

Debt-Related Vulnerabilities and Financial Crises

An Application of the Balance Sheet Approach to Emerging Market Countries

Christoph Rosenberg, Ioannis Halikias, Brett House, Christian Keller,
Jens Nystedt, Alexander Pitt, and Brad Setser



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The following symbols have been used throughout this paper:

- . . . to indicate that data are not available;
- to indicate that the figure is zero or less than half the final digit shown, or that the item does not exist;
- between years or months (e.g., 2003–04 or January–June) to indicate the years or months covered, including the beginning and ending years or months;
- / between years (e.g., 2003/04) to indicate a fiscal (financial) year.

“n.a.” means not applicable.

“Billion” means a thousand million.

Minor discrepancies between constituent figures and totals are due to rounding.

The term “country,” as used in this paper, does not in all cases refer to a territorial entity that is a state as understood by international law and practice; the term also covers some territorial entities that are not states, but for which statistical data are maintained and provided internationally on a separate and independent basis.

Preface

The analysis of currency and maturity mismatches in sectoral balance sheets is increasingly becoming a regular element in the IMF’s toolkit for surveillance in emerging market countries. This paper describes this so-called balance sheet approach and shows how it can be applied to detect vulnerabilities and shape policy advice. It also provides a broad-brush overview of how balance sheet vulnerabilities have evolved over the past decade and presents a number of case studies.

This study is derived from several papers prepared for the IMF’s Executive Board, starting with “The Balance Sheet Approach to Financial Crisis” (IMF Working Paper No. 02/210). The project was initiated by Mark Allen, Director of the IMF’s Policy Development and Review Department, who—along with Juha Kähkönen—provided general direction. The team that drafted this and the previous paper was led by Christoph Rosenberg and included Ioannis Halikias, Brett House, Christian Keller, Jens Nystedt, Alexander Pitt, and Brad Setser. At various stages, the project has benefited from comments by the IMF’s Executive Board, management, various departments, and participants in several seminars organized by the European Central Bank, the Bank of England, the Bank of Canada, the IMF Institute, the Asia and Pacific Department, and the Policy Development and Review Department. In particular, the authors would like to acknowledge the contributions of Nouriel Roubini (who coauthored the earlier working paper), as well as Matthew Fisher, Olivier Jeanne, Leslie Lipschitz, Christian Mulder, Alan MacArthur, and Jeromin Zettelmeyer. Invaluable research assistance was provided by Rich Kelly and Gely Economopoulos. Esha Ray of the External Relations Department edited the paper and coordinated the production and publication.

The opinions expressed in the paper are those of the authors, and do not necessarily reflect the views of country authorities, the IMF, or IMF Executive Directors.

I Overview

This occasional paper describes the conceptual framework of the so-called balance sheet approach (BSA) and its application to emerging market countries. This type of analysis is increasingly used in the IMF's analysis of debt-related vulnerabilities, as evidenced by a growing number of Article IV consultation reports providing applications to individual countries. There is also a large body of academic literature that examines financial crises and their origins by using the BSA (Box 1.1). Moreover, the approach has become a standard element in the toolkit of risk assessments conducted by the private sector.

The paper has four related purposes:

- First, it introduces, in general terms, the BSA and its application to emerging market economies. Specifically, the paper seeks to explain some basic concepts underlying the approach and how they have been used to examine the origins and consequences of recent financial crises.
- Second, it provides an overview of salient balance sheet developments in emerging market economies. The paper takes account of the main balance sheet trends over the past decade and includes a number of case studies. Data weaknesses notwithstanding, the paper illustrates how intersectoral linkages have deepened over time. This suggests that the BSA is becoming increasingly relevant for vulnerability analysis.
- Third, it demonstrates how the BSA can be used to identify vulnerabilities. The paper should be seen mainly as a didactic device: both the broader regional overview as well as the country case studies illustrate how the BSA can be applied, even with relatively limited data. The paper also highlights the importance of systematically taking into account the level and structure of liabilities and assets in addition to traditional macroeconomic indicators. This facilitates analysis of the main linkages between domestic sectors, and consideration of off-balance-sheet activities, including contingent liabilities.
- Finally, it prepares the ground for discussing surveillance and program-related policy issues.

The paper seeks to provide empirical backing for the IMF Executive Board's recent conclusions regarding policies that can make emerging market economies more resilient, including appropriate liquidity management. For the design of IMF-supported programs, the paper provides some background for discussing how best to design debt-related conditionality, and how to justify access to IMF resources.

The paper focuses on emerging market countries, because this is where the application of the BSA appears particularly promising. First, several of these countries have been subject to capital account crises in the last decade, often emanating from balance-sheet-related weaknesses. They have proven particularly vulnerable to sudden capital outflows and sharp changes in investors' confidence, interest rates, and exchange rates because their financing is generally less diversified than in mature countries: they are typically not able to issue foreign debt in domestic currency and are often forced to borrow at short maturities. This may lead to combined currency and maturity mismatches. Moreover, there are fewer avenues to hedge or absorb financial losses.¹ Second, unlike in industrial countries where balance sheet analysis is already widely used and the related risks are factored into policy formulation, IMF staff's work on emerging market countries has more potential to provide new insights and identify avenues for research. Finally, the IMF's current budget constraints dictate a risk-oriented approach where IMF staff resources are concentrated on members that are most likely to be subject to crisis and where the IMF could be—or is already—financially exposed.

The BSA as a conceptual framework is, of course, relevant for mature markets as well. In fact, balance sheet issues feature prominently in the IMF's surveillance of industrial countries. For example, re-

¹Recent empirical work has established that the types of crises for which balance sheet mismatches have strong predictive power, notably "sudden stops," have tended to be an exclusive feature of emerging market economies. See, for example, Calvo, Izquierdo, and Mejía (2004).

Box I.1. The Balance Sheet Approach in the Academic Literature

Until the mid-1990s, the standard “first generation” model explained currency crises usually as the result of monetized fiscal deficits that would lead to reserve losses and eventually the abandonment of an exchange rate peg. The emphasis was on fundamental macroeconomic factors and the idea that a crisis would be triggered more or less mechanically, once reserves had fallen to a critical level (Krugman, 1979; Flood and Garber, 1984).

The “second generation” crisis models developed after the European exchange rate mechanism crisis in 1992 and the Mexican crisis in 1994–95 can be seen as the first formal recognition of the potential role of balance sheet mismatches in currency crises. In these models, crisis can be triggered by an endogenous policy response as the authorities decide whether to devalue based on trade-offs, for example, between the benefits of a strong currency and the costs of higher unemployment.¹ In addition to fundamental weaknesses (such as an overvalued currency and an unsustainable current account deficit), they point out how maturity and currency mismatches may lead to a self-fulfilling currency run, a debt rollover crisis, or a bank run (multiple equilibria).

Following the experience of the Asian crisis of 1997–98, where private sector vulnerabilities rather than fiscal imbalances played a key role, a “third generation” of models has been explicitly based on balance sheet analysis. While crises were seen to have some elements of a self-fulfilling “liquidity run” (see Sachs and Radelet, 1998; Rodrik and Velasco, 1999), these models brought to the open a number of additional vulnerabilities in the corporate and financial

sector, and also highlighted that currency crises are often followed by banking crises (“twin crises”). A wide range of models based on balance sheet analysis were developed to understand how capital account movements drive currency and financial crises (see Dornbusch, 2001).

Different strands of these third generation models emphasize diverse factors, including microeconomic distortions, currency mismatches, self-fulfilling runs, or capital reversals. Work by Krugman (1999), Masson (1999), and Corsetti, Pesenti, and Roubini (1999a and 1999b) points to weakly supervised and regulated financial systems, directed lending, moral hazard caused by government guarantees, and distortions created by fixed exchange rates. Another body of work stresses how large currency depreciation in the presence of foreign currency liabilities increases the real debt-service burden, leading to investment and output contraction.² The initial currency depreciation is triggered by fundamental shocks, but in some models it is a self-fulfilling process, where an expected depreciation leads to a currency run and a collapse of the peg, and the resulting real depreciation wipes out the private sector’s balance sheets, thus ex post validating the confidence loss and the currency crash. Indeed, Chang and Velasco (1999), Burnside, Eichenbaum, and Rebelo (1998), and Schneider and Tornell (2000) interpret financial crises as international variants of “bank run” models (as in Diamond and Dybvig, 1983). Recent work in the IMF’s Research Department shows how the self-fulfilling run caused by the feedbacks between the currency depreciation and balance sheet deterioration can

¹See Obstfeld (1994); Drazen and Masson (1994); and Cole and Kehoe (1996).

²See Krugman (1999); Céspedes, Chang, and Velasco (2000); Gertler, Gilchrist, and Natalucci (2003); Aghion, Bacchetta, and Banerjee (2000); and Cavallo, Kisselev, Perri, and Roubini (2002).

cent Article IV consultations for Australia, Ireland, the United Kingdom, and the United States focused on potential changes in real estate values and the implications for mortgage lending and household debt. The international linkages of the banking and insurance sectors have been the subject of selected issues papers for Germany, Portugal, and Spain. In the case of Austria, currency mismatches (rapidly expanding

foreign currency loans to households) have been the subject of staff scrutiny. These studies have all looked into specific sectors, and data provided by the authorities have generally been adequate. A full-fledged intersectoral balance sheet analysis is very data intensive, but some industrial country members (such as the United Kingdom) are trying to make progress in this area.

be avoided through an international lender of last resort (Jeanne and Wyplosz, 2001; Zettelmeyer and Jeanne, 2002).

The recent literature on debt intolerance emphasizes that developing countries historically have run into problems at much lower debt-to-output ratios than advanced countries.³ This research focuses on weak revenue bases and the lack of expenditure control as critical reasons in explaining why primary balances and hence sustainable public debt levels in an emerging market economy are fairly low.⁴ In the context of balance sheet analysis, these traditional indicators of fiscal weaknesses can be interpreted as vulnerabilities on the asset side of the public sector's balance sheet. Other research highlights the role weaknesses on the liability side of the public sector's balance sheet can play in reducing the level of debt that emerging market economies can sustain. For example, the literature on original sin—the inability to borrow (abroad, but also at home) long term in the local currency—draws attention to important differences between the debt structures of advanced economies and many emerging market economies.⁵

³Reinhart, Rogoff, and Savastano (2003a) find that *external* debt was less than 60 percent of GNP in 47 percent of the default cases they examined. Similarly, International Monetary Fund (2002b) and Manasse, Roubini, and Schimmelpfennig (2003) estimate external debt thresholds of 40 percent of GDP and 50 percent of GDP, respectively, beyond which countries are more likely to experience debt defaults.

⁴Research in International Monetary Fund (2003a) suggests that, based on fiscal performance, the sustainable gross public debt level for a typical emerging market economy may only be about 25 percent of GDP; 50 percent of GDP is found to be a threshold level beyond which the risk of a sovereign debt crisis increases significantly.

⁵Eichengreen, Hausmann, and Panizza (2003).

Financial crises, especially in Latin America, have inspired additional research on the vulnerabilities associated with (partial) domestic dollarization in emerging market countries.⁶ Households' holdings of dollar deposits, for example, can leave the banking system and the overall economy vulnerable to a self-reinforcing deposit run as a shock to the portfolio preferences of domestic households prompts a shift out of domestic dollar deposits toward relatively safer international assets. The need to match dollar deposits with domestic dollar loans can increase the overall stock of foreign-currency-denominated claims in the economy, aggravating the risk that a currency depreciation will result in financial distress.⁷ Balance sheet mismatches in the financial, household, or corporate sectors can seriously limit the degree of exchange rate volatility that policymakers are willing to tolerate (fear of floating) as monetary authorities in practice often intervene to prevent large movements in the exchange rate.⁸ Recent work on currency mismatches by Goldstein and Turner (2004) highlights the need to take into account domestic foreign currency liabilities as well as external debt in assessing vulnerability, and to assess an economy's foreign currency debt in light of both existing stocks of foreign assets and its ability to generate a flow of foreign currency receipts from exports and income.

⁶Reinhart, Rogoff, and Savastano (2003b); De Nicoló, Honohan, and Ize (2003); Caballero and Krishnamurthy (2000); Baliño, Bennett, and Borensztein (1999); Mongardini and Mueller (2000); Oomes (2003); Edwards (2001); Havrylyshyn and Beddies (2003).

⁷Zettelmeyer and Jeanne (2002); Kaminsky and Reinhart (1999); and Jeanne and Wyplosz (2001).

⁸Calvo and Reinhart (2000); Céspedes, Chang, and Velasco (2000).

This paper is structured as follows: Section II introduces some general concepts underlying the BSA and shows how they can help better understand modern-day financial crises. Section III takes a broad look at trends in public and private balance sheets in emerging market countries, highlights their increasing linkages, and points to the vulnerabilities that they may create. Section IV aims to

give a better sense of how such vulnerabilities can actually translate into real crises by more closely tracing balance sheet developments, both in a few recent crisis cases (Argentina, Turkey, and Uruguay) and in some near-crisis cases (Brazil, Lebanon, and Peru). Section V provides some concluding thoughts on policy implications, operationalizing the BSA, and further work.