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A Primer on Managing Sovereign Debt-Portfolio Risks

by Thordur Jonasson and Michael Papaioannou

I N T E R N A T I O N A L M O N E T A R Y F U N D

## IMF Working Paper

Monetary and Capital Markets Department

### A Primer on Managing Sovereign Debt-Portfolio Risks

Prepared by Thordur Jonasson and Michael Papaioannou<sup>1</sup>

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#### Abstract

This paper provides an overview of sovereign debt portfolio risks and discusses various liability management operations (LMOs) and instruments used by public debt managers to mitigate these risks. Debt management strategies analyzed in the context of helping reach debt portfolio targets and attain desired portfolio structures. Also, the paper outlines how LMOs could be integrated into a debt management strategy and serve as policy tools to reduce potential debt portfolio vulnerabilities. Further, the paper presents operational issues faced by debt managers, including the need to develop a risk management framework, interactions of debt management with fiscal policy, monetary policy, and financial stability, as well as efficient government bond markets.

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## INTRODUCTION

The main concerns of a sovereign (public) debt manager are to (1) ensure that the government's financing needs and financial obligations over the medium- to long-term are met at the lowest cost consistent with a prudent level of risk; (2) establish a sustainable debt service profile consistent with the government's medium-term debt repayment capacity; (3) identify, measure and manage debt portfolio risks; (4) attain efficient cash balance management so as to minimize the cost of carry; (5) promote the development and efficiency of domestic primary and secondary markets for government securities; and (6) broaden the investor base and diversify available funding sources (see IMF and WB, 2014). In addition to these concerns, there may be scope for the debt manager to undertake a broader sovereign asset and liability management approach, especially in countries that possess significant financial assets and substantial hedging-cost savings can be achieved by consolidating sovereign balance-sheet risks (Das et al., 2012). These concerns are, in effect, the main elements in the debt manager's objective function.

Liability management operations (LMO) refer to a broad range of non-distressed, market-based sovereign debt transactions undertaken by debt managers to secure funding, affect the debt portfolio profile and address debt portfolio risks.<sup>2, 3, 4</sup> In this connection, LMOs can indirectly impact the fiscal position, such as through the timing of cash flows, and the measurement of debt, particularly through the use of derivatives transactions, as well as the

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<sup>2</sup> For the purpose of this primer, debt managers comprise all authorities, including the relevant management and staff, of the institutions that play a role in the debt management process (see WB and IMF, 2009).

<sup>3</sup> For the purpose of this primer, sovereign (public) debt management relates to the management of the *gross debt of the central government*, including debt contracted on behalf of the central government by the central bank. Other definitions of sovereign (public) debt include (i) the *gross debt of the general government*, which typically includes the central government, state and local governments, and social security funds, and *the public sector*, which typically includes the general government and public corporations (consisting of public nonfinancial corporations and public financial corporations, which include the central bank, public deposit-taking corporations, and other public financial corporations) (Government Finance Statistics Manual (GFSM), 2014, paragraph 7.236 and Figure 2.3); (ii) the *net debt*, which is gross central government (or general government or public sector) debt minus owned financial (liquid) assets corresponding to debt instruments (see GFSM 2014, paragraph 7.243); (iii) outstanding vs. totally-contracted debt; (iv) *debt including contingent liabilities*, as non-realized debt, and/or *derivatives positions* (when a derivative contract, e.g., a swap, is accounted as debt); (v) *domestic vs. external debt* from (a) an issuance perspective (domestic vs. non-domestic governing law), (b) currency perspective (local vs. foreign currency of issuance), (c) investor or ownership perspective (resident vs. nonresident holder of debt).

<sup>4</sup> When debt managers are contemplating funding, main considerations include (i) whether to proceed with a bond issuance, a loan, or other types of government financial obligations, e.g., suppliers' credit, payment arrears; (ii) domestic or external borrowing and, in the case of foreign bond issuance, whether it is an international or global issue, its governing law (jurisdiction), listing, clearing system, etc.; (iii) the selection of currency (local vs. foreign currency and, in the case of foreign currency, whether it is US\$, euro, yen, or other); (iv) the size (amount) and, in the case of a bond, whether it is a benchmark issue and be included in an index; (v) the terms of borrowing, including maturity, target coupon, bullet vs. amortizing structure of repayment; (vi) the selection of (a) financial and legal advisors and (b) underwriters for a bond or bank(s) for a loan.

conduct of monetary policy and operations. While LMOs are primarily used in non-distressed debt situations, they can also be employed in cases of sovereign debt restructuring and voluntary re-profiling to improve the maturity structure of the debt portfolio and/or to reduce credit spreads (Missale, 1999; Missale, Giavazzi, and Benigno, 1997; Steneri, 2004).

From the perspective of strategic debt management, LMOs could be viewed as facilitators of a smooth implementation of a country's debt management strategy. They should not be solely viewed as opportunistic transactions to reduce the cost of debt servicing or to cosmetically improve the presentation of a debt portfolio. Most important, a clear legal mandate, a well-articulated debt management strategy and a robust framework for measuring debt portfolio risks are necessary preconditions for the management of these risks through the use of LMOs. Further, LMOs could be considered for the purpose of amending a country's existing stock of bonds to include revised *pari passu* provisions and enhanced collective action clauses (CACs), in order to mitigate against holdout creditor behavior in the event a restructuring became necessary.

The risks that debt managers are typically confronted with can be broadly grouped under the following categories: (1) *rollover/refinancing risk*, which refers to the refinancing ability or a certain debt exposure at maturity due to, e.g., loss of market access or low investor appetite; (2) *market risk*, which relates to movements in interest rates (interest rate risk) and exchange rates (exchange rate risk); (3) (i) *funding liquidity risk*, which refers to a possible difficulty of the sovereign to raise funds through borrowing in a short period of time to service the debt on the due date, and (ii) *market liquidity risk*, which refers to the risk that the investor faces from a quick diminishing of the trading volume of a bond or a series of bonds in the secondary market due to, e.g., abrupt changes in economic fundamentals or unanticipated cash flow obligations;<sup>5</sup> (4) *credit risk*, which is associated with (i) a sovereign's own credit risk and (ii) a counterparty's ability to fulfill its obligations; (5) *legal risk*, which refers to a range of uncertainties related to legal actions or legal shortcomings to the applicability or interpretation of contracts, laws, and regulations; (6) *contingent risk*, which refers to potential financial claims against the government under certain circumstances; and (7) *operational risk*, which refers to a range of risks, stemming from transaction errors, failures in internal controls and systems, legal shortcomings, security lapses, or natural disasters.

Appropriate measures of portfolio risks were first developed, and their application was extensively discussed in the financial literature, in the context of asset management (Papaioannou, 2006). Sovereign debt management followed, by evaluating these risks and applying market valuations to debt portfolios. Accordingly, debt managers can benefit from using market-based measures of risk and building a risk management framework, which is the base for applying LMOs on debt portfolios to attain a desired structure. Also, the

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<sup>5</sup> The difference between the risk categories (1) and (3) tends to be subtle. Further, there is a link between (3) and (4), as increased funding liquidity risk of the sovereign issuer increases the credit risk taken by the investor and an increased liquidity risk of the investor will increase the cost of any new issues in the domestic market.

domestic institutional framework can help in the efficient management of debt by having in place an appropriate (i) legal framework for debt management, including for bond issuances, contracting of loans, conduct of LMOs, and monitoring of contingent liabilities; (ii) macrofinancial policy setting and coordination mechanisms between debt management and monetary and fiscal policies; and (iii) plan for the development of local currency bond markets.

This primer aims to serve as a reference guide to the pertinent elements of public debt-portfolio risk identification, measurement and management, including through local currency bond market development. The paper presents practical considerations for defining debt portfolio risks, establishing a risk management framework, and applying LMOs, as faced by debt managers, in particular, and other policymakers in general, by market participants and credit rating agencies, and by analysts and Fund staff dealing with debt management issues. The analysis addresses questions on (i) the desirable composition of a debt portfolio, (ii) issuance strategy, including the selection of the currency of issuance, (iii) cash buffers, (iv) assessment of market liquidity, and (v) determination of LMOs, including bond buybacks and exchanges, as well as (vi) the use of derivative instruments, in order to mitigate debt portfolio risks. The roles of underwriters, credit ratings, and government bond markets, including their stage of development and prevailing primary dealership system and auction framework, in debt management decisions are also discussed.

The paper is organized as follows: Section I presents the main sovereign debt portfolio risks, their measurement, and the rationale for their mitigation. Section II outlines the process of and strategic choices in applying a risk management framework, as well as the main arguments for introducing targets for debt portfolio indicators. Section III discusses LMOs that may be undertaken to manage debt portfolio risk. Section IV addresses the issues surrounding the coordination of debt management with fiscal, monetary, and financial stability policies. Section V discusses the role of domestic and international markets in LMOs. Section VI briefly analyzes debt management activities under normal and distressed conditions. Section VII provides concluding remarks.

## **I. SOVEREIGN DEBT PORTFOLIO RISKS**

The main sources of a sovereign's debt portfolio risks relate to the total size, maturity structure, interest rate structure, and currency composition of its debt stock, as well as to the prevailing market conditions and investor appetite for instruments of the country's established (domestic and international) government bond markets.<sup>6</sup> Traditionally, market

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<sup>6</sup> This primer analyzes only risks that are in the direct purview of the debt manager, while risks relating to policy making and political decisions are not covered. However, "discretionary policy risks," such as policy decision not to have or not to comply with fiscal rules, targets, Medium-Term Fiscal Framework, DSA, annual borrowing plan, and "political risks" can adversely affect the debt portfolio and the country's creditworthiness. In particular, when government officials decide to stop servicing the public debt or terminate debt obligations



analysts focus on market risk (interest rate risk and exchange rate risk), credit risk, and liquidity risk. However, an important consideration in managing sovereign debt portfolio risks has often been the trade-off between cost and, e.g., maturity (in general, issuing at shorter maturities to decrease cost would increase the refinancing and interest rate risks).<sup>7</sup> Following the 2008 global financial crisis, debt managers have recognized refinancing risk as a major risk to manage.<sup>8</sup> Recently, especially after the European Sovereign Debt Crisis, measurement of credit risk, stemming from the perceived creditworthiness and potential default of a sovereign, and liquidity risk, stemming from bond market liquidity conditions, have gained increased attention from market commentators, market participants, and debt managers (Bank for International Settlements, 2011; and Caceres et al, 2010).

Traditional measures of risk include symmetrical, quantiles, interquartile range, and shortfall measures. The most widely used symmetrical risk measures are the variance and standard deviations. However, these measures have been met with criticism because they are not able to capture the impact of extreme events (tail risk). Quantiles and shortfall measures, like lower partial moments (LPM), have been proposed as more appropriate in this context. The Value-at-Risk (VaR) statistic is among the best-known quantile measures, especially following the proposals of the Basel Committee on Banking Supervision for the internal model approach to manage market risk.<sup>9</sup> Among LPM measures, the LPM0 (the probability of loss) explains risk perceptions well (Papaioannou, 2006).

Many modern approaches to measuring and controlling risks directly or indirectly are based on density forecasts. Recent studies have proposed various methodologies to evaluate density forecasts from risk models. For risk management purposes, methodologies using likelihood ratio tests are straightforward and easy to calculate. Nevertheless, the likelihood ratio testing framework may fail to detect incorrect density forecasts and, as such, it should be combined with additional diagnostic tests that appropriately evaluate risk models. These techniques are typically adopted to suit the analyzed risk characteristics (Papaioannou, 2011).

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earlier than initially committed, the resulting debt defaults or earlier buybacks become inevitably situations that need to be actively managed by debt managers.

<sup>7</sup> The total size of sovereign debt, often measured by the debt-to-GDP ratio, is a sovereign debt portfolio risk that is typically outside the mandate of debt managers.

<sup>8</sup> A usual development after a financial crisis, whether caused by debt, currency, or financial institutions imbalances, is a credit freeze in the financial system. Thus, after 2008, debt managers wanted to reduce the amount of debt falling due in a given short-term period, e.g., 12 months, and lengthen the sovereign debt portfolio's average time to maturity. This is demonstrated by the significant shifts cited in The World Bank Survey #2 – 2013, where in Survey #1 – 2007, 33 percent of debt managers acknowledge refinancing risk as a risk to manage, while in Survey #2 – 2012, 66 percent saw refinancing risk as a risk to manage.

<sup>9</sup> Assuming a normal distribution for market movements, the 99 percent VaR for a portfolio can be defined as  $VaR_T = 2.33 \times \sigma_T$ , where  $\sigma$  is the standard deviation of the portfolio's value and T is the time period over which the standard deviation of returns is calculated.

We present below some sovereign debt-portfolio risk indicators that are commonly used by public debt managers (sections I.A–I.H). For each indicator, we provide a formula, along with a brief analysis of its relevance for public debt management and possible shortcomings. Many of these indicators are used in the risk assessment of debt-portfolios through the Medium-Term Debt Management Strategy (MTDS) and Sovereign Portfolio Risk Analyzer and Optimizer (SoPRAnO) frameworks and tools (see IMF, 2017 and Abramov, Mirestean and Papaioannou, 2017, respectively).

### **A. Rollover/Refinancing Risk**

The maturity structure (profile) of government debt is an important source of identifying rollover/refinancing risk. Rollover risk refers to the uncertainty that debt may have to be rolled over at an unusually high interest cost or cannot be rolled over at all. The rollover risk is higher when the maturity profile is concentrated on or around a particular maturity and when the maturity profile is short with large individual redemptions.<sup>10</sup> Refinancing risk is typically a major concern for countries with volatile and/or rapidly deteriorating economic indicators, lower credit rating, perceived poor governance, and high political risk, as well as for highly indebted countries and countries under financial distress.<sup>11</sup>

The average time to maturity (ATM) is often used to indicate the speed at which the debt portfolio matures, where debt service is captured in nominal terms.<sup>12</sup> The time to maturity of a bond measures the time between the date that the exposure is calculated and the date that the principal is due. As an example, the time to maturity for a bullet bond is the time remaining until the repayment date. For an amortizing bond, the time to maturity is a weighted average of all times remaining until each partial amortization is made, with the weights given by the proportion of the total loan paid in each installment, i.e., it is the average time until a unit (e.g., dollar) of principal is repaid.<sup>13</sup>

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<sup>10</sup> Also, the rollover risk premium could be heightened by uncertainty related to the government's intentions to roll over large bullet maturities (i.e., uncertainty of LMOs), and/or poorly articulated debt strategy. The uncertainty premium would be more relevant as the bond is approaching maturity.

<sup>11</sup> This risk is greater when a government relies on external financing, or when domestic creditors cannot easily be subordinated.

<sup>12</sup> It is also referred to as the weighted-average life (WAL). Other rollover/refinancing indicators include the average life to maturity (ALM), which includes the coupon payments in addition to principal payments (used, e.g., by Brazil), and the average refixing period. The ALM is considered a more accurate measure of refinancing risk, especially for countries with high-coupon instruments.

<sup>13</sup> Although the Public Sector Debt Guide (2011) defines ATM as “the weighted average time of all principal payments in the portfolio,” when interest payments are included in the calculation, international comparisons become difficult.

The ATM is often expressed as follows:<sup>14</sup>

$$ATM_t = \frac{\sum_{\tau=1}^n \tau \cdot P_{\tau}}{\sum_{\tau=1}^n P_{\tau}}$$

where  $P_{\tau}$  = the principal payment at time  $\tau$  and is counted from the current period, or the period when exposure is assessed, until the principal payment occurs.

Although the ATM is widely used, it is a crude indicator of refinancing risk. Its advantage is simplicity, its easiness to understand, follow, and control ex-post. Its drawback is, because it is an average, concentrations of redemptions may be hidden in the figure making the ATM as a stand-alone measure of refinancing risk an incomplete measure (unless a flat redemption profile is assumed). Acknowledging this drawback, debt managers often consider it as a broad guideline, together with additional guides that describe the maturity structure of the debt portfolio (i.e., redemption profile). Also, ATM figures need to be assessed in the context of the respective country's overall sovereign debt portfolio risk structure, while policy decisions regarding changes in debt compositions should be based on such assessments and on the authorities' views about future funding conditions.<sup>15</sup>

Rollover/refinancing risk depends on liquidity risk, with this relationship being often incorporated into the risk quantification. For example, if a sovereign faces ample market liquidity and market appetite, then it is likely that most maturity points on the yield curve will be refinanced with little difficulty (including the short-end).<sup>16</sup> However, regardless of liquidity, if investors are risk-averse to the country's debt, it is likely to prefer trading at the short-end of the market and to demand high risk premia. Under these circumstances, any news perceived as negative for the country could cause market participants not to extend financing at any cost.

For debt managers, it is also common to set targets aimed at smoothing the maturity profile. Formulation of such a target requires special attention, for example, for a maximum amount allowed to mature each year, may lead the debt manager to miss windows of opportunity for issuance and redemption in the debt market, and it may expose the debt portfolio to sudden changes in borrowing requirements.

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<sup>14</sup> The paper does not discuss threshold (benchmarking) issues of ATM, as well as of other debt portfolio risk indicators (measures) employed in this analysis.

<sup>15</sup> The ATM is sometimes considered as an inadequate indicator of refinancing risk because it does not provide a monetary value of the risk. Further, an analysis of ATM can be found at <http://wriecke.net/average-time-to-maturity-vs-duration/>

<sup>16</sup> Nevertheless, there may be cases of EMs that are relatively liquid but could face significant refinancing risks due to, e.g., market volatility or market closure episodes.

However, it is advisable that debt managers consider the possibility of putting a ceiling on how much debt should be allowed to mature in the subsequent 12 months.<sup>17</sup> This could be expressed as share of the outstanding debt or a monetary-value limit based on liquidity circumstances. Further, it might be prudent to also limit the amount of debt maturing in each quarter, so as all maturities do not concentrate at a single point in the year. In doing so, the near-term refinancing risk is contained. Nonetheless, such a guideline requires careful analysis, good planning, and constant follow-up.

## B. Interest Rate Risk

The interest rate risk is associated with the cost of servicing the government's new or existing floating debt, stemming from potential changes in domestic and foreign interest rates. The concept of average time to re-fixing (ATR) has been adapted by many debt managers to provide a detailed sense of exposure to interest rate risk.<sup>18</sup> In practice, however, many debt managers rely on a number of metrics, such as the share of the debt, in nominal or net present value (NPV) terms to GDP, maturing in any given period or periods (IMF, 2009), even if these indicators are more related to the refinancing risk. To capture better the variable-rate debt portfolio, other debt managers rely on the share of debt with floating rate and/or interest rate to be refixed in a given period (see also previous section). For both domestic and foreign currency debt, changes in interest rates affect debt servicing costs on new issues when fixed-rate debt is refinanced, and on floating rate debt at the rate-reset dates. Hence, short-term or floating rate debt is usually considered to be more interest rate risk sensitive than long-term and fixed rate debt because of the periodic reset of interest rates. The ATR shows on average the time it takes for principal payments to be subject to a new interest rate. As an average measure, this indicator gives information over time of the change in the debt portfolio's average time to re-fixing. A shortening of this indicator suggests that the debt portfolio is, on average, facing a new interest rate more frequently and therefore is more exposed to re-fixing shocks.<sup>19</sup> The ATR can be expressed as:

$$ATR_t = \frac{\omega^f \sum_{t=1}^T (D_t^f \cdot t) + \omega^v \cdot \sum_{s=1}^S (D_{t,s}^v \cdot s)}{D_t}$$

where  $ATR_t$  = the average interest rate re-fixing period of the debt portfolio  
 $D_t^v$  = principal cash flow of variable-rate debt at time t,

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<sup>17</sup> In this context, some DMOs use the "amount of debt maturing in 12 months" or the "amount of debt maturing in 12 months plus all floating-rate debt" (or, as percentage of total outstanding debt) as crude measures of refinancing risk.

<sup>18</sup> There has been a debate on whether to take into account the portion of a debt portfolio that is issued as T-bills in measuring the floating rate component of the portfolio.

<sup>19</sup> Debt managers prefer a shorter ATR in a falling interest-rate environment, or during high interest-rate volatility periods.

$D_t^f$  = principal cash flow of fixed-rate debt at time t

$D_t$  = the total principal debt

s = time to the next interest rate reset for the variable-rate debt

t = time until the fixed-rate principal is due

$\omega^v, \omega^f$ , are respective shares of the variable-rate debt outstanding and fixed-rate principal falling due.

While the focus is often on the volatility of interest rates (fixed/floating), the ATR is also an important interest-rate risk indicator as it reflects the volatility in the redemption of the refixing profile, i.e., the volatility of the weights. Further, this highlights the importance of setting targets for smoothing the maturity profile (see above).

For market analysis, traditional measures of interest rate risk for a bond or a bonded portfolio are typically its duration and convexity. In the fixed-income markets, where about three-fourths of the volatility of bond prices is explained by a common interest rate factor (Jorion and Khoury, 1966), a first-order, linear approximation (first derivative) of the exposure of an asset to movements in interest rates is called duration, and the second-order form of price adjustment (second derivative) is called convexity:

$$D(\textit{duration}) = -\frac{1}{P} \times \frac{\delta P}{\delta R}$$

where P = the market value of a bond

R = interest rates

and

$$\text{"Modified" } D(\textit{duration}) = \frac{D(\textit{duration})}{1 + \left(\frac{YTM}{\textit{number of coupons per year}}\right)}$$

where YTM = yield to maturity

while

$$C(\textit{convexity}) = -\frac{1}{P} \times \frac{\delta^2 P}{\delta R^2}$$

Bond convexity is a measure of the non-linear relationship of bond prices to changes in interest rates, while duration is a linear measure of the sensitivity of bond prices to interest rate changes. Thus, depending on the curvature of the interest rate function, a bond price is not likely to change linearly with an interest rate change and, in turn, the more inaccurate duration is as a measure of interest rate sensitivity. The more curved the price function of the bond is, the more appropriate convexity is as a measure of bond price changes in response to interest rate changes, with more convexity implying more bond price volatility or risk. As such, duration and convexity can help (debt managers and investors) in predicting bond

prices and (investors) in managing the market risk exposure of a bond portfolio, e.g., reducing the interest rate sensitivity of bonds in a portfolio through interest rate swaps.

For a fixed-income asset (liability) or a portfolio of assets (liabilities), duration and convexity, along with yield, are essential metrics/variables to an investor (debt manager) for measuring the price sensitivity of a bond to changes in the yield-to-maturity. The use of a consistent yield-calculation method is particularly important when computing the average yield of a portfolio containing a variety of bond-debt instruments. Also, accurate computations of duration and convexity are essential for evaluating the interest rate riskiness of a bond-debt portfolio. A widely-used measure of duration is the Macaulay duration:

$$D_m(\text{Macaulay duration}) = \frac{\sum_{t=1}^T PV(C_t) \cdot t}{\sum_{t=1}^T PV(C_t)}$$

where  $D_m$  = Macaulay duration, in a number of periods

$t$  = the time period (annual, semiannual, or other) that each fixed coupon or principal payment occurs

$T$  = the number of periods to final maturity

$C_t$  = the interest or principal payment in period  $t$

$PV(C_t)$  = the present value of  $C_t$

It should be noted that  $D$  (duration) (or, “modified” duration), as a linear approximation of the price/yield relationship, is an elasticity/sensitivity measure. However,  $D_m$  (Macaulay duration), as a weighted average of the present values of principal and interest payments expressed as a number of periods (years), has a time dimension. The relationship between  $D$  (or “modified” duration) and  $D_m$  is

$$D = \frac{D_m}{100\% + \text{yield}} = \frac{D_m}{1 + i}$$

which implies that  $D$  is (slightly) less than  $D_m$ .

Sovereign debt managers have sometimes expressed doubts on the relevance of duration and convexity for debt management. These metrics are considered appropriate interest-rate risk measures to analyze the price/yield relationship of a security or a portfolio of securities from an investor perspective. However, as pointed out in section II.B, duration has significant shortcomings, which caution against overreliance on this indicator. In particular, duration tends to be very sensitive to market yield movements, irrespective of debt management objectives and actions by the debt manager. In fact, prudent debt management, supported by cost-at-risk (CaR) analysis, may require that the interest rate mix is skewed toward fixed rates, which will generate volatility in the present value of the interest and principal payments and, hence, in  $D_m$ . This, however, does not have a particular meaning for a set

strategic objective of a debt portfolio. These skeptical perspectives on duration have led to the development and use of CaR measures.

As interest cost is a crucial factor for budget purposes, many debt managers estimate the impact of changes in market rates on the budget, i.e., their exposure to interest rate risk, with CaR measures. CaR is closely related to VaR, which expresses the maximum decline in a portfolio's market value with a given probability over a given period, typically relatively short. VaR notably has limitations in describing what happens on occasional days (for example, twice or three times a year) rather than rare outlier days (for example, once every 10 years) (Marrison, 2002).<sup>20</sup> While VaR determines the maximum portfolio value that can be expected to be lost under non-extreme circumstances, CaR is defined as the  $x$  percent-quantile of the cost distribution. CaR calculations depend on the model applied and the assumptions made, but are nonetheless useful as a supplemental measure used in the management of the interest-rate risk government debt. This is because they quantify the debt portfolio risk and provide input to the weighing of interest-rate risk against costs.

The calculation of CaR is based on the expected future costs of the existing debt. On the basis of scenarios for future interest rates and borrowing strategies, possible future cost profiles related to the domestic and foreign-currency debt are calculated.<sup>21</sup> On the basis of a number of scenarios for future costs, a probability distribution of the costs is found. For example, an absolute CaR for a given year indicates the maximum debt service costs within the specified probability (for example, 95 percent), whereas a relative CaR is the difference between absolute CaR and the average debt service costs. Relative CaR thereby indicates the maximum increase in debt service, e.g., interest, costs for a given year, with a specified probability ("Danish Government Borrowing and Debt," 2010).<sup>22</sup>

Debt managers usually control interest rate risk by establishing strategic targets for risk indicators, such as duration, ATR, and CaR.<sup>23</sup> These targets define the authorities'

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<sup>20</sup> When measuring the likelihood of an outlier day over a 10-year span, the count for the next outlier day begins immediately after it has occurred. Thus, another outlier day may occur again in less than 10 years, perhaps even the next day after the previous occurrence.

<sup>21</sup> These future cost profile calculations are subject to model risk, including from interest-rate formulations.

<sup>22</sup> It should be noted that the calculation of CaR, like VaR, depends on the assumptions used for determining the future values of cost of debt (or the interest rates). As many scenarios would be required to estimate a reasonable probability distribution, a Monte-Carlo Simulation is typically used to deal with the selection "bias" issue of scenarios. However, this presupposes good knowledge of probability distributions and calibration with historical data, as well as availability and good quality of data, which is not always the case in many developing economies.

<sup>23</sup> Some debt managers use either duration, which assumes a market-value approach, or CaR when setting targets for interest-rate risk exposure. However, when derivatives are included in the debt portfolio, both of

preferences about the trade-off between expected cost and risk, enabling them to simplify the communication and monitoring of the risk management strategy. It is important for debt managers to ensure that, even if rates increase significantly, the interest costs remain within the interest rate risk tolerance of the fiscal authorities. Typical analyses in this area, often involving the use of simulations and probability distributions, focus on the following year, but also look into the likelihood of having unacceptable cost increases in any given year. It should be emphasized that analyses cover a broader horizon to ensure that the debt portfolio remains within certain risk parameters for extended periods.

Derivatives, when used appropriately, can help reduce sovereign debt portfolio risks by, e.g., assisting in re-profiling the underlying debt cash flows. However, their use to hedge, e.g., market risks, such as interest rate and foreign exchange (FX) risk, may raise a number of additional needs, as they can influence liquidity risk.<sup>24, 25</sup> Debt managers set limits around risk exposures by applying portfolio-type techniques to asset-liability management and monitoring mismatches periodically. When using options, commonly used measures of exposure are: (1) delta, sensitivity to the price of the underlying instrument, (2) gamma, sensitivity to delta, (3) vega, sensitivity to changes in the volatility of the underlying instrument, (4) rho, sensitivity to interest rate movements, and (5) position size. However, hedging through options is not common in public debt management.

Changes in the value of the exposure are identified using periodic mark-to-market measurement, allowing implicit exposure measurement and evaluation of hedge effectiveness.<sup>26</sup> Portfolio managers are required to determine the extent to which an exposure can be revalued on a daily basis by referencing an active, liquid, two-way market. For debt portfolio risks, VaR measures allow assessment across instruments and correlations among them.

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these interest-rate risk indicators are used. Further, others, e.g., Hungary, use fixed-floating ratios for foreign-currency debt and a duration target plus fixed-floating ratios for domestic-currency debt.

<sup>24</sup> Liquidity risk, related to margin calls, arises from potential liquidity needs to post collateral. However, many sovereigns have one-way CSAs and are not required to post collateral (see also paragraph 103). Although one-way CSAs are widely used, some sovereigns, e.g., Canada, Denmark, have switched to two-way CSAs as a good risk management practice.

<sup>25</sup> It should be noted that the refinancing risk is not influenced by the use of derivatives. In a narrow sense, interest-rate derivatives do not impact the refinancing risk because they do not affect principal payments. Higher interest payments indirectly influence refinancing risk through an increased borrowing requirement. However, direct measures of refinancing risk, e.g., ATM, average life, average refixing period, do not account for derivatives since they look at principal payment only.

<sup>26</sup> Depending on the arrangement with counterparties, a government may have to fund mark-to-market out-of-the-money positions. In cases of derivative collateral postings, they may also need to be incorporated into the liquidity position.



### C. Exchange Rate Risk

From the perspective of public debt management, foreign currency risk is associated with the volatility in exchange rates and its impact on interest and exchange rate cost for the foreign currency debt.<sup>27</sup> For many countries, it is one of the principal risks in a government debt portfolio that need to be appropriately managed.<sup>28</sup> In particular, the FX risk relates to the vulnerability of the government's debt portfolio and the implied debt cost, stemming from a depreciation/devaluation in the external value of the domestic currency, that need to be estimated for budget purposes.

A risk factor is the volatility of the exchange rate, and the extent of the exchange rate exposure of the debt portfolio depends on the magnitude of the changes in exchange rates. The debt manager can affect the exposure by varying the composition of his debt portfolio, but he cannot affect the risk factor: the exchange rate. From this relationship, it is easy to observe that the more the risk factor is transferred into the foreign currency risk, the greater the exposure to foreign currency risk. The following indicator provides a measure to the exposure to this risk:

$$d_t^{fx} = \frac{D_t^{FX}}{D_t} = \frac{D_t^{FX}}{D_t^{DX} + D_t^{FX}} = \frac{\sum_{j=1}^m e_{t,j} D_{t,j}^{FX}}{D_t^{DX} + \sum_{j=1}^m e_{t,j} D_{t,j}^{FX}}$$

where  $d_t^{fx}$  = share of foreign currency debt in the debt portfolio

$D_t^{FX}$  = foreign currency debt

$D_t$  = total debt

$D_t^{DX}$  = domestic currency debt

$t, j, m$  and  $n$  = time intervals

$e_{t,j}$  = exchange rates

An analysis of the mismatch in terms of level and currency composition of foreign currency liabilities in relation to foreign currency reserves can also be used to assess the extent of the government's debt portfolio exposure to foreign currency risk:

$$d_t^{fxr} = \frac{D_t^{fx}}{R_t} = \frac{FX_t}{R_t} = \frac{\sum_{j=1}^m e_{t,j} FX_{t,j}}{\sum_{h=1}^n e_{t,h} R_{t,h}}$$

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<sup>27</sup> Foreign currency debt includes foreign currency-denominated and/or foreign currency-indexed bonds held by domestic investors.

<sup>28</sup> In an SALM framework, debt managers look at the overall sovereign balance sheet foreign-currency exposure, i.e., whether the sovereign has assets denominated in foreign exchange that could be netted against liabilities (natural hedging), or coordinate with sovereign asset managers, typically foreign exchange reserve managers, the management of open sovereign balance sheet foreign-currency positions (see section II.C).

where  $d_t^{fxr} = \frac{D_t^{fx}}{R_t}$  = the ratio of foreign currency debt to foreign currency reserves

$R_t$  = foreign currency reserves. Note that the composition of the foreign currency reserves may differ from that of the foreign currency debt when  $e_{t,j} \neq e_{t,h}$  for any  $h$  and  $j$ .

Because sovereigns with a substantial share of their debt portfolios denominated in foreign currencies assume commensurate exchange risk exposures, they often consider hedging part or all of such positions.<sup>29</sup> However, comprehensively measuring the exchange rate exposure is often not an easy task, given the co-movements between exchange rates and interest rates and the prevailing high correlations among bond markets. In addition to the above indicator, exchange rate risk is typically measured by combining the sensitivity of the debt portfolio to exchange rate changes and the probability of realization of a given exchange rate change.<sup>30</sup>

Accordingly, in managing exchange rate risk, more sophisticated measures to assess foreign currency risk can also be used (see also section II.A.). The Swedish National Debt Office has in the past applied the mean variance optimization framework to determine the optimal foreign-currency debt structure, where the objective of the debt manager is to identify the weights of different currencies in the debt portfolio that minimize the standard deviation of associated costs. The VaR methodology is then used for the active management of the foreign-exchange exposure, which is a small part of the portfolio and, in contrast to the total portfolio, is based on mark-to-market valuation (Swedish National Debt Office, 2003).

The investor base for government debt is also of interest to a country's vulnerability to funding shocks. If a country's debt is held mainly by foreign private investors, the country could become more vulnerable to an external funding shock (a "sudden stop"), even if the debt is denominated in local currency (Arslanalp and Tsuda, 2014). On the one hand, if the foreign-currency debt is held mainly by official investors or investors with home bias, the liquidity risk and foreign exchange risk for the government is diminished.<sup>31</sup> On the other hand, international investors, given the counter-cyclical nature of exchange rates (depreciating in bad times), may lead to a currency depreciation through an external funding shock (Guscina, Pedras, and Presciuttini, 2014). For the case of a potential sudden stop and

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<sup>29</sup> If the goal of a government issuing foreign exchange-denominated debt is to relieve pressure on domestic debt markets, then hedging may not work as intended if it results in the counterparty laying off the exposure in those same markets.

<sup>30</sup> This points to the need to apply a multivariable approach, like simulation.

<sup>31</sup> However, in this case, other risks may become more prominent, e.g., the application of a haircut is much more likely to occur for domestic than for external debt, when a country decides to apply a haircut to interest and/or principal as part of a sovereign debt restructuring.

consequent refinancing difficulties, some governments institute rules that allow them to maintain a reserve cushion for covering maturities due of up to 18 months.

#### D. Funding Liquidity and Market Liquidity Risks

From a public debt management perspective, funding liquidity risk arises from insufficient liquidity in a specific security's market or in a segment of it. In general, funding liquidity relates to the ability of a sovereign issuer to fund its borrowing needs. Typically, the associated risk refers to the volume of available liquid assets being insufficient to meet cash flow obligations and/or a possible difficulty in raising funds through borrowing in the short term (temporarily).<sup>32</sup> It is difficult to always isolate liquidity risk, as it tends to be compounded with other risks, including contagion risk.

From an investor's perspective, there is a financial entity's liquidity risk, with a corresponding measurement. The most basic measure of a financial entity's liquidity risk is the liquidity gap. This static measure is simply the short-term liabilities net of sovereign liquid assets, but this requires extensive information on mismatches between the timing of payments and the availability of cash (Lienert, 2009). This simple test for liquidity risk looks at future net cash flows on a day-by-day basis, and singles out any day that has a sizeable negative net cash flow.<sup>33</sup> Another measure of an entity's sovereign liquidity risk is the liquidity risk elasticity.<sup>34</sup> This measures an entity's sensitivity to a change in the liquidity premium (which represents the amount of compensation required by a lender for lending at the long end of the market, or, irrespective of the tenor, the additional spread on bonds that are not benchmark size, i.e., large enough volume for secondary-market trading to occur). The liquidity risk elasticity of a portfolio of exposures is calculated according to the following formula (Culp, 2001, pp. 424–429):

$$\frac{\delta NV_t}{\delta \Xi_t} = \frac{\delta V_t}{\delta \Xi} - w \times \frac{\delta L_t}{\delta \Xi_t}$$

where  $NV_t$  = the current value of net assets, and  $V_t$  and  $L_t$  = the current values of assets and liabilities, respectively;  $w$  is the proportion of liabilities funded with assets.

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<sup>32</sup> The sovereign funding liquidity risk should be distinguished from the sovereign solvency risk, which arises from a possible inability to raise funds for a long time (permanently).

<sup>33</sup> Instead of being on a day-by-day basis, this could also be in maturity buckets, e.g., 0–1m, 1–3m, 3–6m, etc., or be based on when actual flows are due to be received/paid.

<sup>34</sup> Alternatively, the survival period, i.e. how long can the entity survive without access to markets/refinancing, can be considered.

$\Xi$  = the liquidity premium on the sovereign's funding cost, often defined as the difference between long-term and short-term nominal interest rates on the same credit-rating yield curve for a given date. (Alternatively, liquidity premium is defined as the amount that forward interest rates exceed expected future spot short-term interest rates.<sup>35</sup>) (Papaioannou, 2006).

Further, market liquidity of sovereign instruments, i.e., the ability of trading a sovereign's securities in the markets, is widely recognized as a multidimensional concept that is difficult to capture with a single indicator. It is described by a variety of metrics, including traded volumes, turnover ratios, bid-ask spreads, bid-ask spread over duration, volatility of volumes and costs, distortions in the interpolated yield curve, specialness in the repo market, and yield spreads between government bonds and government-guaranteed agency bonds where available. In certain jurisdictions where highly-liquid bond repo and futures markets exist, bonds in some maturity segments benefit from liquidity premia owing to their eligibility to be delivered for repo and futures contract.

In practice, the liquidity effects in government bond markets are often assessed on the basis of comparisons of yield curves that are estimated for different potential liquidity measures, including issue size and bid-ask spreads.<sup>36, 37</sup> However, some cross-country studies indicate that relative liquidity cannot explain the size of the yield spreads among different issuers (Bangia, Diebold, Schuermann, and Stroughair, 1999; and Neofotistos, 2002). This implies that factors other than liquidity effects, like credit risk, are important drivers of cross-country yield spreads. Other empirical studies of liquidity have focused on time spans of a year or less. Traditionally, daily spreads, and transaction activity on individual bonds (or averaged over several bonds) traded in a specific exchange, have been studied for a specified historical period.

An additional indicator is the Investor Base Risk Index (IRI), which reflects the likelihood of sudden outflows by different types of investors in the sovereign investor base. The IRI is constructed in three steps: (1) historical correlations between changes in investor holdings and bond yields, (2) risk scores for each investor based on the previous correlations, and (3) investor risk index by assigning an aggregate score to the investor base (Arslanalp and Tsuda, 2012). Although the IRI provides important insights into the management of refinancing risk, i.e.,

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<sup>35</sup> In applying this definition, one should be careful to use only homogenous securities in the construction of the yield curve. For example, if a bond is subject to withholding tax, the yield on such a bond is likely to be different (i.e., higher), and one would not want to mix this with bonds not subject to withholding tax. Also, bonds that are callable/puttable should not be combined in a yield curve in which we aim to determine the "clean" liquidity premia for an issuer.

<sup>36</sup> As mentioned before, the concept of liquidity has different meanings, including cash availability by maturity and tradeability or liquidity by instrument. These concepts are also measured differently.

<sup>37</sup> It is often argued that the bid-ask spread is only one aspect of liquidity. The volume of debt at the bid-ask price that can be achieved without distorting the market is considered to provide a better indication of the true liquidity conditions.

relative tolerance for debt maturing in concentrated periods, a high reading of this index is also associated with emerging market liquidity difficulties.

### **E. Sovereign and Counterparty Credit Risks**

From an investor perspective, sovereign credit risk often relates to the ability and/or willingness of a central government to service its debt, which directly affects the value of an investment portfolio. In particular, for bonded debt, it arises from the potential of a bond default when a sovereign fails to make a scheduled payment. Typically, as governments accumulate more debt, the perceived ability to repay debt holders is reduced. Some researchers argue that for emerging-market countries, the threshold level of total net outstanding government debt to annual Gross National Product (GNP) is below 40 percent, while that for developed economies may exceed annual GNP (Reinhart, Rogoff, and Savastano, 2003). The associated credit risk, reflected in a sovereign's credit rating, credit premia, and CDS spreads, is difficult to be managed by debt managers. However, this risk becomes relevant to debt managers as it will determine respective bond yields and borrowing costs. These impacts tend to be more pronounced for non-reserve currency sovereigns. In addition to sovereign credit ratings, sovereign credit default swap (CDS) spreads, and the spread to core-sovereign, the contingent claims approach (CCA) is widely used to measure sovereign credit risk (Gapen, et al, 2008 and Papaioannou, 2006).<sup>38</sup>

Another type of credit risk that is relevant to debt managers is the counterparty credit risk, most notably relating to a derivative contract, which depends on the probability of the counterparty defaulting, the size of the future potential exposure, and the recovery value in the event of default.<sup>39</sup> The size of the exposure is typically only a small proportion of the notional amount of the underlying contract, but can change substantially over the life of the contract as the underlying asset prices and the perceived probability of a counterparty defaulting change. Further, even if the price of the underlying asset (liability) does not change, the counterparty credit risk varies with certainty in the case of a change in the price of the derivative. For example, a plain vanilla interest rate swap, through which an issuer hedges a floating-rate note by swapping its floating-rate liability into a fixed-rate one over a specified period, generates a changing credit exposure when interest rates vary even if the price of the underlying liability does not change (because credit spreads have not changed—

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<sup>38</sup> It should be mentioned that indicators of the credit risk of a borrower that are embedded in its bond yields, such as the asset swap spreads and the z-spreads, are also used, as well as associated relative value analyses. Although CDS spreads are important credit risk indicators, the quality of information they offer is not free from shortcomings, particularly for measuring sovereign credit premia of major economies, as a number of the banking counterparties that have sold the credit protection are likely to be also insolvent in case of a sovereign's default. Also, asset swap spreads and z-spreads are critical in implementing strategies that address the rollover/refinancing risk (see also III.A).

<sup>39</sup> Counterparty risk may also occur through settlement risk, especially when screening of the ability of buyers to take delivery of the securities is overlooked.

in fact, the price of a floater is not affected by interest rate movements but by credit/liquidity spreads movements). Further, the counterparty risk depends on the extent to which any collateral (which affects recovery) is correlated with the likelihood of the issuer defaulting.

When a sovereign utilizes derivatives, margin calls largely mitigate associated counterparty credit risks. A typical prerequisite for entering into non-centrally cleared derivative transactions is the signing of ISDA and collateral agreements.<sup>40</sup> In this framework, as derivatives transactions require collateralization, the impact of these risk exposures on collateral posting (signed through an ISDA Credit Support Annex with bank counterparties) and the implicit cost of increased levels of collateral should be closely monitored. It should be noted that exposures can change fairly dramatically and in a very short time. For example, when a country is downgraded and experiences problems, daily derivative exposure may swing considerably, especially as it may also be adversely impacted by broader market conditions and ISDA-related Additional Termination Events (ATE) and Independent Amount triggers.

Debt managers also face counterparty risk if they are managing liquid assets or lending to other entities. In general, depending on the type of counterparty (e.g., sovereign government, corporation, individual) and the type of obligation (e.g., government bonds, corporate bonds, derivatives transactions, lines of credit, loans), credit risk takes different forms and, therefore, is assessed and managed differently (Bank for International Settlements 2000).<sup>41</sup> Quantitative models enable the calculation of capital (or collateral) necessary to absorb unexpected credit losses at a targeted confidence level. Pricing of credit risk is similar to pricing traditional insurance frequency and severity risk (see CreditMetrics, CreditRisk+). Traditional models usually evaluate the expected loss on an asset or a portfolio of assets by taking into account (in a functional form) the relevant exposure (credit exposure) and uncertainty (default probability and recovery rate in the event of a default) (Culp, 2001). In a risk management framework, the reduced form formula is used to estimate credit risk related losses:  $\text{Expected Loss} = \text{Default Probability} \times \text{Credit Exposure} \times \text{Expected Loss Given Default}$ .

## F. Contingent and Fiscal Risks

Guarantees and other contingent liabilities represent potential financial claims against the government that have not yet materialized, but that could trigger a financial obligation or liability under certain circumstances.<sup>42</sup> A new financial obligation or liability has a direct

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<sup>40</sup> However, some short-term derivative transactions of central banks and MoFs, e.g., swaps up to 1-year, have been done without an ISDA.

<sup>41</sup> The public debt manager is usually not responsible for managing credit risks from lines of credit and loans or from payouts of contingent liabilities, which are typically the responsibility of a country's treasury.

<sup>42</sup> Bova, et al. (2016) have constructed a dataset on the cost and frequency of contingent liability events.

impact on the debt portfolio and can impact the borrowing plan. Debt managers might need to ensure that the impact of risks associated with contingent liabilities on the government's financial position, including its overall liquidity condition, is taken into consideration when designing debt management strategies. For example, this could be done by factoring a portion of the contingent liabilities into the projections for future borrowing requirements that are made for the medium-term debt management strategy. Similarly, it is advisable that debt managers be aware of the explicit contingent liabilities that the government has entered into and understand the potential magnitude and conditions that could trigger implicit contingent liabilities.<sup>43</sup>

Contingent liabilities (CLs) may crystallize into actual liabilities to the government following events in the parties whose obligations are guaranteed, such as debt default, insolvency, or insufficient revenues. CLs can be grouped broadly into two categories:

- *Explicit.* CLs may reflect payment commitments stipulated in a contract or by law. The most important are often guarantees for borrowing and obligations of the state-owned enterprises (SOEs).<sup>44</sup> Although SOEs pose typically the greatest risk, other forms of public guarantees, e.g., contract performance of certain infrastructure projects, entail similar CL risks.
- *Implicit.* CLs arise from possible default on non-guaranteed obligations, as well as from systemic shocks. In such cases, contractual or statutory obligations are lacking, but the government faces a high cost of not providing financial support, whether it is done for financial, "moral," or "political" reasons. These include disaster relief, defaults on non-guaranteed debt of SOEs, local government units, and financial or corporate sector bailouts.

CLs have many of the characteristics of government debt, and if triggered, they will directly add to public debt. In the case of loan guarantees, the obligation of the guarantor is to honor the payment obligations in the event the borrower defaults and thus it constitutes a credit risk. In such a case, the creditor owns a put option on the guarantor since the creditor has, in effect, a put option to sell the guaranteed debt to the guarantor at an agreed price, that is, the face value of the debt. If the put option is then exercised, the guarantor normally has recourse to the beneficiary and can demand the amount in question. This translates into a risk representing a financial loss to the debt manager, whose loss may be mitigated by collecting premiums from guarantee beneficiaries through the establishment of a contingency reserve

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<sup>43</sup> Measures to reduce exposure to implicit contingent liabilities may include strengthening prudential supervision and regulation, introducing appropriate deposit insurance schemes, undertaking sound governance reforms of public sector enterprises, and improving the quality of macroeconomic management and regulatory policies.

<sup>44</sup> On-lending, in giving rise to a "contingent failed asset," is substantively similar.

fund that is financed by the fees received by the guarantee recipients and/or the budget.<sup>45</sup> Equally important are guidelines and safeguards to limit such risks ex ante by having a sound policy to ensure adherence to sound legal and fiscal principles (Box 1).

Arguably, explicit CLs, especially loan guarantees, may be the most frequent type of indirect liability, but implicit CLs are often the most costly and include bailouts of SOEs, banks, and local governments, as well as natural disasters. CLs can significantly add to a government's balance sheet risk inasmuch as they imply additional leveraging and tend to be triggered in times of financial stress, with realized costs having a major impact on a country's fiscal position and debt sustainability.

Fiscal risks arise from macroeconomic shocks and the realization of CLs.<sup>46</sup> Risks associated with sovereign debt are one example of fiscal risks to which governments are exposed. Debt servicing costs can deviate significantly from expectations as a result of shocks to interest rates and exchange rates. However, there are many other sources of fiscal risks (Table 1).

Actions to better identify fiscal risks from CLs,<sup>47</sup> including the call for increased information on the financial health of SOEs, are critical and is often seen within a broad set of key policy processes that the government might consider to better manage CLs:<sup>48</sup>

- *Creating a general policy for government exposure to CLs:* this includes identifying the types of risk to cover, the circumstances in which a guarantee, rather than a loan or subsidy, is justified, and what entity within the government is best placed to bear such risk. Guidelines are expected to be based on a clear framework for roles and responsibilities, especially with regards to who has the authority to decide on issuing guarantees, what types of risk would be accepted by the government, minimum requirements for project support, risk-sharing, and fees policies.

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<sup>45</sup> These reserve funds often serve as self-insurance against calls on guarantees.

<sup>46</sup> For the purposes of this study, fiscal risk is defined as the possibility of deviations of fiscal outcomes from what was expected at the time of the budget or other forecast. In this context, the fiscal risk affects the overall funding needs of a sovereign.

<sup>47</sup> In countries where the majority of the debt has been issued by SOEs, contingent risks are the most important type of risk and countries should be aware of it. While the benefits of using SOEs to develop and diversify the economy, including efficiency gains, may be clear, the risks relating to the debt issued by SOEs that may come back to haunt the sovereign are not always easy to identify and measure. These risks cut across all traditional indicators used to measure and manage other sovereign debt and add to possible fiscal sustainability and financial stability considerations.

<sup>48</sup> The third pillar of the IMF's Fiscal Transparency Code, 2014a, focuses on fiscal risks and provides a set of practices for assessing, quantifying and communicating each element of fiscal risks.



- *Ensuring budgetary transparency and discipline:* explicit CLs should be identified, registered, and disclosed. The expected cost and maximum probable loss should also be quantified.<sup>49</sup> Good practice is to include a provision within the annual budget to meet estimated sums falling due for payment in the fiscal year. Some of the costs and risk of CLs will be correlated: problems for one SOE will generate problems for another, and this interaction (i.e., structural dependencies) can be analyzed within a portfolio approach.
- *Applying financial risk management:* the main risks affecting CLs are similar to those affecting other assets and direct liabilities (for example, macroeconomic volatility).<sup>50</sup> Consequently, the techniques for quantifying CL risk can be similar to those used for estimating risk of other balance sheet items. Through the same processes, methodologies can be designed for pricing guarantees and charging risk premiums.<sup>51</sup>

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<sup>49</sup> In a probabilistic sense, the expected cost should be less than the maximum probably loss.

<sup>50</sup> Potential GDP declines, which feed through the fiscal account, may constitute the largest macroeconomic risk for sovereigns (see IMF, 2016a).

<sup>51</sup> For the IMF's new fiscal stress test framework, see IMF, 2016a.

**Table 1. Sources of Fiscal Risks**

<b>Source of Obligation</b>	<b>Direct Liabilities (certain)</b>	<b>Contingent Liabilities (contingent on future events)</b>
Explicit liabilities (legal obligation)	Foreign sovereign borrowing Domestic sovereign borrowing Other direct borrowing (e.g., from the social security fund) Current committed budget expenditures (may include direct subsidies/transfers to SOEs) Legally mandatory future expenditures (e.g., social and health insurance schemes)	Guarantees for subnational governments and SOE obligations Guarantees for SOE fiscal performance (e.g., electricity uptake) Guarantees for policy banks' borrowing (Development Bank) Guarantees for trade and exchange rate risks Guarantees for private investments (PPPs) State insurance schemes (e.g., on bank deposits, private pension funds, crop failure, flood, war)
Implicit liabilities (public/political choice)	SOE arrears to the government Future public pensions, social security schemes, health care financing (if not required by law) Future recurrent cost of public investments	Default of subnational governments and SOEs on non-guaranteed debt and other obligations Default of banks (support beyond state insurance) Failure of non-guaranteed pension funds or other social security funds Natural disaster relief, environmental recovery disaster relief, military financing

Source: Polackova, 1998.

Debt managers often monitor the risk exposures arising from explicit contingent liabilities, and ensure that they are well informed of the associated risks of such liabilities.<sup>52</sup> They tend to be also conscious of the conditions that could trigger implicit contingent liabilities, such as lax supervision and other policy distortions that could lead to poor asset and liability management (ALM) practices in the banking sector and public enterprises with liquidity or even solvency implications. Moreover, debt managers typically ensure that the impact of risks associated with contingent liabilities on the government's financial position, including its overall liquidity condition, is considered when designing public debt management strategies (IMF, 2014).

<sup>52</sup> A significant portion of CLs that governments face relates to direct government mortgage lending/guarantees.

### **Box 1. Selected Elements of Credit Guarantee Policy<sup>53</sup>**

#### **Determining the appropriate means of support**

To determine what would be the most appropriate form of government support for the proposed beneficiary and activity, the following general principles could be applied:

- *Budget support*: If the support is initiated on social grounds and is not expected to deliver a positive cash flow, funds would be made available through the budget.
- *On-lending*: If the beneficiary is a general government entity, and the project is expected to generate a positive cash flow, funds would be made available as credits (on-lending).<sup>54</sup> For on-lending, a market interest rate reflecting the credit risk could be applied. However, if on-lending is extended to sub-nationals or to SOEs, the viability of both the project and the entity should be ensured.
- *Government guarantee*: If the beneficiary is an individual person, a private company, a public company or a subnational government outside the general government sector, and the following criteria are met, a government guarantee would be considered:<sup>55</sup>
  - The project is considered important, from a public policy perspective, and is expected to generate a positive rate of return for the project sponsor considering any costs associated with the guarantee.
  - The beneficiary is considered financially viable at the time of issuance, based on a sound assessment of the beneficiary's financial past performance and future prospects.
  - The project may not be able to be financed at a reasonable price without a government guarantee. This could include large-scale projects that require long-term financing, projects involving appreciable political risks, and projects that are difficult for the market to assess due to their unique character.

#### **Conditions and terms of government guarantees**

- The issuance of a government guarantee should be based on a comprehensive risk assessment that is documented in a report; the borrowing cost of the underlying guaranteed loan should reflect the borrowing cost of the government.<sup>56</sup>
- A credit risk fee reflecting the difference between the borrowing cost of the government and the borrowing cost of the beneficiary without the government guarantee being typically applied.<sup>57,58</sup>
- The guarantee should be time-bound and related to a project.
- The terms of the guarantee should be so as to minimize the fiscal risk for the government to the extent possible, and should grant the government the right to appropriately monitor, control, and recover the fiscal risk.<sup>59</sup>
- The terms of the guarantee should comply with applicable legal frameworks, including domestic and international legal instruments, such as EU state aid rules.

#### **Financial planning and budgeting for guarantees**

Government guarantees should be well integrated with the macro-fiscal framework and the annual budget. The following principles apply to the financial planning and budgeting for guarantees:

- Considering that government guarantees present a potential claim to the government, the total amount of outstanding guarantees should be subject to an overall limit in line with macro-fiscal objectives and a sustainable level of debt. If the limit on guarantees is not part of the budget code, the government could propose a limit as part of the budget proposal for Parliament's approval.
- A provision for potential payments for called guarantees should be included in the contingency of the Ministry of Finance's budget. The amount to be taken into account should be based on a regular risk assessment of the portfolio of government guarantees.
- Guarantee fees should be transferred to a notional special fund, and payments on called guarantees could be paid out of the notional special fund.

- If guarantee fees are exempted in part or in full, a corresponding provision is usually included as expenditure in the budget of the sponsoring ministry within its expenditure ceiling, and transferred to a notional fund.
- Estimates of potential losses for implicit contingent liabilities should be included as part of the notes to the budget. Also, some estimate of the likelihood of the occurrences of the events leading to losses associated with the implicit contingent liabilities should be detailed.
- Reporting on guarantees to Parliament and to the public should be comprehensive and on a regular basis.
- The required resources, both in terms of human capital and systems, should not be underestimated.

Source: Authors.

## **G. Legal Risk**

Debt managers face various legal risks, ranging from uncertainty related to legal actions to the applicability or interpretation of contracts, laws, and regulations.<sup>60</sup> Legal risks may also arise from weaknesses in the legal framework for debt management, as well as from lapses in compliance with relevant substantive and procedural legal requirements for debt

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<sup>53</sup> The credit guarantee policies discussed here do not include public-private partnerships (PPP) schemes and other guarantees.

<sup>54</sup> This term is also used when lending is extended to financial intermediaries, for the purpose of on-lending and end-borrowers.

<sup>55</sup> Guarantee and on-lending can sometimes substitute each other, with a main difference centering around their accounting treatment, i.e., whether to record in the government debt accounts or not. In most cases, governments prefer to record a guarantee in the beneficiaries' accounts since the individual and/or consolidated reporting of public sector entities' debt is weak in many countries. Also, legally, the government as a guarantor has no debt claim against the borrower until the government has honored the guarantee upon the request of the creditor. In the case of on-lending, the government would have a direct debt claim against the borrower.

<sup>56</sup> Because of the guarantee, the presupposition is that the bank would not charge the borrower a risk margin that it would otherwise charge. However, this would not necessarily mean that the borrowing cost will be the same as for the government, as banks' funding costs need to be covered by interest rate charged.

<sup>57</sup> The guarantee fee could be based on a comprehensive risk assessment, while it may sometimes be difficult to determine this difference owing to insufficient data points on the yield curve for the SOE.

<sup>58</sup> Although risk-based fees would, on average, match expected costs to the government, there are reasons, including for minimization of moral hazard, to require individual beneficiaries to post collateral or ensure that a guarantee covers only part of the overall exposure, so that beneficiaries retain some exposure when the guarantee is granted.

<sup>59</sup> No acceleration of repayment can be considered in the event of lack of performance of the underlying borrower. This can mitigate risk to the government as payment terms remain the same and the government is not faced with a large financing need at a time of crisis.

<sup>60</sup> However, some debt managers do not typically consider legal risk management as a liability management operation, or part of their mandates, but rather a responsibility of the legal division of their DMOs/DMAAs.

management, e.g., compliance with the terms of issuance or with applicable legislation regarding the procedures used for such issuance. Further, debt managers could face legal risks in the context of broader legal claims resulting in judgments or arbitration awards against the government and implications for the sovereign balance sheet. In this context, bond contractual provisions should be able to provide sufficient protection and flexibility to a country. Although sovereign bonds, particularly international sovereign bonds, often contain a number of provisions that, depending on their drafting, offer protection to the sovereign vis-a-vis its creditors, e.g., CACs, particularly aggregated CACs, there are also provisions that could present legal risks depending on their scope, e.g., waiver of immunity, events of default and cross-default, and interpretation, e.g., of *pari passu*. Other aspects, such as interest rate conventions, e.g., the use of indexation to inflation, currencies or commodities, authority to enter into contractual agreements, or compatibility of terms with legislation are crucial principles that must be carefully monitored (Box 2).

### **Box 2. Legal Risks—Argentina and Belgium**

The recent case involving the Republic of Argentina illustrates legal uncertainty regarding interpretation of the *pari passu* clause that is widely used in sovereign debt contracts. According to a conventional reading, its purpose is to ensure that no priority ranking is established for unsecured creditors (Buchheit and Pam, 2004). By contrast, in 2013, the sitting judge, following an earlier Belgian case, interpreted the *pari passu* clause as an obligation by Argentina to make rateable payments to the creditor each time it pays its restructured bondholders. More specifically, the U.S. District Court’s injunctions forbid any financial intermediaries from collaborating with Argentina in paying exchange bondholders unless they are notified that the holdouts have received rateable payment. Argentina settled with its holdout creditors in 2015, and subsequently rulings of the New York courts have to an extent limited the interpretation of the decisions to the specific “course of conduct” of Argentina.

In the early 1990s, the Belgian Treasury and several investment banks entered into a set of complex derivative trades—structured currency options—that took advantage of the expected convergence in the foreign exchange and interest rate levels of the currencies of the future Member States of the European Monetary Union. These transactions, which combined currency and interest rate swaps and foreign exchange options, and were sometimes integrated into leveraged structures, had no link with the management of risks in the debt portfolio, but had the objective of generating financial profits. From mid-1992 and onward, the trades began to show a large marked-to-market loss, raising two legal issues in the process: first, whether the trades were valid ones in view of their speculative nature and second, whether the banks had disclosed the risks of the transactions in a way commensurate with the level of sophistication of the Belgian Treasury. While the latter issue was settled out of court with an investment bank reportedly paying around \$100 million, the first one could not be addressed, because there was no provision in the Public Debt Law at the time that required the prudent management of the risks in the debt portfolio. This indicates the need for the explicit mentioning of whether derivative transactions are allowed or not in the national public debt laws.

Source: *Spink and Magee, 2013; and United Nations Conference on Trade and Development (UNCTAD), 2015.*

## **H. Operational Risk**

“Operational risk” refers to a wide variety of risks faced by debt managers that can disrupt debt service. Unlike market or credit risk, operational risk is mainly endogenous to the debt management office (DMO) (Storkey, 2011). It includes transaction errors in the various stages of executing and recording transactions; inadequacies or failures in internal controls,

or in systems and services; insufficient expertise of staff; reputational risk; security breaches; terrorism; and natural disasters that affect a debt manager's ability to operate its ongoing business processes.<sup>61</sup>

As the operational risk is linked to the scope of a government's debt activities and has multiple sources, it cannot often be easily identified, measured, monitored, and reported. Even in a less-advanced debt management environment, operational risks may be substantial due, for example, to mishandling of transaction data, databases and spreadsheet-computations, or mismanagement of key personnel and disruption of routine processes. However, once a debt portfolio becomes increasingly complicated, for example, with the use of derivatives, it requires a transition to more comprehensive risk management and integrated debt management systems that can process such transactions and maintain control of the debt portfolio structure. In general, the more complex the debt portfolio becomes, the higher the operational risk if clear operational instructions are not in place and, thus, the greater the need to develop an appropriate operational risk management system.

An Operational Risk Management Framework (ORM) will take time and effort to identify the risks and adopt the mitigation techniques in a constantly-changing environment. It requires a culture of risk awareness and understanding of senior management since operational risk needs to be made clear to all staff and embedded into day-to-day operations of treasury (Storkey, 2011).

## **II. SALIENT FEATURES OF A SOVEREIGN DEBT PORTFOLIO RISK MANAGEMENT FRAMEWORK**

### **A. Decisions on Overall Debt Portfolio Structure**

In deciding on the overall debt portfolio structure, the debt manager needs to evaluate a number of borrowing strategies over the horizon of the analysis. This analysis requires detailed information on the current debt portfolio and its risk, information about the expected path of the primary balance, including anticipated government revenues and expenditures and economic growth. When preparing the analysis, the debt manager would typically assess the debt management strategies under the constraints and future scenarios for the primary balance and market rates previously determined. S/he would also want to be aware of any vulnerabilities among primary dealers (see Appendix 2) and of liquidity squeezes, in particular relating to the repo market. The strategies' cost and risk performance would then be evaluated under relevant risk/stress scenarios (IMF-World Bank, 2009). The debt management strategy selected would provide the short- vs. long-term mix and diversification

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<sup>61</sup> For foreign currency-denominated debt, additional operational risks relate to possible mishandlings by the foreign paying agent, the foreign clearing house and the foreign custodian agent.

of investor base, along with the debt portfolio risk indicators, or strategic benchmarks, that define the desired debt structure and provide guidelines for the strategy's implementation.<sup>62</sup>

The use of efficient frontier analysis can provide valuable information for debt managers when determining the cost and risk tradeoffs, although debt portfolio optimization for sovereign debt managers has not been widely applied. A strategic benchmark for debt managers reflects the portfolio structure that the government would like to have for its debt portfolio. As opposed to an asset manager, a debt manager will not base the portfolio structure on views about relative prices, but will reflect the government's preference on the tradeoff between expected cost and risk (Wheeler, 2004).<sup>63</sup> A common problem encountered in debt management is *ex ante* performance measurement, because measurement against market indices is not possible, i.e., defining an *ex ante* reference point.

To determine the strategy for the overall debt portfolio structure, debt managers can apply various techniques, but need to take into account several practical considerations. The broad debt management philosophy and goals, such as tolerance for debt service volatility, and exchange rate and debt sustainability considerations, should be reflected, as well as the formation of a yield curve with appropriate liquid benchmark maturity points. The strategy would also be subject to constraints faced by the debt manager in terms of market access, domestic debt market development, and availability of hedging instruments.<sup>64</sup> Finally, the strategy should be robust under a wide range of economic scenarios and time horizons because a strategy that is dependent on a few key assumptions may need to be frequently revised or the debt manager could be forced into frequent changes in direction (Wheeler, 2004).

Stochastic analysis can be helpful to simulate yield curves and to estimate pricing within the period that is being considered. This is particularly important for cost and risk simulations where the portfolio is stress-tested under various conditions, such as by applying a CaR

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<sup>62</sup> Debt managers, especially from LICs, face sometimes funding and political challenges that prevent them from consistently applying a debt management framework, even when there is internal consensus and clear policy directives. Typically, these challenges relate to yearly funding needs being pre-committed or programmed by future disbursements on current loans/projects. This practically renders the debt management function passive and relegates portfolio cost and risk optimization issues to a mere debt guideline formality. Although it may be argued that such challenges could be prevented at the loan or project inception, experience (political reality) has shown that turning down, for example, a large infrastructure loan on grounds of debt-portfolio risk management is very slim.

<sup>63</sup> Nevertheless, there are asset managers that assume efficient markets and base their portfolio structure on the selection of systematic risk and asset co-variation, as well as their risk and return preferences. Also, some debt managers base their portfolio structures to at least some extent on views about relative prices. The SNDO, for example, takes active positions in the management of the foreign currencies.

<sup>64</sup> Lack of hedging instruments by banks, especially with regards to exchange rate risk, leaves limited scope for sovereign debt portfolio transformation, particularly into local currency exposure.

analysis to quantify the interest rate risk on the government debt (Bolder, 2003; Papaioannou, 2009). In such an application, deterministic scenarios of the future development in interest rates are simulated combined with a stochastic simulation of interest rates (United Kingdom DMO, 2006).<sup>65</sup> On this basis, the expected future interest costs on the debt and the related interest rate risk can be calculated. The risk is calculated as the highest costs or the largest increase in costs that can be expected with a set probability level. The calculations are made subject to various strategic assumptions concerning the government debt policy. For example, the cost and risk profile for various duration objectives is calculated. The choice of a particular duration objective thus reflects a weighing of costs against risk that is deemed appropriate (Danish Government Debt, 2002, p.73).<sup>66</sup>

### **B. The Application of Market-Based Indicators in Debt Management**

Market variables for measuring interest cost and exchange rate risk of debt stocks have not yet been fully adapted by debt managers. Although it is widely accepted that market-based indicators provide very useful information to investors,<sup>67</sup> some debt managers have chosen, for example, not to rely on duration or “modified” duration for setting debt portfolio targets.<sup>68</sup> A fundamental shortcoming of the duration measures cited by debt managers is their dependence on the level of discount rates used—other things being equal, duration falls (rises) when the discount rate rises (falls). This poses a problem because the same borrowing strategy can be assessed differently depending on the selection of the discount rate applied.<sup>69</sup> Debt managers using market interest rates as discount rates could experience a varying duration, even when the portfolio structure remains unchanged. More important, debt managers following a duration target would be forced to extend the debt portfolios duration and lock in long-term rates when rates are high, although it might be argued that the debt manager could actually do the opposite. Various approaches have been used by debt managers

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<sup>65</sup> Methodologically, CaR is related to VaR, which expresses the maximum decline in a portfolio’s market value with a given probability over a given, typically relatively short, period.

<sup>66</sup> Other less-complex methods include the Medium-Term Debt Management Strategy (MTDS) framework and Sovereign Asset-Liability Management (SALM) analysis.

<sup>67</sup> It is recognized that investors have general greater flexibility in managing more actively a portfolio than debt managers.

<sup>68</sup> As mentioned earlier, duration measures risk associated with the value of the debt, whereas debt managers are more concerned with impacts on the budget, i.e., annual payments. Thus, duration is not generally used because the market value of debt may not be particularly relevant for a debt manager who looks at cash flows (unless buybacks or derivatives with margin calls are considered).

<sup>69</sup> Changes in the discount rate used cause most of the variability in duration measurements.



to mitigate this effect, including the use of a fixed discount rate or simpler risk measures, such as the share of debt portfolio that is subject to repricing over a set period.<sup>70</sup>

Full adoption of market-based indicators by debt managers might require an alternative way to present sovereign liabilities that would apply an economic value on the outstanding debt portfolio and account for changes in valuation.<sup>71</sup> However, sovereigns applying cash budgeting do not account for the economic value of their debt.<sup>72</sup> Accrual accounting principles, such as those recommended by the International Public Sector Accounting Standards (IPSAS) and International Organization of Supreme Audit Institutions (INTOSAI), do not capture market valuations but include accrued interest rates in the case of accrual accounting standards. Further, accounting for derivatives on sovereign balance sheets has become more advanced with the application of market valuation on those positions. This has had spillover effects for bond debt because back-to-back swaps may trigger market valuation of the underlying debt position as well. Thus, the universe of accounting varies and includes cash or accrual accounting, as well as national accounting standards and harmonized standards such as the ESA 2010, but none of the standards fully reflects market valuation of liabilities.

Comprehensive guidance for debt managers on how to choose the optimal interest rate and currency structure for their external debt is not yet established.<sup>73</sup> Theoretical approaches point to the relationship between exchange rate volatilities and covariances and domestic fundamentals, where practical implementations are not straightforward (Melecky, 2007). Of principal concern is, however, the correlation between debt charges and the domestic primary balance. This probably practically boils down to the relationship between domestic output and the exchange rate, in other words, the potential for the spillover of the volatility of debt service cost into budgetary volatility that is of concern to a government. Operational rules

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<sup>70</sup> For example, Denmark, which still uses Macaulay duration as a strategic target, introduced in 2003 a methodological change in its calculation by using a fixed rather than a floating discount rate. This brought the indicator closer to an average time to re-fix measure, thus insulating the indicator from market volatility. However, the Swedish National Debt Office changed in 2015 from an adjusted duration measure (basically duration with a fixed discount rate equal to zero) to a standard duration measure, using market rates as discount rates, as had also done in the past (Swedish Ministry of Finance, 2014 and 2015; Swedish National Debt Office, 2015 and 2016).

<sup>71</sup> Debt managers adopt market valuation to be able to better assess the riskiness of the public debt portfolio and undertake relevant risk management, as needed. For example, market valuation of a portfolio instrument is important in debt buybacks and exchanges.

<sup>72</sup> The cash approach gives rise to the accounting standards. Debt liabilities in the European System Accounts (ESA) 2010 are measured at market value (unlike Maastricht that considered face (nominal) value).

<sup>73</sup> Some countries have developed targets related to GDP or budget balance, i.e., if budget is more healthy, higher risk on debt is allowed. Others have developed a “neutral,” least volatile reference point of the yield curve, with all maturities being swapped to that point.

employed by governments that borrow in foreign currency appear to be generally consistent with this logic. A country may do better, for example, by merely attempting to minimize volatility of debt service costs without explicit consideration of its primary balance. Or, alternatively, it may make sense to match the foreign currency composition to the currency profile of the country's export revenues or reserves.

The optimum currency composition of debt is often determined by a quantitative optimization exercise.<sup>74</sup> This takes into account both the minimization of projected debt servicing costs and maximization of the risk-adjusted return of the country's assets (in particular, international reserves<sup>75</sup> and projected primary balances) subject to constraints regarding specified risks and the country's asset-liability structures. This approach, in essence, espouses the view that the currency composition of the debt (liabilities) should closely match that of the assets in a sovereign's balance sheet (Das, et al., 2012).<sup>76</sup> Another approach links the optimum currency composition with the relationship between traded and non-traded goods in GDP. This rule, followed by Uruguay, provides good protection against exchange rate volatility.

### **C. Adoption of a Sovereign Asset and Liability Management Approach**

The term "asset liability management (ALM)" is well understood in the context of financial institutions, but not as much in a sovereign setting. ALM is conceptually different for governments as (1) most governments do not compile a full statement of financial positions (balance sheet), thus being difficult to directly observe all assets and liabilities; (2) many government assets are tangible in nature (for example, land, building, plant), consequently not lending themselves to analysis of financial risk; (3) a government's main asset is its ability to tax, which is not directly related to its balance-sheet financial items; (4) the government is a large player in the domestic economy and domestic financial markets; and (5) the government has public policy objectives beyond portfolio risk-return optimization.

Sovereigns are susceptible to various risks and uncertainties relating to their financial assets and liabilities, depending on the country's level of economic and financial development. These risks, if realized, could cause a significant fiscal and financial drain and a consequent fall in the country's domestic absorption and potential output, besides affecting the balance of payments. To help identify and manage effectively the key financial exposures, a

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<sup>74</sup> Some argue that an efficient frontier is more appropriate, as for each level of risk there is a theoretical least cost. However, judgment still needs to be made about the acceptable level of risk.

<sup>75</sup> If the central bank legally owns the international reserves, i.e., are on its balance sheet, this assumes that it will transfer part of the returns to the budget, as envisaged in the profit distribution rules described in the central bank law.

<sup>76</sup> That position could preclude a lot of MLI lending.

sovereign asset and liability management (SALM) framework, based on the balance-sheet approach, can be employed.

The SALM approach aims to help detect sovereign risk exposures from a consolidated public-sector portfolio perspective. It allows one to analyze the financial characteristics of the balance sheet, identifying sources of costs and risks, and quantifying the correlations among these sources. The SALM approach entails monitoring and quantifying the impact of movements in economic and financial variables, including exchange rates, interest rates, inflation, and commodity prices, on sovereign assets and liabilities, and containing other debt-related vulnerabilities in a coordinated way.

In managing sovereign risk exposures, ALM techniques applied to government operations can uncover interest-rate and currency mismatches between assets and liabilities and make clear the “cost-of-carry” of debt-financed financial assets. More broadly, ALM can help policymakers identify net risk positions requiring management, as well as highlight cash flows available to service net debt, and thereby provide input for the development of debt management strategies.

In cases where the match of financial characteristics of the assets and liabilities is only partial, risk management could focus on the unmatched portions, i.e., net financial positions. In a short- to medium-term perspective, a financial risk management strategy could then be developed to reduce such exposures.

The SALM approach can also be utilized to facilitate a country’s long-term macroeconomic and developmental objectives such as economic diversification, broadening of the export market, or reducing the dependence on key import products. Further, the SALM approach can even help identify long-term fiscal challenges, such as unfunded social security liabilities, implying a future claim on resources. In this context, the SALM framework forms an integral part of an overall macroeconomic management strategy. Especially for commodity-exporting countries, the SALM approach can clarify the potential asset management challenges that stem from a medium-term fiscal strategy.

Arguably, the SALM framework may be complex to implement due to a number of policy and institutional factors:

- Monetary policy objectives have an impact on SALM strategies, by affecting either market—interest rate and exchange rate—risk management or directly the size. On the liability side, debt management strategy typically aims at minimizing debt service cost subject to a prudent level of risk.<sup>77</sup> On the asset side, strategic asset management aims primarily at accumulating an adequate level of net foreign assets, including

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<sup>77</sup> While the conventional objective of public debt management centers on cost of debt service minimization subject to assuming a prudent level of risk, an alternative approach switches the cost-risk trade off and focuses on the minimization of public debt portfolio risks subject to attaining a reasonable cost (Missale, 1999).

foreign exchange reserves, to be used for conducting effective monetary and foreign exchange policies, and as a buffer against external shocks. Also, it may involve the management of “excess” foreign currency assets (e.g., reserves above an adequate level), including through the design and management of investment portfolios through sovereign wealth funds (SWFs) so that returns on international assets can be enhanced and passed on to future generations, or help offset the impact of domestic and external shocks on the fiscal position.

- Fiscal policy objectives that aim at limiting annual debt service costs may put constraints on the duration and currency composition of public debt, since a high share of short-term debt may be perceived to lead to greater volatility in debt service costs.
- The structure of international and domestic capital markets also shapes SALM implementation. Some developing countries cannot issue domestic debt because of illiquid and/or shallow domestic debt capital markets and a lack of a reliable local investor base. Their attempts to issue domestic-currency external debt have also not been well-received in international markets owing, in part, to their vulnerability to shocks, restrictions on foreign investors to buy local-currency debt (e.g., on type of instruments, minimum holding period), poor transparency, and/or a lack of interest rate and exchange rate hedging instruments.

The interaction between the public debt management (PDM) strategy and the SALM strategy should be clear. Maintaining robust formal institutional arrangements in developing the PDM strategy provides investors and the public with a greater degree of assurance about the management of the sizable risks in the government’s balance sheet. A well-articulated PDM strategy, which has as much specificity as possible and clearly explains the analysis and rationale for the chosen approach, is essential for such purpose. Logical and detailed explanations of policy decisions, *ex ante*, may also reduce the likelihood that outside commentators criticize the policy actions *ex post*. A forum for an open dialogue can help secure support for the strategy, as part of the government’s overall approach to macroeconomic management and financial stewardship.

The potential role of the debt manager as the “residual risk manager” for the public sector need to be factored into the development of the debt management strategy. This implies that (1) the needs of public sector entities will have to be regarded as a constraint that should be considered and (2) an analysis of the composition of public debt on a net basis is required, which will indicate net liability exposures in light of the characteristics of sovereign assets and government revenues.

The effects of implementing an ALM strategy should be carefully analyzed. In any effort to develop a comprehensive and meaningful sovereign ALM framework, the potential implications on macroeconomic objectives and policies should be assessed in parallel with the potential benefits from a consolidated sovereign portfolio management. Especially, the impacts of adopting an ALM strategy on policies to support the reduction of inflation,

maintain financial stability and enhance the resilience of the economy to external shocks should be taken into account. In this regard, the role of an ALM framework in developing appropriate local-currency debt instruments to mitigate sovereign balance sheet risks and macroeconomic vulnerabilities should be explored.

Many countries apply SALM concepts, at least partially, by adopting strategies to reduce vulnerabilities of the sovereign assets and liabilities without necessarily having explicit SALM identified objectives (Table 2).

**Table 2. Selected SALM Country Cases**

<b>Country</b>	<b>Management of Sovereign Assets and Liabilities</b>
Canada between the entities involved in SALM	Decision-making authority for both assets and liabilities is assigned to the Ministry of Finance, which delegates the day-to-day management is delegated to the Central Bank. The coordination mechanism is instituting regular meetings
New Zealand	Manages local currency and foreign currency assets and provides derivative transactions for government entities
Australia	Allocation of assets between alternative portfolios and funds may take account of the government’s broader priorities and objectives, but not specifically of balance sheet risks, coordination is by the responsible ministry
Hungary, Uruguay	The coordination mechanism is instituting regular meetings between the entities involved in SALM
Mexico	Reduced its external debt in 2006 through issuing domestic securities and using the proceeds to acquire FX from the central bank, which in turn redeemed its securities to reduce negative carry-costs improving the composition of the sovereign balance sheet
Denmark	Manages the consolidated position of the government debt by considering assets of government funds (e.g., pension funds, holding primarily government bonds and on-lending), guidelines for government guaranteed entities on exchange rate risks and loan types
Turkey	Manages the currency composition of the international reserves based on the maturity structure and currency composition of the government foreign exchange liabilities
Finland, Turkey	Management of central government debt and cash reserves is on a net basis

Source: Lu, Yinqiu, Michael Papaioannou, and Iva Petrova, 2012, “Sovereign Risk and Asset and Liability Management—Conceptual Issues”, WP 12/241 and country websites.

#### **D. Guidelines for Debt Portfolio Management<sup>78</sup>**

The debt management strategy is typically based on a sound institutional structure and governance arrangements supported by a legislative framework that clearly establishes the authority and responsibility of the DMO. In turn, this requires a governance structure for the DMO that is guided by the principles of clear allocation and separation of responsibilities and accountabilities, as well as hierarchical levels with clear rules for delegation of authority. This structure can be complemented by a committee for efficient decision-making and

<sup>78</sup> This section refers to guidelines that debt managers produce to direct this borrowing and risk management program, and not to the IMF-WB Public Debt Management Guidelines.

oversight. A modern DMO often encompasses front-, middle- and back-office functions for clear separation of roles and responsibilities and increased efficiency.

An appropriate legislative framework for public debt management should be in place to ensure its well-functioning (“Revised Public Debt Management Guidelines,” IMF 2014). While economic and political factors tend to influence debt policies and the quality of debt management practices, a good legal framework helps also promote operational discipline, transparency, and accountability, which are critical to achieving sustainable debt. The design of the legal framework involves a set of interactions among distinct but related legal competencies, where striking a careful balance between flexibility in the exercise of authority, and adequate controls and safeguards is important (Addo Awadzi, 2015).<sup>79</sup>

Among the middle-office responsibilities is the development of a risk management framework, which typically includes all relevant risks.<sup>80</sup> All risk exposures and associated risk tolerance tend to be monitored continuously to determine whether they have been extended beyond risk tolerance and appropriate actions identified. To assess the risk and vulnerability of the debt portfolio, the debt manager usually conducts stress tests to ascertain the potential effects of macroeconomic and financial variables or shocks, including extreme events. A significant change in the risk profile might prompt a review of the debt management strategy,<sup>81</sup> whereby the correlation between the risks of the additional loans or issuances and those deriving from the debt portfolio should be accounted for. This exercise may also benefit from an ALM approach that considers all relevant consolidated public balance sheet risks, including contingent liabilities and natural hedges (*Developing a Medium-Term Debt Management Strategy Guidance Note for Country Authorities*, IMF–World Bank, 2009, p.11).

A centerpiece of the risk management framework is the medium-term debt management strategy (MTDS). The MTDS transforms the debt management objective into operational guidelines that the debt manager can use to formulate targets, such as a stipulated average time to maturity. An example of a debt management strategy document is provided in Box 3.

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<sup>79</sup> Key elements include: scope of public debt, objectives, authority to borrow, borrowing purpose, debt ceiling, borrowing by public sector entities, contingent liabilities and government lending and on-lending.

<sup>80</sup> Other responsibilities of the middle-office could include the preparation of progress reports on the implementation of the adopted medium-term debt strategy, quarterly or semi-annually, so as to (i) inform relevant policy makers and responsible committees about the evolution of the debt portfolio stated in the debt strategy, e.g., whether the objectives of lengthening the ATM of the debt portfolio against the target is being achieved and, if not, to explain what the constraints are, such as market conditions; and (ii) provide a good risk management oversight.

<sup>81</sup> If revisions to the debt management strategy are necessary due to fundamental macroeconomic shifts, any revisions could be presented with a clear explanation and rationale of why the revisions are recommended.

Formulating targets enhances transparency for debt management, guides operational work, anchors decisions, and provides a clear overview of the direction of the debt management. The latter could better facilitate communication with investors, making the debt management objective tractable. Last, they form a base for control, reporting, and evaluation of debt management activities and thus contribute to a robust control environment.

### **Box 3. Summary of a Debt Management Strategy Document**

The debt management strategy document typically includes the following sections:

#### **The Objectives and Scope**

- Describes the objectives for debt management, the scope of the medium-term debt management strategy (MTDS), and the types of risks being managed under the MTDS.

#### **The Existing Debt Portfolio**

- Provides the historical context for the debt portfolio, describing changes in its size (including relative to GDP) and composition through time. Changes in relevant market variables should be included, along with commentary on significant events in the evolution of the debt.

#### **The Environment for Debt Management Going Forward**

- Describes the environment for debt management in the future, including fiscal and debt projections, assumptions about exchange and interest rates, and constraints on portfolio choice, including those related to market development and the implementation of monetary policy.

#### **The Medium-Term Debt Management Strategy**

- Describes the analysis that has been undertaken to support the recommended debt management strategy. The assumptions used and limitations of the analysis should be made clear.
- Sets out the recommended strategy and its rationale. Describe the desired debt composition and the core arguments for such composition. This should include a discussion of the key risk factors that influenced the choice of strategy.
- Describes the progress to be made toward the desired composition over the planning horizon (three to five years). Specify ranges for the key risk indicators of the portfolio and the financing program.
- The documented strategy should also outline any specific measures or projects that are planned to manage non-quantifiable risks and/or support debt market development, such as plans to introduce new debt recording systems or a primary dealer framework.
- The documented strategy should also outline the periodic review process that will apply to check whether key assumptions continue to hold and that the MTDS remains appropriate. The document should also highlight the process that would be followed if circumstances were to change significantly outside that regular review cycle.

Source: World Bank and IMF, 2009.

The guidelines can be expressed in qualitative and/or quantitative terms. Many governments express the guidelines as quantitative targets, such as for interest rate risk. Often the targets are set with intervals in order to avoid frequent or short-term adjustments, which could result

in high transaction or other costs and potentially increase operational risk. Generally, guidelines remain reasonably stable over time to help ensure predictability in debt management, thereby contributing to cost minimization. It is also common to express the guidelines as directions, without expressing a firm quantitative target.<sup>82</sup> In practice, many governments use a combination of qualitative and quantitative targets. This could, for example, be expressed as reaching a specific target over the medium term, thus taking timing of actions into account.

Hard quantitative targets generally require developed bond and derivatives markets. A debt manager needs the ability and appropriate instruments to manage the debt according to the targets. This requires flexibility in the primary market to select the amount and maturities, as well as the use of liability management operations and derivatives. If these instruments are not in place, it could be costly or impossible to achieve the targets. Overall, quantitative targets give a more precise direction for facilitating, for example, market communication and the evaluation of the debt management strategy. However, hard targets and wrongly formulated guidelines can also force debt managers into costly transactions that adjust the debt portfolio accordingly, with less possibility to take market conditions into account (this also presents the possibility of the market's exploiting the situation).

Qualitative or semi-quantitative targets provide the direction of the range of allowed debt management flexibility, however, at the price of less accuracy. While they ensure that the DMO works in line with set objectives and that the market understands the direction of the debt management, they give debt managers the flexibility to take market circumstances into account in the timing of operations. This could be useful depending on the stage of market development and/or if the market environment is uncertain. Consequently, they do not give the precise information to the market that could impose a higher cost due to the uncertainty premium (which is difficult to quantify).<sup>83</sup>

Strategic decisions on debt management can be embodied in a benchmark portfolio that represents the desired or optimal portfolio given the debt management objectives and risk constraints. In order to guide debt management operations, the desired benchmark portfolio needs to be well defined in terms of the notional size, instruments, debt composition, and rebalancing rules. Considerations in the selection of the currency mix within the benchmark

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<sup>82</sup> A direction would be suitable when estimating market conditions is difficult, e.g., introducing new debt instruments or markets could move against the debt manager.

<sup>83</sup> However, this may not imply higher costs, if the qualitative indication is sufficiently clear and accompanied by a track record of consistency in the debt manager's behavior that can ensure enough certainty to the market. Also, rigid quantitative targets risk not to be observed in volatile markets, forcing to revise them frequently and thus obliging the debt manager to follow a sub-optimal approach to the market.



portfolio include liquidity and currency risks.<sup>84</sup> The DMO could, for example, hold cash buffers in the main intervention currency, or in specific currencies to facilitate debt servicing.<sup>85</sup> It should also consider whether other major liquid currencies may be held for purposes of natural hedging.<sup>86</sup> A method applied by sovereigns, particularly in the late 1990s, was to set up a passive, rule-based benchmark portfolio against which the debt manager was able to fund at different dates to take advantage of favorable market conditions. In some cases, a discretionary margin can be applied where the debt manager could deviate from currency composition or duration targets (IMF, 1997).

The stage of development of the government securities market may cause several bottlenecks in terms of instrument choice and market absorptions. Governments looking to transition rapidly on their market reforms may need to make strategic choices where they not only prioritize among different initiatives that will advance the market to a next stage, but also realistically consider the time horizon of different initiatives (see also section V and Appendix 1).

### **III. THE ROLE OF LIABILITY MANAGEMENT OPERATIONS IN MANAGING SOVEREIGN DEBT PORTFOLIO RISKS**

Liability management operations (LMO) refer to a broad range of market-based transactions undertaken by debt managers and creditors in the context of debt management strategy to affect the debt profile and debt portfolio risks.<sup>87</sup> LMOs either involve changing the structure of sovereign debt that is already issued, by undertaking direct transactions, or apply financial contracts that affect the structure and riskiness of the debt portfolio.<sup>88</sup> In this connection, LMOs can be undertaken to include enhanced CACs and *pari passu* provisions to existing bonds to address holdout creditor risk. While this paper primarily discusses the use of LMOs for non-distressed debt situations, it should be acknowledged that LMOs can also be used by

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<sup>84</sup> The use of benchmark portfolios requires a complex set of procedural rules and financial market information, with the main challenge for the DMO being to keep the actual portfolio as close as possible to the benchmark that incorporates all cost and risk preferences.

<sup>85</sup> A cash buffer might be used for different purposes and, depending on the reason, the amount of cash reserve and management of risks associated with the cash buffer should be different (see also section IV.D).

<sup>86</sup> The practice of many countries, however, is for government entities' foreign exchange to be kept as a part of the central banks' international reserves, while the treasury single account is in local currency.

<sup>87</sup> Although the analysis here focuses on liability management operations applied to marketable debt issued by sovereigns, a significant part of sovereign debt portfolios of developing countries consists of external loans extended primarily by multilateral creditors. Among the key risk management products that multilateral creditors provide to sovereign borrowers are prepayment, rate-fixing, currency and interest rate conversion, interest rate caps and collars, and swaps.

<sup>88</sup> This section does not examine the impact of accounting rules and other potential internal risk management constraints on the ability of debt-holding financial institutions to accept LMOs, such as buybacks. For a discussion on accounting issues relating to LMOs, see Piga (2001).

sovereigns in cases of loss of market access (LMA) or to help mitigate market pressure on government bonds. Furthermore, distressed LMOs can take place as part of a debt restructuring (IMF, 2014 and 2015).

Debt managers, in non-distressed situations, use LMOs to reach the desired portfolio structure and thus achieve cost savings, as well as to increase the efficiency of the yield curve. This necessitates a robust risk management framework, as LMOs may include additional risks (counterparty credit risk, reputational risk, liquidity risk, operational risk). This is often supported by an accountability framework that could, for example, estimate the savings versus costs of LMOs, usually by assessing operations that minimize the cost of government liabilities against the risks imbedded in the structure of the government balance sheet.

LMOs can also be applied to countries facing debt distress (see also section IV). In cases of countries with IMF-supported programs, LMOs can be applied both before and during a program in order to reduce potential debt portfolio vulnerabilities. These include, in particular, refinancing risks that may emerge from a re-profiling or face-value cut debt restructuring that has been undertaken to restore debt sustainability and market access. Sovereigns facing heightened stress but that have not lost market access may find that voluntary re-profiling by application of LMOs, for example, by improving the maturity structure of the debt portfolio, may help calm market concerns and reduce (credit/risk premium) spreads.<sup>89</sup> It should be noted that some debt distress cases involve a gradual deterioration of the debt portfolio structure due to diminished market access and an effort to reduce debt service costs by issuing in shorter maturities, thus creating a greater strain on the eventual need to smooth the maturity profile. Although the relationship between countries' debt stocks and crisis episodes is non-linear, several factors have a bearing on a potential debt crisis, including the size and currency composition of the debt portfolio, its maturity structure, and investor base.

Governed by the debt management strategy, LMOs are implemented within a risk control framework that provides the basis for changing exposures to a desired risk profile by either changing the structure of outstanding debt or hedging associated risks. This is usually an integral part of formulating a debt management strategy that aims at adjusting the portfolio to a benchmark or target. Traditionally, debt portfolio exposures to movements in interest rates and exchange rates are managed by liability management operations, including utilization of hedging strategies. Hedging can take a number of forms, such as a currency swap when a

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<sup>89</sup> Market access is defined as the ability to tap international capital markets on a sustained basis through the contracting of loans and/or issuance of securities as across a range of maturities, regardless of the currency denomination of the instruments and at reasonable interest rates (IMF, 2013).

loan is contracted in one currency and is swapped into another currency, in parallel or subsequently.<sup>90</sup>

Debt managers using LMOs typically operate based on risk tolerance thresholds. Thresholds may be breached as the volatility of interest rates and/or exchange rates increases (market risk), maturity approaches (rollover/refinancing risk), and demand, preferences, and perceptions of investors change adversely (liquidity and credit risks). Breaching one or more of the risk thresholds usually triggers a necessary policy swift and decisive LMOs, which may involve a market-based exchange or swap of existing debt for new debt under arbitrage-free conditions (zero net present value under the market yield curve) plus fees.<sup>91</sup> In principle, the new debt is expected to have lower risk characteristics than the existing debt and, if possible, enable lowered mismatches with the asset side of the balance sheet.

### **A. Rollover/Refinancing Risk Management**

Debt managers can manage the refinancing risk through a proper borrowing plan that avoids concentrations of maturities, amortizing bonds,<sup>92</sup> debt exchanges of bonds with short ATM to longer ones, pre-financing of maturing bonds, buying back bonds before they mature, issuance of short-term debt,<sup>93</sup> reimbursements on maturity date made out of the Treasury Single Account, sinking funds earmarked to the repurchase of government debt, contingent credit lines,<sup>94</sup> a combination of these operations.<sup>95</sup> A widely-used approach is to partly or fully pre-finance a redemption by issuing new bonds ahead of the redemption. This can be achieved, for example, by issuing a new bond (destination bond) at several occasions (i.e., through reopenings) ahead of the redemption of the old bond (source bond) and using the

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<sup>90</sup> A swap transaction for market-based bonds can be expensive, depending on the sovereign's credit rating (credit spread) and market conditions at the time of the swap. As mentioned, the DMO should also closely monitor the swap over its life.

<sup>91</sup> For example, in addition to exchanges/swaps of existing debt for new debt, market risk can be managed through instruments mentioned in paragraph 79, such as buybacks and interest rate derivatives. Also, a debt exchange and a pre-financing of maturing bonds may be viewed as supplementary instruments.

<sup>92</sup> See also section V.B.

<sup>93</sup> Short-term debt, i.e., Treasury bills, commercial paper, can play an important role in refinancing risk, particularly for higher-rated sovereigns, as well as in managing day-to-day liquidity. In stronger sovereign credit cases, short-term paper can be used both for large nominal redemptions and for replacement of maturing debt with longer maturities.

<sup>94</sup> Contingent credit lines are often part of the pre-funding policy, without bearing the negative carry. Some contingent lines may charge a commitment fee, but this is typically much lower than the coupon that needs to be paid on the issuance of a new bond.

<sup>95</sup> Some countries have explicit rules that require to keep adequate cash to cover debt service payments for a certain period, e.g., next 12 months.

proceeds to pay back the old. However, pre-financing entails a cost of carry and addition of credit risk when proceeds need to be invested before they are used. Both of these concerns are typically taken into account when deciding on the extent of pre-financing.

A common approach among debt managers is to buy back securities before redemption, that is, to purchase bonds prior to their maturity.<sup>96</sup> In order to manage rollover risk caused by the concentration of maturing debt where large benchmark issues may apply, the proceeds of new issues can be used to buy back outstanding bonds. While the aim is to reduce refinancing risk through buyback operations, cost considerations associated with a buyback premium and the benefit of lower funding costs through enhanced liquidity are generally analyzed and factored in the overall cost-risk tradeoff framework. There are three main variants of buyback operations: (1) reverse auction, (2) bond conversion, and (3) outright purchase.

### **Reverse Auction**

A reverse auction can be conducted by a public offering, similar to a regular auction, except that it is for purchase instead of sale of bonds.<sup>97</sup> In a reverse auction, the government announces the maximum amount or range that it plans to purchase. Reserving the right to reject individual bids allows debt managers to reject offers that are outside a predetermined cut-off yield (or price) and to reduce the auction amount.<sup>98</sup> In this way, the debt manager

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<sup>96</sup> The timing of the debt buyback operation is of essence. If such buying is within sight of the bond maturity date, it should have the desired effect. However, buying back very much in advance of the maturity date can cause liquidity problems around the time that the bond is bought. For example, a buy back two years ahead of the maturity date may greatly diminish the outstanding amount and consequent interest in trading the respective instrument(s).

<sup>97</sup> It should be noted that reverse auctions are resource intensive to the Treasury account, unless there is a simultaneous new auction. If the proceeds of the new bond issuance are less than the amount "paid" for the buyback, then the reverse auction involves a shortfall funding risk. For such eventuality, many debt managers conduct buyback operations preceding (before) new issuance auctions. However, the bond exchange may take place after a bond auction of a responded issue, if the debt manager seeks to obtain a firmer price reference for the exchange.

<sup>98</sup> One pricing mechanism is to indicate the buyback price for each targeted bond and to price the issuance of new bonds through a Dutch auction. The tender will rank the proposals submitted, both in cash and through eligible bonds, from the minimum to the maximum interest rate submitted. Each bond's submission will be considered at its effective value, which would be the result of the notional value multiplied by the buyback price. The government would decide the amount of the new bonds to be issued, and the final price would be determined by the cut-off (maximum) interest rate that would in turn determine the coupon rate of the new bond. Such a pricing mechanism is simple and helps to generate competitive pricing of the new bond, since it is the instrument being auctioned. This transaction of an exchange together with a tender for cash and a portion of new money is also known as an accelerated tender and a new issue.

avoids locking in a purchasing price higher than the fair market price.<sup>99</sup> Competitive offers are accepted in descending order in relation to yield until the fair-value price, or fair price plus premium, (determined by the debt manager) is reached, subject to the maximum amount being purchased.<sup>100</sup>

### **Bond Exchange**

In a bond exchange (bond conversion or debt-bond swap or bond switch), the government buys back from bondholders some particular bonds or series of bonds, while the payment for the repurchase is made in terms of issuing a new bond.<sup>101</sup> An exchange can also be used in combination with reopening operations, that is, the newly issued bonds used to pay for the exchange can be a reopened issue. Through this operation, the debt manager can reduce the amount that matures on a specific date, thereby reducing the rollover risk. (By replacing a less liquid issue with a more liquid benchmark issue, a bond exchange could also be used as a tool to develop benchmark bonds and maintain liquidity by replacing illiquid bonds with liquid bonds.) A bond exchange is often carried out by two methods. The first is a competitive-offer format, where the exchange ratio is determined by the bids submitted by market participants.<sup>102</sup> Also, the participants submit bids on the amount of the exchange. Such bids are the same as a conventional auction, except that their offers are in terms of a price ratio and the investors are paying for the new bonds by the old bond. The second method is a fixed-rate format, where the exchange ratio is predetermined by the government according to prevailing prices in the secondary market at the time of the announcement. After the government's announcement of an exchange program, holders of the old bonds have a specified time to decide whether to accept the offer before it closes. Thus, the volume of exchanges is determined by the market, while there is no certainty that the debt manager will be able to buy back the whole volume of the targeted bond. To ensure that the exchange is at a minimum cost-neutral, the auction cut off should be determined so that the swap values of the buyback and the new bond are at least identical. Further, the pre-announcement

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<sup>99</sup> This requires an accurate spot yield curve. However, development of a secondary market yield curve, which provides the basis for the pricing, may not exist and therefore calculation of a fair market price may not be able to be done.

<sup>100</sup> When the bond price in the secondary market is unreliable, for example, due to lack of liquidity in the market, it is convenient to announce a public offer of the bonds to be tendered and the prices at which this would be executed. This will give every market participant the opportunity to be informed and set a price through a market clearing mechanism.

<sup>101</sup> These are also referred as "extension swaps," if the sovereign buys back bonds in exchange of issuing longer-maturity bonds.

<sup>102</sup> The fixed-price exchange ratio format may, however, entail market risk for the debt manager in the event of adverse changes in market prices during the process of such transaction.

communication of these LMOs to markets should be carefully considered and articulated in order to avoid undue volatility.<sup>103, 104</sup>

### **Outright Purchase (Bond Buyback)<sup>105</sup>**

In an outright purchase, the debt manager can directly buy back bonds in the secondary market at the prevailing price.<sup>106</sup> Outright purchases are resource intensive and are typically used in markets where there is good secondary market liquidity. A number of sovereigns, nonetheless, conduct their buybacks discretely in the secondary market and execute at market prices, but do so in small volumes, often responding to reverse inquiries from investors, or at a fixed-price tender. In an outright purchase, the government may directly contact, for example, primary dealers (see Appendix 2) or brokers in the secondary market, and make purchases of government bonds through them (these bonds are then retired).

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<sup>103</sup> Other concerns include reputational risk, e.g., a failed exchange operation, and budgetary costs, e.g., source bonds exchanged at a premium or above par. Also, exchanges of international bonds might not be considered market-based debt management operations but rather distressed-debt management operations (for the purposes of this primer, we define international bonds as those bonds issued under a non-domestic governing law).

<sup>104</sup> Another type of a bond exchange involves the issuance of new bonds (destination bonds) for which payment is made in the old bonds (source bonds), with the price of the source bond being fixed prior to the auction of the destination bond. DMOs may use different methodologies to conduct bond exchanges of new bonds for old bonds. For example, a DMO of a European developed economy utilizes two different arrangements. First, a reverse auction where, after having fixed and communicated to the market (just before the auction) the prices of bonds that can be accepted in payment of the bond offered, all participants (who are exclusively Primary Dealers) submit their proposals, bidding prices for the bond under issuance and indicating what bond are offering in exchange at every price. Bids are offered as in a normal issuance, from the higher to the lower price, and satisfied until the amount the debt manager decides. Second, and more frequently, through a platform connected to MTS (the electronic trading platform that facilitates the wholesale regulated market of the country's government bonds). The DMO announces two days before the transaction the bond offered and the bonds (in general, in a number of four or five) that it will accept in exchange. At 10 o'clock of the auction day, the DMO inserts in the platform the prices accepted for every bond to be bought back and is looking at the prices offered for the bond under issuance, with showing on the screen of bonds returned in exchange for every price. When the DMO considers a price fair, it clicks on the corresponding bid. This session can last up to one hour (but in general is shorter), and the DMO can decide in a very flexible manner how to distribute the repurchase among the bonds eligible. Also, the MTS platform-based method can be extended to buyback operations, which are usually conducted through a traditional auction system.

<sup>105</sup> These operations need to be coordinated with monetary policy auctions, e.g., open market operations, to effect interest rates.

<sup>106</sup> These operations would need to be consistent with the legal terms and conditions of the bonds and market regulation in the relevant jurisdiction.

## Sinking Funds

Sinking funds represent another alternative to manage refinancing risk by explicitly requiring contractual payments, over and above those of debt service payments, into an escrow account. Sinking funds, which could be exercised via an imbedded call, are fairly rigid and the cost, as measured between interest cost and interest earned, is negative, and this adds to the overall cost of financing. While sinking funds were used in the past,<sup>107</sup> they have been substituted by liability management operations, as these are more economical and flexible, albeit potentially more subject to pressures from the political economy that may, in the context of fiscal pressures, choose to accept additional refinancing risk to preserve financial resources.<sup>108</sup>

The opportune time for a debt manager to undertake most buybacks is situation specific, but would depend on ensuring that there were sufficient marketing and reaction time for investors to participate. Contrary to primary market auctions, buybacks have a more restrictive participation, as they target existing holders of specific bond series and successful marketing requires information on the holders and their incentives to participate in a buyback. For this reason, debt managers normally avoid opportunistic approaches and ad hoc buybacks to avoid surprises for investors. However, opportunistic buybacks or tenders may be considered when funding costs are lower than trading levels of outstanding securities due, e.g., to lower liquidity and consequent higher respective premia.

Several countries apply buybacks and bond exchanges as tools to manage their refinancing risk and reach several other objectives. South Africa, for example, has applied these LMOs to improve market liquidity, reduce refinancing risk, increase issuance amounts in an environment of low borrowing needs, maintain an international market presence, broaden the investor base, and align the issuance strategy with a chosen portfolio. Sweden, Hungary, and Belgium actively use LMOs to manage refinancing risk by purchasing domestic government

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<sup>107</sup> Gabon has created one for the bond it issued to take out its Paris Club debt.

<sup>108</sup> From a liability management perspective, mandatory sinking funds are typically not advocated. Historically, sinking funds have required an issuer to deliver a defined number of securities at a specific time prior to maturity. These securities could be purchased in the market at a discount or called at par. A number of institutional investors have made sizeable profits on cornering sinking fund issues trading at a discount and forcing the issuer to pay a higher price than was justified. Many debt managers agree that LMOs are much better ways to manage refinancing risk. Also, the presence of sinking fund bonds in a yield curve can cause distortions, as they will tend to trade closer to par in a lower yield-curve environment and as they approach the sinking-fund periods. This can provide points in a yield curve that underperform the market and will impact new issue levels in a negative way. Further, market participants claim that sinking fund bonds are more expensive than bullet bonds.

securities prior to maturity.<sup>109, 110</sup> Uruguay,<sup>111</sup> Mexico, Iceland, and Brazil<sup>112</sup> have also used LMOs as part of exchange offers (sometimes under distress) when launching international bonds.

### **B. Interest and Exchange Rate Risk Management<sup>113</sup>**

The application of an asset-liability management approach involves a number of practical decisions. For example, in matching foreign-currency debt and foreign-exchange reserves, the interest cost to be hedged would require that income from foreign-currency assets be accessed by (or transferred to) the Ministry of Finance (MoF) to cover debt-service charges on foreign-currency debt. Provided that this is possible, there are practical difficulties, as the currency and maturity structure of the foreign exchange reserves may not match the preferences of the debt manager, thus either resulting in a failure to construct a robust hedge or constraining the policy choices of either the debt manager or the reserve manager.<sup>114</sup> Regardless of practical difficulties, Canada, Denmark, and New Zealand have adopted an approach by which the composition of external debt (both currency and interest rate exposure) reflects the composition of foreign exchange reserves.<sup>115</sup>

Debt managers' use of interest rate and exchange rate derivatives is largely strategic and involves setting clear objectives (Box 4). Debt managers could use derivatives when it is in

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<sup>109</sup> Italy has also regularly used buybacks since 1995 and bond exchanges since 2002.

<sup>110</sup> Some countries use such purchases for cash management, rather than risk management/portfolio restructuring purposes.

<sup>111</sup> Uruguay has implemented various LMOs, both in domestic and international markets, with different objectives, including reduction of rollover and foreign exchange risks and optimization of debt currency composition. In particular, LMOs allowed Uruguay to achieve the goal of 45 percent of its debt to be denominated in local currency (debt de-dollarization), as stated in its debt management strategy, within a relatively short time. Also, they allowed the issuance of benchmark-sized bonds and the provision of liquidity across the yield curve, without increasing the amount of outstanding debt.

<sup>112</sup> Brazil is one of the most active users of LMOs, with several transactions every week and a large LMO schedule announced regularly.

<sup>113</sup> It should be noted that the instruments listed under section III.A, Rollover/Refinancing Risk Instruments, could also help to manage interest and exchange rate risks.

<sup>114</sup> The use of derivatives, e.g., swaps, may relieve these constraints, especially as markets in the currencies in which reserves are typically held are fairly deep. However, overutilization of derivatives should be avoided, as they add risk to the portfolio (see also following paragraph).

<sup>115</sup> It should be noted that these countries' foreign exchange reserves are "borrowed" reserves, i.e., their foreign reserves are financed by foreign-currency debt issued specifically to fund their reserves.



line with achieving their risk and cost objectives within a well-specified debt strategy.<sup>116</sup> Derivatives are commonly accepted not to be used to “earn money” by taking position against the debt portfolio targets based on future expectations in order to decrease debt service costs.<sup>117</sup> Within this framework, the implementation of the debt strategy may include the use of derivatives to separate funding decisions from the optimal portfolio composition decision, reduce the cost of borrowing, manage risks in the portfolio (in particular, interest rate risk and refinancing risk)<sup>118</sup>, and adjust the currency composition of liabilities. Debt managers typically determine the purpose of transactions in order to select the appropriate instrument(s) and structure(s) and determine the most effective way to achieve the desired risk profile, which may well be through direct borrowing. Also, they commonly assess the liquidity risk implications due to the need to post collateral in case of a two-way “Credit Support Annex,” where both parties have to post collateral as and when they are out-of-the-money. Further, if debt managers observe an apparent mispricing in the market, they could use derivatives to temporarily deviate from a strategic benchmark, instead of changing the borrowing plans or the strategic benchmark.

#### **Box 4. Debt Managers’ Use of Derivatives**

Debt managers need to possess adequate internal capacity (including personnel and systems) for front-office execution, middle-office strategic analysis, and back-office settlement for managing derivative transactions and their associated risks and collateral management. Capability is built over time, and in the meantime, if the case for using derivatives is strong, steps can be taken to facilitate their use. These include outsourcing or appointing agents for particular aspects of transaction execution, settlement, collateral management, and ongoing risk management.

Most developed market debt managers use derivative instruments for debt management purposes, while this is the case for only a handful of emerging markets. Several emerging markets, though, are taking steps toward developing the legal environment necessary to support derivative markets, and are addressing the challenges posed by illiquidity of the underlying cash market, deficiencies in prudential regulation, and restrictions on market participation.

In terms of risk management and reporting, real-time market information is needed for evaluating potential new transactions, resetting rates periodically, determining required collateral movements, and remunerating posted collateral. Independent calculation and bilateral confirmation of cash flows is essential. For debt managers, there are sometimes inconsistencies in the accounting treatment of derivatives (often mark-to-market) and underlying bonds (often nominal value), which complicates communication and evaluation of the risk reduction that derivatives were intended to help achieve.

Source: International Monetary Fund and World Bank, 2014.

<sup>116</sup> See also International Monetary Fund and World Bank, 2014, pp. 10 and 35.

<sup>117</sup> Or, to mask the amount of debt outstanding, e.g., Greece.

<sup>118</sup> In particular, exchange rate derivatives may be used to hedge against the risk of refinancing in non-domestic currencies, as interest rate derivatives are not seen as instruments to manage refinancing risks (see also para 17).

### C. Funding Liquidity and Market Liquidity Risk Management

Liquidity risk is referred to both the funding liquidity of an issuer, i.e., the sovereign's ability to service its obligations, and the market liquidity of an instrument. Although these concepts are linked, they should be looked at separately. For example, large benchmark-size bonds tend to be more liquid in secondary market trading. However, a large benchmark bond increases the liquidity risk of the issuer, as well as the refinancing risk at the time of redemption. Thus, building up benchmark bonds to provide liquidity to the market (and thereby reduce costs to the sovereign) is an important element of public debt management, which is separate and distinct from the sovereign managing its own funding liquidity risk (see also IV. D.).

Debt managers regard secondary market liquidity of debt securities as a highly desirable attribute of their sovereign debt portfolio. This is due to the liquidity premium, as liquid debt instruments trade at a premium compared to less liquid instruments, thus leading to lower borrowing costs.<sup>119</sup> In addition, liquid sovereign bonds may be bought and sold at fair market value and low costs (bid-ask spreads), while investors with short investment horizons may be comfortable holding longer-dated bonds, as markets allow these bonds to be easily sold should a liquidity need arise.

Creation of large and liquid benchmark bonds can increase funding liquidity risk and increase refinancing risk. For a debt manager, bunching of sovereign debt redemptions, along with the corresponding rollover/refinancing risk, are major concerns and the subject of constant assessment. In response, many debt managers take a proactive approach in managing their benchmarks by promoting issuances with amortizing structures and, prior to maturity, by establishing buybacks and/or exchanges as a regular feature of their borrowing programs.<sup>120</sup>

From an issuer's perspective, a first line of defense against liquidity risk is to ensure regular funding operations and a balanced maturity profile of new issuances. Maintaining consistency and predictability in a country's financing program should be a debt management priority. This entails issuance of securities on a regular schedule with set well-defined issuance procedures, as this helps reduce market uncertainty and reduces risk premia. The auction cycles, frequencies of issuances, and auction sizes may need to be adjusted depending on the size of the borrowing requirement and should ensure market liquidity,

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<sup>119</sup> Creating liquid markets, if at all possible from a government perspective, can also incur costs that should be weighed against their benefits.

<sup>120</sup> LMOs such exchanges and buybacks for new longer-tenor benchmarks can be most effective as bonds fall between 18-months to 2-years to maturity. Turnover and liquidity in most markets tend to decline substantially once bonds approach their final year to maturity and market prices become more volatile.

which, in turn, promotes efficiency in capital markets, lowering debt service costs over time.<sup>121</sup>

Additional tools are potentially available to debt managers to manage the sovereign's funding liquidity risk, such as the use of extendible bonds that give the issuer the right to extend their term beyond a specified date.<sup>122</sup> Depending on the design of the extendible bond, the issuer can have one or more opportunities to defer the repayment of the bond's principal, during which time interest payments continue to be paid. In addition, the bond issuer may have the option to exchange the bond for one with a longer maturity, at an equal or higher rate of interest (see also Box 5).<sup>123</sup> Another potential tool is committed credit lines, although covenants could be overly restrictive and capital requirements and fees would be driving up costs.<sup>124</sup>

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<sup>121</sup> To enhance predictability, some debt offices have regular meetings with primary dealers or representatives of investment funds and banks to review market dynamics and borrowing plans. For example, the U.S. Treasury meets regularly with the Treasury Borrowing Advisory Committee (TBAC) as part of its quarterly refunding process and releases the minutes of these meetings (see <https://www.treasury.gov/resource-center/data-chart-center/quarterly-refunding/Pages/default.aspx>).

<sup>122</sup> For a discussion of state-contingent debt instruments in debt management, both as a possible prevention device (especially for small open economies subject to large exogenous shocks) and in a sovereign debt restructuring context, see IMF, 2017a.

<sup>123</sup> A definition of extendible bonds as a means to manage funding liquidity risk should coincide with the definition of callable bonds, in which the issuer has a right to extend the maturity. (Note that in puttable bonds, the bond holder retains a right to extend the maturity.) Thus, an extendible bond may be considered a straight bond with a call option for the issuer to extend the maturity of the bond, where the pricing will be equal to the price of a straight bond, adding the price of the option to extend. The imbedded cost of the call option can be significant, as the assumption for the bond holder (bidder) is that the call option will be exercised. Further, while decreasing the liquidity (cash) needs of the government at a given time, the addition of extendibility, as any other specific feature, to individual bond series would reduce their liquidity in the secondary market.

<sup>124</sup> See also footnote 88.

### **Box 5. Potential Use of Extendible Bonds to Reduce Sovereign Liquidity Risk**

Extendible bonds have not been used recently by public sector issuers in developed or emerging markets, owing in part to their inherent higher complexity and consequent more difficulty to price these instruments. Nonetheless, a number of sovereigns have issued bonds with embedded call or put options to protect themselves against high domestic interest rates at the time of issuance or to satisfy investor requirements.<sup>125</sup> Informal evidence from OECD countries suggests that these bonds were useful in the 1980s, when interest rates were volatile. In general, extendible bonds enhance the instruments available to the debt manager and avert liquidity problems in sovereign debt crises. In case of uncertain primary market access, the debt manager could compare the option to extend a bond's maturity with the current financing costs.<sup>126</sup> Because this would also be visible to the investor, it could give the debt manager additional bargaining power or anchor yields bid by investors.

Extendible bonds are common among private sector issuers in developed countries and in international financial markets. Extendible reset options (where the coupon is reset to the market rate on the extension date) have been used in certain segments such as the high-yield bond market and, more specifically, by closed-end funds that may face difficult liquidity conditions as a result of their asset structure. In this environment, extendible bonds reduce the risk premiums for both the issuer and the bondholder because extending the maturity for a solvent issuer reduces the risk of distress and henceforth supports the value of the bond.<sup>127</sup> In general, however, the issuer by buying this optionality (insurance) will likely face an increased cost of borrowing.

Source: Authors.

## **D. Management of Sovereign and Counterparty Credit Risk**

Sovereign credit risk arises from a potential bond default, when a sovereign fails to make a scheduled payment on its bond debt.<sup>128</sup> As governments accumulate more debt relative to GDP, the perceived ability to repay long-term debt holders becomes increasingly questionable.<sup>129</sup> The associated sovereign credit risk is reflected in higher bond yields and credit default swaps (CDS) and in lower credit ratings for some governments. This may

<sup>125</sup> The cost of bonds with embedded options would be higher than of conventional bonds. Embedded call or put options tend to increase borrowing costs, with investors pricing the corresponding bond based on the possibility of exercising the option.

<sup>126</sup> The analysis would include the value of the embedded option versus the fair value, combined with the cost of outright maturity extension. Further, callable/puttable structures tend to be less liquid, so that a liquidity premium may be traded off (as well as market development objectives, e.g., benchmark yield curve).

<sup>127</sup> For EM sovereigns and for foreign exchange debt, the use of an FCL (Facility Clearance) system is helpful.

<sup>128</sup> For the sovereign, this risk reflects a Credit Rating Agency perspective and relates more to monitoring the sovereign's own spreads, rather than managing them. This risk is mainly faced by investors, and could accordingly be expressed as "sovereign credit risk arising from changes in government bond prices due to perceived changes in default potential."

<sup>129</sup> While this section concentrates on credit risk-related aspects of sovereign debt portfolio risk management, the paper does not address issues related to macroeconomic risk.

signal a need for the debt manager to inform fiscal authorities about appropriate actions that need to be taken to address market concerns so that sovereign bond yields and credit default spreads are reduced and ratings are improved.<sup>130</sup>

LMOs, on-lending, and/or acquired assets in the sovereign balance sheet may involve derivatives, requiring the debt manager to manage their credit risk exposure.<sup>131</sup> For debt managers, although credit risk evaluation of a counterparty may be complicated, a certain creditworthiness/credit risk, often assessed on the basis of a credit rating, is typically assigned to the counterparty (or the specific obligation), to be used in credit decisions (Saunders and Allen, 2002). The ratings thus inform the uncertainty (default probability and recovery rate in the event of a default)<sup>132</sup> that is used to evaluate the expected loss and is translated into the relevant exposure (credit exposure) (Culp, 2001).<sup>133</sup> Collateral posting is often used to manage counterparty credit risk. However, credit risk management of cash management operations is usually conducted through rating requirements, limits, follow up and use of collateralized instruments such as reverse repos and tri-party repos.

Debt managers using swaps need to carefully monitor market values, as a swap with a positive market value is an asset and reflects a credit risk exposure. In practice, debt managers monitor the market value of the swap portfolio and receive collateral that is also determined by a rating-dependent threshold value. This requires the counterparties to pledge additional collateral when the market value exceeds the threshold value (Box 6).<sup>134</sup> In addition, counterparty agreements may contain a trigger by which a swap may be terminated

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<sup>130</sup> Traditionally, governments manage their sovereign credit risk by trying to obtain the best possible sovereign credit rating.

<sup>131</sup> On-lending entails management of credit risk exposure arising from government lending to entities within the country.

<sup>132</sup> S&P rates only address default risk, while Moody's asserts that their ratings address both.

<sup>133</sup> Relying on ratings to assess the credit risk in derivative transactions has started to become more complicated because of the introduction of resolution frameworks in many jurisdictions that treat derivatives differently. This development necessitates an adjustment in the assessment of the associated credit risk based on the jurisdiction that the transactions take place. Also, credit rating agencies may assign different ratings to different instruments. These events require that debt managers understand and analyze risks related to derivatives better now than in the past.

<sup>134</sup> It should be noted that (i) two-way collateral agreements could be connected to a need to fund collateral and are associated with costs, as well as a legal framework that makes possible for debt managers to deliver collateral, and (ii) using a rating trigger during times of market stress could be hard and have negative systemic implications.

if the credit rating falls below a certain level (Danish Government Debt, 2013, p. 33).<sup>135, 136</sup> Further, debt managers should take into account the implications of changes in derivatives regulations on the existing and planned derivatives portfolio.

Several DMOs, including the Danish, German, Dutch, and Swedish Debt Management Offices use derivatives in general and swaps in particular to reach the desired debt portfolio exposure in the most cost-effective manner—separating funding from exposure. Sophisticated debt managers may use swaps to achieve comparative advantage, such as by issuing long maturities, and diversify the portfolio across instruments and markets using derivatives to achieve its target risk profile.<sup>137</sup> This approach requires a comprehensive framework to manage credit risk exposures using an integrated risk management system. In all cases of derivative transactions, an ISDA Master Agreement, along with other legal documents that govern margin collateral, serve as the main instruments to manage credit risk (see also section III.F).

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<sup>135</sup> In recent years, key aspects in the trading agreements between two counterparties (ISDA and CSA) are incorporated in the pricing and valuation of derivatives by, so-called xVA (CVA, FVA, etc.). Further, collateral is not only a tool to mitigate credit risk, but also has a direct effect on the pricing and valuation of derivatives.

<sup>136</sup> Rating trigger features are associated with costs, which are paid by the holder of the swap.

<sup>137</sup> Sweden, for example, issued domestic debt with a duration of 4.6 years and then used derivative instruments to lower the duration by 1.1 years, achieving the desired debt portfolio duration of 3.5 years.

### **Box 6. Counterparty Credit Risk Related to Derivatives**

Debt managers carefully select their counterparties for derivative transactions by applying requirements such as minimum credit rating,<sup>138</sup> use of legal documentation (such as that of the International Swaps and Derivatives Association, ISDA), demonstrated market share, assignment of credit lines to each counterparty, weights for individual transaction types, and rotation of counterparties. The understanding and negotiation of ISDA agreements require, in addition to credit risk management, legal competence.

Debt managers generally acknowledge that derivatives do not offer a perfect substitute for direct funding, because derivatives include new types of risk (for the same level of market risks). As an example, a positive swap spread, measured by the cost difference of a euro area borrower issuing a bond in USD and swapping into euros, compared to direct funding in euros, is not always deemed sufficient justification. It has to be “sufficiently positive,” that is, to prove a compensation for the added risk of the swap transaction and cost of managing the positions.

Derivatives entail credit risk to the counterparty and operational challenges with valuation and day-to-day management. Common controls include transacting only with counterparties with a minimum credit rating and applying exposure limits to individual counterparties. Collateral management is important and has increasingly become common. It helps reduce credit risk, but raises further challenges with valuation, posting, and remuneration. Lower-rated sovereigns face additional complexity in that they themselves may have to pledge collateral, which also affects the cost-effectiveness of using derivatives in debt management and liquidity.

Exchange-traded derivatives reduce counterparty and operational risk through centralized clearing mechanisms, and are considered more transparent, liquid, and accessible to a broader range of market participants. Over-the-counter (OTC) derivatives, which are easier to develop, grow organically, do not require fully developed underlying cash markets, and are more customized. This distinction, however, is becoming less clear as electronic trading platforms, which, along with central counterparty clearing houses (CCPs), provide most of the execution and risk management benefits of exchange-traded derivatives, are developing rapidly (Cecchetti, et al., 2009). OTC derivatives can offer public debt managers greater flexibility to customize risk-reduction transactions to the specific risks in their portfolios. Also, even for bilaterally-traded OTC derivatives, CCPs can be used to mitigate the counterparty credit risk.

The basic components for the derivative market to function are similar to that of OTC fixed-income markets. Providing the enabling environment, including an adequate legal and regulatory framework, helps protect against counterparty risk in OTC trades and improves transparency and disclosure. Such efforts could enable emerging market countries to introduce derivatives at an earlier stage in their development, as they would not have to wait until cash markets are liquid enough to support an exchange-traded derivatives market.

Source: Authors.

## **E. Management of Guarantees and Other Contingent Liabilities**

The process for managing government guarantees, once a preliminary decision to issue a guarantee has been taken, is fairly extensive. This would include: (1) risk assessment of new guarantees and determination of fees, (2) monitoring and risk assessment of existing

<sup>138</sup> The G20 has called for the end of using credit ratings mechanically, effectively requiring sovereigns to perform their own credit analysis. However, it would be difficult to replace ratings in contractual triggers like those used to invoke the two-way collateral posting (see also paragraph 102).

guarantees, (3) coordination with borrowing operations, and (4) restructuring and recovery of called guarantees.<sup>139</sup>

The process for granting new lending and on-lending to government entities will be almost identical to that for granting new guarantees. Where the policy requirements are met for providing financing through a loan from the government, the policy assessment, the credit risk assessment, and the fee calculation (or yield spread over the government cost of borrowing) will be the same as for guarantees. The government will finance the loan through the budget in the normal manner, either as a direct loan from its revenue resources or from its own borrowing.

Governments also often take steps to manage the risks associated with contingent liabilities (including public–private partnerships, PPPs). If structured without appropriate incentives or controls, contingent liabilities are often associated with moral hazard for the government. To encourage positive incentives, steps can be taken to set up a clear legal framework for commitments creating explicit contingent liabilities that can be made by the government.

Loan guarantees and borrowing can be closely interlinked. These links are particularly prominent in the case of credit guarantees for foreign loans and sovereign borrowing in foreign markets where it is important to undertake sufficient consultation between the debt manager and the guarantee recipient. Proactive communication will help to project positivity to investors, as this may lead to more favorable terms for all parties involved.

Debt managers normally monitor contingent liabilities to the extent that they can impact the debt management strategy and its implementation. The governance framework for guarantees and on-lending can limit the level of credit risk in the guarantee portfolio, and coupled with a robust credit risk assessment framework can reduce moral hazard when guarantees are granted. It is furthermore important for debt managers to monitor the financial terms and loan documents to ensure that these do not unnecessarily impose a burden on them by negatively impacting interest rates. Finally, debt managers need to monitor the development of credit risk over the term of the guarantee to maintain a proactive approach to guarantees that could be called and could impact the debt portfolio. In this regard, it is also a good practice to make budgetary provisions for guarantees that are assessed to be potentially called. (For managing contingent liabilities and fiscal risks, see also IMF, 2016a).

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<sup>139</sup> The United States' Office of Management and Budget assigns a probability of default to guarantees and, based on changes on the risk assessment, the budget is charged or charges are released.



## **F. Management of Legal Risk<sup>140</sup>**

As debt managers typically have the legal authority to borrow, conduct LMOs, and enter into derivative transactions on behalf of the sovereign, they should have the capacity to understand and evaluate legal agreements.<sup>141</sup> In particular, debt managers need to use standard legal agreements for managing their credit and counterparty risk, for example, ISDA agreements including credit support annexes (CSAs) for full collateralization of exposures.<sup>142</sup> Further, debt managers and their legal advisors typically ensure that bond contracts incorporate sound legal features, such as legal jurisdiction, defining events of defaults, negative pledge clauses, collective action provisions, pari passu clauses, and the scope of the waiver of sovereign immunity (“Revised Public Debt Management Guidelines,” IMF 2014).

## **G. Management of Operational Risk<sup>143</sup>**

The operational risk management framework is an integral part of the risk management framework and requires both resources and a good understanding of risks. For the framework to be successful, it is extremely important to develop a culture of risk awareness and, with endorsement from senior management, to assign responsibility to line managers and more broadly to DMO staff. The process should include the following principles: (1) understand and document business activities; (2) identify, assess, and measure risks; (3) develop risk management strategies and business continuity plans; (4) implement capabilities; (5) monitor performance; and (6) continuous improvement (Magnusson et al., 2010, pp. 6–10).<sup>144</sup>

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<sup>140</sup> Management of legal and operational risks relate more to risk management and less to liability management operations.

<sup>141</sup> A clear legal mandate not only for borrowing and assuming contingent liabilities but also for conducting risk management/liability management activities, including through derivatives, buybacks, prepayment, among others, should be in place (see Addo Awadzi, 2015).

<sup>142</sup> A CSA sets out the rules between counterparties to a master swap agreement about collateral posting. In a typical one-way CSA, the sovereign’s counterparty is obliged to post initial and variation margin, whereas the sovereign does not have to, usually as long as its credit rating is above a specified threshold (see also footnote 23).

<sup>143</sup> Management of legal and operational risks relate more to risk management and less to liability management operations.

<sup>144</sup> In carrying out their responsibilities, DMO officials should have immunity as individuals from frivolous lawsuits relating to the sovereign’s debt-related decisions.

## H. Selected Liability Management Operations Used by Debt Managers

Table 2 summarizes typical LMOs used by debt managers for the various types of sovereign debt portfolio risks:

**Table 3. Liability Management Operations Used by Debt Managers**

Risk	Liability Management Operation
Refinancing risk/rollover risk	<p>Smooth maturity profile by well-planned primary market issuance</p> <p>Regular use of buybacks and exchanges to reduce size of large individual maturities</p> <p>Use of amortizing bonds/debt</p>
Funding liquidity risk and market liquidity risk	<p>Funding liquidity risks:</p> <p>Use of cash buffers and contingency credit lines</p> <p>Market liquidity risk:</p> <p>Issuance in key maturity segments; concentrate on small number of instrument types; transparency to reduce uncertainty</p> <p>Use of market makers and securities lending facilities</p> <p>Use of buybacks and bond exchanges to contribute to trading in on-the-run issues</p>
Interest rate risk	<p>Targets for issuance of fixed/floating rate instruments in primary market issuance</p> <p>Interest rate derivatives to change interest rate structure and duration</p> <p>Changes in portfolio composition to manage interest rate sensitivity</p>
Exchange rate risk	<p>Limits for overall foreign exchange risk and benchmark portfolio composition</p> <p>Well-structured primary market issuance</p> <p>Use of bond exchanges to achieve a targeted mix of local and foreign currency in the debt portfolio</p> <p>Use of cross-currency swaps or optionality in loan agreements (where they exist)</p> <p>Use of foreign exchange derivatives to hedge other foreign exchange risk deriving from other instruments such as foreign-currency bonds or CP, as well as assets</p>

Credit risk	Alerting fiscal authorities of the need to take appropriate action and address market concerns so sovereign bond yields and credit default spreads are reduced
Counterparty risk for derivative transactions and assets on the balance sheet	Counterparty credit risk limits Monitoring of counterparty creditworthiness and adequate posting of collateral
Legal risk	Use of standard legal agreements Sound internal processes and a legal strategy for the use of collective action and pari passu clauses; consistent application of cross default and negative pledge clauses
Operational risk	Internal structure that delineates responsibilities Well-documented internal processes and systems Four-eye principle and well-trained staff A risk management culture that rewards reporting of failed processes or close calls Use of standardized platforms such as DMFAS program
Contingent risk	Management of guarantees Risk assessment of new guarantees, on-lending and CLs

#### **IV. INTERACTIONS OF SOVEREIGN DEBT PORTFOLIO MANAGEMENT WITH FISCAL, MONETARY POLICY, AND FINANCIAL STABILITY**

As indicated in the Public Debt Management Guidelines (2014), debt management should be treated as a separate macroeconomic policy with its own policy objectives and the assignment of a separate policy instrument. Although debt management has increasingly become much more integrally connected with the other parts of financial management by the official sector, without proper policy assignment and accountability framework for debt management, fiscal targets may not be met. In order to reduce the variability of debt service cost, debt management responsibilities are often separated from fiscal and monetary policy to divide policy objectives, and thus enhance the credibility and effectiveness of policy implementation (Togo, 2007).

Communication among debt management, monetary, fiscal, and financial sector regulatory authorities should be promoted, with each authority retaining its independence and accountabilities.<sup>145</sup> Some forms of consultation, where applicable, might be helpful because they may provide policymakers, including financial regulators, with valuable input. In

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<sup>145</sup> The interaction between policy areas is embedded in the process of developing a debt management strategy, as it is outlined in the MTDS steps 4 and 5. Nevertheless, coordinating with fiscal and monetary authorities is often a major challenge.

particular, information sharing among debt managers and monetary authorities is crucial when monetary policy includes so-called non-standard measures, some of which are carried out directly in government bond markets.<sup>146</sup> In regulating and supervising financial markets and institutions, it may happen that certain measures may unintentionally hamper the functioning of the primary and secondary markets.<sup>147</sup> Consultations among debt management, monetary, fiscal, and financial regulatory authorities promote solutions that facilitate proper functioning of public debt markets, while also meeting financial policy objectives (IMF-World Bank, 2014).

### A. Fiscal Policy

Fiscal policy authorities and debt managers should share an understanding of the objectives of debt management, and coordinate on the inclusion of comprehensive debt servicing forecasts in the budget (“Revised Public Debt Management Guidelines,” IMF 2014). Debt managers require fiscal forecasts to adequately plan financing activities.<sup>148</sup> Conflicts may arise if fiscal policy makers attempt to reduce debt servicing costs in the short run, without due regard for the risks and longer-term costs (for example, through the use of zero coupon instruments or excessive short-term debt). In this regard, regular consultations and a feedback loop from debt managers to policy makers should remain active.

Fiscal rules, e.g., debt rules or ceilings, could affect debt management. Addo Awadzi (2015) mentions that the authority to borrow is often subject to controls designed to promote discipline and accountability, consistent with overall fiscal policy and public financial management objectives. The types of controls reflected in the legal framework are often shaped by policy and political economy realities and may include specification of the sources from which government may borrow, borrowing purposes, debt ceilings, and others.

The level of debt is mainly determined by fiscal policy, although ex-post the debt composition can play an important role. A debt management strategy would be formulated within a medium-term fiscal framework (MTFF). Debt sustainability analysis (DSA) will assess whether the fiscal policy implied by the MTFF, and the associated debt level, is sustainable over the long term. A DSA will show the development of debt ratios if (a) the primary balance does not change (improve) and (b) projections of GDP growth are closer to the historic outcome than the assumed outlook, and through bound tests to examine the impact on debt of shocks to key macro variables. The debt management strategy will add to

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<sup>146</sup> For example, quantitative easing (QE), where the DMO may no longer be the largest operator in the domestic debt market.

<sup>147</sup> For example, buying significant portions of a government debt issuance.

<sup>148</sup> A higher fiscal deficit typically leads to higher costs of funding, thus affecting debt management and the composition of the debt. This constitutes an important link between fiscal policy and debt management.

this analysis by providing a more detailed analysis of the cost and risk characteristics of different debt management strategies. Moreover, the debt manager may identify strategies that generate a profile of interest costs consistent with debt sustainability and strengthen fiscal planning by contributing an analysis of the likely, and possible, budget implications for debt service costs (IMF-World Bank, 2009). Box 7 illustrates a simplified debt sustainability framework.<sup>149</sup>

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<sup>149</sup> For the IMF's official debt sustainability frameworks (DSFs) and analyses in established market-access and low-income countries, see IMF 2002; 2003; 2005; 2011; 2013b; 2013c; 2013d; 2014a; 2014b; 2014d; 2015c; and 2016a.

### Box 7. Deriving Debt Sustainability Analysis Equations

The analysis can be extended in a variety of ways, including by allowing for exchange rate movements and varied interest rate structures.

In the following, variables are defined as follows:

Y = nominal GDP

D = end-period nominal public debt stock; d = debt-to-GDP ratio, D/Y

PB = nominal fiscal primary balance; pb = PB/Y

AS = nominal asset sales, privatization receipts, etc.; as = AS/Y

r = average nominal interest rate on the debt

I = nominal interest bill, assumed for simplicity to equal r times the previous period debt stock

g = real GDP growth rate

$\pi$  = inflation (measured by GDP deflator)

The analysis is conducted period by period on an annual basis, with subscripts t, t-1, etc., referring to the years in question. For simplicity r, g, and  $\pi$  are assumed to be constant in the following equations, although in practical application of a DSA, they are often allowed to vary from period to period.

#### Debt dynamics projections

The debt dynamics derive from the identity:

$$\begin{aligned} D_t &= \\ D_{t-1} + I_t - PB_t - AS_t & \\ &= \\ D_{t-1}(1+r) - PB_t - AS_t & \end{aligned}$$

Thus,

$$\begin{aligned} d_t &= \\ D_{t-1} (1+r) / Y_t - PB_t/Y_t - AS_t/Y_t & \\ &= \\ D_{t-1} (1+r) / [Y_{t-1} (1+g).(1+\pi)] - pb_t - as_t & \\ &= \\ d_{t-1} (1+r) / [(1+g).(1+\pi)] - pb_t - as_t & \end{aligned}$$

This is the equation used to project debt ratios forward year by year, based on the five variables r, g,  $\pi$ , pb, and as.

#### Contributions of different factors

Further, this debt dynamics equation may be used to decompose changes in the debt ratio according to the influence of these five variables:

$$\begin{aligned} \text{Increase in debt ratio} &= d_t - d_{t-1} \\ &= d_{t-1} (1+r) / [(1+g).(1+\pi)] - pb_t - as_t - d_{t-1} \\ &= d_{t-1} [1 + r - (1+g).(1+\pi)] / [(1+g).(1+\pi)] - pb_t - as_t \\ &= d_{t-1} [r - \pi (1+g) - g] / [(1+g).(1+\pi)] - pb_t - as_t \end{aligned}$$

Thus, while the influences of r,  $\pi$ , and g cannot be completely separated, the following breakdown of the increase in the debt ratio can be identified:

$$\begin{aligned} \text{Contribution of real interest rate} &= [r - \pi (1+g)] / [(1+g).(1+\pi)] * d_{t-1} \\ \text{Contribution of real growth} &= -g / [(1+g).(1+\pi)] * d_{t-1} \\ \text{Contribution of primary balance} &= - pb_t \\ \text{Contribution of asset sales, etc.} &= - as_t \end{aligned}$$

This decomposition can be used both to analyze why observed changes in the debt ratio in the past took place, as well as to understand why future projections of debt ratios take the path that they do.

#### **Debt-stabilizing primary balance**

The debt dynamics equation can be used to identify the primary balance that would be required to stabilize the debt ratio at a constant level, if  $r$ ,  $g$ ,  $\pi$ , and  $as$  are also assumed constant. In that case,  $dt = dt-1 = d$  and we have:

$$pb = d * [r - \pi (1+g) - g] / [(1+g).(1 + \pi)] - as$$

This is known as the “debt-stabilizing primary balance” and is one measure of the overall fiscal burden represented by the debt stock.

#### **Debt dynamics with exchange rate movements**

The following full debt dynamics equation encompasses changes in the exchange rate, and the effects such changes would have on the forex component of the debt. This would be used for scenarios involving changes in exchange rates of debt denominated in foreign currencies.

$$\text{Increase in debt ratio} = d_{t-1} [r - \pi (1+g) - g + \alpha \varepsilon (1+r)] / [(1+g).(1 + \pi)] - pb_t - as_t$$

where  $\alpha$  = share of foreign exchange denominated debt in the total and  $\varepsilon$  = nominal exchange rate depreciation.

Then, along with the contributions listed above, we also have the following term as the contribution of the exchange rate depreciation:  $\alpha \varepsilon (1+r) / [(1+g).(1 + \pi)] * d_{t-1}$

## **B. Monetary Policy**

The monetary policy regime, the instruments used for monetary policy operations, and the institutional setting, as well as the credibility of monetary policy, all have important implications for debt managers.<sup>150</sup> The core objective of the monetary authority is price stability. Targets for inflation, interest rates, monetary aggregates, or the exchange rate are managed through open market operations or through non-market controls, such as setting reserve requirements. A credible monetary policy will be successful in taming inflationary

<sup>150</sup> Abbas et al. (2014) discuss the interplay between fiscal/monetary policy and debt management in advanced economies. The unconventional monetary policy instituted by some central banks in recent years, i.e., purchasing of long-term government bonds, has also been pointed out to have important implications for public debt management. In particular, Blommestein and Turner, 2012, show that the Federal Reserve’s QE is identical in its macroeconomic effects to shortening the duration of the U.S. Treasury debt issuance. Also, Chadha, Turner and Zampolli, 2013, indicate that the average maturity of Treasury issuance lowered the long-term interest rates, while Greenwood et. al, 2014, document that the Federal Reserve’s attempts to reduce the supply of long-term bonds held by private investors through its QE policy were partially offset by the Treasury’s decision to lengthen the average maturity of the debt. Thus, central bank policies under the special circumstances of the Zero Lower Bound have taken direct action to shorten the duration of the government debt held by the public. In this context, if a central bank acts as a major buyer of government debt, its decisions on where on the curve is buying and on what maturities have significant impacts on the DMO’s planning.

expectations and reduce future uncertainty, which will in turn reduce the risk premium on domestic currency debt.

A clear and transparent framework for monetary policy and debt management contributes to the effectiveness of each policy. In general, where the level of financial development allows, there is a separation of debt management and monetary policy objectives and accountabilities. This principle helps to ensure that conflict between these two important public policy objectives is minimized.<sup>151</sup> For example, a government's objective for financing cost minimization, subject to a prudent level of risk, should not be viewed as a mandate to reduce interest rates, or to influence domestic monetary conditions.<sup>152</sup> Neither should the cost/risk objective be seen as a justification for the extension of low-cost central bank credit to the government.<sup>153</sup>

Monetary operations are often conducted using government debt instruments and markets. The choice of monetary instruments and operating procedures needs to be coordinated with debt management policies for effective overall policy implementation and well-functioning of the government debt markets. In countries with developed financial markets, central bank interventions usually take place in secondary markets, reducing the need for coordination between fiscal and monetary authorities at the operational level (IMF, 1994). In countries with less developed financial systems, central banks start issuing their own securities or use government securities as their intervention instrument for open market operations that are often implemented in the primary market, raising the need for effective coordination on issues such as the tender volume,<sup>154</sup> so as to allow the central bank to issue more securities than is strictly necessary for debt management purposes and decide on mechanisms to bear the cost of overfunding the government's budget (Gray and Pongsaparn, 2015).

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<sup>151</sup> When the central bank doubles as debt manager, conflicts of interest may also arise. The role of fiscal agency agreements/MoUs is crucial in clarifying roles and responsibilities and in providing mechanisms to minimize such conflicts.

<sup>152</sup> In this context, debt management operations should be consistent with monetary and exchange rate policy objectives, e.g., an external debt buyback should not antagonize possible exchange-rate strengthening policies.

<sup>153</sup> In principle, the central bank tends to be prohibited to lend money to (buy bonds from) the government, or, when the objective is to finance the government, the scope of this financing tends to be limited. In this context, all LMOs between the central bank and the government are typically transparent and cleared at market prices. This includes implementation of transactions where the central government exchanges short-maturity bills and notes issued by the central bank for longer-maturity bonds issued by the central government. In these cases, the central bank transfers cash (reserves) to the government (equal to the nominal value multiplied by the market price of the transaction). From the central bank's perspective, the transaction is equivalent to a buyback (with reserves), while from the government's perspective the transaction is a plain issuance.

<sup>154</sup> If the central bank needs to issue its own bills for open market operations, the market should know the sections of the T-bill yield curve that are reserved for central bank-bills and government T-bills. This is important for the market to be able to distinguish between fiscal and monetary operations.



### C. Financial Stability

Debt management plays an important role in securing the economic benefits of a sound policy framework in several ways. First, the debt management strategy is an essential complement to sound macroeconomic policies, an appropriate socio-political environment, and the judicious choice of a policy regime in achieving financial stability (Das et al., 2010). Second, improvements in the debt structure can be an essential complement to fiscal consolidation in ensuring a robust recovery in a post crisis environment. Third, such improvements, when implemented opportunistically (that is, during a cyclical upswing), can strengthen the effectiveness of managing public debt of countercyclical macroeconomic policy going forward, at a relatively low cost.

Financial institutions in most countries typically hold a significant share of public debt.<sup>155</sup> Debt managers must recognize that their actions can have a major impact on the balance sheets of these institutions. Regulations affecting debt management actions are important in this respect.<sup>156</sup> Moreover, given the usually high level of interdependence of financial institutions, the effects can have potential systemic implications. This impact is relevant not only when discussing possible sovereign liability management and debt restructuring operations, but also when thinking about the targeted composition of the debt.<sup>157</sup>

The public debt should have a structure that sustains low levels of refinancing risk for the sovereign throughout the business cycle. Inappropriate debt structures and poor debt management can inhibit a sovereign's ability to ensure financial stability by affecting investors' country risk perception and exacerbating pressures, initially on financial institutions' balance sheets, incomes, and capital reserves and ultimately on the sovereign balance sheet, thereby raising sovereign risks. Measures include the substitution of debt denominated in domestic currency for foreign currency or foreign currency-linked debt; an extension of the maturity profile of the debt portfolio at a reasonable cost; the assignment of maturity brackets that avoid a bunching of refinancing need; financial market reform that

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<sup>155</sup> In many countries, pension funds hold a large share of the long-term public debt instruments.

<sup>156</sup> Regular and comprehensive interaction between debt managers and regulators is crucial for systemic financial stability, as it would tend to minimize the introduction of measures that could have unintended consequences, e.g., measures that neglect particular (depth and/or liquidity) characteristics of government bond markets.

<sup>157</sup> However, there may be instances that the eventual composition of debt does not reflect the government's debt strategy. In Uruguay, for example, pensions paid by insurance companies (that receive the money from a pension fund at the time of retirement) must pay a minimum, set by law and expressed in terms of a unit linked to wages. Insurance companies must, therefore, hedge their liabilities in this unit with assets in the same unit ("unidades reajustables—UR"). The lack of instruments in UR led to their issuance by the government, although this was not part of the debt strategy. Also, LMOs could be constrained by the extent of commercial banks' holding of government debt and prevailing prudential regulations. Further, the stability considerations may impose constraints in sovereign debt restructurings when banks' holding of sovereign debt are substantial.

promotes diversification of the domestic financial sector (i.e., commercial banks, insurance companies, asset managers, etc.); and a widening of the investor base through, for example, attracting foreign investors into the domestic debt market.<sup>158, 159</sup>

Debt managers can play a key role in mitigating financial stability risks by:

- Playing a preemptive role in developing the investor base further, by issuing instruments targeted at a specific group of investors and by working on increasing a specific group's participation in the debt or in particular instruments.
- Facilitating bond liquidity. Doing so would not only reduce costs for the issuer through a liquidity premium and term transfers, but it would also enhance the efficiency of capital markets and in turn of LMOs, (Crocket, 2008). For these reasons, it has become accepted best practice to issue benchmark securities in large individual series, which are critical to creating the basis for a liquid bond market (and eventually of the futures and repo markets)<sup>160</sup> (IMF Diagnostic, 2014).
- Participating in debates on the regulatory scheme and trying to affect the rules in ways that improve the effectiveness of debt management policy and ultimately strengthen financial stability.
- Communicating with investors<sup>161</sup> and other key stakeholders and avoid abrupt changes in direction that could result in constant shifts in the investors' portfolios.<sup>162</sup> Under such conditions, investors cannot hold positions based on a medium-term

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<sup>158</sup> Typical concerns of nonresident investors include: (i) the exchange rate regime; (ii) the existence of capital controls; (iii) the ability to repatriate investments upon liquidation; (iii) access to the primary or secondary markets to purchase government bonds; (v) if nonresidents need to purchase bonds in the primary market through domestic banks, whether the banks would be willing to do so and/or they are mandated by the relevant authority to facilitate nonresident transactions; (vi) secondary market liquidity or ability to buy and sell at "fair value"; (vii) appropriate market infrastructure—clearing, settlement, and custody integrity.

<sup>159</sup> Despite its advantages, the attraction of foreign investors to the domestic market has also disadvantages, especially at a time when many foreigners decide to unwind their positions in local markets as a consequence of a perception or actual depreciation of the local currency.

<sup>160</sup> Issuance of benchmark securities, in large individual series should be mindful of bunching. Further, although governments issue in typical benchmark series, the market accepts the benchmark as relevant or not through pricing in the primary market. If a benchmark does not serve ALM demands of the investor base, the issue could come at a concession or at a higher price to the government. In addition, for yield curve and market development, the benchmark points on the yield curve must be relevant to private sector and SOE issuers, e.g., if corporates can issue out to the 3-year and SOEs out to the 5-year segments of the curve these benchmarks are relevant for pricing non-government debt.

<sup>161</sup> It is advisable to establish an Investor Relations Office for better communication mechanisms, so as to keep market participants well informed of debt management policies and strategies and of market development initiatives, as well as to seek feedback from the markets.

<sup>162</sup> For example, by changing capital charges for banks associated with holding government bonds or restricting the market making of banks, such as through Volker Rules.

view; instead, they have to keep changing instruments based on reports and perceptions, which increases their risk and the cost to the government.

Table 3 shows the main debt management channels to financial stability.

**Table 4. Debt Management Channels to Financial Stability**

<b>Channels</b>	<b>Preemptive Policy</b>	<b>Risk Mitigation Policy</b>
Stock of Debt	Issue low-cost, low-risk instruments.	Debt buybacks, debt exchanges
Profile of Debt	Issue low-cost, low-risk instruments.	Exchange auctions, derivatives
Investor Base	Diversify investor base; monitor investor base risk indicators and adapt appropriate strategy.	Debt buybacks, exchange auctions, investor relations programs
Debt Market Structure	Issue benchmark securities; establish appropriate primary dealers and market makers structure; coordinate with regulatory bodies; put in place appropriate legal framework; draft debt market development strategy.	Changes in legal framework and debt strategy
Institutional Aspects	Coordinate with monetary policy and cash-management policy; maintain good communications channels; adopt a well thought out program, taking into account international practices and domestic idiosyncrasies and constraints.	Changes in legal framework governance and debt strategy

Source: Das et al., 2010.

Debt managers generally maintain an understanding of the risk transfer to different investor categories and monitor their balance sheet structure. It is important for debt managers to understand that the majority of investors will be sensitive to market risk, given their requirement to value their government securities at market prices. To achieve this, debt managers need to monitor the investments of key players and the structure of their holdings, and assess their gross exposures. Doing so can give debt managers important information to gauge investors' appetite for new government securities and/or reversals in their preferences.

Debt managers should exercise caution when they are dealing with debt defaults or debt devaluations, and must consider the impact of their decisions on financial system stability. In cases where the government will need funding to go forward, the outcome of such a deal is crucial: badly conducted debt management could impair the government's ability to keep raising money efficiently in the markets. In cases of debt restructuring, it is imperative for debt managers to provide assessments on a broad range of topics, such as instruments to be issued and exchanged, haircut levels, and timing of operations (Kumhof and Tanner, 2005).

An often-overlooked contribution of a sound debt management strategy is the efficacy of tactical LMOs, in which debt managers credibly intervene in domestic debt markets in emergency situations to quickly rebuild investor confidence. In periods of distress but not loss of market access, appropriate adjustments in the size and maturity structure of issues, as well as undertaking targeted domestic debt buybacks, could quell investor concerns and help restore market confidence.<sup>163</sup> Also, the low level of market development in most developing countries, the still vulnerable structures of debt in many emerging markets, and the rise in debt levels in a number of developed economies make sound sovereign debt management even more challenging for global financial stability in the future, particularly given the higher global funding pressures. Understanding the risks and the channels of their transmission to financial stability is an essential element of formulating appropriate policies for strengthening domestic and international financial stability (Das et al., 2010).

A set of indicators can be used to analyze the size, liquidity, and contribution of government securities markets to domestic and global financial stability such as (IMF 2014 and Appendix 1):

- Macroeconomic variables: (1) GDP growth and inflation, (2) fiscal balance and public debt to GDP ratio, (3) current account and level and volatility of capital flows, and (4) share of household savings to GDP.
- Market structure: (1) debt securities statistics, (2) yield curve and structure of benchmark instruments, (3) composition and diversity of the investor base, (4) foreign holdings of local bonds, (5) types of fixed-income instruments, and (6) derivatives market and types of hedging instruments.
- Market liquidity: (1) volume of outstanding benchmark instruments, (2) size of transactions and turnover ratios, (3) bid–ask spreads, (4) bid to coverage ratios, and (5) accepted ranges of bids in the primary market.<sup>164</sup>

#### **D. Cash Management**

Cash management has implications for debt management and a wide range of policy issues.<sup>165</sup> The first policy consideration is directly relevant for fiscal management, where budget execution interacts with cash inflows and outflows. Cash management should provide

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<sup>163</sup> Debt buybacks to prop up bond prices during periods of debt distress should be used with great caution, especially if they involve the use of substantial amounts of international reserves, as they may not be successful in the end.

<sup>164</sup> The higher the coverage ratios and/or the tighter the accepted ranges, the better the competition, demand, and liquidity.

<sup>165</sup> Cash management is closely related to rollover/refinancing and liquidity risks management (see section III.A and B). Further, banking regulations, e.g., the Basle III Liquidity Coverage Ratio requirement, could impact the decisions on cash balances.

flexibility to accommodate temporary fiscal shocks,<sup>166</sup> thereby minimizing their impact on the orderly execution of the budget. The second policy consideration relates to the extent that the level of cash balances is a policy target. Minimizing idle cash balances reduces the economic cost of borrowing, where effective targeting requires cash flow forecasts, and efficient budget execution facilitates their preparation.<sup>167</sup> Depending on how closely the cash balance target is met, there are likely to be benefits to monetary policy, which is the third policy consideration. In other words, cash management should contribute to the smooth implementation of monetary policy by the central bank. The fourth policy consideration is particularly relevant for debt management because it involves market transactions to meet the target in a way that enables the sound financing of any deficit or the management of excess resources. Finally, the fifth policy consideration is how those actions support or impede domestic market development (Williams, 2010).<sup>168</sup>

Cash management is distinct from budget execution. Budget execution is concerned with ensuring that the budget is managed consistently within agreed financial limits. This covers aspects from control over cash releases linked to resource availability, to ensuring that releases are in line with spending commitments, through to delegation of budget management to line ministries. In contrast, cash management is concerned with ensuring that the government has the liquidity available to fund its expenditure in a timely manner and to meet its obligations as they become due. This requires planning ahead and making cost-effective use of the government's available cash. Cutting planned expenditure because of a lack of cash is cash rationing. It would not be considered cash management; rather, effective cash management removes the need for cash rationing (Lienert, 2009).<sup>169</sup>

Government banking arrangements are an important factor in managing and controlling government cash resources. Such arrangements are critical for ensuring that (1) all tax and non-tax revenues are collected and payments are made correctly in a timely manner and (2) government cash balances are optimally managed to reduce borrowing costs (or to

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<sup>166</sup>The use of Cash Management Bills has been advocated as a means of providing temporary fixes to temporary situations. For example, it is better to borrow for six weeks if that is how long the cash requirements last.

<sup>167</sup> However, the Minister of Finance/Treasurer and debt manager need to maintain a balance as a precautionary level for, e.g., a failed auction, inability to hold an auction (because some sort of a natural occurrence may prevent it, such as a storm or earthquake), etc. (see also last two paragraphs of this section).

<sup>168</sup> Also, it should be ensured that the cash when withdrawn does not destabilize the bank that had held the deposit. Further, if the cash is held at the central bank, it should be ensured that its withdrawal does not upend the implementation of monetary policy.

<sup>169</sup> Effective cash management, especially when integrated with debt management, should be based on a cost-risk approach, which includes handling of both positive and negative cash balances in a cost-risk efficient manner.

maximize returns on surplus cash). This is achieved by establishing a unified structure of government bank accounts via a treasury single account (TSA) system.<sup>170</sup>

A TSA is a prerequisite for modern cash management and is an effective tool to establish oversight and centralized control over government cash resources. It provides a number of other benefits and thereby enhances the overall effectiveness of a public financial management (PFM) system (Pattanayak and Fainboim, 2011).

This centralization of government cash balances is particularly important. In most advanced countries, nearly all revenues are consolidated daily in a TSA, which is under the control of the Treasury of the MoF or the DMO.<sup>171</sup> Through the TSA, the MoF has full access to all cash resources held in the central government ministries and agencies at any given time. The main bank account of the TSA system of accounts is held at the central bank and is used for receiving all government revenues and making government payments. When establishing a TSA, the government payment function can be centralized—with all disbursements made directly from the main operational account of the TSA at the central bank (with few exceptions). Alternatively, payments can be decentralized, and made by spending ministries from accounts held in commercial banks. Each day, the balances in ministries' bank accounts are swept into the TSA, and the government's cash manager ensures that only a minimum end-of-day balance remains in the TSA's main account at the central bank. Temporary cash surpluses are usually remunerated by the central bank or placed in financial market instruments.<sup>172</sup>

The coverage of the upcoming TSA needs to be comprehensive to be effective. The coverage should extend to all government-funded entities and special accounts. Public corporations that are not discharging a government function should remain outside the TSA to preserve their autonomy to operate on a commercial basis. If a public company is discharging a government function, however, it should be designated as a government unit in line with the definition in the *Government Finance Statistics Manual 2014*, and its activities and resources should be integrated with the budget and the TSA. The separation between the permission to spend and making actual cash payments means that flows through the TSA must be the focus of the forecast. Ideally, forecasts of daily cash flows across the TSA should be available for at least three months ahead. This must be coupled with an ability to monitor actual changes in the aggregate balance of the TSA top account, close to real time.

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<sup>170</sup> Or, creating cash sweep mechanisms that mandate the use of cash resources to repay outstanding debt (principal and interest) on time.

<sup>171</sup> Many debt managers nowadays are also responsible for the government's cash management, e.g., Sweden, given the close link and interaction between debt management and cash management. For example, debt managers through cash management can operate on the entire yield curve and with several instruments, which also expose debt managers to new risks such as funding liquidity risk and credit risk.

<sup>172</sup> This relates to the difference between centralized and decentralized treasury management.

Forecasts of future cash flows are essential for more active cash and debt management and planning debt issuance. Debt managers need to know what to borrow and when. This is a precondition for planning future borrowing, and making decisions on the range of instruments to issue. These decisions involve assessing tradeoffs of bills and bonds, taking into account demand, supply, and price information. In relation to demand, intermediaries and/or end-investors may need a steady flow of T-bonds to meet their obligations or shorter-term instruments for liquidity management. Their needs will vary throughout the year with their own cash flows and market developments. An additional important task facing debt managers is linking issuance dates with redemption dates to maximize the opportunities for investors to roll over into a new issue. Maturity dates should be selected to avoid weeks, and especially days, of heavy cash outflow (for example, salary payments<sup>173</sup>), and indeed should target days of cash inflow (the due date for tax payments). Debt managers can mitigate the cash management problems that potentially arise when large bonds come to maturity (Appendix section III.A.) (Williams, 2010).

Cash management has an important role in the management of refinancing risk. Building a cash buffer to meet upcoming maturities has an opportunity cost, as the sovereign's funding cost is higher than the return on the buffer because the yield curve is typically upward sloping.<sup>174, 175</sup> Therefore, there is a trade-off to assess between cost on one hand, and the benefits and possible risk reduction provided by the buffer on the other. Commonly, cash buffers consist of a (1) transactions buffer for an unanticipated fall in cash balances stemming, *inter alia*, from the combination of volatility and forecasting errors in the cash forecasting, and (2) a safety buffer for an unanticipated fall in cash balances stemming, for example, from sudden disruptions in capital markets for a period when no bond/bill issuances would be possible.<sup>176</sup>

The size of the cash buffer should, *inter alia*, be based on the debt manager's needs in its debt and liability management operations. Some countries determine their cash buffers as the maximum amount of financing needed if capital markets were disrupted for several months, and no issuance could take place during those months. Another rationale for the buffer, closely related to the first, is to provide comfort to investors that will be able to honor its debt

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<sup>173</sup> Or, yearly PIT refunds of overpayments.

<sup>174</sup> Formal measures should be used to determine the range within which funds should be invested.

<sup>175</sup> Trading strategies that leverage the shape of the yield curve could result in cash being invested in longer-term assets, but only funded (and hence held) for a shorter period. This strategy could produce a positive carry, which exploits the upward shape of the yield curve.

<sup>176</sup> Having access to contingent credit lines from multilateral and bilateral agencies could also serve the purpose of cash buffer to deal with exogenous shocks.

obligations. A flexible cash buffer would be needed to leave room for inflows from possible pre-financing. Finally, a cash buffer may be used for contingent liabilities and/or for buybacks of outstanding maturities, which will also influence its size. The last three factors are directly related to LMOs.<sup>177</sup>

### **E. Institutional Factors**

Transparency and accountability are key factors in debt management operations. This follows from the debt management objectives, which should be clearly defined and publicly disclosed, and the measures of cost and risk that are adopted should be explained. The legal authority to borrow should state who has the authority to undertake transactions on the government's behalf. The organizational framework for debt management needs to be clearly specified, and the mandates and roles well-articulated. Experience suggests that there is a range of institutional alternatives for locating the public debt management functions, including in one or more of the following: the MoF, the central bank, or an autonomous debt management agency. Regardless of which approach is chosen, consolidation of debt management functions in the same authority could enhance efficiency in debt management operations. The key requirement is to ensure that the organizational framework surrounding debt management is clearly specified and that the mandates of the respective players are clear. This gives debt managers the operational independence to execute their strategies and objectives.<sup>178</sup>

Experience shows that unless there are compelling reasons related to effectiveness, it is not advisable for different agencies to be responsible for the same set of functions (Wheeler, 2006). Government debt management generally operates more efficiently if responsibility for decision making and implementation is not spread across several government departments (such as the ministries of finance, planning, and commerce) or across several different departments within the MoF. In most OECD countries, responsibility for government debt management is centralized either within the MoF or in a DMO outside that ministry. When a DMO is established outside the MoF, the ministry should retain the key responsibility for advising the minister of finance on debt management strategy (often in conjunction with the

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<sup>177</sup> In principle, the scope of cash buffers should be clear, i.e., whether they are only intended for debt service payments or if they could also be allocated to other purposes, e.g., LMOs. Further, if the cash buffer can be used for fiscal purposes and is part of the TSA, there is a risk of fiscal leniency, as different interest groups could exercise pressure on the government for increased public expenditure, e.g., salary increases. To avoid such eventuality, a contingent credit line with a multilateral agency may be a more effective policy, as the funds will be available (in the multilateral) to pay for debt services should there be a market disruption, but they are not available in the government's treasury for any public expenditure.

<sup>178</sup> Another key feature is linking the budget authorization to the debt issuance authorization. Otherwise, it could result in a similar impasse to the debt ceiling that is periodically observed, e.g., in the United States.



debt office) and for approving important risk management policies or advising the finance minister on them.

Governments' centralizing debt management functions have generally opted for two types of DMOs.<sup>179</sup> One type is an office established outside of the MoF but reporting to the minister of finance. Legislative options include either a specific and detailed legislation or a broader government legislation involving regulations, decrees, or policy decisions.<sup>180</sup> The other type is an office located within the MoF or treasury.

An office located outside of the MoF warrants sound governance arrangements and involves an additional monitoring function by its principal. Experience shows that the farther removed the DMO is from the MoF, the more formally monitoring must be carried out to manage agency risk. Governance arrangements can consist of boards of directors or advisory boards, where financial accountability requires internal and external audit arrangements. Furthermore, a government instruction is required to specify the activities of the debt management agent. It is unavoidable that the government needs to retain sufficient competence to both monitor the agent and the enactment of the instruction. Officials from OECD countries have acknowledged that oversight given to them by MoF officials has been weak because of the small number of staff dedicated to oversight and insufficient training in debt management (Currie, Dethier, and Togo, 2003).

For developing and emerging market countries that are only beginning to develop the role of government debt management, the arguments for building this competency within the MoF are compelling and setting up an autonomous DMO when adequate capacity to manage the government debt has been developed.<sup>181</sup> A key issue for emerging market economies is the limited degree to which debt management policy can reasonably be implemented independent of other policy-making bodies, notably the monetary authorities, and the challenges facing the government in developing the government securities market (see Appendix 1). This has important implications for the governance and location of the DMO. In the context of achieving the stated objectives and strategic target, if the debt manager is

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<sup>179</sup> A third option could be the central bank providing DMO services. However, this option is typically not preferred as it allows the central bank to use the DMO to execute monetary operations. Further, the central bank can serve as the government's agent for certain debt management operations, including execution of auctions, based on agency agreements between the institutions.

<sup>180</sup> Including whether the staff is on the same salary scale as other civil servants.

<sup>181</sup> By "beginning" stage we define the period when debt management is focused on the back-office function, and the front-office activities are limited to borrow funds from multi- and bilateral institutions, and to issue T-bills and some medium-term bonds in the domestic market, commonly handled by the central bank. Also, by "adequate capacity" we mean the development of appropriate expertise to prepare an MTDS based on an analytical tool that includes a quantitative analysis of the market risks embedded in the debt portfolio under different scenarios, i.e., the ability to set up a professional middle office.

unable to influence the composition of the debt portfolio—or if its actions are significantly compromised by the actions of other policy-making bodies—then the need of having an MTDS and the degree to which the debt manager can be held accountable for its own actions become questionable (Currie, Dethier, and Togo, 2003).

Many DMOs have adopted an organizational structure similar to that found in leading corporate and banking treasuries and in the reserve asset management departments of many central banks. Functional responsibilities for managing transactions are divided among offices within the debt management organization, and procedures are established to ensure internal control and accountability (Wheeler, 2004). Usually, this involves the creation of front, middle, and back offices and of separate reporting lines to the head of the debt office (Box 8).<sup>182</sup>

#### **Box 8. The Organizational Structure of a Modern Debt Management Office**

The organizational structure of modern debt management offices is based on the separation of responsibilities among the front, middle, and back offices. This facilitates both specialization and effective operational risk management. The key functions are:

- Senior management (supported by internal audit and compliance)
- Front office: primary issuance and execution, internal and external, and all other funding operations, including secondary market transactions (debt and cash), portfolio management and hedging transactions
- Middle office: policy and portfolio strategy development and accountability reporting; Internal risk management: policies, processes, and controls
- Back-office: transaction recording, reconciliation, confirmation and settlement; maintenance of financial records and database management

Source: Wheeler, 2006.

## **V. SOVEREIGN DEBT PORTFOLIO MANAGEMENT AND DOMESTIC AND INTERNATIONAL MARKET ACCESS**

Domestic and international market access plays a critical role in sovereign issuance decisions and in undertaking liability management operations. The level of domestic debt market development, along with its instrument sophistication, and the nature of investor base often determine the availability of various funding sources and the potential impact on considerations of specific LMOs. As mentioned, these issues are integral elements of the process of developing a debt management strategy.<sup>183</sup>

<sup>182</sup> Some DMOs, e.g., Sweden, Germany, have set up separate, independent risk functions from the front, middle, and back offices. In particular, they divide risk management between (i) the execution and (ii) setting of requirements, control, and reporting.

<sup>183</sup> For example, they are explicit in the MTDS process, step 3.

Domestic government securities markets are usually the principal source of funding for governments.<sup>184</sup> A well-functioning and liquid bond market provides the government with a stable source of funding at reasonable costs and desirable maturity (see Appendix 1). The ability to increase the supply of bonds, without a significant negative impact on their pricing and the overall cost of capital, creates an additional tool for countercyclical policies at normal times and adequate policy space at times of crisis.

When international sovereign bond issuance is undertaken in the context of a sustainable debt framework, it can enhance a country's available resources and, hence, its prospects of sustainable growth and prosperity. Other benefits include: (1) the additional incentive to increase macroeconomic discipline and move forward with structural reforms—a result of the intense scrutiny of the domestic economy by credit rating agencies and international market participants;<sup>185</sup> (2) the establishment of the sovereign's presence in the international capital markets, which could also allow local corporates to access international markets in the future; (3) the diversification of the sovereign debt portfolio; (4) lengthening of the maturity structure in the absence of longer-dated securities in the domestic market; and (5) the substantial broadening of the country's investor base (Agenor, 2001, Ditmar and Yuan, 2008, and Das et. al, 2008).

#### **A. Role of Domestic Markets in LMOs**

Development of the domestic and foreign government yield curves is imperative for attracting a relatively diverse investor base and accurate pricing of government instruments in issuances and LMOS. When debt management operations are able to lower the government yield curve, there will be some beneficial spillover effects on other domestic debt issuers. In addition to developing a benchmark domestic curve with a range of maturities for various investor groups, it is also crucial to maintain a diversified product range that includes GMTN/EMTN programs for private placement in domestic and foreign currency, inflation-linked bonds, floating-rate bonds, and, for some countries, retrial debt products, e.g., Ireland. Further, other indexed instruments, e.g., GDP-linked and financially-indexed bonds, may be considered depending on the specific country's circumstances and investor demand. For example, financially-indexed bonds, such as long-term bonds whose return is indexed to a short-term rate, allow the issuer to lengthen the maturity of the debt (though not the duration) when the term premium (i.e., the yield on a bond of  $x$  years that exceeds the average of expected future short rates over the life of the bond) is particularly steep and thus issuing fixed-rate bonds would be too costly.

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<sup>184</sup> In this sense, “domestic” excludes regional market access for members of monetary unions, e.g., ECCU, with regional government securities markets.

<sup>185</sup> In turn, this may lead to more stable sovereign credit ratings, more stable funding costs, and less foreign exchange rate volatility.

Domestic markets can play an integral role in sovereign debt portfolio management, and vice versa. Market development can be considered in terms of three stages of development with different priorities (see also Appendix 1): (1) initial stage: negligible liquidity in the primary market, focus on establishing a functioning primary market and creating the preconditions for secondary market development; (2) deepening stage: basic elements of the primary market and secondary market are established and functioning, focus on improving liquidity on the secondary market; and (3) maturing stage: well-functioning primary market, liquid secondary market in normal times, focus on the development of sophisticated instruments and segments such as derivatives, and making the market internationally competitive (Árvai and Heenan, 2008).

Reforms that target the investor base are usually regarded as fundamental at early stages of government securities market development. An early start of the process of pension and insurance reform might be prudent because of the time it takes to feel the positive impact of such reforms on the capital market. Taking concurrent initiatives with short- and long-term effects, therefore, needs to be considered. The resources available in both the public and private sectors set limits for this kind of sequenced market development. A needs assessment early in the process will be essential to devise an optimal allocation of the scarce resources among different initiative possibilities (Appendix 1).

### **Investor Base**

Government securities should be accessible to different groups of investors. An investor base for fixed-income securities, which is as large and diversified as possible, is important for ensuring high liquidity and stable demand in the market. Development of contractual savings is important in this context, as contractual-savings vehicles such as pension funds and mutual funds provide a natural market for medium- and longer-term government debt.

A heterogeneous investor base with different time horizons, risk preferences, and trading motives ensures active trading and consequent high liquidity, and enables the government to execute its funding strategy under a wide range of market conditions. Efforts should be made to ensure equity of treatment of investors, and measures should be taken to ensure the competition of collective investment managers by introducing market indices, performance league tables, and market valuation of assets.

A complex strategic issue for debt managers that has important implications for macroeconomic-financial stability is the decision to broaden the investor base by attracting foreign investors. Some studies focus on the role of foreign investors in reducing the cost of sovereign debt issuance. Peiris (2010), for example, estimates the impact of the entry of foreign investors on the volatility and level of emerging markets' government bond yields, concluding that the significant presence of foreign investors could reduce borrowing cost, lengthen the maturity of debt, and improve market liquidity. Moreover, foreign investors place an emphasis on the quality and services of intermediaries and their commitment to

sound, safe, and robust market infrastructure. A well-established investor relations program, along with transparency in debt management strategies and operations, is crucial to attract and maintain a stable investor base for ordinary issuances, LMOs, and sovereign debt restructurings (IIF, 2014).

Notwithstanding, it is important for governments to bear in mind the cost-risk tradeoff of attracting foreign investors as a strategy for broadening the investor base. Aspects such as debt portfolio maturities, the point in the business cycle, and volatility of investors can contribute to risks for debt managers. Foreign investors tend to be relatively sensitive to risk, and to manage their portfolios actively, they may make national markets more volatile and vulnerable.<sup>186</sup> Such risks can arise, as even small changes in global asset allocation can generate capital movements that may cause exchange rate overvaluation, asset price bubbles, or credit booms, all of which can affect macroeconomic volatility. Thus, ensuring a stable macroeconomic environment and prudent capital account liberalization is essential to maintain a stable and growing participation of foreign investors in government securities markets (see also Appendix 1). Further, monitoring of foreign investor flows and holdings, including amounts and maturities, would be important for detecting possible adverse changes in investors' sentiment and thus preventing emerging abrupt capital stops and consequent crises.

### **Domestic Debt Instruments**

The development of domestic government securities markets depends on economic size and financing needs, supporting a wide range of policy objectives. It is important that senior policymakers explicitly recognize the potential benefits and costs of creating and deepening government securities markets so that sufficient high-level support can be sustained throughout the process (see Appendix 1). It should be acknowledged, however, that the degree of required and feasible government securities markets development will depend on the economy's size, level of development, and the needs of the public and corporate sectors (IMF, 2014).

In addition to covering financing needs, experience shows that a number of countries issue government securities to: (1) provide a benchmark yield curve for the corporate debt market; (2) support liquidity management operations of the central bank; (3) provide an investment alternative with little or no risk of default for investors; (4) maintain and develop smooth functioning, liquid, and efficient financial markets; and (5) provide market infrastructure through a robust payment and settlement system and a strong legal framework (that is, collateral and bankruptcy laws). A strategy of maintaining the domestic debt market despite the lack of fiscal needs will imply a fiscal cost, typically in the form of negative carry. However, given a favorable macroeconomic environment and lack of financing need, the net interest cost is likely to be low considering the benefits described here. The financial cost

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<sup>186</sup> They are also less easily suborned into rolling over the debt through moral suasion.

may even pay off should financing needs do arise and the domestic market is readily available.

The operation of the primary market should be transparent and predictable and strive to maximize competition among investors to derive the best possible results for the government. To the extent possible, market-based mechanisms such as auctions should be used when issuing securities, and the issuance strategy should seek to provide for government securities in key maturities. The success of auctions will be enhanced by, among other things, ensuring that relevant and timely information is communicated on the government's finances and issuance plans; sound custody and settlement arrangements; a good number of participants of a variety of different types; and liquid money and secondary bond markets which, by reducing liquidity risk of holding term debt, assist investors to maximize their participation (see Appendix 3).

The debt manager is in a key position to influence the development of the government securities through: (1) choice and design of instruments, (2) issuance patterns and its communication channels, and (3) offering procedures and access to the primary market.

Securities are fungible when they belong to the same issue, and are perfect substitutes because the features that identify them (currency, maturity date, nominal amount, coupon, and settlement) are identical. Experience has shown that there is a direct relationship between fungibility of securities and market liquidity. In other words, fragmentation of issues leads to illiquid markets, which mean higher risk and funding costs. In this sense, the cost of market fragmentation outweighs the benefit of portfolio diversification. For example, a high degree of fragmentation increases the financing costs of market-makers because they have to hold larger inventories of securities of different issues, instead of concentrating their portfolio on fewer and more liquid issues. This also adds to the market risk of their portfolio and to their inventory costs.<sup>187, 188</sup>

In the early stages of government securities markets, the trend is to have a multiplicity of issues to either accommodate different investors' preferences or to smooth the central government cash flows. The transition from multiple and fragmented issues to a situation with few selected and high-volume benchmarks takes time and should be carefully assessed (see Appendix 1). It should be approached with a combination of strategies depending on the origin of the fragmentation, the market capacity to absorb standardized issues, and the ability

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<sup>187</sup> In principle, this also argues against governments issuing partially guaranteed debt (e.g., IDA and Ghana), secured debt (i.e., Brady Bonds), bond with puts or other special features (extendable bonds previously cited), bond by SPVs for fiscal purposes (e.g., Ematum). Further, it argues against different tax treatments (e.g., U.S. municipal bond market).

<sup>188</sup> Further, it can increase operational risk. This could be the case with Rule 144A global securities, where 144A domestic instruments may not be fungible with those previously issued and offered in another listing place (i.e., the issue has two different securities that do not fungue).

of the issuer to manage the concentration of a higher volume of maturing debt on specific dates during the year.

A government debt benchmark is an issue with sufficient liquidity against which the performance of other bonds can be measured. Typically, public debt developed markets structure their issues around a predefined set of benchmarks ranging from short- to long-term standard maturities. The latter can be represented graphically as a plot that combines the yield and term to maturity, which is called the “benchmark yield curve.” This is a very useful analytic instrument for markets and policymakers. The benchmark yield curve underpins pricing of all the relevant areas in the securities markets: primary market issues from the public and private sectors, secondary market trading of equivalent issues, derivatives markets (repo,<sup>189</sup> interest-rate futures, options/swaps), and valuation of institutional investors’ portfolios.

Some common features related to their design and volume can be identified in benchmarks that have been developed in liquid markets. In terms of their design, securities in benchmark issues are plain vanilla and typically, if not exclusively, bullet (discount or fixed coupon depending on the maturity); standardized in terms of maturities and denominations, according to pre-established international market conventions; and reduced in number of maturities, which are also sufficiently different so that they do not compete with each other. As far as volume of benchmarks is concerned, there is not a standard size, but it should be enough to provide secondary market liquidity. Liquidity is directly dependent on size, but is also related to the size of intermediaries and the microstructure of the market (secondary market and settlement arrangements). Benchmark building implies a very active strategy in issuance policy, as well as monitoring liquidity of outstanding issues. Liquidity of benchmarks depends on the amount outstanding, the time since issuance, and distribution among investors and dealers.<sup>190</sup>

When transitioning toward benchmarks, it is important to:

- Understand the time and the path, taking into account the issue structures during the different phases of the transition.
- Decide on the instruments that will be used for concentrating outstanding and new issues. This could include, depending on the context, letting fragmented issues mature or establishing exchange programs of fragmented issues for new standardized ones. Instruments that could be adopted on a regular basis to monitor and improve liquidity of outstanding issues are re-openings, buybacks, and issue exchanges.

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<sup>189</sup> A well-functioning repo market, utilizing a master repo agreement, is crucial in adding market liquidity.

<sup>190</sup> Liquidity is also enhanced when the central bank operates a floating exchange rate regime and the capital account is open to foreign investors. Then, foreigners can punt on the credit and on the foreign exchange.

- Initiate a proactive strategy of market benchmark building through market consultations with intermediaries and investors. Guidelines are usually designed and implemented in coordination with all the other aspects mentioned in this analysis related to market design in terms of the participants in the primary market, the type of issuance mechanism, and the organization of the secondary market.

There are various devices to increase outstanding volume per issue:

- Re-open issues to place the same issue along various pre-announced and sequenced auctions until the target volume has been achieved (see Appendix 3). Some factors that have the effect of inhibiting re-openings are: (1) the issuance of new issues that compete in maturity with the remaining maturity of the older issue, changing market conditions that make the coupon of the on-the-run issue very different to the market required yield, and diminishing secondary market liquidity for the on-the-run-issue.
- Use buybacks and exchanges of outstanding securities. This mechanism intends to reduce market fragmentation by withdrawing illiquid outstanding issues and replacing them with new more liquid issues. This is also used to smooth the profile of maturing debt in cases of rollover risk, which is also a potential consequence of benchmark building because it implies higher volumes of debt maturing on fewer dates. Exchanges of large bonds before maturity also greatly avoid the cash management problems that can potentially arise on maturity.

The time passed since a benchmark was first issued can be a very relevant factor for its liquidity.<sup>191</sup> In most cases, the longer the time passed, the less liquid the benchmark, because the market and investors' preferences might have changed, making that issue less attractive.<sup>192</sup> This is why benchmarks are the latest issue within a given maturity, which in general is the issue that is still on the run. Frequently, the life cycle of the benchmark bond is identical in length to the life cycle of the on-the-run issue. Also, the end of the life cycle of the benchmark might make it advisable to follow a strategy of buybacks or exchanges to reduce fragmentation. This would be particularly important in markets in which the overall size of the debt is not very large.

A broad distribution among investors and dealers would be another relevant factor to build liquid benchmarks. The more widely held among active traders, the more liquid the benchmark. Some measures to promote a wide distribution are: (1) a sufficient issue size so that no participant holds the majority of the issue and renders it illiquid; (2) a careful

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<sup>191</sup>Also, the wider the spread between the coupon of a bond and its yield, the less liquid the security is considered. However, benchmark bonds issued in the past at certain rates can still be traded in large volumes if rates have changed considerably.

<sup>192</sup> Or, enough of the bonds have gravitated toward buy and hold investors, like insurance companies.



selection of primary market participants so that they are wholesale and active traders, which eventually can be combined with a primary dealer scheme; and (3) quantity limits in the auction in the event of large participants that can take a too high proportion of the issue.<sup>193</sup> Finally, a gradual approach in building market benchmarks in representative maturities along the yield curve is key for the sustainability of the market. A too high concentration in the short end exposes the government to refinancing risk, whereas concentration in the longer-term end of the yield curve transfers interest rate risk to market participants.

Extending the selected maturities along the yield curve is generally a gradual process that starts with the consolidation of benchmarks for the T-bill segment. The next step would be to issue benchmarks for the medium term (for example, two-year and three-year bonds). After consolidating the medium-term benchmark, a similar approach might be followed for longer terms (for example, 5-year, 7-year, and 10-year).<sup>194</sup>

### **B. Role of International Capital Market Issuance in LMOs**

International bond issuance increases the funding options for a sovereign issuer, but also entails several debt portfolio risks. The key challenge for all sovereign bond issuers, including first-time issuers, is to maintain sound macroeconomic policies, especially fiscal sustainability. This is needed to ensure sovereign creditworthiness, as international investors' confidence in many emerging market countries and low-income countries is often fragile and quickly reversible. Other risks include the sovereign's foreign currency risk exposure from an international bond issue, possible refinancing needs—especially in periods of tight international financial liquidity conditions—and adverse terms-of-trade shocks (Papaioannou, 2008).

To reduce the risk of unfavorable developments related to a debut issue, sovereigns need to make appropriate preparations before accessing the markets. Judging by past successful cases of sovereigns that accessed capital markets, most governments' preparations had primarily focused on issuing and utilizing the proceeds of a debut bond without compromising the sovereign's creditworthiness. Before a debut bond was issued, appropriate analysis was undertaken to examine its balance sheet implications within a medium-term macroeconomic framework. This was to ensure that additional fiscal and debt-related vulnerabilities, as well as adverse effects on international reserve dynamics, did not arise. In this process, the sovereign also had to define the specific strategic characteristics of a debut issue, including

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<sup>193</sup> In effect, this highlights the need for auction rules and procedures.

<sup>194</sup> As the prevailing government yield curve provides the price or cost (coupon rate) that a sovereign issuer needs to pay in the primary market for the indicated maturities, any lengthening of the average time to maturity that involves issuance of longer-term benchmarks would require extrapolation of the prices or costs based on the longest current benchmark. In this process, attention should be paid on setting appropriate coupon levels, e.g., rates that do not result in orders of 2 to 3 times the target issuance size.

its size, maturity, choice of fixed versus flexible interest rate, and currency of denomination.<sup>195</sup> Further, tactical issues, including the choice of legal and financial advisors, lead managers/underwriters, and jurisdiction of issuance, were paramount in making decisions about a sovereign debut debt issue.<sup>196</sup>

An international issue includes an increase in transparency and closer market scrutiny. The prospectus or the offering memorandum of a bond issue requires disclosure of a substantial amount of data, allowing investors a close look at the current economic situation of the issuing country, and a better assessment of the country's prospects for successfully meeting its debt service payments. The successful issue of an international bond signals approval of current and planned economic policies, and may help maintain a steady momentum in maintaining prudent macroeconomic policies and carrying out critical structural reforms, especially because markets subject issuers to close scrutiny and monitor economic developments on a regular basis.<sup>197</sup>

When planning for an initial international bond issue, the government needs to make a number of decisions at various points in the process. Some are broader and more strategic in nature, and can be best addressed in the context of an asset liability management framework and a medium-term debt management strategy. Others are primarily tactical and related to the execution of the issue, although no less important. Regardless of the nature of these considerations, laying this groundwork early improves the chances of meeting the objectives of the issue, lowering its costs, and helping achieve a more stable investor base.

Another important decision that a new issuer faces is to choose between issuing a bullet bond and issuing an amortizing bond. Bullet bonds tend to increase the rollover risk for the issuer, as they create a "hump" in the debt repayment profile. Similarly, reopening such a bond at a later date only increases the size of the payment due on the maturity date, while debt

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<sup>195</sup> In determining the size of a debut issuance, debt managers also take into consideration requirements for benchmarks and for inclusion in global bond indices (typical minimum threshold of \$500 million).

<sup>196</sup> The role of financial advisors, who mainly provide (i) assessments on bond issuances and LMOs, with regard to their size, price, and terms that are consistent with debt sustainability, and (ii) pertinent information relating to market, institutional, and investor base matters, differ from that of lead managers/underwriters, who primarily help the government with (i) the strategy on a bond issuance or LMO, including potential investor demand, documentations, registration, disclosures (in website and prospectives), and (ii) the direct contact of investors, including through road shows.

<sup>197</sup> By "successful issue" is meant the sovereign's ability to issue within expected levels, e.g., in comparison with a peer group.

management operations to smooth debt service humps (for example, pre-funding or debt buybacks and debt exchanges) are often costly and not always easy to conduct.<sup>198</sup>

Small countries and issuers that anticipate going to the markets relatively infrequently should weigh very carefully the advantages of an amortizing structure rather than the more common bullet bond, and ensure an adequate level of preparedness. In general, amortizing bonds are considered to smooth the repayment profile, make reopening easier (the issuer can reopen the bond while avoiding a substantial increase in the bullet payment), and decrease information asymmetry between the issuer and investors. Regular payments help investors monitor the issuer, and reassure them that the issuer is able to honor the payments. This can lead to a more rapid reduction in risk spreads. Also, amortizing bonds have typically a shorter duration than bullet bonds, thus making them less risky and, in turn, contributing to a lower cost of the issue.<sup>199</sup> Moreover, there is no evidence that small or occasional issuers pay a yield or liquidity premium for issuing amortizing bonds.<sup>200</sup> However, callable bonds, an alternative, are generally less preferred because of the difficulty in their pricing and the relative aversion of investors toward these bonds (Box 9).

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<sup>198</sup> There are very few semi-bullet bonds, while amortizing bonds have become more common in recent years. Regarding issues and processes for buying back international bonds, as well as cost-risk tradeoffs of performing other LMOs, including swaps, see section IV.

<sup>199</sup> The same results hold for a bullet bond with maturity equal to the ATM of the amortizing bond. Although amortizers may help ameliorate refinancing risk and reduce cost of issuance, they tend to limit debt managers' ability to extend the maturity profile of the overall debt portfolio.

<sup>200</sup> This suggests that, in small countries, amortizing bonds can help construct benchmarks of significant size.

### **Box 9. Common Pitfalls of First-Time Issuers**

- The size of the issue was too large in relation to the intended use of proceeds. The issues were large enough to support liquidity, but larger than what could be put to near-term use by the issuer, resulting in high carrying costs.
- Bullet bonds were issued. In small economies, the repayment and rollover risks were magnified by the bullet structure of bonds. These risks could have been reduced by using amortizing bonds.
- Preparations were inadequate. A number of first-time issuers could have achieved better pricing by preparing more thoroughly and providing more precise information on the intended use of the proceeds. A few issuers went to market without strong fundamentals or at periods of unfavorable market conditions, or without appropriate selection of lead managers and/or pre-deal roadshows (in some cases without any roadshows) and shortly after obtaining a credit rating. This resulted in a higher cost of the raised funds (higher interest rates) than could have been achieved through more careful fulfillment of economic preconditions for debut issuance, concerted efforts to obtain a better rating, and greater patience while building investor demand.<sup>201</sup>

Source: Das, Papaioannou, and Polan, 2008.

### **Operational Issues in International Bond Issuance**

Debt managers face several risks before the issuance of international bonds, so a number of preconditions must be met and initial actions should be taken well in advance. These considerations can substantially reduce the resulting risks stemming from the issuance, as well as contribute to a lower cost for the new bond. A debt sustainability analysis is helpful in identifying potential risk of sovereign debt distress. This exercise should evaluate the future payment capacity under different macroeconomic scenarios, its budgetary constraints, and the use of the proceeds.

A comprehensive medium-term debt strategy exercise is important to assess the impacts of the external bond on the cost-risk tradeoffs of the debt composition. This exercise should assess whether, among different alternative funding strategies, a bond issuance provides an attractive cost-risk tradeoff. It should evaluate more precisely some issues that a debt sustainability exercise does not cover, such as the exchange rate risk and the refinancing risk of an international bond.

Operational steps before issuance can improve the probability of success. These include solid preparation of the legal aspects involved, proper marketing of the country and of the transaction (which includes securing the best possible credit rating by at least two of the three major international credit rating agencies), an investor relations program to deepen

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<sup>201</sup> There are risks to issuing too soon, as there is also a risk of issuing too late—i.e. sovereign not to be able to raise the intended amount, with Iraq being a recent example (early 2016)—see next section.

communication channels with investors and other stakeholders,<sup>202</sup> and hiring financial advisors who can provide independent advice (from the lead managers) at the issuance.<sup>203</sup> Depending on the economic stage of the country in the process, these steps can take several months to be accomplished.

The role of investor relations and market monitoring needs to receive special attention. The debt manager usually starts monitoring, on a regular basis, the secondary market dynamics of the international bond to gauge market perception of the country that could have an impact on other areas of the economy. Also, active investor relations could help improve market perception, reduce the yields traded on the market,<sup>204</sup> and increase appetite for a potential new bond.

Efforts need to be devoted to addressing refinancing risks early on. Preemptive measures to manage such risks have led some countries to establish a sinking fund, where money is put aside regularly to repay the bond. An alternative is to make use of active liability management operations to exchange the instrument about to mature to new longer-term securities.

Issuing an international bond requires specific institutional and operational debt management expertise, which brings to the fore the importance of hiring and retaining qualified personnel. Before issuing an international bond, the debt manager should be aware that this step will generate a series of new actions and decisions to be taken. To adequately address these challenges, an appropriate debt management structure should be in place, empowered by appropriately-skilled labor, which also gives investors the confidence that debt management is a priority.<sup>205</sup>

Once a bond is issued, economic performance and policies will be subject to closer scrutiny by several stakeholders, whether international investors or the press. This calls for more careful consideration on policy decisions to be taken and on the communication of these decisions. To this end, the role of investor relations and market monitoring is critical.

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<sup>202</sup> Deal and/or non-deal roadshows are crucial for engaging with existing and potential investors in order to articulate the government's macroeconomic objectives, policies, and possible issuance intentions (deal roadshow), as well as to gain feedback on investor demands.

<sup>203</sup> In determining the timing of a sovereign issuance in the international capital markets, the issuer should take into account and consult with the lead managers about the "pipeline" of issues in a given period, as well as to carefully track the outcomes/results of recent sovereign issuances.

<sup>204</sup> In particular, it could help reduce the refinancing premium in the credit spread with better understanding of the government's objectives and policies for international issuances and debt management, e.g., LMOs.

<sup>205</sup> The capacity to go through the due diligence process is critical for a successful international bond issuance, as well as preparations for road shows, e.g., good book runners usually help with preparations.

## VI. SOVEREIGN DEBT MANAGEMENT IN TIMES OF DEBT DISTRESS<sup>206</sup>

### A. Sovereign Debt Restructuring

While the analysis so far focuses on the management of sovereign debt portfolio risks under so-called normal times, this section deals with debt management policies during debt distress periods. A distinction needs to be made from the outset between market stress, with various degrees of market-access challenges, and debt distress problems, which may lead to a sovereign debt restructuring. In addition to the causes, processes, and outcomes of sovereign debt restructurings, this section also examines the role of market access in restructurings, along with determinants and strategies to maintain/regain market access.

Under debt distress situations, a sovereign debt restructuring usually implies some form of debt reduction in present value terms. Standard & Poor's (2006) defines sovereign debt restructurings as debt exchanges at terms less favorable than the original bond or loan terms.<sup>207</sup> Clearly, distressed debt exchanges should be distinguished from restructurings that are part of routine LMOs, such as debt swaps, where there is no net-present-value decrease of debt (Das, Papaioannou, and Trebesch, 2012). LMOs are purely voluntary market exchanges, and usually occur in normal times (Medeiros, Polan, and Ramloga, 2007; and Papaioannou, 2009). In normal LMOs, the issuer may offer a premium to encourage investors to participate in an exchange, e.g., to extend maturity, so that there may be an increase in the net present value of their debt holdings.

Sovereign debt restructurings can have drastic adverse consequences for economic growth, trade, capital flows, banks, and other financial institutions. A debt restructuring should therefore only be initiated if, on the basis of a debt sustainability analysis, it is concluded that a macroeconomic adjustment program cannot realistically restore sustainability, and the scope of debt relief should always be proportional to the country's debt sustainability problem (Das, Papaioannou, and Trebesch, 2010).

Allowing an unsustainable debt situation to fester is costly to the debtors, creditors, and the international monetary system. For debtors, a situation of debt overhang depresses investment and growth and creates a sense of financial uncertainty that can raise the eventual magnitude of the debt problem. Moreover, it may exacerbate burden sharing and moral

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<sup>206</sup> For the IMF's official approach to sovereign debt restructuring and market access issues, see IMF, 2013a; 2014c; and 2015a.

<sup>207</sup> From a Credit Rating Agencies' perspective, a sovereign debt restructuring with a decrease in the net present value of debt, even in the case of a voluntary exchange, is considered a default (technical default, restricted default, or selective default). However, this is a static assessment relating to the time/days after the transaction. If the exchange is successful, the prices of the newly issued bonds may increase significantly and quickly, resulting in a gain in net present value terms.

hazard concerns to the extent that continued financing by the official sector results in the exit of private creditors. Delays that magnify the scale of economic dislocations also tend to reduce the economic value of creditors' claims. In addition, residual private creditors who have not yet been bailed out when the restructuring eventually takes place will have to absorb a greater loss because the entire burden will fall on a smaller group of creditors (IMF, 2013).

Debt restructurings that are based on good faith negotiations often involve private creditors in an adequate way. These negotiations should be transparent and fair and include an open dialogue with creditors and timely information sharing. While collective action clauses (CACs) can play an important role in facilitating debt restructurings, their presence is not a guarantee for a quick debt exchange with high participation. Other legal vehicles and exchange characteristics can play an important role as well, in particular exit consents, and minimum participation thresholds.

In general, private creditors wish to avoid a debt restructuring, therefore pressing for a bailout by the official sector if possible. But when a debt restructuring is the only option to deal with a liquidity shock or to restore solvency, for example, in situations where available financing and policy adjustment have been exhausted, delays end up amplifying the ultimate costs. Also, if authorities delay action while funding is running out, it may not be feasible to execute a preemptive debt restructuring.

In a sovereign debt restructuring process, there is a risk that a minority of holdout creditors could slow or disrupt an agreement that a qualified majority would be prepared to support. Collective action problems can impede the debt restructuring process as creditors may apply a holdout strategy that delays debt restructuring. If a government is forced to restructure its public debt in a time of distress, CACs in bond contracts could help achieve a more orderly and efficient resolution. The design and incorporation of such clauses in the documentation of bonds issued under foreign law have received increasing attention in recent years. These clauses allow a qualified majority of bondholders to bind all bondholders to the financial terms of a restructuring, and limit the ability of a minority of bondholders to disrupt the restructuring process by enforcing their claims after a default.<sup>208, 209</sup>

By mitigating this risk, CACs can contribute to more orderly and rapid public debt resolutions. Given these potential benefits, debt managers should, when issuing international sovereign bonds (that is, bonds issued or guaranteed by a government or a central bank, and

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<sup>208</sup> In particular, a series-by-series form of CACs will bind the minority within a single bond issuance, while enhanced CACs bind the minority of all issuances and is a more effective tool (see IMF, 2014c; 2015b; and 2016b).

<sup>209</sup> In general, the Paris Club and the London Club's norms of behavior aim to keep the major creditors fairly united. However, there have been extreme cases of individual holdouts (Russia, 2000—London Club, 1 percent holdouts).

either governed by a law other than the law of the issuer or subject to jurisdiction of a foreign court), consider including enhanced CACs in new borrowings, in consultation with their financial and legal advisors (IMF, 2014).<sup>210</sup>

Debt managers play a key role in preparing the debt restructuring process. Lim, Medeiros, and Xiao (2005) suggest verifying the following key characteristics:

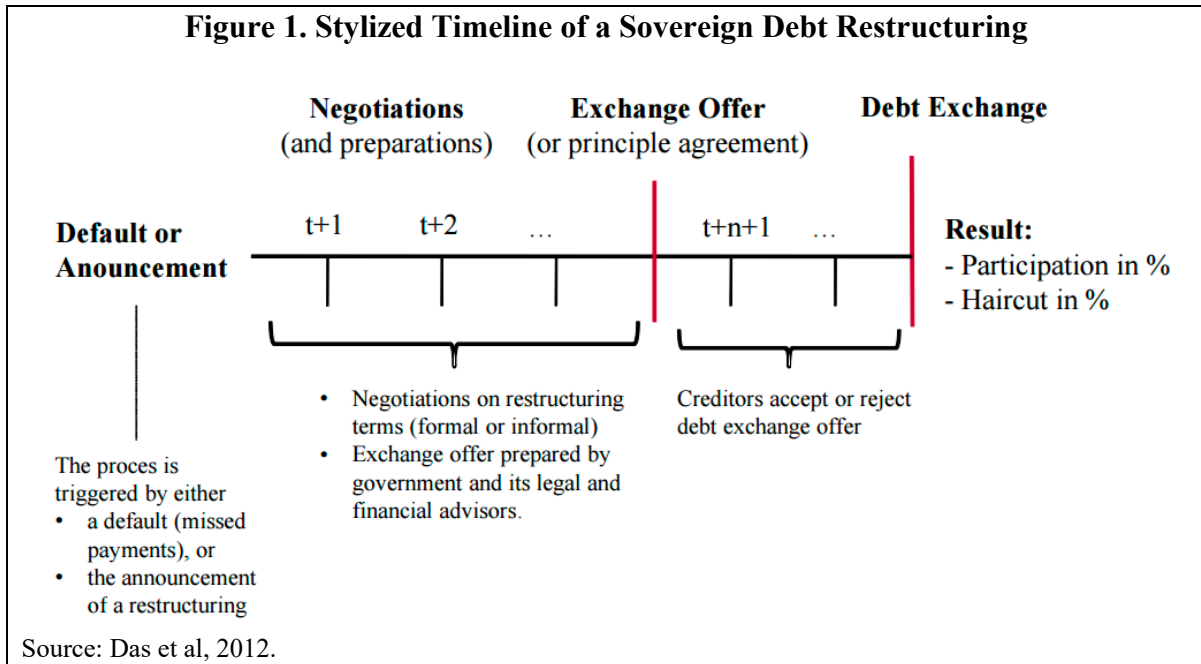
- the face and market value of bonds or loans
- the amortization schedule (bullet versus amortization and/or the existence of a sinking fund)
- interest rate and coupons (fixed versus flexible and/or the existence of step-up or linked features)
- currency of denomination of the instruments (local versus foreign currency)
- enhancements, including embedded options or collateral
- legal clauses, including CACs and non-default clauses, and the ability to include exit consents.

The verification of claims allows governments to ascertain their debt stock, debt-service profile, and the value of debt instruments. This lays the foundation for the detailed debt sustainability analysis, which provides an indication of the financing gap, the macroeconomic adjustment effort, and the degree of required debt relief. On this basis, governments typically develop a set of restructuring scenarios and prepare a final restructuring proposal, often with the support of legal and financial advisors (Figure 1) (Das, Papaioannou, and Trebesch, 2012).

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<sup>210</sup> For euro-area sovereign bonds with an original maturity of more than one year, CACs are standard with a “two-limb” aggregation threshold test (voting procedure). However, the ICMA-model aggregated CACs for sovereign bonds (August 2014) allow sovereigns to use either “single-limb” or a “two-limb” voting.





After the restructuring offer is presented to creditors, they have to decide whether to accept or reject the offer. In most cases, a successful exchange requires a certain minimum threshold of acceptance by creditors. Creditor coordination problems and holdout risks are thus likely to be most acute during this period.<sup>211</sup> In most crisis cases, restructurings mark the end of a debt crisis episode, because the exchange of old into new debt puts the country back on the path of debt sustainability. However, if this is not the case, a second or even a third restructuring may follow within a relatively short period, e.g., Belize 2006–07, 2012–13, and 2016–present.

### B. Role and Determinants of Market Access

IMF lending requires a determination of whether loss of market access (LMA) has occurred. An LMA represents an important signal that, from the perspective of investors, the ability to meet debt obligations has become uncertain. An assessment of whether a sovereign continues to have market access requires the exercise of judgment, and would be based on an assessment of whether the sovereign can tap international capital on a sustained basis through the contracting of loans or issuance of securities across a range of maturities (in both local and foreign currencies) at interest rates compatible with reasonable medium-term growth rates and an achievable primary fiscal position.

<sup>211</sup> In the design of a sovereign debt restructuring, it is important to offer equal treatment to investors in terms of net-present-value decrease in order to minimize holdout risks.

A range of indicators can be used to assess whether the country has lost market access or whether such loss is imminent. Such indicators would be assessed covering a period of at least 24 months and combined with judgment<sup>212</sup> (IMF, 2014):

- Sovereign spreads: conduct a debt sustainability analysis (DSA) scenario to assess whether debt would become unbounded if spreads were maintained at recent levels, and compare changes in the country's spreads to other sovereign spreads within the same asset class.
- Patterns of recent primary market bond issuances: examine whether there have been significant departures in recent primary bond issuance practices (volume, frequency, maturity, and financing terms) from what the sovereign would normally do when it has market access.
- Volume: compare with (1) total financing needs and (2) preannounced bond auction schedule.
- Frequency: compare with (1) average frequency of issuances and (2) bond auction schedule (for example, in case auctions are cancelled or delayed).<sup>213</sup>
- Maturity: compare with average original maturity of instruments.
- Financing terms: compare recent financing terms with past placements (for example, if there is a shift from fixed interest rates to variable rates).
- Nonresident holding of public debt: examine whether there has been a significant and sustained fall in nonresident holdings of public debt.
- Government bond rollover rates: examine whether government bond rollover rates have fallen on a sustained basis. As a corollary, assess the extent to which there is greater reliance on non-tradable instruments (for example, retail instruments and directly placed instruments such as commercial papers and medium-term notes) to meet financing needs.
- Government cash balances: examine whether there has been an abnormal decline in government cash balances.
- Sovereign credit ratings: observe changes in ratings and assess whether the country has lost creditworthiness (for example, if the sovereign rating was downgraded to low sub-investment grade in the past 12 months).<sup>214</sup>

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<sup>212</sup> A related assessment, made in the context of the DSA would help ascertain whether the loss is expected to be short lived.

<sup>213</sup> See also Appendix 3.

<sup>214</sup> Many sovereigns have market access until they are downgraded to CCC.

- Bond trading activity: assess the volume of recent bond trading in secondary markets and bid–ask spreads (for example, if trading volumes are thinner and limited and bid–ask spreads wider).

### C. Strategies for Regaining Market Access

Sovereign borrowers that experience serious debt distress are faced with a set of new challenges because of a new class of investors that buy their credit. During downgrades and exclusion from debt indices, investment guidelines require investors to exit their investment, although some will remain in the credit if they do not share these constraints. Dealing with a new type of investor, distressed investors and hedge funds, marks a shift in investor relations for debt managers, as this class of investors tend to be more short-term focused and often want to engage directly with senior policymakers and impact policy. In this context, it is important that debt managers monitor the investor base and explain to policymakers the direction, who is buying the credit, and why.

Debt managers can typically re-access the market when yields fall to sustainable levels, as well as when the yield curve starts normalizing and becomes positively sloping. At this time, it can also be demonstrated that the required policy efforts, typically fiscal, have been successful.<sup>215</sup> Private sector debt issuance and normalization of market access is a consequent step, as it reinforces the fiscal adjustment by demonstrating that fiscal adjustment is working. Following steps requires a focus on market maintenance, essentially with a focus on building liquid bond issues to ensure continuous market access.

Experience shows that countries stress the following elements as critical on the path to re-accessing markets: (1) decisive action by policymakers and focus on debt sustainability, (2) no complacency in implementation of reforms and focus on the structure of debt; (3) internal coordination and focus on investor needs and expectations, and (4) communication throughout all phases with investors (regular, realistic, and in person) (Moody's, 2013).

Some guiding principles and concrete actions for debt managers are as follows: (1) ensure sound policies and good policy coordination within the government; (2) restart the domestic bond market to demonstrate return to normality; (3) undertake measured exchange operations and issuances, starting perhaps with private placements;<sup>216</sup> (4) continuously improve the structure of maturity profile, such as by extending maturities; (5) bolster credibility by

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<sup>215</sup> Although fiscal policy changes are key, sudden stops of government financing that are part of the BoP crisis necessitate an external adjustment as well. Of course, public sector savings can be the impetus for the latter.

<sup>216</sup> Exchange operations by Ireland in 2012 ensured that the sovereign had regained market access after its debt crisis.

gathering cash buffers; (6) diversify the investor base; (7) ensure frequent and consistent communications with credit rating agencies and investors.

## VII. CONCLUDING REMARKS

This primer presents an overview of the management of sovereign debt portfolio risks and debt managers' use of LMOs to address them. It discusses techniques used by debt managers to manage sovereign debt portfolio risk and achieve their sovereign risk management objective of minimizing cost according to an acceptable level of risk. To achieve the objective, debt managers must develop a strategic plan that consists of specific guidelines and actions that take the underlying economic and financial environment into account. In essence, the strategy is based on the assessment of the medium-term debt servicing cost and portfolio risk subject to the underlying uncertainty. The quantification of risks follows well-known principles for the different risk types, including market, refinancing, liquidity, and operational risks.

It is argued that a debt management strategy, along with a clearly defined risk management framework, should form the basis for the effective use of LMOs. The focus should be on prevailing debt portfolio risks, for example, refinancing risk, where the government will need to manage the debt maturity profile, liquidity, and interest and exchange rate risks, as well as contingent, legal, and operational risks. Debt managers measure interest and exchange rate risks and costs of outstanding sovereign debt and associated exposures differently from asset managers. Sovereigns typically exogenize interest- and exchange-rate-related losses, as they expect to owe the bonds to maturity, while asset managers measure their positions according to movements in market prices. There are exceptions, as this observation may not hold true for sovereigns that actively manage their liabilities. Accordingly, debt managers have sought to smooth variations in duration by applying fixed interest rates in calculating market-sensitive measures. This framework, together with government accounting, may not be suitable for sovereigns, as losses are measured and assumed differently by sovereigns and investors. Further, the assumptions that the sovereign can repurchase its debt at market prices or insure against its own failure are not plausible either, so it remains unclear whether a full-fledged market valuation framework for the government is practical.

Sovereigns with strong credit ratings and access to markets will have a wider range of options to manage their liability structure, including through typical liability management operations and the application of derivatives. For such transactions, a robust risk management framework with an emphasis on operational risk is required, along with a strong credit culture to deal with the complexity of the financial instruments in the debt portfolio.

LMOs and strategic debt management are also relevant for governments that experience debt distress. The role of LMOs at an early stage of stress can preserve market access by undertaking liability management operations that improve the debt maturity profile and avoid a liquidity crisis. In case of program countries that have temporarily lost market access,

LMOs can support the transition to stable market access during the program period, while in cases of re-profiling or restructuring, LMOs reduce the pressure to engage in large debt treatments.

A number of tools have been prepared by the IMF and the World Bank for debt managers. The Medium-Term Debt Management Strategy (MTDS) Framework, prepared by staff of the IMF and the World Bank, provides a guide to debt managers on how to assess debt portfolio risks, prepare debt strategies, and analyze their performance under various scenarios. The Sovereign Portfolio Risk Analyzer and Optimizer (SoPRAnO<sup>217</sup> Tool) can be applied in market-access countries where there exist measures of market prices, such as regular bond pricing and credit default swaps. The tool allows debt managers to analyze a variety of debt portfolio risks, in particular to measure the total risk of a portfolio, provided the volatilities and correlations among the risk factors can be estimated.

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<sup>217</sup> The tool is currently operational and available to IMF staff (see Abramov, Mirestean and Papaioannou, 2017).

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## **Appendix 1: Key Aspects of Government Securities Market Development**

The level of government debt market development may differ across regions and countries. It typically depends on the general macroeconomic environment/setting and the implementation of actions that ensure the even development of all relevant structures underpinning the growth of this market. It should be noted that lack of adequate development or weaknesses in one area, for example, secondary market growth, could slow the move to the next stage.

Basic preconditions for sustained government debt market development:

- Stable macroeconomic environment or sustained implementation of macroeconomic stabilization, especially if a country is at an early stage of economic development.
- Minimization of fiscal dominance, which may occur when the scale of the government's financing requirement undermines the effectiveness and credibility of monetary policy. The extent of fiscal dominance may be mitigated by the statutory limits on central bank financing of the government or by other measures that enhance the independence of the central bank.
- Liberalized interest rates and firm commitment to market funding of government borrowing requirements.
- Policies that encourage the growth of domestic savings and the development of organizations and entities that manage the increasing wealth. The intention should be the creation of a broader investor base that will be interested to invest in the domestic government debt market.

In market development, the following three broad stages can be distinguished:

### **Stage I – Initial Stage of Market Development**

The initial stage of government debt market development is characterized by:

- Severe shortcomings in the functioning of the primary market and negligible liquidity in the secondary market.
- Fragile macroeconomic fundamentals.
- Fiscal dominance and the lack of a firm commitment to market-based financing<sup>218</sup> of government borrowing requirements are also common problems in many countries.

In most countries, these impediments are coupled with serious shortcomings in the five main areas of market development:

- Primary market
- Investor base

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<sup>218</sup> This is partially due to being used to low cost of concessional finance.

- Market infrastructure
- Regulatory environment
- Monetary policy and operations

These shortcomings, along with mitigation policies and measures, are discussed here for each identified stage of market development.

#### *I. A. Primary market*

The average maturity of government debt tends to be short at this stage. In this case:

- The issuance of short-term securities needs to be firmly established before moving on to medium- and long-term securities. It is, for example, not recommended to spread issues thinly in an environment of low demand for longer-term issues and to compel the holding of long-term fixed-rate securities at below market rates.
- If the small stock of domestic debt is combined with a significant share of external debt, increasing the share of domestic debt in the context of the overall debt strategy may be considered, while carefully evaluating the costs and benefits, as well as risks.

The experience of several countries suggests that securities linked to short-term interest rates, indexed to inflation, or foreign exchange rates can be helpful in lengthening the average maturity of government debt and thus in extending the yield curve.

- If persistent high inflation or refinancing risk is a problem, the authorities may want to carefully evaluate the option of issuing floating rate or inflation-indexed bonds, however, bearing in mind that in an unstable macroeconomic environment, they entail considerable risks.

Debt fragmentation is a typical problem at the initial stage of market development. In this case:

- Debt issuance should be consolidated to one agency in order to reduce the number of public debt instruments and increase their size.
- The issuance of nonmarketable debt should be scaled back.<sup>219</sup> Nonmarketable debt should be issued at market rates and have provisions for early redemption, especially in the case of retail products.
- The authorities should refrain from opening new issues at every auction.

A high frequency of auctions is also a problem in a number of countries.

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<sup>219</sup> Nonmarketable securities tend to deter the development of market liquidity. At this stage, liquidity is minimal and therefore the market needs to be provided with marketable and fungible securities to the extent possible.

- The authorities should appropriately adjust the frequency of primary auctions as the market develops.
- High auction frequency, i.e. shorter periods between auctions, reduces “demand tension,” as investors would know that if they miss one auction, another is scheduled shortly thereafter. In contrast, when auctions are less frequent, demand for the current auction may be heightened as the opportunity risk for investors would be higher. This is due to the uncertainties involved in waiting until the next auction that will not take place soon.

Lack of transparency and communication between the authorities and market players increases uncertainty for investors and reduces participation in both the primary and the secondary market.

- The authorities should provide timely information on the government’s finances, debt portfolio, borrowing strategy, as well as data on primary and secondary market activity.
- Reference rates for government securities need to be collected and published.
- An auction calendar (usually monthly or quarterly in this stage) needs to be published. However, the authorities should consider retaining flexibility to fix the amounts and/or maturities of instruments until one or two weeks prior to the auction.
- Regular consultations with market participants about the borrowing strategy, market preferences, and market situation are essential.

#### *I. B. Investor base*

Creating a diversified investor base is a complex task and a lengthy process.

- The first step to build a diverse investor base is to gradually diminish the possible reliance on captive sources of funding.<sup>220</sup> Interest rates should be liberalized and no investor group should be required to hold government debt at below market rates. High reserve requirements and liquid asset ratios should be reduced.

The institutional investor sector (pension funds, insurance companies, and mutual funds) is generally undeveloped.

- If the financial system is dominated by a few banks, it is critical to promote competition in the banking sector and to eliminate privileges of state-owned banks, if applicable.
- The authorities should start building a domestic institutional investor base by creating a favorable legal and regulatory framework for mutual funds and the contractual savings sector.

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<sup>220</sup> This needs to be implemented in a sufficiently cautious manner, especially if captive sources of demand include domestic investors to a significant degree.

Some countries offer retail instruments to individual investors in order to promote savings behavior and mobilize resources for the budget.

- Any retail securities offered by the government should have yields that reflect market rates less marketing and administration costs. Early redemption penalties should also reflect these factors.
- Disincentives for trading, such as requirements to invest in nonmarketable securities and other restrictions on portfolio allocation, have to be removed. Strict quantitative limits on asset holdings are not recommended, as they discourage optimizing behavior and often lead to conservative valuation policies.
- Another reason for the weakness of the institutional investor base is an underdeveloped contractual savings sector (pension funds and life insurance companies).

At the initial stage, the share of foreign investors in the outstanding stock of government securities and in secondary market trading is very low in most countries.

- The participation of nonresidents in the domestic government securities markets is generally not advisable in this stage because of the risk of sudden or large-scale reversals in capital flows that can result in a boom–bust pattern in asset prices if secondary markets are shallow and illiquid.

### *I. C. Market infrastructure*

Most countries in Stage I are characterized by a slow and inefficient securities settlement structure that involves considerable systemic risks.

- The main task in this stage is to establish the foundations of adequate depository and settlement procedures for cash and securities. As a first step, government securities should be dematerialized through the establishment of a registry of securities accounts. A depository system has to be set up to handle the settlement of transactions between the securities accounts in the registry.

Dematerialization improves liquidity in the secondary market by reducing transaction costs and settlement times.

- A strong and transparent legal and regulatory framework needs to be developed for the issuance, trading, and settlement of government securities to ensure investor confidence and to reduce systemic risk.
- The authorities may want to promote organized trading facilities and market microstructure arrangements that are most suitable for the stage of securities market development and financial system structure. These include specifying transactions types, the role of intermediaries, trading mechanisms, and market transparency, including timely reporting requirements of secondary market transactions, that promote efficient price discovery, reduce settlement risk and enhance liquidity in secondary markets.



The interbank market tends to lack liquidity, suffers from excessive volatility, or cannot be accessed by major market participants.

- The development of the necessary infrastructure for the interbank market is of vital importance. Special emphasis has to be placed on repo markets. The authorities could play a crucial role in promoting the use of master repurchase agreements and facilitate adequate settlement and trading procedures. The central bank can foster repo activity by using these instruments for its open-market operations, rather than using unsecured facilities or issuing central bank paper.

#### *I. D. Regulatory environment*

Absent or poor legal and regulatory framework for government debt securities and their markets is a common phenomenon in Stage I.

- Clear borrowing authority for the government needs to be set forth that includes internal procedures for debt management, transparency and accountability requirements, and disclosure procedures.
- A regulatory body for secondary market activity has to be established. Effective regulation of the secondary market should include (1) regulation of market intermediaries, (2) market conduct regulation and market surveillance, and (3) transparency requirements.
- A clear legal and regulatory framework for the payment and settlement process has to be established for government securities.

Inadequate tax policies are also likely to be one of the characteristics in the early stage.

- Tax policies need to be reviewed in the context of their effect on market development. The authorities should seek tax neutrality, and as a first step eliminate transaction taxes for government securities trading.

#### *I. E. Monetary policy and its operations*

- Liquid asset ratios should be removed and high reserve requirements should be reduced. Liquid asset requirements provide the government with captive investors for government debt especially for securities that have less attractive terms. Therefore, they do not help the development of secondary markets.
- The central bank should gradually move away from conducting monetary policy through rules-based instruments, and it should work on creating the conditions for money market-based instruments, such as a liquid interbank market. As the interbank market develops, monetary instruments should be less accommodating to encourage more active liquidity management by banks and more reliance on the interbank market.

## **Stage II – Deepening of Markets**

By this stage, basic elements of the primary and secondary market are established and functioning, but liquidity and depth in the secondary market are still inadequate.

- The maintenance of a stable macroeconomic environment or continuing stabilization is needed to support development from Stage I to Stage II.
- Minimize fiscal dominance and make a firm commitment to market-based funding of the borrowing requirements.

### *II. A. Primary market*

Several shortcomings of public debt management typical of the initial stage are addressed, and the composition of the debt portfolio is beginning to resemble that of more advanced markets.

One of the basic prerequisites for proceeding from Stage I to Stage II is that the government should have a clear and consistent strategy for issuing government securities that provides a medium-term horizon for the investment strategy of market participants.

One of the most important objectives of debt management in Stage II is to lengthen the average maturity of domestic debt.

- If short-term securities are well established and accepted, issuance can be gradually extended to medium- and long-term securities.

Significant progress on debt fragmentation should be made in Stage II, though some aspects of debt fragmentation may take longer to resolve.

- Building a benchmark yield curve requires a well-defined strategy. This may include: (1) discerning market preferences from close consultations with market participants; (2) standardizing debt instruments to reduce debt fragmentation arising from the existence of different types of bonds, coupon rates, maturities, issue sizes and frequencies, and whether an issue is an on-the-run or off-the-run issue; (3) developing the appropriate maturity distribution for benchmark issues; (4) determining the appropriate size and frequency of benchmark issues.
- Building benchmark issues should be further assisted by reopening and buyback operations. Buybacks in combination with reopenings can be used to build the size and lengthen the life cycle of issues targeted to be benchmark issues by eliminating inactive issues and standardizing current outstanding bonds.
- The problem of several public agencies issuing public debt has to be addressed and should be resolved before the country moves to Stage III. In this regard, the central bank should refrain from issuing its own securities unless it is necessary for liquidity management purposes, and in that situation should restrict issuances to the short end of the yield curve (say, under a month).

- Nonmarketable debt should not be issued in Stage II anymore, and the outstanding stock of nonmarketable debt should be converted into securities bearing market interest rates.

The transparency of the authorities' debt management strategy is expected to improve significantly in Stage II.

- The transparency of debt management needs to be further improved and regular communication with market participants remains essential. In Stage II, the authorities should further increase and refine the data and information provided to the public.
- Public debt management practices need to be further enhanced by using appropriate risk management techniques such as stress tests. The authorities should evaluate the impact contingent liabilities have on the government's financial position, monitor the risk exposures to explicit contingent liabilities and be conscious of the conditions that could trigger implicit contingent liabilities.

### *II. B. Investor base*

Many countries in the deepening stage have a developed domestic institutional investor base, in particular if pension reform has been implemented. In this stage, the contractual savings sector is gaining significance. Mutual funds account for an increasing share of government securities holdings in many countries.

- The institutional investor base needs to be further strengthened. Several obstacles typical of Stage I usually continue to pose a problem in Stage II. The same recommendations apply to promoting pension funds, insurance companies, and mutual funds as in the initial stage.
- Sound regulatory and supervisory practices for institutional investors have to be ensured. Because pension plans involve very long-term contracts, their regulatory and supervisory framework needs to be particularly strong and effective. Regulatory and supervisory authorities need to ensure that retail investors of mutual funds and insurance companies are fully informed and properly educated about the types of market risks associated with different instruments.

The level of nonresident participation also varies substantially among countries in Stage II. Many countries are ready for foreign participation in Stage II.

- The authorities should carefully consider easing limits on investment in foreign securities by institutional investors to achieve an appropriate degree of diversification of local investors' portfolios. Failure to allow foreign diversification may lead to local market bubbles and to excessive exposure to sovereign risk.
- The authorities may consider liberalizing the capital account gradually. Experience shows that countries undertaking either complete or very substantial capital account liberalization without suffering a systemic financial crisis illustrate that the common features in these countries are sustainable macroeconomic policies and a systematic

approach to safeguarding financial stability. Strong and effective prudential regulation and supervision of financial markets, as well as improving liquidity in the government securities market, are main preconditions for allowing foreign investors into the market.

- It is advisable to adopt a gradual approach to foreign participation by liberalizing the sale of long-term securities first.
- Short-term flows should be liberalized based on a thorough analysis of (1) experience with foreign investors, (2) macroeconomic policies and conditions affecting financial sector stability, (3) state of development and risk exposures of institutions and markets, and (4) prudential and governance infrastructures, and the observation of relevant standards.

### *II. C. Market infrastructure*

The establishment of securities accounts (dematerialization of securities) is a prerequisite for moving from Stage I to Stage II. Countries are expected to improve their securities settlement system significantly in Stage II.

- The authorities should focus on reducing the settlement period and work on introducing real-time gross settlement (RTGS) with delivery versus payment (DVP).<sup>221</sup>
- As the market expands and becomes more sophisticated, the development of sub-depositories is a key precondition for expanding the investor base and trading activity. Regulations should be developed to establish the status of clients' accounts in the event of sub-depository bankruptcy; the ability to transfer accounts between sub-depositories encourages competition, separation of clients' accounts from the sub-depositories' own business, reporting requirements, and a code of good practices.

The interbank market usually develops in parallel with the government securities market.

- The development of the interbank market should be promoted and active trading in the repo market encouraged. Toward the end of the deepening stage, the establishment of derivatives markets and instruments may be considered.

### *II. D. Regulatory environment*

A coherent legal and regulatory framework is a prerequisite for advancing to Stage II. Regulatory functions may reside with different authorities. A typical structure may involve the central bank or MoF regulating the primary markets and primary dealers,<sup>222</sup> while the securities regulatory authority regulates market intermediaries in the secondary market.

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<sup>221</sup> To ensure fungibility of securities, sufficient bridges among settlement facilities should exist. For example, if inter-bank or professional fund managers settle through one system and retail investors through another, e.g., stock exchange, securities should be able to settle through both systems.

<sup>222</sup> See Appendix 2.

- The legal and regulatory framework needs to be continuously adapted to changes in the primary and secondary market infrastructure, participants, instruments, payment, and settlement process. The authorities should promote industry bodies that deal with transaction conventions or business conduct standards.
- Adequate tax policy needs to be developed for new instruments. If active foreign participation in the government securities is deemed desirable, then the authorities should consider eliminating tax withholding for foreign investors.

### *II. E. Monetary policy and operations*

A major prerequisite for Stage II is the elimination of high liquid asset ratios. In most countries, the development of the interbank market allows the central bank to rely more on money market instruments at this stage.

- The central bank should further encourage active liquidity management by banks by widening the corridor for standing facilities and reducing the frequency of credit or deposit auctions.

### **Stage III – Maturing Markets**

In the maturing stage of government securities markets, the level of development approaches advanced country levels. This stage is characterized by:

- a well-functioning primary market,
- a secondary market that is deep and liquid during normal times.

The focus is on further deepening of the secondary market, the development of derivatives, and on making the market internationally competitive, focusing on market liquidity, low transaction costs, and sound market infrastructure.

#### *III. A. Primary market*

By the maturing stage, the primary market is well established and underpinned by a sound debt management framework. The authorities have no difficulties issuing long-term securities, and their share in the composition of outstanding government debt is increasing.

In most markets in Stage III, government securities are issued in a limited set of benchmark maturities and in a relatively large size. There might be minor problems with debt fragmentation because of irregular maturities. However, these securities are expected to be gradually retired, thereby increasing the average size and liquidity of outstanding securities. In the maturing stage, the authorities are engaged in regular reopening and buyback operations to increase the fungibility of benchmark issues.

The points to remember at this stage include the following:

- The authorities should focus on eliminating any remaining problems from previous stages. The standardization of instruments needs to be completed if debt fragmentation has not yet been fully resolved.
- The authorities should continue building a benchmark yield curve.
- Building on the achievements in Stage II, debt management practices have to be further refined with special focus on the risk management framework.

### *III. B. Investor base*

The maturing stage is characterized by a diverse investor base. The domestic institutional investor base is developed and, in most countries, nonresident investors are allowed to invest in both long-term and short-term securities in this stage. One of the potential issues in Stage III is the participation of foreign investors in derivatives markets.

- The authorities should continue strengthening the domestic institutional investor base by further improving financial sector regulation and supervision.
- When considering allowing foreign investors into the derivatives markets, a thorough analysis needs to be conducted.

### *III. C. Market infrastructure*

Countries in the maturing stage are expected to have established an RTGS system and DVP for securities settlement.

The focus should be on increasing the sophistication of financial markets by developing markets for derivatives, because they can provide hedging vehicles for market participants and further enhance spot market liquidity.

The authorities should follow the recommendations here to mitigate the risks associated with derivatives and risk management instruments:

- Strengthen supervision capacity to assess the risks associated with derivatives.
- Promote the development of risk management capacity in financial institutions, including by mandating the hiring and training of skilled personnel.
- Strengthen accounting rules to properly measure risks.
- Strengthen reporting by financial institutions on derivatives risks (also a task for financial supervision authorities), and disclosure of counterparty exposures.

### *III. D. Regulatory environment*

The legal and regulatory framework for the primary and secondary markets is fully established. Regulatory and supervisory authorities focus on improving the effectiveness of enforcement and developing regulation for the new instruments, techniques, and markets. Full mark-to-market requirements should be in force in this stage.

- As in Stage II, the legal and regulatory framework needs to be continuously adapted to changes in the maturing stage. Regulation related to new risk management instruments and derivatives needs to be developed and continuously improved.

### *III. E. Monetary policy and operations*

In Stage III, the central bank mostly relies on money market operations for the implementation of monetary policy, which gives an impetus to further deepening of the secondary market for government securities. By the maturing stage, the interbank market should be liquid and well-integrated with the other segments of financial markets, including the secondary market for government securities and the foreign exchange market.

If the central bank is issuing central bank bills for monetary policy purposes, it may consider closer coordination with debt management authorities to overfund the budget instead of issuing its own bills. This would allow the central bank to conduct monetary policy through the outright sales and purchases of government securities.

## Appendix 2: Primary Dealers in Domestic-Bond Auctions

### A. Introduction

Primary dealers can support the primary market for government securities by helping to provide a consistent, dependable source of demand by means of their distribution network and proprietary inventory. A broadening and deepening of market participation can be instrumental for a smooth auction process and in promoting secondary market activity. At the same time, they can foster development of the secondary market by providing two-way quotes for selected issues of benchmark government securities, encouraging competition among market participants, by improving price discovery and liquidity, and by servicing the retail market. Under a primary dealer (PD) system, the debt manager and the group of primary dealers pursue a common strategy in support of the effective functioning and development of primary and secondary markets for government securities.

Experience shows that a number of countries have either established or considered primary dealer systems as they appear to provide a solution to develop a more liquid secondary market. However, an assessment on the necessity of primary dealer systems by looking to the experience of other countries will give a mixed picture, not in the least because the motivation for such a system changes from one country to another. In large countries, like the United States, where such systems have originated, it is a way to select suitable counterparts among a group of banks, large and small, and ensure orderly auctions and secondary markets.<sup>223</sup>

Primary dealer systems have received significant attention in Europe in the past two decades, firstly due to the consequences of the introduction of the euro for financial markets. The resulting intra-Eurozone internationalization of capital flows, increased integration of local markets with the “loss of sovereignty” of government borrowers in their local markets, and competition for the cheapest funding among Eurozone governments had created challenges for debt managers. Debt managers, particularly of the smaller Eurozone countries, had to ensure that their debt would continue to be attractive in the large euro market. Outgoing flows of domestic investors reallocating their investments had to be compensated by incoming flows of new investors from abroad. These developments contributed to the introduction of primary dealer systems that explicitly included international banks with

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<sup>223</sup> In the United States, however, primary dealers are primarily counterparts for the execution of monetary policy by the New York Federal Reserve (open-market and repo operations). The primary dealer requirements include (1) to bid a “pro rata share,” and (2) to bid at “reasonably competitive” prices (see FRBNY: <https://www.newyorkfer.org/markets/primarydealers>). As far as secondary market quotation is concerned, only reasonable market making towards the Federal Reserve when it transacts on behalf of foreign account holders is mentioned as a requirement. By contrast, Germany sees limited value in a primary dealer system and successfully functions without it for many years. Thus, sometimes the market gets itself well organized and does not need government intervention.



distribution capacity towards international investors.<sup>224</sup> An additional driver has the broad adoption of electronic interdealer trading platforms. Effectively, the successful platform of the Italian multi-year Treasury bonds (BTPs) has been exported across Europe (MTS) and revolutionized the trading infrastructure.<sup>225, 226</sup> The resulting improvement in price transparency, and thereby risks to profitability, made the banks initially reluctant. Debt managers, however, applied their leverage in order to get banks to agree to quotation obligations. As both developments happened in parallel, a new kind of primary dealer systems, with a new balance of rights and obligations, came into existence.

Despite this success, a primary dealer system should not be considered a panacea for market development as it works best when there are already latent market forces that can be unleashed. Rather, a well-designed primary dealer system is more likely to be a catalyst for improving market functioning. For smaller Eurozone countries, latent market forces were released through participation of international banks and investors in markets that used to be primarily one-sided, and domestic in nature. Despite initial reluctance of domestic banks, who saw their territory undermined, debt managers effectively forced a more open and competitive market.

Improvement of the secondary market can attract non-resident investor flows, but requires careful coordination between financial stability and exchange rate policies. Secondary market liquidity is essential to move away from “liquidity by maturity” and towards “liquidity by instrument,” which would reduce investor concerns when investing in longer tenors and improve the potential for maturity transformation. Also, secondary market liquidity would improve the quality of pricing in the primary market with benefits for the issuer. On the other hand, the involvement of international investors, almost unavoidable for market development especially in smaller markets, involves trade-offs with regards to capital flows and should be aligned to the broader financial stability and exchange rate policies. Access to foreign financing in one’s own currency is a sign of economic and credit strength and, in many countries some initial volatility stemming from international investors has been accepted in favor of the longer term positive contribution to economic development. However, if increased participation of international investors is not considered opportune for macroeconomic or currency policy reasons, then introducing a primary dealer system should

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<sup>224</sup> By contrast, until that time, most primary dealer systems were often aimed at protecting domestic financial markets and domestic banks.

<sup>225</sup> MTS stands for “Mercato dei Titoli di Stato,” which translates to “Market for Government Bonds.”

<sup>226</sup> Electronic bond-trading platform systems (markets) used by primary dealers in some European economies include: Bulgaria, e-bond Bloomberg platform; Czech Republic, MTS system; Hungary, primary dealers are obliged to quote bid/ask spreads and volumes on MTS platform; Poland, platform chosen by Polish primary dealers, which are re-elected every three-years and have to be approved by PDA; Romania, e-bond Bloomberg platform; Slovakia, not explicitly defined, but MTS platform will be used from 2018.

not be a priority. Instead, debt managers could focus on making the primary market as efficient as possible.

In implementing a primary dealer system, the debt manager needs to approach the task as a market party that negotiates with its counterparts, the banks, and other entities, and not as a regulator, imposing laws and decrees. In this context, the debt manager is usually the most important market participant and thus the distinction between negotiating with and regulating primary dealers should be clear, typically reflected in his/her roles and responsibilities. The debt manager may also provide strong incentives by vying other potential business or remuneration, such as fees from syndicated issuance and privatizations. Obviously, the higher the leverage, the more onerous the primary dealer obligations.

Experience shows that there is no optimal number of primary dealers. Instead, it is dependent on specific country considerations. It may be more effective to ensure sufficient competition among primary dealers by, e.g., reviewing dealer lists regularly. In smaller markets, practically, a number between 6–8 primary dealers is sufficient (in many cases, there is little choice beyond that number). Alternatively, the selection process can be avoided and all candidates can be allowed, but this tends to diminish the pressure to perform. Finally, it is important to set minimum requirements to be eligible for primary dealership, such as capitalization, dealing capacity, distribution capacity, address counterparty risk in clearing and settlement, and adapt an appropriate internal infrastructure, e.g., electronic auction system.

## **B. An Outline of a Primary Dealer System**

### **Commitments or Obligations and Entitlements or Privileges of Primary Dealers**

A primary dealer system can be described by a set of commitments or obligations and entitlements or privileges, as described below. In many countries, these tend to be formalized in standard bilateral agreements between each of the primary dealers and the ministry of finance.<sup>227</sup>

The following essential categories of *commitments or obligations* can generally be considered:<sup>228</sup>

*Participation in auctions.* This is both an entitlement and an obligation. There is a range of alternatives to consider for such a commitment. One regularly-used alternative is setting a

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<sup>227</sup> In practice, the bilateral agreement has limited legal enforceability, as in most countries either side can end the agreement at short notice. Thus, instead of the common jargon obligations and privileges, it is probably better to refer to commitments and entitlements.

<sup>228</sup> For example, see Silva and Richard, 2010.

minimum share for bidding in the auctions. This is relatively soft, as a primary dealer can position his/her bids to “miss” being filled in an auction. A stronger alternative is a requirement of a minimum share of the auction allocation. In the stricter version, this requirement would apply to each auction. Clearly, the sum of these minimum shares would only apply one-third or half of the total auction, as each dealer buys a different share. In addition, smaller markets are prone to collusion or “cornering” (when just one or two parties buy up most of the auction), leaving other serious bidders out of the allocation.<sup>229</sup> Instead of a minimum share for each auction, a more strategic alternative is requiring to buy a minimum share in the allocations across several auctions, e.g., a minimum share per month or quarter. Some countries also differentiate minimum auction requirements by type of instrument across the product range, taking into account additional factors such as the market power of each primary dealer.

*Secondary market quotation.* The market may get entangled in a vicious circle of low market liquidity, reflected by minimal tradable volumes and wide bid-offer spreads, while that liquidity can only improve if more participants became more active.<sup>230</sup>

Quotation commitments or obligations can serve to break this circle. Quotation rules generally refer to:

*The quotation platform.* Quotation and trading platforms have developed, with countries having often pursued international platforms, thus making it much easier for international banks to join. More than one simultaneous platform is often considered, but this can lead to fragmentation that might complicate the initial stages of building a secondary market as the limited liquidity and market coverage is spread too thinly.

*Minimum daily quoting time.* The quoting time reflects the length of time that each dealer is quoting simultaneously. For example, the obligatory quotation times may be short initially and expand later. Also, experience has shown that dealers may choose to quote voluntarily for a longer time period.

*Minimum or standard volume for quotes.* This tends to be a small amount, but the ongoing quoting by several dealers results in a market with, eventually, some depth and liquidity.

*A maximum spread between bid and offer.* This is set for each category of bonds and is often dependent on maturity (with longer bonds carrying higher market risk). The market bid-offer spread can initially be wide, as the “inside spread” resulting from several market makers will

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<sup>229</sup> To counter cornering, some countries have a cap on the allocation per bank.

<sup>230</sup> Liquidity in securities markets refers to the tradeability or the ability to liquidate securities without tremendous costs.

in most cases be much smaller. Tighter bid-offer spreads can gradually be established over time.

While a quotation provides trading opportunities to market participants, it requires the primary dealer to take additional market risk and commit capital and, potentially, scarce human trading resources. However, it is not merely the banks that need to step up commitments for a successful development. The debt manager also needs to commit to regular (but not too frequent) supply, giving room and reason for secondary market trading. Transparency and predictability is necessary to enable market participants to anticipate their market engagements. Specifically, government securities auctions need to be predictable, by announcing auction volumes (at least a volume range) before each auction, while the debt manager should be prepared to accept market bid rates and not to cancel auctions, except in extraordinary circumstances.

*Role of the supervisory and law-making authorities.* This involves improving the market infrastructure, i.e., the legal environment, as well as the clearing and settlement system, allowing easy market access and broad participation, including for international investors.<sup>231</sup>

*Instrument promotion towards investors.* Investors, especially non-residents, have a wide range of potential global investment opportunities. Primary dealers can play a role in informing investors with producing economic research and financial strategic analysis. In addition, primary dealers can link the sovereign issuer with large (potential) investors, for example, through roadshows, promoting both foreign and domestic bond issuance.

*Trade activity reporting.* These reports serve several objectives. One is to gain insight in the development of the (secondary) market and the activity of key players (by category). There are two types of trading: interdealer and between primary dealers and their clients.<sup>232</sup> The interdealer activity could be reported also directly from the electronic platform that dealers are using, but it is generally better to receive all coherent trade statistics from the dealers. This avoids potential definition issues and double counting. Some practical suggestions for such reporting are offered below.

The following *entitlements or privileges of primary dealers* are usually considered -- a balance needs to be struck between the commitments or obligations mentioned above and entitlements or privileges, keeping in mind that a viable system needs to be based on voluntary participation:

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<sup>231</sup> A clearing system enables the settlement of payments among banks and/or the facilitation of market transactions, such as the transfer of ownership of securities.

<sup>232</sup> Non-primary dealer banks would, in this context, be considered clients.

*“Primary dealer” brand.* From international experience, the right to carry the ‘primary dealer’ brand is generally the most valuable for many banks. The banks use it to profile themselves in financial markets. An important component tends to be the publication of rankings of primary dealers. It is important for the issuer to evaluate, select, and promote competition among primary dealers but for well-performing dealers, it is an important marketing instrument. This evaluation process becomes more difficult as banks tend to bias their activity towards this ranking and few countries, if any, have identified an unbiased scoring method. It is recommended to score primary dealers not just with quantitative formulae, but also using qualitative criteria, such as market promotion.

*Participation in auctions.* This right becomes, of course, more valuable when auction access is exclusively for primary dealers. In most countries with an established primary dealer system, this exclusivity is the key entitlement. In the initial stages, when such a system is created, it tends to be a highly sensitive issue. Therefore, some flexibility in the access to auctions is provided for candidate primary dealers.

*Direct financial benefits.* Another issue is how to provide direct incentives to bid in auctions. Non-competitive subscriptions grant primary dealers an option to purchase additional bonds, at the weighted average price of the auction, from a few hours and up to a few days following the auction. Another benefit is usually the right to be regarded as a preferred or exclusive counterpart for other debt management operations of the ministry of finance. Such operations can be a joint-lead-management role in syndicated transactions, or access and advice on buybacks and exchanges or even a role in privatizations. Among such benefits, it is common to pro-actively rotate those benefits among performing primary dealers where only one or a few banks are needed, such as lead-management of syndicated issuance, while taking into account that syndicate managers should be selected in principle for their placement power.

*Securities borrowing facility.* If quotation rules are in place, a primary dealer must be able to run a market making book without having to carry excessive inventory of government securities that would impact market risk and use of capital. With no inventory, an easy access to bonds is necessary to cover possible short positions that may result from market making. This access would normally come from the repo market (of the central bank), where bonds are borrowed and lent against cash for relatively short periods. In nascent markets, where repo markets normally do not exist yet or are not functioning effectively, the issuer can perform a lender of last resort function for government securities by means of a repo- or securities lending facility. Generally, access to such a facility would be exclusive to primary dealers.

*Advisors to the debt manager.* The debt manager needs ongoing feedback from the market, where primary dealers are considered the prime market contact and advisors in this regard. The benefit for a primary dealer is that it can have an impact on the decisions of the debt manager.

## **Stylized Preconditions for a Primary Dealer System**

### *1. Debt issuance strategy*

A government must have a strategy for issuing government securities. In particular, a government must accurately plan its debt issuance strategy so as to provide a medium-term horizon for the investment strategy of primary and secondary market agents.

### *2. Financing instruments*

A minimum set of attractively designed securities should be available. In deciding its debt strategy, the government should plan for a certain number of different types of securities, taking into account different maturities and trying to establish benchmarks. Also, other instruments could include index-linked securities, as examples that can help investors diversify their portfolios and provide instruments for risk management.

### *3. Investor base absorption capacity*

An adequate number of end investors is necessary, which implies that the government should try to estimate potential demand among individuals and the financial sector and be able to fine-tune its own supply, arising from its financing needs, to be able to meet potential demand.

### *4. Governments' commitment to market development*

The government must be committed to secondary market development. This condition is important because it guarantees the primary dealers and other market participants that they will not compete directly with the government in the placement of securities in the retail market. The authorities should refrain from intervening directly in the market, e.g., by limiting or avoiding direct sale of securities.

### *5. Commitment to accept market-determined outcomes*

The government must also be committed to market-determined outcomes. This requires that the authorities make efforts to stimulate a setup of the primary and secondary markets that allows competitive forces to play a dominant role. In this context, primary dealers should not be seen as a captive group that can be burdened with government securities, but rather as the initiators of a market or a group providing additional liquidity and transparency to the market for the purpose of better price discovery and resource allocation.

### *6. Primary dealer arrangement*

Arrangements between primary dealers and the debt managers in support of the auction system should be carefully arranged. In effect, this is an important prerequisite, since the auction is the central mechanism for the securities' allocation in the primary market.

### 7. *Sufficient debt and business volume*

Sufficient debt and a potential volume of secondary-market trade should be available to support a profitable group of competing primary dealers without subsidies for the operations. With respect to the size of the market, it is important to have an adequate number of active participants in the market, and enough volume in government securities issued to justify a primary dealer system.

### **C. Establishing a Primary Dealer System—Steps<sup>233</sup>**

Providing secondary market price information, even on a non-committed basis, is the most important step towards creating a market-making group. Once prices are available, it would enable the potential investors to make the right decisions on investments and the debt manager to design financing operations in the most efficient way (see Appendix 3).

Instituting a market-maker group would also require assistance from the debt manager to provide on request securities to market makers through a securities lending facility (SLF) or introducing repo operations. This entails that a Global Master Repo Agreement should be adopted and signed with all market makers. Further, it makes it necessary for the debt manager to issue bonds at the auction in excess of the allocated amount to be kept in the Treasury's account at the central securities depository.

When a debt manager assesses that a sufficient number of prospective primary dealers (candidates) is not able to fully commit to participation in the primary and secondary markets, e.g., allocating capital to underwriting and market making, a way forward may be to apply a phased approach to developing a full primary dealer system. This approach envisions that key measures and policies are gradually implemented as preconditions for each phase.

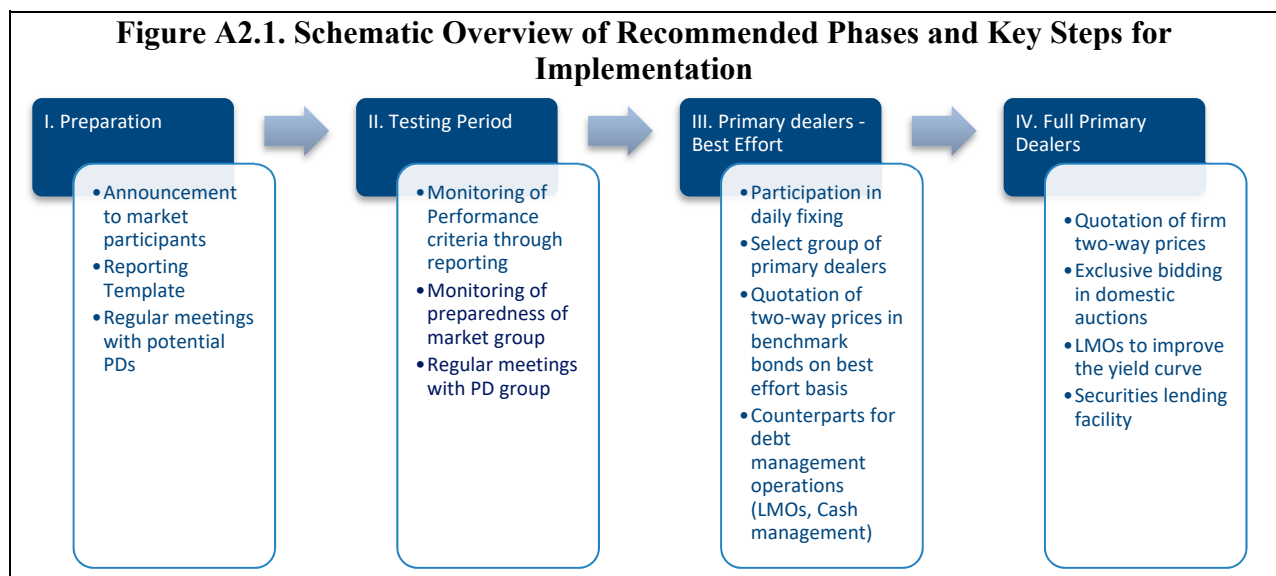
In this framework, an implementation plan could consist of four phases as elaborated below. These phases would cover a period of several years from the start of the implementation process. The final objective of this process would be to establish a full PD system. Such a proposed PD system may become feasible if objectives are realistically aligned. Each phase could be recognized by the market from the creation and operation of new groups of market participants (Table 1):

- (Phase I) Preparation. The first phase consists of a number of steps aimed at preparing the market and the debt manager for moving towards a primary dealership.
- (Phase II) Testing Period. The second phase consists of gaining experience with a set of institutions operating on a trial basis as primary dealers.

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<sup>233</sup> The following steps serve as indicative references, where country specific situations may warrant additional or fewer steps.

- (Phase III) Primary Dealership “Best Effort Basis.” This phase consists of a relatively simple step, initiating a light commitment from market participants towards the debt manager, which will have a market information system and a framework to evaluate the role of market participants. Prior to moving to the next phase, the debt manager and other authorities should decide on domicile of issuance and infrastructure where quoting obligations can be monitored.
- (Phase IV) “Full” Primary Dealership. The final phase will only start after phases I to III have been successfully implemented. It consists of the creation of a committed group of primary dealers, who agree to a balanced set of commitments and entitlements, including the introduction of primary market underwriting commitments.



### Phase I: Preparation

#### *Step 1. Reporting*

Reporting is the first step in establishing a direct, formalized relationship with market participants. This will assist the debt manager to follow market developments. Apart from this aspect of relationship with the market, the purpose of improved reporting would be to gain insights in the holdings and flows in government bonds, as well as to identify the most active participants in the market. Overall, the reporting would be far more comprehensive than what currently exists. As the intention is to have regular reporting, it will also allow to detect trends over time. The debt manager would benefit from the better insights for optimizing his/her issuance policies, for example, by discovering maturity preferences of investors and identifying gaps between demand and supply of certain instruments. Further, it will clarify what placement power banks have, who is the most active, and where the key investors are. Thus, it will allow the debt manager to organize roadshows targeted at specific investor categories and banks that might be best positioned to assist in such matters.



In general, the reporting would address three areas: primary market, secondary market and research/market promotion. Regarding the primary market, auction details are already known. The additional information in the reports would show the distribution of auctioned bonds among investors and the books of the bidding parties. The information would be similar to that of syndicated issuance, where the details of the order and allocation book give valuable information on investor demand. The other reporting segment relates to the secondary market trade volumes, both through OTC and electronic platform(s). The reporting would separate buy and sell transactions, instruments, maturities and categories of investors, including geographically. The last area of reporting concerns analytical publications regarding government securities market, as well as promotional activities that a bank might have conducted (e.g., reports, investor meetings, etc.) (see also Appendix 1). The purpose of this area of reporting is to evaluate the dedication and commitment of each bank, including international banks, in the domestic market, which could in the future help select lead-managers for syndicated issuance.

Participating institutions may include a fairly broad group of market participants. In principle, every professional party who is willing to provide reports, including international banks, domestic banks, investment advisors, etc., may participate. A broad group would be key in the selection of an appropriate group of primary dealers. Only reporting institutions would be eligible to participate directly in domestic auctions.

Market participants submitting reports should receive assurances from the debt manager that their information will be treated confidentiality. Trade statistics would only be released in an aggregated format and with sufficient delay so that they are not price sensitive. This step in the process requires the following actions to be taken by the debt manager:

- Review and, where appropriate, adapt a proposed reporting template;
- Present the draft to several key market players and finalize with feedback received;
- Invite market participants to become PD candidates, followed by a formal naming of PD reporting institutions;
- Prepare to process internally the reports into aggregate statistics; and
- Define the internal and external output.

*Step 2. Adapting issuance to stimulate secondary and primary local market demand*

The debt manager will need to review his/her issuance in terms of auction frequency, aiming at creating benchmarks with sufficient size and differentiation in maturities. At this stage, the international market would be the main market, with the domestic market absorbing shorter maturities such as Treasury bills and Treasury bonds up to five years.<sup>234</sup>

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<sup>234</sup> However, there have been markets that were domestically developed with limited external bond issuance, e.g., United States or Japan.

Auction frequency should be limited in the domestic market to enable the secondary market to play a role in the distribution process of bonds. Furthermore, there should be high transparency of issuance plans, enabling market participants to anticipate and prepare for fresh bond supplies. For example, the debt manager could issue an indicative supply calendar per quarter, with a range around the target amount.

Part of this step entails definition of maturities of domestic issuance to fully access potential demand. Depending on the balance-sheet situation of domestic investors, issuance of a particular maturity range should be pursued. This is important for domestic banks as, if they were to play a role in a future primary dealer system, the debt manager should issue in accordance to their needs, e.g., ALM.

## **Phase II: Testing Period**

### *Step 3. Regular meetings*

Regular meetings between the debt manager and market participants would be beneficial as they would foster dialogue. Regular meetings would also increase the debt manager's awareness of any problems in the market and allow the solicitation of market participants' views on potential new features to be introduced, thus reinforcing cooperation within a PD system.

### *Step 4. Assessment of readiness of market participants and debt manager*

The testing period could run over a 1-year period. During this period, the institutions that sign up for regular reporting to the debt manager would provide reports on their activities in the government securities market. This would enable the debt manager to formulate a view on the preparedness of market participants to move into Phase III, which would designate selected institutions as PDs.

## **Phase III: Primary Dealership— “Best Effort”**

### *Step 5. International custody and settlement of local bonds*

An essential driver of secondary markets is sufficient presence of diverse participants that, at most times, there are simultaneously buyers and sellers, thus making a market. International banks and investors often contribute strongly to this diversity. The ease of access for such international players to domestic bonds depends on infrastructure, particularly the international clearing and settlement of domestic bonds. For this to be achieved, it is important to establish connectivity between the domestic central securities depository and an international settlement institution.

### *Step 6. Define incentives for PDs to undertake market-making*

With this step, market making would receive a boost through the introduction of the so-called non-competitive part to an auction. Thus far, it has been completely voluntary and without any incentive. The approach is relatively straightforward and proven in many countries.

When selecting eligible participants, the debt manager would make a periodic ranking of the most active market makers' voluntarily quoting. This process should not be mechanical, but preferably reflect multiple measures of performance appraisal (Box A2.1). The appraisal would produce a top-list of market-makers that will be given access to the non-competitive auction, which implies that they will be allowed to buy for, e.g., 3 working days after the initial auction an additional amount of up to, e.g., 25 percent of their initial allocation at the average auction price.

#### **Box A2.1. Primary Dealer Performance Appraisal**

A PD performance appraisal can span from a very basic to an overly sophisticated system. Usually, three types of activities are evaluated:

- (i) Primary market activity can be evaluated by the share of government securities bought by a PD at auctions in the given period to the total amount of the securities issued at the auction in the same period. There should be individual weights assigned to securities with different maturities, as buying a certain amount of 10-year bonds should be more rewarded than buying the same amount of 2-year bonds. As a rule, duration weighted systems are applied. In this process, it has to be decided whether (i) only traditional auctions are taken into account or buybacks and exchange auctions are also considered, and (ii) T-bills should be included or be evaluated separately. In some countries, there is an obligatory participation in auctions, which leads to submission of off-market bids for insignificant amounts that distorts auction results.
- (ii) Secondary market activity concentrates mostly on market making obligations, i.e., price quotation for a predefined amount, at a given spread during the quotation period. Dealers are obliged to report trades with all types of counterparties (with other primary dealers and customers) and should be ranked by their share in the secondary-market turnover. Within secondary market activity, participation in repo (i.e., liquidity management) operations with the debt manager may be evaluated separately. Secondary market transactions are based on quantitative criteria, which can be measured using statistical and monitoring instruments.
- (iii) Other (qualitative) criteria try to capture the quality of advisory services performed by the PD, its ability to cooperate and share information, the technical and human resources allocated to assist the debt manager in relation to risk management and optimization of the debt portfolio, and its analytical outputs or economic analyses. All other things being equal, these can make significant differences among PDs.

Primary dealer performance evaluation has to be transparent, comprehensive and feasible. There should be a predefined evaluation period (6 months, 1 year, etc.), with the evaluations being made public in the form of a PD ranking. The evaluation criteria should be defined before the start of the evaluation period and the weights assigned to the different type of activities should be in line with the effort that is being made in that particular activity. The criteria should be "neutral", i.e., should not favor one group of PDs. A typical problem is to have short-term T-bills, which are typically preferred only by local banks, been included into primary market evaluations. This can be disadvantageous for non-resident PDs. Evaluations must be taken very seriously as they may form the base of admitting or deleting institutions from the PD group.

#### *Step 7. Establish a daily fixing for key Treasury bond maturities.*

A daily price fixing of government bond yields would require participating dealers to provide an indicative quote on a non-committal basis. The quotes for the daily fixing would need to be at a defined time and published on a multi-contributory page, as well as directly to the debt manager. The debt manager, or another infrastructure provider, would then calculate and publish an average quote after removing outliers for each of the key maturities.

*Step 8. Introduce an agreement for a light version of a PD system.*

The implementation of a PD system would be a matter of formalizing the rights and obligations of participants. Experience shows that this formalization comes down to standardized, bilateral contracts between the debt manager and each PD, stressing the voluntary and contractual aspect of becoming a PD.<sup>235</sup>

**Phase IV: “Full” Primary Dealer System**

The main distinction between Phase III and IV is that PDs will begin to quote firm two-way prices in benchmark bonds in Phase IV. This will require an electronic trading platform, some consolidation of the existing stock of government securities, and the introduction of a securities lending facility to support and provide incentives for the primary dealers.<sup>236</sup>

*Step 9. Liability management operations for government securities*

The possible high number of government bonds should be consolidated into fewer benchmark bonds to improve liquidity and price discovery. This step would also involve reconsidering the key maturities for the domestic bond market and further refining of the Treasury-bill issuance. This step would define what are the key benchmarks in the domestic market, what constitutes a benchmark size and the benchmark replication. Liability management operations should also consider exchanging loans to government bonds (on market terms) to further increase the liquidity of the market.

*Step 11. Introduce a repo/securities lending facility*

Secondary market quotation can be difficult if no initial position is held in the bond that is being offered. Generally, borrowing those bonds for a short period in the repo market (often operated by the central bank) can cover the market maker’s short positions. The market maker retains the interest rate risk of the short position, when he delivers the bonds.

Limited availability of free-floating bonds for market making may be the result of low outstanding volume of those bonds. Even when the size is increased through several re-openings, the outstanding volume may be insufficient for market makers to offer bonds at reasonable prices. A tested solution to address this problem is for the issuer to provide a repo facility (Box A2.2).

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<sup>235</sup> See Association for Financial Markets in Europe, 2016.

<sup>236</sup> The number of primary dealers becomes very relevant in Phase 4. At that stage, it will become necessary to calibrate the number of PDs to ensure a good fit with the expected volume of activities and the objectives of the debt manager.

### Box A2.2. Securities Lending Facility

To illustrate how a debt manager-led repo/securities lending facility could work, consider a new bond that is aimed to reach a certain final size, considered to be a sufficient “benchmark” size for the domestic market. As of the first issuance, the size of the bond in the prospectus will immediately be the final benchmark size. At each auction (or syndicated issuance), a portion of the total size will be sold; the remaining will stay “on the shelf” as, so-called, “issued-but-not-sold”. Over time, the volume of issued-but-not-sold bonds will become smaller with each reopening. The debt manager can use this portion to repo or lend bonds. The eligible market participants will be able to fulfill their bond delivery obligations on bonds that they have sold as market makers. The period for which they borrow or repo the bonds can range from one day to a few weeks. However, this period can never cross a new issuance date of the bond, as that will be the opportunity for the participant to cover his short position in the upcoming auction.

Such a repo or lending facility should be intended as a safety net for committed market makers. The rate, expressed as a spread against the money-market rate of a similar maturity, applied to a lending or repo operation under the facility should be unattractive for the market maker. For example, if the interbank rate for 2 weeks money is 5 percent and a bank might need the bond for that same period, a repo rate of 4 percent might be demanded, that is a spread of 1 percentage point. This spread is an opportunity cost to the bank and a benefit to the debt manager, in terms of lower short-term financing costs.

The experience in countries with such facilities is that the availability of the facility is generally enough to provide a confidence boost to market makers. For countries where repo markets are developed, the use is rare as market makers find more cost-efficient ways to cover their short positions. However, it may be expected that the facility receives more use compared to larger and more seasoned sovereign borrowers. For this step, a number of actions are needed:

1. Review legal circumstances to implement such a facility, with the participation of supervisory authorities, especially if any new laws are required, and assess the form that is most legally suitable for the facility.
2. Once the repo/bond lending facility is legally feasible, adjust the documentation or prospectus for new bonds, i.e., create new bonds with its final size as of the start.
3. Prepare standardized bond lending/repo documentation.
4. Define the conditions at which institutions can participate: (i) the institutions need to be primary dealers and (ii) the cost of borrowing bonds needs to be more expensive than a potential repo, inducing use only as a safety net or for short periods, and be expressed as a spread (below money market rates—1 percent could be considered as a start).
5. Make a public announcement explaining the instrument and the process.

#### *Step 11. Quotation of firm two-way prices*

There are three main distinctions between market makers and primary dealers: (1) PDs commit to bid for and achieve on average a minimum share of the auctions. While this requirement should be approached carefully, as auction bidding might not be well distributed each time, dealers will effectively commit some of their capital to government securities; (2) quoting rules will be introduced, moving from a situation where market making was without preset rules towards quotes that are monitored and driven by performance measurement; and (3) in principle, a selection among market makers is done to end up with a limited, but sufficient, number of primary dealers, including foreign dealers.

### **Appendix 3: Implementing Auctions of Government Securities**

Auctions are the predominant issuance mechanism for the sale of domestic government securities. While a variety of issuance mechanisms are broadly adopted, auctions are by far the most common method of placement. Alternative mechanisms are sometimes used in parallel, including: (i) syndication—especially in mature markets for the launch of new benchmark securities (e.g., France, Belgium, United Kingdom, and Germany); (ii) tap systems (e.g., Denmark); and (iii) private placements, to a limited extent and usually associated to specific circumstances (e.g., bilateral debt exchange or securitization).<sup>237</sup>

Generally, auction rules are shaped by three main dimensions: (i) pricing, (ii) eligibility for bidder participation, and (iii) types of bids (competitive and non-competitive). These variations reflect the diversity of practice and the lack of a universally optimal auction model. Auction theory provides insights to guide auction design, but to date has yet to present a mechanism that is universally superior and implementable for auctions of government securities. Country-specific factors such as the level of development of secondary markets and composition of the investor base, particularly the existence of captive demand, play a central role in determining the appropriate auction model.

#### **Transparency and Predictability**

Experience shows that it is generally advisable to issue government securities by auction in a transparent and predictable manner and in large individual issues at regular intervals (IMF and WB, 2014). At an auction, a bond is offered at a given nominal interest rate, maturity and redemption profile. A group of market participants may give bids for a certain volume of bonds at a given price (or yield). The use of platforms differs—physical, telephone or electronic. The choice of platforms depends on the number, types and location of bidders, with an electronic auction system offering important benefits in terms of the time it takes to clear an auction.

Rules for auction design need to be complemented by a set of pre-auction sound practices. Auction participants place a high value on predictability in primary markets. This allows investors, including primary dealers,<sup>238</sup> institutional and foreign investors, to program their participation and can lead to a higher level of competition. Guidance on funding objectives and issuance strategy is usually provided in the form of a medium-term debt management strategy (MTDS) and an annual borrowing plan (ABP). These are complemented by auction calendars (practices vary from monthly to annual calendars) and information content (degree of detail on auction dates, maturities, and amounts). Pre-auction consultation also helps

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<sup>237</sup> Some countries also place debt to retail investors for various objectives and through different vehicles, including the internet. For more details on retail debt programs, see Krupa, Togo and Velandia, 2007.

<sup>238</sup> See Appendix 2.

improve adherence between the volumes of securities issued across different maturities and market demand. It usually takes two main forms: regular meetings with primary dealers (and possibly other institutional investor associations); and bilateral consultation with PDs on auction demand a few days before the auction announcement (see Appendix 2). The latter is critical to gauge demand for a specific auction, thereby reducing the margins of error in supplying an amount that may be considered too high for the market to absorb.<sup>239</sup>

Auction execution and decision making on accepted amounts should avoid surprises and follow regular procedures. Governments usually strive to build a reputation of being a price-taker, refraining from opportunistic behavior. As government securities auctions are essentially repeated games, opportunistic behavior by the government would likely lead to higher funding costs in the medium- and long-term. Therefore, sound international practices call for avoidance of changes in offered amounts (e.g., selling more than initially announced) and rejection of bids (totally or partially) only in exceptional circumstances (e.g., in the case of abnormal dispersion across bids). These price-taking practices also reduce perceptions of potential conflict of interest in decision making between monetary and fiscal/debt management policies.

### **Auction Frequency**

The auction frequency should be specified on the basis of the expected role of the secondary market and the government cash management needs. The primary market provides market participants with price discovery in the absence of a functioning secondary market, but frequent auctions may reduce the incentives to use the secondary market. Further, adequate issuance size provides for more reliable price discovery than smaller sizes. In addition, it may help reduce the government's execution risk at the margin, allowing them to accept a greater proportion of bids in any single auction, as the overall cost will be mitigated by size (see Appendix 2).

### **Transparency and Predictability**

Greater predictability is likely to enable investors to better manage their liquidity and increase their demand. It could also support the scope of conducting better analysis of pricing, as experience shows that this leads to higher bid-cover ratios. While predictability begins with the debt management strategy, it follows the logical steps of communication of annual borrowing needs, auction calendars and individual auction announcements in the form of indicative ranges for total requirements by class of instrument. Such practice facilitates investors' portfolio management and/or investment demand.

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<sup>239</sup> However, this requires procedures such as voice recording devices to protect debt office officials from suspicions of providing inside information.

The debt manager should establish an active dialogue with market participants, both banks and nonbanks. This would help communicate the debt management strategy and increase transparency to potential investors in government securities, as well as to credit ratings agencies. Along with an investor relations function and website, this dialogue would form part of an overall reporting and communications strategy covering both internal and external stakeholders. This framework could be characterized broadly as: (i) internal reporting to senior policy makers; (ii) formal external reporting through various publications; and (iii) informal liaison through meetings. In addition, a formal market consultation group, chaired by the debt manager, to present and examine proposals to develop the market and improve its efficiency is very useful.

Allowing investors to submit multiple bids is beneficial to the debt manager. By allowing banks to effectively submit an entire demand schedule, they are allowed to test various price levels, enhancing the price discovery process, which, at the margin, could encourage an increase in volumes bid. This could also encourage other institutions to submit bids through the banks, again at the margin, as they can be more selective of the price at which the bid is made, adding to demand. Finally, it would also reduce the government's execution risk, allowing finer discrimination between bids to be accepted and bids to be rejected.

### **Determining Cut-off Rates**

Debt managers seek to avoid a cancellation of Treasury auctions, other than in extreme circumstances, as such practice can transmit negative signals to the market. Debt managers operating in deep and liquid primary markets enjoy long periods of well-subscribed auctions. However, many EM and LIDCs debt managers may resort to allocating amounts that are different from the allotted amounts for a variety of reasons. When demand is unpredictable, the debt manager may wish to explain the allocation criteria, where some countries have defined a rule-based approach to ensure the transparency around such allocation, e.g., by rejecting bids that are more than [x] basis points away from the weighted average price of the lowest half of the bids by value (with [x] being published in each prospectus.<sup>240</sup> Other countries publish a range for the target amount, where the lower part of the range represents a "significant" amount that is published in prospectuses or is based on an established market practice. Regarding practice, a reserve price reflects the penultimate emphasis on the auction tail, but is difficult to be implemented since a reserve price can be interpreted as an ex ante determination of a "speculative offer." This may provide a signal for market participants to bid aggressively and/or cluster their bids around the reserve price.

More complicated arrangements may exist, e.g., linked to underwriting, as in Spain, where PDs must bid for at least 3 percent of the auction (which does not guarantee a full subscription since there are only 21 PDs/market makers). The minimum price bid is defined,

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<sup>240</sup> See Macedonia, FYR of, 2009 (Article 33).



in terms of a spread below the clearing price of the auction (the spread varies with maturity). In making their underwriting bids, PDs estimate the likely clearing price, for which they have a guide in the form of the price in the secondary market at the time of the auction. This puts a floor on the extent to which the underwriting bids pull down the weighted average price of the auction.

In Singapore, the Monetary Authority (MAS) may adjust its purchase in the auction according to the specified difference between auction cut-off and secondary market yields. Each PD is obliged to tender for an equal share of the issue on offer. There is no direct compensation and the issuer is exposed to defensive bidding by PDs. This is mitigated by the ability of the MAS to vary its subscription amount to offset unexpected changes in investor demand. Where the auction cut-off yield is more than 25 basis points below or above the market yield, MAS may subscribe for a lower amount in an unexpectedly strong auction or a higher amount in an unexpectedly weak auction. Higher performing PDs are also given priority in MAS' liquidity operations, which encourages PDs to submit competitive bids at auctions.

### **Auction Format**

The auction format is an important parameter in the determination of the final auction price. An open distribution allows broad participation, but the optimal degree of participation depends on several factors. Auctions tend to become more open as the market develops, although there have been some exemptions. In fact, a few less-developed markets have promoted broad participation by including retail bidding. A retail strategy can be successful and increase competition, but it assures the existence of a relative developed financial sector with a wide range of potential auction participants. The opposite situation is an auction form with narrow participation, e.g., a PD solution where PDs have exclusive access to primary auctions. A number of permutations exist with either more or less open participation. When government securities are auctioned, a distinction is often drawn between two different methods of fixing the price paid by the bidders, each with advantages and shortcomings.

When the "uniform pricing" method, or Dutch auction system, is used, a cut-off price is determined by the debt manager on the basis of the bids received and all bids at the cut-off price or above are met at the cut-off price. If the total volume of bids at the cut-off price and above exceeds the volume that the issuer wishes to sell, allocation can take place on a pro-rata basis. This entails that for bidders who have submitted bids at the actual cut-off price only a part of the bids is honored. The bids can be made for a yield or for a price.

In the "multiple pricing" method, a cut-off price is fixed on the basis of the bids received and all bids at the cut-off price or above are met at the prices offered by the individual bidders. The multiple pricing method has the advantage for the issuer that he/she always obtains the maximum price each participant is willing to pay. Studies have shown that participants tend

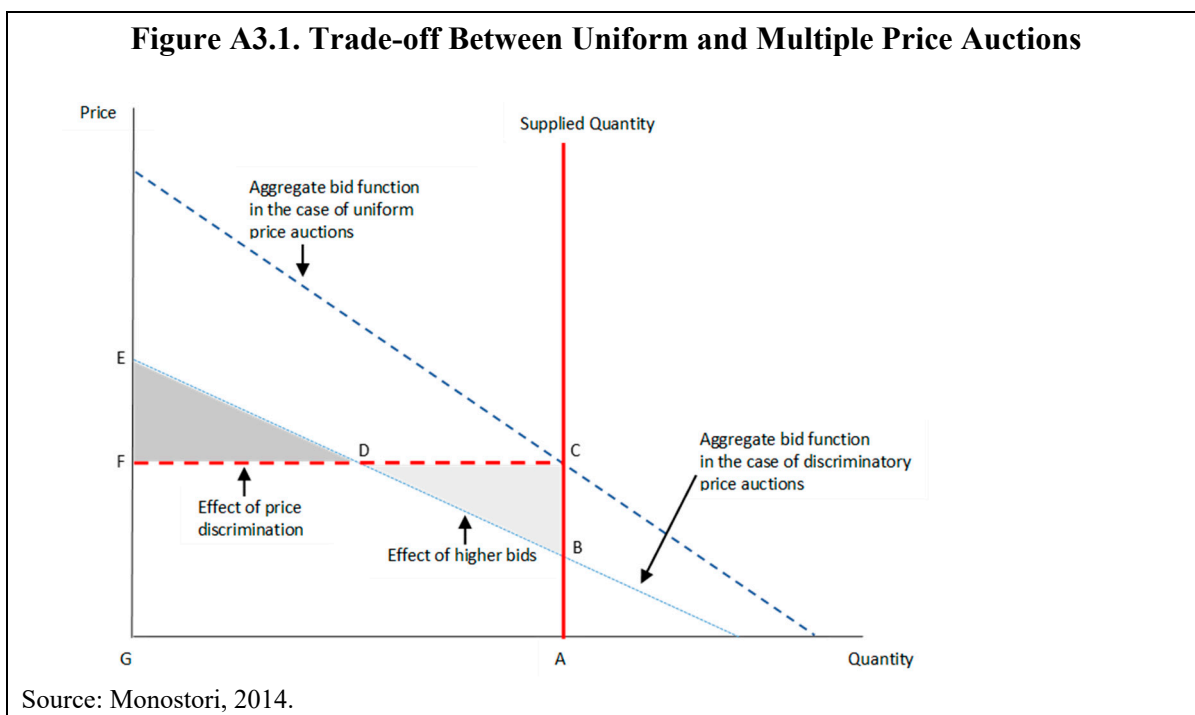
to bid more cautiously in a multiple pricing auction. This tendency does not arise in uniform pricing auction, where bidders are more willing to pay a higher price (everything else being equal). Uniform pricing also tends to encourage broader participation in the auction. Debt managers need to take such advantages and disadvantages, including noncompetitive behavior, into consideration when they decide for a uniform- or multiple-pricing method in auctions or for a combination of these two techniques.

The choice between multiple or uniform price auctions is debatable. Studies have compared the markups in uniform-price and multiple-price formats to investigate whether the switch to the uniform-price format in two- and five-year notes results in higher revenues for the Treasury. They find that the differences in the markups of the average auction yield over contemporaneous when-issued yields (a measure of the Treasury's possible savings) between the two formats depend on the time of the day the when-issued yield is quoted and the maturity of the note (Nyborg and Sundaresan, 1996). Multiple price auctions, also known as discriminatory or pay-as-bid auction, are the most commonly observed model. However, the uniform price mechanism has also been widely adopted. The debate on revenue superiority of one model over the other remains quite inconclusive as empirical studies face reasonable challenges to accurately estimate the trade-off between the two mechanisms. Practices vary both across and within countries, according to the type of instruments (bills and bonds, fixed rate vs. indexed) and maturities.

The investor base is an important factor affecting the choice of the pricing model, particularly with regards to reactions to (i) the risk of the "winner's curse" and (ii) the risk of losing the auction. A higher risk of winner's curse may drive investors to shade their bids or not to participate in the auction. As in the uniform price auction, successful bids are allocated at the cut-off price, the winner's curse is mitigated potentially leading to more aggressive bidding and demand.<sup>241</sup> The trade-off for auction revenue then lies on how much is gained by the supposedly higher demand in uniform-price auctions versus how much is lost by allocating all securities at the cut-off price (Figure A3.1).

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<sup>241</sup> The "winners curse" may not be completely eliminated, as the cut off price may still be higher than the resale price in secondary markets.



In practice, the majority of global issuers of government bonds use the multiple-price format. A study detailing global practice, consisting of 41 country cases, revealed that 56 percent of the countries used multiple-price, 22 percent used uniform-price, and 22 percent used both (Monostori, 2014).<sup>242</sup>

In some cases, investors may be relatively more concerned with the risk of not receiving an allocation in the auction. This may be especially relevant in markets where excess liquidity is prevalent (and where alternative sources of investments are limited) or the secondary market is not significantly developed. In these cases, multiple price auctions will tend to be preferred by the debt manager. However, uniform-price auctions may also be useful where secondary market liquidity is limited, or there is uncertainty about pricing, e.g., due to the absence of a suitable reference rate or hedging instruments. For example, both South Africa and the U.K. uses this for format for inflation-linked bonds; similarly, Brazil has used this format to encourage greater bidding. By limiting the risk to uninformed bidders, uniform pricing generally encourages more aggressive bidding and has been shown to contribute to broader market participation.<sup>243</sup>

<sup>242</sup> See Monostori (2014) for a comprehensive overview of literature and a discussion of the uniform-price and multiple-price auction formats.

<sup>243</sup> See Malvey, Archibald, and Flynn, (1995).

## **Tap Sales and Other Variations**

Sale on tap means that government securities are sold on an ongoing basis, when the government needs financing and markets are favorable. The availability of a certain amount to be sold at a fixed or a minimum price is announced, and bids are received during a specific (limited) period. The price can be changed depending on demand.

Tap distribution is sometimes seen as a useful tool for retail bond programs and when cash planning is deficient due to its flexible application. It can also be an appropriate tool when demand for government securities is unpredictable, which is the situation in many developing countries, as it allows the possibility to tap the market at the right and most favorable time.

An erratic application of tap sales, however, can cause conflicts in the market. If market participants are aware of, or expect, tap sales between the auctions, it can result in a negative influence on the competitive bidding and undermine the auction. The tap sale must therefore be used carefully, be balanced and be based on the prevailing market situation. Aggressive tap sales at fixed prices can also undermine the price setting procedure and the liquidity in the secondary market.

## **Use of Non-competitive Bids**

Non-competitive bidding (NCB) is often used as an integrated part of an auction. Depending on the applied pricing system, the non-competitive auction uses the average or the highest yield from the competitive auction, as the price. At the end of the competitive auction, amounts are allocated to the non-competitive bidders, subject to different limits.

A distinction is made between open or closed auctions. Closed auctions are those restricted to fewer, dedicated participants, e.g., primary dealers. In open auctions, participation is allowed for a broader range of participants. An advantage of closed auctions is that such exclusivity in access provides an incentive to perform more competitively in primary markets and may also enhance their distribution and market making role in secondary markets (see Appendix 2). An open auction system may arguably enhance competition in primary markets, especially in countries with a large number of non-primary dealer banks. Experience shows that both models are widely used. The main factors to monitor when adopting a closed-auction system are the extent to which non-primary dealers have cost-efficient access to the government securities market (through client bids in primary markets or via secondary market trades) and the number and size of PDs be sufficient to effectively compete in auctions.

The participation in NCB varies from a few selected groups to a fully open free access/participation. In countries with PD systems, primary dealers often have an exclusive right to participate in competitive biddings, whereas other groups, even retail investors, may

not be allowed to participate in NCB. Many countries see NCB as an efficient and alternative way to encourage retail participation, compared to retail participation in competitive auction. In some countries investors are only allowed to bid through PDs.

Country practices vary regarding the rules for accepting non-competitive subscriptions in the context of competitive bids. NCBs can be useful in attracting bids from investors that are less specialized and thus more susceptible to the winner's curse (e.g., retail investors, public sector funds) and as an incentive mechanism for primary dealers. NCBs can follow a pre-auction format, where bidders present bids before the competitive auction is conducted, or a post-auction format, where the decision to submit NCB bids is taken from a few hours to a few days after the auction is conducted and the results are released (yields and allocations in the competitive auction).

The participation of PDs in pre-auction NCB is largely less common than in the post-auction format. This is because access at an average (and unknown) price before the auction is hardly perceived as an incentive to dealers. Due to the PD business model, PDs are very sensitive to the price of securities that they are allocated and the potential profits they could generate in secondary markets. Post-auction NCB, on the other hand, is a prevalent tool to motivate dealers to perform, as it is effectively an option at a fixed strike price (e.g., the average auction price). The share of post-auction NCB that a PD is entitled to is usually a function of his/her relative performance compared to other dealers.

To ensure sufficient liquidity in the competitive part of the auction and to allow the price to be determined by a sufficient large number of bids, the amount allocated to the non-competitive bidders is often limited to a smaller fraction of the total auction amount. The fixing of the fraction size of the total amount to NCB reflects, among other things, a balance between the value of the PDs' exclusive right and the interest of the end investors. NCB may also be subject to individual limitations, mainly to secure the non-professional character of the NCB, but also to secure that no single investor including the competitive participants has a dominating role.<sup>244</sup>

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<sup>244</sup> As an example, the U.S. Treasury permits non-competitive bidding as a means to encourage broader participation in auctions of relatively small investors. However, rules have been put in place that are designed to minimize the use of non-competitive bidding by bidders that more appropriately should bid competitively—a bidder bidding competitively for his/her own account may not bid non-competitively for its own account in the same auction (see also Appendix 3).