%	55–70%	70–100%	100–130%	130–190%	190–250%	>250%
Low, stable, and/or falling (<5%)	1	1	2	3	4	5	6	7
Moderate and stable (5-10%)	1	2	3	4	5	6	7	8
Moderate and rising or high and stable (10-15%)	2	3	4	5	6	7	8	9
High and rising (<15%)	3	4	5	6	7	8	9	9

Step 2

Additional considerations

Level of debt (apply horizontally)	**Sustainability of debt** (apply vertically)
1. Fiscal performance Through the cycle evaluation of a sovereign's track record with regard to fiscal discipline as measured by deficits as a percentage of GDP over 10 years. [+1 to -2 notches]. **2. Volatile revenue** 10-year standard deviation of revenue is above 4%. [-1 notch]. **3. Contingent liabilities** See details in Box 2. [Negative notching]. **4. Net debt** Applied if the net debt profile is more favourable than what is implied by the gross debt profile due to liquid assets that may be deployed. [Positive notching].	**1. Debt stress (any two out of four)** • More than 40% of debt is in foreign currency. • Non-residents hold more than 60% of government debt. • Large variations exist in debt service profile. • More than 20% of the banking sector assets are central government debt. [-1 notch]. **2. Official funding** Refinancing needs are covered by official funding for the next two to three years. [+1 notch].

Step 1: Determination of the initial score

The initial Fiscal Flexibility score is determined from the table in **Figure 6**, based on the gross general government debt level as a percentage of GDP and the sustainability of general government interest spending expressed as a percentage of revenues. The general government debt-to-GDP ratio used in the

determination of the initial score is based on a four-year average that includes the previous year, the current year and the subsequent two years' projections based on the latest IMF WEO data. For the general government interest spending, the initial score is determined using the average of the previous year, current year and one-year outlook. The initial Fiscal Flexibility score is then adjusted based on additional considerations, as described below.

Our Fiscal Flexibility score is based on gross debt. While we take the view that net general government debt as a share of GDP is in many ways a better measure than gross debt, the publicly available net debt measures and data series are not sufficiently standardized to allow for consistent comparisons across sovereigns. International differences in public sector accounting standards and data availability also make constructing a reliable in-house measure of net debt challenging. We therefore instead rely on an adjustment to the initial score to capture the nuances of a sovereign's net debt relative to other sovereigns as well as to its own gross-debt level.

Additionally, relative to Muller and Bourque (2017), our approach has evolved to allow for greater penalization, extending the Fiscal Flexibility score's range with the worst score now being 9 instead of 6. This helps account for debt burdens that have grown substantially above those envisioned by previous thresholds. Crucially, however, the worst possible scores of 8 and 9 can be given only if the sovereign experiences issues with debt sustainability. Furthermore, our model does not penalize for additional debt past the point of a gross debt-to-GDP ratio of 250 percent.

Step 2a: Additional considerations on level of debt

The Fiscal Flexibility score considers the following factors with respect to the level of debt. These adjustments should be applied to the initial score matrix in **Figure 6** only on the horizontal axis; in other words, a sovereign's position in the matrix can shift left or right as a result of the application of these adjustments but not up or down. These adjustments therefore cannot impact a sovereign with a debt burden over 250 percent of GDP. This is intended to account for the fact that these adjustments relate primarily to the level of debt and not its sustainability, the latter being accounted for in the following section.

- ***Fiscal balance***
  Fiscal balance is intended to measure a sovereign's fiscal track record, which is an indicator of the stability of the current debt load, the government's ability and willingness to take steps to limit debt increases, and a proxy for the credibility of any fiscal projections. The metrics and descriptors included in **Table 2** are used in determining the fiscal balance adjustment.

Table 2: Fiscal balance adjustment

Adjustment	Descriptors
History of fiscal discipline (+1)	• Multiple years of positive (>0% of GDP) government balance at the peak of cycle. • History of active and effective efforts by government to shrink deficits and return to fiscal balance following recessions. • Evaluation that any current deficit matches and is warranted by the economy's current position in the business cycle coupled with the expectation that the government is willing and able to retrench as conditions improve.
Largely cyclical patterns (0)	• Modest (>-2.5% of GDP) deficits or individual years of negative general government balance at peak of business cycle. • History of general government balance being driven largely by changing economic conditions, bolstered somewhat by government efforts. • Evaluation that any current deficit matches and is warranted by the current position in the business cycle.
Persistent deficits (-1)	• Moderate (-2.5 to -5% of GDP) deficits at the peak of the business cycle. • History of general government balance being driven by a combination of changing economic conditions. Deficits are however made larger by government policy. • Evaluation that any current deficits are somewhat larger than is warranted beyond cyclical responses to current business cycle conditions.
Large and persistent structural deficits (-2)	• Large (<-5% of GDP) deficits even at the peak of the business cycle. • History of unwillingness or inability of government to take measures to shrink deficits. • Evaluation that any current deficit reflects structural revenue-expenditure mismatches going beyond cyclical responses to current business cycle conditions.
General guidelines	
• Fiscal performance should be evaluated on a through-the-cycle basis. • Data and analysis should incorporate a full peak-to-peak or trough-to-trough perspective, based on the current position of the business cycle. This should include at least 10 years of data on general government debt balances.	

- ***Volatile revenues***

  A volatile revenue base makes fiscal planning more difficult because expenditures are far more rigid. This adjustment would typically apply to sovereigns that rely heavily on royalties from agriculture, mining or oil extraction. To set the threshold for this adjustment, we calculate the 10-year standard deviation of the annual change in general government revenues as a percentage of GDP. If the 10-year standard deviation is greater than four, we apply a negative one-notch adjustment.

- ***Contingent liabilities***

  A sovereign's Fiscal Flexibility score can receive negative adjustments depending on the level of contingent liabilities. The methodology relies on a quantitative approach to assess contingent liabilities. See Box 2 for more details.

Box 2: Determination of contingent liabilities

A sovereign's Fiscal Flexibility score can receive a negative adjustment depending on the level of contingent liabilities. The analysis is focused on dividing the potential liabilities into different categories and assigning a risk factor that estimates the proportion that may end up on the government's balance sheet. This methodology is intended to provide a rough estimate that can be added to the general government debt level to provide a sense of the potential total debt stock. It is not intended to be a precise estimate because it is our view that such precision is not attainable. **Table 2-A** provides an overview of the process using hypothetical numbers for demonstrative purposes.

Table 2-A: Contingent liabilities adjustment (example)

		1	2	3
		% of GDP	Risk factor (%)	Range (% of GDP)
A	Banking sector	230%	3–5%	7–12%
B	Guaranteed government-related entities	13.3%	5–10%	0.7–1.3%
C	Other (including COVID-19 guarantees)	15%	40–50%	6–7.5%
D	Total	-	-	14–21%
E	Recommendation	2-notch negative adjustment		

Step 1

The first step is to gather data related to the different types of contingent liabilities that could plausibly be added to the government's balance sheet.

- ***Banking sector assets***: Potential contingent liabilities from the banking sector are taken into consideration, given the historical examples of governments intervening in support of the banking sector to maintain the critical functions of the financial sector. Such interventions often result in significant increases in public debt. Our approach allows for flexibility to consider the various levels of reforms that have been and are being implemented by governments around the world to ensure that shareholders and creditors of failing banks bear losses before taxpayers.
- ***Government-related entities***: Some governments are owners or guarantors of a number of entities where liabilities are not explicitly incorporated into general government debt levels. Often these entities serve essential or popular government functions. This implies that these entities would likely be bailed out by the government in the event of a crisis.

- ***Other***: This category can include any other potential sources of contingent liabilities to the sovereign as assessed by the analyst. A prominent example is government guarantees to businesses put in place in 2020 in response to the COVID-19 economic crisis.

The total level of contingent liabilities, expressed as a percentage of GDP, is gathered by the analyst for each the three categories above (column 1 in **Table 2-A**).

Step 2

The second step is to assign a risk factor in the form of a numerical range (column 2 of **Table 2-A**). This range is intended to capture the estimated riskiness of that pool of contingent liabilities and provide a rough sense of what proportion could end up on the government balance sheet. The following guidelines are used to determine this risk factor for each category of contingent liabilities:

- ***Banking sector***

  The following formula is used to compute the risk factor. The calculation is rough and relies on the assumption that total loans are roughly representative of total assets in terms of their proportion in stress. The end product likely overstates stressed loans somewhat.

$$Risk\ Factor = \frac{Stressed\ Gross\ NPLs}{Total\ Loans} \times \frac{Banking\ Sector\ Assets}{GDP}$$

  A three-step process is used to compute stressed gross non-performing loans (NPLs) to total loans (this is an estimate of stressed gross NPLs in a time of crisis when the government would have to intervene):
  - Start with the maximum data point in historical NPLs.
  - Adjust up or down based on various factors including, but not limited to, the Banking Industry Country Risk Assessment rating, level of banking sector capitalization and burden sharing with other countries.
  - Create a range (which will result in the range in the risk factor). The standard range is created by adding 2 percent to the initial estimate. The range can be expanded to alleviate uncertainty in statistics or instability in the economy or the banking sector.

- ***Government-related entities***

  A standard risk factor of 5 to 10 percent is the baseline for government-related entity (GRE) liabilities not explicitly accounted for in general government debt levels. We consider this valid for advanced economies where the exposures of GREs would be relatively safe. This standard can be adjusted up or down based on an in-depth qualitative assessment of the financials and balance sheet of the individual entities in question. Factors for an adjustment can include:
  - strength and stability of business model
  - riskiness of sector
  - level of GRE debt relative to assets
  - history of required government support

- ***Other***
  For this category, a range should be developed based on a qualitative assessment of the nature of the liabilities. The resulting range should reflect a view as to whether these potential liabilities are more or less likely to be incurred than those in the categories referred to above as well as the liabilities of other sovereigns.

Step 3

The third step is to multiply the liabilities as a proportion of GDP (column 1 in **Table 2-A**) by the risk factor range (column 2 in **Table 2-A**) to arrive at a range of potential contingent liabilities (column 3 in **Table 2-A**). The ranges for the categories of contingent liabilities are then added together to create a comprehensive total range for the sovereign (cell D3 in **Table 2-A**). The analyst examines the range in the context of the initial score matrix (**Figure 6**) and proposes an adjustment they feel is appropriate based on the effects of adding the total range to the general government debt levels.

The data on banking sector assets and liabilities and NPLs are sourced from the Bank for International Settlements and the International Monetary Fund International Financial Statistics database. Data on GREs is sourced from various national or supranational statistics agencies, such as Eurostat, as well as from financial results of individual GREs. Information on other contingent liabilities is sourced from disclosures or data relevant to the liabilities in question.

- ***Net debt adjustment***
  Using general government gross debt as the basis for the calculation of the Fiscal Flexibility score may overstate the risks for some sovereigns as this metric does not take into consideration liquid financial assets.[21] Some sovereigns have undertaken higher borrowing to fund portfolios of government assets such as state pension funds, sovereign wealth funds or assets in strategically important national corporations. These assets may be readily accessible to meet debt obligations if needed and therefore should be included in the consideration of a sovereign's fiscal position.

  However, as mentioned previously, precisely incorporating liquid assets into a measure of net debt that is adequately comparable across different sovereigns is difficult due to differences in accounting and data reporting standards across sovereigns. Furthermore, over-reliance on existing net debt metrics (e.g., IMF and OECD net debt measures) may result in further misstatement of risks because some assets included in these metrics should not be considered as accessible to meet debt obligations. Given these issues of data comparability and the significant resource investment required to quantitatively correct for these issues across all sovereigns, some level of qualitative judgement is required to adequately assess risks associated with a sovereign's debt level.

  To determine which sovereigns may be eligible for an uplift due to a large difference in their net debt relative to gross debt, the difference between the IMF WEO's gross and net debt measures is

[21] This section benefits from insights from Bloch and Fall (2016), Dippelsman, Dziobek and Gutiérrez Mangas (2012), the International Monetary Fund (2011) and Mbaye, Moreno Badia and Chae (2018), as well as the sovereign rating methodologies of credit ratings agencies.

analyzed to determine whether gross debt metrics are overstating the risks of a sovereign's fiscal situation. This initial screening then leads to further investigation of the assets for these sovereigns that have a significant difference between the net and gross debt metrics.[22] Consideration is given to the liquidity and accessibility of the assets and the ability and willingness of the government to use these assets to meet debt payment obligations. Examination of the liabilities included in a sovereign's debt metrics may also be warranted to ensure that only those with payment priority *pari passu* to the sovereign's debt obligations are included in the analysis.

Consideration is also given to the comparability of data on assets and liabilities across sovereigns, most notably regarding the reporting of government pensions and social security assets and liabilities. We share the view generally held among practitioners that pension and social security liabilities are not on par with other contractual financial obligations, such as debt interest and principal payments. Consequently, governments maintain a certain degree of flexibility to adjust future payouts and preserve fiscal sustainability. Nevertheless, any assets held against these liabilities are at least partially encumbered and should not be considered as readily available to offset existing debt obligations. Social security and public pensions should instead be included as part of the assessment of contingent liabilities.

The size of the proposed adjustment will depend on the size of the gap between net and gross debt as well as on the analyst's judgement about the government's ability and willingness to use these assets to meet debt payment obligations. The analyst proposes a positive adjustment to the score based on the effects of subtracting relevant assets from the general government debt levels.

Step 2b: Additional considerations on sustainability of debt

The Fiscal Flexibility score considers the factors outlined below with respect to the sustainability of debt. These adjustments should be applied to the initial score matrix in **Figure 6** only on the vertical axis. In other words, a sovereign's position in the matrix can shift down as a result of the application of these adjustments, but not left or right. This is intended to account for the fact that these adjustments relate primarily to the sustainability of debt and not its level, the latter being accounted for in the previous steps.

- ***Debt stress***
  The level of risk associated with the debt burden varies based on the debt profile. Considerations include the currency in which the debt is denominated, the nationality of debt holders, the maturity profile and the share of the banking sector's assets that consists of government debt. A one-notch negative adjustment can be applied when any two of the following conditions are met:

    - ***More than 40 percent of the general government debt is denominated in foreign currency***. A large amount of debt denominated in a foreign currency raises the risk of a rapid deterioration in debt-servicing costs and debt sustainability from

[22] A difference is "significant" if measurement based solely on a net debt metric would result in a more favourable score in the matrix shown in **Figure 6**. For example, a sovereign with a gross debt level of 105 percent and a net debt level of 85 percent would fall into a lower scoring category (i.e., would move left in the matrix). In this instance, further examination of the net debt measure would be undertaken to determine whether an uplift is appropriate.

a devaluation or depreciation of the country's currency. A drop in the value of the country's currency has an immediate impact on debt ratios and adds pressure on debt repayment as a greater amount of local currency is needed to repay foreign-currency-denominated debt. For advanced economies, the main source of data for this factor is the OECD *Public Sector Debt* database. When data from this source is not available, information on the currency composition of long-term foreign debt can be sourced from the World Bank International Debt Statistics.

- ***More than 60 percent of the general government debt is held by non-residents.*** Debt held by non-residents includes debt denominated both in local currency and in foreign currency. We consider debt held by non-residents to be more susceptible to capital flight than debt held by residents. The main source of data for this factor is the last annual data point available from the Bank for International Settlements and the IMF and in the World Bank Quarterly External Debt Statistics database.
- ***The debt maturity profile is subject to large annual variations or is of short tenor***. This factor applies to a sovereign facing a debt repayment profile that projects a large increase from year to year at some point in the next five years. This increase may come, for example, as the result of a large number of bonds or a sizeable share of the government debt maturing in the coming year, increasing refinancing risk. The main sources of data are Bloomberg (Debt Distribution—DDIS), the IMF *Fiscal Monitor* and the WDI statistics.
- ***The domestic banking sector has a large exposure to the central government***. This factor applies when the banking sector's claims on the central government exceed 20 percent of assets. A banking sector in which government paper is already a large share of overall assets may have limited capacity to absorb additional debt without crowding out the private sector or may incentivize higher government debt burdens. The data for this factor come from the IMF IFS database; the last available year of data is used.

- ***Official funding***

  The Fiscal Flexibility score can be improved by one notch when funding from official sources (for example the IMF, World Bank or European Stability Mechanism) is sufficient to cover gross financing requirements over the next two to three years. This adjustment applies only to countries whose government has run into financial difficulties and is receiving or is due to receive a funding package from a multilateral institution. Bilateral funding arrangements between countries are not considered. The adjustment is contingent on the expectation that funding conditions will be met by the authorities of the recipient country.

v. Monetary Policy Framework and Flexibility score

The approach used to determine the Monetary Policy Framework and Flexibility score captures a sovereign's ability to use monetary policy to address economic and financial stresses. The degree of flexibility and sophistication of monetary authorities as well as their demonstrated ability to contain inflationary or deflationary pressures and prevent asset price imbalances are key factors in assessing this score. Other key

considerations are the credibility of monetary authorities, which is a requirement for achieving the desired monetary policy, and the presence of the necessary financial levers through which monetary authorities can implement the desired policy.

Figure 7: Monetary Policy Framework and Flexibility score

Step 1	Step 2
Initial score	**Additional considerations**
The initial score is divided between four subcategories that are each scored from 1 to 5. More details are provided below. **1. Capacity and flexibility to undertake monetary policy (45%)** **2. Monetary policy effectiveness (20%)** **3. Monetary policy independence (15%)** **4. Monetary transmission mechanism (20%)** The scores are then averaged and rounded to the nearest integer to obtain the initial score.	**1. Deflation** Applied to sovereigns that experienced deflation in the previous year when deflation is expected to be sustained for three years in future. [-1 notch]. **2. High dollarization of deposits or loans** [-1 notch]. **3. Sovereign is part of a monetary union** [-1 notch]. **4. History of exchange restrictions** [-1 notch].
	Step 3
	Restrictions
	1. The score cannot be better than 4 or 5 if inflation over past year and in next three years is expected to be 10–15% or 15–20% respectively. **2. Automatic score of 6 if any of the following is true:** • Sovereign uses the currency of another country as its domestic currency unilaterally. • Dollarization of deposits or loans stands above 75%. • Inflation over past year and in next three years is expected to be above 20%.

Step 1: Determination of the initial Monetary Policy Framework and Flexibility score

The initial Monetary Policy Framework and Flexibility score is determined by averaging four sub-scores on a scale of one to five and rounding to the nearest integer. The four sub-scores are described below.

- ***Capacity and flexibility to undertake monetary policy***
  This sub-score is based on the principle that a country's exchange rate regime serves as the basis for the level of flexibility a central bank has to undertake monetary policy to respond to shocks and control inflation. Data used are based on the most recent IMF *Annual Report on Exchange Arrangements and Exchange Restrictions*. In general, a free-floating regime corresponds with a higher score, and a hard peg regime corresponds with a lower score. However, this distinction is not applied mechanistically—pegs and other exchange rate regimes should be evaluated by the extent to which they limit the flexibility of monetary policy. Factors that can mitigate the negative impacts of a less free exchange rate regime include the pegging partner (more flexibility if a country is pegged to another country or region that has similar economic dynamics) and whether the peg could easily be exited without severe disruption (soft or hard peg).

  Additionally, this sub-score considers the demonstrated willingness and ability (unconstrained by legal or other barriers) of the respective central bank to use a range of policy tools to fulfill its mandate as opposed to a narrow reliance on reserve requirements.

  For members of currency unions, the sub-score is capped at 2, reflecting the tension between bloc-wide and individual sovereign economic and financial needs. Additional notching downward can be considered based on divergence in economic and financial conditions. The basis for any downward notching is the position of the sovereign within the currency union: Are they a central, regular, or peripheral member of the union? Are they central to the monetary policy decisions? This is measured based on the member country's share of GDP within the currency union as well as the influence it has historically been able to wield within its institutions. Additionally, the analyst considers whether there is evidence or reason to believe that the member country's currency is significantly over- or under-valued, and the analyst may notch down the score accordingly.

Table 3: Capacity and flexibility sub-score

	1	2	3	4	5
Capacity and flexibility to undertake monetary policy (45%)	Strong	Adequate	Moderate	Limited	Very limited

- ***Monetary policy effectiveness***
  This sub-score is a qualitative assessment of the monetary authorities' track record with respect to whether the institutional set-up and credibility of the central bank translate into desired outcomes. Central banks are evaluated based on the existence and fulfilment of publicly stated, clearly defined goals, such as inflation targets or dual mandates. The focus of this score is not on temporary deviations from target related to shocks, but rather on medium- and long-term outcomes beyond a single business cycle. The central bank's ability to use monetary policy to return to and stay at target is the core assessment within this sub-score.

For all central banks, including those with mandates beyond inflation (e.g., a dual mandate that also considers unemployment), each "mandate metric" is considered individually. Efforts are made to keep account of the contributions of other economic policy elements, such as fiscal policy, in the attainment—or lack of attainment—of targets.

Concerns about the future effectiveness of monetary policy instruments and tools may be considered in this sub-score. For example, this would be the case if monetary policy, for a given reason, were forecasted to be constrained or structurally less effective in responding to shocks or controlling inflation in the future.

Table 4: Monetary policy effectiveness sub-score

	1	2	3	4	5
Monetary Policy Effectiveness (20%)	Central bank has long track record of success at meeting clearly defined, publicly stated goals.	Central bank has a track record of success at meeting clearly defined, publicly stated goals.	Central bank has a mixed record of success at meeting clearly defined, publicly stated goals.	Central bank has a poor record of success at meeting publicly stated goals, which may or may not be clearly defined.	Central bank has a very poor record of success at meeting publicly stated goals, and the goals are not clearly defined.
	For sovereigns in currency unions, monetary policy effectiveness should be assessed in light of the outcomes of the overall currency area as well as the match with the circumstances and needs of the sovereign under assessment.				

- ***Monetary policy independence***

  This sub-score is a qualitative assessment of the independence of monetary authorities. It assesses whether they have the expertise and freedom to take a long-term view of monetary policy goals and are insulated from short-term political pressures that may force decisions causing financial instability or inflation in the long run. The track record, perception of independence, and qualifications of the governing board are the determinative factors in this sub-score.

Table 5: Monetary policy independence sub-score

	1	2	3	4	5
Monetary policy independence (15%)	Strong, long-established track record of full operational independence; governing board is composed of qualified and independent members.	Track record of full operational independence; governing board is composed of qualified and independent members. OR Institution with strong, long-established track record with emerging issues with independence.	Mixed track record of full operational independence; governing board may be composed of qualified and independent members.	Poor track record of full operational independence; governing board may be composed of qualified and independent members.	Limited operational independence; governing board is composed of unqualified and/or non-independent members.

- ***Monetary transmission mechanism***

  This sub-score is an assessment of the presence and depth of capital markets, another necessary condition for the transmission of monetary policy objectives to the real economy. The assessment is based on the capacity of the central government to issue long-term bonds denominated in local currency, the presence of a deep corporate bond market, and the existence of a developed banking system with a sizeable level of bank loans denominated in local currency. Additionally, the adjustment looks at whether there is evidence of disruptions in the short-term transmission mechanism.

Table 6: Monetary transmission mechanism sub-score

	1	2	3	4	5
Monetary transmission mechanism (20%)	Government debt is above 20-year maturity on average; corporate bond market capitalization is above 75% of GDP; domestic claims pass 100% of GDP; there is no other evidence of short-term transmission disruptions.	Government debt is above 10-year maturity on average; corporate bond market capitalization is above 50% of GDP; domestic claims pass 80% of GDP; little evidence of short-term transmission disruptions.	Government debt is above 5-year maturity on average; corporate bond market capitalization is above 25% of GDP; domestic claims pass 60% of GDP; some instances of short-term transmission disruptions.	Government debt is below 5-year maturity on average; corporate bond market capitalization is above 10% of GDP; domestic claims pass 40% of GDP; common short-term transmission disruptions.	Government debt is below 5-year maturity on average; corporate bond market capitalization is below 10% of GDP; domestic claims do not pass 40% of GDP; central bank has little or no control over short-term transmission.

Step 2: Additional considerations

A number of factors can result in a one-notch negative adjustment to the Monetary Policy Framework and Flexibility score.

- ***Expected deflationary pressures***
  The Monetary Policy Framework and Flexibility score can be adjusted down when deflation is expected to persist for the foreseeable future, since the presence of deflation impedes monetary policy flexibility.

- ***High dollarization of deposits or loans***
  The Monetary Policy Framework and Flexibility score can be adjusted down when there is a substantial presence of parallel currencies in the financial system, in the form of either deposits or loans, which prevents the effective transmission of monetary policy.

- ***History of exchange restrictions***
  The Monetary Policy Framework and Flexibility score can be adjusted down if, over the course of the last 20 years, a sovereign has unilaterally imposed transfer and convertibility restrictions in response to balance of payments pressures.

Step 3: Restrictions

Because we expect monetary authorities to foster a low and stable inflation environment, the methodology places restrictions on the final Monetary Policy Framework and Flexibility score of countries that fail to achieve this objective or that have very limited flexibility or ability to achieve an independent monetary policy.

- ***Countries with high inflation***
  The final Monetary Policy Framework and Flexibility score can be no better than 4 if, on average, the inflation rate for the five-year period comprising the previous year, current year and three-year forecast is between 10 and 15 percent.

- ***Countries with very high inflation***
  The final Monetary Policy Framework and Flexibility score can be no better than 5 if, on average, the inflation rate for the five-year period comprising the previous year, current year and three-year forecast is between 15 and 20 percent.

- ***Countries with extremely high inflation***
  The final Monetary Policy Framework and Flexibility core is set at 6 when the average inflation rate for the five-year period comprising the previous year, current year and three-year forecast is greater than 20 percent.

- ***Countries with no separate legal tender***
  The final Monetary Policy Framework and Flexibility score is set at 6 if the latest IMF *Annual Report on Exchange Arrangements and Exchange Restrictions* classifies the country as having no separate legal tender.

- ***Countries with a highly dollarized banking sector***
  The final Monetary Policy Framework and Flexibility score is set at 6 when over 75 percent of bank deposits or loans from the banking sector are denominated in a foreign currency.

5. Climate change factors

For sovereigns, climate change entails risk from the economic and social costs of both climate events and transition initiatives, including programs for reducing emissions (e.g., transitioning away from carbon-based industry) and investing in adaptation measures to address potential vulnerabilities. Significant uncertainty remains about both the magnitude and the nature of climate change impacts. At the same time, current decisions being made relating to climate change (including around transition risks) have some credit implications within the methodology's rating horizon of three to five years.

In this update to our methodology, we introduce a light-touch approach to evaluating the impacts climate change on a sovereign's credit risk profile. This approach will evolve over time and remains adaptable with the advent of new and better sources of information and improved understanding of climate change impacts. It is informed by current best practices in credit ratings.

The first step is to identify whether a sovereign is relatively more at risk than others from climate change impacts. We use customized metrics of sovereign *vulnerability* to climate change from the Notre Dame Global Adaptation Initiative (ND-GAIN) database.[23] Vulnerability factors measured include food, water, health, human habitat and infrastructure. Each factor is assessed in terms of a country's exposure, sensitivity and capacity to adapt to negative effects of climate change, as summarized in a single number per factor. We established internal thresholds for low, medium and high vulnerability, considering the entire universe of sovereigns captured by the ND-GAIN. The thresholds are determined using one standard deviation below or above the median scores.

The second step is to screen each sovereign for its *readiness* to adapt to climate change risks. Readiness metrics are also represented by a single number that measures a country's ability to leverage investments in climate change adaptative actions depending on its economy, institutional features and social conditions. We again established thresholds for readiness scores. In this instance, since the minimal level of readiness needed was considered to be at least as high as the median score among sovereigns, a high readiness threshold was established at the 80th percentile score and higher, and a low threshold is anything below the median readiness score. The medium readiness threshold range falls between the high and low scores.

[23] The ND-GAIN initiative was established in 2013 and uses 20 years of data across 45 indicators from a broad range of sources such as the World Bank WDI, the Earth System Grid Federation, AQUASTAT, the World Resources Institute and many others.

Using these thresholds, sovereigns are categorized as low, medium or high on the readiness scale for each factor.

The third step is to determine those instances for which a vulnerability categorization exceeds the readiness grouping for a given factor. The red squares in **Table 7** indicate combinations that would immediately trigger a deeper investigation of potential climate impacts for the factor. However, the analyst also has the flexibility to look further into potential impacts when vulnerability and readiness levels are matched in classification (i.e., the yellow highlighted areas) if their analysis gives them reason to do so.

Table 7: Vulnerability and readiness by factors

		VULNERABILITY														
		Food			**Water**			**Health**			**Human Habitat**			**Infrastructure**		
		Low	*Med*	*High*	*Low*	*Med*	*High*	*Low*	*Med*	*High*	*Low*	*Med*	*High*	*Low*	*Med*	*High*
READINESS	HIGH															
	MED															
	LOW															

Area for which a deeper investigation of climate change impacts is triggered

In cases where this additional step is triggered, a high-level, qualitative analysis of the vulnerability-readiness discrepancy is performed. If it is determined that the discrepancy is readily linked to creditworthiness for the sovereign, then the factors underlying these risks are considered within the appropriate subfactors of the sovereign model (i.e., Institutional Framework and Political Developments, National Wealth and Factors Impacting the Economic Outlook, External Vulnerabilities, Fiscal Flexibility, and Monetary Policy Framework and Flexibility). In practice, most findings from a qualitative investigation will likely be discussed within either the National Wealth and Factors Impacting the Economic Outlook score or the External Vulnerabilities score.

While there is no established scorecard at this time, analysts use their best judgement to make a recommendation for potential adjustments to sub-scores.

6. Exceptional adjustments and the final internal credit rating

Analysts determine their final internal credit rating recommendation after applying a number of checks and potential adjustments to the preliminary rating. The preliminary rating is determined by the Institutional Framework and National Wealth Profile (Institutional Framework and Political Developments and National Wealth and Factors Impacting the Economic Outlook scores) and the External Vulnerabilities and Policy Flexibility Profile (External Vulnerabilities, Fiscal Flexibility, and Monetary Policy Framework and Flexibility scores) using the matrix in **Figure 2**.

i. Exceptional adjustment factors

There are a number of reasons why additional adjustments to the preliminary rating suggested by our methodology may be warranted. Even in a comprehensive methodology, models may not adequately capture all risks. While we believe that the framework performs well, credit risk practitioners may face challenges when applying the methodology to a specific country. An exceptional adjustment is proposed only when material risks are not appropriately captured in the five risk factors.

As indicated in section 3, the sovereign rating models we use are designed to provide an assessment of the credit quality for all countries. This approach raises challenges for the development of a methodology that reflects the different levels of income and wealth of countries, the sources of countries' wealth and income, the various political and legal systems, and the monetary policy implemented by countries' central banks or monetary authorities.

While our model allows some room for analyst judgment, the model is driven predominantly by quantitative factors. In some cases, issues may arise related to the availability and quality of the data needed to run the model. The required data may not be available for the country in question, the quality of the data may be in doubt, or the data may be published with a significant lag. As a result, the current situation in the country could differ significantly from what the model suggests. Finally, a key risk indicator may be materially worse than the threshold needed for the worst possible score, in which case the full extent of the risk to the sovereign's creditworthiness may not be adequately represented. There are three specific types of exceptional adjustments in the sovereign methodology, as outlined below. In all cases, the appropriateness of an exceptional adjustment should be informed by sufficient evidence and expert judgement, including a view that the balance of risks is commensurate with the alternative sovereign peer rating group associated with the final adjusted rating.

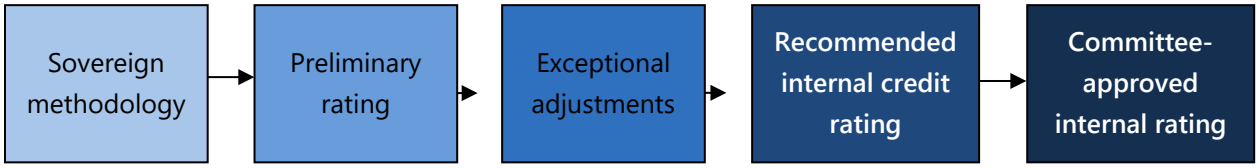
- ***Technical adjustments***
  A sovereign's preliminary rating may be adjusted up or down to ensure the final rating does not move an excess number of notches because of the interaction of changes in scoring and the ratings matrix. The Credit Rating Committee can adjust a rate further if it feels improvement or worsening in a particular scoring category does not warrant the methodology-implied upgrading or downgrading of the overall rating.
- ***Specific adjustments***
  A sovereign's preliminary rating may be adjusted up or down to capture a credit weakness or strength not sufficiently considered in the individual scoring categories.
- ***Mixed adjustments***
  A sovereign's preliminary rating may be adjusted up or down to capture credit weaknesses or strengths that touch on multiple scoring categories but that have not led to a change in any of those categories.

These adjustments can cover a variety of issues and concerns, including event risk, peer comparison and individualized quantitative or qualitative factors pertaining to a sovereign that are not captured in the methodology.

ii. Final recommended internal credit rating

As presented in **Figure 8**, we obtain the final recommended internal credit rating by applying the sum of notches from the exceptional adjustment factors (if any) to the preliminary rating suggested by the model. The Credit Risk Advisory Office presents this recommendation for approval to the Credit Rating Committee, which has the final say in determining the appropriateness of the recommendation and assigning the final internal credit rating for the sovereign in question.

Figure 8: Final internal credit rating



7. Conclusion and future considerations

In this paper, we presented a technical description of the methodology used to assign internal credit ratings to sovereigns. The methodology builds on industry best practices and uses publicly available data. Relative to Muller and Bourque (2017), the latest internal review of our methodology incorporates the following key innovations:

- a new approach to assessing a sovereign's fiscal position
- adjustments to the approach to assessing monetary policy flexibility
- the explicit consideration of climate-related factors

Using this updated methodology, the Bank and the Department of Finance Canada are able to independently assess the relative creditworthiness of the various sovereigns and any other entity deemed important to evaluate. In addition to a rigorous quantitative approach, we have the ability to adjust ratings qualitatively in response to changes in credit quality that occur as a result of a deterioration in the economic, political or financial environment.

The application of the methodology has generated insights that are used to inform and support investment and management decisions. Given the high quality of the ratings, we include them as part of our existing internal credit risk management and investment policies. This has also allowed the Bank and the Department of Finance Canada to end mechanistic reliance on the ratings of CRAs.

We intend for this paper to support efforts by reserve managers and other investors to end mechanistic reliance on CRA ratings and instead establish or strengthen internal credit assessment practices. The methodology presented can be used as is by credit risk practitioners to assess the relative credit quality of a sovereign. Or it can be used to facilitate a process of developing a methodology that caters to the specific needs of a given institution. This will also improve the ability of reserve managers and other investors to manage credit risk and enhance the financial performance of their portfolios. Our methodology also

provides the means to monitor indicators that reflect the key credit risk factors of sovereigns and ways to apply expert judgment on these to infer a credit rating for any sovereign.

We intend to continue to refine our methodology, in line with best practices and new research, and to update this paper to detail the new approaches.

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