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THE MEDIUM-TERM DEBT MANAGEMENT STRATEGY: AN ASSESSMENT OF RECENT CAPACITY BUILDING

Prepared by the staffs of the World Bank and the International Monetary Fund
Approved by Jan Walliser (WB)
and Peter Dattels (IMF)

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Glossary

ABP	Annual Borrowing Plan
AT	Analytical Tool
DeMPA	Debt Management Performance Assessment
DMO	Debt Management Office
DMS	Debt Management Strategy
DPI	Debt management performance indicator
DPO	Development Policy Loan
DSA	Debt Sustainability Analysis
EBRD	European Bank for Reconstruction and Development
EMDC	Emerging Market Developing Country
IDA	International Development Association
IMF	International Monetary Fund
LCBM	Local Currency Bond Markets
LIC DSF	Low Income Country Debt Sustainability Framework
LIDC	Low Income Developing Country
MAC DSA	Market Access Countries Debt Sustainability Analysis
MEFMI	Macroeconomic and Financial Management Institute of Eastern and Southern Africa
MOOC	Massive Open Online Course
MTDS	Medium-Term Debt Management Strategy
NCBP	Non-Concessional Borrowing Policy
OECD	Organization for Economic Cooperation and Development
PPP	Public-private partnership
PRGT	Poverty Reduction and Growth Trust
SOE	State-owned enterprise
TA	Technical assistance
WB	World Bank

Executive Summary

This report to the Boards of the World Bank (WB) and the International Monetary Fund (IMF) is the third in a series regarding the evolution of the Medium-Term Debt Management Strategy (MTDS) framework and the associated capacity building efforts. In 2007 the two Boards endorsed the development of the MTDS and ancillary tools, and mandated a program of technical assistance to help countries build capacity in this area. This endorsement and mandate reflect a recognition that sound debt management is critical both to macroeconomic stability and to the development and functioning of the financial sector.

The WB and the IMF have collaborated to deliver a large volume of MTDS-based technical assistance to numerous, diverse countries, with a focus on middle- and lower- income countries. Donors have recognized the importance of this work and have been generous in their support. The assistance has taken many forms, including country visits by staff and experts, the delivery of regional training events, and the organization of forums. As documented here, modes of delivery have evolved, with greater emphasis on tailoring to country circumstances, ownership, and coordination within and across agencies in the recipient countries.

The report and accompanying annexes describe how capacity building on MTDS has been adapted to keep abreast of country needs. An increasing number of countries have market access (such as through the issuance of Eurobonds or local currency bonds), and face the potential realization of contingent claims, which requires that the MTDS framework consider additional risk factors; more diverse scenarios and market risk metrics; and a wider range of strategies. In many countries, effective capacity building in MTDS was complemented by efforts to strengthen institutions and governance arrangements; debt recording; and government cash management. Linkages with the formulation of annual borrowing plans (ABP) and debt sustainability analysis (DSA) have been strengthened, but more work is needed. Providing a sustained stream of support, rather than one-off missions, often produced better results. Country ownership, often reflected in commitments under WB- or IMF- supported programs, has proven critical to the sustained enhancement of debt management capacity.

The value and effectiveness of these capacity building efforts are documented in the report using qualitative and quantitative metrics. The responses from national authorities to a questionnaire on their experience with MTDS technical assistance, and the evolution of various quantitative indicators suggest that there were benefits and these were generally sustained. In particular, the majority of countries that had received technical assistance indicated that it helped them to introduce a structured and coherent approach to designing a debt management strategy (DMS) and raise awareness of risks among senior officials and broader stakeholders. Countries also appreciated advice on institutional and governance reforms and integrating debt management into macroeconomic policy formulation and implementation. The observations are supported by case studies detailing how technical assistance was successfully tailored to country needs. It is shown that many recipient countries are now better able to integrate debt management into overall economic policy formulation and adapt their debt management strategies to changing countries' circumstances. For some, risk exposure indicators have improved even as debt levels have increased.

Looking forward, the report suggests that the MTDS framework and modes of delivery should continue to be updated and refined, while maintaining core functions. Some countries will need more sophisticated techniques both to analyze cost-risk trade-offs and to implement their chosen strategy. Others are still in the process of building a solid foundation for debt management. In addition to hands-on trainings, greater use of on-line learning may further enhance effectiveness and efficiency. Building institutional capacity in debt management is a long-term endeavor, often times requiring a more "programmatic" approach and sustained client ownership. Such an approach would involve diagnosis followed by an actionable reform plan supported by tailored technical assistance.

The Boards are asked for their views on priorities in a strategy for future development of capacity building in this area, and how best to ensure that improvements in debt management are sustained.

I. Introduction

1. **The report provides an updated assessment of WB and IMF efforts to help countries develop capacity in formulating and implementing medium-term debt management strategies.** It seeks the view of the Boards on whether those efforts are on the right track in adapting advice to the needs of countries as they face new challenges in debt management, related notably to increasing market access and potential realizations of contingent liabilities.

2. **The primary aim of debt management is to raise the required amount of funding at the lowest possible cost over the medium to long run, consistent with a prudent degree of risk, but it can also be critical to macro-financial stability and to financial sector development (Annex I, Section A).**[1] A debt management strategy (DMS) is a plan for the evolution of the public debt portfolio that operationalizes the debt management objectives given the constraints, and specifically the government's preferences with regard to cost-risk trade-offs. A DMS should thus have a strong focus on managing the risk exposure embedded in the debt portfolio, and notably the potential variations in the cost of debt servicing. A DMS is one, guiding component of public debt management, which involves also tactical decisions, and coordination with other public sector policies. Debt managers are responsible for ensuring that financing constraints do not lead to sharp reversals in fiscal policy or spikes in interest costs. Thus, sound debt management contributes to reduced macro-financial risks, complementing prudent fiscal management and monetary policy implementation. Debt management contributes also to market and institutional development.

3. **The MTDS framework consists of a methodology and associated analytical tool (AT) to facilitate sound debt management (Annex I, Section B).**[2] The framework seeks to help countries develop a DMS that explicitly recognizes the relative costs and risks of alternative financing choices; takes into account the linkages with other key macroeconomic policies; is consistent with maintaining debt sustainability; and facilitates domestic debt market development.[3] The framework is adaptable, but it is especially geared towards the needs of low-income developing countries (LIDCs) and emerging market developing countries (EMDCs).[4] The main components addressed by the MTDS framework include: the objectives and scope of debt management; the characteristics of the existing debt portfolio and the identification of risk priorities; the sources of potential domestic and external financing; the macroeconomic framework and structural factors; baseline pricing assumptions and shock scenarios; and the

[1] See WB and IMF (2014), "Revised Guidelines for Public Debt Management".
[2] See WB and IMF (2009), Developing a Medium-Term Debt Management Strategy (MTDS)—Guidance Note for Country Authorities".
[3] See WB and IMF (2009), "Managing Public Debt: Formulating Strategies and Strengthening Institutional Capacity" SecM2009-0105, IDA/SecM2009-0100, and the update SM/14/74.
[4] See IMF Policy Paper (2014), "Proposed New Grouping in World Economic Outlook Country Classifications: Low-Income Developing Countries" for a full description and list of LIDCs and EMDCs.

(continued)

comparison of alternative funding strategies based on estimates of cost and risk. The resulting DMS is typically published in a separate document.

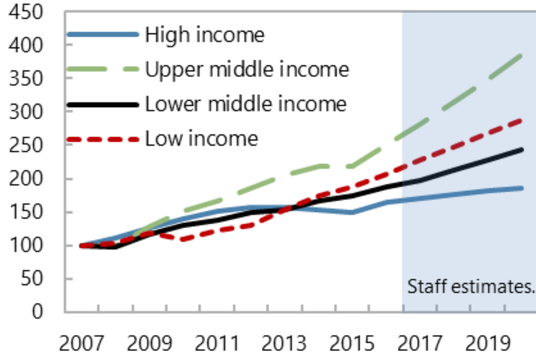
4. **Many EMDCs and LIDCs currently face increasingly complex debt-related vulnerabilities, making effective and prudent debt management all the more macro-critical.** Several countries' debt vulnerabilities—in terms of total and external debt stocks, but also financing and debt service needs—have been rising (Figure 1).[5] These trends over the past few years are mainly due to:

- A prolonged growth slowdown, increased fiscal deficits, and heightened geopolitical risks in some developing countries;
- Negative terms of trade shocks—particularly commodity and energy price shocks—weather related shocks, and contagion from global financial market crisis (Figures 2 and 3); and
- A deliberate increase in reliance on foreign financing in a low interest rate environment.

[5] See also IMF, Fiscal Monitor, various issues, and WB and IMF, Public Debt Vulnerabilities in Low-Income Countries: The Evolving Landscape, December 2015.

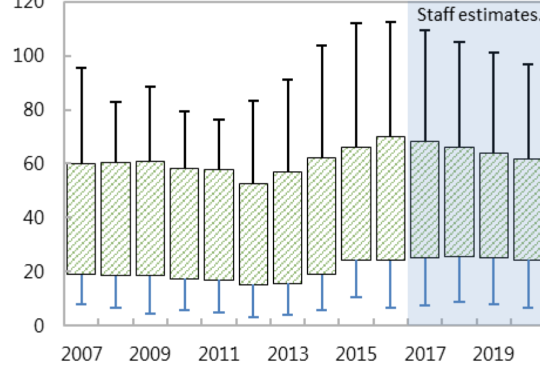
FIGURE 1: EVOLUTION OF PUBLIC DEBT, 2007 – 2020

Over the past decade, debt levels for all income groups have been climbing gradually. However, the outlook suggests that debt levels are likely to continue rising.



Sources: World Economic Outlook; and staff calculations.

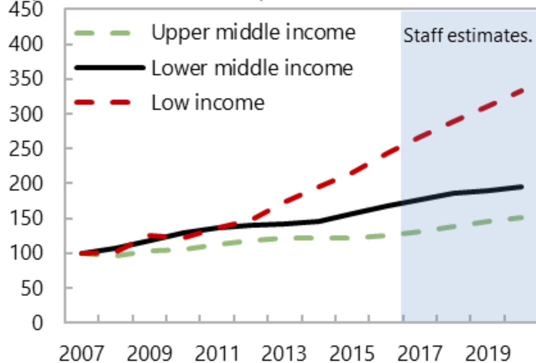
The impact on debt sustainability has been contained; though pressure is building on some low-income countries,



Sources: IMF WEO database, and staff calculations.

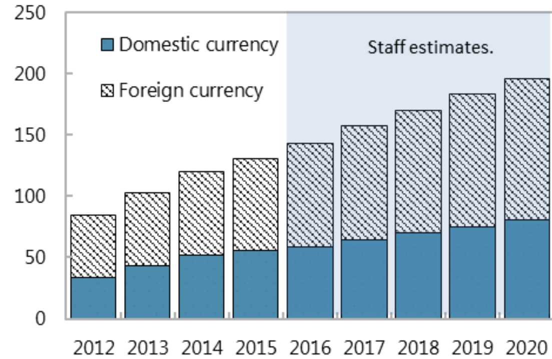
1/Boxes indicate one standard deviation from the mean

However, debt sustainability ratios and levels mask potential vulnerabilities that may surface, …



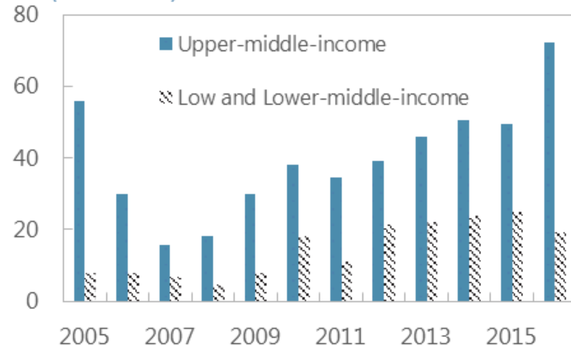
Sources: World Economic Outlook; and staff calculations.

… as external vulnerabilities rise with increased dependence on foreign currency debt, …



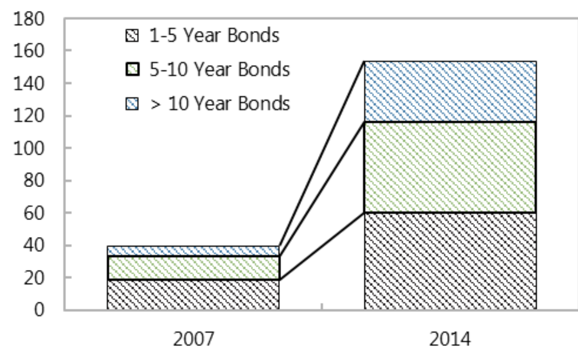
Source: World Economic Outlook.

… with a continued strong US dollar careful, planning for Eurobond issuances will be critical, …



Sources: Dealogic, and staff calculations.

… as is deepening of the domestic market, and continuing issuance towards long-tenor instruments.



Source: African Development Bank.

Figure 2: Commodity Prices Indices, 2007 – 2017

From their peaks levels in 2008, commodity prices have been declining for the past two years.

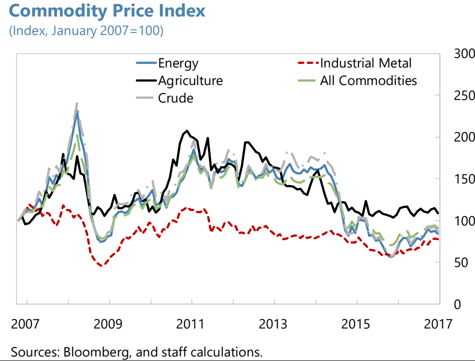
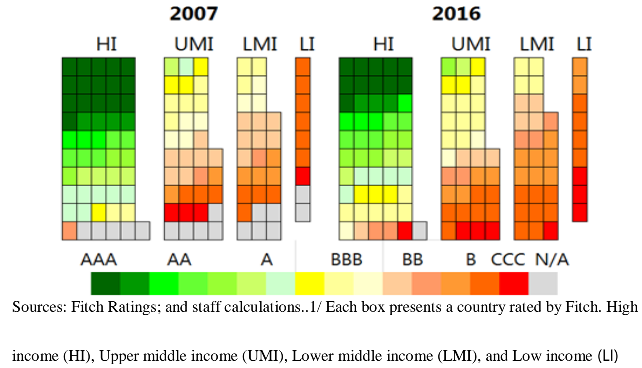


Figure 3: Countries' Credit Rating Heat Map, 2007 versus 2016[1]

Based on Fitch's credit rating of foreign currency bond, credit risks have heightened since 2007.



Sources: Fitch Ratings; and staff calculations..1/ Each box presents a country rated by Fitch. High income (HI), Upper middle income (UMI), Lower middle income (LMI), and Low income (LI)

5. **Many EMDCs and LIDCs are widening the range of debt instruments that they employ**. New opportunities for LIDCs to access non-concessional sources of financing, including access to the international capital markets, have increased the risks of the public debt portfolios. In particular, there was a surge in Eurobond issues (Figure 1), supported also by prolonged low global interest rates.[6] The Eurobond market can be volatile and spreads can vary by several hundred basis points in a few months in reaction to local or global events (Figure 4). Hence, access conditions can be highly uncertain, not only for LIDCs, but also for EMDCs. Going forward, if global interest rates return to historical levels and if capital flow reversal coincides with the initial wave of Eurobonds reaching maturity, refinancing risk could become acute, particularly for countries with macroeconomic imbalances.[7] Hence, effective debt management is likely to gain in importance for these countries.

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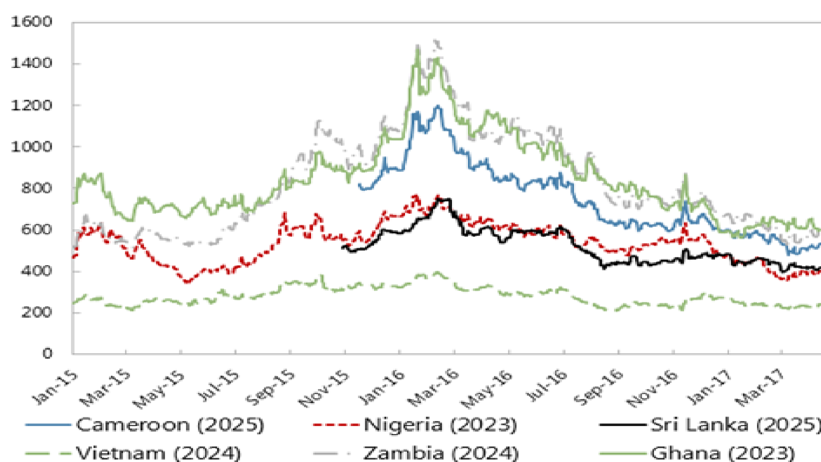
[6] Some oil exporting countries entered or returned to the Eurobond market in response to the fall in oil revenues.

[7] IMF "Capital Flows—Review of Experience with the Institutional View," December 2016, provides an up-to-date discussion of related issues.

FIGURE 4: SELECTED COUNTRIES: EUROBOND SPREADS 1/



Sources: Bloomberg and IMF staff calculations.
1/ spreads over comparable US treasury bond yields.

6. **EMDCs and LIDCs have been developing their local currency bond markets (LCBMs).** In Africa, for example, countries such as Senegal, Namibia, Cote d'Ivoire, and Uganda more than doubled the issuance of local currency government bonds between 2009 and 2014; the stock of local currency bonds in these countries is now on average equivalent to 8.5 percent of GDP. The maturity of bonds issued between 2009 and 2014 increased on average from 1.5 years to 6.4 years; some counties such as Ghana, Kenya, Namibia, Nigeria, and Tanzania issued local currency bonds in maturities over 15 years.[8] Non-resident investors often supported the development of the market for longer maturity local currency bonds, but may also subject markets to swings in sentiment of international investors. While the local currency bond issuance helps to mitigate the currency mismatch, and long maturities help to reduce refinancing risk, they are often issued at relatively high cost. Overall, the increasing importance of commercial borrowing necessitates a careful and on-going assessment of related costs and risk implications as part of the DMS.

7. **The WB and IMF Boards recognized the critical importance of the MTDS framework in their respective 2007 discussions on strengthening debt management practices, and supported the intensification of resource allocation to capacity building work related to MTDS activities.**[9] The Board discussions, the review conducted in 2009, and the 2013 report for information yielded a number of underlying themes and challenges (Annex II):

[8] Some countries introduced local currency instruments such as retail bonds and Sukuk to attract new investors.
[9] See WB-IMF (2007) "Strengthening Debt Management Practices - Lessons from Country Experiences and Issues Going Forward" http://documents.worldbank.org/curated/en/261421468177558598/pdf/39314.pdf; SecM2007-0141, IDA/SecM2007-0197, PIN 07/60; SM/09/64; PIN 09/45; SM/13/56.

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- The Boards expressed ongoing support for the provision of technical assistance to help countries strengthen their capacity in debt management. The work programs endorsed by the Boards in 2007 and 2009 suggested that MTDS-related activities and capacity building focus on LIDCs and International Development Association (IDA)-eligible countries.[10] However, it was recognized that EMDCs and high-income countries could benefit as well;
- Strong country ownership is essential for building and maintaining capacity. To this end, senior policy makers need to be committed to organizational and legal changes, and devote sufficient resources to debt management; and
- With more countries gaining market access and graduating from IDA, financing challenges are changing. In particular, substituting market-based finance for concessional financing presents new demands and risks. Thus, debt management strategies need to continue to adapt.

8. **There has been increased emphasis on debt management in WB-IMF policy frameworks, commensurate with the increasing importance of debt management for developing countries.** For example:

- **Revised WB and IMF Guidelines for Public Debt Management** (2014).[11] The Revised Guidelines for Public Debt Management stressed the importance of having a DMS to avoid risky debt structures.
- **Introduction of the market access country debt sustainability analysis (MAC DSA) and the current review and update of the Low-Income Country Debt Sustainability Framework (LIC-DSF; see paragraph 33).** The MAC DSA includes five indicators of debt structure characteristics relating to maturity, currency composition, spreads, investor base and total external financing requirement in the analysis of debt distress. Therefore, effective debt management and the use of the results from an MTDS analysis will have a strong bearing on the assessment of the sustainability of a country's debt.[12]
- **IMF's Public Debt Limits Policy in IMF-Supported Programs** (effective June 2015).[13] The reformed policy uses an assessment of debt management capacity (see below) in determining the debt limit under a program.

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[10] The rationale for the focus on LIDCs was based on the new borrowing space created by the significant debt relief because of the Heavily Indebted Poor Countries Initiative and the Multilateral Debt Relief Initiatives, and the need to use this borrowing space prudently.

[11] Available at http://documents.worldbank.org/curated/en/539361468170971115/pdf/866520REV0SecM0C0disclosed040160140.pdf

[12] The MTDS and DSA tools are complements: the DSA is a monitoring tool aimed at highlighting debt vulnerabilities for a given debt structure and strategy. The MTDS is a policy tool to then help the authorities adjust strategy to address the debt profile-related vulnerabilities highlighted in the DSA (as well as meet broader cost-risk objectives).

[13] Available at http://www.imf.org/external/pp/longres.aspx?id=4926.

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- **The Public Investment Management Assessment (PIMA) Framework.** The PIMA framework focuses on the need to ensure that all costs (including debt service costs) associated with these projects are published.
- **WB's revised non-concessional borrowing policy (NCBP).** Findings from the application of the Debt Management Performance Assessment (DeMPA) tool are used to provide options regarding the type of the non-concessional borrowing ceiling under the NCBP (see paragraph 17 and Annex III).[14]

9. **The international community continues to strongly support the debt management agenda:**

- **The G20 has endorsed an action plan to support the development of local currency bond markets (LCBMs), which involves elements of sound debt management.**[15] Under this action plan, the WB, the IMF, the EBRD, and OECD have prepared a diagnostic framework to identify general preconditions, key components, and constraints for successful LCBM development.[16] One such element is sound debt management that fosters the effective evolution of a country's LCBM.
- **The United Nations Addis Ababa Action Agenda on Financing for Development** concludes that borrowing is critical for financing investment and reaching sustainable development goals. In that context, prudent debt management is a priority. The efforts of the WB, IMF, and the United Nations in further strengthening debt management capacity and analytical tools for debt management were stressed.[17]

10. **The increased attention paid to debt management and its growing importance for many EMDCs and LIDCs suggest that a review of capacity building in this area is timely.** Section II documents and reviews capacity building efforts in MTDS and related fields, including data on resources and delivery; the range of technical assistance recommendations and themes, and innovations in both the content and the modalities of technical assistance. Section III assesses evidence on the effectiveness of technical assistance, based in part on responses to a questionnaire from recipient countries and on various quantitative and qualitative measures. Section IV draws lessons for future efforts in this area, and some issues for discussion.

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[14] See Annex 5, WB (2015) Non-Concessional Borrowing Policies: http://ida.worldbank.org/sites/default/files/pdfs/ncbpoct2015.pdf.

[15] Development of Local currency Bond Markets: Overview of Recent Developments and Key Themes. Staff Note for the G20 IFAWG. IMF and WB Group, 2016. Available at http://www.imf.org/external/np/g20/pdf/2016/121416.pdf

[16] Local Currency Bond Markets: A Diagnostic Framework, 2013. Available at: https://www.imf.org/external/np/pp/eng/2013/070913.pdf

[17] Addis Ababa Action Agenda of the Third International Conference on Financing for Development, United Nations 2015, available at http://www.un.org/esa/ffd/wp-content/uploads/2015/08/AAAA_Outcome.pdf

II. Technical Assistance in Developing MTDS

A. Resources and Delivery

Inputs

11. **A large volume of technical assistance has been delivered and resources deployed within the context of the MTDS framework.** There have been over 100 WB and IMF technical assistance missions on MTDS since 2008 (Table 1). About half of missions have been to Africa, and a quarter to Latin America and the Caribbean, but all regions have received missions.[18] It is notable that many middle-income and even some high-income countries are recipients of this assistance: it is once countries start to have international market access and develop a domestic debt market that the cost and risk tradeoffs of their financing decisions become acute and the need for proactive debt management and a medium-term perspective becomes pressing. Hence, it is typically such countries that request related technical assistance.

12. **The pace of delivery has been steady.** Over 10 MTDS technical missions are delivered in a typical year. In 2016, 18 MTDS technical assistance missions were completed. There is currently a strong "pipeline" of outstanding requests.

[18] Independent Evaluation Group (IEG) of the World Bank Group Engagement in Small States (2016) discusses the WB - IMF support for better debt management in the Organization of Eastern Caribbean States and Pacific Island countries in more detail.

Table 1. Delivery of Bilateral Technical Assistance on the MTDS Framework (2008–2016)1/

Africa				Europe, Central Asia and Middle East		Latin America and Caribbean				Asia and Pacific	
Low income		Middle income		Middle income		Middle income		High income		Middle income	
Benin	2016	Angola	2014	Armenia	2011	Belize	2013	Antigua and Barbuda	2012, 2016*	Bangladesh	2008, 2011
Burkina Faso	2012, 2013	Cameroon	2008, 2013, 2015	Azerbaijan	2013	Bolivia	2013	Barbados	2014, 2015	Maldives	2015
Ethiopia	2013, 2015	Cape Verde	2010, 2012, 2014	Bosnia and Herzegovina	2014*, 2015	Grenada	2015	Trinidad and Tobago	2011*	Mongolia	2011, 2013
Gambia, The	2011, 2014, 2016	Cote D'Ivoire	2012, 2016	Bulgaria	2011	Guatemala	2013			Tonga	2014
Guinea	2015	Ghana	2008, 2011, 2015	Cyprus	2015	Honduras	2013			Samoa	2013, 2015
Liberia	2013*	Kenya	2009, 2010, 2016	Djibouti	2013	Jamaica	2010, 2011			Vanuatu	2015
Malawi	2011, 2013	Lesotho	2013	Iceland	2011	Nicaragua	2008, 2011, 2014			Vietnam	2015, 2016
Mozambique, Rep. of	2011*, 2014, 2015	Namibia	2012	Jordan	2009, 2012	Paraguay	2011				
Niger	2016	Nigeria	2010, 2011, 2013, 2016	Kyrgyz Republic	2011, 2016	St. Lucia	2016				
Rwanda	2012	Sao Tome and Principe	2013	Moldova	2009*	St. Vincent and The Grenadines	2014				
Senegal	2011	Zambia	2010, 2015, 2016	Pakistan	2014*, 2016						
Sierra Leone	2013			Tajikistan	2013						
Tanzania	2010, 2011, 2013										
Togo	2016										
Uganda	2016										

Sources: WB and IMF. *indicates multiple missions in that year.
1/ As part of broader technical assistance, MTDS analysis has also been used in Bhutan, Egypt, Lebanon, Morocco, Nepal, Panama, Peru and Tunisia.

13. **The bilateral technical assistance missions have been supported by regional, international, and on-line training on the MTDS.** Typically, about 30 national officials take part in each training event. Since 2008 over 27 dedicated MTDS training events have been held in all regions. This has further been supplemented by 8 more general trainings on debt management that have incorporated selected elements of the MTDS training (Table 2). In many instances, the delivery has been with other development partners, broadening the pool of trainers, and used venues such those provided by the Joint Vienna Institute, the Asia Pacific Finance Development Institute, and the Japanese International Cooperation Agency.

Table 2. MTDS and Debt Management Regional Training Coverage (2008–2016)

Region	MTDS	Debt Management
Africa *	2009, 2010, 2011, 2012, 2013, 2015, 2016, 2017	2009, 2015
East Asia and Pacific	2008, 2009, 2011, 2014, 2015, 2016	2016
Europe and Central Asia	2013	
Latin America and Caribbean	2009, 2012, 2013, 2016*	2010*, 2012
Middle East and North Africa	2012	2016*
Global *	2011, 2012, 2013, 2014, 2015, 2016	

* indicates multiple training events were delivered that year, or in multiple years for the respective region.

Source: WB and IMF

14. **Capacity building is increasingly complemented by online training.** Since 2013, ten offerings have been made of the two online courses on debt sustainability and debt management.[19] More than 6,400 participants were involved in the courses, and a total of 3,629 participants were awarded course certificates (more than half of which were government officials). In addition to those, several hundred government officials have accessed the online material ahead of MTDS technical assistance missions.

15. **A considerable portion of costs was covered by donors** (Box 1). Numerous donors have recognized the importance of sound debt management for development and stability in EMDCs and LIDCs, and have therefore supported WB and IMF capacity building in this area.

[19] Participation in the online course on debt sustainability and debt management strategy in English (DSAx) tends to be spread across all regions. Participation in the French course (DSAx-F) tends to come from the African and the Middle East and Central Asia regions. Typically, the courses used to run several times a year, for government officials across the globe and as a Massive Open Online Course (MOOC). As of April 2017, and in response to the preferences of government officials, both English and French versions are open on a rolling basis as MOOCs. The WB offers twice a year a facilitated on-line course DeMPA course, which also covers the fundamental concepts of MTDS and DSF.

Box 1. Donor Funding

The Debt Management Facility (DMF) trust fund is dedicated to supporting technical assistance on debt management and debt sustainability.[1] The DMF is a multi-donor trust fund currently supported by Austria, African Development Bank, Germany, The Netherlands, Norway, the Russian Federation and Switzerland, with the objective of strengthening debt management capacity and institutions. The DMF works with all LIDCs, IDA-eligible and PRGT countries (84 in all). Along with on-going program activities, new activities have been included, such as: strengthening capacity in the application of the Joint WB-IMF Debt Sustainability Framework, domestic debt market development, sub-national debt management, risk management, and international capital markets access. Besides "traditional" country missions, DMF supports training events, on-line training courses, outreach programs, and research and development. From its inception to end-FY16, the DMF supported over 230 missions across 75 countries and twenty sub-national governments, and trained over 800 client practitioners. Moreover, peer learning and outreach activities include the DMF Stakeholders' Forum, The Debt Managers' Network, the quarterly DMF newsletter, and the Debt Management Practitioners' Program.

The Government Debt and Risk Management Program provides medium-term technical assistance for middle income countries. Implemented by the WB, the program covers Azerbaijan, Colombia, Egypt, Indonesia, Ghana, FYR Macedonia, Peru, Serbia,[2] South Africa, Tunisia and Vietnam, and is currently supported by Switzerland. The technical assistance supports the design and implementation of tailored reform plans – with a 3- to 5-year engagement in governance arrangements, risk management, strategy design and implementation, debt market development, management of contingent liabilities, and asset and liability management.

Other donors have contributed as well. Regional advisors on debt management, including MTDS, are hosted by the IMF's Central and Western African Regional Technical Assistance Centers, and are thus supported by donors to those centers (including governments from the respective regions). The Canadian Department of Foreign Affairs, Trade and Development (previously the Canadian International Development Agency) has supported a resident advisor in the Caribbean who contributes to strengthening debt management capacity in that region. Some donors provide support in kind: the MTDS training session in December 2016 was held in Tokyo, facilitated by the Japanese International Cooperation Agency.

1/ Countries included are those that are eligible for TA funded by the Debt Management Facility II (DMF II), where data are available. DMF-eligible countries comprise all IDA-eligible and PRGT countries; see list at http://pubdocs.Worldbank.org/en/801651467996815221/DMF-Eligible-Countries-as-of-July-2016.pdf

2/ IEG (2016) Project Performance Assessment Report on policy based guarantees for Serbia, and IEG (2016) Findings from Evaluations of Recent Policy Based Guarantees point towards the importance of Bank and Fund collaboration for sound debt management.

16. **Capacity building efforts have been leveraged through the contributions of various partners, who are well-placed to provide training and advice tailored to regional needs.** Regional partners can provide targeted assistance to their member countries at relatively low-cost. Specifically, the DMF II facility finances "implementing partners" whose staff participate in MTDS technical assistance missions as well as host MTDS training events.[20] Typically the

[20] The implementing partners comprise the Center of Latin American Monetary Studies; the Commonwealth Secretariat; the United Nations Conference on Trade and Development; Debt Relief International; Macroeconomic and Financial Management Institute of Eastern and Southern Africa (MEFMI); and West African Institute for Financial and Economic Management; and the Agence UMOA-Titres.

training is delivered by a mix of WB-IMF staff and experts and counterparts from implementing partners. The latter's capacity is increasing; in Africa for example, MEFMI and WAIFEM have delivered MTDS workshops. In addition, the long-term experts residing in IMF's regional technical assistance centers have increasingly played a role as MTDS technical assistance has been incorporated in their work programs.

17. **Country progress in developing and implementing debt management strategies is informed and monitored by application of the WB's DeMPA tool in many of the same countries (Annex III).** Specifically, the DeMPA tool allows, to assess a country's strengths and weaknesses in debt management, including debt recording capacity, and on that basis, define and benchmark debt management reforms. The DeMPA framework is used also in the implementation of the IMF's Public Debt Limits Policy.

18. **MTDS capacity building is complementary to other technical assistance on related topics, with the aim not only of enhancing debt management, but also of achieving financial deepening and improving fiscal management (Box 2).** Capacity to prepare a DMS based on the MTDS framework is most beneficial when a country has adequate capacity in the formulation and implementation of appropriate monetary, financial, and fiscal policies, but the dependence is mutual. Also institutional and legal reforms may be needed to complement efforts to employ the MTDS framework to full effect. In addition, well-functioning domestic markets provide the authorities with better choices in implementing their DMS.[21]

[21] The Bank and the Fund have developed the *Government Securities Market Development*, tool kit, to assess the state of functioning of the domestic market.

Box 2. Complementary Technical Assistance

Capacity building related to the MTDS is often complemented by, and complements, technical assistance in other areas, notably:

- Strengthening public debt and associated risk management capacity, going beyond the MTDS;
- Establishing the requisite institutions, subject to suitable arrangements for operational independence and accountability, including the centralization of the public debt management functions in one office/unit of the Ministry of Finance;
- Putting in place the appropriate legal framework for debt operations and debt market functions;
- Deepening domestic primary and secondary debt markets, for example, by establishing a primary dealer network and instituting reliable settlement and depository services;
- Developing securities markets generally, refining monetary policy operations, and issuing and enforcing a suitable framework of regulation and oversight;
- Managing contingent liabilities, including those arising from public-private partnership investments;
- Improving government cash and public investment management;
- Ensuring the timely and reliable recording of government debt data and the availability of government debt statistics; [1]
- Ensuring timely payment of debt service obligations;
- Preparing, developing and implementing rules-based fiscal frameworks; and
- Building capacity to apply the debt sustainability framework and undertaking debt sustainability analysis. [2]

1/ A specific issue is the identification of the institutional coverage reported in accordance with the Government Finance Statistics Manual 2014 and the 2011 Public Sector Debt Statistics: A Guide for Compliers and Users (revised 2013).

2/ Trainings to strengthen client capacity in using the revised DSF will be significantly increased during the coming fiscal year (see below).

Innovations in modalities of delivery

19. **The modalities of technical assistance missions were adjusted to increase effectiveness, ownership, and coordination within and across agencies in the recipient countries.** Earlier missions focused on preparing and presenting a main report. Starting in 2011, the approach was modified by:

- **Greater reliance on workshops on MTDS analysis using the AT as part of technical assistance missions.** Missions increasingly hold workshops, involving hands-on training using country data. The authorities then conduct the analysis and consider alternative debt management strategies, with immediate applicability to their country circumstances.
- **Increasing reliance on briefings/presentations by the authorities rather than technical meetings.** This more participatory approach enhances interactions between the

different stakeholders in debt management and promotes internal discussions (strengthening the horizontal communications).

- **Having the authorities present a draft DMS in the final wrap-up presentation to the senior policy makers.** Besides strengthening engagement and ownership, this procedure allows the authorities to gauge their own technical capacities and creates demand for analytic work (strengthening the vertical communications).

20. **The technical assistance missions ensure that sufficient time is allocated to prepare the debt database that feeds into the MTDS AT.** Understanding the country's current debt portfolio is the first step to identifying risk priorities. Depending on the country, advance teams assist the authorities to analyze the debt data and consider the options for aggregating them into stylized debt instruments.

21. **Similarly, technical assistance missions conduct training on constructing yield curves, and baseline and risk scenarios for interest rates and exchange rates.** The analysis can be as simple or complex as data and capacity allows. Most of the technical assistance recipient countries do not have a well-developed domestic yield curve, or the yield curve does not extend into longer maturities, so an implied domestic yield curve is derived, for example, based on an external benchmark yield curve combined with the application of parity relationships.

22. **Innovations in the modalities of trainings on the MTDS framework have enhanced the effectiveness of training courses.** In the past, mostly basic MTDS training courses were offered, to which participants (not exceeding 30) from multiple countries (as many as 20 diverse countries) were invited. In 2015, staff developed the "Advanced MTDS and Annual Borrowing Plan (ABP)" training course, in which teams of representatives from selected EMDCs and LIDCs prepared and delivered presentations on MTDS and ABP issues, based on their respective country data. The course was innovative in that it:

- **Integrated the MTDS and ABP**. Participants used the outputs from the MTDS analysis to develop an annual borrowing plan and a debt auction calendar;
- **Used country data**. Rather than fictional data, country representatives brought their own data and worked on their respective country cases; and
- **Invited teams from a limited number of countries**. Four to five debt management specialists from a limited number of countries were invited representing the middle, front and back offices of the debt management office (DMO), the budget office, and the central bank, to enhance policy coordination and ensure macroeconomic consistency.

Feedback from participants suggests the structure is effective because of its practical orientation and utilization of own-country data; focus on relatively advanced issues; and in particular, the peer-to-peer exchange based on diverse mix of countries and experiences.

23. **Innovative online training has increased exposure to the WB-IMF toolkits, including the MTDS (see above).** Going forward, consideration is being given to making the courses available year-round, and developing additional language modules.

24. **Results-Based Management Framework is being used to facilitate the monitoring of MTDS technical assistance.** The objective of the results based management framework is to enhance accountability by systematizing the definition of objectives and the tracking of outcomes. For each mission, a logical framework is established to describe the development objectives of the activity, outcome indicators, how they will be verified, and the associated risks and risk mitigants. A hierarchy of such frameworks is established for the DMF II, for capacity building related to the MTDS, for individual projects, and for single missions. Specifically, the desired result of much capacity building related to the MTDS framework is the enhanced ability of national authorities to prepare their own debt management strategies and to use it to steer debt management operations. Publication by the national authorities of a DMS document and improved DeMPA indicators provide evidence that desired results have been achieved. Typical risks relate to shifting government priorities, lack of ownership, and high turn-over of trained staff.

B. Technical Assistance Recommendations and Themes

Common themes

25. **MTDS technical assistance missions and training courses provide overarching recommendations on how best to design, produce and document a DMS based on an analysis of a range of options and scenarios.** Technical assistance teams jointly with country authorities conduct comprehensive and systematic analysis of the existing debt portfolios, recent macroeconomic developments and medium-term projections, financing choices available to the sovereign, the baseline and shock pricing assumptions, and the overall cost and risk implications of the financing choices over the medium-term. Thus, the framework provides strategy options and an approach to assess the costs and risks attached to each under various market scenarios. Often the advice provokes debates among policy makers that may have conflicting policy objectives, while bringing consensus on the benefit of containing excessive risks that would imply risks to the economy as a whole. The selection of a specific strategy to be followed depends on the judgement of the authorities based on their risk preferences.

26. **MTDS technical assistance missions typically analyze the need for complementary reforms to strengthen institutional capacity and deepen the domestic debt markets, and make recommendations in those areas.** For example, using the MTDS framework requires the availability of coherent, timely debt data derived from debt records, but often record keeping is found to be deficient. Hence, recommendations are often included related to improvements in record keeping and the regular compilation of needed data.

27. **The review of country cases underlined the importance of adapting technical assistance to the needs of the relevant country (Annex V).** This view was corroborated by the

responses to the questionnaire of country authorities (see below and Annex IV). MTDS analysis has been extended to address specific country needs, for example, by:

- Analyzing jointly government assets and liabilities, particularly relevant for commodity exporting countries;
- Incorporating the risks related to state owned enterprises (SOEs) liabilities into the MTDS analysis where quasi-fiscal activities are significant;
- Applying the MTDS framework to sub-national debt in a confederal system;
- Taking into account debt related to leasing obligations in the MTDS analysis;
- Exploring liability management operations; and
- Basing the development of more complex, stochastic models of debt dynamics on the MTDS framework.

Development and innovations

Framework

28. **The MTDS AT has been updated, incorporating improvements and adaptations to evolving country needs.** The aim is to make it more adaptable, transparent, and user-friendly by:

- **Introduction of operational financing targets as policy anchors and constraints**. Countries face policy constraints such as limits on their ability to borrow from domestic sources, or the need to fill an external financing gap. In some cases, these are included as performance criteria in IMF program countries. To facilitate consistent analysis, a feature that constrains the financing choices based on these anchors was introduced.
- **Addition of more customizable features.** Additional features introduced include the ability to assess the impact of liability management operations (such as buyback and exchange operations); accumulation and use of cash buffers; and expansion of the number of debt instruments from 15 to 20 instruments. Additional features being planned would account for interest costs for intra-year borrowing; introduce the ability to track cost and risk indicators over a longer time horizon; and to develop an ABP consistent with the DMS.
- **Enhancement of transparency of calculations and outputs.** Development of the AT has focused on ensuring that all equations are tractable and is based on excel spreadsheet, which facilitates integration with other tools including the IMF's financial programming and the joint WB-IMF DSA. The AT is built on the principle that it should not become a black box to users, and hence it is not menu driven.

Challenges and emerging issues

29. **Experience from recent technical assistance suggests that some emerging issues need to be addressed, even while capacity "at a more basic level" needs to be enhanced.** For many countries, capacity building starts with "getting the basics right," and can be refined and extended subsequently. Moreover, as countries develop their debt management capacity and their debt markets, and especially as they move on to being "frontier" markets, the analytical framework and techniques need to evolve. The questionnaire helped identify countries' priorities for more detailed advice, and in particular, an increasing need to advise countries on issues such as:

- Expanding the scope of public debt covered by the strategy. In over three quarters of responding countries, the current strategy is limited to central government debt;
- Incorporation of contingent liabilities. Less than half of respondents include explicit central government guarantees in the analysis;
- Ensuring more consistent implementation of the DMS. In over one third of the countries, actual borrowing decisions are not informed by the strategy document (in most of these cases, the highest national authorities independently negotiate with the creditors). Moreover, about one fifth of the countries do not complement the strategy with a detailed annual borrowing plan;
- Construction of well-targeted macro-financial scenarios that are tractable but well-calibrated, use of diverse risk metrics. Some countries noted that data preparation is often one of the greatest practical challenges; and
- Many countries use qualitative guidelines to express the DMS and would benefit from using quantitative benchmarks for key risk indicators.

30. **Another area of emerging importance relates to the use of innovative instruments.** Some EMDCs have begun introducing debt instruments other than conventional loans and bonds. The MTDS AT can accommodate instruments such as Sukuk, Green Bonds and Debt-for-nature swaps, while acknowledging that demand for and pricing of these instruments may diverge from that of conventional instruments. State contingent debt instruments and hedges, however, cannot be accommodated. To ensure the MTDS AT retains its simplicity and transparency, the latter should be treated outside of the AT. In terms of their features:

- **Sukuk**, the equivalent of bonds in Islamic finance. Sukuk rely on the transfer of benefits on an underlying asset, and its structure should adhere to the Islamic legal principles. Therefore, their use requires some adjustment mainly in the legal and operational framework, especially in non-Islamic jurisdictions;
- **Green bonds**, to fund projects that have positive environmental and/or climate benefits. Disclosure ex ante and ex post verification of "green" features remain challenging;
- **Debt-for-nature swaps,** used for generating funding for environmental programs; and

- **State Contingent Debt Instruments and hedges**.[22] Many EMDCs and LIDCs could potentially benefit from linking debt servicing to some state variable capturing their ability to pay (such as GDP, a commodity price or export performance), either through "bundled" instruments or through hedges.

31. **Government contingent liabilities present a particular challenge that may require adaptation of the MTDS framework or its linkage to other tools.** Contingent liabilities are a source of fiscal risks that, if realized, can become a prominent part of the government debt portfolios.[23] They arose not only in the context of the global financial crisis when banks were under strain, but also, for example, because some governments use them to finance infrastructure investment and public services through "off-budget"' borrowing and guarantees. There is a need to develop more targeted diagnostic tools and provide dedicated technical assistance that can then provide inputs into an MTDS analysis.[24]

Program integration

32. **Staff have integrated the MTDS AT into the financial programming exercise for a number of countries (see text chart).** In the traditional financial programming exercise, there is no explicit financing file, as financing is generally a residual in the macroeconomic framework. Further, normally only net financing is considered, with refinancing of maturing debt taken as given. However, in countries where financing pressures have been acute, it has been useful to have an explicit financing file that allows for debt management considerations. This has been the approach in the cases of Ghana, Grenada, and Nigeria. The general architecture for integrating the financing file with the traditional financial programming is illustrated in the text chart. The MTDS (financing) file receives information on the primary balance from the fiscal file, and generates information on (domestic and external) interest payment and amortizations. That information is input into other parts of the framework. Mechanisms are incorporated to represent feedback mechanisms and to ensure consistency. Exploration of more formal linkages between the MTDS analysis and the macro-framework, including the DSA, may help in better integration of the MTDS framework into the WB and IMF macro-financial work.[25]

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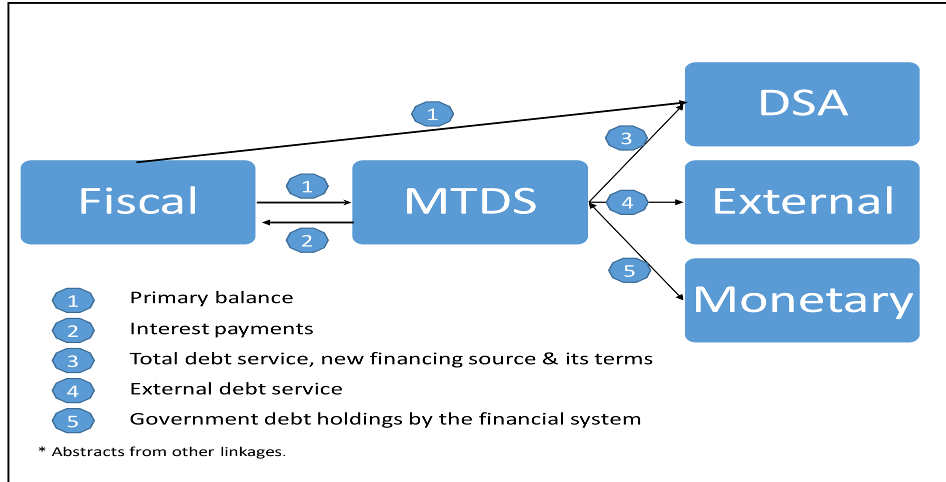
[22] See SM/17/61.

[23] See Elva Bova ; Frederik G Toscani ; H. Elif Ture ; Marta Ruiz-Arranz, "The Fiscal Costs of Contingent Liabilities : A New Dataset," IMF Working Paper WP/16/14.

[24] It should be noted that analyzing risks related to contingent liabilities often goes beyond the scope of the explicit responsibilities of the debt manager. Instead, tools developed by the WB and the IMF, such as public-private partnership (PPP) Fiscal Risk Assessment Model (PFRAM) can assist countries in assessing potential fiscal costs and risks arising from PPPs, while the Debt, Investment and Growth model is helping countries to analyze the debt sustainability of large scale public investment programs.

[25] For example, IMF technical assistance to Jamaica and Barbados in 2016, where financing details from the MTDS were incorporated into the MAC DSA. Similarly, WB support in Bosnia and Herzegovina linked financing and shocks scenarios in both the DSA and the MTDS exercises.

MTDS Financial Programming Linkages



33. **Complementing work on the MTDS, WB and IMF staff are making progress towards completing the review and update of the LIC-DSF.**[26] Since the framework was introduced in 2005, the nature of risks facing LIDCs has shifted, including due to increased exposure to rollover and market volatility risks, and risks from domestic debt. The new framework would: bring more country-specific information into the determination of debt thresholds; introduce new tools to help analyze scenario risks (e.g., related to exposure to debt markets, commodities, natural disasters or contingent liabilities); introduce new tools to help assess underlying macro assumptions (including with respect to the relationship between investment and growth); and provide enhanced guidance on the use of judgment to complement model-based results. Given the new focus on market-related risks (where relevant), effective debt management and the use of the results from an MTDS will have a bearing on the assessment of the sustainability of debt for many countries.

[26] The Boards are expected to discuss informally the revised LIC-DSF before this is considered.

III. Effectiveness

A. Assessing effectiveness

Responses from recipients

34. **Based on the questionnaire results, the MTDS framework, the associated AT, and related technical assistance are highly valued by national authorities, who see an impact on several fronts.** Responses have been received from 62 authorities of the 110 to whom the questionnaire was sent.[27] The great majority of countries that had received technical assistance in MTDS indicated that it helped them to introduce a structured and coherent approach to designing a DMS. Another main benefit of technical assistance has been the increased recognition of the importance of the strategy document and the institutional role of the DMO. Explicit monitoring of cost and risk indicators is seen as a way to raise risk sensitivity among senior officials and broader stakeholders. In this connection, more than four-fifths of respondents indicated that they have prepared and published DMS. Countries were highly appreciative of advice on the institutional and governance reforms needed to develop a DMS. Assistance helped elevate the role of the DMO within the respective institution and integrate debt management into macroeconomic policy formulation and implementation. Other benefits reported included improving institutional coordination, revision of the DMS, and monitoring of additional debt portfolio cost and risk indicators.

35. **Yet, even when capacity to formulate a DMS and undertake the necessary analysis has been established, implementation has sometimes lagged.** Weakness in translating strategy into operations can often be related to institutional and organizational shortcomings, including fragmentation of debt management responsibilities across several entities, or limited support from senior officials. Large turnover of staff at the debt management units, sometimes induced by restructuring within the government, diminishes the pool of staff with the capacity to internalize the numerous concepts embedded in the MTDS analysis; and requires renewed efforts to rebuild capacity. Particularly when debt is largely concessional, and especially when it relates to financing of investment projects, often limited attention is paid to the selected DMS. Even then, debt management considerations are becoming more important as the multilateral development banks increasingly offer financial choices to the borrower.[28] The timely compilation of necessary information from the debt recording database has often been challenging. A number of countries continue to lack a capable and fully functional debt recording system; assistance to ensure adequate debt recording is often a precondition for successful assistance related to the MTDS.[29]

36. **National authorities viewed the technical assistance delivery mechanisms as appropriate and effective**. Countries found national workshops most helpful, followed by

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[27] Not all were recipients of technical assistance.

[28] IDA offers choices on currency and customize redemption dates; IBRD provides free currency choice (if WB can swap back to USD), fixed vs floating, and freedom to construct tailor made redemption profiles.

[29] MTDS missions typically devote much time to compiling consistent and up-to-date data (see above).

international trainings, and regional workshops. The vast majority of responding countries reported that integrated Debt Sustainability Analysis–MTDS Trainings were helpful.

Case studies

37. **Results of case studies for a select group of countries that use the MTDS toolkit and have recently received technical assistance in this area illustrate how these countries have tried to optimize the composition of their respective debt stocks (Annex V).** Most of these countries exhibit rising debt ratios and greater reliance on external financing. However, within the envelope, countries have mostly exhibited improvements in refinancing risk indicators; the reduction in the share of debt maturing within one year, has been very marked in certain cases. Successful improvement of refinancing risk of the portfolio was often complemented by improvements in interest rate risk indicators. Thus, many of these countries seem to have chosen to take on more foreign currency risk in exchange for lower roll-over and interest rate risk. Some examples illustrate that the MTDS methodology and approach is sufficiently flexible to be applied across a wide spectrum of economic development, market access levels, and even across confederal levels.

38. **Moreover, the case studies provide evidence on the value of supporting capacity building through a sustained, multi-pronged approach.** Building capacity in debt management takes time and requires sustained assistance, accompanying recipient countries throughout the process. Experience suggests that the design, monitoring, delivery, and follow-up of technical assistance demand a medium-term commitment from the delivering institutions and from the recipients. Preliminary evidence suggests that EMDCs are especially receptive to such a programmatic approach. Also, there is some evidence that MTDS technical assistance recommendations have been more effectively implemented in the context of an IMF-supported adjustment program or a WB investment or policy-based operation. Case studies show how technical assistance in debt management can complement an adjustment program in the restoration of market confidence, and ensure that financing needs are met while other adjustment measures are being implemented.

Quantitative measures

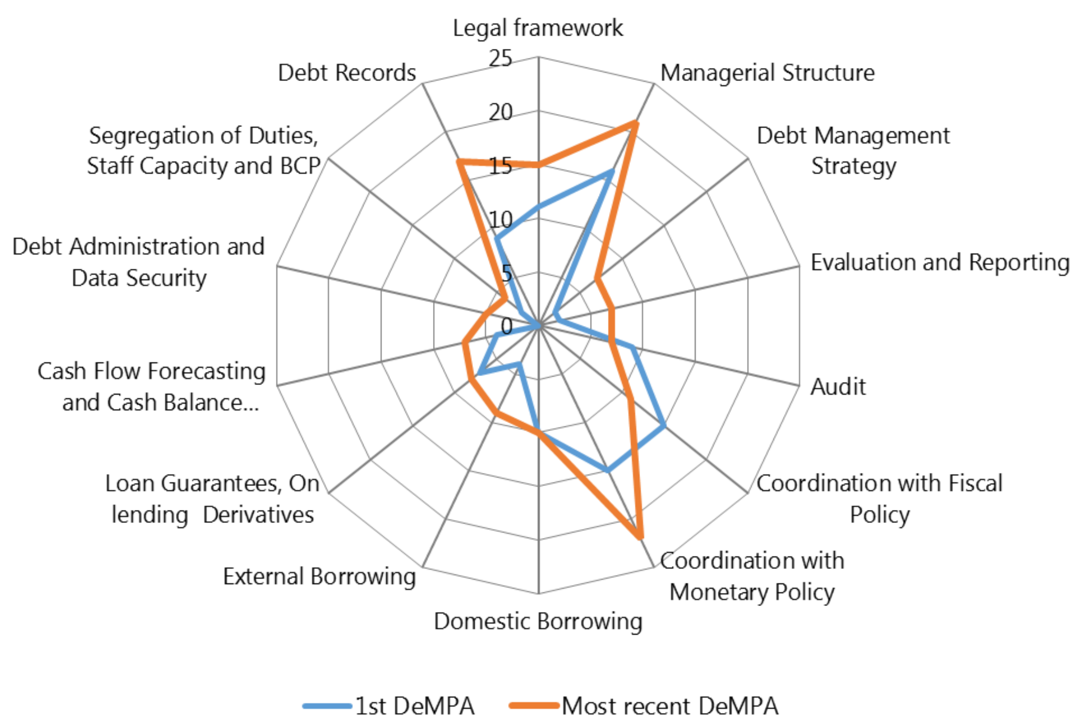
39. **A variety of measures are available to quantify countries' debt management capacity, and in particular, improvements in formulating and implementing debt management strategies.** However, it must be acknowledged that the evidence is limited, mainly because of constraints on data across time and countries, and that it is hard to link changes in quantitative indicators to specific technical assistance events.

DeMPA scores

40. **The DeMPA findings reveal improvement in countries' ability to prepare and publish debt management strategies (Figure 5 and Table 3).**[30] The number of countries with approved or published DMS has increased. Moreover, additional countries are fulfilling the quality requirements. These countries also saw an improvement in debt recording and the legal framework. Most already had relatively strong institutional arrangements and coordination with monetary policy. However, deficiencies in cash management, assessment of loan guarantees, and management of operational risk remained; these factors tend to hinder the smooth implementation of the DMS and are the focus of further technical assistance.

Figure 5. Changes in DeMPA Scores

(Number of countries that scored A, B, or C) 1/



Sources: WB, and staff calculations.

1/ The sample includes a total of 31 countries. A score of A, B, or C means that a formally approved and publicly available medium-term DMS, covering all central government debt, is in place. The DMS should contain a discussion of the evolution of interest rate, refinancing, and foreign currency risk. A score of D applies if a medium-term DMS is not published or the quality is insufficient.

[30] A description of the DeMPA framework is provided in Annex III. Results from DeMPAs and especially those on DMS should be interpreted with caution: fulfilling the quality requirements hinges on a range of criteria, such as including measures to support domestic debt market development in the strategy, or publishing the strategy on an official website and/or in print media. A country might, therefore, be capable of preparing a DMS but still fall short of fulfilling the minimum requirements if other criteria are not met. Incremental measures and reforms undertaken by countries may not necessarily be reflected in score upgrades.

Table 3. Changes in DeMPA Detailed Scores
(Number of countries)

Score	Quality of the DMS		Decision-making process and publication of the DMS 1/	
	1st DeMPA	Most recent DeMPA	1st DeMPA	Most recent DeMPA
A,B,C	3	7	3	9
D	28	24	7	13

Source: WB.

1/ This dimension of the DMS was not assessed for all countries; the sample includes a total of 31 countries.

Other measures

41. **Additional quantitative measures can shed light on the success of recent efforts at capacity building related to debt management:**

- The WB's Country Policy and Institutional Assessments (CPIA) scores show improvements on debt policy and debt management in countries that received MTDS intervention.[31] Between 2008 and 2015, CPIA scores for criteria on debt policy and debt management increased for low- and middle-income countries (text chart).[32] It is notable that the quality of debt management performance frequently correlates to other, broader, vulnerabilities, and capacity constraints. Thus all countries where the CPIA currently scores debt management at 2.5 or below are classified as fragile and/or small states. Conversely, those with a score of 4.5 and above typically either (i) enjoy middle income levels and access to market-based sources of financing, including to IBRD financing; or (ii) have low- and lower-middle income levels with low public debt relative to GDP.

[31] The CPIA aims to capture the quality of a country's policies and institutional arrangements on an annual basis. Criteria 3 addresses specifically debt related policies, and the extent to which debt management is conducted in a way that is conducive to minimizing budgetary risks and ensuring long term debt sustainability.

[32] CPIA scores are not available for high-income countries.

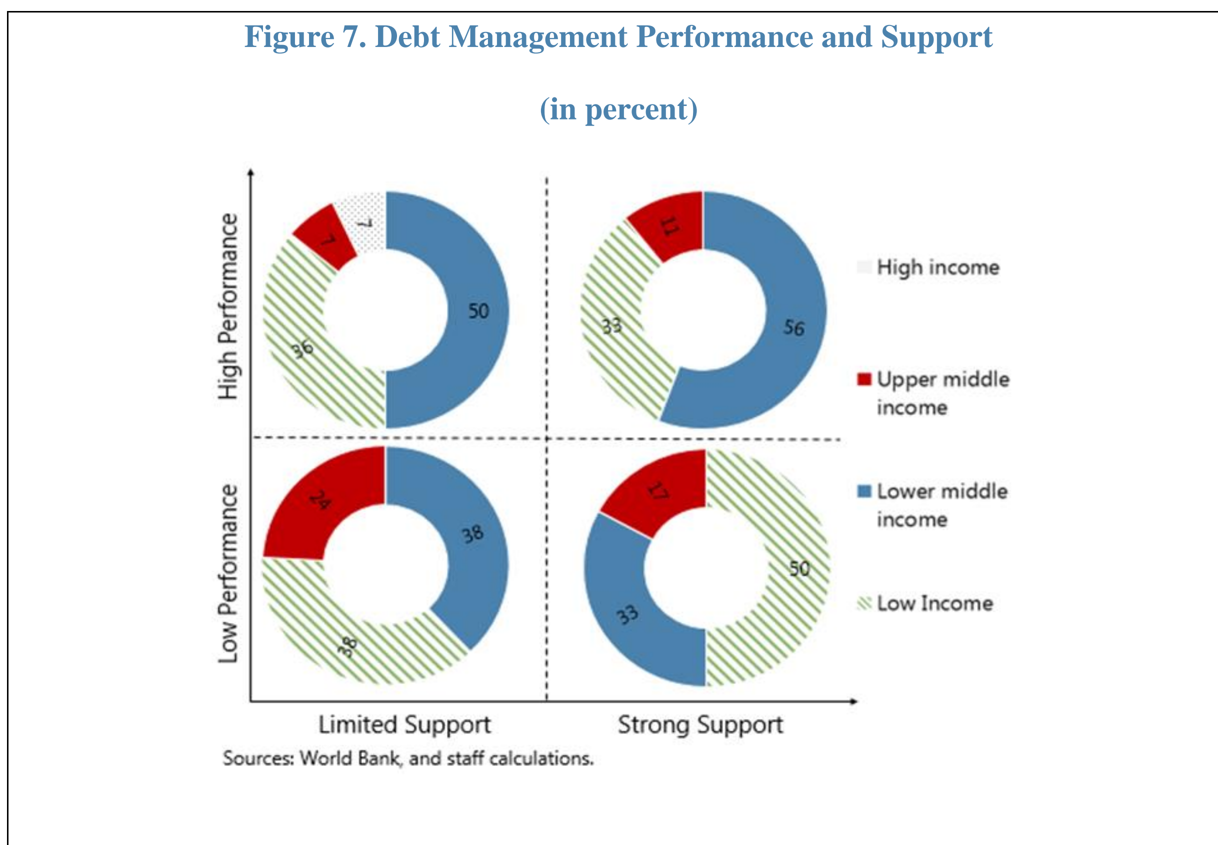
(continued)

- **The WB's Debtor Reporting System (DRS) suggests a parallel improvement in debt reporting.**[33] Based on end- 2015 data, three quarters of these countries were rated satisfactory, measured in relation to adherence to the specified reporting requirements and timetable. This was a marked improvement over end-2010 when only half met the criteria.

42. **Evidence from a study combining several indicators suggests the limited improvement in debt management observed in several countries is attributable mainly to weaknesses in other areas rather than in MTDS capacity itself.**[34] Often it was fiscal challenges, mandatory civil service rotation policies, and lack of high-level ownership and support that hindered progress (Figure 7).

Figure 7. Debt Management Performance and Support

(in percent)



[33] As a condition of borrowing from IBRD and IDA, countries are obligated to submit detailed information on the terms and conditions of long-term external debt borrowing and related stocks and flows to the Debtor Reporting System (DRS). Most countries that received MTDS technical assistance borrow from the WB and thus report to DRS. MTDS-eligible countries with no loan obligations to IBRD or IDA do not report to the DRS.

[34] The study is based on a weighted index of CPIA scores, DRS scores, the ability to develop and publish a debt management strategy, and the risk of debt distress.

a. Enhancing effectiveness

Priorities based on questionnaire results

43. **The questionnaire results suggested some approaches to improving the effectiveness of capacity building and to address issues ancillary to the MTDS:**

- Several countries mentioned the need for stronger involvement of high-level officials in the process, as they play a pivotal role in ensuring that the strategy is disclosed and implemented on a sustained basis, and that institutional capacity is maintained;
- Some respondents pointed to the need to facilitate the exporting of debt data from the debt recording system to the AT, thus allowing effort to focus on debt management analysis;
- Some countries mentioned the value of greater flexibility and granularity in the AT to allow for more country-specific scenarios; and
- A few respondents mentioned the need to expand the scope of the MTDS framework and the AT to cover possible debt restructuring or liability management operations.

Effectiveness and program design

44. **Building institutional capacity in debt management is a long-term endeavor, often times requiring a more "programmatic" approach and sustained client ownership**. Such an approach would involve diagnosis followed by an actionable reform plan supported by tailored technical assistance. Up-front country ownership and political commitment, and commitment from technical assistance providers and donors are crucial to allowing this approach to succeed. Also, capacity development in related areas and follow-up through regular reviews and adjustment would normally be part of the program.

45. **A programmatic approach may be particularly relevant to countries where their debt management practices need substantial and extensive support, but would not suit every case.** One-off engagements can run a risk of failed implementation and wasted resources, but designing a technical assistance program is no guarantee of success. A programmatic approach implies substantial start-up costs (to donors and technical assistance providers), which in some cases may have to be written off if country circumstances change. For a given resource envelope, a programmatic approach implies turning down ad hoc requests. However, some countries request and make good use of focused technical assistance, for which a programmatic approach would not be suitable.

46. **A more programmatic approach can be implemented through various (complementary) mechanisms:**

- **A commitment from the authorities and providers to an assistance program, based on an agreed diagnosis and scoping effort.** The commitment might, for example, be embodied in a memorandum of understanding. The commitment would encompass a

definition of objectives and work areas; a time line; planned resource allocations from all parties; commitment by the authorities to make the effort to retain trained and skilled staff in the DMOs, criteria for measuring progress; and review mechanisms to allow for adjustment along the way.

- **More regular follow-up of MTDS capacity development in WB and IMF macro-financial work.**[35] Regular consultations between country authorities and the WB and the IMF could provide a vehicle for discussing progress made and remaining obstacles, and for reinvigorating high level commitment. This would also allow for a closer monitoring of the implementation of the DMS.
- **Linkage to WB- or IMF-supported programs, where debt management is macro-critical.** Including measures to enhance debt management supported by MTDS-related assistance in a member's program document or a WB policy-based operation would underline and reinforce the authorities' sustained commitment in this area, provided that conditionality in IMF-supported programs will be specified where the measures are critical for achieving the goals of the program or for monitoring its implementation. Authorities formally accept "ownership" of the reform effort, and announce the intention to implement actions and provide the necessary resources to the relevant institutions. This mechanism also ensures follow-up (in program reviews, DPFs and subsequent surveillance) and maintains high-level visibility. Such a linkage is perhaps most appropriate where debt management issues are macro-critical.

[35] The MTDS-enhancing measures would be covered under IMF Article IV surveillance if the significantly influence a member's present or prospective balance of payments or domestic stability, consistent with IMF surveillance policy.

IV. Conclusions and Issues for Discussion

A. Lessons from Recent Capacity Building in Debt Management

47. **Debt management and specifically the MTDS have been gaining importance and evolving in both LIDCs and EMDCs, and capacity building has changed in parallel, so it is a good time for a review.** As a wave of Eurobonds and local-currency bonds issued by LIDCs and EMDCs in the past decade reach maturity and global interest rates start to rise, debt managers will require more intensive technical assistance to navigate through the expected challenges.

48. **Evidence has been provided on the effectiveness of MTDS technical assistance missions and trainings.** WB-IMF capacity building on the MTDS framework remains multifaceted and carefully coordinated. It is effected through country specific technical assistance missions, various forms of regional training events, and desk-based advice. Extensive coordination is undertaken between the WB and the IMF, and with the broader community of partners. Activities have been shown to be relevant, practical, and adaptable. Demand remains strong, as evidenced by activities in recent years and the “pipeline” of outstanding request.

49. **Some countries have made rapid strides in developing their debt management capacities with the help of this assistance.** Those who have made greatest progress typically require MTDS support either due to external requirements, or they face a more complicated set of decisions, where the tools and the framework can support decision making. These countries have also put in place a legal framework and a coherent institutional set-up that facilitate exchange between debt managers and other concerned parties (in the Ministry of Finance, but also the central bank and market participants). This infrastructure is backed by, and helps generate high-level attention to debt management issues. These countries can then build analytical capacity, for example, in the analysis of portfolio risks and cost-risk trade-offs, and in the promulgation of borrowing calendars and debt reports. Managerial willingness and capacity go a long way in facilitating progress in debt management reforms.

50. **Possibly, enhancing the effectiveness of technical assistance in this area requires more emphasis on strengthening operational and “tactical” capacity.** MTDS-related advice has mostly concentrated on supporting capacity building in the formulation of a strategy. To complement that, focusing on strengthening capacity to record and monitor public debt is needed where such capacity remains low, so as to have in place the empirical basis for formulating and implementing any DMS. At the other end of the spectrum, there is a need for a smooth transition to capacity building on more “advanced” issues (for example, sovereign asset-liability management, hedging of debt portfolio risks, developing annual borrowing plans and auction calendars, integration into macro framework and financial market surveillance), especially with the impending arrival of a wave of Eurobond maturities. Implementation capacity could be strengthened through support for loan negotiation, functions of market intelligence, communication with investors and rating agencies, the execution process, and funding transaction, including derivatives Moreover, the MTDS implementation cannot be seen in isolation;

understanding debt sustainability risks and how to address them is not separate from debt management. Hence, capacity building efforts on DSF will complement MTDS advice.[36]

51. **In parallel, there is a need for on-going efforts to develop and extend the MTDS.** In this connection, defining appropriately the scope of sovereign debt to be managed is crucial. Especially for smaller member countries very prone to natural disasters or commodity price fluctuations, it may in due course be possible to add an analytic framework that facilitates making the choice between taking out insurance and issuing debt. The viability of sovereign portfolios of some countries may depend critically on contingent liabilities. Hence, they may have to be taken more explicitly into account, not only from a debt sustainability perspective, but also in the development and the implementation of the DMS. Further, the AT could be better adapted to deal with new instruments, such as hedging instruments, and to strengthen its linkages with the annual borrowing plan and the debt sustainability analysis. In this connection, staff intends to review progress on MTDS capacity development and implementation in WB and IMF work, and proposes to inform the Board accordingly from time to time.

52. **Despite good progress in general, fundamental capacity building on DMS formulation needs to continue.** The ability of some LIDCs and EMDCs to formulate a DMS remains limited, and staff turn-over precludes the establishment of sustained institutional capacity. Often their debt management planning is not well integrated with the fiscal policy formulation process, and debt operations are conducted in an ad hoc manner. In some countries the fragmentation of responsibilities and the difficulty of controling concessional borrowing disrupts implementation of the strategy. These countries may have other priorities so long as they can rely on (or are limited to) long-term concessional borrowing. But it is useful to anticipate their eventual evolution with basic training: if their development accelerates, lack of capacity in debt management may become costlier and riskier.

53. **There may be advantages in delivering MTDS and other debt management technical assistance using a "programmatic" approach, and even to link these efforts to country programs and surveillance where the composition of government debt is macro-critical.** A programmatic approach could be substantiated by an up-front understanding between the country and assistance providers, where country ownership and a plan for debt management capacity development are acknowledged. In the context of country programs, the linkage may be embedded in a member's program document—and even in structural benchmarks and post-program monitoring when of sufficient macroeconomic importance —and in WB lending operations. The proposed revision to the LIC DSF provides a context for raising the visibility of debt management and in particular the MTDS framework within the context of bilateral surveillance more generally.

54. **Sustained support from donors, the WB and the IMF will be needed to deliver and enhance capacity building in debt management.** Technical assistance and training—especially that targeted at LIDCs—has been funded largely by donors' contributions. Steady support,

[36] For example, training through workshops on the revised DSF is expected to be increased significantly in the coming years.

including from the WB and the IMF, is a condition for on-going delivery and in particular for the further development of the MTDS framework and for the more widespread adoption of a programmatic approach to capacity building. This support is equally important for EMDCs, where donor funding and scope for reimbursable advisory services are limited.

b. Issues for Discussion

55. **We seek the feedback from the Board to the following questions:**

- Does the Board support further development of the MTDS, with more focus on, scenario construction, and market risk indicators?
- Does the Board favor the delivery of MTDS capacity building using a longer-term programmatic approach, whereby countries commit in advance to a reform strategy and implementation?
- Does the Board support stronger integration of the MTDS capacity development into macro-financial work and the recognition of contingent liability risks, in some cases in WB- and IMF-supported programs?

Annex I. The Role of Debt Management in Economic Policy Frameworks and the Medium-Term Debt Management Strategy Framework

A. The Role of Debt Management in Economic Policy Frameworks

Effective debt management and hence the design and implementation of a debt management strategy depend on the macroeconomic and institutional context, but the connection is two-way: sound debt management is critical to macro and financial stability, and financial and overall development. It follows that debt management is an integral part of a country's macroeconomic and financial policy framework, and needs to be coordinated with other policy areas.

Within the constraints of the macroeconomic framework, the debt manager has the delicate task of balancing domestic and external sources of financing of various tenors so as to meet the government funding needs at low over-all cost and contained risk. The debt management strategy must not only accommodate forthcoming fiscal financing needs, but also take into account effects on the size and currency composition of external capital flows, the monetary policy and exchange rate regimes, foreign currency reserve levels, the state of development of domestic markets, and the financing preferences and balance sheets of the private sector.

Sound debt management contributes to reduced macro-financial risks, complementing prudent fiscal management and monetary policy implementation. Debt managers are responsible for ensuring that financing constraints do not lead to sharp reversals in fiscal policy or spikes in interest costs. Also, debt management affects monetary policy transmission, market liquidity, and financial market price discovery. The debt manager's ability to cover external public financing requirements through external debt issuance, and avoid undue bunching of debt service obligations helps reduce crowding out, exchange rate pressures, or large swings in international reserves.

Debt management contributes to market and institutional development. For example, the development of the domestic sovereign debt markets is a public good that assists banks to manage their liquidity, provides a saving tool, enables the central bank to effectively conduct monetary policy and provides a benchmark yield curve for private sector borrowing. Also, active debt management depends on the availability of timely and accurate debt and fiscal data. Furthermore, good debt management practice involves fostering the investor base through predictable issuance and regular communication. Therefore, the transparency and accountability of the debt managers are directly linked to their effectiveness.

B. The Medium-Term Debt Management Strategy Framework

The Medium-Term Debt Management Strategy (MTDS) framework consists of a methodology and associated analytical tool (AT) to facilitate sound debt management. In particular, a debt management strategy (DMS) is a plan for the evolution of the public debt portfolio that operationalizes the debt management objectives given the constraints, and specifically the government's preferences with regard to cost-risk trade-offs. The MTDS framework is a policy tool to then help the authorities formulate, adjust, and ultimately implement their DMS. The key elements of the steps involved in formulating an MTDS are summarized below:

Step 1. Identify the objectives for public debt management and the scope of the MTDS.

Purpose is to help clarify what objectives the MTDS should seek to achieve. This will also help clarify the tasks and responsibilities for which the debt manager is accountable.

- Identify the main objectives for public debt management.
    - For example:
        - Meet the financing needs;
        - Minimize cost;
        - Maintain risk at a prudent level;
        - Develop the domestic debt market; and
        - Establish a reference or benchmark for private sector issuance.
- Ensure objectives (where they are not set down in law) are properly documented.
- Define scope of MTDS:
    - Central government, general government, or wider public sector; and
    - Contingent liabilities.

Step 2. Identify the current debt management strategy and cost and risk of existing debt.

Purpose is to clearly determine the starting position for the analysis; this will help identify whether the MTDS should seek to change the characteristics of the existing debt portfolio in any specific way, e.g., reduce a specific risk.

- Explicitly identify the current strategy.
    - Provide a benchmark against which alternatives can be evaluated.
- Identify outstanding debt and its composition.
    - Determine debt servicing profile of outstanding debt.
- Calculate basic cost and risk indicators for the portfolio.

- Identify sources of vulnerability to the existing debt stock.

Step 3. Identify and analyze potential funding sources, including cost and risk characteristics.

Purpose is to determine the range of possible strategies that might be feasible and desirable to implement. This will also help identify any potential constraints that might impede the implementation of a chosen strategy. This may require interaction with financial market supervisors, investors or other agencies (e.g., the Ministry of Planning).

- Identify potential sources of finance, their financial characteristics, including cost and risk parameters, and potential amounts available:
  - List existing and potential instruments, domestic and external, and describe their financial characteristics;
  - Evaluate the potential quantum of borrowing available through each instrument/creditor type;
  - Identify any constraints that might impede the availability of funding; and
  - Discuss the instruments based on their cost/risk characteristics.

Step 4. Identify baseline projections and risk in key policy areas—fiscal, monetary, external and market.

Purpose is to determine the baseline scenario for the analysis of the performance of alternative strategies and identify specific risk scenarios to be evaluated. Requires interaction with fiscal, monetary policy and financial market authorities, and (where relevant) market participants.

- Identify the baseline medium-term projections for key fiscal and monetary policy variables:
- Identify whether there are any external constraints relevant for MTDS formulation:
  - Discuss any anticipated change in exchange rate or capital account regime; and
  - Discuss any required financing of international reserves.
- Identify the baseline medium-term projections for market rates.
- Clarify assumptions about likely pricing of non-market instruments:
  - Based on creditor information and other sources.
- Determine specific risk scenarios:
  - Those identified in DSF; and
  - Other specific changes to market conditions and demand (e.g., shock to global liquidity conditions).

Step 5. Review longer-term structural factors

Purpose is to take a longer-term perspective and identify any factors that could influence how the debt composition should ideally change over the longer-term. Requires interaction with fiscal and monetary policy authorities.

- Set out long-run structural features of the economy that the MTDS should try to take into account, for example:
    - Commodity price vulnerability;
    - Access to concessional financing;
    - Trends in real effective exchange rate; and
    - Inflation trends.

Step 6. Assess and rank alternative debt management strategies on the basis of the cost- risk trade-off.

Purpose is to analyze under different shock scenarios alternative debt management strategies, assess their performance, and identify a small number of candidate strategies, including a preferred strategy.

- For a range of alternative strategies:
    - Assess how costs could change under the various risk scenarios;
    - Assess how well each strategy helps mitigate the identified portfolio vulnerabilities;
    - Assess how well each strategy meets the debt management objectives, both primary and secondary; and
    - Assess whether each strategy would be feasible to implement given assumptions about potential sources of financing.

Step 7. Review implications of candidate strategies with fiscal and monetary policy authorities, and for market development.

Purpose is to clearly determine that the preferred, and other candidate, strategies are consistent with fiscal and monetary policies, maintaining debt sustainability, and in line with plans for market development.

- Outline the preferred, and other candidate, strategies to the fiscal and monetary policy authorities:
    - Discuss any points of interaction; and
    - Confirm that debt sustainability indicators are in line with DSA.
- Review the potential debt market implications of the candidate strategies, including where relevant with financial market authorities.

Step 8. Propose and Approve the MTDS

Purpose is to propose the preferred strategy to the decision maker, and secure his / her agreement.

- Document the preferred and a small number (e.g., one or two) of alternative strategies:
  - Outline why the preferred strategy is superior to the others; and
  - Clearly describe the key associated costs and risks, and relationship with the broad objectives.
- Present the proposal to the highest responsible authority.
- Agree the MTDS.

Once determined, the agreed MTDS should be disseminated.

Annex II Past MTDS Board Papers[37]

The 2007 Board Paper explained the Public Debt Management Guidelines; the 12-country pilot; and the intention to intensify debt management support. [38] That support would serve to identify and manage sovereign balance sheet risk, develop debt markets to undertake reforms, and integrate these efforts into the policy dialogue with country authorities (paragraph 50). It was recognized that:

- This would be a long-term endeavor, demanding a project management focus and a comprehensive diagnostic (paragraph 53); and
- The MTDS and flexibility in its implementation (paragraph 93) would be valuable to many countries; and

The Board endorsed the proposal to scale-up technical assistance (TA) in this area, and to develop and apply the DeMPA and MTDS frameworks.

The 2009 Board Paper described the DeMPA tool (paragraph 32), the development of the MTDS Guidance Note and the MTDS Analytical Toolkit (paragraph 45). [39] The paper reported on:

- The initial application of the DeMPA, with the intention to undertake 20 assessments per year and the intention to do 4–6 MTDS assessment per year (paragraph 53);
- The importance of training activities and training of trainers as well as cooperation with external partners; and
- The need to strengthen coordination with debt market development work (paragraph 65).

The Board endorsed the work program—specifically the use of the MTDS Toolkit (Guidance Note and AT; see Annex I) and the ongoing undertaking of DeMPAs—and encouraged countries to continue to strengthen their public debt management frameworks.

The 2013 Board Paper presented lessons and developments since the 2009 Board Paper, strengthening further the case for public debt management reforms in the aftermath of the global financial crisis. [40] Information was provided on:

- The number of DeMPA evaluations and the—sometimes slow—progress in improving indicators;
- Progress on MTDS, with several countries developing formal and explicit strategies (paragraph 25);

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[37] Please see Footnotes 1, 2 and 3 of the main paper.
[38] See IMF-WB (2007) "Strengthening Debt Management Practices - Lessons from Country Experiences and Issues Going Forward" http://www.imf.org/external/pp/longres.aspx?id=4189 ; PIN 07/60.
[39] See SM/09/64; PIN 09/45.
[40] See SM/13/56.

- Progress in the clear allocation of debt management responsibilities and establishing suitable institutional arrangements (paragraph 30); in debt recording; and in the management of operational risks (paragraph 31) as well;
- Progress in development of domestic government securities markets (paragraph 32); and
- Examples of country program support (Box 2 on page 15).

Annex III. DeMPA Framework and Results

The DeMPA is a diagnostic tool to assess government debt management through a comprehensive set of performance indicators. The DeMPA tool was launched in February 2008 and has been revised twice (2009 and 2014). The current DeMPA tool comprises 14 debt management performance indicators (DPIs) and 33 subordinate dimensions spanning five core areas of debt management:

- Governance and strategy development;
- Coordination with macroeconomic policies;
- Borrowing and related financing activities;
- Cash flow forecasting and cash balance management; and
- Debt recording and operational risk management.

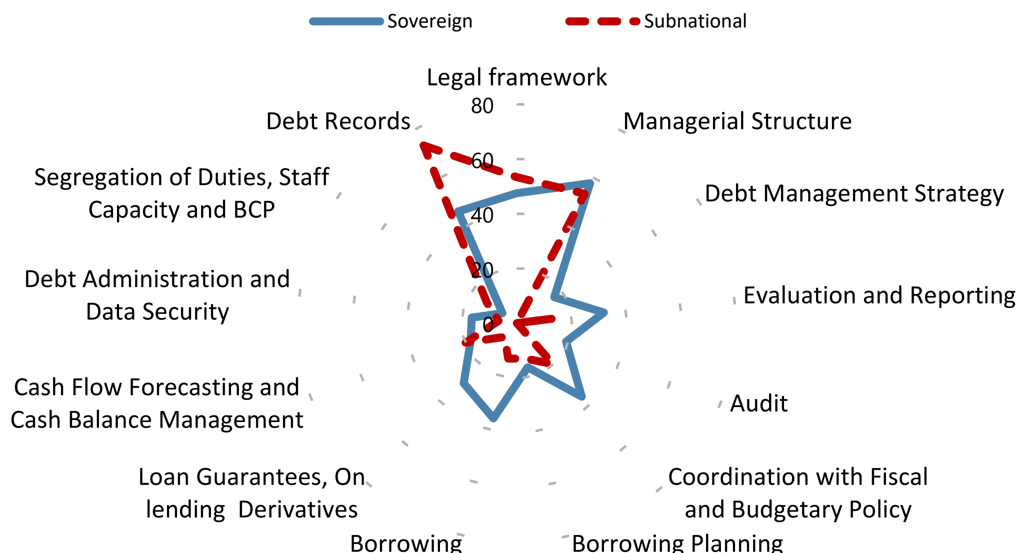
By end-2016, 113 DeMPA missions had been fielded in 78 countries, of which 31 countries have received repeated assessments. More than 80 percent of beneficiary countries are low or lower-middle income countries. The DeMPA findings have contributed to the development of debt management reform plans in over 46 countries, with focus on strengthening institutional arrangements, governance and managerial structure, formulation of debt strategies, improved domestic markets, and mitigating operational risk.

Results from countries with more than one DeMPAs across time (Table III.1) indicate progress in several debt management areas. [41] Table III.1 measures improvements over time in the 5 main areas of the DeMPA methodology. Coordination with macroeconomic policies is generally relatively strong. Both governance, comprised of 5 indicators (one of which is on the DMS), and capacity in borrowing operations have been improving. Debt recording and operational risk management show significant improvements, although they remain one of the weaker core functions across several debt offices. The weak and stagnant scores in cash flow forecasting and cash flow management (which is not part of the MTDS framework) suggest both technical capacity deficits and deeper structural issues with budget formation and execution.

[41] The DeMPA conducted by the WB is a demand driven program, and hence the assessments are updated upon request from authorities; data are therefore not available for all countries that have received MTDS technical assistance.

Figure III.1. Subnational vs. Sovereign DeMPA Scores[1/]

(in percent)



Source: WB.

1/ Includes information of the assessments of 15 subnational governments and 78 sovereign governments.

Table III.1. Comparison of Scores from the Countries that have repeated DeMPAs [1/]

(In percent)

Share of the scores that have experienced	Up-grade	Down-grade	Stable	Share of score A, B, or C	
				Latest DeMPA	First DeMPA
Overall	16	8	69	37	29
I. Governance and Strategy Development	15	8	65	39	29
II. Coordination w/ Macroeconomic Policies	19	15	61	58	57
III. Borrowing and Related Financing Activities	12	4	74	33	27
IV. Cash Flow Forecasting and Cash Balance Management	6	5	87	13	15
V. Debt Recording and Operational Risk Management	21	9	69	30	17

Sources: WB, and staff calculations.

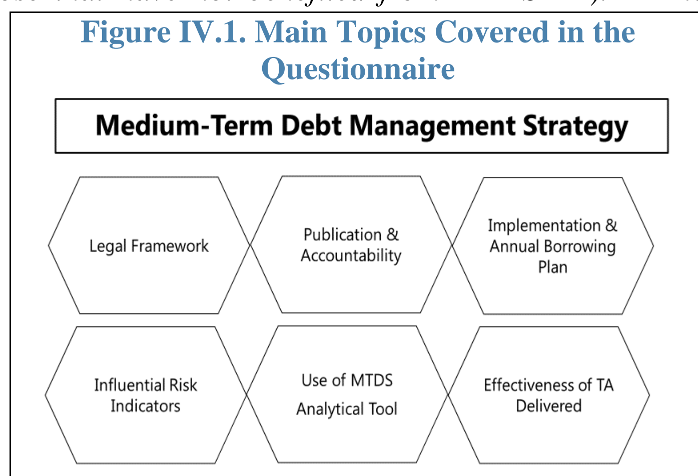
1/ The sample includes a total of 78 countries. A score of A, B, or C means that a formally approved and publicly available medium-term DMS, covering all central government debt, is in place. The DMS strategy should contain a discussion of the evolution of interest rate, refinancing, and foreign currency risk, and the opinion of the Central Bank are obtained. A score of D applies if a medium-term DMS is not in place or the quality is not sufficient, the decision-making process is not sufficient, and/or the DMS is not published.

The increasing importance of subnational borrowing led to the development of the Subnational DeMPA (August 2012, revised in December 2016), comprising 13 DPIs and 31 dimensions. It has been applied across 15 subnational governments (five in Sub-Saharan Africa, three in South Asia, and two each across LAC and EAP). Results from these reveal significant gaps in most key debt management areas, except for debt recording, legal frameworks, and managerial structure (Figure III.1). It should be noted that the sample is small and may be biased towards countries with highly developed institutional arrangements for managing subnational debt.

Annex IV. Detailed Questionnaire Results

A questionnaire soliciting views on debt management strategy and the capacity to develop one was sent to 110 countries (including those that have not benefited from MTDS TA).[42] *The questionnaire touched on six broad areas (Figure IV.1). Respondents were asked to rate various aspects of their own debt management activities or related technical assistance (TA); all questions sought additional comments. This annex summarizes the key findings from the questionnaire and provides insights on the usefulness of the MTDS TA and areas of focus for further improvement.*

Figure IV.1. Main Topics Covered in the Questionnaire



Most countries indicated having in place a formal debt management strategy. For those without one, they cited lack of expertise and limited human resources as the main reasons. That said, even in those cases where a formal DMS is absent, many mentioned the presence of a passive strategy that maximized concessional borrowing before resorting to domestic debt issuance.

The majority of respondents confirmed the publication of DMS report (Figure IV.2a). DMS documents are regularly published either as an independent document or as an attachment to the annual budget. Most acknowledged the benefits of publications as promoting transparency and accountability. In some cases, debt managers said the DMS being in the public domain gave them the lever to implement the selected strategy. The report also facilitated communication with market participants and other stakeholders, including government entities.

In many cases, the formulation of DMS was underpinned by a dedicated legal framework (Figure IV.2b). One third of respondents confirmed the requirement by law to prepare a DMS. Approval by the highest authorities, such as the Cabinet, Council of Ministries or the Minister of Finance was obtained in almost all cases.

Debt management strategies varied across countries, reflecting differences in debt portfolio risks (Figure IV.2c). In addition to debt portfolio risks, there were also differences by horizon and scope of debt:

- *The cost and risks features of existing debt portfolio were found to be the principal factors that determined the countries' DMS.* Market risks ranked top (refinancing, exchange rate, interest rate, and liquidity), followed by risks that could surface from contingent liabilities.

[42] Of the 110 countries, 62 responded, of which 37 received MTDS TA.

Operational risk was also highlighted as a source of risk for the functioning of the government bond market.

- *The horizon of debt management strategies varied, with the common period being 3 years.* The period for DMS ranged from 3 to 5 years, with annual review conducted in many cases. The exception was low-income countries, where review took place less frequently.
- *The default for debt coverage was central government debt.* A few countries incorporated the consolidated public sector debt, while consideration of guaranteed loans was rare.

The execution of a strategy largely depended on the capacity to develop an annual borrowing plan (Figure IV.2d). While some countries planned their annual borrowing plan (ABP) based on the adopted DMS, actual borrowing diverged due to factors outside the control of debt managers (fiscal slippage, delay in implementation of large projects, ministerial decisions). Some countries indicated lack of capacity to develop an ABP consistent with the debt management strategy as a reason for inconsistent ABP with that of DMS.

In many cases, the formulation of MTDS was supported by quantitative analysis, **including through the utilization of the MTDS Analytical Tool (AT) (Figure IV.2e).** For those countries that did not use the MTDS AT they reported owning an internal quantitative model. While countries that use the MTDS AT found it to be a helpful tool, a few found some aspects to be challenging: projecting baseline interest and exchange rates; determining shock scenarios; and ensuring consistency with the macroeconomic framework. However, the main challenge in using the MTDS AT was the difficulty of obtaining fiscal and macroeconomic data and the time it took to set up the AT.

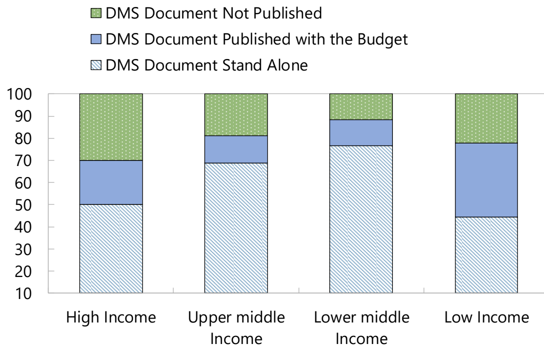
Additionally, understaffing and lack of technical expertise contribute to the challenge debt management office face in developing a DMS. High staff turnover meant retention of capacity was a recurring challenge, and debt management offices were seldom fully staffed. Lack of support from higher management was another challenge reportedly faced by debt management offices.

Those countries that received TA from IMF and WB found the workshops and international trainings to be most helpful (Figure IV.2f). The Debt Management Practitioners' Program is popular by those who participated in it.

Figure IV.2. Key Findings from the DMS Questionnaire

While there is no clear pattern by income group for the choice to publish DMS report, capacity constraint is the common factor for Low Income Countries.

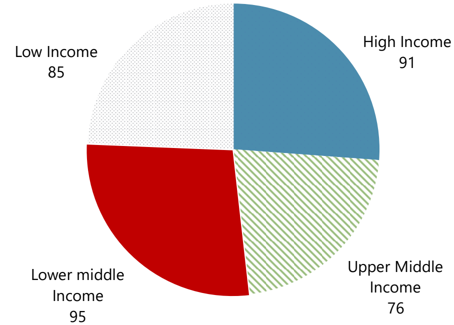
a. Published DMS Document
(in percent)



Sources: Country authorities, and staff calculations.

The legal framework stipulates for the DMS to be formulated in many countries.

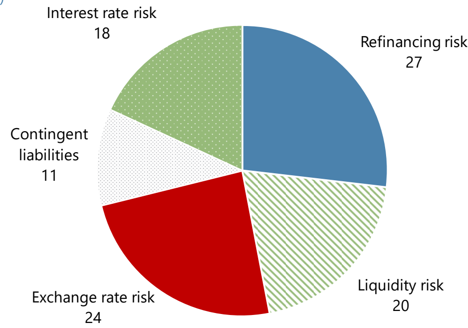
b. Legal framework supports the development of DMS
(in percent)



Sources: Country authorities, and staff calculations.

In analyzing and designing DMS, market risks are the key elements that influence debt managers, while contingent liabilities are also a concern.

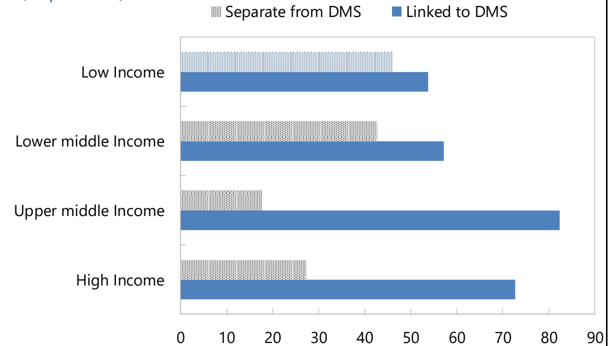
c. DMS Risk Indicators by Importance
(in percent)



Sources: Country authorities, and staff calculations

Execution of DMS through an ABP is less common in the low and lower middle income countries, in part due to factors outside the control of debt managers.

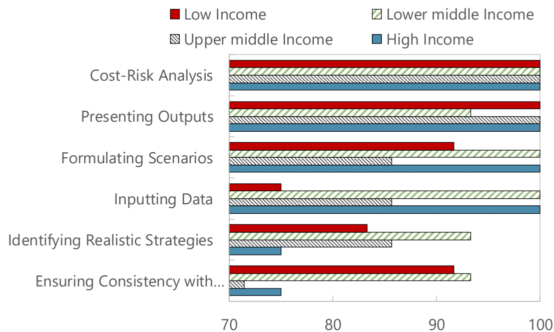
d. Annual Borrowing Plan Based on DMS
(in percent)



Sources: Country authorities, and staff calculations.

Looking ahead, linking the MTDS AT with the macro framework and guidance on strategy identification would be important to assist the users of the tool.

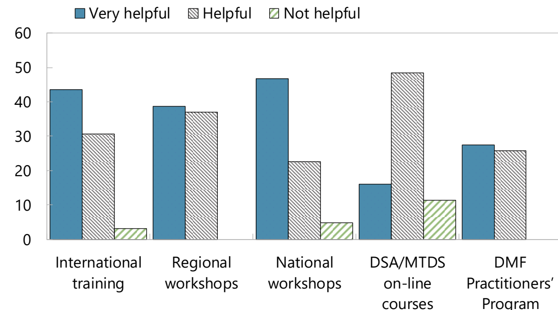
e. Usefulness of the MTDS AT
(in percent)



Sources: Country authorities, and staff calculations

Workshops and international training were slightly preferred for TA delivery, probably due to the opportunity they offer for peer to peer learning.

f. Effectiveness of MTDS TA[1/]
(in percent)



Sources: Country authorities, and staff calculations
1/ Figures do not add up to 100 as "Not Applicable" responses have been excluded.

Annex V. Case Studies

This annex presents country cases studies as evidence on the content, modalities, and achievements of a range of MTDS TA missions. *The analysis is based on the detailed examination of eighteen MTDS country missions, delivered between 2008 and 2016.*[43] *The examination involved the review of MTDS reports, the models supporting the analysis and advice provided, other relevant documents (such as TA reports on other debt management topics), and interviews with TA mission chiefs.*

The Annex is organized in four sections: Section A, distills common themes in the analysis and advice provided. Section B describes the effectiveness of the TA, and challenges encountered. Section C, presents topical case studies, and Section D presents fuller country case studies.

A. TA Components

Adaptation to country circumstances

The TA missions considered a variety of country specific factors, while maintaining a consistent approach to the analysis across countries. TA missions invariably covered the first six steps of the MTDS framework (see Annex I). However, to accommodate specific circumstances or reflect actual practices, complementary (separate) analyses were undertaken (Table V.1).

Table V.1. Incorporating Country Characteristics: Some Examples

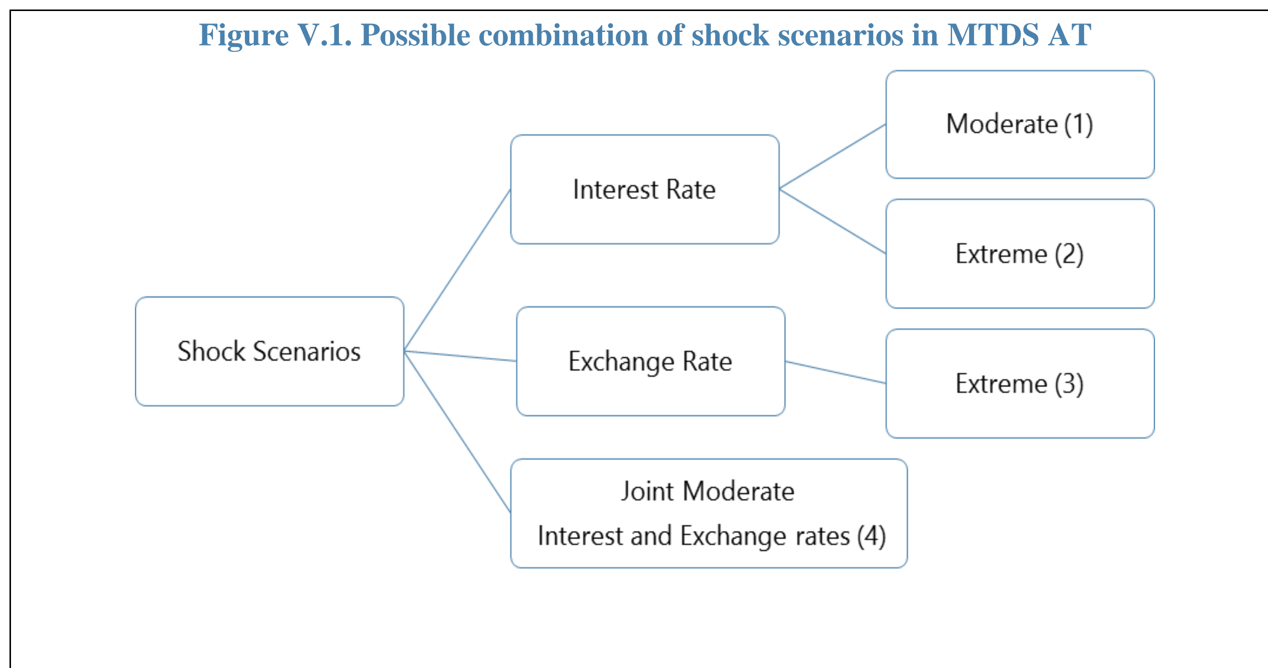
MTDS Framework Steps	Adaptations
Scope of debt	In addition to central government debt, incorporated broader public sector debt, including: • liabilities of state owned enterprises; and • potential liabilities from public private partnerships.
Structural factors	Sensitivity factors that could influence the government's ability to meet debt service obligations were considered, such as for example a collapse in relevant commodity prices
Potential funding sources	Viability of new sources and methods for pricing: • Tapping the international market (Eurobond issuances); and • Inflation-linked bonds.

[43] The full sample included countries, which had multiple missions: Mongolia and Vietnam from East Asia; Bosnia & Herzegovina and Kyrgyz Republic from Europe & Central Asia; Pakistan from South Asia; Benin, Cameroon, Ivory Coast, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Tanzania, Uganda, Zambia from Sub-Saharan Africa and; Grenada from Caribbean. The following section discusses six countries in more detail: Bosnia & Herzegovina; Kyrgyz Republic; Lebanon; Uganda, Vietnam; and Zambia.

Cost-risk analysis and shock scenarios

Shock scenarios were consistently applied and adapted to country specific risks, as agreed with the authorities. The MTDS analytical tool (AT) allows five scenarios, including the baseline to be analyzed, by varying interest and exchange rate risks (Figure V.1). Shocks were generally applied in the second year of the MTDS analysis period.

Figure V.1. Possible combination of shock scenarios in MTDS AT



The extreme exchange rate shock, guided by the LIC-DSF, is usually set at 30 percent, and the moderate one at the range of 15-20 percent, against major currencies. In Zambia and Kyrgyz Republic, where currency depreciations had exceeded those levels, shocks were calibrated based on historical data. Exchange rate shocks were included also in countries with fixed exchange rate regimes to illustrate the budgetary impact of adjustments to the currency regime.

Interest rate shocks were linked to the borrowing instruments. The baseline interest rate projections for capital market instruments, including Eurobonds and domestic sovereign bonds, were generally based on forward yield curves, to which shocks were applied to represent a parallel shift, or change in slope of the yield curve. Loans from multilateral institutions on concessional terms (for example, the African Development Fund) were rarely subjected to interest rate shocks. Bilateral loans were considered on a case by case basis taking into consideration available information on the loan conditions or evidence from previous fluctuations in interest rates.

The TA mission team in discussion with the authorities would determine the size and timing of shocks. If the underlying rationales for shocks were regarded to be sensitive—for example, based on expectation of an upcoming election outcome—the TA mission reports would refrain from discussing them. In a similar vein, mission reports did not elaborate on the probability of

market shocks materializing, which may inadvertently signal government's views of monetary policy or change in exchange rate regime.

Analysis of borrowing strategies

Alternative borrowing strategies were identified for each country based on discussion with officials. A common theme was the desire to examine the cost-risk trade-offs between lengthening the maturity of domestic securities (higher cost, lower refinancing risk) and maintaining the status quo that often relied heavily on short-term securities (lower cost, higher refinancing risk); there was a clear aspiration to gradually extend the maturity profile of the domestic debt. In some countries, domestic borrowing strategies included the introduction of new financing instruments such as an inflation-linked bond in Zambia and diaspora bonds and Sukuk in Nigeria. For external debt, a typical topic was assessing Eurobond issuances. Some analysis included debut Eurobond issuance (Uganda and Ethiopia). To smooth the redemption profile, mitigation options evaluated included introducing amortizing bonds (Zambia) and accessing commercial loans (Benin).

Recommendations

TA recommendations addressed a range of measures that support the formulation and implementation of a DMS, and in particular the effective use of the MTDS framework (Table V.2). The TA missions (and their subsequent reports) did not single out preferred strategies or specific debt operations, because those are policy decisions that are the responsibilities of the authorities. Rather, the TA explained and recommended measures to improve DMS analysis and decision-making, and supporting institutional changes or policy actions. Thus, recommendations directly related to the use of the MTDS framework and the AT were typically set in a wider context of how to build capacity on a sustained basis, promote effective implementation, and foster financial market development more generally.

Table V.2. Selected recommendations

DMS formulation, implementation, and communication
Publish and update the DMS
Align the development of the DMS with the medium-term fiscal framework
Ensure that the budget statement includes the DMS approved by the Cabinet
Present MTDS analysis to senior management, recommending a specific strategy
Extend coverage for future DMS by including explicit guaranteed debt
Improve coordination between public debt management units to enable implementation of DMS
Increase coordination with Central Bank for the management of foreign currency reserves
Increase investor communications
Develop an ABP and ensure consistency between the DMS and the ABP
Cost-risk Analysis
Maximize concessional financing
Ensure an appropriate balance of concessional and non-concessional financing
Closely monitor refinancing risk related to international market issuance
Establish broad targets for debt portfolio risk indicators
Increase domestic debt issuance, combined with semi-concessional financing to reduce vulnerability
Institutional
Review debt management laws to clarify objectives, roles, borrowing purposes, and DMS mandate
Establish a DMO with front, middle and strong back-office function
Improve debt management institutional arrangements by appointing a principal debt management unit
Complete a reorganization of the debt management unit and strengthen analytical capacity
Appoint and train staff for the central debt management unit
Data-Related
Consolidate and reconcile debt and government guarantees data into a single debt recording system
Publish a debt statistical bulletin covering key debt portfolio indicators
Enhance monitoring of contingent liabilities
Enhance reporting and recording of SOE debt
Cover all government accounts
Improve capacity in cash flow forecasting
Market development
Reduce market fragmentation, develop investor base and revise primary dealers' framework
Improve incentives for domestic market development by avoiding administered rates
Inform market participants when Treasury bills are issued for deficit financing and for sterilization
Establish price reporting of secondary market transactions and strengthen custody arrangements
Introduce quarterly auction calendar
Sources: IMF and WB staff. Based on TA reports of the following countries: Benin, Bosnia Herzegovina, Cameroon, Ethiopia, Ghana, Grenada, Ivory Coast, Kenya, Kyrgyz Republic, Malawi, Mongolia, Mozambique, Nigeria, Pakistan, Uganda, Vietnam, Tanzania and Zambia.

B. TA Effectiveness and Hindrances

Risk indicators

The TA mission reports provided recommendations that were associated with improvement in debt portfolio structures and cost-risk indicators (Box 1). The association does not prove causation, but it is plausible that the capacity that the countries built up with support from TA allowed them to reduce debt riskiness. The improvements are most remarkable in light of the fact that external or macroeconomic circumstances often deteriorated or the total debt stock increased. In this connection, it is noticeable that, for countries wishing to deepen the domestic sovereign market or reduce exchange rate risk (by increasing the share of domestic debt), their success depended on the depth and resilience of the domestic financial market.

Box V.1. Debt Portfolio Risk Exposure Indicators and Debt Developments

Debt to GDP ratios increased considerably between 2010 and 2015 in 13 of the 18 select countries, albeit by widely varying amounts. While the average increase was around 10 percentage points in three years, the surge is more significant in countries with high foreign currency debt that saw their currency depreciate substantially, such as Ghana and Zambia, Mongolia, and Mozambique. Several countries with large public debt increase in recent years resorted to Eurobond issuance between 2012-2015, making use of the favorable circumstances in international markets.[44]

External debt continues to dominate the debt portfolio in countries that have traditionally relied on concessional financing such as Kyrgyz Republic, Malawi, and Mozambique. The opposite was true for countries that were either part of a regional currency union (Benin and Ivory Coast), giving them access to a larger investor base in domestic currency, or have relatively more developed domestic markets (Kenya, Vietnam, Pakistan), allowing a reduction of the share of foreign currency denominated debt.

The same set of countries was also able to improve or maintain debt portfolio risk exposure indicators associated with domestic debt. Generally, countries with relatively larger and more developed domestic (or regional) markets had additional options in managing the composition of their debt portfolio.

In the context of increasing debt to GDP ratios, countries were generally able to reduce or stabilize key debt portfolio risk exposure indicators but results were not uniform with 9 countries achieving an either a risk reduction or stability in the management of foreign exchange, interest rate and refinancing risks. Foreign exchange risk either decreased, or was stable, in 12 of the 18 countries. Interest rate risk either decreased or was stable in 13 of the 18 countries, mainly driven by increased issuance of fixed rate debt (domestic or international). Refinancing risk was reduced in 13 of the 18 countries due to longer maturities, but deteriorated in 5 countries that mainly had to resort to shorter maturities in their domestic market.

Challenges to DMS implementation

The TA missions identified a range of capacity related challenges that impact countries' ability to perform the MTDS analysis:

The processing of compiling debt portfolio data for analytical purposes posed a hurdle for some countries with implications for the MTDS TA. Looking ahead, additional TA efforts on debt recording and basic cost and risk monitoring would be helpful; and

Deploying the required skills to utilize the Analytical Tool (AT) was challenging for some low-income countries. Looking ahead, a simplified version of the AT, particularly for countries

[44] These countries include: Zambia (2012), Mongolia (2012), Ethiopia (2014), Kenya (2014) and Cameroon (2015); they issued their debut Eurobonds, while some others like Ghana, who had earlier issued a Eurobond, accelerated borrowing from international markets. Pakistan returned to the international markets in 2013 after a long absence.

with a large share of concessional debt, could be sufficient and significantly easier to implement.

Some countries had an approved DMS but they were unable to execute it. For example, where SOEs are significant, coordination within the public sector is needed (Ethiopia, Mozambique), together with the institutional mechanism to approve, update and monitor the strategy (Tanzania, Mongolia and several others). In addition to institutional arrangement, capacity to develop annual borrowing plan was also a factor. In the future, TAs focusing on linking DMS with annual borrowing plans would be important, as well as assistance on strengthening the overall institutional framework for debt management.

Experience suggests that countries would benefit from capacity development efforts over longer periods. While each TA mission would have its own focal issues to address, it should ideally build on previous TA missions to identify and address persistent challenges, and ensure continuity. To ensure that TAs continue to be effective, assessing the implementation status of previous TA recommendations, and confirming full commitment from the authorities are equally important going forward.

C. Topical case studies

Ghana

The MTDS technical assistance in Ghana contributed to developing the government's financing strategy consistent with the medium-term macroeconomic framework. The technical assistance pointed to previous years' financing strategies that relied heavily on domestic financing, which had led to significant drawings from the overdraft facility from the central bank and accumulation of arrears. The result had been high inflation and high domestic interest rates, and rapid and large depreciation of the local currency. By 2014, non-resident inflows had ground to a halt and practically all residual domestic financing was achieved through Treasury bills. It was agreed that domestic financing had to be curtailed to a level consistent with the absorptive capacity of the domestic market and to prevent further crowding out of the private sector investments. Thus, in the mid-year revised fiscal framework and supplementary budget, the financing strategy was revised in which the share of external and domestic borrowing was more balanced. This strategy was approved by the Cabinet and published, satisfying the structural benchmark.

Over the medium-term, the DMS envisioned a gradual return to greater reliance on domestic financing. To prepare for the return, it was critical to make progress in deepening the domestic debt market by strengthening the primary and secondary markets; market infrastructure and the operating environment; as well as risk management practices, with a focus on reducing domestic refinancing risk. Non-resident investors have returned in significant volume to Ghana beginning in late 2016, which allowed the authorities to implement its strategy to lengthen domestic maturities and reduce refinancing risk.

Indonesia

Indonesia is an example of a country that used the MTDS AT as a springboard to develop their own tools for cost-risk analysis. The Directorate General of Financing and Risk Management (the debt office), Ministry of Finance, decided in 2012 that they wanted to strengthen the analytical foundation for the debt management strategy. It was decided to initially apply the MTDS AT, and on that basis develop more advanced and tailored tools in-house. The analysis undertaken in the MTDS AT provided the quantitative basis for the debt management strategy 2013-17, and was followed by the construction of a MTDS AT replica in Matlab. The deterministic model was further developed allowing greater flexibility in granularity and number of instruments, and supplemented by a stochastic version that allowed a richer output. In practice, the two models were applied side by side. The experience with developing cost-risk tools in-house has been very positive; it substantially increased the analytical capacity in the debt management office.

Bosnia Herzegovina (BiH)

BiH provides an example of application of the MTDS framework and AT in a subnational context. The country has a highly decentralized governance structure, with two Entities (the Federation of BiH (FBiH) and the Republika Srpska (RS)) having their own constitutional right to borrow externally and domestically. The approach adopted was a "bottoms up," with the determination of the borrowing strategies at the Entity level dictating the strategy at the State (national) level. The exercise was a success in ensuring improvements not only in the borrowing stance but also in overall debt management practices at the Entity level. In 2015, all Entities published their DMS. By late 2016, RS presented its auction calendar for the upcoming year 2017 to investors, after FBiH already had adopted this practice.

Nigeria

In Nigeria, the MTDS TA provided support to the DMO analyzing the asset and liability portfolios of the central government. Nigeria has a fiscal rule in which the fiscal revenue is derived by a predetermined "budget oil price." Under this rule, if the realized oil price is above the budget oil price, the excess revenue arising from the difference between the realized and the budget oil price is saved in a fund. Depending on the chosen budget oil price relative to the outcome, it is possible that funds are accumulated while the government runs a fiscal deficit. The MTDS mission illustrated the usefulness of analyzing the public debt path, accounting for asset accumulation, and how net debt evolved depending on different budget oil price assumptions and the relative interest rates on the assets and liabilities. The analysis generated discussions on the circumstances under which asset accumulation might make sense (despite the cost of carry) and when to reduce the size of the balance sheet.

Ethiopia

In Ethiopia, the MTDS AT captured in the analysis debt management issues related to SOEs, which play a critical role in public investments and borrowing. The central government fiscal framework comprises a small portion of the total public expenditure execution. The MTDS TA demonstrated the usefulness of a broader coverage: vulnerabilities were found to be higher, as the risk profile of the public debt portfolio including the SOEs is significantly worse because of their reliance on commercial debt (compared to the central government borrowing, which comprises mostly of concessional sources). Moreover, vulnerabilities were found to be intensifying because the public debt ratio including SOE debt was found to be on a steeper upward trajectory.

Tanzania

The MTDS TA in Tanzania incorporated public-private partnership transactions into the analysis. The government had accumulated debt-like obligations in deals whereby pension funds would invest and build structures (e.g., hospitals and schools) which are later leased to the government. The government was then to pay a "fixed rental payments" over 15 years, and at the end of the period, the ownership of the building was to be transferred to the government. The "fixed rental payments" effectively comprised interest and principal repayment, similar to a mortgage, but without the upfront recognition of the stock of debt. In turn, the rental payment expenditures would appear under health and education expenditures, which was misleading in terms of the true budget allocation to the sectors. The MTDS assistance demonstrated the benefits of recognizing these obligations as debt and reclassifying the expenditures from hospital and education expenditures to interest payments, and supported the authorities' decision to cease entering into similar deals that lacked transparency.

D. Country Case Studies

Kyrgyz Republic

Background

Kyrgyz Republic received two TA missions (2011 and 2016). Both missions delivered training in cost-risk analysis, applying the MTDS AT, and the latter assisted in updating the DMS. It built on earlier support provided during 2015, including a DeMPA-based diagnostic and a reform plan. In addition to the MTDS TA, the mission provided recommendations on the development of the government securities market.

The update and publication of the DMS was required by the regulatory framework and under the IMF Extended Credit Facility (ECF). The DMS covering the period of 2015–17 was approved by Cabinet and published. The DMS specifies the debt management objectives and the scope; it also contains guidelines on (i) lengthening the maturity profile of debt, that is, increasing the average time to maturity, and (ii) informing annual financing plans by market consultations.

In the MTDS AT, yield curves (spot and forward) were modeled based on US Treasury yield curves. To consider credit and exchange rate risk, a credit spread was applied, whereas exchange rate risk was based on expected inflation differentials, which was refined further to allow gradual depreciation in line with the expected forecast from the Ministry of Finance.

The shock scenarios were applied in the second year of the analysis. For exchange rates, shocks were set at 40 and 20 percent, based on historical developments and discussions with authorities. The external interest rate shock was based on an increase of the US Treasury yields by 200 basis points (bps) for a 1-year maturity and 400 bps for a 10-year maturity. For domestic interest rates the shock spanning 2016 and 2017 was assumed to be a parallel shift of the yield curve by 5 percent, based on historical data for primary interest rates.

Key Issues and Outcomes

- The development of DMS has been a positive development, and is providing guidance of borrowing decisions; and
- The narrow investor base was an impediment in developing the domestic government securities market, as well as the limited progress in consolidating the government securities into fewer individual lines.

Lessons Learned

- Given that concessional debt have long maturities, currency shocks may have only a mild effect on debt service cash flows, but the effect on the debt size can be more significant;

- A key task of a mission is to assess the potential development of domestic market for government securities, with a focus on the primary market. From a narrow short-term cost perspective, taking into account the continued access to concessional funding, a shift to more market based borrowing may not be attractive at present, but the longer-term benefits may make it worthwhile; and
- The cost-risk analysis may serve to increase awareness of debt portfolio risks and the importance of developing the government securities markets in the medium term.

Lebanon

Background

Lebanon received TA on several key aspects of debt management. Initial TAs supported the establishment of a debt management unit in the Ministry of Finance. The TA program consisted of 4-5 peripatetic visits per year, hiring of local junior consultants, as well as remote assistance. The development and implementation of a DMS has been an integral element of the TA.

The TA helped the authorities formulate a DMS.[45] In 2013, the Public Debt Directorate (PDD) had developed its first DMS (2014-16), which was formally approved by the High Debt Committee and published.[46]The annual borrowing plan was also presented. The strategy sets qualitative goals informed by internal analysis and covered key developments around debt and borrowing strategy for the coming 5 years (initially 3 years).

The MTDS AT provided the analytical foundation for the DMS. The initial cost-risk analysis and each subsequent update investigated both extreme and realistic scenarios. Notwithstanding the currency peg, the risks have been analyzed with and without currency shocks. Both simple and more sophisticated approaches have been considered for interest rate projections.

Key Issues and Outcomes

- The political context has been challenging for management of the public debt and TA delivery, and the publication of a DMS based on detailed MTDS analysis was a major development;
- Borrowing plans and debt issuance has been in line with the DMS; and
- The TA led to technical achievements at the level of the PDD, such as the creation of an integrated debt management unit, with a centralized back-office of central government debt and new front and middle offices, where capacity was built on MTDS and issuance of domestic securities. Some staff gained expertise in using the MTDS AT.

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[45] At the time writing, a new MTDS for 2017 – 2021 has been formulated.

[46] Foreign currency borrowing is subject to a ceiling; every year Parliament votes on a new debt ceiling that sets out new foreign currency issuance.

Lessons Learned

- A programmatic approach can be very effective; and
- Solid implementation of the DMS requires strong support at a high level. For this reason, in principle approval for the implementation of the DMS should be sought from decision-makers prior to TA delivery.

Uganda

Background

There have been two joint Fund-Bank MTDS missions to Uganda (April 2013 and December 2015). The 2015 mission specifically targeted to strengthen the capacity of officials and assist in updating the existing DMS.

The legal framework requires annual reporting to Parliament on evaluation of debt management activities against the DMS. The Ministry of Finance has updated the DMS on an annual basis since its first formulation in 2013. The objectives of the DMS include a requirement for an evaluation of costs and risk trade-offs for all borrowings.

In the 2015 TA mission, the cost-risk analysis concentrated on reducing both cost and risk by maximizing (semi-) concessional financing. The strategy for 2015–2020, however, anticipated a gradual increase in non-concessional borrowing. The TA mission highlighted that other borrowing strategies that relied less on concessional loans could become unavoidable; these include Eurobond issuance, and more and longer domestic financing.

The exchange rate shocks were standard but the interest rate shock included a tapering effect. The exchange rate shocks were standard DSA shocks of 15 and 30 percent in the second year of the analysis. For interest rates, it was assumed that the shock materializes in the second year, tapers off in the third, before fading away.

Key Issues and Outcomes

- The authorities are now capable of formulating a comprehensive DMS;
- A DMS was formally approved and published;
- Access to concessional financing was expected to decline as Uganda's per capita income surpassed the concessional eligibility criteria, which prompted the analysis of a Eurobond issuance and created new debt management challenges; and
- The issuance of domestic debt was constrained by the absorption capacity of the local market, particularly its appetite for longer maturities.

Lessons Learned

- Domestic market development issues should be addressed.

Vietnam

Background

The development of the DMS was part of a programmatic approach to debt management TA in Vietnam. In January, 2014, the WB launched a medium-term TA program with the design and implementation of the DMS being one component of the program, which would be reinforced by other components, such as the revision of process and procedures in the debt management office and the review of the debt management law. TA on MTDS was delivered in 2014 and 2015.

The DMS was formally approved. In 2012, the Prime Minister formally approved the Public Debt and National External Debt Strategy over 2011–2020 and "Vision toward 2030". The document includes both fiscal policy thresholds and debt management guidelines. The MTDS workshop focused on a six-year analysis, 2015 – 2020.

Key Issues and Outcomes

- As Vietnam approaches middle-income country status, concessional and semi-concessional financing could become scarce; and
- The fragmented institutional responsibilities for debt management presented challenges for the formulation and implementation of the DMS.

Lessons Learned

- When relevant, it is important to widen the scope of MTDS missions beyond strict cost-risk analysis to include, for example, domestic market development issues; and
- A current multi-year program can be especially effective.

Zambia

Background

There have been three MTDS missions to Zambia (2009, 2014 and 2016). The missions focused on MTDS capacity building for the technical level of the debt management unit

For the MTDS analysis, the missions analyzed strategies that were defined together with the authorities. In 2014, the financing strategies that were considered related to more domestic financing, domestic maturity extension, and Eurobond issuance. The strategy analysis in 2016 started with maximum (semi-) concessional financing and considered the issuance of domestic

inflation-linked bonds, in addition to addressing the lengthening of the average domestic maturity, Eurobond issuance, and attention to the capacity of the domestic market.

The missions used different parameters for shock scenarios. In 2014, in line with DSA analysis, the extreme exchange rate shock amounted to a 30 percent depreciation against the US dollar in the second year of projections (and a more moderate shock against the Chinese yuan) and the moderate foreign currency shock amounted to 15 percent versus the US dollar. In the 2016 mission, the extreme and moderate foreign currency shocks of, 25 and 50 percent, respectively, were based on the kwacha's history. The interest rate shocks too were derived from historical data.

Key Issues and Outcomes

- The Ministry's debt management unit produced its own DMS in 2008 and 2014;
- The missions noted challenges regarding debt recording and reporting, despite investment in an updated debt recording system (DMFAS 6);
- Attention was given in the 2016 report to developing domestic debt markets, such as broadening the investor base, strengthening benchmarks, and developing a secondary market, including the trading platform of the central bank; and
- The lack of progress could be attributed largely to a deterioration in macro-fiscal conditions, which led to the doubling of public debt. The reduction of foreign currency risk was hampered by the absorption capacity of the domestic market, which constrained the issuance of domestic debt in longer maturities or larger amounts.

Lessons Learned

- Due attention should be given to debt data collection and preparation prior to MTDS missions;
- The implementation of DMS needs to be addressed in detail;
- Strong early commitment from senior officials can contribute to better implementation of the DMS; and
- A programmatic approach combining different types of training may enhance overall effectiveness. Based on prior MTDS missions and debt management TA, stronger up-front support from the authorities may thereby have been established.