

INTERNATIONAL MONETARY FUND

**Managing Sovereign Debt and Debt Markets through a Crisis—Practical Insights and Policy Lessons**

Prepared by the Monetary and Capital Markets Department

Approved by José Viñals

April 18, 2011

Contents	Page
I. Overview and Summary .....	3
II. The Crisis and its Impact on Debt Management and Debt Market Operations .....	5
III. Implications of the Crisis for Debt Management Strategies .....	13
IV. Challenges for Debt Management Practices and the Functioning of Debt Markets.....	19
V. Debt Management and Enhanced Collaboration .....	24
VI. Going Forward: The Key Issues .....	26
Tables	
1. Gross Central Government Financing Need: Selected Countries.....	6
2. Summary of Debt Management Responses: A Cross-Country Sample.....	8
3. Debt Management Responses: Selected Countries.....	28
Figures	
1. Portfolio Flows to Emerging Markets.....	6
2. Improved Resilience in Emerging Markets .....	7
3. Key Portfolio Risk Indicators .....	9
4. Differential Cost Conditions: Euro Area Issuers .....	11
5. Central Bank Purchases of Government Securities .....	13
6. Relative Importance of Banking Sector, End-2010 .....	14
7. The Relation between Sovereign and Bank CDS Spreads.....	32
8. Foreign Banks' Exposure to Selected European Sovereigns, 2010 Q3 .....	33
9. Evolution of Debt Composition, 1999-2009.....	37
10. Impact of Extending the Maturity Structure .....	40
11. Debt Structures: Current Context.....	41
Boxes	
1. Debt Management Challenges in Emerging Markets: Then and Now .....	7
2. Sovereign Debt Developments in the Euro Area.....	15
3. Developing a Stress-testing Framework for Public Debt Portfolios.....	17

4. Mitgating Risk: Building Resilience through the Debt Structure .....	18
5. Liability Management Operations as a Risk Management Tool .....	21
6. New Regulatory Initiatives and Sovereign Debt Markets .....	25
7. Feedback Channels between Sovereign and Banking Sector Risk.....	31

#### Appendices

I. Summary of Debt Managers' Responses—Selected Countries .....	28
II. Sovereign and Banking Sector Risk—Some Key Interconnections .....	30
III. Guiding Principles for Managing Sovereign Risk and High Levels of Public Debt .....	34
IV. Debt Structures and Crises of the 1990's—Original Sin and its Absolution .....	37
V. Sovereign Risk and its Components—Defining Solvency and Liquidity/Rollover Risk ...	38
VI. Choosing the Optimal Maturity Structure: The Cost–Risk Tradeoff .....	39
References.....	43

## I. OVERVIEW AND SUMMARY<sup>1</sup>

- 1. The crisis highlighted the importance of debt management in containing debt-related risks and the associated impact on debt markets.** The impact of the crisis on debt levels, and the consequent implications for fiscal consolidation, has been the subject of much discussion and analysis. However, there has been relatively less focus on the issue of how that debt should be managed, including how its composition should be structured so as to mitigate key risk exposures, and its implications for debt market functioning. That task proved significantly complex and challenging through the crisis, particularly in advanced economies, with additional dimensions of risk revealed.
- 2. At the heart of the operational challenge was how to meet increased borrowing needs against a backdrop of intensely challenging market conditions.** This required sovereign debt managers be more creative in their operational approaches—modifying the issuance mix and financing modalities, and stepping up market management activities, complemented in some cases with coordinated support from central banks.
- 3. The crisis also tested the efficacy of risk management frameworks for managing the sovereign debt portfolio and its resilience.** The experience highlights the need for risk management frameworks to identify target debt structures that reflect more closely the level of debt, degree of macro policy flexibility, market depth, and concentration of the investor base. The risk of significant negative feedback effects between the financial and fiscal sectors—one that was exacerbated by large and damaging cross-border spillover effects in this crisis—now also needs to be factored in. The availability of liquidity buffers has also assumed greater importance, especially for countries where monetary policy is constrained, and those with concentrated or fragile investor bases.
- 4. So long as financing needs remain elevated and market conditions volatile, achieving the desired debt structure will prove challenging.** In some cases, the crisis has led to a re-categorization of sovereign debt from low credit risk to high credit risk, which will complicate the debt management task further, even for the systemically important sovereign issuers. This increased perception of the credit risk associated with sovereign debt could also exacerbate the interconnections between the debt capital markets, the financial sector and the sovereign. This carries far-reaching implications for how debt will be managed going forward and the financial sector reforms currently under consideration.
- 5. A recalibration of sovereigns' debt management policies and practices is desirable at this point.** This is due to the combination of deepening fiscal imbalances and long-term fiscal risks, currently high levels of public debt, weaknesses in sovereign balance sheets, and the fuller information on the nature of debt portfolio and contingent liability risks revealed by the crisis. An effective response requires sovereign debt managers to take action along the lines below. These steps will complement the implementation of credible and sustainable fiscal policies and

---

<sup>1</sup> This paper was drafted by a team led by Udaibir S. Das, comprising Myrvin Anthony, Allison Holland, Christian Mulder and Michael Papaioannou, with additional support from Faisal Ahmed, Cesar Arias, Serkan Arslanalp, David Grigorian, Vincenzo Guzzo, Turgut Kisinbay, Guilherme Pedras, Faezeh Raei and Samer Saab. Robert Sheehy provided overall guidance.

effective macro-prudential and financial sector policies, which are also necessary to reduce sovereign risk:

- *Augmenting risk management frameworks to capture a wider set of risk considerations.* Explicitly incorporate: (i) the potential materialization of contingent liabilities; (ii) the interaction of sovereign risk with financial sector risk; and (iii) the degree of macroeconomic policy flexibility, especially exchange rate and monetary policy constraints, and its effect on financing costs under stress. Potential cross-border spillovers also need to be recognized, an issue that is as relevant for advanced economies as for emerging markets.
- *Improving the resilience of debt structures to financing and macroeconomic shocks.* Initiate steps, including liability management operations, to lengthen maturity and reduce rollover and liquidity risk. In this context, there may be scope for emerging markets to take advantage of capital inflows to further lengthen the maturity of their domestic currency debt. Appropriate liquidity buffers can complement these strategies.
- *Ensuring sufficient operational flexibility.* Maintain adequate operational flexibility, including the scope to adapt primary issuance techniques, and use liability management operations to alleviate secondary market impairments and support liquidity. This can reduce execution risk, improve price discovery, and address market dislocations. Systemically important sovereign issuers, which provide a reference for the wider debt capital markets, need to be particularly cognizant of the risk of broader market disruption that could follow any unsuccessful market operation.
- *Strengthening communication with stakeholders and investors.* Better understand the nature of the investor base and its investment philosophy, the impact of regulatory reforms on investors, and other factors affecting global asset allocation decisions. Apart from improving investors' understanding of the macro-economic fundamentals, structural developments and debt management philosophy, issuers should focus on identifying potential debt capital market vulnerabilities. This will help inform instrument design, shape market perceptions and mitigate the risk of a sudden loss of market access.

**6. Enhanced collaboration among debt managers and other policy makers will also be essential for identifying, monitoring and mitigating risk on the sovereign balance sheet.**

This collaboration should focus on an ex-ante determination of the extent of exposure, such as to the financial sector or demographic pressures, so as to inform any necessary debt management related interventions, including the need for any liability management operations, and the appropriate size of liquidity buffers. Collaboration will also ensure the consistency of debt management policies with financial sector and macroeconomic policies, and facilitate cross-institutional efforts to enhance debt market liquidity. Where appropriate, institutional arrangements for macro-prudential monitoring could be leveraged to achieve this goal.

**7. The paper thus reviews the sovereign debt management response during this period, and discusses the main lessons for country authorities in managing sovereign debt going forward.** It builds on discussions held at the 10<sup>th</sup> Annual IMF consultations on “*Policy and*

*Operational Challenges Facing Public Debt Management*” (July 1-2, 2010), from which the “Stockholm Principles” for managing sovereign risk and high levels of public debt emerged, and at the *High-Level Roundtable on Sovereign Risk and Financial Stability* (March 18, 2011), providing more detailed analysis of the key issues and specific suggestions on how key vulnerabilities should be addressed going forward. While the paper focuses on the challenges faced by advanced economies, the broader lessons are equally relevant for emerging markets and those developing countries where debt structures remain relatively weak and markets shallow. They also have relevance for those LICs who anticipate increased reliance on non-concessional sources of financing and are seeking to establish durable market access. The structure of the paper is as follows. Section II describes how debt managers coped with the challenges of meeting large financing needs given challenging market conditions. Section III discusses the lessons of the crisis for debt management strategy formulation and risk management. Section IV examines the debt management challenges to be faced in the period ahead. Section V looks at the importance of collaboration between debt managers and other policy makers. Finally, Section VI sets out the issues for discussion.

## II. THE CRISIS AND ITS IMPACT ON DEBT MANAGEMENT AND DEBT MARKET OPERATIONS

8. **The crisis raised significant challenges for debt managers, especially in advanced economies (Table 1).** Debt managers in these economies had never faced such significant and widespread financing challenges and market disruption. The scale of the shock represented an intense test of operational and strategic frameworks, requiring the adoption of more flexible approaches that could cope more readily with changing market conditions. Overall, there was a sharp increase in the number of financing operations, which elevated execution risk<sup>2</sup> and put the debt management function under significant operational strain.<sup>3</sup>

9. **Most emerging markets, on the other hand, experienced a relatively less severe impact on their financing operations.** This partly reflected the fact that they were more insulated from the causes of the crisis. Nevertheless, especially in the early phase of the crisis, many emerging markets also faced some financing stress as a consequence of a sharp outflow of capital, changes in investor demand and the effective closure of international capital markets in the latter half of 2008 (Figure 1). The impact of that stress would have been much more severe if emerging markets had not made sustained efforts to enhance the resilience of their debt profiles and strengthen their debt management frameworks over the past decade (Box 1).<sup>4</sup>

---

<sup>2</sup> Execution risk is the risk that a debt manager will fail to raise the required quantity of financing through a debt operation.

<sup>3</sup> For example, the number of operations in the U.K. almost doubled from 34 auctions in fiscal year 2007-08 to 66 operations in fiscal year 2008-09. This number increased further to 77 in fiscal year 2009-10.

<sup>4</sup> Many emerging markets had established large liquidity buffers to ensure they could sustain a temporary loss of market access while continuing to their debt servicing obligations. For example, Uruguay targets a minimum level of 12 months of debt servicing needs. Several had also made significant strides in lengthening the maturity of domestic currency debt—for example Mexico.

**Table 1. Gross Central Government Financing Need: Selected Countries**

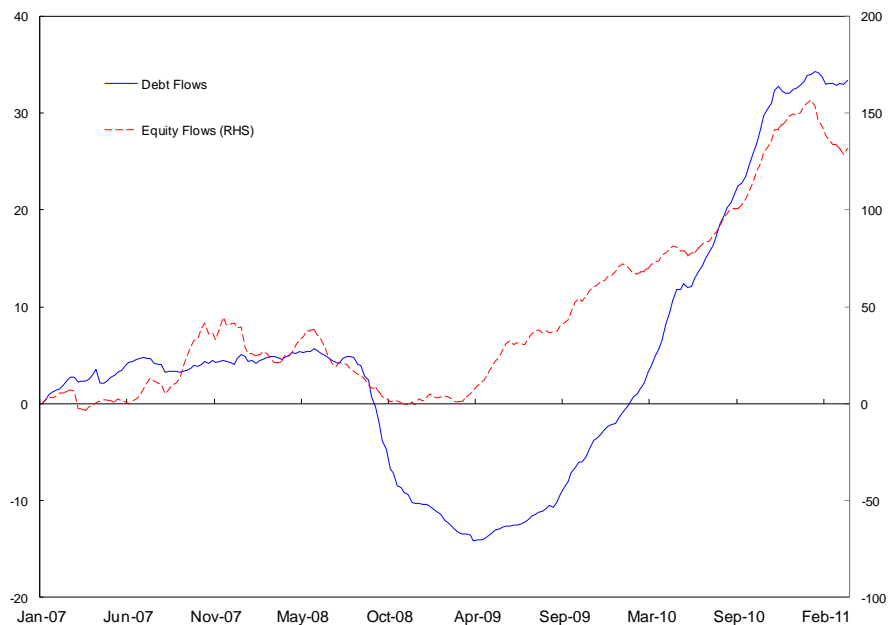
	Average 2005-2007 (% of GDP)	Average 2008- 2010 (% of GDP)	Ratio	Average 2005-2007 (% of GDP)	Average 2008- 2010 (% of GDP)	Ratio	
<b>Selected advanced economies</b>				<b>Selected emerging market economies</b>			
Australia	0.5	5.4	11.2	Brazil	25.0	16.8	0.7
Belgium	14.8	24.0	1.6	Hungary	21.4	26.0	1.1
Canada	8.9	14.7	1.6	Korea	10.8	10.0	1.0
France	10.6	18.1	1.7	Mexico	7.8	11.5	1.3
Germany	8.8	12.8	1.5	Turkey	3.3	5.7	1.7
Italy	19.2	24.1	1.3				
Japan	50.9	50.6	1.0				
Netherlands	6.3	16.4	2.6				
U.K.	5.7	13.2	2.3				
U.S.	13.4	24.8	1.8				

Sources: WEO; and BIS.

Note: Gross borrowing is calculated as the sum of the overall fiscal balance (based on WEO data) and maturing debt (based on BIS data on short-term debt).

**Figure 1. Cumulative Net Weekly Flows to Emerging Market Funds**

(In billions of U.S. dollars)



Source: EPFR Global.

### Box 1. Debt Management Challenges in Emerging Markets: Then and Now

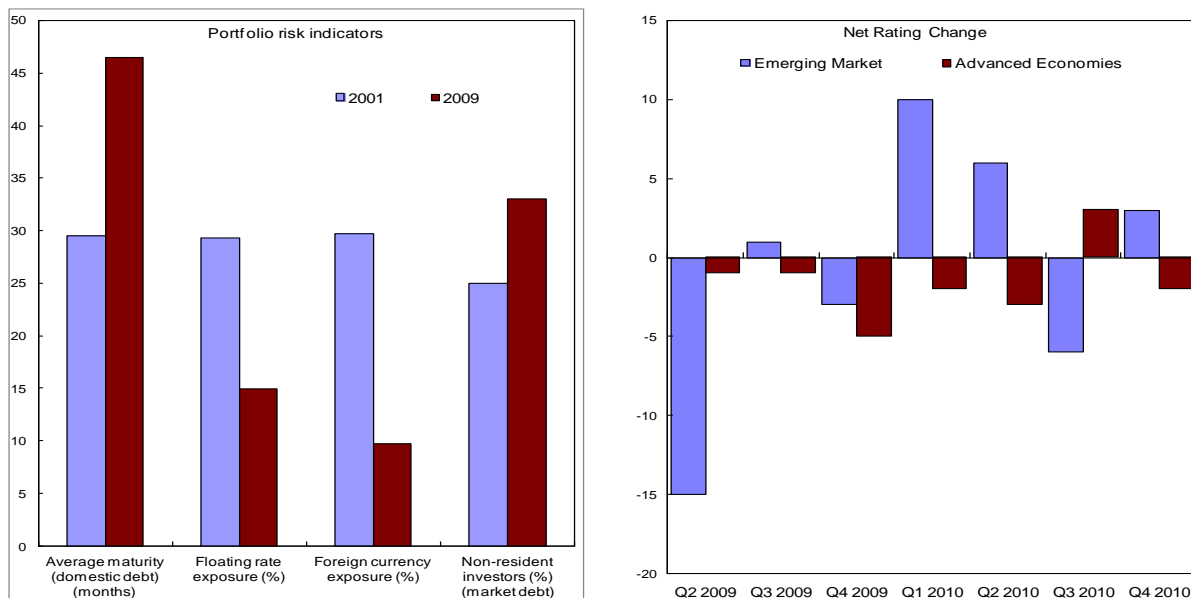
The relative resilience of emerging markets to date has been a notable feature of this crisis. This is in sharp contrast to the past. While this partly reflects that the causes of the crisis were not centered in emerging markets, it also reflects sustained improvements to macroeconomic and financial sector fundamentals over the past decade, supported by the strengthening of debt management policies and practices:

- Debt managers have been actively addressing the key vulnerabilities in debt structures that were highlighted in past crises. Thus, the maturity profile of debt has been extended, while reliance on floating rate and foreign currency denominated (or linked) debt has been reduced (IMF, 2007). These changes were facilitated by policies tackling fiscal dominance and inflation, which gave rise to the “original sin” dilemma—see Appendix IV.
- In parallel, emphasis was placed on improving institutional arrangements for debt management, enhancing transparency, establishing active investor relations programs, and working with other agencies on developing local capital markets. In some instances—e.g., Brazil and Uruguay—these institutional improvements were also contributing factors to credit rating upgrades.

As a result, vulnerabilities to sharp changes in the exchange rate, interest rates, or market access have been significantly reduced relative to previous emerging market debt crises (de Bolle, *et al*, 2006), contributing to an improvement in credit ratings (Figure 2).

Nevertheless, debt structures in emerging markets are, in general, still weaker than in most advanced economies, and remain vulnerable to a variety of macroeconomic shocks (e.g., inflation, commodity price, exchange rate). Notwithstanding the other associated policy challenges, emerging markets should take advantage of all conjunctural and structural opportunities to further lengthen the maturity of their debt structures and strengthen their resilience to risk.<sup>1/</sup>

Figure 2. Improved Resilience in Emerging Markets



Sources: BIS; Fitch; Moody's; OECD; S&P; and Fund staff estimates. Based on WEO country groupings.

Note: Net rating changes are calculated as the difference between the number of upgrades and number of downgrades across all three credit rating agencies.

<sup>1/</sup> The Fund staff discusses these issues with emerging market debt managers on an annual basis within the context of the IMF “Consultations on the Policy and Operational Challenges facing Public Debt Management”. Over the last three years, the coverage of these consultations has expanded to also include advanced economy debt managers.

10. **The debt management challenge facing low-income countries (LICs) remains (largely) different.** LICs were relatively insulated from the crisis, given their low integration in international financial markets; consequently, there was a much smaller impact on financing needs. For most LICs, the challenges reflected potential shortfalls in donor disbursements and more constrained access to concessional loans rather than concerns about more volatile market conditions (see IMF, 2010b). However, the broad lessons will become pertinent for LICs as they seek to diversify financing sources and increase their reliance on market-based financing to meet their infrastructure and other long-term investment needs going forward.

### Responding to increased financing needs

11. **To address these challenges, debt managers used three broad approaches (Table 2).**<sup>5</sup> To accommodate the large and sudden increase in financing needs, without overwhelming the markets, debt managers adjusted the issuance mix to include more short-term debt (Figure 3).<sup>6</sup> This was particularly true in Belgium, the Netherlands, U.K. and the U.S. where the financing of financial support schemes represented a significant proportion of GDP. However, even where the increase in borrowing was not so significant, the fragile state of the markets also warranted more short-term debt (e.g., Germany, France). This was also true in a number of emerging markets in the initial phase of the crisis (e.g., Hungary, Poland, Mexico), where debt managers had to respond to an abrupt departure or the absence of foreign investors.

**Table 2. Summary of Debt Management Responses: A Cross-Country Sample**

	Change in Instrument Mix	Change in Issuance Technique	Market Management Activities
<b>Advanced economies</b>			
Belgium	X	X	X
Germany	X		
Italy		X	X
The Netherlands	X		X
U.K.	X	X	X
U.S.	X		X
<b>Emerging market economies</b>			
Brazil			X
Hungary	X		X
Korea	X		X
Mexico		X	X
Poland	X	X	X
Turkey	X	X	X

Note: See Appendix I for more detail of the changes.

12. **Debt managers expanded their use of non-core markets and borrowing instruments.** For example, before the crisis, both Belgium and the Netherlands had introduced a medium-term note (MTN) program to promote investor diversification and to secure some cost advantages.<sup>7</sup> Several other debt managers also expanded the scale of activities in international capital markets

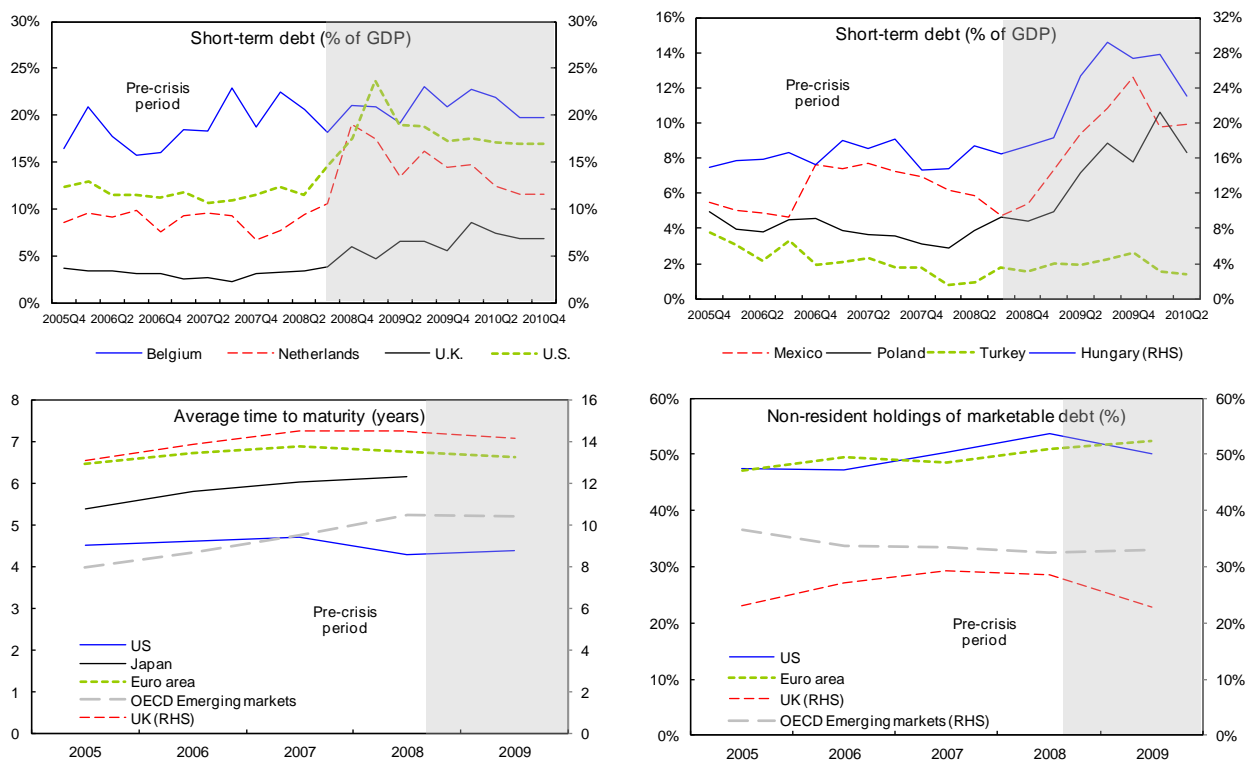
<sup>5</sup> These changes are discussed in detail in de Broeck, *et al* (2011), and Euroweek (2009, 2010).

<sup>6</sup> Short-term debt is less subject to mark-to-market volatility given its low duration.

<sup>7</sup> A medium-term note program provides an overall umbrella structure under which separate tranches with a wide range of maturities, currencies, and interest rate structures can be sold to investors. Often, new tranches (continued)



Figure 3. Key Portfolio Risk Indicators



Sources: BIS, OECD, WEO, and Fund staff estimates.

to improve investor diversification and help ease the financing burden on domestic markets (see Figure 3).<sup>8</sup> This highlighted the benefits of maintaining a presence in these markets in better times, which could be exploited to complement their core issuance programs. In some instances, increased borrowing needs were met by re-introducing some debt instruments. For example, both Canada and the U.S. re-introduced a three-year maturity, while Australia re-introduced inflation-linked bonds. Similarly, in some emerging markets, there was a temporary resurgence in the use of floating rate notes (e.g., Poland).

**13. Supplementary issuance programs that complemented the core issuance program helped raise additional financing at the margin.** For instance, in both Hungary and the U.K. a post-auction non-competitive facility was introduced for primary dealers. In many other countries, smaller issues of “off-the-run” bonds became a more frequent and significant part of the financing program (e.g., the Netherlands, Belgium, Italy, Germany, U.K.).<sup>9</sup> These supplementary programs helped.

---

are issued in direct response to a reverse enquiry from an investor, i.e., through a private placement. This illustrates the flexibility of the mechanism to allow issuers to quickly respond to revealed market demand.

<sup>8</sup> For example, the German Finanzagentur issued its second ever foreign currency denominated bond in September 2009; its debut on the international capital markets was made in May 2005.

<sup>9</sup> “Off-the-run” bonds are typically older bonds that are no longer considered benchmarks. These smaller issues are generally referred to as “tap sales.”

## Limiting the effects of market disruptions and other dislocations

14. **Debt managers had to also address the challenge of deteriorating market functioning and confidence.** Market perceptions of sovereign risk<sup>10</sup> intensified as sovereign balance sheets deteriorated reflecting worsening economic conditions and the general health of the financial sector. This, in particular, brought into sharp focus the interconnectedness between sovereign risk and the financial sector, which was most vividly illustrated in the cases of Iceland and Ireland (Appendix II). More generally, the market became increasingly more sensitive to differences in credit quality (Figure 4). AAA-rated issuers benefited from “safe haven” flows, while less creditworthy issuers experienced greater market volatility, in particular where countries’ ratings approached or breached thresholds set in investment mandates.<sup>11</sup>

15. **Cross-border spillovers also exacerbated the general deterioration in market conditions.** In several instances in Europe, market concerns about sovereign credit risk in one country spread to others perceived to be afflicted by similar fiscal, financial, and growth vulnerabilities. While cross-border contagion was a feature of the emerging market debt crisis of the 1990s, this was a relatively new risk factor for advanced economy debt managers that further aggravated market volatility and increased financing strains.

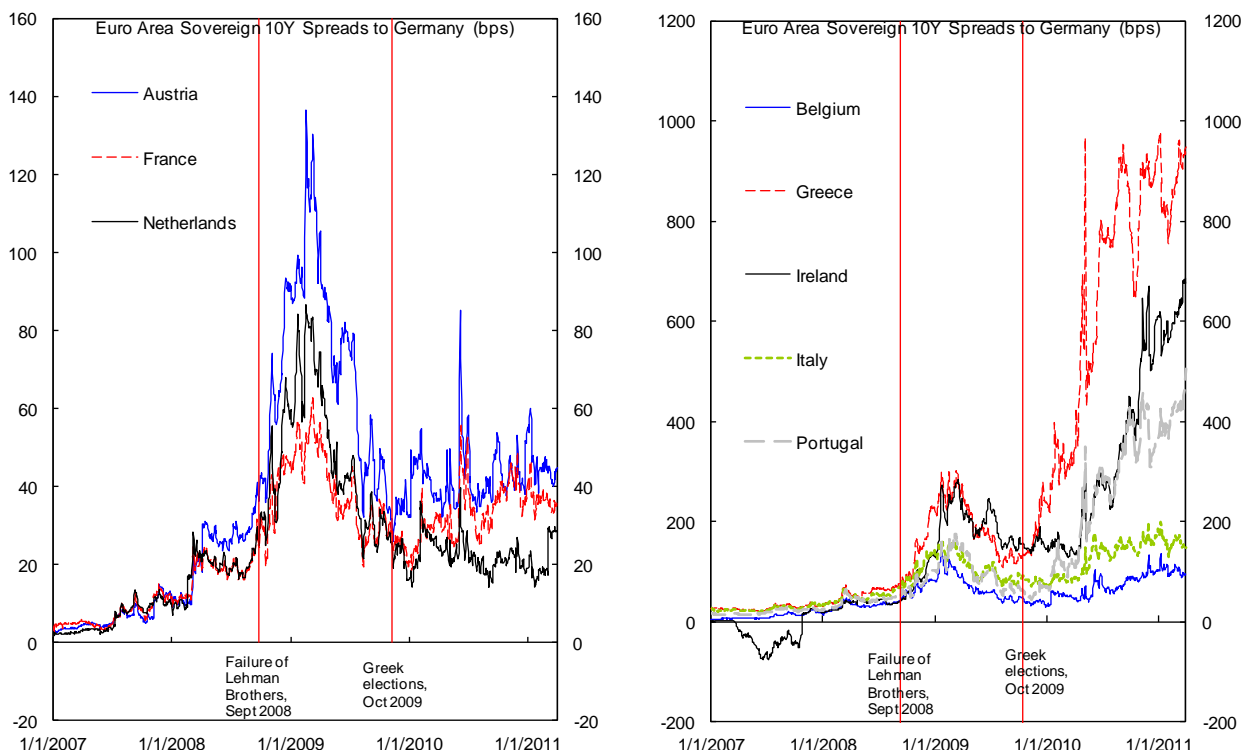
16. **The fragility of markets affected both primary and secondary segments forcing adaptations of operational frameworks.** Issuance mechanisms were modified to support the primary market. Given the vulnerabilities on primary dealer balance sheets, more efforts were made to use mechanisms that would facilitate a larger participation of investors in primary issues.<sup>12</sup> In some cases, this led to an increased use of syndication (e.g., in the U.K. where it accounted for over 13 percent of issuance in 2009-10, and 16 percent in 2010-11). In other cases, the format of auctions was changed to make it more attractive for investors to participate.

---

<sup>10</sup> See Caceres, *et al.* (2010), IMF (2010a), and IMF (2011b) for a fuller discussion of indicators of sovereign risk. Also, at the recent IMF High-Level Roundtable on Financial Crisis and Sovereign Risk—Implications for Financial Stability (March, 2011), the Managing Director noted that a wider definition of sovereign risk—one that complements core fiscal and macroeconomic variables with elements reflecting broader balance sheet developments, debt portfolio structure, investor base, cross-border linkages, and financial assets of a country—is needed.

<sup>11</sup> Overall, the pool of AAA-rated fixed income securities decreased significantly as a consequence of the crisis, which had a corresponding impact on the relative demand for these instruments.

<sup>12</sup> This minimizes the time that primary dealers need to carry inventory on their balance sheets.

**Figure 4. Differential Cost Conditions: Euro Area Issuers**

Source: Bloomberg.

17. **Although transparency and predictability remained at the core, debt managers recognized the benefits of increased flexibility.** Greater flexibility was introduced in the size and choice of debt instruments to be issued through auctions, and by adapting auction programs to changing market conditions. For example, Italy widened the band between the minimum and maximum size of an auction, while Hungary cut the time between announcement of the precise bond to be issued and the issue date (although the calendar remains pre-announced on an annual basis).

18. **Primary dealer frameworks were also adapted to these more challenging market circumstances.** Vulnerability in the banking sector impaired dealers' ability to take large positions, leading to a significant decline in secondary market liquidity. Responding to this, market making obligations were relaxed or adapted during the crisis by many countries. In some instances, these changes have become permanent (e.g., Belgium).<sup>13</sup>

19. **Debt managers engaged in a number of operations to enhance market liquidity.** These included liability management operations, such as debt exchanges and purchases or sales of "off-the-runs" (depending on market circumstances). Often these operations were initiated at the request of dealers (e.g., Italy). Other market-support mechanisms, such as repo facilities

<sup>13</sup> Belgium has permanently moved to a relative performance measure to assess whether primary dealers are meeting their quotation obligations. This measure will automatically adjust to reflect market conditions.

offered by debt management offices, were also expanded (e.g., Belgium). Despite these efforts, liquidity in secondary markets, particularly of the non-benchmark issuers, remains relatively poor.

20. **Investor relations activities were refocused on restoring market confidence.** Debt managers have put increasing emphasis on ensuring that investors (and other stakeholders) are kept informed.<sup>14</sup> Investor relations activities have been stepped up with an increase in non-deal road-shows and other activities that allow investors direct access to debt managers and other policy officials. These activities have also contributed to efforts to attract new investors, particularly from Asia and the Middle East.

21. **The actions of other policy makers, particularly central banks, also helped improve market conditions (Figure 5).** Coordinated and sustained monetary easing has helped keep interest rates low in the benchmark currencies. In some cases, quantitative easing (QE) programs, while driven by monetary policy considerations, contributed to improving market liquidity.<sup>15</sup> These programs have required enhanced coordination across debt managers and central banks (e.g., U.K., U.S.).<sup>16</sup> In contrast, the European Central Bank's (ECB) Securities Market Program (SMP) has been designed to directly target and mitigate extreme conditions in the secondary debt markets in the euro area, while being neutral from a monetary policy perspective.

22. **Nevertheless, market conditions remain fragile.** Volatility, especially in higher spread countries in the euro area, remains elevated and continues to constrain investor appetite for certain issuers' bonds (see Figure 4). In particular, foreign investors have reduced their exposure to higher spread euro area government issuers, with domestic banks offsetting the consequent reduction in many cases (see IMF, 2011a). Improving market conditions remains a priority for debt managers.

### **Taking on other crisis-related functions**

23. **In parallel with meeting these challenges, debt managers had to cope with other operational demands.** The range of activities assigned to debt managers increased in a number of instances, taking them into other policy areas and requiring new institutional mechanisms to

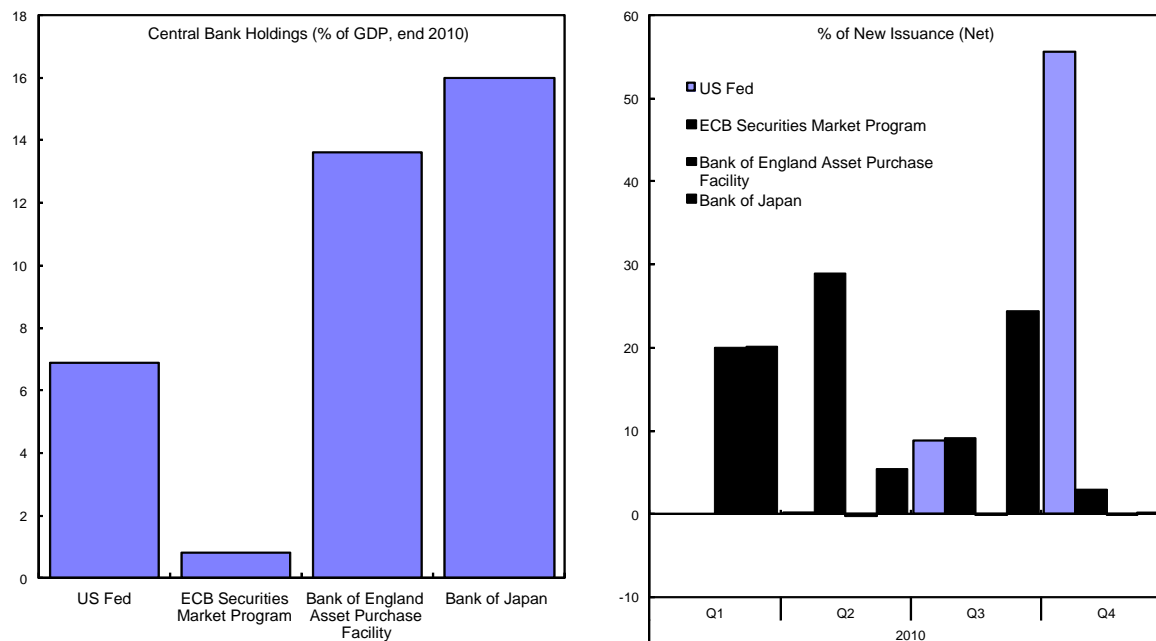
---

<sup>14</sup> This was reflected in the "Stockholm Principles" that emerged from the discussions at the 10<sup>th</sup> Annual IMF consultations on "*Policy and Operational Issues facing Public Debt Management*" co-hosted by the Swedish National Debt Office in Stockholm, June 2010 (Appendix III). It was also a key theme at the 11<sup>th</sup> OECD-WBG-IMF Global Bond Market Forum (see Blommestein, *et al*, 2010).

<sup>15</sup> The Bank of England (BoE) has attributed a 100 basis point decline in gilt yields to the impact of the Asset Purchase Facility (APF)—see Joyce, *et al* (2010). Similarly, the Federal Reserve believes that the anticipation of the QE program contributed to reducing long-term interest rates—see Federal Reserve Bank of New York (2011).

<sup>16</sup> For example, the BoE's APF has been designed to minimize conflict with the UK Debt Management Office's (DMO) gilt issuance program by avoiding purchasing gilts within an agreed time frame around any new issue of those gilts by the DMO. In addition, the BoE and DMO have agreed a securities lending facility through which gilts purchased via the APF are made available for on-lending to the market through the DMO's normal repo market activity.

Figure 5. Central Bank Purchases of Government Securities



Source: Fiscal Monitor (April 2011).

be established. These included taking an active role in managing the government's financial sector acquisitions (e.g., Sweden, U.S.) and bank-related guarantee schemes (e.g., Belgium, U.K.). In a few instances, debt managers were tasked to support market liquidity in other sectors (e.g., Sweden).

### III. IMPLICATIONS OF THE CRISIS FOR DEBT MANAGEMENT STRATEGIES

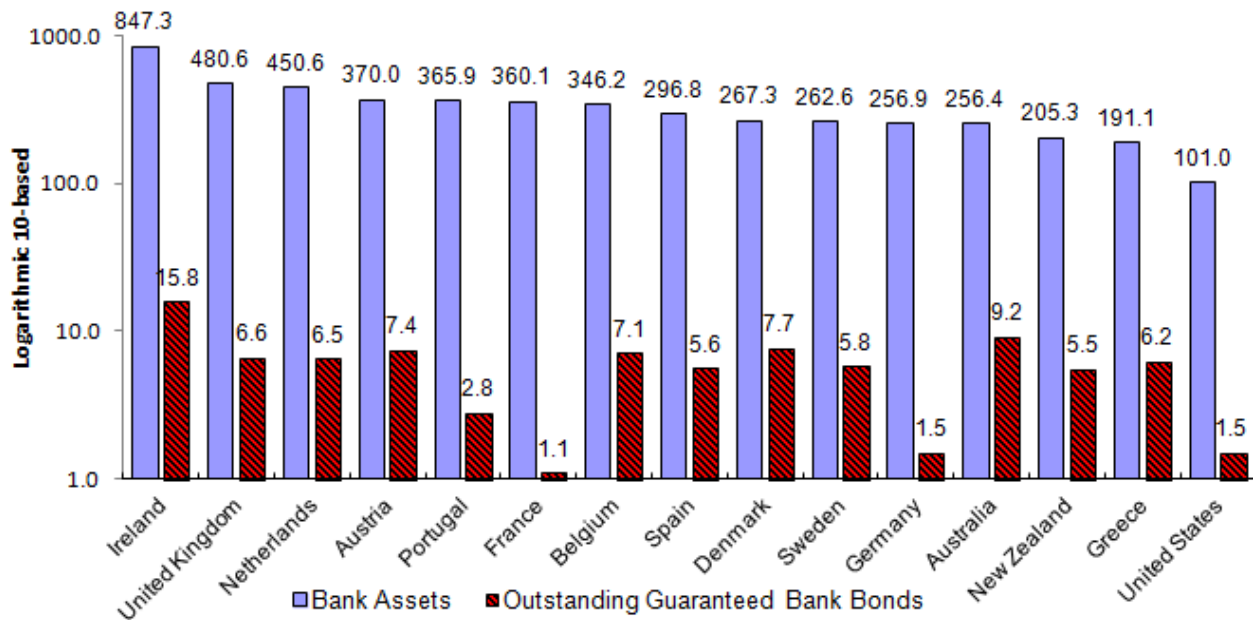
24. **The crisis brought into sharp focus key interconnections between debt management and macroeconomic policy constraints.** The sovereign's vulnerability to financial sector contingent liabilities, particularly for those countries with outsized financial sectors, has also been clearly highlighted (Figure 6 and Appendix II). The rollover needs of countries with high debt levels and a fragile investor base have had a critical bearing on the market's assessment of sovereign risk, leading to a sharp re-pricing of some countries' sovereign debt. In particular, it highlights the importance of actively managing liquidity risk, especially within a monetary union. More generally, the relative importance of these factors point to a number of imperatives for debt management policies and strategies going forward, including the need to (i) have in place a strong risk management framework; (ii) actively use the structure of the debt to mitigate shocks; (iii) maintain access to a liquidity buffer; (iv) adopt an integrated asset-liability (ALM) management framework to monitor and mitigate risk on the sovereign balance sheet; and (v) address vulnerabilities in the investor base.

25. **The extent to which constraints on liquidity support within a monetary union can aggravate sovereign financing difficulties has received relatively little focus.**<sup>17</sup> As solvency

<sup>17</sup> Rating agencies have started to recognize this issue and have proposed changes to their methodology to explicitly account for it (see Standard and Poor's, 2010).

risk and credit spreads on debt increase, vulnerable countries face rising issuance costs. This can, in turn, aggravate rollover concerns and liquidity risk, raise spreads further and exacerbate the risk of a debt crisis (Box 2).<sup>18</sup> However, this dynamic is aggravated in the case of a monetary union given that countries are more policy constrained in their response relative to those outside the union.<sup>19</sup> In such cases, the timely provision of a robust liquidity support mechanism for individual countries becomes important, allowing them room to undertake necessary macroeconomic, structural and financial sector reforms.

Figure 6. Relative Importance of the Banking Sector, End-2010  
(In percent of GDP)



Sources: Economist Intelligence Unit; Dealogic; World Economic Outlook; and Fund staff calculations.

Notes: All figures are as of end December 2010. Values are shown in logarithmic 10-based units.

<sup>18</sup> See Appendix V for a discussion of solvency and liquidity risk and their interaction.

<sup>19</sup> This is because, even in extreme circumstances, vulnerable countries cannot resort to using monetary policy instruments—which may only have a very indirect impact on financing costs at the individual country level—to help accommodate government liquidity needs. Countries in a fixed exchange rate regime face similar constraints.

## Box 2. Sovereign Debt Developments in the Euro Area

Despite the monetary and financial integration of euro area countries over the past decade, the degree of financing stress faced over the crisis diverged sharply across countries (see Figure 3). A number of key factors are likely to have influenced that outcome—the level of debt, the scale of the financing need and structure of the investor base. Each factor is potentially benign in isolation—countries can tolerate higher levels of short-term debt where debt levels are lower or where markets are more robust—but can be disruptive in combination.

In particular, models of debt crises emphasize the role of short maturity debt structures and vulnerable investor bases which can lead to an intensification of liquidity risk and sharp increases in financing costs. This increase in financing cost can then aggravate solvency risk, possibly to the extent of rendering a sovereign insolvent. While these factors have undoubtedly raised investor concerns and contributed to the widening of spreads seen in some countries in the euro area, nevertheless, the varied experiences illustrates that these are not necessary or sufficient conditions for a debt crisis.

A more significant factor is likely to have been the combination of these debt management factors with a broader assessment of the extent of fiscal, structural and financial sector vulnerabilities of these countries. That overall risk assessment would typically be captured in sovereign credit ratings, which heavily influence investors' behavior, including that of domestic institutional investors (IMF, 2011a). A number of countries in the euro area have experienced a series of sharp rating downgrades that aggravated the liquidity risk and financing stress already facing debt managers as a consequence of the overall high financing needs, and which in the case of both Greece and Ireland led eventually to the need for external support.

In response to these developments and recognizing the need to safeguard financial stability in the euro area, on March 25, 2011, the European Council established a permanent crisis mechanism—the European Stability Mechanism (ESM), that will be available for euro area Member States from June 2013 (see European Council, 2011); this replaces the temporary European Financial Stability Facility. Financial assistance under the ESM will be provided on the basis of an agreed adjustment program. This will provide countries a greater degree of liquidity support, which will create sufficient financing space within which to deliver the required macroeconomic, structural and financial sector reforms necessary to strengthen economies and put debt on a sustainable path.

### Enhancing the risk management framework

26. **The crisis highlighted the need for debt managers to revisit their approach to risk management.**<sup>20</sup> Traditional cost-at-risk analysis is typically used to inform the preferred maturity structure of the debt, but it may not be particularly effective at capturing the full range of risk factors.<sup>21</sup> This means that important interactions between macroeconomic vulnerabilities and debt structures can be missed. Moreover, models calibrated on historical outcomes would not have captured an event as extreme as the current crisis.

27. **In particular, efforts are needed to ensure nontraditional risk exposures are also adequately captured.** For example, financing shocks that materialize as a result of implicit financial sector contingent liabilities—a key feature of this crisis—, as well as from large quasi-sovereign and sub-national debt, are generally not accounted for in many cost-at-risk models. Nor are shocks that arise from a sudden withdrawal of investors effectively captured—an issue

<sup>20</sup> This has been reflected in the *Guiding Principles for Managing Sovereign Risk and High Levels of Public Debt* (“Stockholm Principles”) that were published in September 2010 (Appendix III).

<sup>21</sup> In particular, some cost-at-risk models abstract from an analysis of the underlying macroeconomic framework, modeling interest rates (and exchange rates) independently.

brought into sharp focus by the euro area debt crisis (Box 2). For example, nonresidents may be more sensitive to events that undermine the quality of the sovereign balance sheet and led to a downgrade in credit quality. If there is excessive reliance on these investors, their exit from the market will aggravate financing risk even further.

28. **Overall, the importance of augmenting traditional cost-risk analysis with appropriately designed stress tests has been brought into sharp relief.** The importance of conducting regular stress tests of the debt portfolio was recognized in the *Guidelines for Public Debt Management* (IMF-World Bank, 2001). Stress testing provides a flexible and tractable approach for debt managers to consider the impact of a wide variety of risks, including the materialization of contingent liabilities from large banking sectors and quasi-sovereign and sub-national debt (Box 3). The outcomes can then be discussed with other policy makers (e.g., financial sector regulators) to help inform, where relevant, the appropriate set of risk mitigation options. However, as a generally accepted approach to determine and assess the impact of extreme events is lacking, there is considerable variation in country practices.<sup>22</sup>

29. **Ideally, the stress test performed by key stakeholders should, at a minimum, converge to a joint stress test of the sovereign balance sheet and financial sector.** Currently, stress tests are carried out as standalone exercises by different stakeholders (e.g., debt managers, bank supervisors, sovereign wealth funds, etc.). However, subjecting these different elements to a common shock (even if in a stylized form) would allow a more holistic assessment of vulnerabilities.

### **Structuring the debt portfolio to mitigate shocks**

30. **The experience of the crisis also highlights some imperatives for debt portfolio structures.** These reflect the currently high debt levels and continuing high financing needs, which intensify the scale and importance of any risk exposure, coupled with the fuller information on the nature of risk revealed by the crisis. There is a broad understanding of the effectiveness of portfolio structures in providing insurance against a range of shocks (Box 4 and Appendix VI). This is an area where many emerging markets have put considerable emphasis since the debt crises of the 1990s, in particular placing a significant premium on mitigating rollover risk and external vulnerabilities. This has contributed to their resilience in this crisis.

---

<sup>22</sup> Much of the subsequent work has focused on developing stochastic cost-at-risk models rather than on defining and considering the impact of specific extreme scenarios (OECD, 2005). However, there is anecdotal evidence that some debt managers are beginning to place a greater focus on specific stress scenarios, including extreme financing shocks.



### Box 3. Developing a Stress-Testing Framework for Public Debt Portfolios

The importance of stress-testing the public debt portfolio was first highlighted in the Fund-Bank *Guidelines for Public Debt Management* (2001). Debt managers re-iterated this in the “Stockholm Principles” (Appendix III). The key purpose of stress-testing is to assess the impact of a shock or extreme event on key cost and risk debt indicators—for example, indicators of liquidity risk, such as the timing and scale of debt servicing cash flows.<sup>1</sup>

The general approach adopted by debt managers has focused on stress testing the debt portfolio for some standardized shocks to key variables, often with limited feedback to other variables. A typical cost-at-risk model will capture the impact of these standardized shocks, which could be generated either stochastically or deterministically. For example, a stress test could be as simple as considering the impact of a two standard deviation parallel shift in the yield curve on interest costs, while holding all other variables constant. However, a more complete form of that stress test would also factor in the feedback from higher interest rates on GDP and the budget position, or consider the impact on the nature of investor demand (depending on the assumed source of the shock to interest rates). In practice, that would require a more complete model of the economy potentially requiring input from other officials (e.g., the economic research department of the central bank).

Determining the appropriate calibration of an extreme event can be challenging. The intention of testing a more extreme scenario, such as an international financial crisis, is to complement these statistically generated indicators by considering specific scenarios that have a low probability of occurrence but have a large impact.<sup>2</sup> Historical analysis can help, particularly if the country has experienced such an extreme scenario and the impact on key variables can be observed. Still, the current crisis showed that extreme events can take place that are larger in scale than any past experience.

Fund staff is currently working on developing a set of principles that addresses some key issues in the calibration of stress tests and their use. This will be discussed at the forthcoming *11th Annual IMF Consultations on Public Debt Management Policy and Operational Issues* to be held in collaboration with the Government of Korea, in Seoul in June 2011. This work will also complement ongoing work by Fund staff to enhance the stress-testing framework applied under the Fund-Bank Debt Sustainability Framework (IMF, 2002).

<sup>1</sup>Note that terminology is not common across users. For example, the Swedish National Debt Office refers to this as “consequence analysis” (see Swedish National Debt Office, 2004); others might refer to this simply as “scenario analysis.”

<sup>2</sup>This would allow the assessment of specific scenarios that are of particular interest, such as an increase in interest rates associated with a tightening of global liquidity conditions, or increased market uncertainty as a consequence of weaknesses in the financial sector.

31. **The crisis clearly illustrated the benefits of a relatively low rollover profile.** Some countries that were hit by the materialization of contingent liabilities from the financial sector were able to absorb that shock, in part due to their relatively manageable rollover needs. For example, in fiscal year 2008, reflecting its unusually long average term to maturity (ATM),<sup>23</sup> the U.K. only needed to refinance GBP 17 billion of bonds (about 1.3 percent of GDP). Maintaining a low rollover profile has further benefits: it (i) reduces the risk that an investor strike will drive up yields; (ii) provides resilience where the exchange rate regime constrains policy choices; (iii) reduces the cost of servicing the debt as a consequence of any deterioration in creditworthiness; and (iv) makes it easier to absorb the financing impact of reduced tax receipts and an accommodative fiscal policy.

<sup>23</sup> At around 14 years, the ATM of the U.K. debt portfolio is about twice as long as the European average and close to three times as long as the U.S. portfolio.

#### **Box 4. Mitigating Risk: Building Resilience through the Debt Structure**

Countries are exposed to a wide range of shocks—demand, supply, terms of trade, balance of payments, etc. The structure of the debt portfolio can help mitigate or aggravate the effects of these shocks on the fiscal position, and consequently the financing need. For example, variable-rate debt protects against negative demand shocks (such as a banking or global demand crisis) where monetary policy makers respond with lower interest rates. Fixed-rate debt protects against negative supply shocks that push up interest rates. Inflation-linked bonds provide for debt service that is well correlated with government revenue, and can reduce rollover risk if used to lengthen maturities (see Appendix VI).

Recent events highlight how the structure of debt can also offer protection against increasing sovereign credit/default risk. In cases where increases in interest rates reflect market perceptions of elevated sovereign risk, long-term fixed-rate debt would offer the best protection by minimizing the extent to which the increase in the interest rate is captured in debt service costs. In contrast, depending on the nature of the underlying reference rate, variable rate debt, as well as short-term fixed rate debt, can aggravate this risk as any deterioration in credit quality could translate almost immediately into higher interest rates.

Finally, the debt structure can also shield the budget against liquidity risk, i.e., the risk that a government will be unable to discharge its obligations due to a lack of liquid resources, despite being fundamentally solvent. Again, a relatively longer and smoother maturity profile, which limits the amount of principal payments falling due during any specific period, will mitigate this risk and create financing space to absorb other fiscal needs.

#### **Recalibrating liquidity buffers**

##### **32. The appropriate scale of liquidity buffers could also usefully be recalibrated.**

Liquidity buffers, by providing access to resources to meet redemptions, can play a similar role in reducing rollover risk. For example, some countries were able to rely on previously established macro-stabilization (or other sovereign wealth) funds to offset increased financing needs (e.g., Chile, Ireland, Norway, Russia). Indeed, many debt managers actively pre-fund (or equivalently buyback shorter-dated maturities) as part of their ongoing operations (e.g., Belgium, Netherlands, Portugal). However, some are more constrained by their fiscal frameworks in the extent to which cash buffers can be established (e.g., Finland).<sup>24</sup> If these buffers are very large, they can also have consequences for both government cash management and central bank liquidity management. Consequently, the decision on whether and how large a buffer should be established will need to be coordinated across a range of stakeholders.

**33. Nevertheless, building resilience through these mechanisms will entail costs.** The key policy decision for debt management is to determine the appropriate trade-off between cost and risk in light of an assessment of the scale of the risk exposure.<sup>25</sup> Key factors that should influence this trade-off are the level of debt, degree of fiscal space, and potential flexibility of monetary and exchange rate policy, coupled with an assessment of the scale, and likelihood of materialization, of contingent liabilities, and the durability of market access. The new information regarding the nature of risks that has been revealed through the crisis will allow debt managers and policy makers re-calibrate their assessment of these factors.

<sup>24</sup> See Euroweek 2009 for discussion on this—Finland has no provision for pre-funding.

<sup>25</sup> Appendix IV presents a stylized representation of this trade-off. *The Bank-Fund Medium-Term Debt Management Strategy* (MTDS) Framework provides some general guidance on the key factors that should influence the decision (see IMF-World Bank, 2009).

### **Adopting an integrated ALM framework**

34. **More generally, adopting a more comprehensive and integrated sovereign asset and liability management (ALM) framework could be useful.** A joint analysis of the characteristics of the financial assets and liabilities on the sovereign balance sheet would allow decision makers take into account more fully the interrelationships and correlations among sources of risks in formulating appropriate strategies and policies. This would provide a natural environment for a more comprehensive stress testing exercise. This could allow countries to achieve their desired level of balance sheet risk exposure more efficiently and cost effectively.<sup>26</sup>

### **Addressing vulnerabilities in the investor base**

35. **There may be scope to strengthen the resilience of the investor base through changes in the debt structure.** In particular, some instruments may make a greater contribution to the goal of investor diversification. For example, certain classes of investor may be attracted by issuances in specific foreign currencies or with specific transaction size limits.<sup>27</sup> Traditionally, greater issuance of inflation-linked debt or longer-dated debt will appeal to institutional investors, such as pension and insurance companies, but may not meet banks' needs as investors. Reducing the concentration of investor type would not only reduce exposure to rollover risk but could also enhance market liquidity and, consequently, contribute to the broader policy goal of enhancing financial stability.<sup>28</sup> Increasing the participation of the domestic investor base might provide greater resilience to a sudden stop in market access, although this could increase the risk associated with a greater degree of interconnection between the domestic financial sector and the sovereign. However, targeting a specific investor base composition is generally difficult for debt managers, with care needed to avoid inadvertently creating a captive investor base to the broader detriment of market functioning and financial stability. In particular, targeting the domestic investor base is difficult in a monetary union.<sup>29</sup>

## **IV. CHALLENGES FOR DEBT MANAGEMENT PRACTICES AND THE FUNCTIONING OF DEBT MARKETS**

36. **Going forward, the challenges facing debt managers remain significant.** There are several inter-related priorities: (i) achieving over time more robust debt structures, while meeting immediate financing needs; (ii) restoring market liquidity; (iii) managing the impact of new regulations; and (iv) contributing to the more effective management of sovereign risk. While these issues may be more acute for advanced economies, they remain relevant for emerging market economies, where there remains further scope for debt managers to improve portfolio structures and enhance the robustness of market access (both domestic and external). In addition,

---

<sup>26</sup> For example, some exposures could be mitigated more cost-effectively by adopting a specific asset investment strategy, rather than solely relying on adjusting the debt structure to achieve the equivalent effect.

<sup>27</sup> For example, retail investors need access to instruments with a relatively small minimum transaction size.

<sup>28</sup> For more details, see Das, *et al*, (2010).

<sup>29</sup> In a monetary union, with free capital movement across borders and no foreign currency risk, investors can more readily place funds in other countries. This makes the distinction between domestic and nonresident investors who are part of the union practically seamless.

there are also important lessons for LICs, where the nature and extent of debt management challenges will change rapidly as the scale of non-concessional and market-based borrowing increases to meet infrastructure, and other, investment needs.

### **Ensuring sufficient operational flexibility**

37. **Given continuing financing needs, coupled with elevated sovereign balance sheet and market risks, it will be vital that market-related debt management operations remain flexible.** In particular, debt managers should ensure they have scope to tailor the size of financing operations to market conditions. Where possible, all opportunities to secure a more robust portfolio structure should be exploited. Nevertheless, such flexibility should not imply a reduction in transparency or predictability. This can be achieved, for example, through the use of issuance ranges to preserve the predictability of an operation while allowing scope to adjust the size to revealed market demand. More generally, as set out in the “Stockholm Principles”, debt managers should adopt proactive and timely market communication strategies that ensure any changes to the operational framework are quickly and clearly communicated.

### **Lengthening maturities**

38. **Achieving the desired lengthening of maturities could prove challenging.** Given that overall financing needs will remain elevated into the medium term,<sup>30</sup> and, particularly, until confidence has been restored, market conditions are likely to remain volatile. Debt managers will need to consider the ongoing merits of meeting specific investor needs to maximize the probability of smooth absorption of new issues, relative to the nature of risks that are to be contained. However, debt managers need to be cognizant of the potential impact on investor portfolios and consider whether such a strategy aggravates other dimensions of risk by, for example, increasing financial sector fragility. Moreover, sovereigns are likely to face increased competition from banks, whose demand for long-term financing is set to rise as a result of regulatory efforts to increase capital buffers.

39. **The cost of lengthening maturities may be further aggravated by rising interest rates as monetary conditions eventually tighten.** For most countries, rising nominal interest rates will further constrain the pace at which they can lengthen the maturity of the debt portfolio. Moreover, if inflation expectations become entrenched, there is a risk of significant increases in nominal fixed-rate yields, which will raise the relative costs of extending maturities through nominal debt and make the relative merits of inflation-indexed debt more evident. Under these conditions, countries that have an established and relatively deep market for inflation-linked debt should consider expanding their issuance of these instruments.

40. **For emerging markets, the recent trend of capital inflows represents an opportunity to further lengthen the maturity of domestic currency debt (Box 1).** In the years preceding the crisis, some emerging market debt managers (e.g., Brazil, Mexico) took advantage of the relatively higher risk appetite of international investors to increase issuance of longer-term fixed rate and inflation-linked instruments. This improved the debt profile and enhanced market efficiency. Going forward, notwithstanding the other related policy challenges, debt managers

---

<sup>30</sup> For example, advanced economy gross financing needs are expected to remain at around 25-30 percent of GDP over the next two years.

should, to the extent possible, resume this policy and consolidate further their portfolio of longer-term debt securities.<sup>31</sup>

### Potential benefits of LMOs

41. **There may be some scope for debt managers to achieve a more desirable portfolio structure through liability management operations (LMOs) (Box 5).** As part of the portfolio transition, debt managers can also contemplate a series of LMOs spread over time to help accelerate the process of moving the debt structure in the desired direction. For example, a systematic program of reverse auctions or debt exchanges for near-maturity bonds could be instituted as a longer-term solution to reduce rollover needs.<sup>32</sup> However, to have a more significant impact on the structure of the portfolio, larger operations are likely to be necessary. Depending on country circumstances, these could prove more challenging to implement, particularly where investor sentiment remains fragile.

#### **Box 5. Liability Management Operations as a Risk Management Tool**

Liability management operations (LMOs)—buying back or exchanging outstanding debt—have been regularly used by sovereign debt managers over the last two decades as a normal financing technique, as well as an important risk management tool.

For sovereign debt managers that have focused on building large benchmark issues, particularly if they use a limited set of coupon dates to stimulate either the futures market or the strips market, LMOs are an integral part of the toolkit necessary to manage rollover risk. These debt managers will provide a standing mechanism to repurchase near-maturity bonds on a bilateral basis (e.g., Belgium does this as part of its ongoing cash management operations). Alternatively, debt managers can focus on more significant reverse auction events (e.g., Portugal.).

Debt exchanges can be one of the more useful tools for both achieving a more favorable debt servicing profile or for facilitating a change in investor preferences (e.g., U.K in 2000s.). Some debt managers use debt exchanges as part of their regular ongoing business (e.g., Brazil and Turkey), or to respond to particular market needs. Others use them on a more *ad hoc* basis to achieve particular portfolio objectives. For example, the Philippines exchanged nearly \$3bn of outstanding debt for longer dated issues in September 2010, in what was the largest ever LMO in Asia.

Sources: Euroweek (2010); and EU Working Group on Bonds and Bills Markets (2001).

42. **Derivatives will also continue to play a role in helping debt managers achieve a more favorable risk profile.** For example, the use of standard interest rate swaps can provide some protection against potentially higher interest rates, complementing efforts to reduce interest rate exposure through maturity extension. The overall effectiveness of these tools will depend on country specific circumstances.<sup>33</sup> Ongoing changes in collateral provisions related to the use of

<sup>31</sup> Note that the associated risks of greater capital inflows should not be underestimated. For instance, they could destabilize the debt market given the potential for a sharp reversal, while they also contribute to inflationary pressures and exchange rate appreciation.

<sup>32</sup> Facilities whereby debt managers have the flexibility to respond to a direct enquiry from an investor to exchange bonds with a shorter remaining maturity for longer dated bonds could also be useful.

<sup>33</sup> In particular, appropriate debt management frameworks that adequately address the institutional, legal and accounting implications are required.

these instruments—driven to a large extent by the regulatory reform agenda—may significantly change the market environment for some debt managers and change the cost-benefit trade-off.

### **Managing execution risk**

43. **Investor appetite, including for new instruments, will prove critical to achieving the desired financing targets.** It may be possible to try to increase investor diversification through instrument design. Tailoring products to meet a specific investor’s needs (as with an MTN) may help secure some financing at the margin. However, focusing the core financing program on standard benchmark instruments, which maximizes liquidity, will likely remain the most effective way to generate investor appetite. Nevertheless, within that, there is scope to consider whether it is possible to exploit any “preferred habitats” to secure a more robust investor structure. For example, institutional investors—particularly pension and insurance companies—tend to have a preference for inflation-indexed debt; consequently, there may be scope to increase their participation in the investor base by increasing issuance of this instrument.

44. **Overall, given the scale of the challenge, debt managers will need to tailor the speed of portfolio adjustment to market conditions.** Although the medium-term portfolio objective may be clear, in the short-term, debt managers may need to place greater emphasis on minimizing execution risk. In particular, debt managers from the “benchmark issuers”—which could be considered systemically important sovereign issuers—should take account of how the effectiveness and success of their operations will have repercussions for the wider debt capital markets through their role as a market reference.<sup>34</sup> In that context, positive steps to enhance investor relations programs and improve transparency, including through enhanced data provision, will be critical.<sup>35</sup> These efforts will play a key role in minimizing investor uncertainty and containing costs as investors would be provided the required information to form reasonable expectations and manage their investment decisions. An effective investor communications strategy will also play a vital role in restoring confidence and improving market liquidity.

### **Restoring market liquidity**

45. **Debt managers will need to consider further steps to help mitigate market volatility and restore liquidity.** In this context, there may be an effective role for LMOs. For example, debt exchanges that allow investors to lock in a desired relative price can provide an effective mechanism to help liquidity move from an “off-the-run” bond to a new benchmark bond.<sup>36</sup> Both Brazil and Turkey use this mechanism to good effect by providing an exchange option to primary dealers as part of their regular auction framework. Alternatively, buybacks and debt

---

<sup>34</sup> These issuers have the largest share in global sovereign debt issuance in reserve currencies and whose yields are typically used as a reference rate in the pricing of a wide range of capital market products—for example, France, Germany, Italy, Japan, U.K., and U.S. would be candidates. Given their relative importance in determining broader capital market outcomes, they could be considered systemically important sovereign issuers.

<sup>35</sup> To support this goal, the Task Force on Finance Statistics has recently finalized the Public Sector Debt Statistics Guide (<http://www.tffs.org/PSDStoc.htm>) that provides guidance and a template for reporting comprehensive debt statistics. The recently established Public Sector Debt Statistics Online Centralized Database of the World Bank-IMF (<http://www.worldbank.org/qpsd>) also contributes to efforts to enhance transparency.

<sup>36</sup> This mitigates the risk of a relative price change if investors had to execute two separate trades.

exchanges can be used specifically to address market dislocations, as they were during the crisis in several emerging markets (e.g., Brazil, Korea) to alleviate pockets of illiquidity. Targeted bond sales (i.e., “taps”), which were also used by many during the crisis (e.g., Belgium, Netherlands), can also relieve market liquidity at specific points of the curve.

46. **Debt managers, along with central banks and other financial stability authorities, should work together to identify other effective mechanisms to restore market liquidity.** For example, debt managers and central banks could usefully review the effectiveness of the various buyback programs, QE programs, and the SMP in smoothing market volatility and consider whether there is merit in establishing a more permanent liquidity backstop in markets (effectively a “market maker of last resort”). For example, some debt managers, notably Germany, are active participants in the secondary market, using their balance sheets to effectively provide a market making service to dealers in the market. Some others, notably Brazil, conduct regular buyback auctions to provide a window of opportunity for investors to liquidate their investments. Providing this reassurance of liquidity to investors complements the process of improving the debt portfolio composition by encouraging their market participation. These types of facilities were generally more prevalent in the 1990s and early 2000s (e.g., Poland, U.K.); however, they fell into disuse as markets developed and as debt managers imposed tighter market making obligations on primary dealers. Nevertheless, given market making obligations are typically relaxed in extreme market conditions, there may be some merit to the wider use of such programs.

47. **The challenge will be complicated by any unwinding of QE programs.** This will release bonds back into the market, again raising the prospect of market indigestion, with added volatility potentially spilling over into other asset markets. Consequently, ongoing dialogue between debt managers and central banks will be critical in this phase.

### **Strengthening sovereign balance sheets**

48. **Improving market liquidity will require restoring market confidence and strengthening sovereign balance sheets.** Strengthening sovereign balance sheets will require credible fiscal policies over a sustained period of time and strengthened fiscal institutions to support these policies (*Fiscal Monitor*, November, 2010). The insurance buffers in the debt structure need to be enlarged, especially for those countries with structural risk factors such as large financial sectors or those that have limited means to deal with rollover risk. The authorities also need to focus on making financial institutions safer in order to mitigate and manage the sovereign’s exposure to contingent liabilities on its balance sheet.

49. **Debt managers will experience first-hand whether policies are perceived to be credible.** This will be an important factor in the feedback loop and in identifying the virtuous circle, where enhanced credibility of policies contributes to a reduction in the perception of sovereign risk, reflected in lower financing costs, which reinforces the benefits of credible policies.

### **Monitoring the impact of changes in the regulatory framework**

50. **Regulatory changes will also impact the market environment.** The current initiatives to enhance the regulatory frameworks for the banking sector, including strengthened capital and liquidity buffers, and improvements in the quality of capital and transparency of markets should be highly welcome as a means to reduce the sovereign contingent exposure to the banking sector.<sup>37</sup> However, specific proposals—in particular the liquidity coverage and the leverage ratios—may create problems for some countries (those with low debt in relation to the size of the domestic banking sector) or for some operations (notably repo operations) (Box 6). While demand for government bonds may rise for some countries, these new regulations may have detrimental effects on secondary market liquidity. In particular, an increase in the propensity of banks to buy and hold sovereign debt securities is likely to change the demand and supply dynamics in the secondary market and could reduce market liquidity.<sup>38</sup> These effects are likely to be more aggravated in countries where the supply of debt securities is small relative to the size of the banking sector. Debt managers, along with central banks and other financial stability authorities, should closely monitor the impact of these new regulations on secondary market liquidity and primary market participation.

## **V. DEBT MANAGEMENT AND ENHANCED COLLABORATION**

51. **To be in a position to meet these overall debt management challenges effectively, debt managers will require closer interaction with other policy areas.** In particular, given the extent to which the health of the financial sector is interconnected with the sovereign (Appendix II), debt managers should play a more central role in monitoring, and possibly measuring, the sovereign's exposure to banking sector contingent liabilities and assessing the likelihood of their materialization. Countries with large contingent liabilities, especially outsized banking sectors, will need to monitor such risk closely. Enhanced sovereign risk monitoring will require collaboration and information sharing across key institutions, and may necessitate new cross-institutional arrangements. For instance, in some country circumstances, it might be efficient and worthwhile to consider including debt managers on newly established macro-prudential committees.<sup>39, 40</sup>

---

<sup>37</sup> This exposure could arise as the consequence of both an explicit or an implicit contingent liability.

<sup>38</sup> This will also aggravate the degree of interconnectivity between the financial sector and the sovereign, which could actually add to risk in the banking sector. This point emerged from the discussions at the recent IMF *High-Level Roundtable on Financial Crisis and Sovereign Risk—Implications for Financial Stability* (March, 2011).

<sup>39</sup> For example, following the banking crisis in 2001, Turkey established a tri-partite committee comprising the Under Secretariat of Treasury, the central bank and the banking regulator to monitor at a macro level the potential fiscal and financial stability risks emanating from the banking sector. This committee continues to meet regularly.



### Box 6. New Regulatory Initiatives and Sovereign Debt Markets

*New financial regulations that aim to improve the resilience of the financial sector could have important implications for liquidity, price formation and the use of collateral in sovereign debt markets. These need careful analysis.*

Several new regulations are expected to increase the demand for sovereign debt. Basel III establishes two liquidity standards—a liquidity coverage ratio (LCR) and a net stable financing ratio (NSFR) to be introduced after an observation period. As of end-2009, the Basel Committee on Banking Supervision (BCBS) estimates that the additional financing needed to meet the LCR ratio is about EUR1.7 trillion across large and internationally active banks.<sup>1</sup> For the most part, this financing gap is expected to be closed through increased purchases of sovereign debt by banks. In addition, new regulations on capital and risk weighted assets could also incentivize banks to shift demand towards safer assets that carry a lower risk weight, increasing demand for sovereign debt further.

In parallel, regulations being introduced for the nonbank financial sector may also increase demand—e.g., new regulations on money market funds in the U.S. or on insurance companies in Europe. Initiatives that reduce the reliance on credit rating agencies may also shift demand towards sovereign debt which is easier to evaluate relative to other securities. Regulatory reforms designed to encourage greater use of central counterparties for both repurchase agreements and derivative transactions are anticipated also to increase the demand for government debt for collateral purposes.

This regulation-induced demand for sovereign debt, in particular the LCR, may reduce liquidity in debt markets by requiring banks to hold relatively more government debt securities on their own balance sheets, and consequently reduce the proportion available for sale. This might then reduce trading in the secondary markets, which would also impede price discovery and distort market signals.<sup>2,3</sup> These factors will be aggravated in jurisdictions, such as Australia and Denmark, where the stock of debt is not sufficient to cover the increased demand from banks to meet the LCR. Other countries with a low stock of sovereign debt may face similar challenges if the new standards become part of the Basel core principles and are adopted more widely. Although the Basel process allows for exceptions to the standards and allows for country specific solutions to this problem, the formal rules for exceptions have not yet been formulated.

Other regulations on trading and leverage that disincentivize repo activity may further reduce liquidity in debt markets. Collateralized lending in the form of repos is successful as they are a very safe form of lending, with virtually no credit risk beyond the exposure to the sovereign. The proposal of an outright leverage ratio that includes the repos as part of leverage, despite their safety, could make this lending practice costly in terms of the capital needed. Accordingly, some debt management offices are concerned that, in the absence of a well-functioning repo market, government bond markets will become broker markets where market makers neither trade on their own books nor provide continuous pricing.

<sup>1</sup> Bank for International Settlements (2010).

<sup>2</sup> Lundgren, B., and Hörngren, L. (2010).

<sup>3</sup> Olofsson, T., (2010).

---

<sup>40</sup> The goal of macro-prudential policy is to identify, monitor, and manage systemic risk arising from two externalities: (i) the pro-cyclicality inherent in the financial system; and (ii) the joint failure of institutions because of interlinkages and common exposures. Any comprehensive approach needs to be cognizant of how both sovereign and bank debt—their level and structure—impact financial stability due to the interlinkages of public and financial sector balance sheets; consequently there is a need for debt managers to be engaged.

52. **These efforts could be facilitated by adopting a wider ALM approach to the management of sovereign risk.** That will require a consolidated view of the sovereign balance sheet and its risk exposure, drawing information from a broad range of policy areas, and a coordinated decision on the most appropriate portfolio strategies to be adopted to manage that risk effectively. Nevertheless, the design of an effective framework that can be operationalized is an issue that requires further work, and would likely entail significant institutional challenges.

53. **Establishing an effective dialogue between debt managers and financial sector regulators will also mitigate the risk that regulatory changes have unintended consequences.** Debt managers could usefully contribute to a discussion on proposed regulatory changes at an early stage and help identify any potentially negative impacts on debt markets (e.g., the proposed ban on short-selling of sovereign debt). That would allow a fuller assessment of the likely costs and benefits of such regulatory changes and alternative solutions to be explored where appropriate.

54. **Fund staff will continue to support debt managers' efforts in these areas.** On the one hand, staff can help illuminate more fully the nature and extent of key risks that should be taken into account when designing debt management strategies. Staff can also contribute to the technical work on developing stress-testing methodologies and risk monitoring frameworks.<sup>41</sup> In addition, the Fund can facilitate the development of a consensus on these issues through its regular multilateral interactions with debt managers, contributing to the discussion on the basis of its ongoing bilateral and multilateral surveillance.

## VI. GOING FORWARD: THE KEY ISSUES

55. **This paper has highlighted a number of key issues with respect to vulnerabilities in debt management.** Staff believe that country authorities need to take action along the following lines, and would welcome Directors' views:

### Strengthening risk management

- **Risk management frameworks should be enhanced, and greater attention paid to stress testing.** A more comprehensive approach is needed that takes greater account of (i) the degree of macroeconomic policy flexibility available; (ii) the degree of exposure of the sovereign balance sheet to, and interaction with, the financial sector; (iii) the extent of other contingent liabilities, including those arising from quasi-sovereign and sub-national debt; (iv) investor base fragility; and (v) the risk of cross-border spillovers.
- **Debt structures need to be strengthened and appropriate risk buffers established, notably to limit rollover risk.** LMOs can be used to modify debt structures more actively. A pragmatic approach will be needed to determine the extent of portfolio adjustment that is feasible. Emerging market economies should use the opportunity of increased capital inflows and renewed risk appetite of investors to further lengthen the maturity of their debt structures.

---

<sup>41</sup> For example, see Gray (1999) for the likelihood and cost of financial and corporate sector support.

### Greater collaboration

- **Collaboration should be strengthened across debt managers, fiscal authorities and financial sector regulators.** This will enhance risk monitoring and risk management, including the monitoring of contingent risks in the financial sector, and will better inform fiscal and financial stability assessments.

### Capital market considerations

- **The operational toolkit for debt management should continue to be flexible and comprehensive to deal with a variety of market circumstances.** This involves techniques to mitigate identified market and liquidity risks, coupled with operations to improve secondary market liquidity. In that context, “benchmark issuers” (or systemically important sovereign issuers) need to be particularly mindful of how the effectiveness and success of their operations carry ramifications for the functioning of debt capital markets on a wider scale.
- **Debt managers need to focus on enhancing investor relation programs along the lines suggested by the “Stockholm Principles.”**<sup>42</sup> This will help overcome any limitations in the primary dealer networks and will reduce market volatility. Debt issuance choices should contribute to diversifying the investor base where feasible—both in terms of residency and type.

---

<sup>42</sup> See Appendix III.

**APPENDIX I: SUMMARY OF DEBT MANAGERS' RESPONSES—SELECTED COUNTRIES**

56. The operational response of debt managers to the crisis generally involved three broad approaches: (i) changing the issuance mix; (ii) adaptation of financing modalities; and (iii) stepping up market management operations. However, the specific details varied from country to country. This appendix presents a cross-country sample of specific actions taken.

**Table 3. Debt Management Responses: Selected Countries**

<b>Advanced economies</b>				
	<i>Adjusted instrument mix</i>	<i>Adapted primary issuance technique</i>	<i>Steps to support market functioning</i>	<i>Other noteworthy developments</i>
<b>Belgium</b>	Introduced an EMTN program in 2008; initially increased issuance of short-term instruments (including in FX).	Increased tapping of long-term debt. Increased proportion of syndication and private placements (including through greater issuance of State notes and BTBs). Temporarily doubled number of auctions in first half of 2009.	Adapted primary dealers quoting obligations, initially under the provisions for “exceptional market circumstances”, but then moved to a permanent adoption of a peer performance measurement.	Treasury made responsible for administering State guarantees of banks; regular meeting of a monitoring committee established to assess the risk that the guarantees will be called.
<b>Germany</b>	Increased tapping of long-term debt; increased foreign currency issuance.		Maintains a continuous presence in the secondary market that allows it to mitigate temporary market dislocations on an ongoing basis.	
<b>Italy</b>		In the uniform price auctions the Treasury moved from announcing a fixed size to be issued to an issuance range. The width of this auction range is calibrated according to market conditions.	Off-the run bonds offered as a response to highly volatile market conditions. The timing of reopening of bonds to PDs at non-competitive prices also extended.	
<b>U.K.</b>	Initially increased the proportion of short-term instruments, but has subsequently refinanced these with long-term bonds.	Introduced a post-auction option facility (PAOF); introduced mini-tenders to supplement the core auction program; increased the proportion of issuance through syndication.	Partnered with the Bank of England on implementing the Special Liquidity Scheme; coordinated with the Bank on the bond purchase scheme.	Coordinated with the U.K. Treasury on the implementation and operation of the credit guarantee scheme and asset-backed guarantee scheme for banks.
<b>U.S.</b>	Reintroduced the 3-year tenor ; initially increased the proportion of short-term instruments; from 2009 has increased the proportion of inflation-linked and longer tenors.		Coordinated with the Federal Reserve on the bond buyback program.	Coordinating with the Federal Reserve on the management of the toxic assets acquired from AIG and Bear Stearns.

<b>Emerging markets</b>				
	<i>Adjusted instrument mix</i>	<i>Adapted primary issuance technique</i>	<i>Steps to support market functioning</i>	<i>Other noteworthy developments</i>
<b>Brazil</b>			Engaged in <i>ad hoc</i> debt buybacks and exchanges. Introduced regular buy-back program of longer-term fixed-rate bonds.	
<b>Hungary</b>	Stopped issuing long-dated fixed rate bonds; introduced floating-rate notes; introduced new inflation-linked instrument targeted at retail investor; increased proportion of FX issuance.	More flexibility in the amounts offered and in the auction calendar (bi-weekly bond auctions with dates but without tenors in calendar). Noncompetitive auction facility introduced.	More frequent buy-back auctions, particularly in longer-dated bonds. More frequent reopening/ taps of off-the-run bonds.	Introduction of direct, regular meetings with institutional investors.
<b>Korea</b>	Stopped issuance of inflation-linked bonds; initially limited issuance of long-term bonds.	Single price format of auctions was changed to a multiple price format.	Offered buy-back facility for inflation-linked instruments. Conversion offers also introduced.	
<b>Mexico</b>			Engaged in market management operations through buybacks and debt exchanges.	
<b>Turkey</b>	Initially reduced issuance of nominal fixed rate bonds; introduced innovative revenue-linked bond to broaden the investor base; subsequently introduced a new 10-year fixed rate bond (2009).	Revenue linked bond sold through private placements.	Increased scale of debt exchange program, i.e. bonds made available to primary dealers for switching at time of new issues.	

Source: National authorities, Euroweek (2009).

## APPENDIX II: SOVEREIGN AND BANKING SECTOR RISK—SOME KEY INTERCONNECTIONS

*The interlinkages between sovereign balance sheets and the banking sector have both domestic and cross-border aspects.*

### Domestic interlinkages

57. **Due to the close linkages between the public sector and domestic banks, deteriorating sovereign credit risk can quickly spill over to the financial sector.** There are several channels through which this occurs (Box 7 and *Global Financial Stability Report*, October 2010). On the asset side, a sharp decline in sovereign debt prices generates losses, especially for banks holding large portfolios of government bonds. On the liability side, banks' wholesale financing costs tend to rise in tandem with sovereign spreads.<sup>43</sup> This was a particularly notable feature in peripheral European countries (Figure 7), although idiosyncratic factors are also clearly important. As bank financing costs rise, credit conditions tighten with a negative impact on economic growth and tax revenues. While these real economic effects impact directly the sovereign balance sheet (increasing sovereign spreads), they also increase financial sector risk through a further deterioration in income and asset quality. Consequently, sovereign risk (and spreads) increases further, reflecting the increased probability that the financial sector related contingent liability will materialize.<sup>44</sup>

58. **In extreme situations, this intertwining can severely impair the sovereign balance sheet through these negative feedback channels.** The experience of both Iceland (2008) and Ireland (2010) provides a stark illustration of the significance of this interconnection and underscores the role of outsized banking systems in creating negative spirals, requiring drastic solutions such as the take-over of banks and repudiation of bank debt (Iceland 2008), sharp fiscal reform (Ireland 2010), and external support (Fund programs, and EU and country support) to break the cycle.

- **Iceland** experienced an extraordinary foreign borrowing funded boom during 2003-2007. This rapid expansion, however, left a legacy of large macroeconomic imbalances and overstretched private sector balance sheets. Financial sector assets expanded annually at about 100 percent of GDP to over 1,000 percent of GDP at end-2007, with about half consisting of foreign assets funded through external debt. The resolution of the ensuing banking crisis and the sharp depreciation of the krona resulted in a huge burden on the public sector, despite large scale repudiation of liabilities by the banking sector. The gross fiscal cost of honoring deposit insurance obligations and recapitalizing commercial banks amounted to about 70 percent of GDP, although the net cost will eventually be somewhat lower as assets are gradually recovered from the old banks. This was the main driver behind the increase in gross government debt from 29 percent of GDP at end-2007 to an estimated 100 percent of GDP by end-2010.

---

<sup>43</sup> This reflects the established perception that domestic institutions cannot be less risky than the sovereign.

<sup>44</sup> Note the contingent liability could be both implicit and explicit.

### Box 7. Feedback Channels between Sovereign and Banking Sector Risk

Sovereign risk can impact the banking system through both the asset and liability sides of banks' balance sheets:

- The banking system tends to hold significant amounts of sovereign debt directly in their asset portfolios—as a liquid or low risk asset, as collateral for transactions with counterparty risk (e.g. repos) or through derivatives (e.g., to manage the maturity structure of their portfolio).
  - The value of the sovereign debt impacts the market value and sometimes book value of the banking system (e.g. in the trading book or in case the bank needs to provision against the debt). A lower value of the debt reduces its collateral value, and valuation changes can alter the derivative positions. The liquidity of the sovereign debt affects that bank as the debt is often used to manage liquidity.
  - Bank demand for sovereign debt affects the price of the debt. Domestic banks are often the “demander” of last resort. They often de facto transform short-term deposits into longer term government debt holdings, and maintaining public confidence in banks is therefore essential also for the government's financing.
- The banking system relies on governments for deposit guarantees (sometimes as explicit or implicit backstopper of deposit guarantee funds, sometimes outright) and for loan guarantees (as part of a capital support function).

The banking system in turn affects governments through the tax base and the sovereign balance sheet:

- The banking system affects the tax base, both directly (through taxes on banking sector wage income, value added and profits) and indirectly (through their role in supporting the economy through the credit channel in particular).
- The banking system affects the sovereign balance sheet as they may require costly capital support and guarantees could be called.

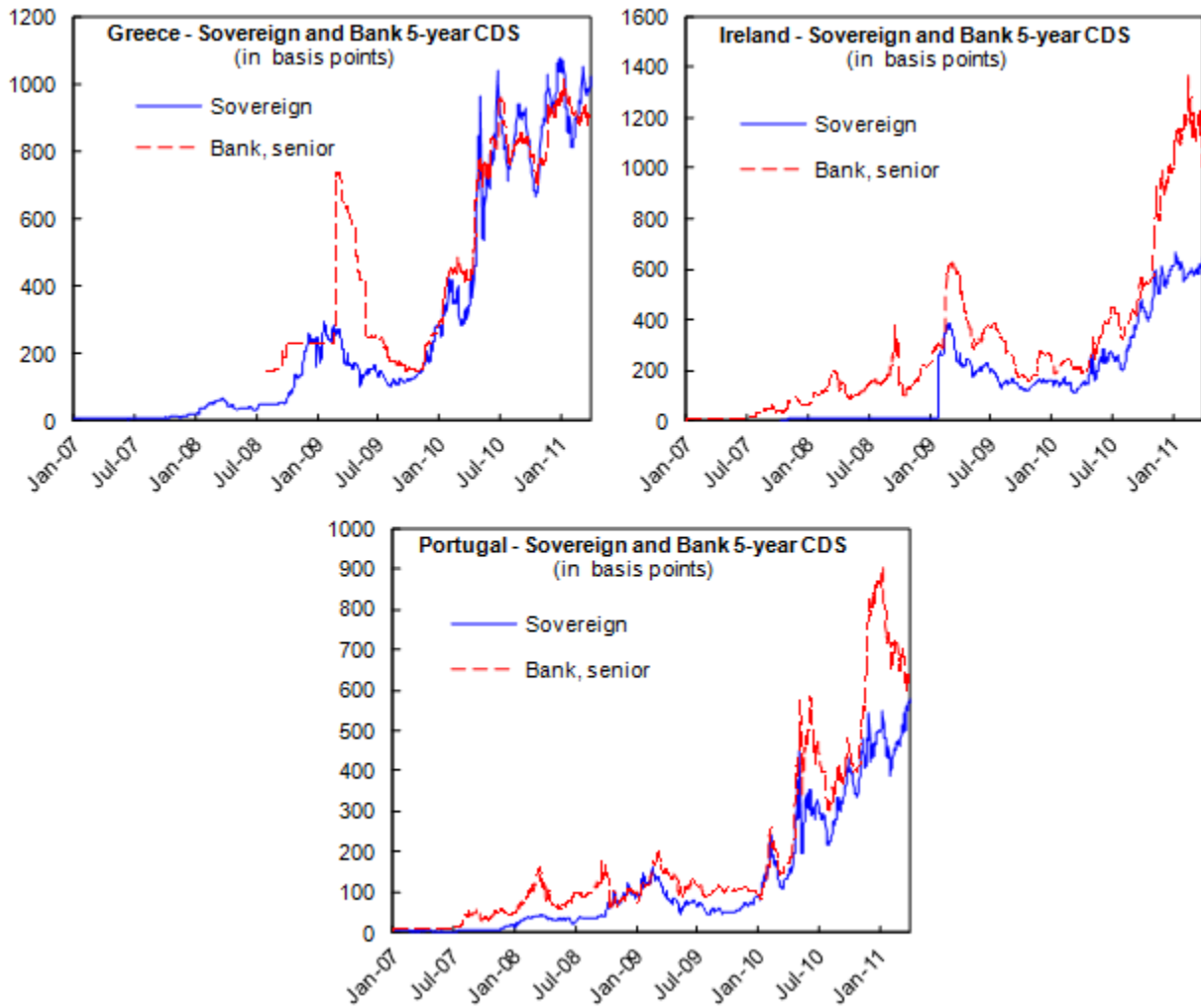
- Before the global crisis struck, **Ireland** had a fiscal surplus, relatively low public debt, and high growth. Ireland's success depended heavily on the financial and construction sectors, fuelled by rapid credit growth, with property prices tripling between 2000 and 2008. At the height of the boom, the assets of domestic banks amounted to five times Ireland's GDP. From 2008, this process worked in reverse and economic activity contracted precipitously, with real GDP falling by nearly 11 percent over the period 2008-2009. By the end of 2010, the Irish authorities had injected capital into the banking sector equivalent to 28 percent of GDP, which was reflected in increasing in public debt from 25 percent before the crisis to 99 percent of GDP at end-2010. They also guaranteed debt issued by banks to the tune of 16 percent of GDP by end-2010.

#### Cross-border aspects

59. **Financial sector linkages across borders also transmit one country's sovereign credit and banking sector concerns to other regional economies.** The financial turmoil that has engulfed parts of the euro area since April-May 2010 has provided a stark reminder of these close linkages and the potential for cross-border spillovers (*Global Financial Stability Report*, October 2010, and Figure 8). Markets began to differentiate more among sovereigns within the euro area and consequently among banks with the greatest exposures to those economies. For example, French banks carry significant exposure to peripheral European governments (Figure 8) which may explain some of the general increase in CDS spreads of French banks seen since January 2010. The consequent increase in the financing costs of those banks in turn affected their

cost of credit provision, while also increasing sovereign risk in the banks' home countries banks' increased vulnerability.

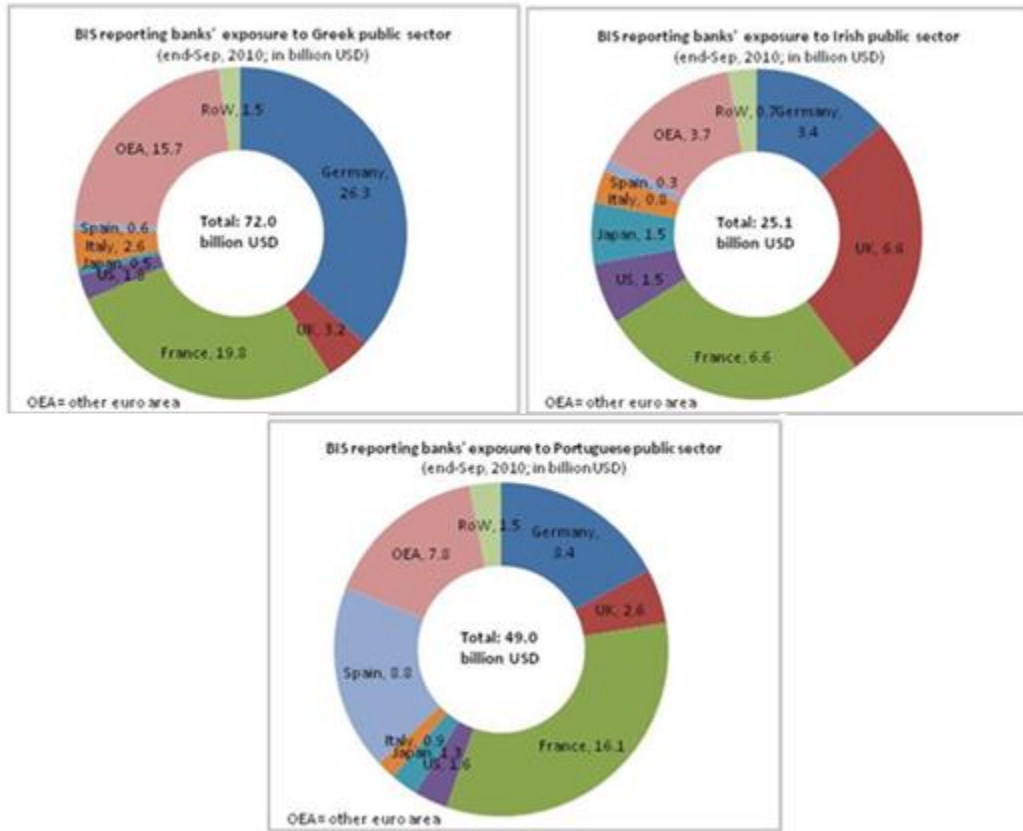
Figure 7. The Relation between Sovereign and Bank CDS Spreads



Source: Bloomberg.



Figure 8. Foreign Banks' Exposure to Selected European Sovereigns, 2010 Q3



Source: BIS Consolidated Banking Statistics.

## APPENDIX III: GUIDING PRINCIPLES FOR MANAGING SOVEREIGN RISK AND HIGH LEVELS OF PUBLIC DEBT

(“Stockholm Principles”)<sup>45</sup>

### Framework and operations

**1. The scope of debt management** should be defined in a way that also accounts for any relevant interactions between the nature of financial assets, explicit and implicit contingent liabilities, and the structure of the debt portfolio.

The crisis-related interventions have involved a wide range of debt management operations. In some instances, changes have taken place in the structure and the composition of the debt portfolio. It is important that the debt management strategy takes into account the relevant variables and the policy and financial risk implications.

**2. Strategic and operational debt management decisions** should be supported by relevant information sharing at the domestic, regional, and global levels.

The crisis has raised the risk of financial stability spillovers, including systemic cross-border contagion. Therefore, the need for information sharing on materially important aspects, at both the regional and global levels, takes on greater significance. This aspect becomes especially important when the investor base comprises both domestic and foreign participants. Information sharing should take place among relevant public authorities, and where appropriate, also with the private sector.

**3. Flexibility in market operations** should be maintained to minimize execution risk, improve price discovery, relieve market dislocations, and support secondary market liquidity.

In light of the challenges of issuing and managing increased amounts of debt, debt managers should retain sufficient flexibility to adapt the debt issuance format and/or adopt different issuance techniques. They should also be prepared to make timely use of liability management operations to alleviate secondary market impairments. In such cases, the following Principle 5 should also be taken into consideration.

### Communication

**4. Proactive and timely market communication strategies** should be maintained to support a transparent and predictable operational framework for debt management.

Effective communication helps minimize uncertainty and contain costs by providing investors with the necessary information required to form expectations and manage investment decisions. This also facilitates the smooth undertaking of debt management operations, including primary market issuance.

---

<sup>45</sup> These principles emerged from discussions at the *10th Annual IMF consultations on “Policy and Operational Issues facing Public Debt Management,”* co-hosted by the Swedish National Debt Office in Stockholm, June 2010.

**5. Modifications to the operational toolkits** of debt managers should be properly explained.

As changes are made, debt managers should communicate them to the public clearly and in a timely fashion. Where appropriate, prior consultation with investors and other stakeholders should be undertaken to garner feedback and support for the planned changes, such as the introduction of a new debt instrument or an adjustment to an existing debt issuance mechanism.

**6. Communication among debt managers and monetary, fiscal, and financial regulatory authorities** should be promoted, given greater inter-linkages across objectives, yet with each agency maintaining independence and accountability for its respective role.

The higher levels of debt and increased uncertainties regarding fiscal, monetary, and regulatory policies imply the need for close communication among different agencies on all relevant aspects. However, it is important that these agencies retain their functional and operational independence in areas for which they are accountable.

**7. A close and continuing dialogue with the investor base should be promoted** to keep abreast of its characteristics and preferences.

Understanding the nature of the investor base and shifts in the investment philosophy enables debt managers to identify potential vulnerabilities and new opportunities, and to offer instruments that better match investors' needs. This can have important positive effects in limiting funding disruptions, mitigating adverse funding conditions, and reassuring that investors are being treated equitably.

## **Risk management**

**8. Debt portfolio risks** should be kept at prudent levels, while funding costs are minimized over the medium to long term.

Given the increased exposure to macroeconomic and financial risks, a stronger emphasis should be placed on risk mitigation than that implied by traditional policy objectives of public debt management. The debt manager should have a framework that helps identify, assess, and monitor the risks associated with debt management operations.

**9. When determining medium-term debt management strategies, the range of risk factors considered should be consistent with the broadest definition of the debt portfolio** and the associated range of potential scenarios.

The main sources of the risks to which the sovereign balance sheet is exposed should be identified and a clear framework on how these risks are managed should be established. A careful analysis of the debt portfolio should be carried out on the basis of relevant economic and financial stress scenarios, including the costs and risks of alternative strategies.

**10. Prudent risk management strategies covering the full range of risks facing sovereign debt managers** should be adopted and communicated to investors.

In many cases, the high level of debt is constraining governments' ability to absorb additional risk on their balance sheets. It is important to maintain debt portfolios that reduce the sovereign exposure to a variety of financial risks, including refinancing risk and exposure to contingent liabilities. Debt managers should clearly set out the strategies being adopted to limit these risks and communicate them to the public.

#### APPENDIX IV: DEBT STRUCTURES AND CRISES OF THE 1990'S—ORIGINAL SIN AND ITS ABSOLUTION

60. **Emerging market policymakers have made great strides in resolving the “original sin” dilemma<sup>46</sup> in the period since the Tequila crisis of 1994/95.** Policymakers have tackled fiscal dominance and inflation. This has helped reduce the related risk premia and facilitated a lengthening of the maturity of domestic currency debt. This has also allowed them to reduce the reliance on variable rate and foreign currency debt (Figure 9). In several instances, they were able to make effective use of inflation indexed bonds to contribute to their strategy to lengthen domestic maturities. Such bonds are especially suitable when policymakers are determined to bring down inflation as it reduces the cost of such policies, and were successfully used in Chile, Brazil, Peru among others (Holland and Mulder, 2005).

61. **The relatively limited impact on emerging markets during the global financial crisis is testimony to these improvements in macro policies, and the strengthening of debt structures they allowed.** Indeed the “original sin” problems of the 1990s could not be further from the current situation where many emerging markets are coping with excess demand for their currency and debt instruments. These capital inflows allow a still further strengthening of debt structures, which for many countries still fall short of the relative resilience of advanced countries.

Figure 9. Evolution of Debt Composition, 1999-2009

*Over time, domestic maturities lengthened .... while variable rate debt decreased ....*



Source: BIS, staff estimates.

Note: Regional aggregations reflect those emerging markets that report data to the BIS on their domestic debt portfolio composition, in particular, Asia comprises China, Hong Kong, India, Indonesia, Malaysia, Philippines, Singapore, Korea and Thailand; Europe comprises Czech Republic, Hungary, Poland, Russia and Turkey; and Latin America comprises Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Total EMs also includes South Africa.

<sup>46</sup> The term “original sin” was coined by Eichengreen and Hausmann (1999) following the Tequila crisis of 1994/95 to describe the situation where countries had to choose between two evils—issuing in foreign currency but at long-term maturities (often internationally), or in domestic currency but at very short-term maturities. It is generally associated with a situation where issuing domestically in medium to long-maturities is not available due to a very high inflation risk premium, reflecting past experience with high and unstable inflation rates.

## APPENDIX V: SOVEREIGN RISK AND ITS COMPONENTS—DEFINING SOLVENCY AND LIQUIDITY/ROLLOVER RISK

**Sovereign risk.** Sovereign risk can be defined as the risk of losses by an investor due to the failure of the issuer to service the nominal stream of payments agreed in a credit contract.

**Fiscal risk.** Fiscal risk is defined as the deviation between the projected and actual results of a country's fiscal stance and can be regarded as a contributing factor to sovereign risk.

**Determinants of sovereign risk.** Sovereign risk can logically be split into two components: a solvency and a liquidity component, i.e., the inability to discharge your contractual payment obligations may result either from a *solvency* or a *liquidity* problem.

**Solvency risk.**<sup>47</sup> Solvency risk can be defined as the risk that a country is not able to meet the present value of its external obligations evaluated at interest rates that are commensurate to the debt stock and primary balance. Solvency is usually considered beyond the control of the debt management office and determined by the primary balances and the willingness to pay.

**Liquidity risk.** Liquidity risk can be defined as the risk that the government is unable to discharge its obligations due to a lack of liquid means, despite being solvent as evaluated at interest rates that are commensurate with the debt stock and primary balance. Although this risk is under the control of the debt manager, it is also affected by outside factors such as contagion and global risk aversion. One specific aspect of liquidity risk is rollover risk. This refers solely to the risk that the government is unable to refinance debt falling due because new borrowing rates are exceptionally high or investors are unwilling to purchase the debt.

**Solvency and liquidity are closely linked.**<sup>48</sup> Illiquidity can lead to insolvency. When an entity is solvent but illiquid it means that its future income streams are highly positive. In order to ensure liquidity and survival till the income and cash flow streams turn positive an entity can sell shares in the future income stream, or borrow against the future income stream. Insolvency can occur if the future income stream is discounted to such an extent that it does not yield sufficient liquid assets to overcome the liquidity constraint. Insolvency can also lead to illiquidity. Even though the entity is liquid as of the current date, investors/ depositors may anticipate it to be illiquid at a future date. Such a case is likely to result in runs that exhaust the liquidity position of the entity. Note that solvency and liquidity risk are functions of interest and exchange rates.

---

<sup>47</sup> See, IMF (2002) (Box 1, page 5) for a definition of solvency that can be used to derive a consistent definition for liquidity.

<sup>48</sup> See, e.g., IMF (2000).

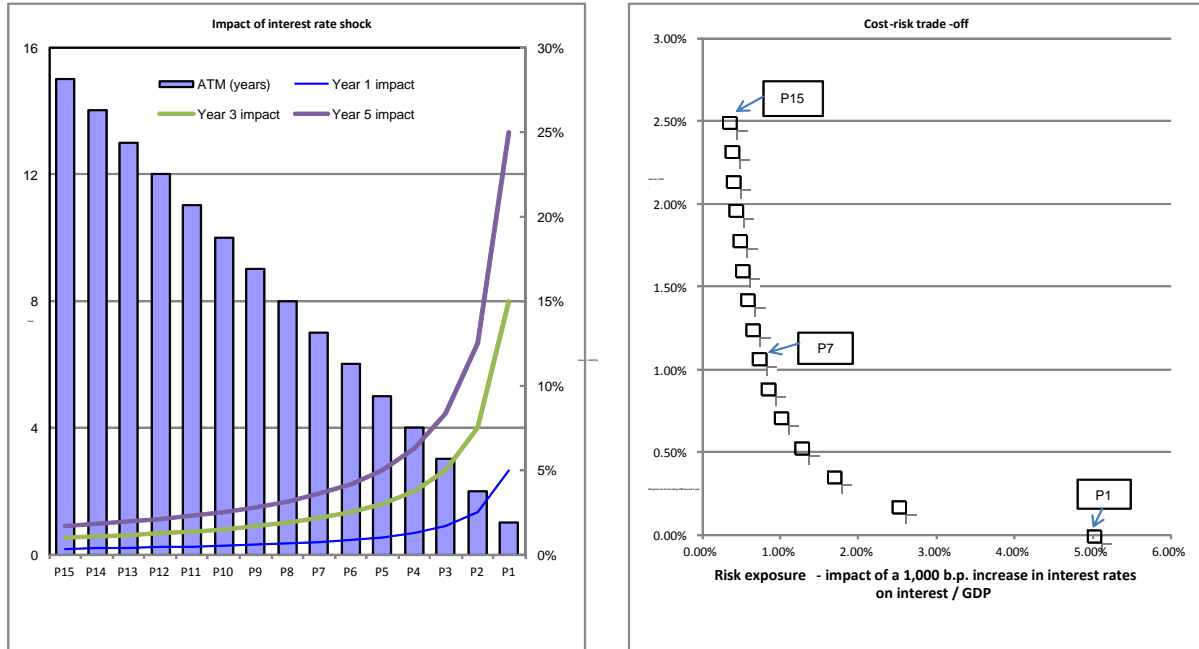
## APPENDIX VI: CHOOSING THE OPTIMAL MATURITY STRUCTURE: THE COST–RISK TRADEOFF

*To illustrate the trade-off between the potential benefits of lengthening the maturity of the debt portfolio and its potential cost, consider the following stylized set-up.*

- A debt manager can choose between 15 different portfolios, each with a different average time to maturity (ATM). Each portfolio has a smooth and even maturity profile on an annual basis; consequently, the maximum maturity of each portfolio is simply twice the ATM. For example, a portfolio (P1) with an ATM of one year has two equal principal repayments—one in the first year, and one in the second. Consequently, the maximum maturity of the portfolio is two-years and 50 percent of the debt falls due within the next 12-months (i.e., short-term debt is 50 percent of the portfolio). Similarly, a portfolio (P15) with an ATM of 15 years has 30 principal payments, each of 3.3 percent of the portfolio (i.e. short-term debt is 3.3 percent of the portfolio and the maximum maturity is 30-years).
- Let us additionally assume that the level of debt is high, i.e. the debt / GDP ratio is 100 percent. The results can then simply be scaled by the degree to which debt is below or above 100 percent of GDP.
- Consider the exposure of each of these portfolios to a large and sustained shock to interest rates, e.g., as a consequence of a contingent liability or other fiscal shock that leads to a sharp deterioration in the country's creditworthiness. For illustrative purposes, let us assume the credit risk premium increases by 1,000 basis points. If the shock is sustained over one year, then the additional cost of refinancing maturing debt will be equivalent to 5 percent of GDP in the case of P1 and just 0.33 percent in the case of P15. Consequently, the fiscal adjustment required to keep the deficit unchanged will be 15 times greater in the first case relative to the latter.
- Under a scenario where the interest rate shock is sustained over the medium-term, then, assuming that the country runs a balanced budget and the debt manager maintains the same portfolio structure (by rolling maturing debt into a new bond at the maximum maturity of the portfolio), the cumulative impact is simply a multiple of the additional interest cost incurred the first year. For example, in the case of P1, the debt that matures in the first year is rolled into a new 2-year bond. If there is insufficient scope for the required fiscal adjustment to maintain a balanced budget, then the debt stock itself will grow correspondingly as these additional interest payments are financed with new debt.
- This is illustrated in Figure 10. This clearly shows that the relationship between maturity and interest rate sensitivity is nonlinear, and that the relative benefits of extending maturity decline as starting position declines.
- On the cost side, there will be an increase in the underlying cost as maturities extend, which will depend on the shape of the yield curve. These additional costs need to be weighed against the reduction in interest rate sensitivity discussed above. Assuming that the country faces an upward sloping linear yield curve, with the spread between 30-year and 2-year yields at 250 basis points—close to the current bund spread, but significantly less than the

spread between 30-year and 2-year gilts (of 380 basis point) or U.S. Treasuries (of 420 basis points). Figure 10 illustrates the marginal cost of each portfolio relative to P1, with the interest rate sensitivity or riskiness of each portfolio. This is a typical cost-risk tradeoff.

Figure 10. Impact of Extending the Maturity Structure

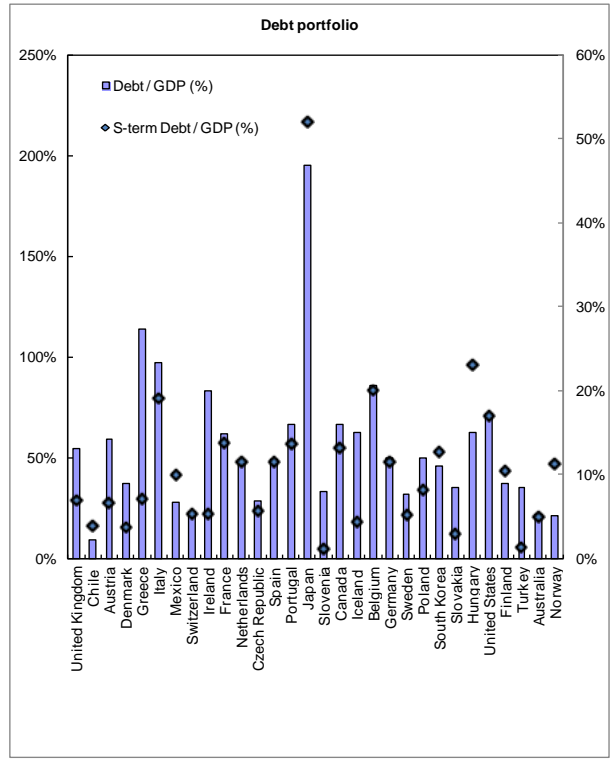
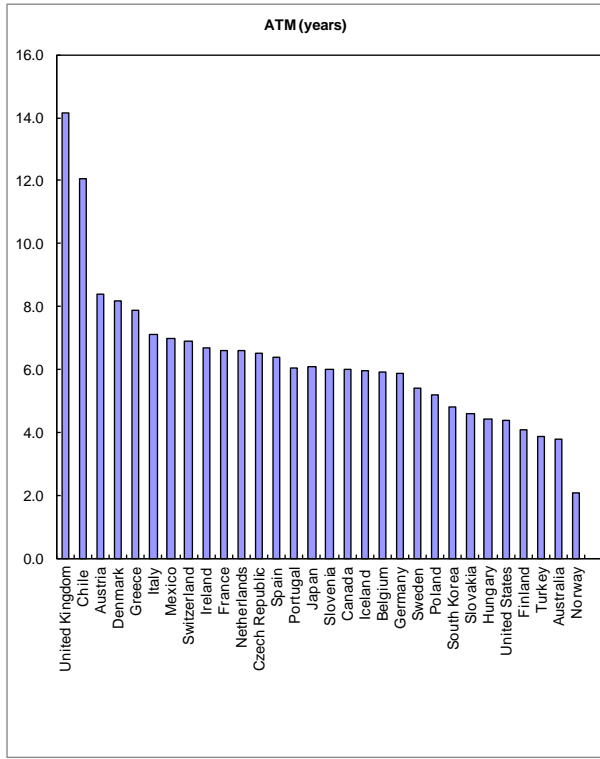


Source: Fund staff estimates.

- Overall, the actual cost-benefit tradeoff will be country specific and depend on (i) the level of debt; (ii) the maturity profile; and (iii) the shape of the yield curve (Figure 11 puts these factors into their current context). Where a country chooses to locate along this trade-off is a key policy decision, which will be influenced by policymakers' assessment of the likelihood of or vulnerability to a significant negative shock to creditworthiness. However, the crisis experience illustrates that such extreme events are possible; consequently, they would constitute a reasonable scenario to consider.



Figure 11. Debt Structures: Current Context



Sources: BIS, OECD, and WEO.

## References

- Allen, M., C. Rosenberg, C. Keller, B. Sester and N. Roubini, 2002, "[A Balance Sheet Approach to Financial Crisis](#)," IMF Working Paper 02/210 (Washington: International Monetary Fund).
- Arezki, R., B. Candelon and A. Sy, 2011, "[Sovereign Rating News and Financial Markets Spillovers: Evidence from the European Debt Crisis](#)," IMF Working Paper 11/68 (Washington: International Monetary Fund).
- Arslanalp, Serkan, Yin Liao and Marcos Souto, 2011, "You Can't Manage What You Can't Measure: Monitoring Banks' Contingent Liabilities," IMF Working Paper (forthcoming).
- Bank for International Settlements, 2010, "Results of the Comprehensive Quantitative Impact Study," (December) (Basel: Committee on Banking Supervision).
- Blommestein, Hans, Guzzo, Vincenzo, Holland, Allison and Yibin Mu, 2010, "[Debt Markets: Policy Challenges in the Post-Crisis Landscape](#)," *OECD Journal: Financial Market Trends*, Vol. 2010/1.
- Caceres, Carlos, Vincenzo Guzzo and Miguel Segoviano, 2010, "[Sovereign Spreads: Global Risk Aversion, Contagion or Fundamentals?](#)," IMF Working Paper 10/120 (Washington: International Monetary Fund).
- Cole, Harold and Timothy Kehoe, 2000, "Self-Fulfilling Debt Crises," 2000 *Review of Economic Studies*, 67, pp. 91-116.
- Das, Udaibir, Papaioannou, Michael G., Pedras, Guilherme, Ahmed, Faisal and Jay Surti, 2010, "[Managing Public Debt and its Financial Stability Implications](#)," IMF Working Paper 10/280 (Washington: International Monetary Fund).
- De Bolle, Monica, Bjorn Rother, and Ivetta Hakobyan, 2006, "[The Level and Composition of Public Sector Debt in Emerging Market Crises](#)," IMF Working Paper 06/186 (Washington: International Monetary Fund).
- De Broeck, Mark, and Anastasia Guscina, 2011, "[Government Debt Issuance in the Euro Area: The Impact of the Financial Crisis](#)," IMF Working Paper 11/21 (Washington: International Monetary Fund).
- Eichengreen, Barry and Ricardo Hausmann, 1999, "Exchange Rates and Financial Fragility," NBER Working Paper no. 7418 (November).
- European Council, 2011, *Conclusions of the European Council Meeting* (24/25 March 2011), EUCO 10/11.
- EU Working Group on Bonds and Bills Markets, 2001, "[Report on Bond Exchanges and Debt Buybacks: A Survey of Practices by EU Debt Managers](#)," 2001.
- Euroweek, 2009, "Financing Sovereigns: Analysing Financing Needs and Solutions," December 2009.
- Euroweek, 2010, "Financing Sovereigns 2010/2011: Analysing Financing Needs and Solutions," December 2010.
- Federal Reserve Bank of New York, 2011, "Implementing the Federal Reserve's Asset Purchase Program," speech by Brian Sack, Executive Vice President, February 2011.

- Gray, Dale, 1999, “Assessment of Corporate Sector Value and Vulnerability: Links to Exchange Rate Crises and Financial Crises,” World Bank Working Paper.
- Guscina, Anastasia, 2008, “[Impact of Macroeconomic, Political, and Institutional Factors on the Structure of Government Debt in Emerging Market Countries](#),” IMF Working Paper 08/205 (Washington: International Monetary Fund).
- Holland, A., Mulder, C., 2006, “The Role of Inflation-Indexed Debt in Developing Local Currency Markets,” *Financial Dollarization: The Policy Agenda*, edited by A. Armas, A. Ize and E. Levy Yeyati, London: Palgrave.
- International Monetary Fund, 2000, [Debt and Reserve-Related Indicators of External Vulnerability](#), IMF Board Paper, March 23, 2000 (Washington, D.C.).
- \_\_\_\_\_, 2002, [Assessing Sustainability](#), IMF Board Paper, May 28, 2002 (Washington, D.C.).
- \_\_\_\_\_, 2007, [Strengthening Debt Management Practices: Lessons from Country Experiences and Issues Going Forward](#), IMF Board Paper, May 28, 2002 (Washington, D.C.).
- \_\_\_\_\_, 2009, [Crisis-Related Measures in the Financial System and Sovereign Balance Sheet Risks](#), IMF Board Paper, August 8, 2009 (Washington, D.C.).
- \_\_\_\_\_, 2010a, [Global Financial Stability Report, October 2010](#) (Washington, D.C.).
- \_\_\_\_\_, 2010b, [Emerging from the Global Crisis: Macroeconomic Challenges facing Low-income Countries](#), IMF Policy Papers, October 2010 (Washington, D.C.).
- \_\_\_\_\_, 2010c, [Fiscal Monitor, November 2010](#) (Washington, D.C.).
- \_\_\_\_\_, 2011a, [Global Financial Stability Report, April 2011](#) (Washington, D.C.).
- \_\_\_\_\_, 2011b, [Fiscal Monitor, April 2011](#) (Washington, D.C.).
- International Monetary Fund-World Bank, 2001, [Guidelines for Public Debt Management](#) (Washington, D.C.).
- \_\_\_\_\_, 2009, [Developing a Medium-Term Debt Management Strategy \(MTDS\)—Guidance Note for Country Authorities](#), March 2009 (Washington, D.C.).
- Joyce, Michael, Ana Lasaosa, Ibrahim Stevens and Matthew Tong, 2010, “The Financial Market Impact of Quantitative Easing,” Bank of England Working Paper No. 393, July 2010.
- Lundgren, Bo, and Hörngren, Lars, 2010, “Liquidity Regulation Gone Astray,” Swedish National Debt Office, Mimeograph (March).
- OECD, 2005, *Advances in Risk Management of Government Debt*.
- Olofsson, T., 2010, “Leverage Ratio Gone Astray,” Swedish National Debt Office, Mimeograph (March).
- Standard and Poor’s, 2010, “Sovereign Government Rating Methodology and Assumptions,” November 2010.

Swedish National Debt Office, 2004, "Central Government Debt Management: Proposed Guidelines 2005-2007," September 2004.