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Sovereign Risk: A Macro-Financial Perspective

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Abstract

We examine some of the macro-financial dimensions of sovereign risk and propose a conceptual framework that captures risks other than just the default risk. Morphed under a multi-dimensional notion of sovereign risk, we argue that the existing empirical methodologies to measure sovereign risk cover only partial aspects of sovereign risk and fail to capture its macro-financial dimensions. We highlight a menu of tools that could be used to tackle the broader notion of sovereign risk, and suggest that authorities should actively use them to manage the macro-financial dimensions of sovereign risk before those risks feed into the real economy.

JEL Classification: F30, F34, E43

Contents

1. INTRODUCTION

High level of indebtedness in advanced economies is not a new phenomenon. In fact, at the onset of the current Global Financial Crisis (GFC) in 2007, most advanced economies had significantly high debt levels, way in excess of the commonly accepted 60% threshold. Yet, these high debt levels did not trigger fundamental debt sustainability concerns and investor nervousness. Growth projections conveyed a very solid medium-term economic outlook. Most early warning and risk indicators did not predict that the following years would be radically different from a sovereign credit risk angle. What influenced such a benign outlook and why did various actively used models not identify "sovereign risk" until after it got amplified and led to a disruption in global sovereign debt markets? Did the policymakers have the right set of tools to act preventively and fix the system before concerns relating to sovereign credit risk fed into the real economy?

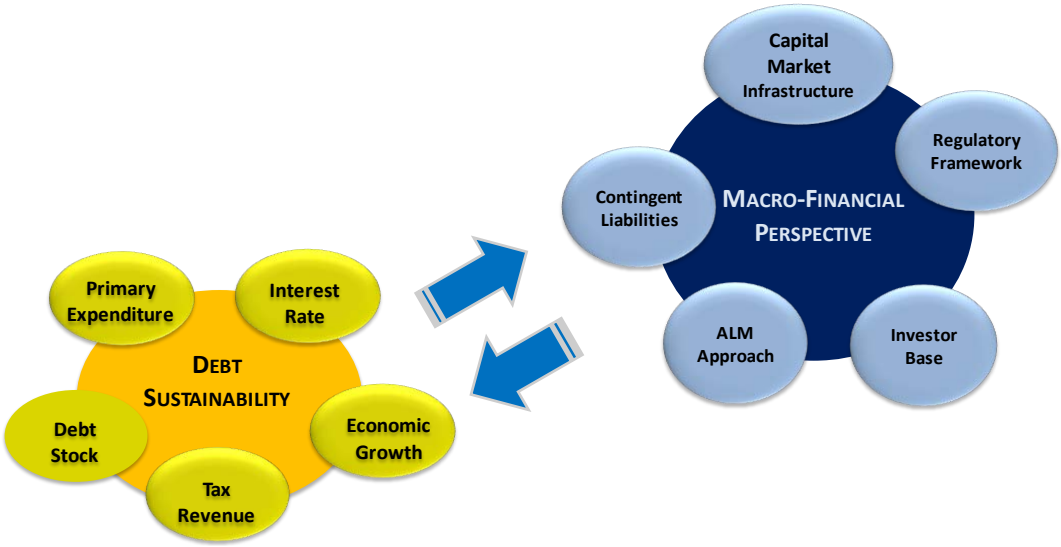
The complex network of direct and indirect interconnections between the balance sheets of a sovereign with those of the corporate, households, and banks and non-banking institutions calls for a broader approach towards identifying and measuring sovereign risk. At the same time, there is no silver bullet in managing sovereign risk. A full policy menu is needed that goes beyond the traditional monetary and fiscal policy mix and explicitly takes into account the macro-financial aspects of sovereign credit risk that propagate and magnify its negative effects, particularly those relating to financial stability. Perhaps, a new office of a Sovereign Risk Officer (SRO) could be set up whose main tasks would be the review and the assessment of risks affecting a sovereign's credit standing and to advise the pertinent policymakers on remedial measures. The SRO is similar to the Chief Risk Officer found in many financial firms, where (s)he is usually responsible for the three categories of risks: market risk, credit risk, and operational risks.

In Section 1 below we discuss the holistic concept of sovereign credit risk that incorporates the macro-financial aspects. Section 2 discusses the financial stability dimension of sovereign risk and the related transmission channels. Section 3 discusses the existing measures being used to capture sovereign risk and their limitations. Section 4 looks at policy responses, and Section 5 concludes by highlighting challenges ahead and points at some open questions and issues for further examination.

2. MOVING TO A MACRO-FINANCIAL PERSPECTIVE OF SOVEREIGN RISK

A key legacy of the GFC is the realization that sovereign risk is far more than just a pure fiscal risk. The analysis of sovereign risk needs to go well beyond the traditional debt sustainability approach to encompass the complex net of macro-financial interactions (Figure 1).

Figure 1: Debt Sustainability and Macro-Financial Perspective



Source: IMF staff.

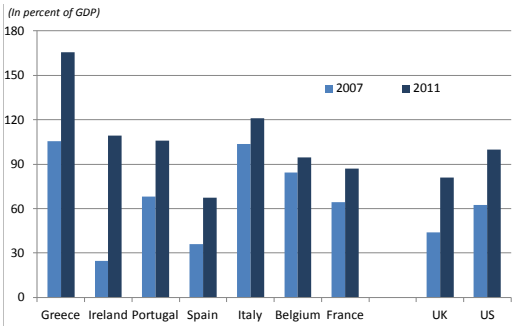
2.1 Pre-crisis Debt Outlook and Medium-term Macro Projections

The sole focus on sovereign solvency risks in the early 2000s missed the importance of the direct and contingent intertwining of cross-sectoral balance sheets with that of the sovereign. This aspect has played a crucial role in a number of country cases caught in the direct headwind of the GFC. At the onset of the crisis, debt sustainability in advanced economies was not an issue despite their sovereign debt levels being well above 60% of GDP in a number of cases (Figure 2). On average, the euro area's sovereign debt hovered around 69% of gross domestic product (GDP) in 2000–07. 2007 outstanding public debt levels of Italy, Greece, and Belgium were projected to be 105%, 85%, and 79% of GDP, respectively.

In 2007, financial markets were stable and the projected medium-term macroeconomic outlook of these highly-indebted economies suggested nothing but stability and solid growth. For

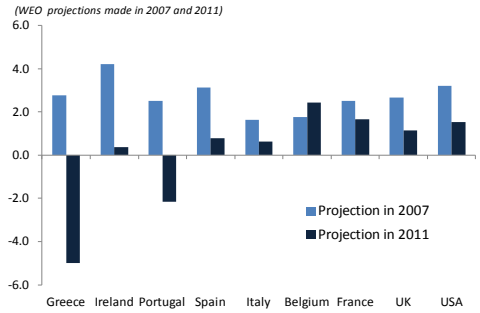
instance, for the euro area, the World Economic Outlook (WEO) growth projections made in 2007 for the period 2007–11 averaged 4.2%, and showed a path of smooth debt consolidation. The 2007 housing market downturn in the Unites States (US) and the subsequent GFC, however, led to significant downward revisions of the projected debt consolidation trend and the macroeconomic outlook (Figure 3). In 2011, the euro area's stock of sovereign debt surged by 40 percentage points relative to the 2007 levels, and nominal GDP growth rates cut back to 1.5%.

Figure 2: Public Debt to GDP Ratio



Source : IMF, Fiscal Monitor (September 2011).

Figure 3: 2011 GDP Growth Projections



Source: IMF, World Economic Outlook.

The shift in confidence and market expectations in future events, not purely macro fiscal variables, thus played a key role in determining the public debt trajectory going forward.[1] The continuous revisions of some advanced economies' sovereign debt ratios and growth projections validated the market perception that advance economy sovereigns are no longer risk free. Stronger inter-linkages between sovereigns' and banks' balance sheets, combined with the deterioration of fiscal and real sector outlooks, contributed to further exacerbation of the perception of sovereign credit risk among advanced economies.

2.2 From narrow Debt Sustainability to a Broader Macro-financial Perspective

Often, sovereign risk is referred to as risk to debt sustainability of a country, i.e., the probability that debt ratios may cross a certain threshold.[2] Under this purely macro-fiscal approach,

[1] See Reinhart and Rogoff (2009) for more discussion.

[2] Aizenman et al. (2011) look at the past and current fiscal space (defined in terms of levels of debt and deficits relative to tax revenues) to measure sovereign risk in a number of European countries that are currently facing pressures. Gray et al. (2008) propose extending the notion of debt sustainability to control for the risks associated

sovereign risk is defined as solvency risk measured in terms of primary expenditure, stock of nominal debt, and tax revenue. In a debt sustainability analysis approach, which examines the net present value of future debt flows, market and investor factors enter into the equation only through the discount variable. The qualitative aspects of the composition of the debt stock, through which market expectations operate, are mostly neglected.

Reliance on a fiscal approach to sovereign risk, while important, becomes too narrow to address the macro-financial stability challenges that sovereigns confront. It is now well accepted that, with the evolution and deepening of global and domestic capital markets, and the entwining of the sovereign and financial sectors' balance sheets in developed markets, the notion of sovereign risk has to inevitably expand to cover a much larger set of risk factors.[3] To cite a few, the sovereign risk analysis needs to capture risks deriving from the debt structure and its composition, the existing capital market infrastructure, the regulatory framework, the composition of the investor base of the country (beyond the share of non-resident to resident debt holders), and the funding conditions of systemically important corporations and financial firms, among others.

Inadequate policy responses in preventing and managing a sovereign credit crisis in a timely manner can be explained by misperceptions about the nature of sovereign risk. The excessive focus on traditional macro-fiscal risk indicators and a poor understanding of the financial stability and capital market implications for the sovereign balance sheet may contribute to the mispricing of sovereign assets pre-crisis. Weak macro-prudential and regulatory framework and sovereign debt management practices also lay the ground for a faster, broader, and more amplified spread of market anxiety.

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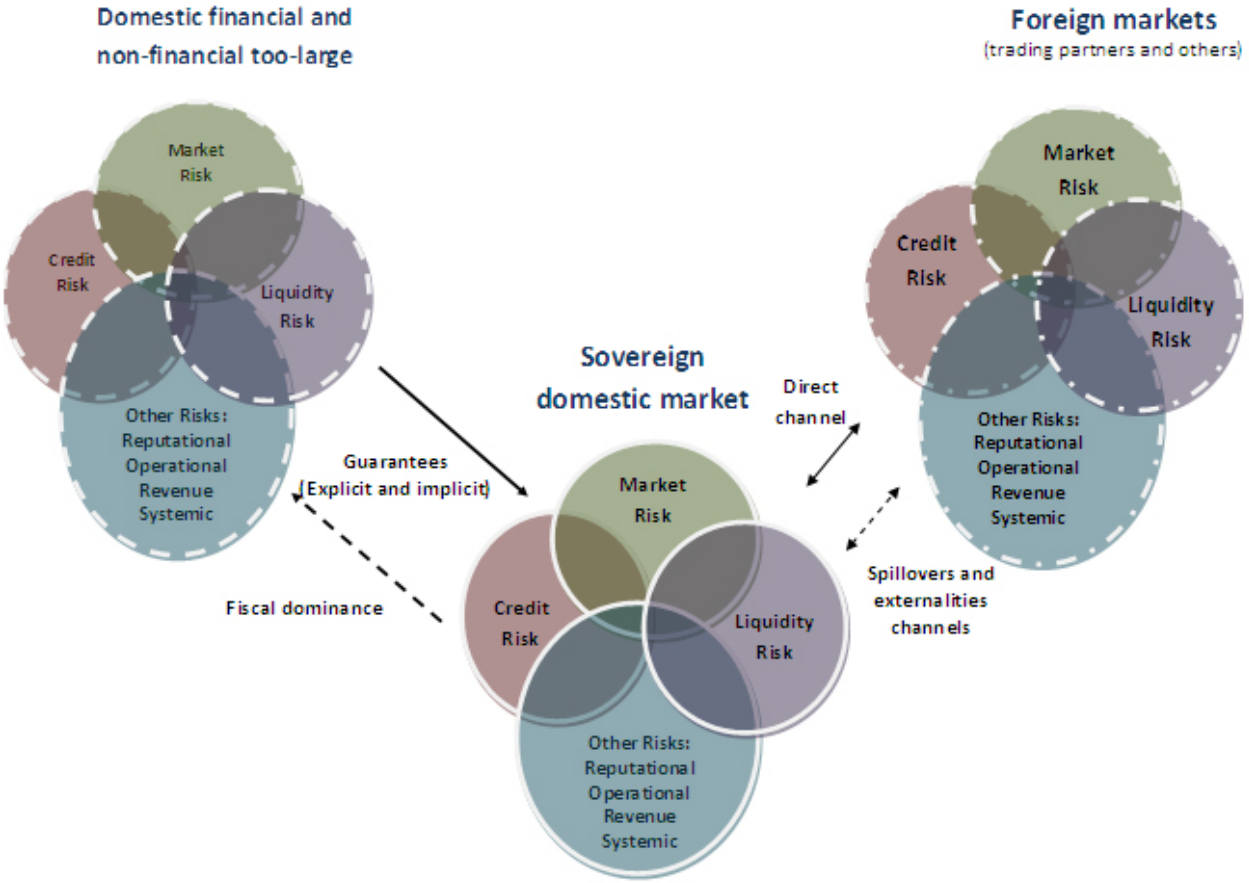
with sovereign assets and liabilities. Under the contingent claims approach, Gray et al. (2007) link sovereign credit risk to the probability the asset value falls below the distress barrier (i.e., the present value of promised payments.). Garcia and Rigobon (2004) extend the debt accumulation equation to incorporate the stochastic features of key macroeconomic variables (e.g., the real interest rate, GDP, exchange rate, and inflation) and define credit risk as the probability the debt will reach a threshold in a certain period of time.

[3] Cottarelli (2011a) defines rollover risks or fiscal sustainability risks as the probability that the move of certain fiscal indicators into dangerous territory, or other form of shocks, will trigger a negative market response. This concept relies on three dimensions: (1) basic fiscal variables that are often captured under the basic fiscal solvency analyses; (2) the composition of sovereign asset and liabilities and its management; (i.e., rollover needs, maturity structure, and global market risks) and (3) factors affecting long-term fiscal trends. Baldacci et al. (2011) formulate the fiscal stress index using the notion of crises events that fall into one of four criteria: (i) sovereign debt default or restructuring; (ii) IMF-program with more than a 100% quota access; (iii) very high inflation; and (iv) very high sovereign bond yields.

2.3 Defining Sovereign Risk

Despite its popular use since 2009, there is little consensus on how best to define sovereign risk. We propose expanding the concepts advanced in the macro-fiscal and macro-prudential literature to incorporate the macro-financial risks that sovereigns encounter. Sovereign risk is a complex combination of risks that feed through a number of channels into the sovereign balance sheet in a non-monotonic fashion (Figure 4). For instance, credit risk from systemic financial institutions will channel through the contingent liabilities component of the sovereign balance sheet, whereas market risk will affect the fiscal revenue and international reserves components.

Figure 4: Defining Sovereign Risk



Source : IMF staff.

Using a balance sheet approach, sovereign risk can be defined as the probability of a significant deterioration of the sovereign's balance sheet, either via increased vulnerabilities in the domestic market (financial sector, sovereign credit market, real sector, the external sector), and/or vulnerabilities in foreign markets that spillover to the country. More formally:

Sovereign risk = Probability (event) $\geq$ Threshold

$\equiv$ Prob ($A < A^{Threshold} \cup L > L^{Threshold} \cup K < K^{Threshold}$) $\cup$ Threshold (1)

where A stands for assets, L for liabilities, and K for net debt or net worth of the country.

The deterioration of the balance sheet could be explained by a weakening of the asset side and/or a surge of the sovereign liabilities of the country. It could be driven by a factor(s) that increase(s) the value of the sovereign liabilities of the country and/or reduces the value of sovereign assets, and that, as a result, cause(s) the balance sheet to worsen. The dynamics of the asset side will vary significantly, country by country, and depend on particular circumstances. For instance, in the case of fixed assets, the value and liquidity of public real estate properties may significantly worsen during periods of stress. Also, assets from oil-rich economies will be significantly affected by changes in the oil and related commodity markets. Further, the notion of being "significant" can be seen as country-specific. For instance, economies with a history of default may suffer from higher risk aversion (Eichengreen and Hausmann 1999) and therefore their "significant" may mean less than for countries with no default history. A conceptualization of "significant" would require testing the complex net of risk indicators (e.g., liquidity and solvency ratios) against some pre-determined threshold values.

2.4 Sovereign Risk as a Composite of Risks: Conceptual Framework

Sovereign risk is a complex blend of risk factors that spread into the sovereign balance sheet in a non-monotonic fashion through a variety of channels. Sovereign risk encompasses (i) domestic sovereign risk emanating directly from the sovereign balance sheet, (ii) domestic negative feedback risk originating from the impact of systemic institutions on the sovereign balance sheet and, (iii) cross-border risks spilling over from foreign economies countries to the sovereign balance sheet. Formally, equation (1) can be re-written as the combination of risks at play as a result of the expansion of linkages across sectors and countries (see Figure 1):

Sovereign risk $\equiv$ F ($risk^{i,d,sov}$, $risk^{i,d,SI}$, $risk^{i,foreign}$) (2)

with the impact of event i (i = solvency, liquidity, market, and operational) fueling through the sovereign (sov) balance sheet of the domestic market d. Risk components can be decomposed as:

(i) $risk^{i,d,sov}$ that stands for the *domestic sovereign risk*, that is, domestic risks emanating directly from the sovereign balance sheet are:[4]

$$risk^{i,d,sov} = risk^{solvency,d,sov} \cup risk^{liquidity,d,sov} \cup risk^{local\ economy,d,sov} \cup risk^{other,d,sov} \quad (2a)$$

(ii) $risk^{i,\,d,SI}$ that stands for the *domestic negative feedback*, that is, domestic risks emanating from systemic institutions (SI) in the domestic financial and corporate sectors and fueling into the sovereign balance sheet through both explicit and implicit guarantees and sovereign debt holdings. This is most eminent in the context of the linkages between the sovereign and the banking sector.

$$risk^{i,\,d,SI} = risk^{solvency,d,SI} \cup risk^{liquidity,d,SI} \cup risk^{local\ economy,d,SI} \cup risk^{other,d,SI} \quad (2b)$$

(iii) $risk^{i,\,f}$ stands for *cross-border spillovers*, that is, risks emanating from foreign markets (f) and impacting the sovereign balance sheet through the real or financial sectors (e.g., trade exchanges, non-resident debt exposures), or shifts in market perceptions. These risks are also a composite of domestic sovereign risks, domestic negative feedbacks from systemic institutions, and foreign sovereign risks they are also exposed to (third markets).

$$risk^{i,\,f} = \Phi\,(\,risk^{f,f,sov},\ risk^{f,\,f,\,SI},\ risk^{f,foreign}\,) \quad (2c)$$

where $risk^{i,\,f}$, risks from foreign sovereigns, is also a function of (i'), its own sovereign risk

$$risk^{f,f,sov} = risk^{solvency,f,sov} \cup risk^{liquidity,f,sov} \cup risk^{local\ economy,f,sov} \cup risk^{other,f,sov}$$

(ii') the risk deriving from its own systemic institutions,

$$risk^{f,\,f,SI} = risk^{solvency,f,SI} \cup risk^{liquidity,f,SI} \cup risk^{local\ economy,f,SI} \cup risk^{other,f,SI}$$

and, (iii') the risk spilling over from third economies,

$$risk^{f,foreign} = risk^{solvency,foreign} \cup risk^{liquidity,foreign} \cup risk^{local\ economy,foreign} \cup risk^{other,foreign}.$$

Based on this framework, we discuss below the various channels through which these three risk components amplified and materialized during the GFC.

[4] In this context, the local economy risk component refers to financial market risks driven by domestic factors only. Global capital market conditions are mainly considered in the context of cross-over spillovers and the foreign sources of risks.

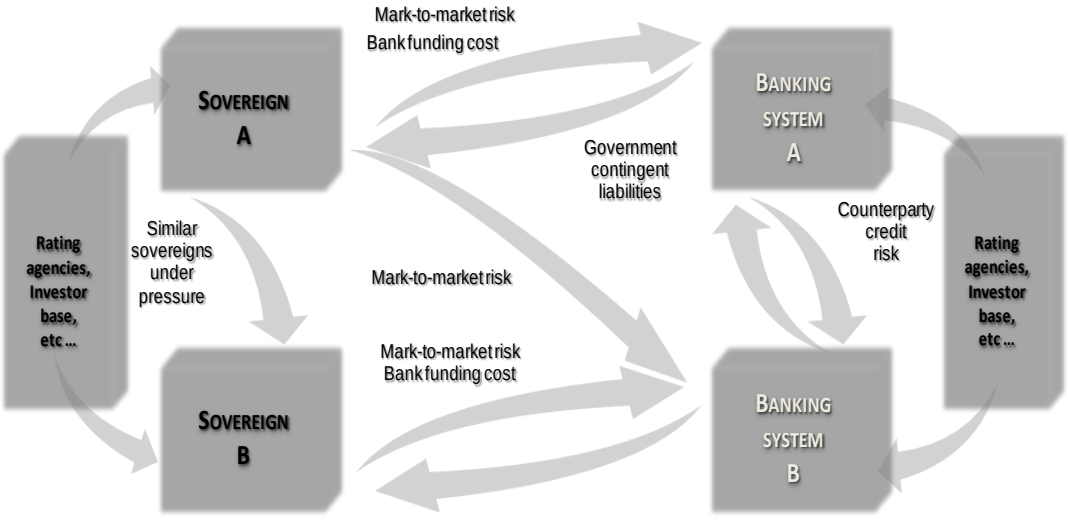
3. AMPLIFICATION AND MANIFESTATION OF SOVEREIGN AND FINANCIAL STABILITY RISK

The broader notion of sovereign risk presented above has surfaced in different forms during the crisis. It is, however, most evident in the context of financial stability, with the tightening of the sovereign and banking sector balance sheets and the larger exposures to external shocks through financial channels. The dynamics of global investment, through changes in the investor base and capital flows' composition, illustrates the transmission of sovereign risk from one country to another and its global implications.

3.1 Sovereign-Bank Inter-linkages: Concepts and Channels

Sovereign credit risk can fuel through both sides of banks' balance sheet (e.g., through the loan portfolio and financing), resulting in negative feedback loop (Figure 5). It is transferred through various channels (Merler and Pisani-Ferry 2012) including (i) mark-to-market losses on sovereign bond holdings; and (ii) an increase in bank funding costs caused by the re-pricing of risk, including credit rating downgrades and higher haircuts in liquidity assistance from the central bank. Moreover, bank funding pressures could lead to government guarantees on bank securities to be called, thus increasing the sovereign debt burden. In the GFC, direct support from the sovereign to the financial sector in a selected number of advanced economies averaged about 6.8% of GDP, but the range is ample. In the case of Ireland, for example, the Irish government support to the domestic banking sector reached 41% of GDP (IMF 2011b).

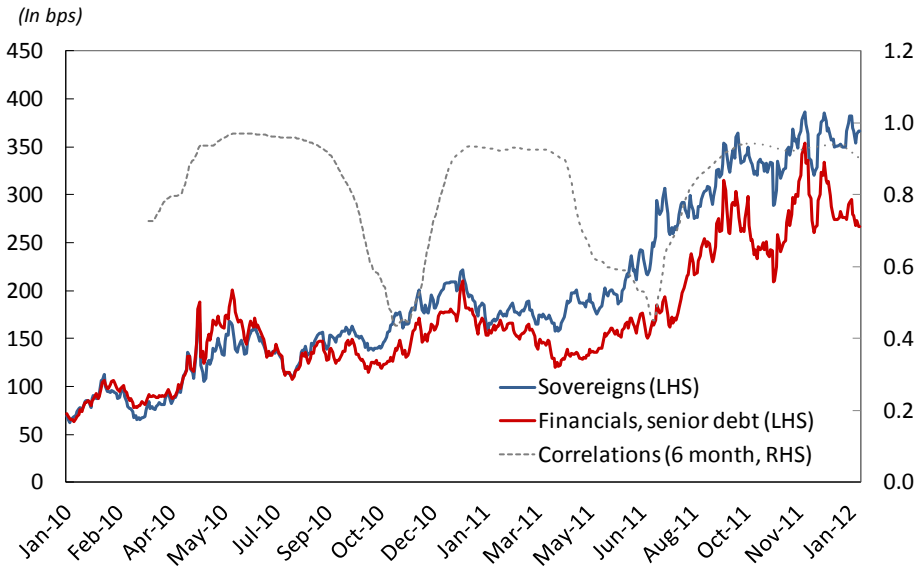
Figure 5: Sovereign-Banking Sector Linkage



Source: IMF Staff.

The strengthening of linkages between the sovereign and domestic banks' balance sheets further increased the two-way shocks' transmission channel. As such, two-way spillover effects may reinforce each other, potentially to a point in which implicit government guarantees to the banking sector lead to value losses. The tightening of sovereign-banks' balance sheet inter-linkages suggests the need for a joint assessment of banking and sovereign sectors' vulnerabilities. In the past years, sovereign credit default swaps (CDSs) and bank CDSs in the European region showed high correlation, reflecting the market participants' perceptions on the negative feedback linkages (Figure 6).

Figure 6: European Sovereign and Financial CDS Spreads



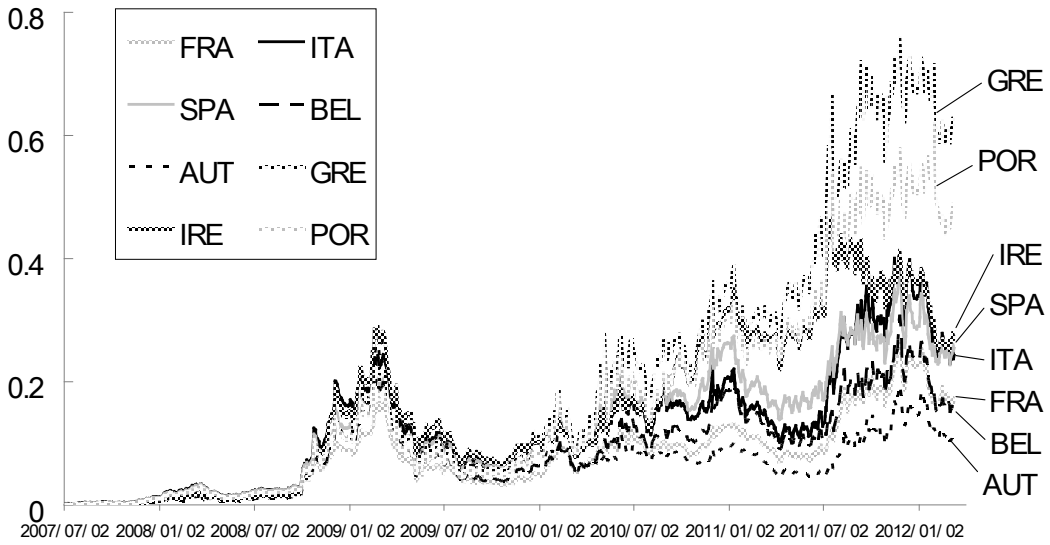
Sources: Bloomberg and IMF staff calculations.

A strong nexus between the sovereign and domestic financial institutions can lead to financial risk concentration in the medium- and long-term. In the short run, both banks and sovereigns share common interests: banks' holdings of large amounts of government bonds assures stable financing for sovereigns, while banks improve their solvency ratios by accumulating low-risk weighted government bonds. However, excessive links between the two balance sheets may exacerbate future spillovers and increase their vulnerabilities.

On the international channel, the loss of confidence in a sovereign market can cause knock-on effects on other distressed sovereigns (Claessens and Forbes 2001). These well-known contagion effects across highly-indebted economies evidenced once more during the GFC. In Europe, the sovereign spillover risk (measured in "spillover coefficients", which is a sum of probabilities of debt distress of a sovereign, conditional on other sovereigns becoming distressed, see Figure 7) not only increased during the crisis for each of the vulnerable economies but also showed signs of clustering, reflecting the highly-integrated regional

financial system. These strong inter-relations may explain why stronger policy efforts are being called for.

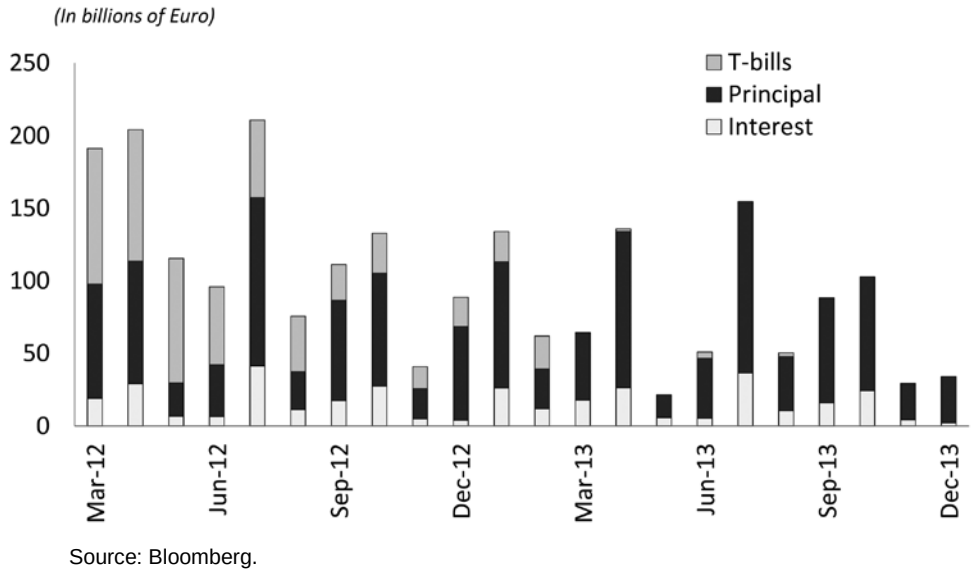
Figure 7: Spillover Coefficients



Sources: Bloomberg and IMF staff calculations.

Furthermore, high debt redemption needs for both sovereigns and banks could heighten refinancing risk, especially in periods of weak market confidence. In crisis episodes, global investors' willingness to participate in sovereign debt auctions tends to get impaired, raising the risk of auctions failures. To date, there have been very few episodes of failing auctions during the GFC despite high refinancing needs for banks and sovereigns. However, weak sovereign and bank balance sheets could still suffer from heightened refinancing risk through excesses in absorption capacity (Figure 8).

Figure 8: Euro area Sovereign Refinancing Risk



Source: Bloomberg.

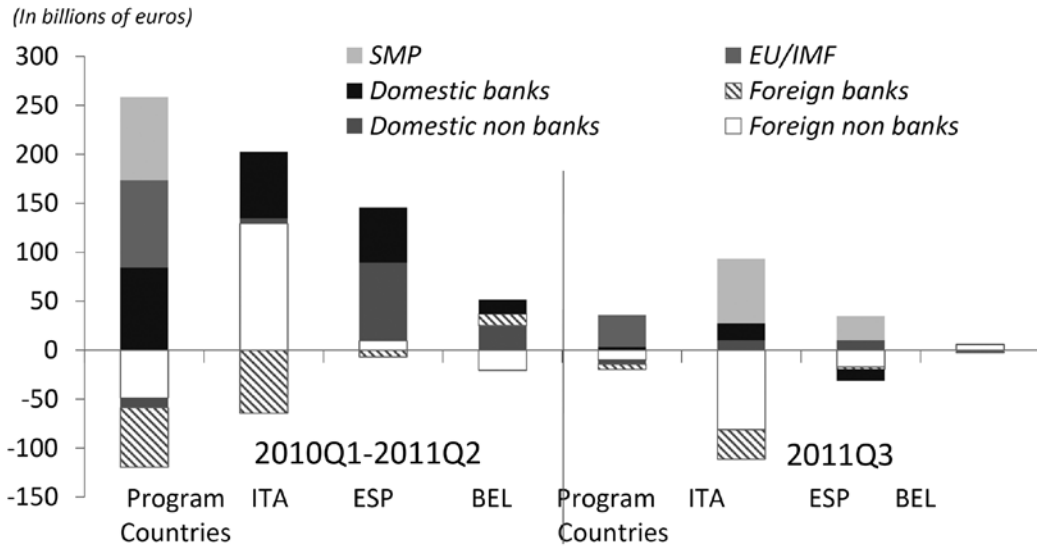
3.2 Investors' Perspective: Investor Base and Capital Flows

The composition of the investor base is a key variable in the analysis of sovereign risk and financial stability. The changing investor base is a significant factor in determining the yield (Andritzky 2012). Further, Arslanalp and Tsuda (2012) argue that the composition of the sovereign investor base can have key policy implications on government refinancing risks (through a high participation of foreign investors) and domestic financial stability (through the increasing importance of domestic banks). The composition of the investor base can be also examined in terms of the diversity of the investor; a more diversified investor base can foster secondary market liquidity, while a disperse investor base could complicate investor relations, and in the extreme, post a significant challenge in debt restructuring negotiations (e.g., Greek private-sector involvement [PSI] negotiation).[5]

[5] See Das et al. (2012) for a study of debt restructuring processes.

The demand side of sovereign debt is increasingly taking center stage. Indeed, the investor base of a country mirrors the demand side of the sovereign debt dynamics and can play a major role in the loss of market access.[6] In particular, investors' balance sheets mirror the stability levels of market demand, since highly-leveraged investors tend to liquidate their positions faster than those with lower leverage. IMF (2011a) discusses evidence on the sensitivity of investors in the euro area sovereign bond markets, the loss of market access in some countries as well as the large negative price actions in Italy and Spain in 2011 H2 (Figure 9). Beyond the euro area, Arslanalp and Tsuda (2012) examine the global trend of the major advanced economies' investor base and identify the rising proportion of foreign investor base as risks in the future.

Figure 9: Changes in the Sovereign Investor Base



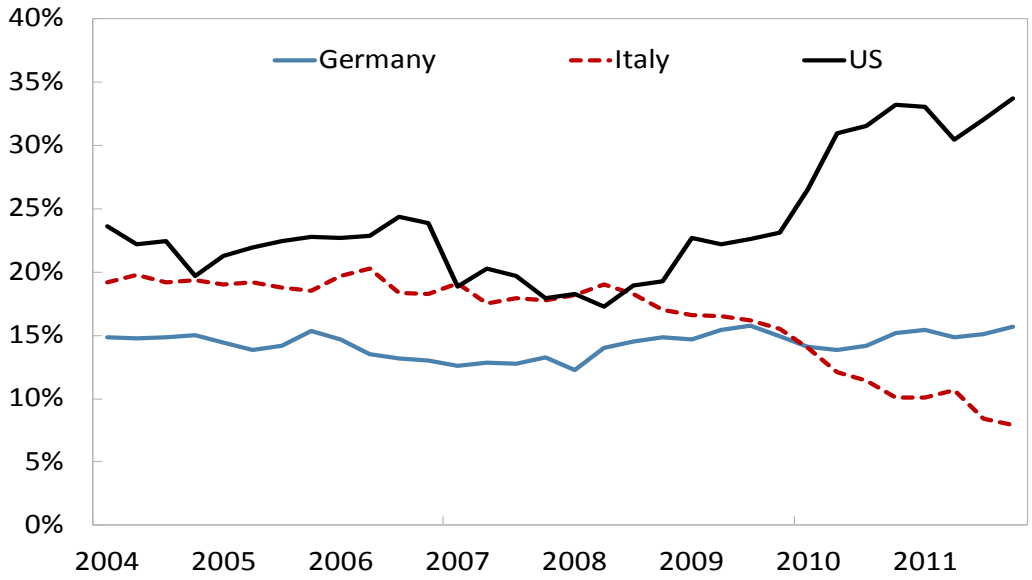
Sources: Bank for International Settlements; Quarterly External Debt Statistics database; and IMF staff estimates.
Note: Program countries include Greece, Ireland, and Portugal.

Investors have become more selective in their sovereign credit risk assessments. Prior to the GFC, most investors tended to assume that advanced economies' sovereigns were risk-free. The debt crisis has, once again, crystallized the wide spectrum of credit risks among various sovereigns. The novelty this time around is that financial markets are much more developed and integrated. The compounded set of risks and their magnification are forcing investors to be more risk-sensitive. International banks are now shifting their assets from once risk-free sovereigns to safer destinations, in particular, those with reserve currency status (Figure 10).

[6] Gelos et al. (2004) underline also the institutional aspects as determinants for developing countries' access to international markets.

Figure 10: Foreign Bank Holdings of Government Debt

(Invested country in percent of total non-resident bank holdings)



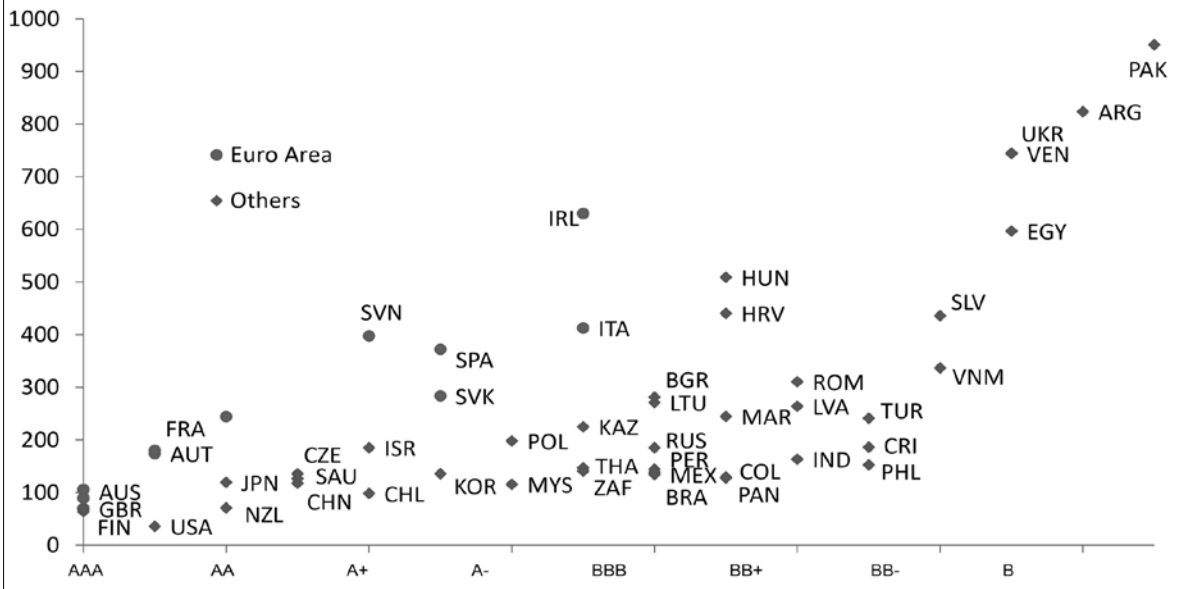
Sources: BIS banking statistics and IMF staff estimates.

The ongoing deterioration of sovereign credit conditions in advanced economies has resulted in a decline in the supply of safe assets. Scarcity of eligible collateral, fed traditionally by risk-free sovereigns, has added to the dysfunctionalities of the interbank money market as well as of the monetary policy transmission mechanisms.[7] Going forward, advanced economies may face further credit rating downgrades given the lagged nature of credit rating actions and the high CDS spreads in euro area countries compared to emerging market countries with similar credit ratings (Figure 11).[8]

[7] Singh (2011) argues, since collateral can be reused, the overall effect of the decline in the source collateral for the dealers (i.e., reduced "source" of collateral times the velocity of collateral) may have lead to a decline of about $4–5 trillion in collateral.

[8] See and Cotarelli (2011b) for a discussion of CDS spreads and determinants during the crisis.

Figure 11: CDS Spreads and Credit Ratings—Advanced and EM Countries



Sources: Bloomberg, credit rating agencies, and the IMF staff.

4. MEASURING SOVEREIGN RISK

Various measures of sovereign risk are currently in use. Such measures include default risk extracted from CDS and bond spreads, financial sector indicator, global risk indicator, and fiscal indicator. None of them captures the complex nature of sovereign risk by themselves, thus suggesting the need for a more holistic measure.

Measuring sovereign risk implies attaching a scalar value to a tail event altering the sovereign balance sheet. As such, it implies attaching a value to the probability of observing an undesirable development affecting the sovereign balance sheet. This probability is determined by a number of observable and unobservable factors. The mis-measurement of risks and of their pricing before the GFC is often seen as having altered agents' risk taking and become a source of financial fragility.

There is no consensus among practitioners and economists on how best to measure sovereign risk from a sovereign balance sheet angle. The bulk of the literature on sovereign risk has explicitly focused on a subset of risks affecting the stability of the economy or a number of sectors, prominently the banking sector. We examine several empirical methodologies applied by practitioners.

Market perception extracted from CDS or bond spreads. CDS or bond spreads to benchmarks are often used as an indicator of the market's perception of sovereign risk. Changes in the market-implied default probabilities extracted from 5-year CDS premia on sovereign debt are often cited as indication of changes in sovereign risk. Another standard

measure used by practitioners to track sovereign risk is spreads of sovereign bond prices to risk-free bond prices (bunds in the European Union (EU) market, US bonds in the Latin American context, or swaps more in general), Drawbacks of the CDS methodology, however, relate to its sensitivity to liquidity conditions in the CDS market itself and uncertainty in the triggering of CDS credit events.

Financial sector soundness indicator. The IMF's Financial Sector Assessment Program (FSAP) looks at the effects of some components of sovereign risk on the financial sector. Recent FSAPs have sharpened their focus to incorporate the impact of sovereign debt holdings on the banking sector's balance sheet. The risk assessment relies on stressing the cost of holding sovereign instruments in the different bank accounts and assessing the sensitivity of banks' positions when imposing more stringent sovereign spread assumptions. The tests assume a concentration of exposures to sovereign debt under assumptions that risks spill over through other asset prices, asset volatility and the real sector of the economy. However, they do not cover the feedback effect of risk originating from banks' balance sheets on the sovereign balance sheet.[9, 10]

Global financial stability indicator. The IMF's Global Financial Stability Report (GFSR) assesses risks facing the economy (macro, credit, funding liquidity, and leverage, among other type of risks) and their impact on global financial stability; sovereign risk is a sub-component. The "six ray map indicator" builds on four sets of risk indicators (macroeconomic, emerging markets, credit, and market) and two sets of conditions (monetary and financial, investors' risk appetite), each of which is a constructed index summarizing a number of variables and indicators identified in the literature.

Fiscal indicator. The fiscal vulnerability and stress indexes measure fiscal sustainability risks by looking at government roll over risks (Baldacci et al. (2011a, b)). The simple average of both indexes is used as a risk score measure to rank fiscal sustainability risks under baseline policy scenarios. The fiscal vulnerability index tries to identify abnormal increases in rollover risks compared to the same country's medium-term trends and cross-country averages. The fiscal stress index tries to measure the probability of a tail event resulting from hikes in fiscal variables risks (e.g., adjusted primary balance, population aging, or expenditure pressures) and asset and liability management risks (e.g., risks resulting from the currency and non-resident investor base composition of the stock of debt.)

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[9] The FSAP work is based on extreme but plausible scenarios guided by past history of the country, including on default episodes. They produce economic assessments on the vulnerabilities of the economy that may differ from those resulting from a regulatory approach. The treatment of issues such as bank capital, liquidity and maturity risks based on the country's regulatory framework may differ from that resulting from economic analysis.

[10] In a similar vein, over the years the Bank of England has developed an analytical risk assessment approach to financial stability. Their approach also builds on a number of identified vulnerabilities to the UK's financial sector, including those propagating through the public sector. The focus, however, is the banking sector (Bank of England 2007).

Our brief summary of currently-existing risk metrics reveals the absence of a ***standardized indicator of sovereign risk***. Some indicators discussed above include elements of sovereign risk (as defined in Section 2), but either fail to capture its complex nature or mix it with other global risks (going beyond sovereign risk). Going forward, there is demand for a "mapping" approach, that permits analyzing risk indicators (that explain sovereign risk) in a comprehensive manner.

5. THE POLICY RESPONSE

As the concept of sovereign risk progressively drifts away from narrow debt sustainability analysis to a more complex network of macro-financial interactions, so should too the appropriate policy response. With the debt profile depending on a broad range of financial variables (including the structure and composition of the debt, the evolving nature of the investor base and cross-border spillover effects), a debt trajectory target also needs to be designed controlling for financial market factors. Policies exclusively focused on fiscal aggregates risk exacerbates the adverse loop between investor confidence and demand for financial assets, and may ultimately dampen economic activity.

The GFC highlights the need for revisiting the approach to sovereign risk management, both at normal and crisis prevention phases. Sovereign risk management in normal times calls for managing the stock of debt in a way that provides insurance against a broad range of shocks, for instance, by achieving low rollover profiles and building up sufficiently large cash buffers. Also, crisis prevention calls for internalizing exposures on contingent liabilities and potential feedback effects, and for structuring the stock of debt as to isolate it against negative shocks.

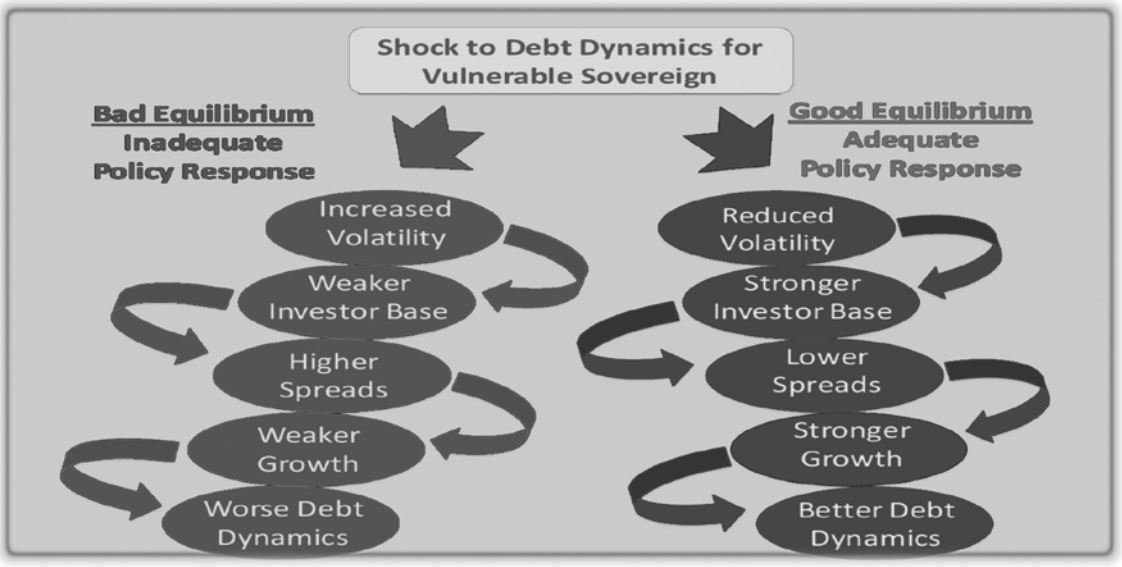
Given high integration of financial markets, only a comprehensive and coherent policy menu encompassing the sovereign-financial sector-foreign spillovers' linkages can tilt the balance back towards a good equilibrium. Restoring a good equilibrium encompasses a "crisis" policy mix with a solid back stopping facility that covers all members of the union, credible financing instruments to achieve burden sharing, a clear role of the central bank in the crisis resolution framework, and an early commitment to correcting existing frictions in the market structure.

5.1 The Multiple Equilibrium Risk: Tilting the Balance to the Good Equilibrium

Driven by weak balance sheets and affected heavily by expectations, debt capital markets can be prone to multiple equilibria. The bad equilibrium is usually triggered by market perception that sovereigns are vulnerable. A loss of investor confidence leads to higher market volatility, erosion of demand for financial assets, and an unstable investor base. As a result, funding costs surge. If taking systemic dimensions, these pervasive dynamics will install into the

country's real sector economic activity and feed backwards into further loss of market confidence (Figure 12).[11] A vicious circle channeled through financial markets sets in and is difficult to break.

Figure 12: Illustration of Multiple Equilibria



Sources: IMF, Global Financial Stability Report, September 2011.

During bad times, financial market integration helps catalyze and morph risks faster and deeper into the economic structures. Similar adverse dynamics may develop in other non-European advanced markets or emerging markets. Benefiting from a perception of relatively safe assets, emerging markets have so far been isolated from pressures. However, spill-over channels makes them vulnerable to financing stress through potential sharp outflows of capital or changes in investor demand. In any of these cases, only adequate policy response can tilt the balance towards the good equilibrium.

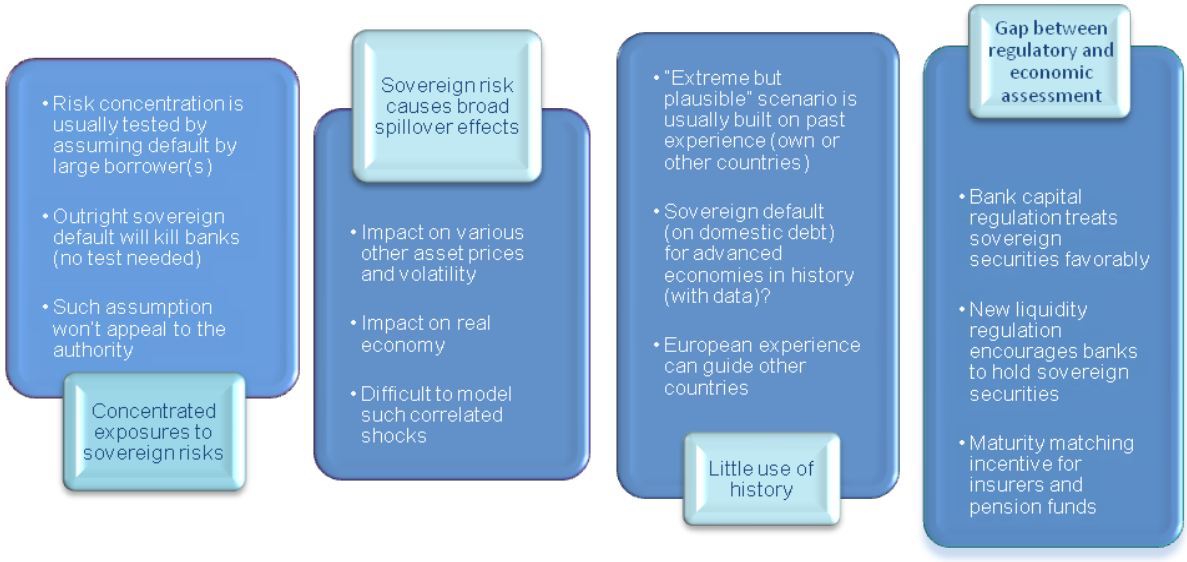
5.2 Managing Risk through a Crisis—Crisis Prevention

The broader concept of sovereign risk that has come with the crisis highlights the need to revisit the risk management approach (Figures 13 and 14 and Principle 8 in Annex). Important interactions between macroeconomic vulnerabilities and sovereign debt structures have been missed under the traditional cost-risk debt management analysis. Once sovereign stress surfaces, there are three broad sovereign risk management approaches to tilting the balance

[11] The good equilibrium is not immune to future negative debt dynamics. For instance, a lower interest rate may induce private sector investors to pursue higher leverage again, as observed in the Great Moderation.

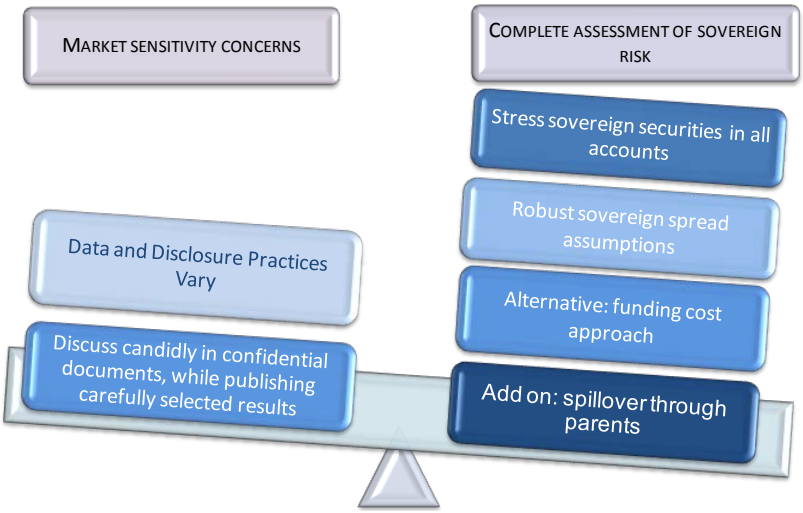
to a good equilibrium (see next sub-section): (i) changing the issuance mix; (ii) adapting financing modalities; and (iii) stepping up market management operations. Typically, the design of the preferred maturity structure of the debt is informed using cost-risk tradeoffs and historical outcomes. A forward-looking approach focusing on existing exposures and a full range of risk factors (including in the macro-financial area) would have been needed to respond to an event as extreme as the current crisis.

Figure 13: Modeling Sovereign Risk



Source: IMF staff.

Figure 14: Assessment of Sovereign Risk and Sensitivity Concerns



Source: IMF staff.

In preventing risk build-up, nontraditional risk exposures also need to be adequately captured (see Principle 1 in Annex). Most cost-risk analyses do not consider financing shocks that may materialize via the activation of implicit financial sector contingent liabilities, large quasi-sovereign or sub-national debt. Moreover, models do not contemplate shocks that may arise from a sudden withdrawal of investment. Excessive reliance on foreign investors, typically more sensitive to negative shocks, may aggravate financing risk even further. Nonresidents tend to be more sensitive and reactive to events that undermine the quality of the sovereign balance sheet and to downgrades in credit quality.

There may be scope to strengthen the resilience of the investor base through changes in the debt structure. To better understand the market dynamics, debt managers need to be cognizant of the underlying motivation of the transactions. For instance, certain classes of investors may prefer specific instruments or issuance volumes due to their risk-return preferences, transaction size limits, or regulatory constrains. Traditionally, greater issuance of inflation-linked debt or longer-dated debt appeals to institutional investors, such as pension funds and life insurance companies, but may not meet needs of banks that prefer shorter duration in general. Reducing the concentration of investor type would not only reduce exposure to rollover risk but could also enhance market liquidity and, thus, contribute to the broader policy goal of enhancing financial stability. Increasing the participation of the domestic investors 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.

The current crisis has highlighted the importance of favorable public debt portfolio structures in providing insurance against a range of shocks (see again Principle 1 in Annex). Since the debt crises of the 1990s, many emerging market economies put considerable emphasis on mitigating rollover risk and external vulnerabilities.[12] This has contributed to their resilience in this crisis. For example, maintaining a low rollover profile helps: (i) reduce the risk that an investor strike will drive up yields; (ii) provide resilience where the exchange rate regime constrains policy choices; (iii) reduce the cost of servicing the debt as a consequence of any deterioration in creditworthiness; and (iv) make it easier to absorb the financing impact of reduced tax receipts and an accommodative fiscal policy.

The appropriate scale of liquidity buffers could also be usefully recalibrated. Liquidity buffers, by providing access to resources to meet redemptions, can play a similar role in reducing rollover risk. Some countries actively pre-fund their debt (or equivalently, buyback shorter-dated maturities) as part of their ongoing standard operations (e.g., Belgium and the Netherlands). Whether and how large a liquidity buffer should be established is a policy

[12] See Anderson, Silva, and Velandia-Rubiano (2010).

decision to be coordinated across a range of stakeholders. Large buffers may raise new challenges for both government cash management and central bank liquidity management.

5.3 Managing Risk through a Crisis—Debt Management Policy

The linkage between public debt management and financial stability is highlighted following the GFC (Das, Papaioannou, Pedras, Ahmed, and Surti 2010). Apart from the adoption of specific strategies that may vary substantially from country to country, there are three broad debt management measures to manage sovereign risk during sovereign stress outbursts: (i) changing the debt issuance mix; (ii) adapting financing modalities; and (iii) stepping up market management operations.[13] De Broeck and Guscina (2011) discuss various crisis-related changes in government debt issuance in European countries.

Countries may need to expand their use of non-core markets and borrowing instruments. For example, in an effort to flexibly respond to market demand, both Belgium and the Netherlands introduced a medium-term note (MTN) program and issued additional short-term debt securities, thus promoting investor diversification. Germany used the benefits of maintaining a presence in foreign markets in better times to issue new debt instruments; and in September 2009 it issued its second ever foreign currency denominated bond. Furthermore, supplementary issuance plans that complement core programs also helped raise additional financing at the margin.[14] In several countries (e.g., the Netherlands, Belgium, Italy, and Germany), smaller issues of off-the-run bonds became a more frequent and significant part of the financing program during the crisis.

Financial fragility may call for operational frameworks to adapt to new conditions both in the primary and the secondary markets. As sovereign risk spurs, issuance mechanisms may need to be modified to support the primary market. With vulnerable primary dealer balance sheets, mechanisms that facilitate a larger participation of investors in primary issues may be needed. In some cases, syndication may be a valid option. In other cases, the format of auctions may be modified to make it more attractive for investors to participate. Although transparency and predictability remain at the core of risk management practices, there are gains to increasing flexibility in periods of tension. Greater flexibility may require extending the size and choice of debt instruments to be issued through auctions, and adapting auction programs to changing market conditions.

Primary dealer frameworks also need to remain flexible to market stress. Vulnerabilities in the banking sector impair dealers' ability to take large positions, leading to a significant decline in secondary market liquidity. Responding to challenging liquidity conditions, countries may

[13] IMF 2011c for further discussion.

[14] See Das, Papaioannou, and Trebesch (2010) for the effects of sovereign default risk and private sector access to capital in emerging markets.

choose to relax or adapt market making obligations and to consider changes as permanent. The debt managers' toolkit to enhance market liquidity may also include liability management operations, such as debt exchanges and purchases or sales of off-the-runs. Their implementation will hinge on market circumstances and vary market to market. Often liability management operations are initiated at the request of dealers.

6. CONCLUSIONS—CHALLENGES AHEAD AND OPEN QUESTIONS

We have yet to fully comprehend the interplay of factors driving sovereign risk. The nature of sovereign risk has been transformed in a number of ways since the beginning of the GFC four years ago. Under the conventional view, high levels of debt and fiscal vulnerabilities play key roles in market assessments of sovereign risk. Recent events, however, have exposed the relevance of contingent liabilities and the inter-linkages between sovereigns and banks.

Furthermore, the GFC has evidenced the lack of appropriate tools to measure and manage sovereign risk. There is a need for new tools to monitor sovereign risk as a complex set of risks. The complexity and entwining of sovereign, corporate and households' balance sheets calls for a more holistic approach to risk analysis and stress testing work that places more focus on the inter-linkages and feedback loops embedded in sovereign risk.

A sovereign risk management office (Das and Lindner 2012) could be set up to oversee and assess sovereign risk and vulnerabilities in the economy, and advise the country on remedial measures. The recommendations issued by this independent institution would inform and feed into the policy mix design of the country authorities.

The overhauling and strengthening of the global financial system encompassed the adoption of several new regulations that could further increase the demand for sovereign debt. Basel III covers two liquidity standards—a liquidity coverage ratio (LCR) and a net stable financing ratio (NSFR) to be introduced after an observation period. For the most part, the additional financing needed by banks to meet the LCR ratio requires more purchases of sovereign debt.[15] Also, 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

[15] Banks may be induced to sell longer-term government bonds to meet the desired NSFR. To this extent, there may be certain sell pressure for the government bonds.

debt further. The larger demand for safe assets might also respond to changes in the regulatory framework for the non-bank financial sector.[16]

The new regulations may increase liquidity risks on the secondary and repo markets. The regulation-induced demand for sovereign debt, in particular the LCR, risks reducing 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. Jurisdictions in which the stock of debt is not sufficient to cover the increased demand from banks to meet the LCR could be the most affected ones. 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. Furthermore, the adoption of outright leverage ratios that include repos as part of leverage, despite their safety, could make this lending practice too costly.[17]

Finally, the issuance and distribution models of public debt could be at risk. The heightened sovereign risks in some government bond markets may constrain primary dealers' ability to warehouse sovereign debt securities. Large financial institutions are reassessing the business model in dealing with volatile sovereign debt assets, resulting in large yield concessions ahead of government bond auctions and poor distribution of bids. Alternative debt management techniques may need to be explored.

[16] For instance, new regulations on money market funds in the US or on insurance companies in Europe. Other sources of safe assets' demand could result from lower reliance on credit rating agencies, greater use of central counterparties for both repurchase agreements and derivative transactions as collateral.

[17] Collateralized lending in the form of repos is credit risk-free beyond the exposure to the sovereign. However, regulations on trading and leverage that dis-incentivize repo activity may further reduce liquidity in debt markets. In the absence of a well-functioning repo market, government bond markets might become broker markets where market makers neither trade on their own books nor provide continuous pricing.

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ANNEX: GUIDING PRINCIPLES FOR MANAGING SOVEREIGN RISK AND HIGH LEVELS OF PUBLIC DEBT (STOCKHOLM PRINCIPLES)[18]

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.

[18] 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.

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.

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.