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Assessing Loss of Market Access: Conceptual and Operational Issues

by Anastasia Guscina, Sheheryar Malik, and Michael Papaioannou

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Prepared by Anastasia Guscina, Sheheryar Malik, and Michael Papaioannou[1]

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Abstract

Loss of market access (LMA) is a central element and an exacerbator of balance of payments and fiscal crises. This paper provides an operational definition of LMA, examines the predictive power of potential LMA leading indicators, attempts to determine the likely nature (temporary versus structural) of an LMA episode, and analyzes potential implications of such an assessment on the required degree of adjustment to restore market access. Finally, it highlights the possible application of the methodological framework for identifying emerging risks to market access.

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Author's E-Mail Address: AGuscina@imf.org; SMalik2@imf.org; MPapaioannou@imf.org

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Contents Page

I. INTRODUCTION

Market access, especially to international capital markets, is critical for sovereigns that need to finance their budget deficits and service their existing debt stocks. If a sovereign enjoys the trust and confidence of markets, it can "access" them in the sense that the sovereign can typically borrow the amounts it seeks at the time it wishes and at yields commensurate to its credit ratings. In contrast, a sovereign does not have, or can lose, market access if financial markets severely doubt the soundness of that sovereign's macrofinancial policies or if markets perceive that it may not be able or willing to honor its debt obligations. A sovereign may also temporarily lose market access due to a spike in global risk aversion or as a result of contagion.

Loss of market access (LMA) may trigger capital flight, depletion of reserves, and exchange rate pressures. Severe LMA can lead to a full-blown balance of payment (BOP) crisis, that can further aggravate external and public debt sustainability. Depending on the circumstances, LMA can be manifested by a gradual or abrupt stop of the country's financing or an increase in its cost of borrowing to levels that preclude debt sustainability. In a debt distress situation with complete LMA, the country may have to resort to IMF financing, usually under an IMF-supported program, often combined with new financing from other multilateral donors, Paris Club treatment, and debt restructuring (pre or post arrears).

Under current policy, a Fund-supported program needs to resolve a member's balance of payments problem subject to adequate safeguards and achieve the member's medium term viability (i.e. restore debt sustainability and reestablish access to capital markets). The use of IMF resources requires a joint assessment of market access and the degree of sustainability of the member's public debt.[2] Although market access and debt sustainability are related, they are also distinct. Debt sustainability entails mostly judgments about the trajectory of debt and the realism of the primary fiscal balance required to achieve a downward adjustment in debt. Market access broadly reflects a country's ability to raise necessary funds at acceptable terms (cost and risk) in the international and, in some cases, domestic markets (a fuller definition is provided below). This ability has an impact on debt sustainability both through the interest rate channel and the resulting structure of government borrowing.[3] Likewise, the sustainability of a country's debt can influence whether it has market access.

[2] See "The Fund's Lending Framework and Sovereign Debt—Preliminary Considerations," IMF Board Paper, June 2014 and "The Fund's Lending Framework and Sovereign Debt – Further Considerations – Annexes. Annex III. Assessing Loss of Market Access," IMF Board Paper, April 9, 2015.

[3] The IMF debt sustainability framework distinguishes between market-access countries (MAC) and low income countries (LIC), as outlined in "Staff Guidance Note for Public Debt Sustainability Analysis in Market-Access Countries," May 2013 and "The Joint World Bank-IMF Debt Sustainability Framework for Low-Income Countries," September 2016. Categorization of a country as having market access changes the conditions for debt sustainability and the weights allocated to the different criteria (thresholds) for LMA.

The IMF can provide funding to a member country in exceptional access cases,[4] even if a member has lost market access, if its debt is assessed to be sustainable with "high probability." In such cases, there is the expectation that such LMA is temporary and the provision of IMF's financing can help the country resolve its BOP problems and regain market access.[5] If an assessment of LMA is accompanied by a determination that debt is unsustainable, exceptional access would be conditional on a debt restructuring operation that is sufficiently deep to restore debt sustainability with high probability. In such cases, LMA could be judged as having a more permanent or structural nature. Where the member's debt is considered sustainable but not with a high probability, exceptional access would be justified if financing provided from sources other than the Fund, although it may not restore sustainability with high probability, improves debt sustainability and sufficiently enhances the safeguards for Fund resources. For purposes of this criterion, financing provided from sources other than the Fund may include, inter alia, financing obtained through any intended debt restructuring. Hence, the assessment of whether LMA has occurred and whether it is of a temporary or more structural nature is an important input to IMF's lending decisions.

In practice, the determination of LMA in the context of the IMF-supported programs has been based on a range of considerations. For example, market access was judged to have been lost in a number of recent Fund-supported programs that involved a face-value cut restructuring or reprofiling, as well as in recent euro area programs that involved the systemic exemption (e.g., Greece).[6] Although Fund documents of the time cite widening spreads, cancelations of planned bond issuances, rating downgrades, and, at times, the withdrawal of foreign investors from domestic markets as evidence of LMA, no specific, explicit decision-making framework appears to have been followed in making such assessment. In this context, this paper can inform, complement, and provide structure in IMF's judgement when assessing market access.[7]

The main contribution of the paper is the development of a framework that provides analytical insights on whether a country under distress has lost market access, and on whether such loss is temporary or structural. In this context, the paper first provides a definition of LMA, which takes into account the extent of a sovereign's market access during normal times and outlines the links to the debt sustainability assessment (DSA). Second, it examines various potential leading indicators to evaluate their predictive power in signaling past LMA cases. Our findings show that the indicators of LMA that had shown the highest

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[4] The relevance of market access assessment in IMF lending decisions is detailed in the IMF's lending policies. For an overview of these policies, see an IMF survey article "IMF Reforms Policy for Exceptional Access Lending," January 29, 2016 and a press release number 16/31. A summary of IMF lending decision is provided in Annex VIII. http://www.imf.org/en/News/Articles/2015/09/28/04/53/sopol012916a and BUFF/16/9, Cor. 1 (1/27/2016)

[5] See Morris and Shin (2006).

[6] The Executive Board of the IMF approved on January 20, 2016 reforms to the IMF's exceptional access lending framework that included the elimination of the "systemic exemption." Also, see Annex VIII.

[7] This paper is not intended as a formal guidance note for IMF lending decisions.

explanatory power in past cases are sovereign bond spreads, nonresident holdings of general government debt, and sovereign credit ratings. Third, it presents a framework to evaluate the likely causes for LMA, by analyzing information on market pricing, macroeconomic and fiscal fundamentals, the health of the financial sector, and global risks. Finally, it discusses implications of a temporary versus a structural LMA on external assistance appropriate for the country's circumstances, and highlights the possible application of the proposed framework for identifying emerging risks to market access.

The paper is organized as follows: section II discusses the conceptual and operational issues in assessing LMA; section III proposes a seven-step framework for assessing LMA; and section III provides some concluding remarks.

II. Defining LMA—Conceptual and Operational Issues

Market access is defined in a May 2013 IMF Board paper as "*the ability to tap international capital on a sustained basis through the contracting of loans and/or issuance of securities across a range of maturities, regardless of the currency denomination of the instruments, and at reasonable interest rates.*"[8] While this definition is comprehensive and clear in its principles, it is not an operationally precise definition. For example, applying the most demanding or extreme interpretation, only a handful of advanced and emerging market countries would meet a standard of issuing in international markets on a sustained basis, across a range of maturities, regardless of the currency of denomination. Indeed, such an interpretation would imply that infrequent issuers on the international markets are in a constant state of LMA.[9]

To operationalize this definition, it is important from the start to clarify the relationship between LMA and the sovereigns' *ability* versus *willingness* to tap international markets, treatment of domestic debt, and maturities of instruments. It is also important to ensure that the definition of LMA takes into account the extent to which sovereigns tap international capital in normal times. This key distinction between regular and sporadic issuers is important in deciding when a sovereign is entering a period of LMA.

A. Evaluating a Sovereign's *Ability* to Access Markets

In determining whether a sovereign has the ability to tap the market, one first has to distinguish between being forced out of the market and voluntary lack of borrowing. A

[8] See "Sovereign Debt Restructuring—Recent Development and Implications for the Fund's Legal and Policy Framework," IMF Policy Paper, April 26, 2013, paragraph 11 https://www.imf.org/external/np/pp/eng/2013/042613.pdf; and Bassanetti, Cottarelli and Presbitero (2016, forthcoming).

[9] The emphasis on being able to raise capital in international markets relates to the need of a country to maintain its international financial obligations. Inability of a country to access international markets (in most cases in foreign currency) for servicing its debt or financing its budget deficit indicates a BOP crisis, which is a *sine qua non* for IMF involvement and financing. The IMF may only provide financing to resolve a member's balance of payments problems.

sovereign may decide not to tap international capital if it is running fiscal surpluses and has very low refinancing needs. Such lack of issuance, although not always recommended (see Box 1), could not be considered as LMA. If, on the other hand, lack of issuance could be attributed to either debt amount rationing or deteriorating financing terms, where rising interest rates are incompatible with debt sustainability,[10] the decision not to tap international markets could not be considered "voluntary," and a country that ceases such issuance would be considered in LMA.

Drawing down on international reserves or using central bank swap lines to meet BOP needs instead of borrowing may be a rational choice by many sovereigns from the asset-liability management perspective. In fact, abstaining from the market in distressed times and drawing on cash buffers may be preferred to locking in very high interest rates that may be resulting from contagion or a temporary spike in risk aversion. However, since such absence from the market is driven by a deteriorating environment, we consider such cases as being LMA. It should be emphasized that no stigma should be associated with the determination of LMA, as such episodes can be extremely short-lived.[11]

[10] For a more detailed discussion of the similarities and differences between market access and debt sustainability, see Box 3.

[11] Even advanced countries conduct regular stress-testing exercises of what they would do if they lose market access for 1-day, 2-days, etc.

Box 1. Tapping Markets in Times of Plenty

It is typically advised that sovereigns, in particular advanced market (AM) and more developed emerging market (EM) issuers, continue tapping markets on a sustained basis even in the absence of any budgetary financing needs. Such continued presence in the market is recommended in order to provide a benchmark yield curve for the corporate debt market, to provide investors with relatively safe investment alternatives, and to be able to quickly increase issuances should the need arise.

A strategy of maintaining the debt market, despite the lack of fiscal needs, will imply a fiscal cost, typically in the form of negative carry, especially for EMs. However, given the favorable macroeconomic environment and lack of financing need, the net interest cost is likely to be low, against the benefits described above. The financial cost may even pay off when financing needs do arise and the debt market is readily available.

The recent financial crisis illustrated the importance of continued presence in the markets despite lack of funding needs (de Broeck and Guscina, 2012). Countries such as Ireland, which had a budget surplus and small government debt prior to the global financial crisis, were confronted with a surge in gross funding needs from low pre-crisis levels, and they had to reintroduce issuance procedures and instruments to meet these needs. Other countries, Italy for instance, entered the crisis with a deficit and already high debt and hence substantial gross financing needs. In Italy, additional issuance due to the crisis-related widening of the deficit resulted in a relatively small increase in gross financing needs, which could be absorbed through limited adjustments in well-established mechanisms and instruments.

B. Accessing *International Capital*—Treatment of Domestically-Issued Debt

In defining what constitutes market access, the treatment of domestically-issued debt is nontrivial.[12] As the Fund's mandate is geared toward BOP issues, in defining what constitutes market access the emphasis is placed on its international dimension (i.e. the country's ability to tap 'international capital').[13] Sovereigns may no longer be able to place new debt or rollover existing debt on the international markets, but may still be able to issue debt domestically. Domestic banks typically hold a substantial share of their own sovereign's debt. Likewise, domestic nonbank holders are an important investor category in government debt in many AEs and EMs.

As sovereigns may either directly or indirectly (through changing regulation or raising the reserve requirement) force domestic institutions to buy government debt, ability to raise funds domestically may not constitute true market access. This ability to exert control over domestic investors implies that even in the midst of distress, sovereigns can typically roll over domestic debt. Moreover, in times of stress, central banks may hold increasing amounts

[12] For the purposes of this paper, "domestic debt" is defined by jurisdiction of issuance, i.e. "domestically-issued debt."

[13] From the BOP perspective, the ability of a country to repay is in many cases related to access to international markets (in many cases in foreign currency).

of domestic debt, as well as put in place liquidity facilities which use sovereign debt as collateral and other backstops. However, such purchases of government domestic debt do not constitute true market access.

Most sovereigns have few difficulties issuing or rolling over domestic-currency debt with very short original maturities, even in the midst of distress.[14] There have been some exceptions, such as Cote d'Ivoire (2011), Russia (1998), and Ukraine (1998), which defaulted on domestic T-bills. If a sovereign can no longer rollover short-term domestic debt, it should definitely be considered in an extreme case of LMA.

The distinction between domestically issued and internationally issued debt is not as important in advanced economies and is becoming increasingly blurred for some EMs. These countries can typically borrow abroad in their own currency and/or have a high participation of foreigners in the domestic markets. Domestic debt issuance (in domestic or foreign currency) constitutes ability to tap international capital and thus market access, if nonresident investors participation is significant. Hence, in assessing whether domestic issuance represents true market access, IMF staff would have to take into account country-specific characteristics and exercise judgment.

C. Contracting of Loans and Issuance of Securities Across *a Range of Maturities*

Market access requires that a sovereign is able to contract long-term loans or issue long-term securities.[15] As almost all international bonds and loans tend to be long term, this question applies only to whether domestic issuance of short-term securities constitutes market access. These instruments are close substitutes for cash and used throughout the financial system for liquidity management, benchmarks for the yield curve and collateral for the interbank market. However, if the sovereign can only place very short-term instruments and can no longer borrow in the long-term segment of the market, it would be considered that it is in a state of LMA.[16]

D. Taking into Account the Degree of Market Access in Normal Times

Practical assessment of LMA depends on the extent to which a country had market access in normal times. In order to determine when a sovereign has lost market access, one has to first evaluate to what extent and in what context it had market access in the first place, as measured by interest rates, frequency of issuance, amounts issued relative to its funding

[14] If a country cannot borrow at long-term maturities in local currency domestically, this phenomenon is referred to as "domestic original sin" and points to the underlying weakness of the country's fundamentals. This inability often leads to domestic issuance of foreign-currency debt, such as the case of Argentina, where protracted LMA led to higher dollarization of domestic debt.

[15] For the purpose of this study, long-term debt instruments are considered those with maturity of more than one year.

[16] It is important to note that market access in the context of positive net borrowing is different from full or partial rollovers.

needs, tenors, and currency denomination. These initial conditions (that are quite different for regular vs. infrequent issuers) would then be used in determining whether and when the LMA occurs. By evaluating past issuances of bonds (and syndicated loans) one can establish the pattern (for regular issuers) and identify periods of a significant deviation from the established pattern.[17]

The degree of market access in normal times is also a key consideration for what constitutes the end of LMA. For the purposes of this empirical work, we define the end of LMA as issuance of a new long-term security (or syndicated loan) in the international market.[18] A more stringent standard, which is however more subjective, would be to define the end of LMA as the resumption of normal issuance patterns in terms of frequency of issuance, amounts, tenors, and, especially, bond spreads.[19]

E. Traditional LMA Definition in the Empirical Literature

LMA is typically defined in the empirical literature as time period between announcement of default and restructuring and until the next international bond issuance. Defining market access in terms of primary issuances of bonds and loans is consistent with prior academic literature. For example, Gelos, Sahay, and Sandleris (2004) examine market access by looking at sovereign bond issuances and public syndicated bank loans. Kaminsky and Fostel (2007) capture countries' access to international markets by using primary gross issuance in international bond, equity and syndicated loan markets. Likewise, Cruces and Trebesch (2013) look at issuance of bonds and loans to measure the period of market exclusion.[20]

The conventional definition of LMA in the empirical literature, however, does not account for LMA episodes that are not associated with debt distress related to BOP crises. This is an important distinction since some sovereigns that lost market access were able to avoid any type of debt restructuring operations (e.g., Brazil, Ireland, and Portugal). Moreover, the conventional definition does not take into account the degree to which a country had market access in normal times and whether lack of issuance post-restructuring or default could be explained by benign factors, such as lack of funding needs due to fiscal surpluses.

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[17] For the purposes of this empirical work, in order to simply and objectively define the dependent variable, a "significant deviation" means complete cessation of primary issuances. An adverse deviation from regular patterns toward riskier debt structures (e.g., shorter maturities) or failed or undersubscribed auctions serve as predictors of LMA. It should be noted that pattern changes may not always reflect LMA, but merely prudent debt management decisions.

[18] And/or domestic market that is accessible to foreign investors, as in the case of AEs or some EMs with sizeable foreign participation.

[19] Spreads is one of the key predictors of both the beginning and the end of LMA. In real time, return of spreads to pre-crisis levels signals the end of LMA. For the empirical work, spreads are an explanatory variable.

[20] See also Bassanetti, Cottarelli, and Presbitero (2016, forthcoming).

F. Expanded Definition of LMA Used in the Empirical Work of the Paper

Market participants often question the usefulness of issuance-based measures for LMA assessment and indicate that normal trading conditions, with reasonable spreads would be a more appropriate definition of market access. While we fully agree, there is an important distinction between doing an assessment of LMA in *real time* and conducting *empirical work* to test the predictive power of various LMA indicators. As it will be demonstrated below, spreads have the highest predictive power in signaling past LMA episodes. Hence, *in real time*, a sovereign would be considered to have lost market access if its primary or secondary market spreads have risen to such an extent that, if permanent, would render borrowing programs unsustainable. This makes the definition compatible with the traditional IMF definition (May 2013 Board Paper) where "reasonable interest rates" are a key determination of market access.

In this empirical work, to adequately test the predictive power of various leading LMA indicators, we define the dependent variable (i.e. timing of LMA) in terms of criteria specified below. Since spreads/yields cannot be simultaneously used as both the dependent and the explanatory variables, in the empirical work we use them strictly as the latter. Likewise, in *real time*, when a country requests a non-precautionary IMF-supported program, the assessment of LMA, and whether the LMA is temporary or structural, has not yet been ascertained. For the timing of LMA in the *empirical work*, we attribute such requests to LMA.[21]

The timing of LMA has to take into account a sovereign's ability to issue long-term securities in markets that are accessible to foreign investors, including its own domestic market. The operational definition has to take into account the degree to which a sovereign had market access in normal times, as well as distinguish absence from the market that could be explained by benign factors. Taking into account these considerations, we broaden the conventional definition of LMA, based on announcement of default and/or restructuring until the next international bond issuance, to include also periods of no primary international and/or domestic issuance that cannot be explained by lack of funding needs or prefunding. For the timing of LMA in the empirical work presented in this paper, the following criteria are used:

a) For governments that are *regular issuers*,[22] the start of LMA coincided with either (i) an expected issuance (based on an auction calendar, previous patterns of issuance, or

[21] Typically, there is an overlap of LMA episodes based on cessation of issuance, announcement of default and/or restructuring, and request for a high-access non-precautionary IMF-supported program criteria. LMA based on the "cessation of issuance criterion" often predates a determination of LMA based on announcements of default/restructuring, and/or a request for a Fund-supported program. However, in rare circumstances where primary issuance data are not available or in the case of sporadic issuers where primary issuance data are not as informative, the latter two criteria allow us to identify additional LMA episodes.

[22] Regular issuers are defined as those that issue according to a pre-announced schedule or have clearly identified patterns of issuance. Regular issuers do not have to be frequent issuers. As long as they tap

rollover and financing needs) of long-term international or domestic securities (accessible to non-residents), or a syndicated loan[23] with long-term maturity either did not happen or was cancelled; and/or (ii) an announcement of a default or restructuring, (iii) and/or a request for a high-access or exceptional access non-precautionary IMF-supported program.[24] The end of LMA episode was marked by an issuance of a long-term security or a syndicated loan in markets accessible to foreign investors.

b) For governments that are *sporadic issuers*,[25] the start of LMA is marked by either (i) a predicted issuance (based on rollover and financing needs) of a long-term international security or a syndicated loan did not happen; (i) and/or an announcement of a default or restructuring; (ii) and/or a request for a high-access non-precautionary IMF-supported program. The end of LMA is marked by an issuance of a long-term security or a syndicated loan in markets accessible to foreign investors.

III. An Operational Methodology for Assessing LMA—The Seven Steps

As mentioned above, LMA is defined as a condition when a sovereign is unable to tap international capital markets. This definition includes restructuring or rescheduling events, as well as periods when a sovereign stops issuing in the primary markets and such cessation of issuance cannot be explained by benign factors. In the seven-step approach described below, we evaluate potential leading LMA indicators, test the predictive power of most commonly used LMA indicators (spread and credit ratings) using signaling and risk-zone approaches, and identify additional LMA indicators that could be used to supplement early-warning-type analysis. We then discuss the relationship between LMA and DSA, which is crucial in determining whether LMA is temporary or structural in nature, with the latter having major implications for IMF lending decisions to members in distress. The seven-step framework is described below:

international capital at predicted intervals (even once a year), they are considered regular issuers. See Annex I for more details.

[23] Nowadays, even in the extremely rare cases of issuing syndicated loans, these are always transformed into tradeable instruments.

[24] To be considered in LMA, for the purposes of this empirical work, the sovereign must have requested IMF support of more than 100 percent of its quota in order to fill an identified financing gap in the baseline scenario. Our empirical work is not sensitive to the exact specification of the access (i.e. 200, 400 percent of the quota, mostly because the cessation of issuance criterion typically precedes a request for an IMF-supported program). A request for a precautionary arrangement (e.g., FCL), including cases of exceptional access, does not imply that a country has lost market access, as there is no identified financing gap in the baseline scenario and the sovereign does not intend to draw unless some extreme shocks materialize.

[25] Sporadic issuers tend to be developing countries.

A. Step 1: Consider Potential Leading Indicators of LMA[26]

Different analytical variables relating to both internationally and domestically-issued debt, have been proposed as indicators of LMA. A significant deterioration in the following indicators is typically considered to foreshadow LMA:[27]

- Sovereign spreads: Observe changes in sovereign spreads that are well above the historical levels, across the whole maturity spectrum.

- Nonresident holding of public debt: Examine whether there has been a significant and sustained fall in nonresident holdings of public debt.

- Terms structure of bond prices: Assess whether recovery rates and probability of default (PoDs) implied by the term structures of bond prices signal a distress episode.

- Significant adverse deviations in recent primary bond issuance practices (in terms of volume, frequency, and composition of borrowing, including maturity and financing terms) from what the sovereign would do in "normal" circumstances, especially for domestic issuances:

    - Volume: Compare with (i) total financing needs; and (ii) announced bond auction schedule;

    - Frequency: Compare with (i) average frequency of issuances; and (ii) bond auction schedule (e.g., if auctions are cancelled or delayed);

    - Maturity: Compare with recent average original maturity of instruments. Inability to issue even short-term domestic debt may signal an extreme case of LMA.

    - Financing terms: Compare recent financing terms with past placements (e.g., if there is a shift from fixed interest rates to variable rates).

- Government bond rollover rates: Examine whether government bond rollover rates have fallen on a sustained basis, and whether this reduction in rollover rates cannot be attributed to reduced financing needs.

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[26] In this empirical exercise, LMA, defined as complete cessation of primary issuance is used as the dependent variable. The term "leading indicators" is used not as a definition of what constitutes LMA, but rather as a set of variables whose signaling powers could be used as "early warning indicators" of LMA. In this context, these are the explanatory variables of LMA. Among the indicators listed in step 1, sovereign bond spreads, bond prices, and credit ratings are the most reliable in predicting LMA.

[27] See "Annex III. Assessing Loss of Market Access" of April 9, 2014 Board Paper "The Fund's Lending Framework and Sovereign Debt – Further Considerations."

- Government cash balances:[28] Examine whether there has been an abnormal decline in fiscal balances, or government cash balances, or greater reliance on direct central bank financing.

- Sovereign credit ratings: Observe changes in ratings and assess whether the country has lost creditworthiness.

- Bond trading activity: Assess the volume of recent bond trading in secondary markets and bid-ask spreads (e.g., if trading volumes are thinner and bid-ask spreads wider).

- Shape of the yield curve: Assess whether flattening or inversion of the yield curve may be signaling market expectations of sovereign debt problems and LMA.

- CDS spreads: Observe steep increases in CDS spreads that may signal increased risk of sovereign default

- Upfront CDS contracts: Observe increases in up-front CDS contracts and convergence in various measures of upfront costs based on default expectations.

B. Step 2. Determine the Timing of Past LMA Episodes

In analyzing the performance of market access indicators in foreshadowing LMA, defining the dependent variable is non-trivial. As argued earlier, in *real time*, deterioration in spreads, credit ratings, primary debt issuance patterns, etc. could all be used to assess whether a government has lost market access. Methodologically, however, when assessing the *historical* performance of these indicators in prior episodes of LMA, one cannot determine the dependent variable (LMA) in terms of the indicators listed above and then proceed to use the very same indicators to explain it. One of the indicators described above has to be treated as a dependent variable, while the rest have to be treated as explanatory variables.

From the operational definition of LMA and the list of indicators in Step 1, two possible candidates for the use as the dependent variable have emerged—primary issuances and spreads. We focused on primary issuances in determining the dependent variable, as this allowed us to build on the definition of LMA used in prior empirical literature that has defined the LMA period from the time of default or restructuring and until the next bond issuance. We also consider that timing of LMA based on the announcement of default/restructuring and/or a complete cessation of primary issuance by regular issuers to be a more definite and objective criterion than a determination of LMA based on spreads. A determination of LMA timing based on spreads would have required judgment of what constitutes "reasonable cost" that would be "consistent with debt sustainability," while "complete cessation of issuance" is more objective.

The decision rule for the dependent variable (timing of LMA episodes) is summarized in Figure 1 and described more fully in Annex I. Following the operational definition of LMA, we first include all episodes of absence from the market, based on the announcement of a

[28] One has to be careful with using cash balances as an indicator due to seasonal and idiosyncratic patterns.

default or restructuring, and/or a request for a high-access IMF-supported program that is not of precautionary nature. It should be emphasized that such a request does not imply that a country will undergo a restructuring or reprofiling of its debt. Such a determination depends on the combined assessment of LMA and debt sustainability. However, a request for a non-precautionary IMF-supported program typically does imply that a sovereign's access to market borrowing is impaired.[29]

We then augment the set of LMA episodes to include cases not associated with debt restructuring or request for a non-precautionary IMF program. We do so by evaluating episodes of unexpected absence from the primary debt that could not be explained by benign factors. We start by evaluating past issuances of long-term bonds and syndicated loans to establish a pattern that a country follows in normal times. Once we establish a pattern (for regular issuers), we focus on the episodes of a significant deviation from the established pattern. In order not to get lost in what constitutes "a significant deviation," which is subjective, we only identify episodes where all primary issuances have ceased, and mark them as potential suspects for LMA. We then consider if complete cessation of primary issuances could have benign explanations, such as lack of financing needs (due to fiscal surpluses, low gross financing needs) or prefunding. If there is no benign explanation for lack of issuance, we mark these cases as LMA based on "cessation of issuance criterion."

Our methodology to identify past LMA episodes represents an improvement over past empirical literature, in particular for regular issuers. By augmenting the criteria to include cessation of issuance that could not be explained by benign factors, we are able to identify LMA episodes that are not associated with debt default or restructuring. Moreover, even in situations where default or restructuring did occur, our methodology allows for a timelier identification of LMA. This is important, as LMA often precedes announcements of default or restructuring. That said, when applied to sporadic issuers, our empirical methodology suffers from similar limitations as past empirical literature. As most of the identified LMA episodes for sporadic issuers were based on the announcements of defaults, restructurings, or requests high-access non-precautionary IMF-supported programs, early identification of LMA, as well as identification of LMA episodes not directly linked with debt distress, become more problematic.

Determining through the issuance criterion when LMA had occurred using historical series is complicated by a number of factors. First, data on primary bond issuances may not be available in some instances or for the whole sample period.[30] Second, it is often hard to infer with very high accuracy whether a significant deviation from prior issuance pattern cannot be explained by factors other than LMA. In real time, IMF staff could more easily inquire from the authorities why, for example, certain auctions have been cancelled or postponed.

[29] By impaired market access we mean that a sovereign might still have the ability to place international bonds, but will have to do so at heightened spreads, which may be damaging for debt sustainability.

[30] To identify patterns of issuance, at least 3 years' worth of data are typically necessary for countries that issue on an annual basis (a shorter period is sufficient for countries that issue at a monthly or quarterly frequency).

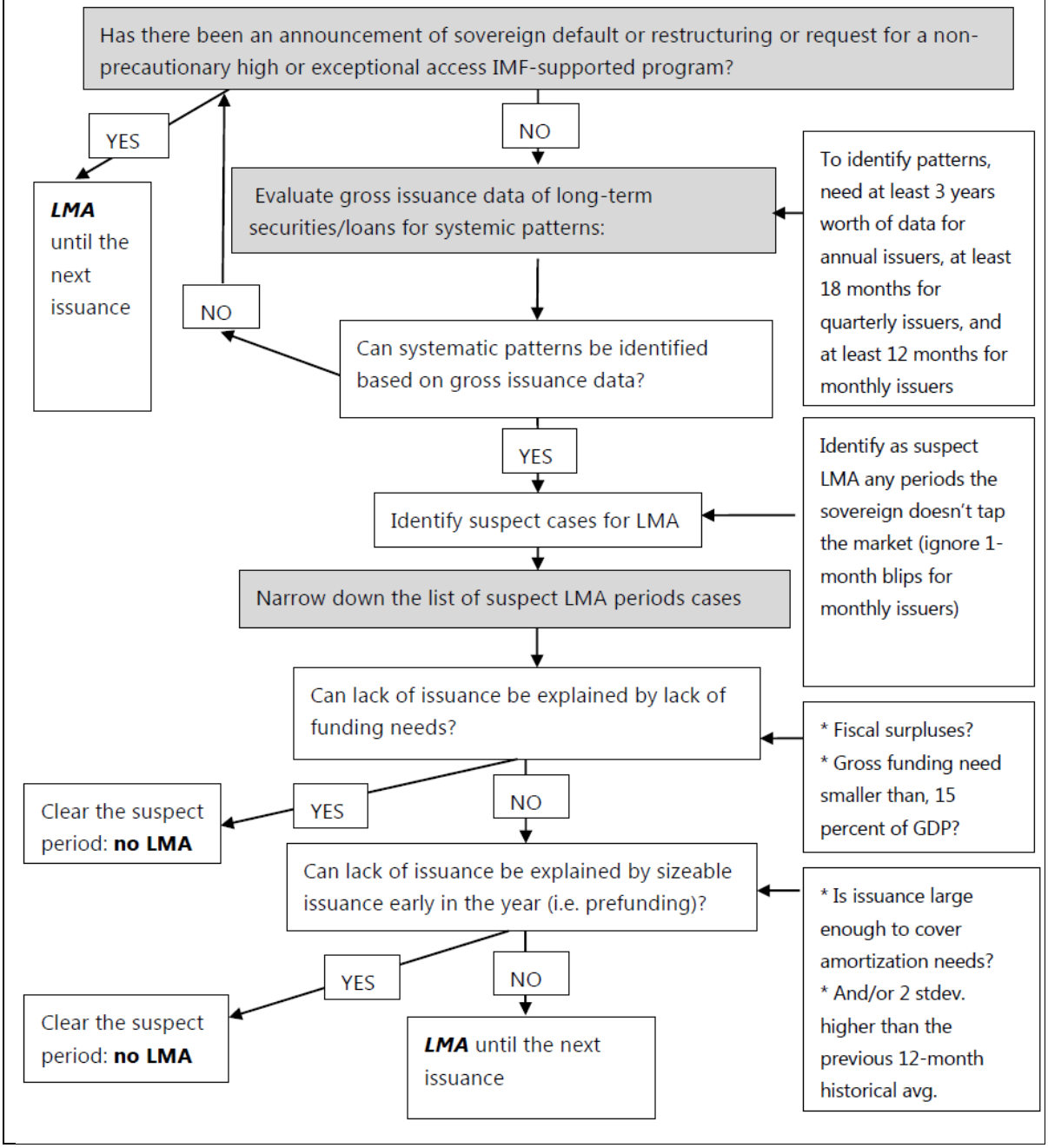
Moreover, data on fiscal needs of a country could be available at a higher frequency than the annual data we used in the empirical exercise.

It should be noted that the application of the decision rule captures definitive cases of LMA. To make the determination of past LMA timing more objective, and not subject to the interpretation of what constitutes "significant" deviation from prior patterns of issuance, we focus on the cases where primary issuance stopped completely. In real time, staff can make a determination of a "partial LMA" based on the behavior of the indicators described above. In such cases, a country might still be tapping markets but at a lower volume, lower frequency, shorter maturity, etc.

We applied the decision rule presented in Figure 1 below to a large sample of countries to assess its performance relative to previous Fund assessments of LMA. To do that, we followed a systematic approach in examining the previous issuance pattern, in identifying the suspect cases of LMA, and in clearing (or not) these suspects. Expectations on issuances are formed based on previous issuance patterns or rollover needs. The deviation from previous issuance patterns has to be big enough and not be explainable by other factors (prefunding or bunching of issuances earlier in the year to take advantage of favorable market conditions or lack of net funding needs due to fiscal surpluses).

Figure 1. Decision Rule on LMA in the Empirical Exercise

(used to define the dependent variable—timing of LMA)



Following the decision rule described above, we test for LMA a sample of 57 advanced, emerging and frontier market economies using monthly data for 1990–2015 period. The data on gross issuances and amortizations were taken from the BEL and Dealogic databases and supplemented by the de Broeck-Guscina (2012) database on the euro area countries. Data on fiscal fundamentals were taken from WEO and VEE databases.

Table 1 describes the summary statistics regarding the LMA variable. Out of 57 countries in the sample, 49 had lost market access at least once over the observation period, out of which 24 lost market access more than once (See Annex II for a complete list of the identified LMA episodes by country). The median duration of market access loss was 41 months over the entire 1990–2015 period. The median duration of LMA has shortened over time—it was 36 months for countries that have lost market access in the 1990s, 31 months for LMA episodes that started between 2000–2009, and only 16 months for LMA episodes that began between 2010–2015.[31]

Table 1. Summary Statistics for the LMA Variable

Number of countries:	57			
of which:				
never in LMA	7			
1 LMA episode	26			
2 LMA episodes	9			
3 LMA episodes	10			
4 or more LMA episodes	5			
		episodes that began during:		
Duration of LMA episodes:	1990-2015	1990-1999	2000-2009	2010-2015
Minimum	4	2	4	6
Maximum	178	217	179	48
Average	57	59	38	19
Median	42	36	30	16

Source: Fund staff estimates.

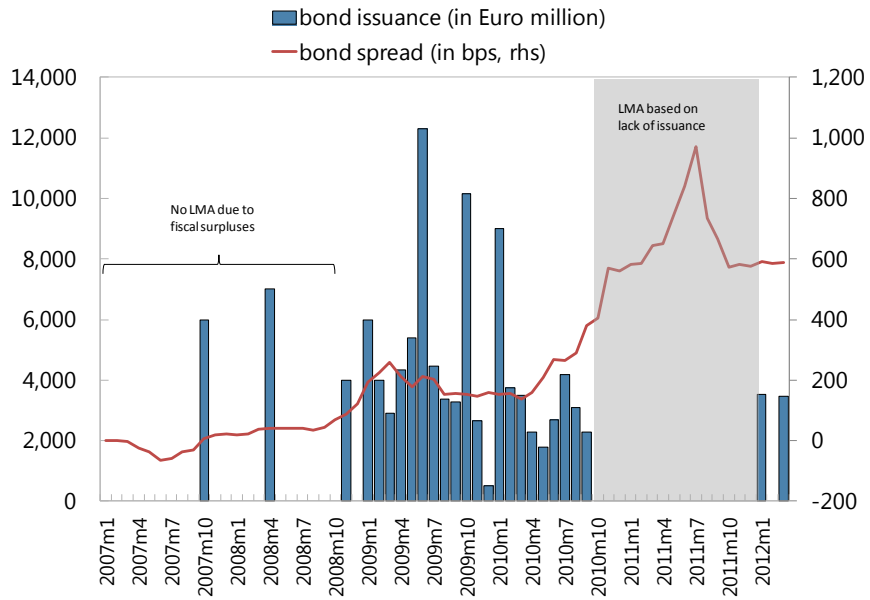
The used decision tree accounts for the fact that the issuance pattern is not static and reasons other than LMA could explain lack of issuance. As domestic debt market develops, most countries move from being sporadic issuers to regular issuers. However, there are some exceptions. Ireland, for example, moved from being a regular issuer to a sporadic issuer after many years of running fiscal surpluses (Figure 2). However, as explained in the decision tree, since such lack of issuance can be explained by lack of funding needs, Ireland was not classified in LMA during 2007–08. Nevertheless, as explained in Box 1, it could have been prudent to continue tapping markets on a regular basis even in times of plenty, so as to avoid having to re-introduce issuance procedures and instruments during an unexpected surge in funding needs. Ireland ceased issuing long-term securities starting in October 2010, despite

[31] The duration of LMA episodes may be understated. For countries that have not yet regained market access we used December 2015 as the cut-off point.

having very large gross financing needs (43 percent of GDP).[32] This timing of LMA is consistent with IMF assessment at the time.

Ireland's market re-access proceeded in stages. It started with a switch in January 2012, thereby investors exchanged 30 percent of the outstanding 2014 bond for a new 2015 bond. Later in 2012, investors could switch their holdings of shorter-dated 2013 and 2014 bonds into a new 5-year bond or the existing 2020 bond. The new syndication in January 2013 was followed by a new 10-year year issuance in March 2013.

Figure 2. Ireland: Loss of Market Access



Sources: de Broeck and Guscina (2012), Bloomberg, and authors' estimates.

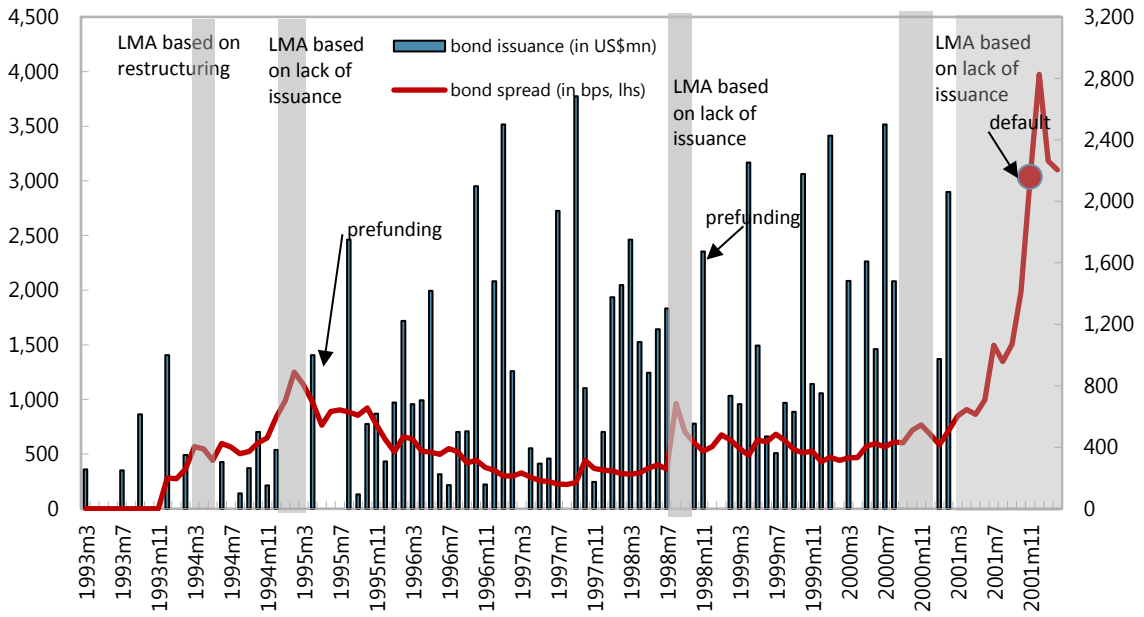
The case of Argentina can illustrate how the decision rule identifies various types of LMA episodes. The shaded areas in Figure 3 correspond with LMA periods (defined either based on restructuring or unexpected cessation of issuance). The first shaded area (April–June 1993) corresponds to the LMA episode after a commercial debt restructuring. The second shaded area (January–March 1995) corresponds to LMA based on unexpected lack of issuance. Prior to January 1995, Argentina was tapping the market every month. In evaluating whether there could have been a benign explanation for this lack of issuance, we note that Argentina was running fiscal deficits at the time, and it had amortization needs for two international bonds that were maturing during this period. Hence, we consider this short period of time as LMA, possibly due to the contagion from Mexico's tequila crisis which caused the borrowing rates to increase for other countries in the region. The third identified LMA episode (August–September 1998) based on unexpected lack of issuances seems to have a similar explanation, namely contagion from Russia. Further, there are two suspect

[32] Half of the gross financing need was due to the financial sector support, which amounted to about 21 percent of GDP.

episodes based on lack of issuance that had been "cleared" due to large prefunding (marked with arrows on the chart).

The case of Argentina also illustrates the benefits of identifying LMA episodes based on unexplained lack of issuance criterion. It is often the case that loss of market access precedes the time of default or restructuring. For example, by the time Argentina defaulted in November 2001, it had already lost market access. The timing of LMA based on lack of issuance (March 2001) coincides with what is reported in the Fund documents at the time.[33]

Figure 3. Argentina: Loss of Market Access



Sources: Bloomberg, Bonds and Loans (BEL) database, and authors' estimates.

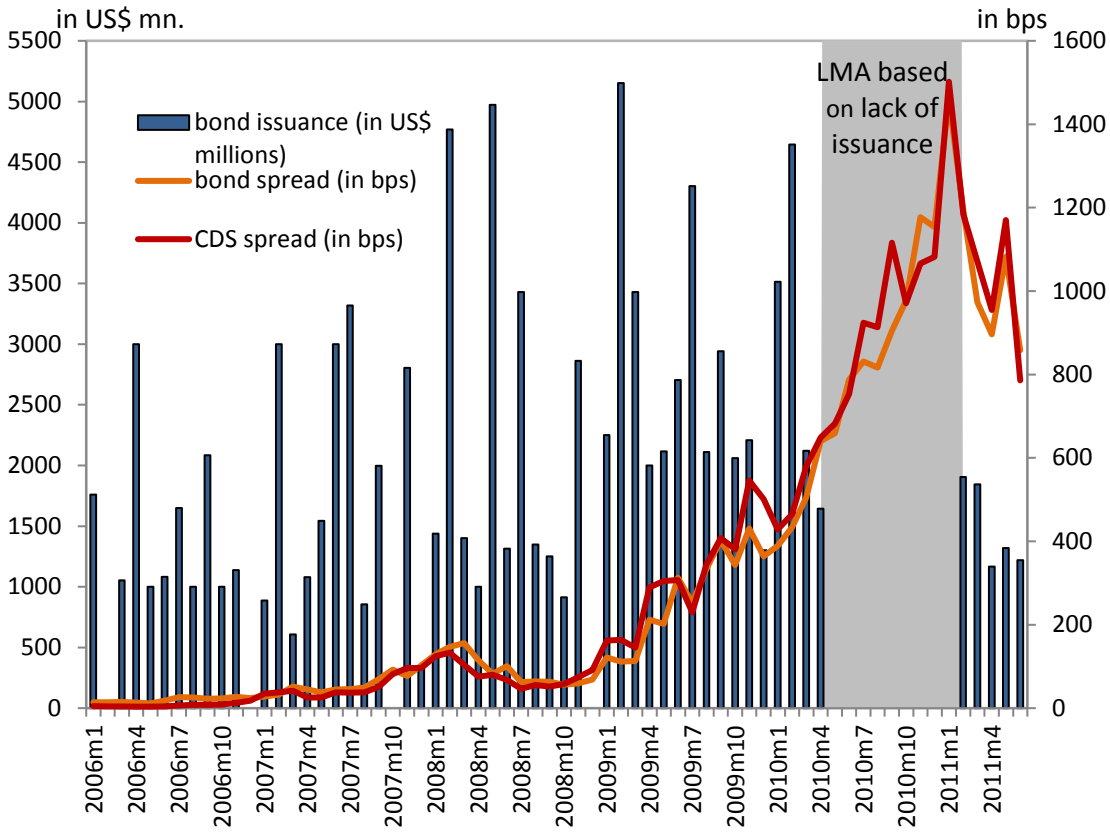
The case of Portugal case of Portugal demonstrates how a country tried to preserve market access in challenging times. Portugal continued tapping international capital markets by issuing long-term securities even as borrowing costs were climbing (Figure 4). Long-term bond spreads over Bunds have increased from less than 100 bps on average in 2009 to almost 650 bps at the time of last issuance in April 2011. The issuance of long-term debt had ceased for almost a year (until January 2012), despite large fiscal deficits and high gross financing needs (more than 30 percent of GDP). As benign factors could not explain this lack of issuance, we classified Portugal in LMA during this time period. This is consistent with the IMF's assessment that Portugal lost market access in April 2011.[34]

[33] See EBS/01/66.

[34] EBS/11/72

Figure 4. Portugal: Loss of Market Access

(in bps and US$ million)



Sources: De-Broeck and Guscina (2012), and authors' estimates.

C. Step 3: Consider Past Performance of Leading LMA Indicators

There is a distinction between conducting empirical work and doing an assessment of LMA in real time. As explained earlier, for the empirical work, one of the indicators has to be used as the dependent variable (the timing of an LMA episode). Only after the timing of the event has been clearly identified, can the predictive power of leading LMA indicators (spreads, ratings, CDS) be tested. In contrast, in real time, all the indicators described in Step 1 can be used as the "leading indicators" of LMA, including changing pattern of primary issuance.

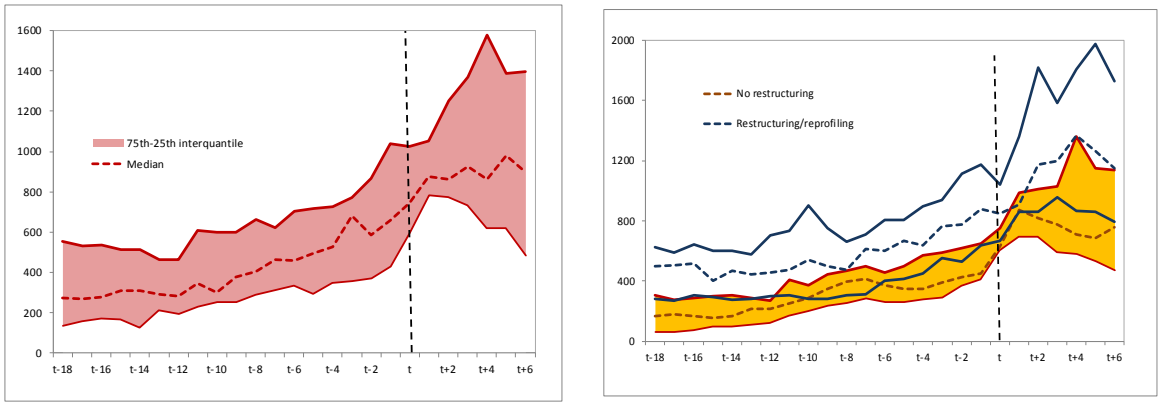
Now that the dependent variable (timing of past LMA episodes) has been determined by applying the decision tree, we can assess the performance of leading LMA indicators prior to the event. Since the historical data for many of the indicators identified in Step 1 may not be available,[35] we first focus on spreads, credit ratings, nonresident holdings of government debt, and composition of borrowing in terms of currency, maturity and interest rate structure (fixed vs. floating), for which we had the best data coverage.

[35] In real time, IMF staff tends to use whatever relevant information is readily available on a case-by-case basis.

Sovereign bond spreads are the most widely-used measure of sovereign distress. These are typically considered as a comprehensive measure of a country's overall risk premium, which is a function of its market, credit, liquidity, and other risks. Since sovereign bonds are priced to compensate for the aforementioned risks, spreads tend to rise in the period of sovereign stress. Credit ratings provide a measure of a sovereign's creditworthiness that reflect country's fundamentals and outlook. Declines in nonresident holdings of government debt signal rising vulnerability to sudden stops and inability to roll-over debt. Shifts in the composition of sovereign borrowing towards shorter-term, floating rate, or foreign-currency denominated debt may signal rising vulnerability to sovereign bond stress.

The behavior of spreads prior to LMA is consistent with the priors. Time t indicates the time the country lost market access, as determined by the application of the decision tree described in Step 2. Spreads start to rise 10 months prior to LMA for the median country in the sample, with the steepest increase occurring 2 months prior (Figure 5). It is interesting to note that markets are pricing in the probability of face-value cut restructuring or reprofiling prior to LMA, as spreads are generally higher for these countries compared to countries that were able to avoid any type of restructuring. The spreads of sovereigns that were able to avoid a face-value cut restructuring/reprofiling are lower prior to LMA, and even though they tend to rise faster compared with the restructuring cases, they come down quicker, especially in cases where fiscal adjustments and the IMF's catalytic lending role[36] are significant.

Figure 5. Behavior of Sovereign Spreads Around LMA in the Sample
(in basis points, t=0 is time of LMA)

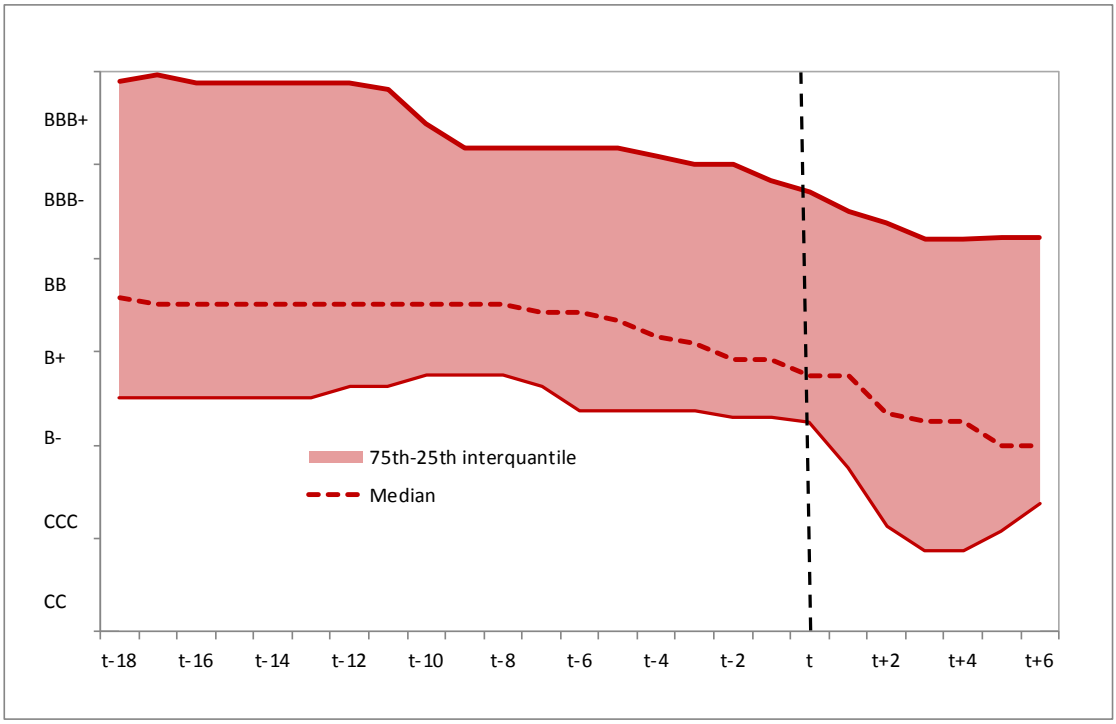


Sources: Bloomberg, and authors' estimates.

Credit ratings decline prior to LMA, but tend to operate with a lag. Credit ratings show evidence of a decline starting around 6 months prior to LMA, however the decline becomes abruptly more steep after the initial loss of market access. This is consistent with past experiences of credit market downgrades (Figure 6).

[36] In the sense that IMF financing can act as an important catalyst for attracting other funds.

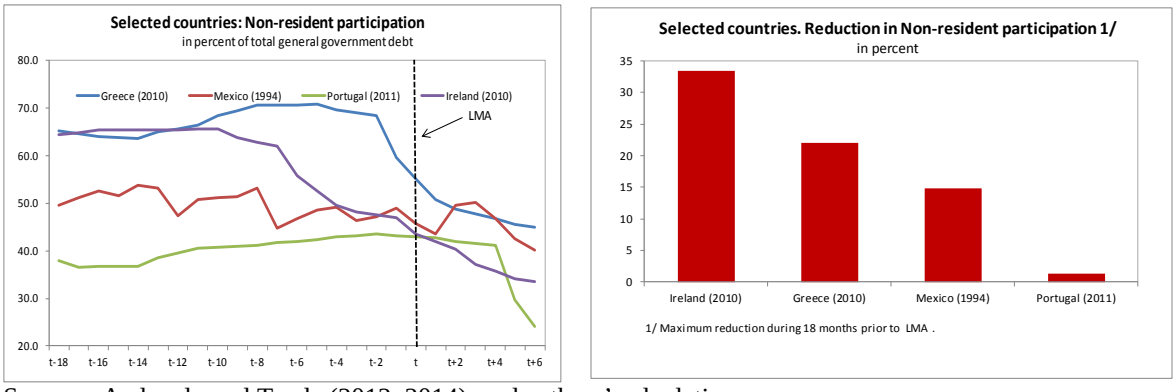
Figure 6. Behavior of Credit Ratings Around LMA in the Sample



Sources: Rating agencies, and authors' calculations.
1/ It covers 22 emerging and advanced economies. It refers to the average of S&P, Moody's and Fitch.

Nonresident shares of general government debt decline prior to LMA, as expected (Figure 7). This observation is based on the analysis of government debt from the Arslanalp and Tsuda (2013) database. However, since the database starts in 2004, the analysis is limited to only a subsample of countries, which lost market access in recent years.

Figure 7. Nonresident Holdings of Government Debt in Selected Countries

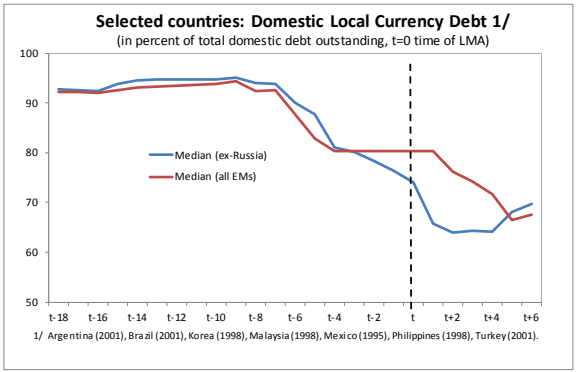


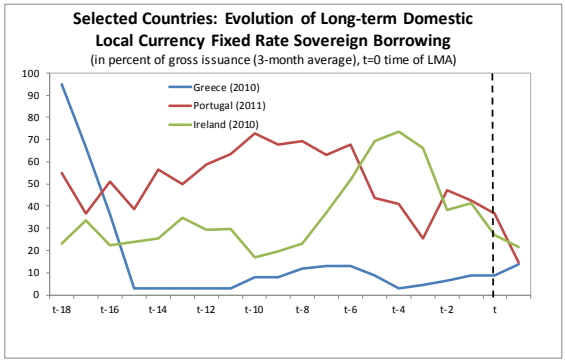
Sources: Arslanalp and Tsuda (2012, 2014), and authors' calculations.

Changes in maturity and currency composition of debt and/or borrowing were also considered in the analysis. Using data from Jeanne-Guscina EM Debt database (2014) and de Broeck-Guscina (2012) database on the composition of borrowing in the Euro area, we looked at the evolution of local currency long-term debt prior to LMA. As expected, these

shares showed a decline prior to LMA as sovereigns found it difficult to place longer term local-currency instruments even in the domestic market (Figure 8).

Figure 8. Changes in Currency Composition and Tenor of Sovereign Debt/Borrowing Prior to LMA in Selected Countries





Sources: Jeanne and Guscina (2014), De-Broeck and Guscina (2012).

D. Step 4: Test the Predictive Properties of Selected LMA Indicators

As the stylized facts confirmed that the leading LMA indicators behave as expected prior to LMA, we can proceed to more formally test their predictive properties. Although the stylized facts described above show that the selected LMA indicators behave as expected prior to LMA, they do not account for countries that never lost market access. In order to evaluate how well these indicators predict LMA, we use the signaling approach,[37] which explicitly controls not only for missed cases (Type II errors) but also for false alarms (Type I errors). The sample includes countries that had never lost market access, lost it only temporarily, and countries where LMA was succeeded by a debt restructuring. As mentioned before, the determination of LMA is separate from the determination of debt sustainability. Such loss of market access may be temporary in nature and, therefore, may not necessarily involve a request for an IMF-supported program. Hence, limiting the sample to just more severe cases that ended up with IMF-supported programs when trying to identify systemic patterns may lead to a selection bias (i.e. false positives).[38]

The signaling approach[39] (described in more detail in Annex III) can be used to shed light on which indicators have the greatest signaling power (defined as 1 minus type I and type II

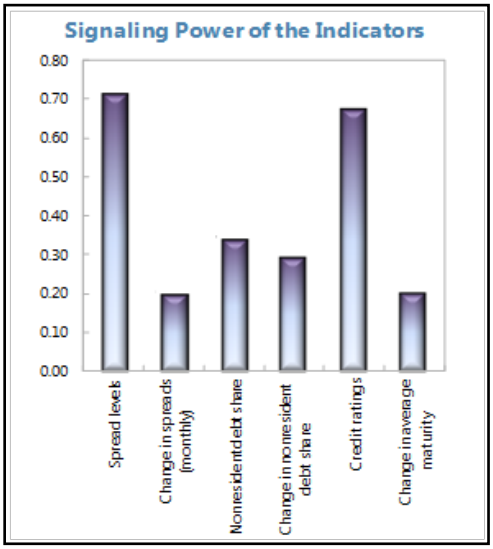
[37] The "signaling approach" was first proposed by Kaminsky, Lizondo, and Reinhart (1998) in predicting currency crises and was subsequently used to assess fiscal vulnerability indicators (Hemming, Kell and Schimmelpfennig, 2003) and the risk of sudden stops (IMF, 2007).

[38] The signaling power of the level of spreads is found to be the highest, whereas monthly changes in spreads display very low power. This is not surprising given that the latter series is characterized by relatively more volatility, thus reducing its signal to noise ratio.

[39] The signaling approach is described in more detail in Baldacci et al. (2011).

errors) for LMA. Preliminary results suggest that spreads, credit ratings, nonresident debt share, and changes in the composition of borrowing (in terms of currency and maturity) display the greatest signaling power of market access loss.

The signaling approach—which aims to minimize the prediction errors—has certain advantages over standard multivariate probit models. These are: (i) data gaps are not a constraint given each variable individually is used to predict the dependent variable;[40] (ii) it is easy to understand and interpret; (iii) its relatively superior out-of-sample performance is well-documented;[41] and (iv) its predictions can more readily adapt to new and evolving information.[42] However, one of the disadvantages is that individual predictive variables cannot be tested for their conditional statistical significance. This implies that feedback effects between the variables are not captured, so the signaling approach could potentially over-or underestimate the significance of individual factors. Further, to address the above concerns, the risk zone classification and road-testing of selected LMA country cases below serve are used as robustness tests for the results of the signaling approach.



While the signaling approach is useful in identifying indicators with the greatest signaling power, it has other limitations. First, in determining a threshold, it relies on an aggregation across all the countries in the sample. Second, it only indicates whether or not a country has crossed a certain vulnerability threshold (e.g., credit rating of single B or below, year-on-year increase in spreads over 200 bps, etc.), but not how the relevant indicator behaved prior to LMA. Hence, the signaling analysis can be usefully supplemented with another empirical approach, which describes the behavior of the indicators in terms of country-specific risk zones, over time. Since the risk zone approach is implemented on a country-by-country basis, it can account for cross-country heterogeneity. For example, it takes into account that some countries can tolerate higher spread levels than others without losing market access. Given availability of time series, we construct an empirical distribution for a given indicator; and

[40] Essentially, we chose the "signaling" approach in order to accommodate large differences in data availability across variables. Using panel multivariate regression models would have limited the number of predictive variables due to significant data gaps.

[41] Berg and Patillo (1999) and Berg, Borensztein and Patillo (2005) show that while a multivariate probit model outperforms (albeit marginally) the "signaling" approach both in-sample and in cross-country predictions, the "signaling" approach has superior out-of-sample performance.

[42] The predictions from probit—and similar parametric models—relies on fixed parameter estimates. The impact of incorporating new information on probit parameters depends heavily on the cross-sectional and temporal dimensions of the model.

from this distribution we delineate various percentiles of interest. Using these percentiles, at each point in time, it can be determined whether the indicator is in a zone of high, elevated, depressed, or low risk relative to historical norms.[43] The methodology for setting the various percentiles into different risk zones is described in some detail in Annex IV.

An IMF Board paper[44] provided an evaluation of how well the identified indicators predict LMA, by applying the signaling approach and risk zone classification approach on a sample of 45 countries. We expand the analysis to a wider range of 57 advanced and emerging market countries. The results suggest that spreads, nonresident debt share, changes in composition of borrowing, and credit ratings perform well in predicting LMA.

As with the signaling approach, the results of the risk zone approach suggest that among the indicators considered, spreads have the best predictive power.[45] In most cases, the examined indicators were in the high or elevated risk zones at the time of LMA. Countries in an elevated risk zone at the time of LMA had been within this zone for a minimum period of 3 months prior to LMA.[46] There have been no instances of LMA in our sample where the indicators were in the low risk zone and only a handful of instances where the indicators were in the depressed risk zone at the time of LMA. In Annex IV, an example of zone classification exercise is also provided for the case of spread data.

Table 2 reports the number of instances that the method determines the different risk zones and LMA occurrences. The main results can be summarized as follows:

a) In our sample of distress cases for which sufficiently long time series for spreads and credit ratings were available, we find that in 18 cases when LMA occurred, spread levels were within high or elevated risk zones on 12 and 10 occasions—for spreads and ratings, respectively. There were 5 cases where spreads fell in inter-quartile range, i.e. between the 25th and 75th percentiles range when LMA occurred. There was only one case in our sample where spreads were in a depressed risk zone but the country lost market access.

[43] By pooling this type of information across all considered indicators and countries, we can back out a generalized configuration of risks/rule that is optimal from the perspective of predicting LMA.

[44] "The Fund's Lending Framework and Sovereign Debt Restructurings – Further Considerations," IMF Board Paper, April 9, 2015.

[45] We use both the signaling and risk zone approaches not only to test the predictive power of the LMA indicators, but also to determine the level of the indicator that is indicative of stress. For example, to determine what constitutes "high spreads," we analyzed what spread levels are "too high" relative to own spread historical patterns and relative to other sovereigns.

[46] The maximum period of staying within the elevated risk zone before LMA was 6 months across all countries.

b) While analysis on credit ratings suggests 10 instances of elevated or high risk zones that coincided with LMA, there are fewer instances of elevated risk zone-LMA identification for ratings data, as compared to spreads (6 versus 9).

c) We also found that countries in an elevated risk zone coinciding with LMA had remained within this zone for a minimum period (on average) of 3 months prior to the LMA. In the case of high risk zone, the respective countries had remained in this zone for a 1 month prior to LMA.

Table 2. Number of Hits with Each Risk Zone

	Spreads	Ratings
High risk & LMA	3	4
Elevated risk & LMA	9	6
IQR	5	5
Depressed risk & LMA	1	3
Low risk & LMA	0	0

Source: Authors' calculations.

E. Step 5: Consider Additional Indicators of LMA

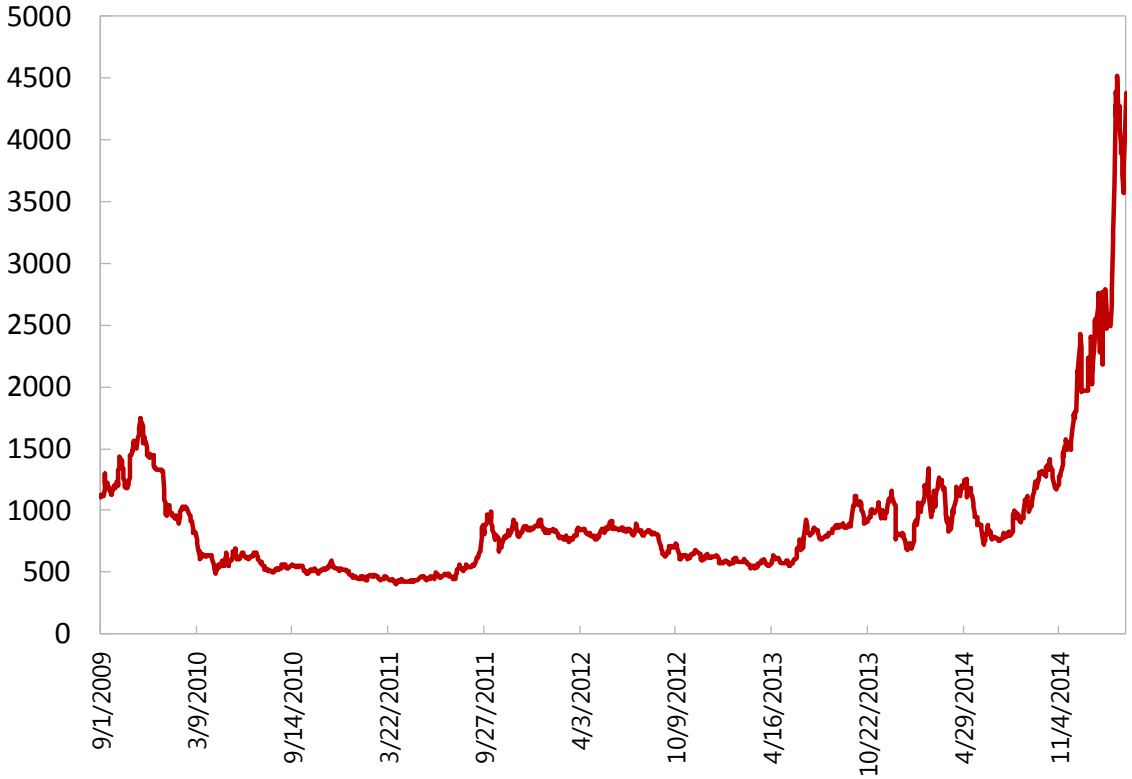
The analysis above could be usefully supplemented by evaluating the behavior of other indicators (described in Step 1), such as CDS spreads, shifts in the term structure of bond yields, and falling and/or converging bond prices. In addition, we demonstrate how to extract recovery rate information embedded in bond prices and what these may imply for exit yield determination. Such information can be potentially useful in both predicting LMA and assessing whether the LMA would likely be short-lived or would require a debt operation, and if so, what would be the likely size of the debt operation in terms of NPV haircuts.

We demonstrate the usefulness of these additional indicators using some recent cases of LMA (Greece and Ukraine). These two countries were chosen due to availability of the required data. It should be noted that the purpose of this section is to describe the application of the methodology of using these indicators at a point in time. It is not meant to provide the most up-to-date information on these countries or to prescribe any particular policy actions.

CDS spreads

In general, steep increases in CDS spreads signal increased risk of sovereign default. A sovereign CDS contract provides insurance against default by a sovereign. For example, in Ukraine, as with bond spreads, the 5-year CDS spreads (also called running spreads) increased dramatically since the start of December 2014, when it became clear that a new program involving a debt treatment may be necessary. In response, CDS spreads rose to more than 4,000 basis points, by April 2015 (Figure 9).

Figure 9. Ukraine: Evolution of 5-year CDS Spread, February 2014–April 2015



Source: Bloomberg.

CDS-implied probabilities of default

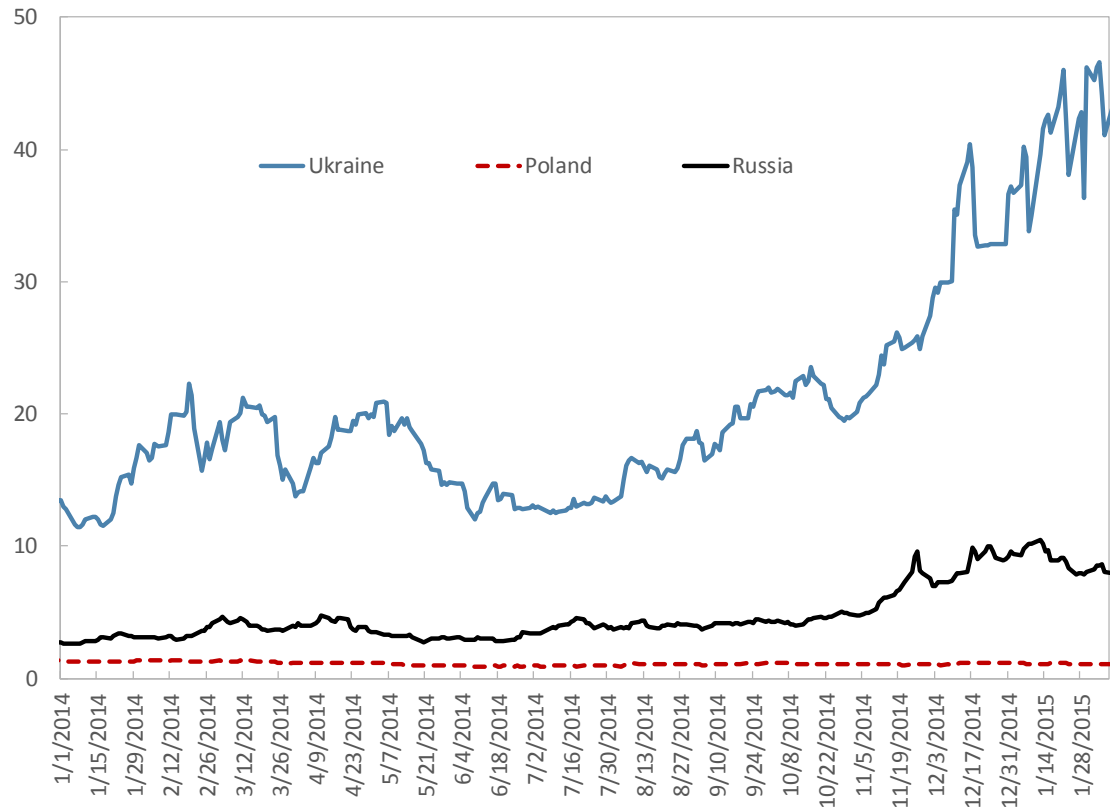
Estimates of probabilities of default (PoDs) are generally considered informative indicators of an issuer's credit risk. There are several methodologies used for estimating PoDs. A widely-used method that resembles a simple "rule of thumb" formula asserts that PoD of a sovereign issuer over a certain period is the respective CDS spread divided by one minus the recovery rate.

$$PoD = \frac{CDS\ Spread}{(1 - R)}$$

Figure 10 illustrates the application of the PoD formula to 5-year CDS spreads (assuming a recovery rate, *R*, of 40 percent). It can be observed that by start of February 2015, the PoD for Ukraine reached a level close to 45 percent.[47]

[47] Since the CDS market becomes increasingly illiquid in times of distress, it may not provide unbiased information of the true PoD.

Figure 10. Ukraine and Peer Countries: Evolution of Implied PoDs



Sources: Bloomberg, and authors' calculations.

There are certain limitations to using the simple CDS-implied PoD formula. While the formula is simple and has an intuitive appeal, it relies on a set of unrealistic assumptions that can lead to erroneous conclusions and policy recommendations. From a policy perspective, it is not entirely clear what material information one obtains from movements in CDS-implied PoD, over and above standard CDS spreads. Caution should be applied against taking such numbers at face value given that the marginal information provided by any increase in PoD after a certain threshold is minimal. For instance, an estimated PoD moving from 65 to 80 percent provides little actionable information for policy makers and market participants.

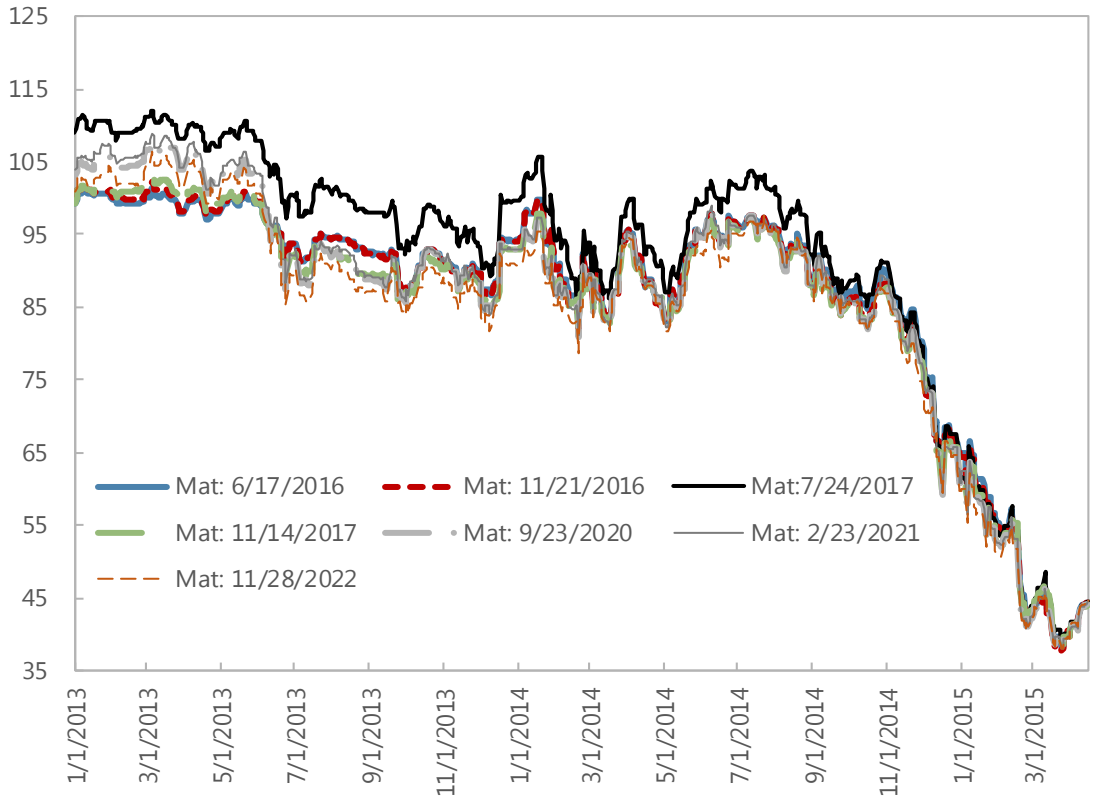
Bond prices[48]

Rapidly falling bond prices coupled with convergence across different tenors point to a high probability of LMA, which would likely be resolved by a significant haircut. In Ukraine, international bond prices declined dramatically in the first half of December 2014, when it

[48] The analysis in this section is especially relevant for periods of debt distress, when default concerns are heightened and bonds tend to be valued in terms of expected recovery.

became clear that, with a large financing gap and lack of substantial support from other donors, the IMF's funding for Ukraine would be contingent on some form of debt treatment. By the end of December, these bonds were trading in the low 60s, compared to the low 70s earlier in the month. The declining trend continued through January 2015, as markets reacted to Standard and Poor's December 19th downgrade of Ukraine debt to CCC- (with negative outlook) and worries over Russia's potential demands for an early repayment of its $3 billion loan.[49] Prices converged afterwards to the low 40s, as of early May 2015. Flattening of the price curve over time and across all maturities observed since end-January 2015 in Ukraine supports the view that bonds would be dealt with on equal terms, regardless of their maturity, in a debt restructuring or default, as a the result of an acceleration of all bonds (Figure 11). Such a dynamic for the term structure is typically indicative of default/distress expectations becoming embedded in the market. When the term structure flattens significantly, it is a sign that market participants are "pricing to recovery" and assigning an unconditional PoD very close to unity.

Figure 11. Ukraine: Evolution of International Bond Prices, Feb. 2014–May 2015



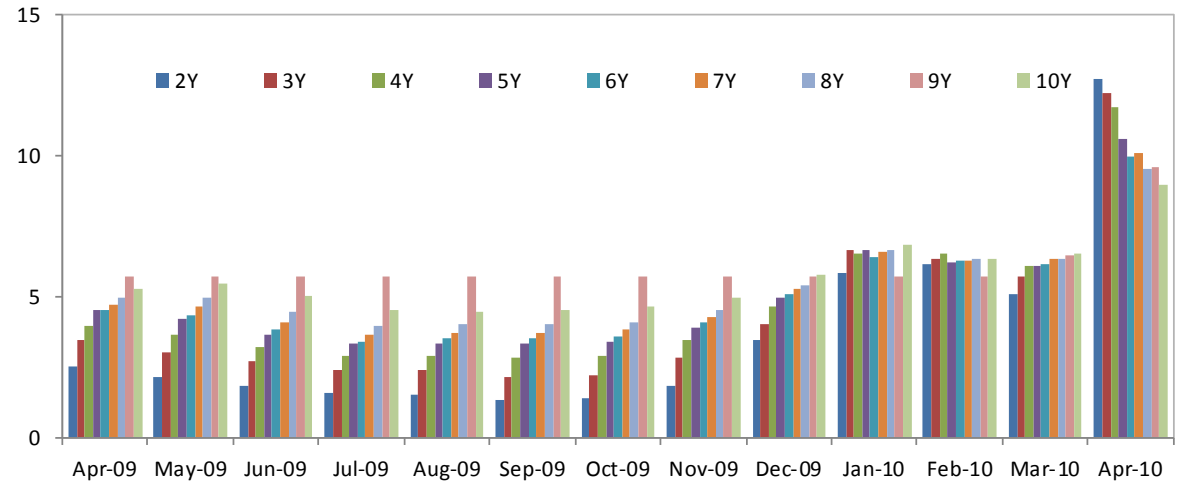
Note: Left-hand axis: USD price of bonds. "Mat" refers to maturity date of bond.
Sources: Bloomberg, and authors' calculations.

[49] The terms of the loan included a condition that Ukraine's public debt should not exceed 60 percent of GDP.

Shape of the yield curve

Information pertaining to market-based expectations about future macroeconomic conditions is embedded in the slope of a yield curve. A typical yield curve is usually upward sloping with longer-term yields being greater than shorter-term yields. Higher long-term yields reflect the compensation for risk that investors require for holding longer-duration bonds and the uncertainty in the behavior of economic indicators over the forecast horizon. If, for example, investors expect an economic downturn in the near term (for a given level of credit risk) or a distress event that increases uncertainty about future income streams, then they will aim to hedge this risk by increasing their holdings of shorter-maturity bonds.[50] Figure 12 below illustrates how the shape of the curve for Greece evolved over a period of a year prior to the month where LMA episode occurred in April 2010. We consider maturities between 2 and 10 years (inclusive). The plots provide evidence that the yield curves are initially characterized by positive slopes (10-year yield minus 2-year yield), which evolved to a phase of flattening and then eventually inverting prior to LMA.

Figure 12. Greece: Yield Curves' Behavior Prior to April 2010 LMA



Sources: BEL, Bloomberg, and authors' estimates.

The implication of a flat and eventually inverted yield curve is an increase in short- an medium-maturity yields, as corresponding bond prices in these regions of the curve become compressed. First, the yield curve will display an upward shift and flattening, as investors' price in increased risk across the maturity spectrum. Then, it may invert, as selling pressure at the short end of the curve increases in addition to increased sensitivity of shorter-maturity bond prices to yield movements. In view of these patterns, we propose regular monitoring of

[50] The reason is that, when there is a non-negligible probability of restructuring, market participants begin to assess credit risk in terms of expected recovery value. When credit risk increases, prices of longer-term bonds decrease more than of short-term bonds. If the probability of default in the foreseeable future becomes very high, all bonds will be priced at the expected recovery value. See Estrella and Hardouvelis (1991).

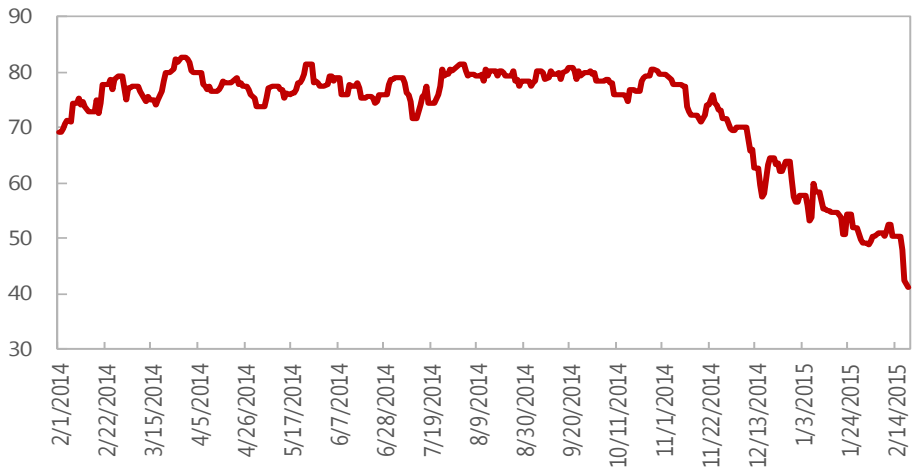
the shape of the yield curve, as it could serve as a leading indicator of sovereign debt problems and loss of market access.

Term Structure of Bond Prices—PoDs, Recovery Rates, and Implied Exit Yield

In times of extreme stress, the yield to maturity ceases to be informative. Therefore, practitioners switch to considering the raw bond prices. Information on the implied default probabilities and recovery rates embedded in bond market prices can be used as leading indicators of LMA. Using an implied default probability model for bond valuation,[51] one can infer expected recovery rates embedded in observed market prices. This information can guide the assessment on whether LMA is expected to be short-lived or whether it would require a debt restructuring operation. Moreover, implied recovery rates and exit yields could shed light on the likely size of the restructuring and time to re-access. The estimation methodology is described in some detail in Annex V.

We use the case study of Ukraine to illustrate the application of the described methodology. Prior to December 2014, Ukrainian bonds were trading in the high 80s and low 90s, indicating a low default probability. We estimate the average recovery rate over this period to be 75 percent, which is consistent with the then prevailing market estimates (Figure 13). For example, Citibank[52] estimated the recovery rate at around 73 percent at the end of March 2014 under the assumption that the IMF would move fairly quickly and provide short-term financial support to Ukraine. However, by March 2015 the expected recovery rate had fallen significantly to about 40 percent, as it became clear that debt treatment was unavoidable.

Figure 13. Ukraine: Evolution of the Expected Recovery Rate, Feb. 2014–March 2015



Sources: Bloomberg and authors' calculations.

[51] For a detailed description of the methodology, see JP Morgan's "Introducing the J.P. Morgan Implied Default Probability Model: A Powerful Tool for Bond Valuation," September, 2000.

[52] See "Citi Research: EM Markets Strategy," February 26, 2014.

Upfront CDS-implied Recovery Rates:

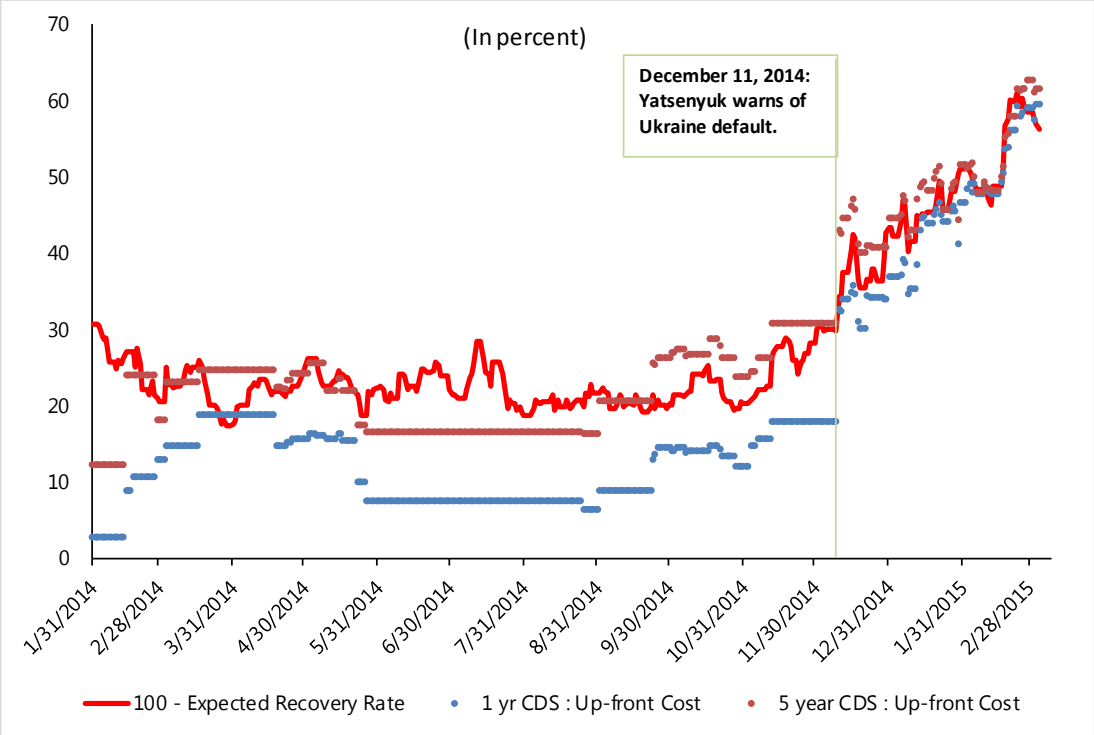
Upfront CDS payments can be a useful indicator of both the timing of LMA and its likely duration. When bonds are trading at distressed prices, CDS protection is typically quoted as an upfront payment rather than a running spread, until either a default or maturity, whichever comes earlier. This type of CDS contract changes the risk profile of the swap in two fundamental ways. First, it front-loads the timing of the cash flows at the initiation of the transaction. Second, it removes credit risk in the payment of the premium in the standard CDS (which terminates after a credit event). Then, the cost of the up-front contract (V) can be written as follows:

$$V = E^{Q}\left[(1-R)\int_{t}^{T} Z(t,s)Q(t,s)\delta(s)ds\right]$$

where, Z( ) denotes the discount function, Q( ) the arbitrage-free survival probability and $\delta(\,)$ the hazard rate. As the likelihood of a credit event becomes inevitable, the upfront cost, $V \rightarrow (1-R)$. Given this approximation, *R* can be easily derived.

Figure 14 depicts the evolution of 1-year and 5-year upfront costs for Ukrainian CDS. Various measures of upfront costs tend to converge, once the market considers that default or restructuring is inevitable. The increasing convergence between the 5-year and 1-year upfront costs at the end of the sample can be viewed as evidence of the expected default event being brought forward in time to within a 1-year horizon. Prior to December 11, 2014 in Ukraine, there was a constant wedge between these 5- and 1-year costs. Evidence suggests that even though the market had begun to expect a default with very high probability, there was still uncertainty regarding the horizon within which it may occur.

Figure 14. Ukraine: Up-front CDS Costs, February 2014–March 2015

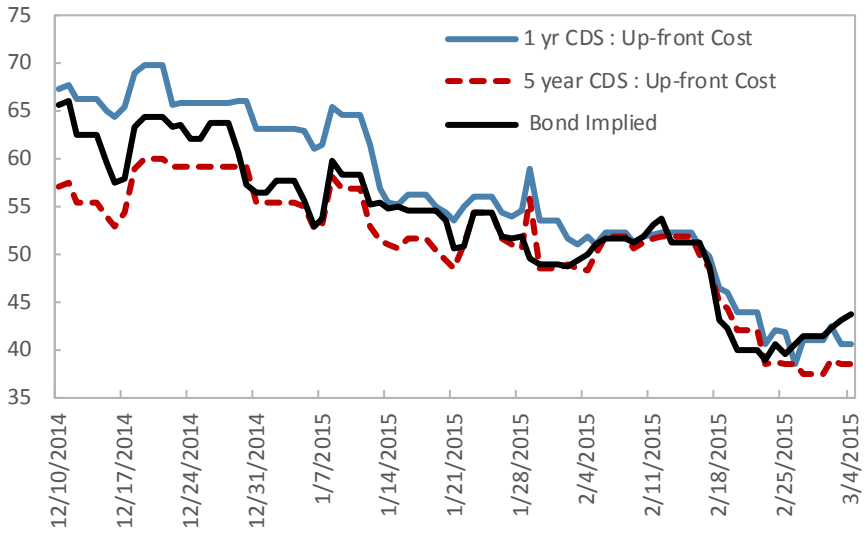


Sources: Bloomberg and authors' calculations

Discontinuities in the upfront costs may also signal uncertainty and/or turning points. As opposed to running spreads, the upfront costs appear to display discontinuities during periods of heightened uncertainty and/or turning points. This pattern—moving from continuous to increasingly discontinuous—is a fairly "clean" signal of LMA. Increased uncertainty causes a continuous updating of information and reassessment of the state and, hence, results in "jittery" dynamics of upfront costs. When no new relevant information is available, these costs remain essentially flat. The step-wise movements that characterize upfront costs are consistent with a regime-switching nature of expectations.

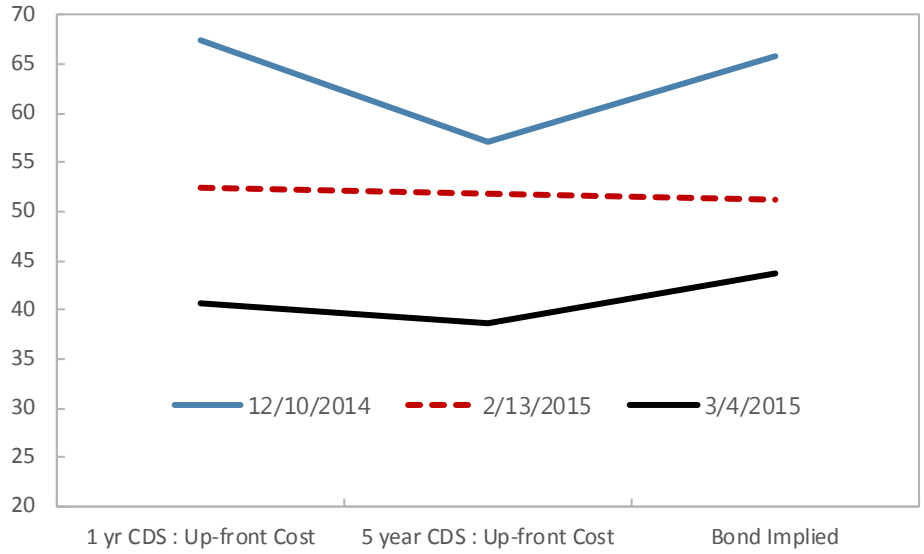
Recovery rates from the up-front CDS and the modified bond pricing model (discussed in earlier section) provide consistent results (Figure 15). The chart shows estimates of recovery rates corresponding to 1- and 5-year upfront costs and estimates from the term structure of the Ukrainian bonds. Alternatively, Figure 16 depicts the recovery rates on selected dates. Our estimate of the expected recovery rate being priced in by the market at the end of the sample for Ukraine is around 42 percent. Annex VI provides technical details on how the information on recovery rates can inform exit yields in restructuring scenarios.

Figure 15. Ukraine: Recovery Rates Implied by Upfront CDS and Bond Pricing Model: December 2014–March 2015
(in percent)



Sources: Bloomberg and authors' calculations.

Figure 16. Ukraine: Recovery Rates Implied by Upfront CDS and Bond Pricing Model



Sources: Bloomberg and authors' calculations.

F. Step 6: Distinguish between Temporary and Structural LMA[53]

By evaluating the behavior of leading indicators described above, one can assess whether the sovereign is in LMA or is at a high risk for LMA. However, the IMF's lending decisions would depend critically on whether the LMA episode is likely to be temporary or of a more permanent/structural nature that requires a major policy adjustment and perhaps also a debt treatment operation.

Examination of the LMA data points to the prior that the duration of LMA depended on the underlying causes. In line with previous empirical work,[54] we find that LMA episodes that could be traced to contagion from other countries and rising global risk aversion were typically short-lived. On the other hand, LMA episodes that could be directly attributed to the deterioration in fiscal and debt sustainability indicators and worsening growth outlook took longer to resolve and often required a significant fiscal adjustment with often, but not always, necessitating a debt restructuring. After a restructuring, LMA usually continues until the fiscal adjustment is considered by markets as credible and continuing to generate appropriate primary fiscal surpluses through the medium term. As previously shown in Figure 3, Argentina lost market access for only a few months due to spillover from the Mexican crisis in 1994 and the Russian crisis in 1998. However, the 2001 episode due to outright default lasted for more than a decade.[55] Fiscal fundamentals and growth outlook matter. Generally speaking, governments with lower debt-to-GDP ratios at the time of LMA were able to re-access markets faster than governments with higher debt-to-GDP ratios.

The duration of LMA is also a function of the NPV loss ("haircuts') imposed on investors, with LMA episodes following defaults being especially prolonged. The Moody's Sovereign Default Series 2013 report analyses 36 distressed exchanges of sovereign bonds between 1997–2013, by 20 sovereign issuers. The study found that sovereigns on average did not issue either voluntarily or non-voluntarily in international capital markets for 5.6 years after default and 4.4 years after the final default resolution. Further, 45 percent of defaults never regained market access during this period. It also found that the length of market exclusion was highly correlated with the size of the loss imposed on investors during the debt restructuring. This is consistent with findings by Cruces and Trebesch (2013). Governments that underwent debt reprofilings involving relatively small NPV losses and followed prudent macroeconomic policies were able to re-access markets relatively quickly (e.g., Uruguay and the Dominican Republic).[56] In contrast, countries with debt restructurings that involved

[53] This section does not include extensive analyses of willingness to pay cases that affect LMA, e.g. Ecuador, Belize, and Argentina (post 2005).

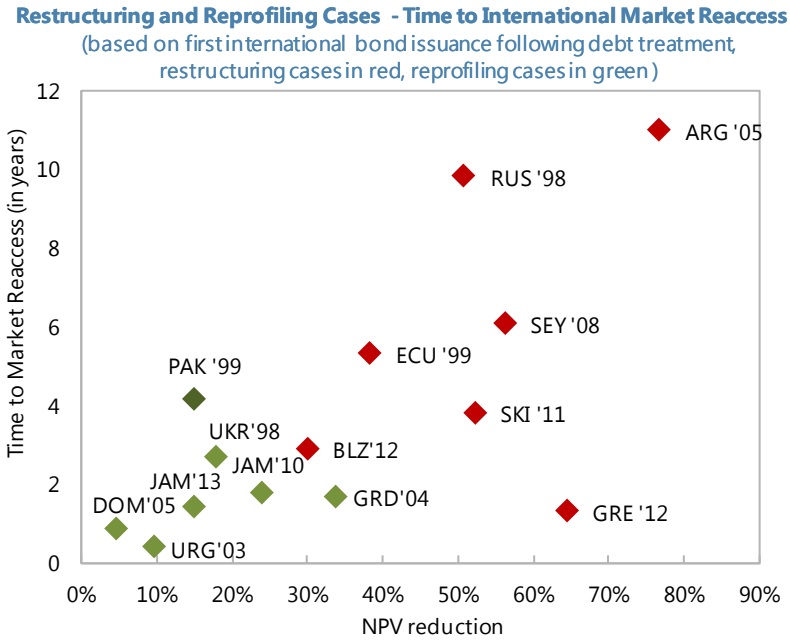
[54] See, for example, Gelos, Sahay, and Sandleris (2004).

[55] For Argentina, not only the default but also the way the debt was restructured led to its long LMA in international markets, as it provoked many lawsuits that could block proceeds from reaching the country. However, there were years when there was extensive access to international investors using local issues.

[56] Both Uruguay and Dominican Republic were seen as not asking much of creditors, except time to improve their fiscal situations. This has not been the case for others, e.g., Belize or Grenada.

sizeable nominal reductions and NPV losses have experienced much longer periods for re-access of markets (Figure 17).[57]

Figure 17. Duration of LMA and Size of NPV Haircut



Sources: Bloomberg, Cruces and Trebesch (2013) and authors' calculations

Notes: For countries that have not yet regained market access, the duration of LMA is based on December 2015 cut-off date.

Drawing on the lessons learned from past LMA episodes, the following distinction between temporary versus structural LMA can be inferred:

- *Temporary LMA* is characterized by a change in market conditions that results in a loss of funding access that is not directly related to debt or fiscal fundamentals. Changes in external market conditions, global shocks, or political instability may lead to a spike in spreads, deterioration in credit ratings, and lead to a temporary situation where a sovereign cannot access international capital markets or can only do so at a prohibitively high cost or at very short maturities.

- *Structural LMA* is characterized by a loss of funding access that is accompanied by a significant deterioration in debt or fiscal fundamentals or by a financial crisis that is

[57] That said, in some cases significant NPV haircuts can be conducive to regaining market access if they are viewed as bolstering debt sustainability.

likely to have serious fiscal implications. Increases in spreads and credit downgrades can be directly attributed to investors' concerns about debt sustainability. Such a situation is unlikely to resolve itself without major fiscal policy adjustments and/or debt treatment.

Hence, the determination of the temporary vs. structural LMA depends on the complementary assessment of LMA and debt sustainability. While the two assessments are related, there are some crucial differences between them, as explained in Box 2.

Box 2. Market Access and Debt Sustainability—Differences and Similarities

Although market access and debt sustainability are related concepts and often reinforce each other, they are also quite distinct. Sustainable debt is one that can be at least stabilized in baseline and realistic shock scenarios with a primary balance that is economically and politically feasible. Market access deals principally with country's ability to raise necessary funds at acceptable terms (cost and risk) in the international and, in some cases, domestic markets. This ability would of course have an impact on debt sustainability both through the interest rate channel and the resulting structure of government borrowing. Likewise, debt sustainability analysis can influence whether or not a country has market access.

What matters for market access is not only the debt burden that a country carries and its fiscal indicators, but also investors' expectations about its ability and willingness to service its debt. In the past, countries have lost market access, despite low debt ratios, due to global shocks, sudden increase in risk aversion, herd behavior on the part of the investors, or domestic shocks (financial or otherwise) that increase the level of debt servicing uncertainty. At the same time, some countries retain market access despite carrying an immense debt burden that traditional debt sustainability analysis would suggest is unsustainable. These are typically countries that benefit from reserve currency status, can borrow abroad in their own currencies, and have a large share of domestically-held debt.

Some countries might continue tapping the markets at rates that are incompatible with debt sustainability for short period of time. Sovereigns might do so if they believe that a spike in rates is temporary and want to preserve sustained market access (see Box 1). Alternatively, they might do so to meet severe funding needs that cannot be postponed.

A country with low levels of debt, strong fundamentals, and low vulnerabilities will most likely be viewed as having low risk of debt distress, based on IMF's debt sustainability analysis. However, there is no guarantee that such a country will have market access at all times. Should the fiscal situation worsen abruptly, they might not be able to tap international markets quickly and on a sustained basis to meet these funding needs at acceptable costs.

Fund assessment of debt sustainability distinguishes between low-income countries[58] and market-access countries (MAC).[59] MAC debt sustainability analysis (DSA) framework uses a risk-based approach allowing for greater scrutiny of countries where either breach debt to

[58] For a discussion of LIC DSA methodology, see "The Joint World Bank-IMF Debt Sustainability Framework for Low-Income Countries," September, 2016.

[59] The MAC-DSA heat map uses the following benchmarks: 70 (EMs) and 85 (AM) percent for debt to GDP level; 15 (EMs) and 20 (AMs) for gross financing needs.

GDP or gross-financing needs (GFN) to GDP thresholds or request exceptional access to Fund resources. For higher scrutiny countries MAC DSA complements the basic DSA with an assessment of the realism of baseline assumptions, a heat-map that presents risks to debt levels, GFNs and profile of debt, and stochastic simulations of debt paths.

The heat map may be a useful to help to distinguish between cases of temporary vs. permanent market access loss. The heat map provides information on how the country fared with respect to selected market access indicators (spreads and credit ratings), as well as some DSA indicators.[60] When both sets of indicators are crossing their respective vulnerability thresholds, it can be ascertained that a country's LMA episode is likely to be of a permanent/structural nature, requiring a major policy adjustment and/or debt treatment operation. On the other hand, when the DSA indicators are not above the indicative thresholds, but market access indicators are flashing red, the LMA episode is likely to be temporary. Some of the indicators examined in step 5 (potentially encompassing forward-looking information), such as recovery rates and implied exit yields encompass some important information on whether LMA is expected to be short-lived or whether it would require a debt restructuring operation and the likely size of the restructuring.

The heat map in Figure 18 shows the results of applying this methodology to select cases of LMA. It showcases how the assessment of market access indicators (spread levels and changes, credit ratings and downgrades) could be combined with fiscal vulnerability indicators (gross general government debt and general government cyclically adjusted primary balance) to draw conclusions on the likely causes of LMA. Since emerging and advanced economies have different levels of "debt intolerance," they have different vulnerability thresholds.

The results are broadly consistent with the priors.[61] They demonstrate, for example, that structural LMA episodes (that resulted in a debt treatment operation) were typically characterized by a significant underperformance and/or deterioration in both market access and debt sustainability indicators.[62] For example, the two episodes of LMA in Brazil were temporary in nature, as market-based LMA indicators crossed into the elevated risk zone (especially the 2002 episode), while primary balance remained in the low risk zone.[63] The 1995 LMA episode in Argentina was relatively short lived, as fiscal fundamentals remained below the critical thresholds. On the other hand, the 2001 episode of LMA was structural and

[60] The heat map presents only two DSA indicators for illustrative purposes. In reality, the MAC DSA uses a much wider set of indicators as well as a set of shock scenarios, stochastic projections, and staff judgement to assess debt sustainability. The thresholds for both fiscal indicators used are the same as in the MAC DSA.

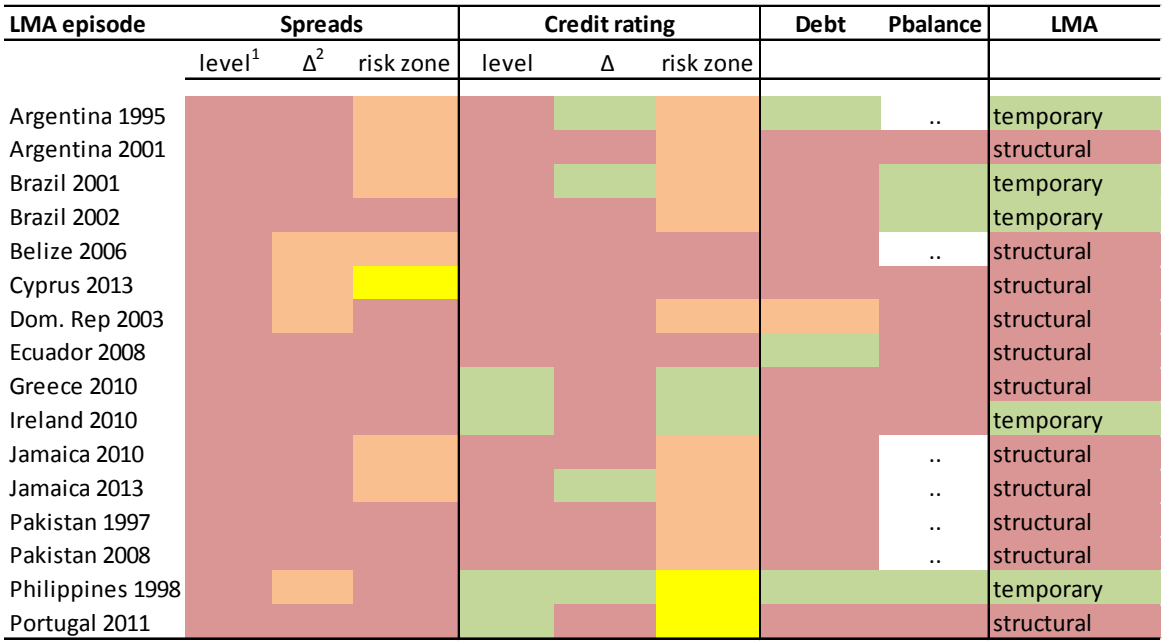
[61] The approach does not perform as well for advanced countries, as they appear to tolerate higher debt burden and/or have access to other source of financing—helping them avoid defaults or restructurings.

[62] The paper does not present a statistical analysis to infer with a high degree of statistical certainty the distinction between temporary versus structural LMA episodes. We leave this question for future research.

[63] Market participants have indicated that the Brazil 2002 LMA was in large part due to fears of willingness to pay if Mr. Lula da Silva was elected President. These concerns started to dissipate before the election and soon thereafter evaporated, along with (temporary) LMA.

resulted in a debt restructuring operation as the deterioration in market-based LMA indicators was accompanied by the deterioration in debt sustainability indicators.

Figure 18. Market Access and Fiscal Vulnerability Indicators in Selected Countries



Notes:

[1] Average spread over the duration of the LMA episode

[2] Based on 12-month change in spread at the start of the LMA episode

Sources: Bloomberg, S&P, Moody's, and Fitch for credit ratings; WEO for debt and structural primary balance

Red indicates high risk, orange elevated risk, yellow medium risk, and green low risk.

The heat map may be useful as a forward-looking tool or an early warning exercise to help identify country-specific vulnerabilities to LMA. In such cases a country may choose to resolve its difficulties on its own or to approach the IMF for support. Should the heat map signal an impending LMA of a structural nature, actions can be taken to either prevent it or mitigate its impact. Annex VII provides a sample heat map as of February 2016 for frontier markets. For an application of the heat map using this methodology in surveilling frontier market stress please see April 2016 GFSR.

G. Step 7: Consider the Implications of Structural vs. Temporary LMA Assessment on the Required Degree of Adjustment

A comprehensive model that looks at both market access and debt sustainability indicators could be potentially useful in assessing the likely nature of an LMA episode (temporary versus structural) and the required degree of possible adjustment to restore market access. In cases where debt sustainability indicators are below the indicative thresholds, but market access indicators are not, one can conclude with some degree of confidence that the loss of market access is temporary in nature and just funding support is needed. If debt sustainability thresholds and market thresholds are breached, the loss of market access may be of a more

permanent nature and a sovereign is a potential candidate for a strong fiscal adjustment and/or debt treatment (reprofiling or face-value cut restructuring) as a condition for an exceptional access program. In situations where market-based indicators appear to be safe and debt sustainability indicators do not signal a problem, one should also look at the state of the financial sector. Weaknesses in the financial sector could be a source of contingent liabilities and may lead to a rapid deterioration in investor confidence and loss of market access.

While an operational framework is useful in determining whether LMA is imminent and its likely nature, exercise of judgment is often necessary. For example, there could be a situation where debt thresholds are not breached, but LMA is assessed to be structural due to a major change in the political regime that could eventually lead a solvency problem.

IV. Concluding Remarks

Devising a predictive LMA model for policy purposes is not an easy task. Identification of the main variables that can help accurately determine LMA, in tandem with an encompassing DSA, can help in forming a sound judgement of whether or not an LMA event has occurred and in early detection of a sovereign debt distress situation. This in turn can help inform the degree of required fiscal adjustment, the appropriate debt treatment (if any), and the nature of IMF involvement.

The paper proposes an operational analytical framework for making assessments of LMA, and evaluating whether such loss is of a temporary or permanent (structural) nature. This assessment is an important component of guiding the kind of support that is needed by the country in distress. The paper first discusses conceptual issues relating to the determination of LMA, such as how to make a judgment on the ability vs. willingness to tap international capital, whether issuance of debt domestically or at short-term maturities constitutes market access, and how to take into account the degree of market access that a country had in normal times. This key distinction between regular and sporadic issuers is important in deciding when a sovereign is entering a period of LMA.

In the empirical literature, LMA is typically defined as the time period between the announcement of default and/or restructuring and the next international bond issuance. Such definition, however, does not take into account the fact that not all LMA episodes are associated with debt distress. Hence, for purposes of this analysis, we also classify as LMA episodes periods of unexpected lack of primary debt issuance that could not be explained by benign factors, such as lack of funding needs or prefunding. This classification offers a broader coverage of LMA.

In this context, the paper suggests a methodology for analyzing LMA, which involves the following seven steps: (i) consider potential leading indicators of LMA; (ii) determine the timing of past LMA episodes through the systematic application of the decision rule; (iii) evaluate whether past performances of selected indicators follows a systematic pattern prior to LMA; (iv) test the predictive power of selected LMA indicators using the signaling

and risk zone approaches; (v) evaluation of additional indicators of LMA, such as CDS spreads, shifts in the term structure of bond yields, falling and/or converging bond prices; (vi) distinguish between temporary and permanent (structural) LMA; and (vii) assess the implications of LMA and its nature on the required degree of adjustment and policy advice. The last two steps of the proposed framework bring together the assessment of LMA and debt sustainability. An LMA can be judged as temporary if it is caused by external shocks, such as contagion. In contrast, it can be judged as structural, if it is accompanied by a serious deterioration in debt sustainability indicators or by a financial crisis that is likely to have significant fiscal costs.

The paper applies the described seven-step methodological framework to past cases of LMA and describes its potential application to current cases. It shows that the framework can be a reliable tool in identifying risks to LMA, determining its likely nature and implications for the required degree of possible adjustment and related policy advice. This framework can be further refined by taking into account lessons from current distress cases, so as to better capture and hopefully address emerging LMA risks.

Annex I. Determining LMA in Empirical Work—Decision Rule

Stage 1: Identify LMA periods associated with default or restructuring

a. Code as LMA all time periods following default or announcement of restructuring/reprofiling (whichever is earlier)
b. A country remains in LMA until the next issuance of long-term debt instrument

Stage 2. Identify additional LMA periods that are not associated with defaults and/or restructurings. This is important since some countries lose market access but avoid any types of debt management operations (e.g., Brazil, Turkey, Ireland, and Portugal)

2A. Identify suspect cases for LMA

Evaluate gross issuance data of long-term securities and/or syndicated loans (if available) for patterns of issuance and look for deviations from the established patterns

1. At least 3 years-worth of data are necessary for countries that issue on an annual basis (a shorter period is sufficient for countries that issue at a monthly or quarterly frequency).

2. If no issuance patterns can be identified—cases when countries issue sporadically (typically on a less than annual frequency), define LMA as described in Stage 1.

3. If a country issues on a regular basis, identify as suspect LMA all cases when it deviates from its established patterns

    a. For monthly or quarterly issuers, identify as suspect LMA any period when the sovereign does not issue. Ignore 1 month blips.

    b. For annual issuers identify as suspect LMA the year that the sovereign doesn't issue.

Clarifications: The pattern of issuance is not static. In most cases in our sample countries have moved from being sporadic issuers to more regular issuers. Ireland is an exception as it moved from being a regular issuer to a sporadic issuer after many years of running fiscal surpluses.

2B. Narrow down the list of suspects—is there a benign explanation for lack of issuance?

1. *Can lack of issuance be explained by lack of funding needs?*

    a. Is the country running fiscal surpluses?

b. Is gross financing need smaller than 15 percent of GDP?

If the answer to both of these questions is “Yes”, then one can clear the suspect and conclude that deviation from the historical issuance patterns has an explanation other than LMA.

Exceptions:

There are a few cases where a country was running very small deficits (e.g., Ireland in 2003 with a deficit of -0.1 percent of GDP) and was not issuing. We classify it as having market access even though it did not meet the criteria in point a) above, since the deficit was very small and it had a history of fiscal surpluses in prior years.

2. *Can lack of issuance be explained by prefunding?* There could be instances where a sovereign may decide to do a large issuance early in the year (in order to take advantage of a lower interest rate environment that might not last, or for other reasons). In order to be considered true “prefunding,” it has to meet either of the following two rules:

    a. Prefunding has to be large enough to cover the primary deficit and amortization needs coming due over the suspect period

    b. Prefunding has to be 2 standard deviations higher than the 12-month historical average

    c. Prefunding has to take place prior to the suspect LMA period and can span a period of a few months. This means that a country can, for example, issue two consecutive bonds whose sum should meet the criteria described in bullet (a) or (b) above.

    Exceptions:

    There are a few cases when prefunding is almost but not quite large enough to meet the criteria described above. However, we still consider it “legitimate prefunding”, if the funding needs are decreasing (fiscal deficit is falling or gross financing needs is declining), since an argument can be made that the country does not need to issue as often as it once did.

Annex II. Past LMA Episodes Identified Through Application of the Decision Rule

Countries	LMA Episodes 1/ start	end	Debt Default and/or Restructuring 2/	Requests for IMF-Supported Programs	Comments
Albania	1992m9	2010m9	1995m8; 1998m7; 2000M1	1992m9; 1993M7; 2001M7; 2002M6; 2006M1	
	2014m2	2015m10		2014m2	
Angola	2009m11	2012m9		2009m11	
Argentina	1990m1	1991m11	1987m8; 1989m12; 1991M9;	1989m11; 1991m7	
	1992m3	1992m8	1992m7	1992m3	
	1993m4	1993m6	1993m4		
	1995m1	1995m3			temporary; Mexico effect
	1998m8	1998m9			temporary; Russia/Asian crisis
	2000m9	2000m12			temporary
	2001m3	2016m1	2001m12; 2005m4	2003m9	2005m3 bond issued for payment on defaulted debt (still LMA)
Austria					
Belarus	1995m9	2010m6		1995m9; 2009m1	
Belgium					
Brazil	1990m1	1995m4	1988m11; 1992m2; 1992m11;	1988m8; 1992m1	1995m5 first interntl. bond issuance in 15 years
	1998m6	1999m3	1994m4	1998m12	
	2001m9	2001m12		2001m9	
	2002m7	2003m3			
	2007m7	2008m4			
Belize	2006m8	ongoing	2006m8; 2007m2; 2012m8		2006m8 restructuring announcement; 2007m2 bond exchange; 2012m8 announcement
Bulgaria	1991m3	2001m10	1991m4; 1992m12; 1994m4; 1994m6	1991m3; 1992m4; 1996m7; 1997m4; 1998m6; 1998m9; 2002m2	1994m7 bond issuance in the context of restructuring - LMA; 2004m8 exceptional access request was precautionary - no LMA
Chile	1990m12	1999m3	1990m12	1989m11;	1999m4 intl. bond issuance - the first in 8 years
China					
Colombia				1999m12; 2003m1; 2005m5; 2009m5; 2010m5; 2011m5; 2015m6; 2016m6	all programs were precautionary in nature - no LMA
Costa Rica	1990m1	1998m3	1989m5; 1990m5; 1991m7; 1993m6	1991m4; 1993m4; 1995m11	2009 exceptional access program was precautionary - no LMA
Croatia	1994m10	1997m1	1995m3	1994m10; 1997m3; 2001m3; 2003m2; 2004m8	programs approved in 1997-2004 were precautionary - no LMA
Cyprus	2013m5	2014m4		2013m5	
Dom. Rep.	1991m8	2001m8	1991m11; 1994m8	1991m8; 1993m7	
	2003m8	2006m2	2004m4; 2005m5; 2005m10	2003m8; 2005m1	
	2009m11	2010m3		2009m11	

Countries	LMA Episodes 1/ start	end	Debt Default and/or Restructuring 2/	Requests for IMF-Supported Programs	Comments
Ecuador	1991m12	1997m3	1989m10; 1992m1; 1994m6; 1995m2	1991m12; 1994m5	
	1999m8	2005m11	1999m8	2000m4; 2000m8; 2000m9; 2003m6	
	2008m12	2014m5	2009m6		2008m12 default
Egypt	1991m5	2001m5	1991m5	1991m5; 1993m9; 1996m10; 1990m8; 1992m1; 1993m5; 1995m7;	
El Salvador	1990m8	1999m7		1997m2; 1998m9	
	2009m1	2009m10		2009m1	
Georgia	1995m6	2008m4	2001m3; 2004m7	1995m6; 1996m2; 2001m1; 2004m6;	
	2008m9	2011m3		2008m9; 2012m4	2012m4 precautionary request - no LMA
	2014m7	ongoing		2014m7	
Ghana	1990m1	2007m8	1996m4; 2001m12; 2002m5;	1988m11; 1995m6; 1999m5; 2003m5	
	2009m7	2013m6	2004m7	2009m7	
	2015m4	2015m9		2015m4	
Greece	2010m4	2014m3	2012m5; 2012m12	2010m5; 2012m3	exceptional access non-precautionary - LMA
	2014m10	ongoing			
Hungary	2008m11	2009m6		1990m3; 1991m2; 1993m9; 1996m3; 2008m11	bond issuance continued despite programs in the 1990s - no LMA; 2008m11 - exceptional access
Iceland	2008m11	2011m5		2008m11	exceptional access, non-precautionary program
India			1991m1; 1991m10		
Indonesia	1994m1	1996m6	1994m1		
			1998m9; 2000m4; 2002m4;		2005m5 Paris Club treatment, but issuance
	1997m11	2004m2	2005m2	1997m11; 1998m8; 2000m2	continued - no LMA
Iraq	2004m11	ongoing	2004M11; 2006M1	2005m12; 2007m12; 2010M2; 20016M7	2006M1 bond issued in the context of restructuring - LMA
Ireland	2010m10	2012m1		2010M12	2012M1 beginning of market reaccess with a domestic bond switch
Italy					
Jamaica	1990m3	1997m5	1990m4; 1990m6; 1991m7; 1993m1	1990m3; 1991m6; 1992m12;	
	2009m1	2011m1	2010m2	2010m2;	
	2012m7	2014m6	2013m2	2013m5; 2016m11	

Countries	LMA Episodes 1/ start	end	Debt Default and/or Restructuring 2/	Requests for IMF-Supported Programs	Comments
Jordan	1992m2	2004m11	1992m2; 1993m12; 1994m6; 1997m5; 1999m5; 2002m7	1989m7; 1992m2; 1994m5; 1996m2; 1999m4; 2002m7	
	2012m8	2013m9		2012m8	
Kazakhstan	1994m1	1996m11		1994m1; 1995m6; 1996m7; 1999m12	
Korea	1997m12	1998m3		1997m12	
Latvia	1992m9	1995m7		1992m9; 1993m12; 1995m4	
	1996m5	1999m4		1996m5; 1997m10	
	1999m12	2001m10		1999m12; 2001m4;	
	2008m12	2011m5		2008m12	
Lebanon	2002m2	2004m4	2001m2; 2002m11; 2007m1		
	2011m11	2012m10			2011m11 issuance in the context of debt operation
Lithuania	1992m10	1995m11		1992m10; 1993m10; 1994m10; 2001M8	2001M8 program precautionary - no LMA
Malaysia	1998m8	1999m4			temporary; Asian crisis
Mexico	1990m1	1991m1	1989m5; 1990m2	1989m5;	
	1995m1	1995m6		1995m2; 1999m7; 2009m4; 2010m3; 2011m1; 2012m11; 2014m14; 2016m5	Temporary LMA in 1995; Programs in 2009-2016 precautionary - no LMA
Pakistan	1993m9	1994m11		1993m9; 1994m2; 1995m12	
	1997m10	2004m1	1999m1; 1999m7; 1999m12; 2001m1; 2001m12	1997m10; 2000m11; 2001m12	
	2008m9	2014m3		2008m11; 2013m9	
Panama	1990m11	1997m1	1990m11; 1994m8; 1996m5	1992m2; 1995m11; 1997m12; 2000m6	issuance continued during 1997 and 2006 programs - no LMA
Paraguay	1993m7	2006m5	1993m7	2003m12; 2006m5	
Peru	1991m9	2002m1	1991m9; 1993m5; 1996m7; 1997m3	1993m3; 1996m7; 1999m6; 2001m3; 2002m2; 2004m6; 2007m1	programs approved in 2001-2007 were precautionary
Philippines	1990m2	1993m1	1990m2; 1991m6; 1992m12	1991m2	
	1994m6	1996m6	1994m7	1994m6	
	1998m4	1998m12		1998m4	
Poland	1990m2	1995m5	1990m2; 1991m4; 1994m10	1990m2; 1991m4; 1993m3; 1994m8; 2009m5; 2010m7; 2011m1; 2013m1;	programs in 2009-2017 precautionary - no LMA
Portugal	2011m5	2012m1		2011m5	
Romania	1991m4	1996m1		1991m4; 1992m5; 1994m4	
	1999m8	2000m8		1997m4; 1999m8; 2001m10; 2004m7	
	2009m5	2010m2		2009m5; 2011m3; 2013m9	2009 non-precautionray program - LMA; 2011 and 2013 programs precautionary - no LMA
Russia	1992m8	1996m10	1993m4; 1994m6; 1995m6; 1996m4; 1997m12	1992m8; 1995m4; 1996m3	
	1998m8	2001m1	1999m3; 1999m8; 2000m2; 2000m8	1999m7	2000m2 bonds issued in the context of debt restructuring - LMA

Countries	LMA Episodes 1/ start	end	Debt Default and/or Restructuring 2/	Requests for IMF-Supported Programs	Comments
Serbia	2000m12	2005m2	2001m11; 2004m7	2001m6; 2002m5	
	2008m9	2011m8		2009m1; 2011m9; 2015m2	
Seychelles	2008m7	ongoing	2009m4; 2010m2	2008m11; 2009m12; 2014m6	2009m12 bond issued in the context of restruct.
South Africa	1990m1	1991m3	1989m10		
	1993m9	1994m11	1993m9		
Spain					
Sri Lanka	1991m9	1997m2		1991m9	
	2001m4	2007m8		2001m4; 2003m3	
	2008m10	2009m9		2009m7; 2016m6	
Thailand	1997m8	1999m1		1997m8	
Turkey	1994m7	1995m3		1994m7	
	1998m5	1998m10		1999m12	temporary, Russia/Asian crisis
	2001m3	2001m9		2002m2; 2005m5	temporary
	2002m5	2002m10			temporary, banking crisis
Ukraine	1995m4	1997m7		1995m4; 1996m5; 1997m8; 1998m9	
	1998m9	2000m1	1998m9; 1998m10; 1999m8		bonds issued in 1999, 2000 in the context of restr.
	2000m4	2002m10	2000m4; 2001m7		
	2008m9	2009m8		2004m3; 2008m11	
	2010m7	2012m6		2010m7	2012m12 issuance was to Russia (not true market)
	2013m7	ongoing	2015m4	2014m4; 2015m3	2014m5 issuance was with US Treasury guarantee - not true market access
Uruguay	1990m12	1992m4	1991m1	1990m12; 1992m7; 1996m3; 1997m6	
	2002m5	2005m4	2003m5	1999m3; 2000m5; 2002m4; 2005m6	
	2008m10	2009m8			
Vietnam	1993m10	2005m9	1993m12; 1997m12	1993m10; 1994m11; 2001m4	

1/ Our data sample starts in January 1990. Some LMA episodes may have started prior to this date. We list IMF-supported programs that were ongoing as of January 1990. Requests for precautionary program are not considered LMA.

2/ For 1990-2010 from Das, Papaioannou, Trebesch (2012)

3/ From "Fund Arrangements since 1952" IMF database

Annex III. Signaling Approach for Identifying Vulnerability Indicators

One can assess the probability of an imminent LMA by applying either of the following two approaches:

- Conduct multivariate probit econometric analysis that establishes a relationship between the probability of LMA and spreads, macroeconomic and fiscal fundamentals, investor sentiment, institutional characteristics, and global factors, and interaction between these variables.
    - Advantages: decent in-sample and cross-country predictions
    - Disadvantages: takes time, data availability concerns, major data gaps, overfitting and/or poorer out-of-sample performance
- Evaluate vulnerability to market access loss using "signaling approach"
    - Advantages: can be done quickly, better out-of-sample performance compared to the multivariable probit, easy to understand and interpret, data gaps are not a constraint
    - Disadvantages: individual predictive variables cannot be tested for their conditional statistical significance

Previous studies have used "signaling approach" to predict currency crises (Kaminsky, Lizondo, and Reinhart (1998), to assess fiscal vulnerability indicators that help predict financial crises (Hemming, Kell, and Schimmelpfennig, 2003) and to assess the risk of sudden stops (IMF, 2007). The approach entails using each potential indicator of crisis events separately, identifying critical thresholds that signal such events with the lowest prediction error.

Two methods are commonly used to determine an optimal threshold: the minimization of total misclassified errors and the maximization of the signal-to-noise ratio. Total misclassified errors are computed as follows:

$$TME(X) = \frac{FN(X)}{N_C} + \frac{FP(X)}{N_{NC}}$$

The optimal threshold, X*, is the value that minimizes TME(X), where TME stands for total misclassification errors, FN for false negatives or missed crises, FP for false positives or false alarms, Nc for total crises and N for total non-crises. Due to the small number of crisis events relative to non-crisis events, the TME methodology places greater weight on misclassifying crisis events, thereby yielding relatively conservative thresholds compared to other methods.

Annex IV. Risk Zone Classification—Example for Spreads

Identifying Risk Zones

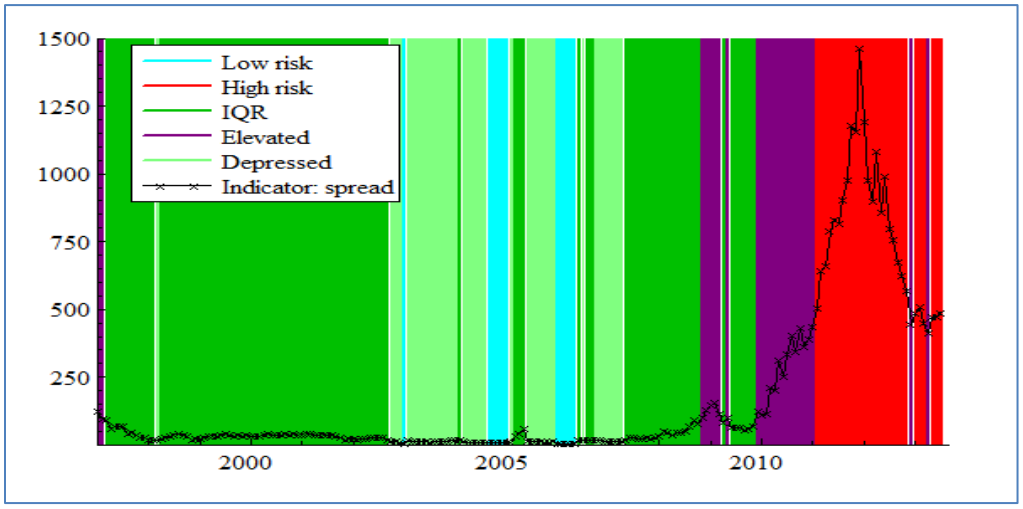
Risk zone classification entails construction of an empirical distribution of the time series being investigated. Suppose we have a set of data X and X~*F*, then *F*(x) = *Pr* (X < x). The empirical distribution function $\hat{F}$(x) puts weight $\frac{1}{n}$ at each data point x_i , such that, $\hat{F}$(x) = $\frac{1}{n}\sum_{i=1}^{n} I(x_i \leq x)$; where *I*(.) is an indicator function. Given $\hat{F}$(x), the τ –th (sample) percentile of interest p_τ would correspond to $p_\tau = \hat{F}^{-1}(\tau)$. Once percentiles of interest are delineated, based on either the full, or partial span of available data, observations at each point in time can be categorized according to which risk zones they fall into.

Suppose we compute the following percentiles at τ = {5th, 25th, 50th, 75th and 95th} and denote these as *a, b, c, d* and *e* respectively. We can then assign risk zones for the series as follows.

Risk zone classification scheme				
High risk	**Elevated risk**	**IQR**[64]	**Depressed risk**	**Low risk**
$X \geq e$	$e > X \geq d$	$d > X \geq b$	$a > X \geq b$	$X \leq a$

According to such a classification, observations can be allocated into risk zones as we move through time. A hypothetical example is provided in the chart below.

Example: Evolution of risk zones



Note: Y-axis denotes basis points.

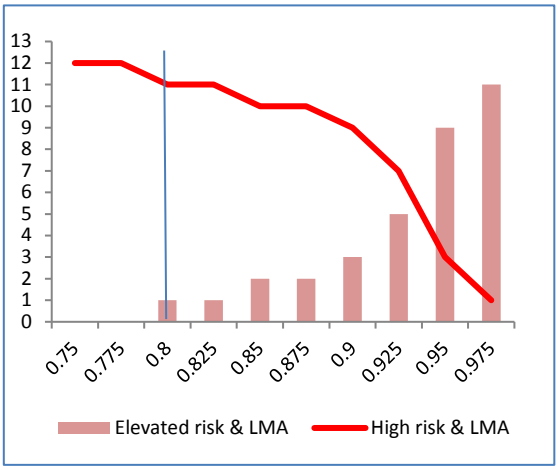
The chart illustrates how the indicator has moved through different risk zones over time. For example, the series entered into a zone of elevated risk starting around February 2010, after

[64] IQR refers to the inter-quartile range, which we consider a zone of 'normal' variation.

which it displayed a consistent upward trajectory, and eventually entered into a high risk zone by January 2011.

Example: Locating "an optimal" high risk percentile

In principle, the location of the percentiles will be determined by historical properties of the data as well as assigned tolerance levels, i.e. configuration for τ we are prepared to set for breaching a particular threshold. For example, if our tolerance for spread widening is lower than that defined by the 95th (high risk) percentile of the empirical distribution, then it follows that this will amount to setting e_{low}, such that, $e_{low} < e$.



Notes: The left hand axis measures the number of LMA episodes within the high or elevated risk zones. Candidate percentiles are recorded on the x-axis.

By exploiting information on past LMA episodes across countries, the framework can be adapted to account for differing preferences. This will essentially rely on recording the number of LMA episodes observed historically within each risk zone, under different values of τ, across the cross-section of countries available.

Selecting τ in order to maximize episodes of LMA within, for example, the high risk zone will naturally amount to fewer episodes being observed within the elevated risk zone. Arriving at a notion of "optimality" in terms of risk zone delineation will boil down to identifying which percentiles are consistent with observing the maximum number of LMA episodes within a particular risk zone. In our example, $p_{\text{high risk}} = \hat{F}^{-1}(0.8)$. $\hat{F}^{-1}(0.775)$ would correspond to a percentile such that no recorded LMA episodes fall in a zone of elevated risk, for instance.

Annex V. Extracting Information from the Term Structure of Distressed Bond Prices

The estimation methodology is based on the assumption that market participants are pricing to recovery. Under the assumption of recovery value R for one dollar of principal, the market price *P* of a particular bond paying annual coupon C can be given by:

$$P = \sum_{i=1}^{n} C \frac{1}{(1+r)^i} e^{-i\lambda} + \frac{1}{(1+r)^n} e^{-n\lambda} + R \sum_{i=1}^{n} \frac{1}{(1+r)^i} [e^{-(i-1)\lambda} - e^{-i\lambda}]$$

The parameter λ is the unconditional default intensity per unit of time (or hazard rate). Hence, the probability of no default from time zero until time *t* is given by $e^{-\lambda t}$ (the arbitrage free survival probability). This implies that the annualized probability of default is $1-e^{-\lambda}$, which is (approximately) λ, when λ is not too large. Also, *r* is the risk free discount rate.

The above expression for price is the present value of the cash flows weighted by the probabilities of receiving them and the recovery value. Under some very general constraints, the unknown parameters R and λ, can be jointly estimated by minimizing the sum of squared fitting errors between *P* and corresponding observed market prices of outstanding bonds at any point in time.[65] Each period's cash flow is discounted using the appropriate points on the relevant spot curve. In order to obtain a continuous risk free discount rate curve we generate Svensson curves using observed US spot yields.[66] The obvious advantage of this method compared to the more traditional CDS-based measures is that it is able to utilize information contained in the entire term structure of outstanding bonds.

The estimated recovery rates are robust to the use of various distribution functions. The specification above is an example of a pricing formula consistent with a homogenous Poisson process. However, one can allow for other distributional assumptions on the survival function, such as Weibull and Gumbel distributions,[67] as well as the survival functions proposed by Merrick (2001) and Vrught (2011). The results we provide for Ukraine are robust across these different specifications.[68]

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[65] Due to the heteroscedastic nature of bond prices, the literature typically suggests using a minimized weighted sum, i.e. weighted by the inverse of Macauley duration. This is the strategy we adopt in our estimations.

[66] Since we are solving the minimization problem at each point in time, we also generate a new Svensson curve for each date.

[67] For details on these distributions, see Adritzky (2006), Chapter 4.

[68] We also check how the estimated recovery parameter behaves assuming a fixed value of λ.We experiment with values between 0.5 and 0.9, i.e. assuming more than a 50 percent chance of default.

Annex VI. Restructuring Scenarios Conditional on the Market's Expected Recovery Rate

Let us consider a situation where the recovery rate priced in by the market corresponds to a lower bound. Specifically, the conjecture is that bond holders will not agree to any restructuring strategy that would be consistent with a recovery rate lower than what they have priced in.[69]

In practice, assessments regarding the effectiveness of sovereign debt restructurings are summarized by comparisons of the *NPV* of debt service, before and after restructuring, i.e. the "haircut", which is typically calculated as,

$$\dddot{Haircut} = 1 - \frac{NPV^{new}(\ddot{r})}{NPV^{old}(\ddot{r})} . \quad (a)$$

The above formula suggests that when bond holders exchange their original bonds with new bonds, the NPVs of both will be discounted at the same exit yield. Alternatively, the formula for the haircut used in some of the earlier literature is:

$$\dddot{Haircut} = 1 - \frac{NPV^{new}(\ddot{r})}{100} . \quad (b)$$

Haircut calculations are inherently sensitive to the choice of discount rate or so-called "exit yield", denoted here by $\ddot{r}$. Thus, a vital aspect of restructuring negotiations is ascertaining the appropriate exit yield. Also, results will be sensitive to whether we assume the haircut be calculated as (*a)* or (*b).*

Our aim is to derive a set of exit yields that would be consistent with bondholders' assigning of a lower bound on recovery rates, i.e., an upper bound on the haircut they are willing to accept. Let $\underline{R}$ be the expected lower bound on the recovery rate. This implies that bond holders' upper bound on haircut can be written as,

$$\overline{Haircut} = 1 - \underline{R} .$$

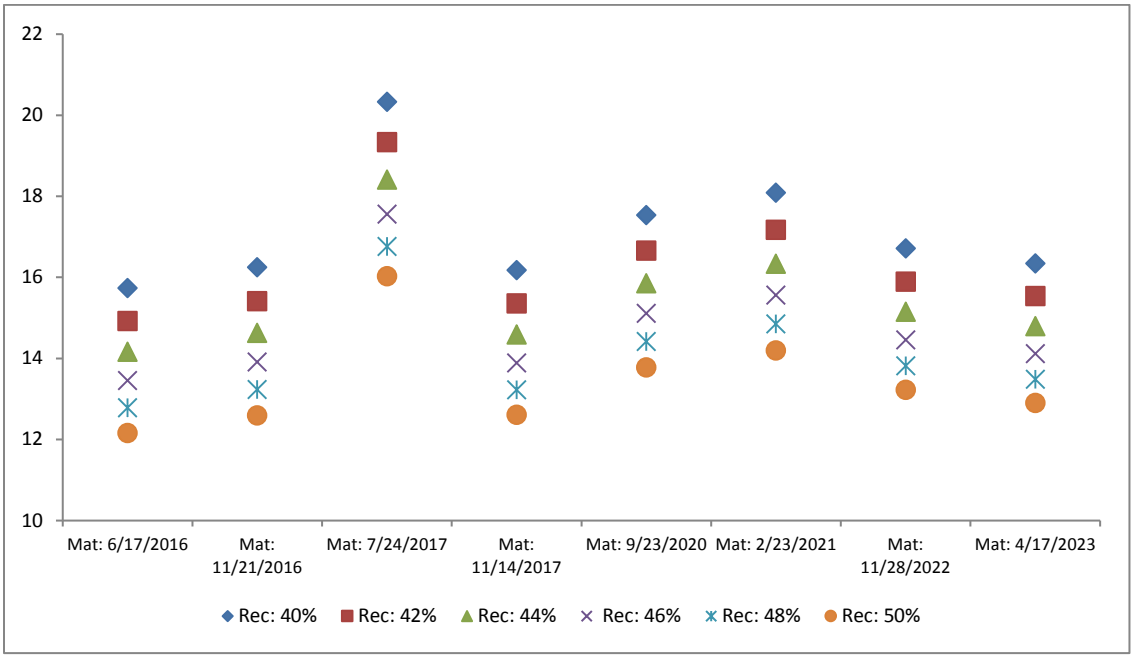
For a given restructuring scenario we can derive $\ddot{r}$ by minimizing the quadratic distance between $\dddot{Haircut}$ and $\overline{Haircut}$. Such an exit yield would be consistent with the market's upper bound for the haircut.

Illustrative scenario: For a maturity extension on all bonds by 10 years, accompanied by a coupon reduction by 25 percent and principal reduction by 25 percent, exit yield estimates corresponding to haircut definitions (a) and (b) are provided in Charts A and B. Whereas, the

[69] A lower bound on recovery rate is equivalent to an upper bound on the haircut ($haircut = 1 - R$) bond holders are willing to accept.

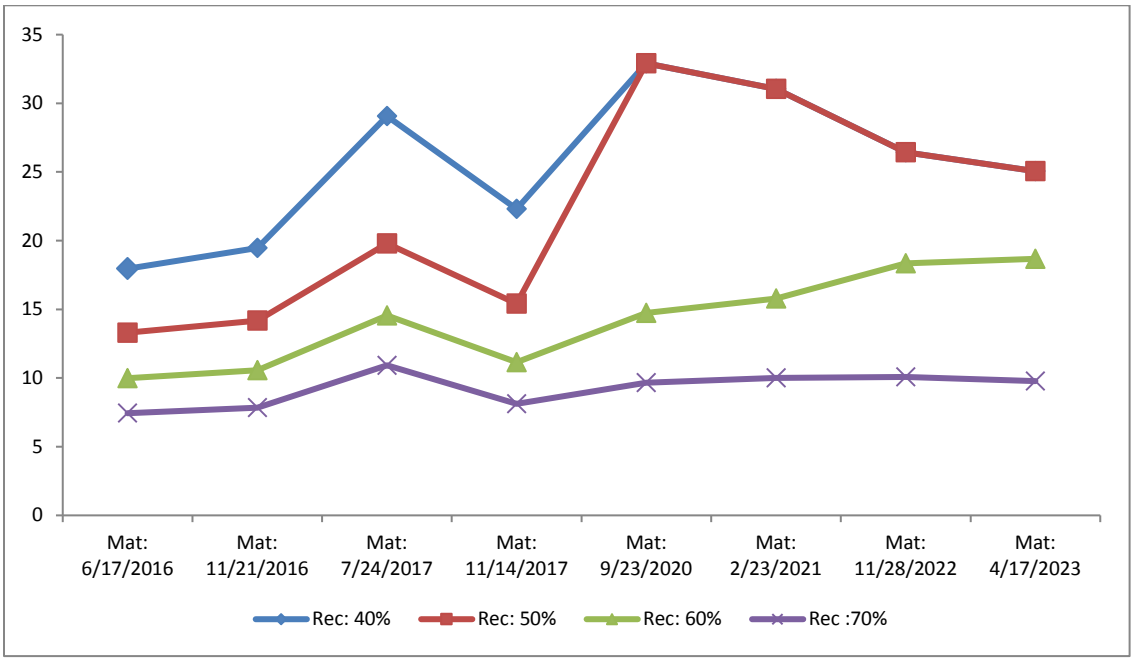
implied exit yield declines linearly when we allow for higher recovery rates when using formula (b), as definition (a) is associated with a relatively more non-linear decline.

A: Exit yield estimates corresponding to different maturity bonds, assuming haircut definition (b)



Note: Exit yield (in percent) on right-hand axis.

B: Exit yield estimates corresponding to different maturity bonds, assuming haircut definition (a)



Note: Exit yield (in percent) on right-hand axis.

Annex VII. Heat Map

	Sovereign Dollar Bond Spreads (bps)			Sovereign Credit Ratings	
	Average 2015 Level	Average 2016 Level	Δ Jun 2014 - Dec 2015	S&P 2014	S&P 2015
Asia					
Mongolia	610	989	279	B+	B
Sri Lanka	421	615	223	B+	B+
Vietnam	259	325	87	BB-	BB-
Central and Eastern Europe					
Belarus	921	588	59	B-	B-
Bulgaria	233	249	-10	BBB-	BB+
Croatia	283	316	69	BB	BB
Georgia	421	515	165	BB-	BB-
Latvia	90	101	-37	A-	A-
Serbia	280	301	12	BB-	BB-
Ukraine	2375	860	41	CCC	B-
Middle East					
Egypt	409	604	232	B-	B-
Iraq	746	1189	514	NR	B-
Jordan	249	402	186	BB-	BB-
Lebanon	402	482	100	B-	B-
Pakistan	500	587	65	B-	B-
Tunisia	378	638	318	...	...
Africa					
Angola	638	1042	545	BB-	B
Côte d'Ivoire	459	584	132	...	...
Ghana	755	1224	388	B-	B-
Kenya	489	703	303	B+	B+
Senegal	485	633	205	B+	B+
Tanzania	572	875	446	...	...
Zambia	686	1243	553	B+	B
Latin America					
Belize	781	1079	60	B-	B-
Costa Rica	449	568	208	BB	BB
Dom. Rep.	385	496	111	B+	BB-
El Salvador	497	740.5	246	BB-	B+

Sources: Bloomberg, Dealogic, S&P Capital, Fitch, Moody's, and authors' calculations.

Notes: Based on EMBI Global sovereign spreads. Red indicates high risk, orange elevated risk, yellow medium risk, and green low risk.

The critical thresholds are time-varying and depend on country-specific characteristics.
Cote d'Ivoire is rated by Moody's.

Annex VIII. Summary of IMF Lending Policies

An IMF-supported program in the General Resources Account (GRA), is guided by the following rules with respect to debt sustainability and market access:

A. Exceptional Access[70]

Where a rigorous and systematic analysis indicates that there is a high probability that the member's public debt is sustainable in the medium term the IMF may provide exceptional access financing. Where the member's debt is considered sustainable but not with a high probability, exceptional access would be justified if financing provided from sources other than the Fund, although it may not restore sustainability with high probability, improves debt sustainability and sufficiently enhances the safeguards for Fund resources. For purposes of this criterion, financing provided from sources other than the Fund may include, inter alia, financing obtained through any intended debt restructuring.

Where the member's debt is assessed to be unsustainable ex ante, exceptional access will only be made available where the financing being provided from sources other than the Fund restores debt sustainability with a high probability. For more details on the recent reforms to the IMF's exceptional access lending framework, please see IMF Press Release of January 29, 2016 below:

IMF Press Release No. 16/3, January 29, 2017

"The Executive Board of the International Monetary Fund (IMF) has approved reforms to the IMF's exceptional access lending framework, which governs access above the Fund's normal financing limits, to make it more calibrated to members' debt situations, while avoiding unnecessary costs for the members, creditors, and the financial system as a whole. These reforms were put forward in a 2015 staff paper "The Fund's Lending Framework and Sovereign Debt – Further Considerations." The Board's January 20, 2016 decision follows a preliminary Board discussion on this topic in June 2014 (Press Release No. 14/ 294).

The approved reforms include the elimination of the "systemic exemption" introduced in 2010, an increase in flexibility for members where debt is assessed to be sustainable but not with high probability, and a clarification to the criterion related to market access. IMF staff consulted with numerous stakeholders, including market participants, in the course of its work on the reforms.

In May 2013, the Executive Board endorsed a four-pronged work program and asked staff to present options for reform (see Public Information Notice No. 13/61). Two of the four components were concluded earlier. These are: (i) strengthening the contractual framework

[70] Exceptional access is defined as 435 percent of access on a cumulative basis, 145 on an annual basis.

to address collective actions problems (see Press Release No. 14/459); and, (ii) reforming the IMF's policy on the non-toleration of arrears to official creditors (see Press Release No. 15/555). Additional work related to private sector involvement in debt restructurings, including the lending-into-arrears policy, will begin shortly.

Executive Board Assessment

Executive Directors welcomed the discussion of proposed reforms to the Fund's exceptional access framework, one of the issues under the sovereign debt restructuring work program that was endorsed by the Executive Board in May 2013. Directors supported the broad objectives underlying the proposed reforms. They agreed that, by modifying this framework to allow responses that are better calibrated to a member's debt vulnerabilities, the reforms would help promote more efficient resolution of sovereign debt problems and avoid unnecessary costs for the member, its creditors, and the overall system. At the same time, they would enable the Fund—consistent with its mandate—to continue providing financing to assist members in resolving their balance of payments problems, including in the presence of spillover and contagion risks.

In this context, Directors generally favored the removal of the systemic exemption. It was recognized that the removal of the systemic exemption is critical for several reasons. First, to the extent that a member faces significant debt vulnerabilities despite its planned adjustment efforts, the use of the systemic exemption to delay remedial measures risks impairing the member's prospects for success and undermining safeguards for the Fund's resources. Second, from the perspective of creditors, the replacement of maturing private sector claims with official claims, in particular Fund credit, will effectively result in the subordination of remaining private sector claims in the event of a restructuring. Third, the systemic exemption aggravates moral hazard in the international financial system and may exacerbate market uncertainty in periods of sovereign stress. Finally, it is far from clear that invoking the systemic exemption to defer necessary measures on debt can be relied upon to limit contagion, since the source of the problem—namely, market concerns about underlying debt vulnerabilities—is left unaddressed.

Directors agreed that staff's proposed approach addresses more robustly the rigidities in the exceptional access framework, while ensuring that debt vulnerabilities are addressed in an appropriately calibrated way. Specifically:

• When the Fund is confident that debt is sustainable with high probability, it would continue to provide financing in support of a strong adjustment program that envisages payment of outstanding obligations as they fall due. These cases would include those where, although a member may have lost market access, the Fund is confident that this loss is temporary and that debt is sustainable.

• By contrast, when debt is clearly unsustainable, prompt and definitive action to restructure debt and restore debt sustainability with high probability remains the least-cost approach.

• However, when a member's debt is assessed to be sustainable but not with high probability, requiring a definitive debt restructuring could incur unnecessary costs. In such situations, it would be appropriate for the Fund to grant exceptional access so long as the member also receives financing from other sources during the program on a scale and terms such that the policies implemented with program support and associated financing, although they may not restore projected debt sustainability with a high probability, improve debt sustainability and sufficiently enhance the safeguards for Fund resources.

Directors noted that, in applying this more flexible standard in circumstances where debt is assessed to be sustainable but not with high probability, there would be a range of options that could meet the prescribed requirements. There would be no presumption that any particular option would apply. Rather, the choice would depend on the circumstances of the particular case, and would need to be justified accordingly. In particular:

• In situations where the member retains market access, or where the volume of private claims falling due during the program is small, sufficient private exposure could be maintained without the need for a restructuring of their claims.

• If the member has lost market access and private claims falling due during the program would constitute a significant drain on available resources, a reprofiling of existing claims (that is, a short extension of maturities falling due during the program, with normally no reduction in principal or coupons) would typically be appropriate. This could allow a somewhat less stringent adjustment path while also reducing the needed level of access. Although a reprofiling is a form of debt restructuring, it was recognized that, in these circumstances, it will likely be less costly to the debtor, the creditors, and the system than a definitive debt restructuring. In this context, the scope of debt to be reprofiled would be determined on a case-by-case basis, recognizing that it would not be advisable to reprofile a particular category of debt if the costs for the member of doing so—including risks to domestic financial stability—outweighed the potential benefits. Notably, short-term debt instruments (by original maturity), trade credits, and local currency-denominated debt had not been included in most past restructurings.

• Similarly, financing from official bilateral creditors, where necessary, could be provided either through an extension of maturities on existing claims and/or in the form of new financing commitments.

As is the case with all debt restructurings under Fund-supported programs, a reprofiling, where it is needed, should ideally be undertaken before the approval of the Fund arrangement. However, there may be circumstances under which more flexibility is warranted, so that the conclusion of the debt operation is contemplated at a later date. Against this background, it would not be necessary to hold up Fund support until there is complete clarity regarding the terms of this financing.

Directors broadly concurred with staff's analysis on the nature and type of cross-border spillovers that could result from a debt restructuring. They recognized that some spillovers, insofar as they reflect a repricing of risk in line with fundamentals, should be accommodated

and complementary policy actions should be taken if necessary to counter market fluctuations that are not rooted in fundamentals.

Nevertheless, Directors took note of the fact that, if a rare tail-event case were to arise where any restructuring of private claims, even a reprofiling, is judged to pose unmanageable risks, either for domestic financial stability or in terms of possible cross-border spillovers, the reformed framework creates the flexibility for the Fund to approve exceptional access to Fund resources without such a restructuring so long as official sector partners are willing to provide the necessary financing. Such financing would need to be on terms sufficiently favorable to improve sustainability and enhance safeguards for Fund resources, and, accordingly, the Fund would need assurances that the terms could be modified in future if the outlook for debt sustainability were to deteriorate significantly. If official creditors were unwilling to provide such assurances, the terms of the financing would need to be sufficiently generous upfront to restore debt sustainability with high probability. In circumstances where debt is unsustainable, the terms of the financing provided by official bilateral creditors would similarly need to be sufficiently favorable to restore debt sustainability with high probability. This could take the form of loans with long tenors and concessional rates, grants, or other instruments. Directors noted that these requirements would be implemented flexibly. The Fund could proceed on the basis of political commitments to backstop debt sustainability without necessarily requiring all the specific modalities to be spelt out. Directors concurred that, while this alternative approach for rare tail-risk cases does not allay moral hazard concerns, it would be more effective than the systemic exemption, as it would help the member address its debt problems, mitigate contagion at its source, and provide safeguards for Fund resources. Some Directors noted the expectation that the approach would be used only rarely and emphasized that the decision to resort to this approach should be made in an evenhanded manner. A few Directors expressed the view that the approach described in this paragraph could be feasible even in less extreme circumstances rather than just in rare tail-events characterized by unmanageable risks.

Directors observed that the Fund's assessment of debt sustainability will continue to play a central role in the exceptional access framework. In this regard, they emphasized that, notwithstanding continued improvements in the Fund's toolkit for making debt sustainability assessments, the determination of where a country's debt prospects lie on the spectrum of probabilities will continue to involve a significant element of judgment. Specifically, the determination, which is inherently forward-looking, would take into account all relevant information, including country-specific information on prospects for policy implementation, growth opportunities, contingent liabilities, the nature of the creditor base and indicators of investor confidence; as well as the outlook for the global economic environment. Directors noted that, taking these considerations into account, the levels of debt that are consistent with sustainability could vary significantly across programs.

With regard to the third criterion under the exceptional access framework, namely the condition related to market access, Directors supported staff's view that this condition needs to be met even in cases involving open-ended commitments of official support beyond the program period. They agreed that the resolution of a member's balance of payments problem and the achievement of medium-term external viability is a key objective of Fund lending,

and a member's ability (as distinct from its need) to access private capital markets is inherent to this resolution. While official financing commitments can provide a useful backstop against downside risk, they do not render the market access criterion moot. Directors emphasized, nonetheless, that staff should take into account the positive impact that commitments of official support may have on a member's ability to access markets, on a case-by-case basis, when assessing whether the third criterion is met.

Directors also broadly supported staff's clarification on the timeframe within which to establish market access. Specifically, they noted that the Fund has generally expected that a member gain or regain market access within a timeframe that facilitates the repayment of all of its obligations to the Fund—not just the last one that is due, as the current wording of the third criterion might suggest.

The changes to the Fund's exceptional access framework will enter into effect immediately and will apply to all future completion of reviews under existing arrangements or approval of new Fund arrangements.

Looking ahead, Directors called on staff to continue its work on ensuring that the Fund's lending toolkit is effective in addressing systemic crises and contagion. They looked forward to the upcoming review of issues relating to debtor-creditor engagement, including the Fund's lending into arrears policy. This would complete the program of work aimed at facilitating the timely and orderly resolution of sovereign debt problems."

*B. **Normal Access***

The IMF needs to assess debt to be sustainable in the medium term to provide financing. To the extent debt is assessed to be unsustainable, the IMF is precluded from providing financing unless steps are taken by the member to restore sustainability.

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