

The International Monetary Fund's Balance Sheet Approach to Financial Crisis Prevention and Resolution

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In 2002, the International Monetary Fund added the Balance Sheet Approach to its set of instruments for monitoring member countries as well as the international financial system and for preventing and resolving financial crises.

In this approach, which was predominantly conceived for emerging market economies, the IMF assumes that a country's vulnerability to financial crises depends in part on the financial structure of its sectoral balance sheets. With this instrument, the IMF analyzes the size and the composition of financial assets and liabilities in a country's aggregate balance sheet and its most important sectoral balance sheets (government, banks, corporations and households as well as the rest of the world). The IMF finds indicators of a country's vulnerability to crises by detecting imbalances in its maturity and currency matching, capital structure and solvency. This makes a valuable contribution to crisis prevention and helps to determine the necessary economic policy measures and external financing needs once a financial crisis has emerged.

The IMF already employs this approach in its analyses and also plans to use it routinely in future Article IV consultations.¹

1 Introduction

The tasks of the International Monetary Fund (IMF) include promoting and securing economic growth and international trade as well as monitoring the world monetary system. In this context, the IMF is responsible, on the one hand, for the *surveillance* of its member countries and the international financial system in order to prevent financial crises and, on the other hand, for *crisis resolution* by providing finance subject to economic policy requirements.

In order to perform its functions more effectively, the IMF has at its disposal a wide array of instruments for monitoring its members and resolving financial crises (Table 1). In December 2002, the IMF expanded this set of surveillance instruments to include the Balance Sheet Approach (BSA).

The BSA provides early warning signs which allow for the prevention and resolution of financial crises and is among the new developments arising from the IMF's *Surveillance and Crisis Prevention* and *Crisis Resolution* strategies. The IMF already uses this approach in its analyses and also plans

to use it routinely in future Article IV consultations.

This instrument is particularly helpful in the case of *emerging market economies* (e.g. Brazil, Turkey, Mexico), especially as such countries have become increasingly active in international capital markets and have been issuing international bonds denominated in foreign currency since the early 1980s. The corporate sector in these countries has also taken on external debt in foreign currency. Similarly, banks in emerging market countries have refinanced themselves externally in foreign currency, while their revenues have largely remained in local currency.

As a result, financial markets have become increasingly integrated over the last 20 years. In many countries, foreign borrowing made it possible to finance higher investment volumes than would have been possible with domestic savings capital alone. However, especially in emerging markets, this opening of capital markets and the high volatility of private capital flows have led to major financial crises in a number of emerging market economies (Allen et al., 2002, p. 4).²

¹ Annual review of a country's economy.

² See the Mexican crises of 1982 and 1994–95 as well as the Asian crisis of 1997–98.

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Table 1

IMF Instruments for Monitoring Member Countries and Resolving Financial Crises		
Surveillance and Crisis Prevention		
Instrument	Abbreviation	Explanation
Financial Sector Assessment Program	FSAP	Assessment of a country's financial system (including banks, insurance companies, pension funds, financial market supervision).
Country surveillance: Article IV consultations	Art. IV	Annual review of a country's economy as a whole (including the government, financial sector; corporations, private households), especially monetary policy; fiscal policy; economic policy; international trade, retail demand, investment activity; short-term forecasts.
Regional surveillance		Assessment of monetary unions in particular (e.g. euro area, East Caribbean Currency Union, West African Currency Union, East African Currency Union).
Multilateral surveillance, especially: World Economic Outlook Global Financial Stability Report	WEO GFSR	Assessment of economic development and risks to the world economy. Outlook and risks for the worldwide financial system.
Report on the Observance of Standards and Codes	ROSC	Review of whether countries are adhering to best practices in the development of standards and codes (mainly for fiscal policy).
Special Data Dissemination Standard	SDDS	Worldwide collection and preparation of national economic indicators.
Debt Sustainability Analysis	DSA	Analysis of the potential effects of a GDP, currency or interest rate shock on debt sustainability, that is whether debts can still be serviced.
Balance Sheet Approach	BSA	Assessment of a country's vulnerability to crises and crisis prevention through the detection of currency and maturity mismatches on the country's aggregate and sectoral balance sheets.
Technical Assistance and Regional Institutes	TA and Regional Institutes	Technical assistance in the establishment of systems relevant to economic and monetary policy (e.g. central bank, payment system, statistics). Regional institutions such as the Joint Vienna Institute (JVI) in Vienna serve as educational facilities for experts from emerging and developing economies.
Crisis Resolution		
IMF loans Includes special IMF facilities (e.g. Poverty Reduction and Growth Facility) Principle: IMF has preferred creditor status	PRGF	Capital inflows under an IMF program to mitigate balance of payments crises. Special facility for developing countries. The funds made available by the IMF are to be repaid first (even before national loans); currently common practice.
Rollovers¹		Banks do not demand repayment of loans but extend their terms.
General bond exchange¹		One or more bonds are exchanged for a new bond, usually with a longer maturity.
Capital outflow controls¹		Capital outflows are stopped or subjected to restrictions.
Payment suspension or debt moratorium¹		Temporary suspension of payment obligations. Payment suspension: unilateral. Debt moratorium: multilateral agreement.
Heavily Indebted Poor Countries Initiative	HIPC Initiative	Debt relief for the poorest developing countries.
Collective Action Clauses	CACs	Clauses in foreign currency bonds (usually in U.S. dollars) which facilitate debt restructuring by changing issuing terms (e.g. interest rates, maturities). Initiated after the failure of SDRMs. Available to emerging market economies since 2002.
Balance Sheet Approach	BSA	Assessment of the necessary economic policy measures and external financing needs after the eruption of a crisis due to currency and maturity mismatches on the country's aggregate and sectoral balance sheets.
Sovereign Debt Restructuring Mechanism	SDRM	Bankruptcy procedure for sovereigns. Discussed from 2001 to April 2003, not currently under active discussion.
Principles for Stable Capital Flows and Fair Debt Restructuring in Emerging Markets (formerly: Code of Good Conduct)	Principles	Agreement between private industry and emerging market economies regarding rules of conduct for information, consultation and adherence to agreements, and that are expected of the lender and borrower in the event of a debt crisis.
Private Sector Involvement	PSI	Involvement of the private sector in the financing of crisis prevention programs.

Source: OeNB.

¹ Instruments employed jointly with other sectors with the participation of the IMF.

In principle, financial crises can originate in all three main sectors of the economy (government, banks or corporations). One of the *main sources of financial crises* is the *financial balance sheet structure in emerging market economies*. A country's *balance sheet* reveals financial risks which can materialize quickly. Although there are significant differences between emerging market economies in terms of their financial balance sheet structure, their overall vulnerability to crises is far higher than that of mature market economies.

The IMF document (Allen et al., 2002) underlying substantial parts of this study provides a systematic set of analytical instruments for the purpose of examining whether a country's balance sheet contains weaknesses, whether such vulnerabilities can trigger or exacerbate financial crises and which measures can be taken in each case.

2 The IMF's Balance Sheet Approach

2.1 Definition

The IMF's Balance Sheet Approach is an instrument for the *detection, prevention and resolution of financial crises*. The BSA allows the IMF to analyze the *size and composition of the assets and liabilities on a country's aggregate financial balance sheet as well as the financial balance sheets of its most important sectors*.

The BSA is not based on a balance sheet in the conventional sense of the term, that is, the accounts of an economic entity (usually a company) for a business year in the form of a comparison of financial and nonfinancial balance sheet positions on the assets

and liabilities sides as of a certain accounting date (Betriebswirtschaftlicher Verlag Dr. Th. Gabler GmbH, 1984, p. 748). The Balance Sheet Approach in the IMF model is merely a comparison of financial assets and liabilities as of a certain accounting date, which means that nonfinancial balance sheet positions are omitted. Moreover, the IMF does not draw up such balance sheets for individual economic entities but in aggregate form for the overall economy and for its most important sectors.

In this context, the IMF assumes that the resilience of an economy to various shocks, including financial crises, depends in part on the structure of the country's financial balance sheet. From this perspective, a financial crisis typically emerges in cases where demand for domestic financial assets plunges in one or more sectors (1. government sector, 2. financial sector, 3. nonfinancial sector, 4. external sector). Creditors lose confidence in the government's ability to service its debt, in the banking system's ability to meet deposit outflows, in the corporate sector's ability to repay bank loans and other debt, or in the country's ability to earn sufficient foreign exchange in order to meet its external obligations. This leads to the sale of local assets by nonresidents or to a surge in demand among residents for foreign assets and/or assets denominated in foreign currency. The results are massive capital outflows, a sharp decline in the exchange rate (in a flexible exchange rate regime) or an outflow of reserves (in a fixed exchange rate regime) along with other potential negative economic and social effects (Allen et al., 2002, p. 5).

2.2 Concept of the Balance Sheet Approach

2.2.1 The Balance Sheet Approach – A Third-Generation Model for Explaining Currency Crises

Economics literature provides three model theory-based approaches for the explanation of currency crises:

Until the mid-1990s, the standard *first-generation model* explained currency crises as a consequence of monetized fiscal deficits leading to losses in currency reserves and eventually to an abandonment of the exchange rate peg (Krugman, 1979; Flood and Garber, 1984).

Second-generation models were developed after the European Monetary System's exchange rate mechanism crisis in 1992 and the Mexican crisis of 1994 to 1995. These models were based on fundamental weaknesses (e.g. an overvalued currency, an unsustainable current account deficit), but for the first time they also included the potential consequences of maturity and currency mismatches on the balance sheet (Obstfeld, 1994; Drazen and Masson, 1994, etc.).

Third-generation models were developed on the basis of experience from the Asian crisis of 1997 to 1998, in which weaknesses in the private sector played a more important role than fiscal imbalances. These models are based explicitly on the analysis of financial balance sheets. They point out additional vulnerabilities in the financial and corporate sectors as causes of currency crises and show that currency crises often bring about banking crises (twin crises) (Kaminsky et al., 1997; Calvo, 1998; Kaminsky, 1999; Krugman, 1999; Dornbusch, 2001, etc.) (IMF, 2003, pp. 3–4).

2.2.2 The Balance Sheet Approach – A Stock Concept

The IMF's traditional *financial programming* approach basically builds on the examination of *flow variables* such as the current account or capital account. Those analyses focus on the gradual accumulation of unsustainable deficits in the respective areas.

While the traditional analysis of financial crises relies on the examination of flow variables over a certain period of time, the BSA focuses on examining *stock variables* on a country's financial balance sheet and on the balance sheets of key sectors (i.e. their assets and liabilities) at a certain point in time. Therefore, the BSA constitutes an enhancement and extension of the set of instruments available for analyzing capital account crises. Especially in the wake of the capital account crises of the 1990s, academics and policymakers are now attributing greater importance to the continued development of these tools (IMF, 2003, pp. 1–2).

2.2.3 Compiling a Country's Intersectoral Balance Sheet by Consolidating its Sectoral Financial Balance Sheets

In the BSA, an economy is analyzed as a *system of sectoral balance sheets*, with a distinction being made between the following sectors:

1. Government sector (including the central bank);
2. Financial sector (mainly banks);
3. Nonfinancial sector (corporations and households);
4. External sector (nonresidents, i.e. rest of the world).

The first three sectors listed above each have claims and receivables vis-à-vis one another and the rest of the world.

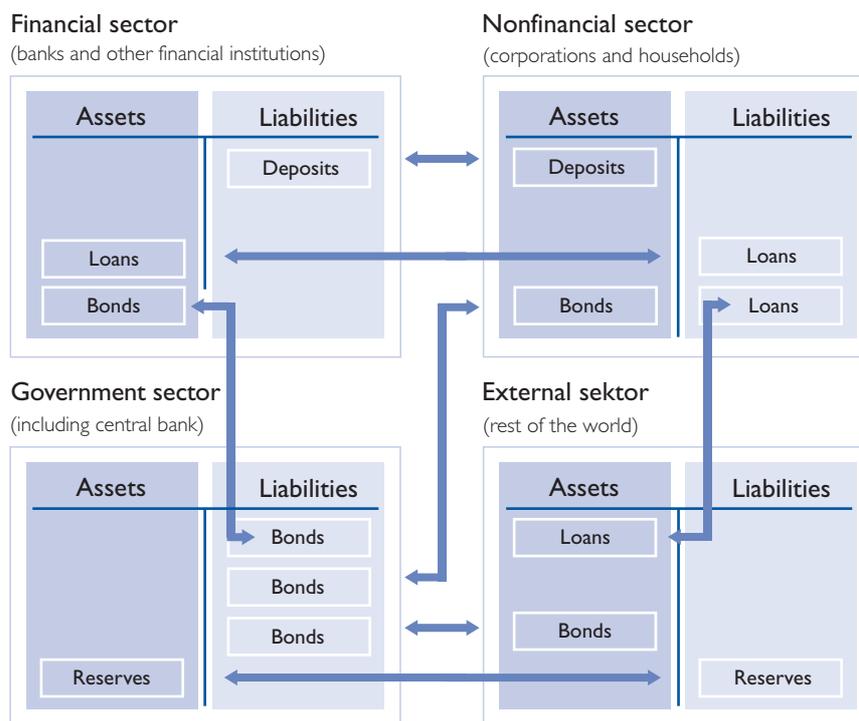
When the first three sectoral balance sheets are consolidated to yield a country's aggregate balance sheet, the assets and liabilities held by residents are netted out, and what remains is the external balance sheet

vis-à-vis the rest of the world (i.e. nonresidents).

Chart 1 gives a simplified overview of the system of sectoral and aggregate balance sheets; nonfinancial assets and liabilities are omitted.

Chart 1

Sectoral Financial Balance Sheets and Their Main Interlinkages



Source: Rosenberg, 2003.

A country's aggregate financial balance sheet can reveal the potential extent of its vulnerability to changes in external financial flows, but it is rarely suited for examining the causes behind such changes. *Sectoral financial balance sheets provide important information* which is not visible in the aggregate financial balance sheet. One conspicuous example is foreign currency-denominated debt between residents, which is netted out in the aggregate balance sheet. Weaknesses in a sectoral balance sheet can contribute to the development of a nationwide balance of payments crisis without even appearing on a country's aggregate balance sheet.

The risk of problems in one sector spilling over into other healthy sectors is exacerbated in countries which have liberalized their capital flows if external investors only take country risk into account and do not necessarily differentiate between sectors (Allen et al., 2002, pp. 13–15).

2.2.4 Four Types of Risk in the Analysis of Financial Balance Sheet Mismatches

The four most important risk types included in the analysis of balance sheet mismatches are as follows:

- *Maturity mismatch risk*
This type of risk typically arises when *assets are long-term* and

mainly illiquid, while *liabilities are short-term*. Maturity mismatches create *rollover risk*, that is the risk that it will not be possible to refinance maturing debts and that debtors will have to meet their obligations with liquid assets. Mismatched maturities also constitute an *interest rate risk* for the debtor, that is the risk that the level and/or structure of interest rates on the outstanding debt will change. Maturity mismatches can arise in both domestic and foreign currency.

For example, debtors may have short-term liabilities in foreign currency which exceed their short-term liquid assets in foreign currency, even though their total assets in foreign currency are equal to their total liabilities in foreign currency.

This risk has consistently played a key role in recent financial crises. Maturity mismatches in foreign currencies often led to a rollover crisis because short-term liabilities in foreign currency exceeded liquid assets. In some countries, financial pressure arose due to short-term government debt (e.g. Mexico, Russia, Turkey, Argentina), while in other countries (e.g. Korea, Thailand, Brazil) it was triggered by the short-term liabilities of the banking system. In other cases, (e.g. Russia, Turkey, Brazil, Argentina), short-term interest rates on government debt rose substantially even before the financial crisis struck.

– *Currency mismatch risk*

This risk arises when assets and liabilities are denominated in different currencies. If *assets are held in domestic currency but liabilities*

are denominated in foreign currency, substantial losses may result if the domestic currency depreciates sharply in an exchange rate shock. Currency mismatches tend to be more prevalent in emerging markets than in mature market economies. This is because financial intermediaries in emerging markets are often unable to borrow long-term capital in local currency domestically. As a result, it is often only possible to obtain capital for investment purposes by assuming currency risk. Hedging this currency exposure domestically merely transfers it to another sector within the country. If, for example, banks in an emerging market economy take on liabilities in U.S. dollars, a currency risk results. If the banks pass those liabilities on to corporations in the form of U.S. dollar-denominated loans, the banks' currency exposure declines again, while that of the corporations increases. If the corporations are not major net exporters, the risk that they will not be able to repay their foreign-denominated liabilities increases as well.

Currency mismatches can also trigger capital flows, which in turn create pressure on a country's currency reserves.

This risk has also played a significant role in nearly all recent crises. Currency mismatches were very pronounced in the government sector (e.g. in Mexico, Brazil, Argentina), in the banking sector (e.g. in Korea, Thailand, Indonesia, Brazil) and in the corporate and household sector (e.g. in Korea, Thailand, Indonesia, Turkey, Argentina, Brazil).

- *Capital structure mismatch risk*
This risk results from *excessive reliance on debt financing instead of equity*. The absence of an “equity buffer” can lead to a financial crisis when a sector encounters a shock. While profits slacken in economically bad times, interest payments on debt generally remain unchanged. Excessive debt financing is usually accompanied by excessive short-term borrowing, and thus not only leads to capital structure mismatches but also to maturity mismatches. The reasons for excessive debt financing can include poor corporate governance as well as tax and regulatory distortions.

In this context, Korea and Thailand can be mentioned as examples of countries in which excessive debt financing has been a factor. The Korean government imposed severe restrictions on foreign direct investment until 1997 and encouraged inflows of external capital in the form of debt. In Thailand, the tax regime favored corporate debt over equity financing. The resulting *debt-to-equity ratio* in each country's corporate sector was therefore very high at the onset of the crisis (1997: Korea, 320%; Thailand, 200%; as compared to USA, 110%). In addition, the capital structure of the banking and financial sector was also poorly balanced, as banks and financial institutions were undercapitalized. In many crisis countries, the banks were leveraged excessively and often showed capital adequacy indicators far below international standards. Therefore, when liquidity and currency shocks hit the financial institutions' balance

sheets, the “equity buffer” was not sufficient to absorb them.

- *Solvency risk*
This risk emerges when a sector's financial assets no longer cover its financial liabilities. *Solvency risk* is closely linked to maturity mismatch risk, currency mismatch risk and capital structure mismatch risk. These three types of risk can all increase the risk of insolvency in the wake of a negative shock.

The concept of solvency is easy to explain for private sector balance sheets: A private firm can be considered solvent when its financial assets exceed its financial liabilities. The government sector is considered to have sufficient cover when the present value of all future revenues (mainly taxes) is higher than the current stock of net government debt on its sectoral balance sheet. Likewise, a country as a whole will remain solvent as long as the present value of all future current account balances is higher than the current stock of net external debt.

In order to assess solvency, government debt is often compared to flow figures such as gross domestic product (GDP) or government revenues, and a country's aggregate debt is usually compared to GDP or exports.

Solvency risk varied widely in the countries most recently affected by crises. In Mexico, Korea and Thailand, the government appeared to be solvent despite some macroeconomic, structural and financial weaknesses. In other cases, high ratios of debt to GDP and/or government revenues already signaled the risk of a government liquidity and/or solvency crisis. In many

other cases (and especially in Russia and Argentina), stable exchange rates prior to the crises improved the ratio of foreign currency debt to GDP. Once the crisis had erupted, however, drastic declines in exchange rates gave rise to a sharp increase in government debt relative to GDP. In some cases, this shock was further amplified by the high fiscal costs of recapitalizing domestic banks (and, indirectly, the cash-strapped corporate sector), by a drastic increase in real interest rates and by a slump in economic growth.

All of the risk types discussed above are closely interrelated and can generate *credit risk*, that is the risk that debtors will no longer be able to repay their debts. Solvency risk for the debtor is equivalent to credit risk for the creditor. Due to its specific functions, the banking system is especially susceptible to credit risk, which itself can lead to a run on deposits. On the other hand, solvency problems in another sector can also trigger a run on the banks and thus quickly bring about payment difficulties in the economy as a whole.

In its analyses, the IMF examines whether the risks mentioned above are found on the financial balance sheets of the main sectors of the economy in question and how such problems in one sector might spill over into other sectors, possibly causing a balance of payments crisis. However, balance sheet weaknesses can persist for years without triggering a crisis as long as investor confidence remains unbroken (Allen et al., 2002, pp. 15–20).

2.2.5 Potential Course of a Financial Crisis in an Economy with Sectoral Balance Sheet Mismatches

An economy which shows mismatches on its sectoral financial balance sheets (i.e. those of the government, banks, corporations and households) will tend to be more vulnerable to financial as well as real economic shocks.

A financial crisis in an economy with sectoral financial imbalances typically takes the following course:

Shocks (e.g. a plunge in demand or prices for an important export product, deterioration of government revenues or corporate earnings, or worse-than-expected economic data) can trigger a *loss of confidence* in the economy.

This can affect a country's capital flows, in particular bringing about capital outflows (especially portfolio investment but also foreign direct investment), which in turn put pressure on the exchange rate. In the case of a managed float or an exchange rate peg, the country's government will attempt to stabilize its exchange rate, usually by raising interest rates.

This loss of confidence can trigger three effects:

- *Rollover shock*, that is banks will demand repayment of their claims.
- An *exchange rate shock*, that is corporations which have foreign-denominated liabilities and earn the bulk of their revenues in domestic currency will have to make higher capital repayments on their foreign-denominated liabilities.
- An *interest rate shock*, that is refinancing costs will rise along with interest rates.

These three effects have implications for the overall economy. In the case of financial mismatches on a sec-

toral balance sheet, the problems can spill over into other sectors and snowball very quickly.

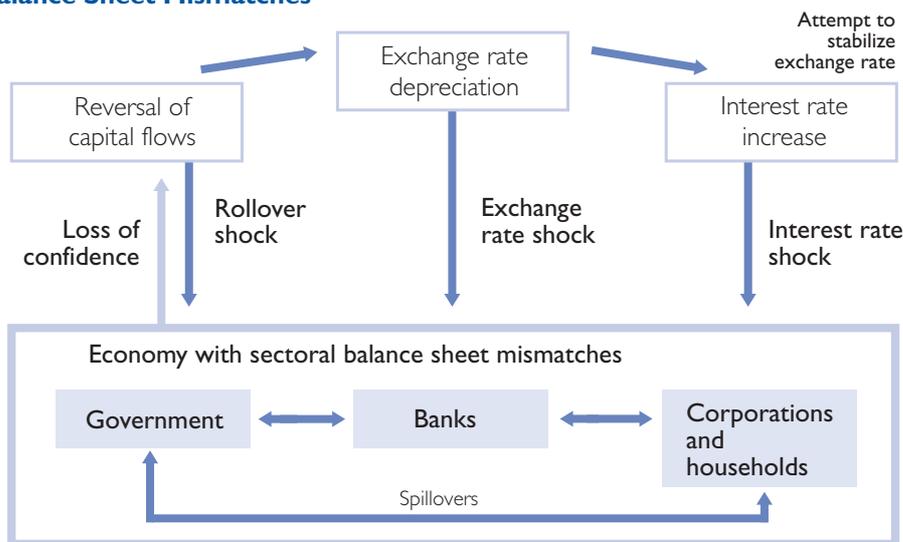
- Corporations and households experience economic problems, which in turn affect
- banks. When the banks find themselves in a problem situation, they turn to the
- ministry of finance or the central bank (due to guarantees, contingent liabilities, etc.).

Once the entire country ends up with a financing problem, corporations and households have to provide financing (e.g. by means of tax increases and interest rate hikes).

Mismatches on a country's aggregate balance sheet or sectoral balance sheets can lead to a loss of confidence, thus triggering the course of events and effects described above. If the loss of confidence is caused by exogenous factors, any existing sectoral imbalances can exacerbate these effects.

Chart 2

Course of a Financial Crisis in an Economy with Sectoral Balance Sheet Mismatches



Source: Rosenberg, 2003.

2.2.6 Characteristics of Financial Crises under the Balance Sheet Approach

The following *characteristics of financial crises* can be derived from the IMF's experience in recent years:

- *Exchange rate pegs* have played an important role in recent financial crises. In each balance of payments crisis in the 1990s, the countries in question maintained some form of exchange rate peg. In many cases, the nominal stability of the exchange rate led to a real appre-

ciation of the local currency, which reduced the real costs of foreign currency borrowing. In effect, this strategy led to an *accumulation of severe currency mismatches*. By contrast, countries with *floating exchange rate regimes* were often better equipped to withstand external shocks.

- *Sectoral financial balance sheet problems spilled over into other sectors and snowballed*, with the banking sector often playing a key role in the transmission proc-

ess. In all cases, sectoral financial balance sheet problems led to *twin crises*, that is currency and banking crises. The depreciation of the currency weakened the financial asset side of the banks' balance sheet, even in cases where the banking sector was formally matched in terms of currencies at the onset of the crisis. The appreciation of the foreign currency led to an increase in credit defaults, while foreign-denominated liabilities persisted.

- Problems on both the sectoral and aggregate financial balance sheets of a country showed the potential of developing into *balance of payments crises*.
- *Weaknesses in the private sector's financial balance sheet* often brought about problems in the banking sector due to implicit and explicit guarantees provided by the banks and *ultimately encumbered the government sector's financial balance sheet* due to contingent liabilities. In Indonesia, for example, these liabilities amounted to 50% of GDP in 1997.
- *Sectoral financial balance sheet problems led to a more severe slowdown in economic growth than expected*. Corporate expenditure cuts as well as the required restrictions on bank lending exceeded the immediate positive effect on competitiveness triggered by the depreciation of the domestic currency.
- *It was difficult to determine the scale of external financing needs* because information on the size and maturity of financial assets and liabilities was incomplete (or completely missing) on the balance sheets of banks and especially of the private sector. Moreover,

the rollover rate and the extent of the exchange rate adjustment could not have been anticipated. *Short-term external financing needs can be extremely high*; in 1997, they reached 43% of GDP in Indonesia and 31% of GDP in Thailand (Allen et al., 2002, pp. 20–23; IMF, 2003, pp.3–5).

2.3 Objectives of the Balance Sheet Approach

2.3.1 Crisis Prevention Objectives

Financial crises and subsequent balance of payments crises do not arise by pure coincidence. As long as a country's aggregate and sectoral financial balance sheets do not show severe mismatches, economic entities in the country can borrow in order to sustain imports (and thus consumption and investment), for example. However, persistent deficits can translate into balance sheet problems. Therefore, one important objective of the IMF is to *develop the data sources* necessary to create transparency regarding financial asset and liability positions and in order to monitor them effectively.

Information about sectoral financial balance sheets is very useful when it is available in due time, as it enables policymakers to *identify and correct weaknesses before these trigger financial difficulties*. In practice, however, this information is often only available in part or with significant time lags, meaning that its utility is frequently limited to ex post analysis.

In addition to the development of data sources necessary for monitoring, government economic policies in emerging market economies can also have a significant influence on the strength of their national balance sheets.

Information about sectoral financial balance sheets can also be useful in evaluating the tradeoffs between various economic policy goals; such tradeoffs arise as soon as sectoral problems spill over into other sectors and thus pose a systemic danger to the economic and financial system. Finally, the BSA makes it possible to assess whether and to what extent financial intervention by the government is warranted.

The BSA thus focuses on *measures to reduce sectoral financial vulnerabilities* (especially those which are affected by changes in key financial variables), specifically:

- First, sound debt management in the public sector (a reasonable level of public debt, insulation of liabilities against shocks, a gradual shift from foreign currency-denominated liabilities to long-term debt in local currency, limitation of contingent liabilities).
- Second, the creation of incentives for the private sector to limit its exposure to balance sheet risks (mismatches), especially the explosive combination of currency and maturity mismatches, by means of sufficient equity buffering and hedging.
- Third, the need to maintain sufficient foreign currency reserves (as exchange rate risk is largely not covered in emerging markets with high levels of foreign currency-denominated debt (i.e. high liability dollarization); Allen et al., 2002, pp. 24–29, and IMF, 2003, pp. 5–6).

2.3.2 Crisis Resolution Objectives

The BSA not only provides guidance in estimating a country's vulnerability and in preventing crises through suitable economic policy measures, it also

serves to support crisis resolution once a financial crisis has erupted. Specifically, it is useful in determining the required economic policy measures and external financing needs.

Common *economic policy measures for crisis resolution* include exchange rate policy, monetary policy, capital outflow controls and fiscal policy. These instruments not only serve to address specific macroeconomic and structural problems, they are also intended to renew confidence in the economy in order to prevent a broader financial crisis.

If financial imbalances in the sectoral balance sheets can be offset before they spill over into other sectors, it is possible to avoid a larger financial and economic crisis. The BSA can help determine when *official external financing* is warranted. Balance sheet problems in private firms tend to pose less risk of spilling over into other sectors and leading to a broader crisis. However, there are cases in which the need to resolve a financial crisis in the private sector justifies intervention on the part of the national government in order to prevent the crisis from spilling over into other areas of the economy (e.g. the banking sector). By contrast, financial problems in the government sector usually harbor a high risk of triggering a broader financial crisis, as government debt is often the banking sector's most important financial asset. The BSA can also help in assessing sectoral demand for foreign currency liquidity, although the calculation of financing needs should not prejudice the appropriate level of IMF support. However, the BSA provides a series of tests which enable policymakers to judge how strong the case for official external financing is.

In general, official financing is best suited for financing needs created by maturity mismatches. It is then possible to make additional capital available, either in foreign currency (in the form of preferred IMF loans) or in local currency through expansive monetary policy measures. The other imbalances (currency mismatch, capital structure mismatch and solvency risk) cannot be alleviated by official external financing measures. By definition, external capital inflows will augment a country's external debt in foreign currency and thus also

exacerbate currency mismatches or shift them from one sector to another. Official external financing would only improve poor capital structure matching if it were extended as a grant. In practice, however, official financing for emerging market economies is almost always provided in the form of low-interest loans. Additional loans do not help either in cases where a country requires substantial debt restructuring in order to regain its solvency and to be able to service its debts sustainably (Allen et al., pp. 29–41).

Practical Application of the Balance Sheet Approach

by the IMF – Case Study: Thailand

The information necessary for crisis prevention and resolution can be presented in a matrix of a country's intersectoral financial assets and liabilities which highlights intersectoral financial linkages as well as currency and maturity mismatches.¹

The example below analyzes Thailand's sectoral financial balance sheets at the outset of its 1997 crisis and illustrates the scope for and severe limitations of forecasting external financing gaps. Thailand was selected as an example for various reasons: First, Thailand's crisis is better documented statistically compared to other countries. Second, the financial crisis originated in the private sector, which made sectoral analysis especially useful. Finally, the size of capital account adjustment and the scale of potential financing needs were substantially underestimated; in fact the IMF's projection error in the case of Thailand was by far the largest among all crisis countries.

If we look at Thailand's intersectoral financial assets and liabilities as of the end of 1996, we can see the existing stock positions and the related financial vulnerabilities which continued to accumulate through the end of June 1997 and led to the financial crisis starting on July 2, 1997, when the baht was floated. The financial balance sheet only helps to highlight the vulnerabilities themselves, not to reveal the causes behind these weaknesses (in Thailand's case, the quality of investments). In Thailand, the weaknesses were the high short-term foreign-denominated liabilities of banks (nearly USD 29 billion in 1996) and of the nonfinancial sector, that is, corporations and households (almost USD 19 billion in 1996), making for a total of some USD 48 billion in short-term foreign currency debt. On the assets side, the Bank of Thailand (BOT) held almost USD 39 billion in foreign currency reserves, thus showing a potential financing gap of some USD 10 billion.

The sectoral financial balance sheet for commercial banks showed extremely severe maturity and currency mismatches. Under the pessimistic assumption that no short-term debt would be rolled over and in light of its liquid assets in foreign currency (USD 2.6 billion), the banking sector showed a short-term financing need of USD 26 billion.

Although no information was available on the short-term assets held by the nonbank sector, we can assume that the balance sheet mismatches were even larger among corporations and households than in the case of banks. Any calculation of an external financing gap is highly sensitive to behavioral assumptions, in particular the willingness to roll over short-term debt. Aside from possible financing gaps, the matrix also shows a capital structure mismatch in the nonfinancial private sector. A comparison of the private sector's total liabilities (approximately USD 269 billion) and its equity (approximately USD 137 billion) implies a debt-to-equity ratio of almost 200% as of the end of 1996. Ultimately, it was possible to detect a significant level of solvency risk at the aggregate country level,

as the external foreign-denominated debt of the private and public sectors came to a total external debt of USD 115 billion, that is, more than 60% of GDP and over 200% of exports (Allen et al., 2002, pp. 50–59).

The Thai example shows that a country can have extremely high external financing needs if it has a large stock of short-term liabilities in foreign currency which cannot be refinanced.

¹ See Allen et al., 2002, p. 44. The liabilities in each line are divided among the columns depending on which sector used the relevant instrument. As the liabilities are already consolidated data, the matrix diagonal (representing intrasectoral liabilities, e.g. the level of the financial sector's liabilities to the financial sector) is blank.

In practice, the lack of data in many IMF member countries poses an obstacle to the complete numerical application of the BSA. The reasons for this are the lack of resources for data preparation and misgivings with regard to data confidentiality. In the future, such information should be more readily available as soon as more countries subscribe to the Special Data Dissemination Standard (SDDS) for the worldwide collection and preparation of economic indicators. Some of the data can be derived from other sources, for example national authorities, the country pages in the IMF's monthly International Financial Statistics (IFS), and the international banking statistics published by the Bank for International Settlements (BIS). IFS and BIS data provide information on the assets and liabilities of the public sector and on the aggregate external debt of a country. However, information on the residual maturity of individual sectors' external liabilities as well as data on financial assets and liabilities in the nonfinancial private sector (including corporations) are generally scarce.

Matrix of Thailand's Intersectoral Assets and Liabilities

(End of December 1996)

USD million (1 USD = 25,6 baht)

Debtor	Creditor				Total
	General government and central bank (BOT)	Commercial banks	Nonbank sector	Rest of the world	
General government and central bank (BOT)					
Domestic currency		2,394.0	11,885.0		14,279.0
Total other liabilities		5,555.0		5,152.0	10,707.0
a) short-term		3,616.0		34.0	3,650.0
in foreign currency					
in domestic currency		3,616.0			
b) medium and long-term		1,939.0		5,118.0	7,057.0
in foreign currency					
in domestic currency		1,939.0			
Commercial banks (incl. BIBF)					
Total liabilities	10,327.0		139,299.0	48,790.0	198,417.0
a) deposits and other short-term liabilities	9,366.0		131,866.0	28,858.0	170,090.0
in foreign currency			448.2	28,189.0	28,637.0
in domestic currency	9,366.0		131,417.0	669.0	141,453.0
b) medium and long-term	961.0		7,434.0	19,932.0	28,327.0
in foreign currency					
in domestic currency			7,433.7		
Equity (capital)					23,439.0
Nonbank sector					
Total liabilities		206,715.0		61,701.0	268,416.0
a) short-term				18,831.0	18,831.0
in foreign currency				18,831.0	
in domestic currency		555.2			
b) medium and long-term				42,870.0	42,870.0
in foreign currency		31,542.0		42,870.0	42,870.0
in domestic currency					
Equity (capital)				4,745.0	136,252.0
Rest of the world					
Total liabilities	38,694.0	7,029.0			45,723.0
Currency and short-term liabilities	38,694.0	2,580.0			41,274.0
Medium and long-term liabilities		4,449.0			4,449.0
Equity (capital)			481.0		

Source: Allen et al., 2002, p. 51.

BOT – Bank of Thailand, BIBF – Bangkok International Banking Facility.

3 Evaluation of the Balance Sheet Approach

3.1 General Remarks

The BSA is primarily useful for *emerging market economies*, as these have recently begun to issue foreign currency-denominated bonds on international capital markets, have experienced major financial crises in connection with the opening of capital markets in recent years and tend to be more susceptible to crises than mature market economies.

If the information contained in sectoral balance sheets is available in due time, it can allow economic policymakers to identify and correct weaknesses before these give rise to financial difficulties, provided the measures are politically and economically feasible. In practice, balance sheet data are often only available in part or with significant *time lags*, meaning that this instrument is mainly suited for *ex post* analysis. For example, Austria, like all other EU Member States, is required to provide Eurostat with its financial accounts data within six to twelve months, while some countries are exempt from this requirement. Due to these delays in data publication, this approach will at best make it possible to detect emerging structural problems.

3.2 Evaluation in Comparison to the 1995 European System of National Accounts (ESA 95)

In Austria, sectoral financial corporate balance sheet data can be derived from financial accounts data compiled in accordance with the *1995 European System of National Accounts* (ESA 95), which itself is based on the international System of National Accounts (SNA). In effect, the BSA constitutes a different type of financial accounts.

The BSA's *classification of currencies* as domestic and foreign is not provided for in the ESA 95, can only be calculated with considerable effort, and usually bears little significance in highly mature market economies such as Austria. The classification of currencies is mainly relevant in cases where capital only flows into a country in foreign currency (as is the case in emerging market economies, e.g. Thailand), and not in domestic currency as well (as is the case in countries belonging to a currency zone, e.g. Austria).

For those countries which belong to a *monetary union* (e.g. the euro area), the currency question is entirely different than for a country with its own currency, as the bulk of their financial claims and liabilities are denominated in this common currency. However, foreign currency-denominated debt (i.e. debt which is not denominated in the common currency) still poses an individual currency risk. Therefore, it is not the national currency reserves indicated on the balance sheet which are relevant in the case of a financial crisis, but rather the total currency reserves of the entire monetary union.

Moreover, the BSA only includes *consolidated data*, which means that intrasectoral claims and liabilities are netted out among the various sectors of the economy. The IMF approach only makes it possible to detect structural shifts over time, as actual transactions cannot be derived. The table values show net stocks and net year-on-year changes therein, that is, the values include exchange rate fluctuations, reclassifications, inflows and outflows. Accordingly, the IMF approach contributes little to revealing the causes of vulnerabilities in a

country, but it does make it possible to detect the weaknesses themselves.

3.3 Applicability of the Balance Sheet Approach to Mature Market Economies

In principle, this approach can be applied to emerging markets as well as mature market economies.

While missing or insufficient data hamper the BSA's application in emerging markets, most of the countries in which financial accounts are obligatory (i.e. most mature market economies) can already provide data material which is nearly sufficient for the BSA. Thus the BSA can be applied as an additional analysis tool with a reasonable level of effort. The IMF considers it wise to apply the BSA to mature market economies as well, even if those countries are not subject to the same types of risk (e.g. rollover risk, foreign currency exposure in the corporate sector) as emerging markets.

3.4 Applicability of the Balance Sheet Approach in the IMF's Practical Work

In general, the IMF's view is that the BSA is a useful analytical tool for identifying currency mismatches and other vulnerabilities of an economy and its most important sectors as causes of financial crises and for the purpose of supporting the IMF in making economic policy recommendations.

For some time now, the approach has already been in use as a supplement to traditional flow-based analysis (IMF, 2004a, p. 1), and many of its elements are applied in the practical work of the IMF in (country) analyses, e.g. Article IV consultations, fiscal and external sustainability, liquidity and debt management, debt sustainability

analysis (DSA), quarterly external vulnerability exercise or the Financial Sector Assessment Program (FSAP).

The BSA already serves as a systematic framework for IMF supervision in mature market economies. For example, selected sectors were analyzed in the course of *Article IV consultations* in 2003. In the consultations for Australia, Ireland, the United Kingdom and the U.S.A., the IMF focused on potential changes in real estate prices and the implications for mortgage lending and household debt. The international linkages of the banking and insurance sector were examined in selected issues papers for Germany and Spain.

In the case of Austria, IMF staff scrutinized currency mismatches which had arisen due to rapidly increasing foreign-denominated loans to households.

Comprehensive intersectoral balance sheet analysis is highly data intensive; however, some countries (e.g. the United Kingdom) have already made great advances in this area. In Article IV consultations for selected emerging market economies (e.g. Thailand, Peru) the IMF has already integrated several sectors and their interlinkages into its balance sheet analysis.

In some cases, the *analysis of individual sectoral balance sheets*, in particular those of the financial sector, is useful for detecting weaknesses which could spill over into other sectors. For example, the IMF routinely applies the BSA to the financial sector in the course of FSAP reviews of individual countries and includes some sectoral data on corporations and households in stress tests. Some studies (e.g. for Ecuador, Uruguay) have examined fiscal policy on the basis of public-sector balance sheet analysis.

Article IV reports on some emerging market economies (e.g. Malaysia, Mexico, South Africa) have focused on the corporate sector (IMF, 2004a, p. 3). In the Global Financial Stability Report (GFSR), the IMF analyzed structural developments in selected sectors in mature market economies over a quarter as well as a longer period and aggregated these developments for the euro area (IMF, 2004b, pp. 64–66).

The IMF's *debt sustainability analysis (DSA)* examines the potential impact of shocks (e.g. changes in exchange rates, interest rates, etc.) on a country's debt level with regard to solvency.

The quarterly *external vulnerability exercise* quantifies potential short-term financing needs in the case of reduced rollover rates as well as the extent to which currency reserves may serve as liquidity buffers.

FSAP reviews reflect the conclusion that the banking sector's financial balance sheet plays a key role in a country's resilience to crises.

Efforts to integrate the BSA into the ongoing work of the IMF have been supported by statistical and transparency initiatives. The requirements of the *Special Data Dissemination Standard (SDDS)*, the *Coordinated Portfolio Investment Survey* and the new *Government Finance Statistics Manual (GFSM)* have improved the availability, accuracy and comparability of important balance sheet stock figures (IMF, 2003, pp. 6–7).

3.5 Future Use of the Balance Sheet Approach at the IMF

Recent experience with the practical application of the BSA has highlighted the paramount importance of high *data quality*. In emerging and mature market economies alike, the necessary

data are often not available (or not in the proper formats). The development of sound databases requires a great deal of time and effort on the part of a country's authorities and the IMF. Thus it will still take some time before the IMF can routinely integrate the BSA into its work.

The analysis of the corporate sector in particular is subject to practical limitations. The available data often only cover publicly listed corporations, that is a sub-group of firms which does not adequately reflect the complex vulnerabilities of this heterogeneous sector.

However, even an analysis which is confined to the banking and government sectors (where data are more readily accessible) can provide useful information on a country's vulnerability to shocks. As a caveat, however, it is necessary to note that partial analyses can provide a misleading picture of the risks to an economy.

The IMF plans to examine BSA data requirements thoroughly for the purposes of supervision and crisis resolution. In addition, the IMF is working together with the World Bank to develop a standardized quarterly statistical report on the external debt of countries subscribing to the SDDS. The coordinated compilation exercise for Financial Soundness Indicators (FSIs) will also be useful for BSA-related work (IMF, 2004a, pp. 4–5; IMF, 2003, pp. 8–9). The IMF will also include the BSA in the guidance note on the coverage of financial sector issues in Article IV consultations using the same macroprudential analysis framework employed in FSAPs. Finally, the IMF is planning broad-based outreach work on the topic of BSA with numerous analytical papers, publications and expert lectures (IMF 2004a, pp. 5–6).

4 Conclusions

In summary, the IMF's Balance Sheet Approach is an interesting new instrument for crisis detection, prevention and resolution.

For some time now, the IMF has been using the BSA as a complement to traditional flow-based analysis, and many BSA elements have already been applied in the IMF's practical work in country analyses, such as Financial Sector Assessment Programs (FSAPs), debt sustainability analyses (DSAs), quarterly external vulnerability exercises, etc. The IMF also uses the BSA as a supplementary analysis tool to examine selected sectors (e.g. the banking and corporate sectors) in Article IV consultations for mature market economies.

The IMF plans to enhance its work in this area by means of case studies on additional countries (in the course of

Article IV consultations), country comparisons of debt structures and relevant weaknesses, training seminars, etc.

The further integration of sectoral balance sheet analysis into IMF work can refine and reinforce existing instruments such as the DSA, vulnerability exercise, etc., by enabling the identification of existing weaknesses in those balance sheets. The systematic recording of sectoral weaknesses in an economy will allow the IMF to assess more precisely the type and amount of liquidity required as well as the need for IMF loans and any accompanying debt restructuring measures. However, due to incomplete data and the static nature of the approach, the BSA can only be regarded as a useful complement to the other IMF instruments (IMF, 2003, pp. 9–10).

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