Asset and Liability Management in Developing Countries[1] - A Balance Sheet Approach

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Abstract

This paper presents a discussion on the usage of a Balance Sheet Approach applied to developing countries. As an initial stage to conduct proper asset and liability management it discusses how this analytical tool could be used to increase the level of awareness from the debt managers' point of view. The conclusion is that, although gathering the data is often difficult, the rationale behind it is rather straightforward, which could be useful to help the authorities to mitigate public debt risks while formulating policies.

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Acronyms

BIS	Bank of International Settlements
BCRA	Central Bank- Argentina
BCB	Brazilian Central Bank
BoP	Balance of Payments
BSA	Balance Sheet Approach
CL	Contingent Liabilities
CPI	Consumer Price Index
DMO	Debt Management Office
DSA	Debt Sustainability Analysis
DPA	Debt Portfolio Analysis
GAAP	General Accepted Accounting Principles
GFS	Government Finance Statistics
GGGD	Gross General Government Debt
IMF	International Monetary Fund
MDRI	Multilateral Debt Relief Initiative
MoF	Ministry of Finance
MOFED	Ministry of Finance, Economics and Development - Ethiopia
NBE	National Bank of Ethiopia
NPSD	Net Public Sector Debt
ONCP	Oficina Nacional de Crédito Público - Argentina
SDDS	Special Dissemination Data Standard
SOE	State Owned Enterprises
SPNNF	Non-Financial National Public Sector- Argentina
UNCTAD	United Nations Conference on Trade and Development
WB	The World Bank
YTM	Yield to Maturity

1. Introduction

Public debt has long been associated with a heavy burden that constraints the government's ability towards policy implementation, but also with the periodical occurrence of financial distress and economic crisis. Governments usually raise funds to meet their financing needs using a range of securities and loans with different maturities, interest rates, and exchange rate structures. While doing that, debt managers need to consider various policy objectives to decide on the structure of the public liability portfolio The selection of specific financial instruments and their intersection with other sectors of the economy could exacerbate the fragilities on the underlying public sector balance sheet leading to instability and negatively affecting the real sector.

Governments worry about their liabilities because of the financial and economic costs that result from an unexpected increase in debt servicing flows. This means that, in general, the emphasis is on the liability side and policy makers often have a narrow view of integrated asset and liability management (ALM). Nonetheless there are benefits in managing their liabilities more consistently with the characteristics of the available assets. Because of the nature of government assets, the application of traditional ALM framework to the sovereign risk analysis is more complex. Many public assets lack the exogenous and explicit financial features that are at the core of risk identification and quantification in the traditional ALM framework. To highlight the different sources of risks Das, et al (2012a) argue that some countries face other financial risks associated with an aging population, structural issues that need reform (health and pension), contingent liabilities arising from systemically important financial or corporate sectors, and imbalances coming from sub-national entities. These risks, if materialized, could cause a significant fiscal and financial drain with a consequent fall in the country's domestic absorption and potential output.

Over time, various crisis-related events have shown that policy makers could no longer rely solely on a country's so-called flow variables (among them revenues, expenditures, imports, exports, and borrowing) as a guide to economic vulnerabilities. Financial soundness turned out to be more complicated than traditional macroeconomic imbalances which can be promptly identified. Monitoring fiscal policy and its

framework is no longer sufficient to assess debt sustainability and its impacts on growth, inflation, and employment.

It is unusual to see governments engaging into risk management activities of their assets and liabilities in an integrated way. This paper will show some relevant aspects that could be effective for developing countries to take the initial steps in risk management, using the data available and reasoning on the risk nature residing on each part of their balance sheet. Aside from this introduction, the following section connects ALM with Balance Sheet Approach (BSA); section 3 comments on how to build a balance sheet for the public sector; section 4 expands the analysis to a more comprehensive scope in order to include other sectors. Section 5 presents a few examples and section 6 concludes.

2. ALM and the Balance Sheet Approach

"Unlike mermaids and unicorns, sovereign balance sheets are real, but very rare. They are also very valuable, for a range of reasons". With that peculiar comment, Ball, (2012) characterizes the importance of financial balance sheets in identifying hidden risks and unveiling financial imbalances that could unfold in a series of negative events affecting the sovereign fiscal position and public debt bond market. Many sovereigns have been careless about their financial balance sheets or simply have lacked one, failing to prevent crisis and getting hampered when market financing conditions became more restrictive.

This situation does not seem to be restricted only to developed countries, where complex economic structures make the identification of crises far more difficult than in smaller economies. Though the scenario has changed a lot in the past decade, emerging economies typically have shown weak revenue base and poor expenditure controls. This has contributed to explain why fiscal balances and public debt sustainability have been on the top of the agenda for most policy makers. Because many emerging economies have also achieved more integration with the external sector and have developed their domestic markets, with greater financial intermediation, other sources of risks gained importance. For example, these risks may be originated in the banking

industry, non-financial corporate sector, state owned companies or in the external sector.

The Balance Sheet Approach (BSA) provides important hints to snipe proper imbalances on sovereigns' structure and potentially anticipates increases in overall riskiness. It can be seen as a comprehensive framework for looking at vulnerabilities that may emerge as a result of: (i) interactions between different debt types, and structures (maturity related) and the relevant assets for servicing these debts; (ii) linkages between sector balance sheets [IMF, (2004)]. However, most countries do not have a balance sheet, despite the recent efforts to provide guidance on that[2]. For those countries which choose not to publish a balance sheet, questions would be raised about the status of their fiscal position. There are clear incentives to publish a balance sheet because, if credible, the disclosure of government's true fiscal stance could be reassuring to markets, resulting on financial relief on debt financing conditions.

Other aspects could be related to the importance of balance sheets. Because it is an account of all government's assets and liabilities and, therefore, provides a clearer snapshot of its financial strength and sustainability, it is more complete than only observing debt to GDP ratios. It also elucidates that sovereigns have also important obligations other than traditionally reported debt (far more complicated to identify) and different asset structures from which to meet those liabilities. It enhances transparency and guide investors to better analyze the issuers' fiscal position, preventing the debtor to bear unnecessary costs.

In addition, a balance sheet gives a sovereign a starting point for better managing its assets and liabilities. This aspect must be highlighted for developing countries, which are the main object of this paper. In fact, the BSA can be easily built, at least on a conceptual basis, in order to create the initial stages towards a more complete understanding of asset and liability management (ALM). Therefore, sound accounting helps a government to use its assets more effectively insulating its balance sheet from intrinsic risks.

[2] See IMF (2012).

On the policy front, cross-country experiences underscore the importance of temporary protection associated with strong public sector balance sheets. Thus, they highlight the benefits of promoting appropriate hedge to improve risk allocation within and across sectors. They also support the strengthening of banking supervision, limit currency exposure and avoid maturity mismatches as will be explored in the following sections. Considering both private and public sectors, balance sheets show how robust liability management is useful in taming interest rate, currency, and rollover risks.

Despite the fact that it seems straightforward to conceptually build a balance sheet, there is no consensus on how to do it. There is an ongoing discussion on whether one should include only financial assets and liabilities rather than physical ones, such as real estate property. Alternatively, one might also consider more intangible assets such as the present value of unexplored natural resources or cultural heritage. Evidently, it does add complexity and instability to these concepts[3].

Should financial assets dominate the balance sheet? To give vent to these ideas, one would assume that this is not necessarily true. Thus, to illustrate, what is the Amazon Forest value? How much is the South African shoreline worth? At which price could a public building be sold? Indeed, it is very hard to assess the economic value of these national assets and incorporate them into a balance sheet. Because of practical reasons and liquidity constraints of more tangible assets, sovereigns should avoid including the non-financial assets in the balance sheet, which is often described as a "snapshot of a sovereign financial condition". This guards a close relationship with corporate finance.

A standard corporate balance sheet has three parts: assets, liabilities and ownership equity. The main categories of assets are usually listed first and typically in order of liquidity. Assets are followed by the liabilities. The difference between the assets and the liabilities is known as equity or the net assets or the net worth or capital of the company.

[3] According to Ball (2012), very few governments seek to manage their balance sheet such as corporations do, that is, complying with standard accounting rules. New Zealand is one example.

A business operating entirely in cash can measure its profits by the sum of all bank balance plus any cash in hand at the end of the period. However, many businesses' dividends are not paid immediately; companies often build up inventories and acquire buildings and equipment. Likewise, government activities accumulate assets and so they cannot, even if they want to, immediately turn these into cash at the end of each period. On other occasions, businesses and the public sector do not withdraw all their original capital and profits at the end of each period because they owe money to suppliers and the proprietors.

The fact that, unlike companies, a sovereign cannot be put under foreclosure implies that legal disputes may occur in extraordinary circumstances making it a more difficult to include non-financial assets in the balance sheet. In addition to the practical reasons aforementioned, one should only include financial assets that could be measured by reasonable methodologies.

Hence, BSA cannot be easily reduced to a small set of readily comparable indicators that quantify vulnerabilities, and, by definition, it disregards off-balance sheet transactions. Nevertheless, there are papers demonstrating that available data, even where limited, providing useful insights into the nature of intersectoral vulnerabilities and the channels by which they are transmitted[4].

As previously stated, balance sheet represents an initial step. Putting it together does not guarantee that a government will use the information effectively. Careful research reinforces a better assessment of the liability side of the public sector's balance sheet and, when confronted to certain assets, allows authorities to reduce the level of debt toward sustainable levels. For example, Hausmann and Panizza (2003) provide insights on the *original sin* - the inability to borrow in the long-term and in local currency - drawing attention to important differences between debt structures of advanced and some emerging economies. Though many countries have been overcoming that shortfall[5], it is still a very important restriction on the liability side.

[4] See IMF, (2004); Das, Lu, Papaiaoannu, and Petrova, (2012)

[5] Countries like, Brazil, Colombia and Uruguay gradually accessed the external capital market to issue securities denominated in their local currency, transferring exchange rate risk to the bond holder, thus, redeeming from the *original sin*. See more on Papaioannou (2009).

Another example that relates to vulnerabilities on the liability side is the partial dollarization of the domestic economy and its embedded foreign exchange regime. 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 [IMF, (2004)]. The need to offset dollar deposits with domestic dollar-linked borrowings increases demand for foreign currency and significantly augments the exchange rate linked claims in the system. In turn, adding severity on the impact of currency depreciation and setting the stage to the occurrence of a financial distress. This sort of mismatches, both on corporate and public balance sheets, hinders monetary authorities' (and policy makers, in general) tolerance towards currency movements. If currency pressures are strong and persistent enough, the authorities will eventually run out of ammunition to intervene and avoid large movements on the exchange rate.

One may realize the fragility and self-fulfillingness of this scheme. Latin America displayed many examples of that situation, often associated with the usage of hard currency indexation to anchor inflationary expectations in stabilization plans devised in the 80's and early 90's. Important examples will be further explored later, but some initial thoughts are useful. Fiscal policies and financing current expenditures through public debt issuance was quite characteristic. Because there was limited capacity to fund public debt obligations on local currency and longer maturities this outlook has proven particularly vulnerable to sudden capital outflows, sharp changes on investors' confidence and underlying sources of financing. As a result, currency mismatches had arisen, maturity and interest rate risks had sharpened, leading public sector finances to be highly sensitive to shocks[6].

Next, a few concepts and inputs will be discussed on how to build a balance sheet. First, emphasis is given to the sovereign and then an expanded balance sheet is presented aggregating other sectors and its cross linkages. After that, a few country examples are presented.

[6] See Reinhart, Rogoff, and Savastano (2003); De Nicoló, Honohan, and Ize (2003); Caballero and Krishnamurthy (2000); Calvo (1998).

3. Building a Sovereign Balance Sheet for Sovereigns

The BSA can be best understood as a comprehensive framework for scanning vulnerabilities that may emerge as a result of poor debt profile (composition), structure (maturity-related), and the relevant assets for servicing these debts besides the correlations between sectoral balance sheets.

Rosemberg et al, (2005), proposes that ALM should focus on the continuous search for constraints that could emerge from different parts of the economy. It reinforces the idea of interdependency across different sectors and tries to establish relations between risk exposure, transmission channels and policy responses. Table 1 shows these relations.

Table 1 – Balance Sheet and ALM Components

Balance Sheet Components	Domestic Constraints	External Constraints
Debt level	Policy Interest Rates and Inflation	Exchange rates
Composition	Contingent Liability	External Interest Rates Market risk appetite
Asset level	Institutional Organization	Commodity Prices
Composition	Market Development	Asset prices

Source: Rosemberg at al, (2005)

Moving towards a more operational level, the IMF – GFS (Government Finance Statistics) provides guidance on an internationally recognized statistical reporting framework, also advocating for simplicity on balance sheet for the public sector. Table 2 shows that it would be interesting to have an inventory of both financial and non-financial assets. The latter could be somehow controversial and cumbersome to assess also with practical difficulties in pricing, as discussed below. Moreover, it should be mentioned that one is looking to consider assets that could be used to offset the government's obligations under specific conditions. Therefore, it is vital to be reasonable and realistic about which type of assets could be included in the analysis.

Table 2 –GFS (IMF) definition for Government Balance Sheet

ASSETS	LIABILITIES
Financial Assets (Domestic and External)	Liabilities (Domestic and External)
•Currency and Deposits	•Currency and Deposits
•Securities (except shares)	•Securities (except shares)
•Loans	•Loans
•Shares	•Shares
Receivables • Insurance/derivatives	Payables • Insurance/derivatives
Foreign Reserves	
	Net Financial Worth
•Non Financial Assets	
•Fixed Assets	
•Inventories	
•Other	
	Net Worth

Source: GFS/IMF. Elaborated by the author.

Refining the discussion above, Merton, (2007) introduces economic principles and intertemporal linkages in substitution of mere accounting ones. This would include future revenues and expenditures, potentially giving more stability and predictability on the balance sheet. On the asset side, a country's foreign reserves and long-term funds, such as a sovereign wealth fund, are part of sovereign assets. Cash, securities, loans, and receivables owned by the government are also sovereign assets. Equity in state-owned-companies profits is also counted as sovereign assets in some cases. On the liability side, public debt is included irrespective of whether it is issued by the central bank or the government [Das, Lu, Papaiannou and Petrova, (2012)].

Table 3 – Customized Balance Sheet

ASSETS	LIABILITIES
Income (PV)	Expenditures (PV)
•Taxes	•Social and Economic Development
•Fees	•Gov't Administration
•Seignioriage — Inflation Risk	•Loans — Interest Rate Risk
Balances of:	Balances of:
•Cash	•Monetary Base
•Currency Reserves — FX risk	•Gov't Debt
•Investments (SWF, other)	•Domestic — Interest Rate Risk
•State Owned Enterprises	•External — FX risk
•Infrastructure — Interest Rate Risk	•Pension Liabilities — Aging Population
•Real State	Contingent Liabilities — A Different Animal
•Gov't Commodities — Commodities Risk	•Guarantees to Banks
•Other Assets	•Other Guarantees
	Net Worth
	Net Financial Worth

Source: Merton, (2007). Elaborated by the author.

From the analytical point of view, this conceptual[7] balance sheet is the most relevant for policy analysis even if precise data is only available for the financial balance. Note that Table 3 brings the concept of contingent liabilities, which is tagged as "a different animal". They are far more difficult to quantify, concern market analysts, government officials and can be defined as a potential source of government cash outflow, which has to be met through either increasing borrowing or selling assets [Currie and Velandia, (2002)]. They may be divided into explicit – already accounted for - and implicit ones – those clearly absorbable by the government, depending on the state of the nature. Figure 1 represents this classification and brings examples.

[7] It is unusual to see published conceptual balance sheet mostly because of the challenges in estimating revenues and expenditures in present value, not to mention contingent liabilities.

Figure 1 – Examples of Contingent Liabilities

Contingent Assets	Contingent Liabilities
Explicit	
Legal actions in process by the State	**Legal actions in process against the State**
Insurance purchased	**Guarantees issued by the State**
Contingent credit lines	**Government insurance schemes** Ex: Deposit insurance, war-risk insurance
Implicit	
Windfall gains Ex: Undiscovered natural resources that could be licensed or explored	**Banking failure** Beyond deposit insurance
	Natural Disaster / Catastrophe
	Sub-National Government Defaults

Elaborated by the author.

Box 1 presents some examples of explicit contingent liabilities. Das et al, (2012a) argue that contingent liabilities are more likely to be realized during economic recessions, when government borrowing requirements tend to be high. The size, extension and evaluation of contingent liabilities draw the attention of many economic agents, bringing a lot of discussion with both financial analysts and credit agencies. The later have recently modified the credit analysis framework to monitor the effects of those on government finances. Ultimately, the crystallization of these liabilities depends on many assumptions, including probability of defaults and recovery rates, which are difficult to estimate.

The next step is going to be important for didactic purposes and explains the benefits of incorporating other sectors that are quite helpful to derive a broader view of the economic structure. An expanded balance sheet facilitates understanding how intersectoral relations could pressure public finances.

Box 1– Important Aspects of Contingent Liabilities (CL)

Contingent Liabilities are obligations that materialize conditional on the occurrence of a particular event. They are possible liabilities as a result of the state of the nature and its emergence depend on uncertain events that are often out of control of the sovereign. One

important characteristic associated with CL is that it is hard to accurately quantify its value.

It can be divided[8] into explicit CL, where the sovereign contractually recognizes its responsibility in covering the beneficiary under given circumstances, or implicit CL, where the sovereign is expected to assume the obligation for political, "moral" or practical reasons. Although it is a controverted topic, some sovereigns choose to include CL in their balance sheet and assess their value as an expected cost associated with a probability distribution and expressed in present value.

Examples of explicit CL are given by credit guarantees given from the central to local governments; concessions of public services (airports, railways, roads) and legal disputes already decided by the court of law.

As for implicit CL, some examples could be represented by the amount needed to support public enterprises that are considered strategic for the government (for instance, state owned oil companies), but also important corporates. Also, the financial sector and the needs to correct its imbalances are often contingent and sizable. Clear examples arise from the subprime crisis and the restructurings in the Swedish banking system in the 80's and in the Brazilian in the mid 90's. The associated costs were plenty more than what the government would have been willing the bear. In other cases, like state run pension systems, the government is expected to fulfill its obligations (for moral and political reasons) even though the funding scheme is structurally running on deficit. Finally, it has been observed that sub-national borrowing may result in future debt restructuring and absorption by the federal government, a topic colored with high political sensitiveness.

Some countries proactively monitor CL and prepare to buffer its effects if needed. In Chile, for example, there is an emergency fund, financed from fiscal sources, that is ready to be used upon natural seismic catastrophes. In the UK, there is a team in the H.M. Treasury dedicated to monitor the government-backed securities issued by the banking industry (*Banking Act, 2009*). If a default event occurs, then the Treasury covers it, whether if it goes well, they collect a fee for engaging in these operations. In fact, the British use market based CDS (*Credit Default Swaps*) to assess the probability of default and come up with an estimate of the expected cost of this CL.

Because CL can have a significant impact on fiscal sustainability, they should also be included in DSA (Debt Sustainability Analysis). There have been suggestions in the literature to identify and to create quantitative triggers for the materialization of CL, above all, in the banking industry [IMF, (2013b)]. The calibration of the resulting shocks should be tailored to country-specific circumstances.

[8] An explicit CL is usually the result of a contract (a guarantee, an insurance contract, etc.) that legally binds the Government to a payment (or multiple payments) if a given condition (or event) realizes. implicit CL allows the Government to decide after the triggering event, if it is necessary to make a payment and the amount of the payment. By definition of implicit CL, the economic and/or social cost of not making any payment, may be particularly high.

4. Building a Comprehensive Balance Sheet

Financial vulnerabilities are often originated outside the government. Allen, et al (2002), provides a comprehensive review of the literature on the role weak balance sheets could play in the genesis and evolution of a financial crisis. It focuses on the risks created by maturity, currency, capital structure mismatches and solvency. This framework draws attention to the vulnerabilities created by debt among residents (particularly those denominated in foreign currency) and it helps to explain how problems in one sector could spill over into other segments, eventually triggering an external balance of payments crisis.

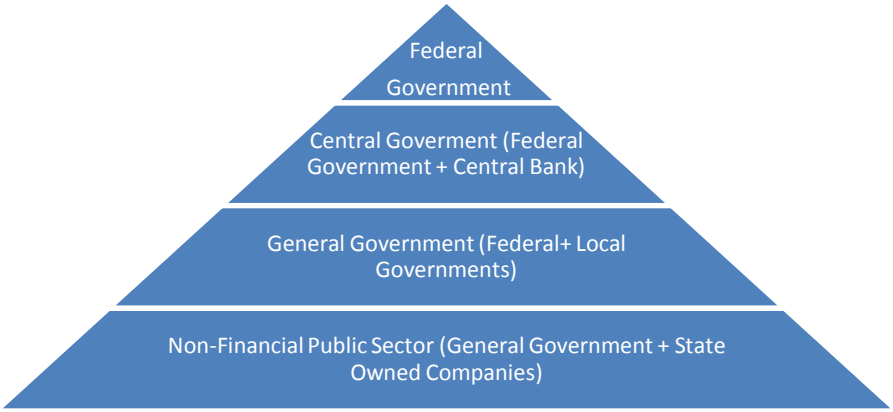
Despite all data weaknesses evolving the construction of a balance sheet, recent events illustrate how intersectoral linkages have deepened over time, especially regarding the financial sector. This suggests that the BSA is becoming increasingly relevant for vulnerability analysis.

Constructing an expanded balance sheet evolves putting together a matrix summarizing the asset and liability positions of the main sectors of the economy. One should start with a step by step approach on the government side. Initially, debt managers should list Central Government's (Federal Government and Central Bank) assets and liabilities and then consider other government entities, such as Local Governments (States and Municipalities), Public Enterprises to form different levels and be in a position to understand broader sorts of risks and buffers. Figure 2 shows the relation between government levels.

Ideally, the analysis starts with a compilation of the data needed to fill the cells of that matrix for the public sector, private financial sector, and nonfinancial sectors vis-à-vis each other as well as the rest of the world. Data for the first two are often readily available, while data for the nonfinancial private sector is usually harder to obtain. Information on the international investment position or external data sources (such as the BIS or SDDS) can help in compiling the external position and deriving (as a residual) some of the unknown data elsewhere in the matrix [IMF, (2004)]. Although

data limitation is a common constraint, it does not impede analysts to have insights from those numbers. Where possible, the balance sheet approach can be augmented by including off-balance sheet items, such as contingent liabilities or derivatives. Further, linkages across economies could be examined to assess possible routes for contagion.

Figure 2 – Relationship Between Government Levels



Elaborated by the author

Further exploring this idea, the IMF,(2004) suggests that the balance sheet could be broken down in four segments, (i) Public Sector, (ii) Financial Private Sector, (iii) Non-Financial Sector, (iv) Rest of the World. Then, it should be listed, for each of these, short-term liabilities – usually within a period of a year – mid and long-term liabilities, both denominated in local and foreign currencies. Equity should also be included as detailed in Table 4.

Unlike traditional analysis, which is based on the examination of flow variables (such as current account and fiscal balance), the balance sheet approach focuses on the examination of stock variables in a country's sectoral balance sheets and its aggregate (assets and liabilities) [Allen et al, (2002)]. A financial crisis occurs when there is a sharp downfall in demand for financial assets of one or more sectors: creditors may lose their faith in a country's ability to earn foreign exchange to service the external debt, in the government's ability to service its debt, in the banking system's ability to meet deposit outflows, or in corporations' ability to service its debt. It is interesting to see the pace these changes could assume. In a matter of days, debt managers may face a complete different scenario upfront, severely affecting their financing conditions. An entire sector may be unable to attract new financing or roll over existing short-term

liabilities. It must then either find the resources to pay off its debts or seek a restructuring[9]. Ultimately, a plunge in demand for the country's assets leads to a surge in demand for foreign assets and/or for assets denominated in foreign currency. Massive outflows of capital followed by sharp depreciation of the exchange rate, large current account surplus, and deep recession that reduces domestic absorption are often the consequence to a sudden adjustment in investors' willingness to hold a country's accumulated stock of financial assets.

Table 4 – Asset and Liability Position Across Sectors

Issuer of the Liability ↓	Public Sector	Private Financial Sector	Non Financial Sector	Rest of the World
Public Sector Monetary Base Total Liability Short Term Domestic Currency FX-linked Mid and Long Term Domestic Currency FX-linked Equity				
Private Finacial Sector Total Liability Short Term Domestic Currency FX-linked Mid and Long Term Domestic Currency FX-linked Equity				
Non Financial Sector Total Liability Short Term Domestic Currency FX-linked Mid and Long Term Domestic Currency FX-linked Equity				
Rest of the World Total Liability Domestic Currency FX-linked Equity				

Source: IMF, (2004)

Note: To see a full description of the assets and liabilities for each group, plus aggregated data per region, see IMF (2004).

An analytical framework that examines the balance sheets of an economy's major sectors for maturity, currency, and capital structure mismatches helps to highlight how balance sheet problems in one sector can spill over into other sectors, and eventually

[9] To explore this point, see Das, U., Papaioannou, M., Trebesch,C., (2012).

trigger an external balance of payments crisis. Indeed, one of the core arguments that emerge from this approach is that the debt among residents that create internal balance sheet mismatches also generate vulnerability to an external balance of payments crisis. The transmission mechanism often works through the domestic banking system. For instance, broad concerns about the government's ability to service its debt, whether denominated in domestic or foreign currency, will quickly destabilize confidence in the banks holding this debt and leading to a deposit run [Allen et al, (2002)], [Krugman, (2000)]. Alternatively, a change in the exchange rate coupled with unhedged foreign exchange exposure in the corporate sector can undermine confidence in the banks that have lent to that sector. The run on the banking system can take the form of a withdrawal of cross-border lending by nonresident creditors, or the withdrawal of deposits by domestic residents.

Though the description above fits very well onto a series of events over the past 20 years, it no longer suffices given the incredible complexity of interconnections across different sectors. Moreover, the complexity is proportional to the development of financial sector, market sophistication, deepness, regulation and openness. Usually, mid to low income developing countries are in the early stages of that and allows BSA approach to be used more comfortably by analysts and researchers. Contrasting to that, there are developing countries, such as Brazil, Turkey, Mexico and South Africa with reasonable complex economies and sophisticated domestic markets. The more complex the economy, the more limited is the usage of the BSA, calling for other approaches to conduct proper ALM.

Before introducing a few country examples, an important issue arises regarding policy makers: how to effectively spot risk sources, such as contingent liabilities and poor debt structures, that would have impact on public finances? As it has been mentioned, the financial sector has originated crisis in a number of occasions in different parts of the world. Typically, the consequences of dealing with it share a couple of characteristics, such as large increases in public debt levels and costs. In the leeway of the 2008's crisis, a lot of criticism was raised towards ineffective oversight and efforts have been put in place to overcome that. For instance, the IMF (2013b) has been working on policy papers exploring the main channels through which financial sector stress endangers public debt sustainability. This evolves documentation of current practices in

measuring and reporting risks from the financial sector to the sovereign and raising awareness of the need to integrate financial sector risks in the assessment of public debt sustainability. To implement that, country authorities' have been surveyed to input their current practices on how to identify, measure and monitor risks stemming from the financial sector and its implications on public debt. Box 2 describes how surveys could be useful in that sense.

Box 2 – Applying Surveys to Identify Risks

Surveys could be helpful in identifying potential sources of risks. To cover that, the IMF (2013b) has designed a template to shed some light on the institutional framework under which financial sector risks are monitored and reported assessing their potential impact on public finances and debt.

Attention is given to specific division of responsibilities for identifying, recording, and quantifying financial sector contingent liabilities that could potentially be transferred to the government balance sheet. Here, explicit guarantees given to the financial sector should be closely monitored by a single agency. By the same token, it is important to knowledge which agency is responsible for quantifying and reporting potential CL associated with implicit guarantees (i.e. potential fiscal cost of bailing out financial institutions in the event of a crisis). Furthermore it investigates if there is a crisis resolution mechanism in place delineating each agency's responsibilities in this process.

A list of indicators must emerge to assess and monitor vulnerabilities in the financial sector. Examples suggest leverage and indebtedness ratios for households and corporates; credit risk indicators (non performing loans, coverage ratios, write-off); liquidity and market risk indicators (FX and interest rate risk exposures, derivatives positions; maturity mismatches, CDS spreads, YTM); external vulnerability (external funding reliance, asset exposure to foreign countries, credit lines availability).

Evaluating public debt sustainability is also important. A distinction between public debt sustainability analysis (DSA) and public debt portfolio analysis (DPA) should be kept in mind. Questions are made on the regularity, responsibility of DSA, and ultimately, its application. DPA is also present to see how do the structure and conditions of the financial sector affect the design of the public debt management strategy. It factors in its main influence on public debt management (e.g. regulatory requirements, liquidity conditions, concentration and liquid asset ratios, capacity of absorb government debt, etc.).

Similar initiatives have been delivered by UNCTAD in Africa. To illustrate, a survey has been used to conduct an assessment of current explicit and implicit contingent liabilities of the Government of Zambia with the indication of policy and organizational reforms aimed at strengthening the management of such.

The surveys should be answered by all agencies involved in identifying, measuring, and monitoring financial sector risks as well as risks to public debt sustainability, including the ministry of finance, the central bank, the local securities and exchange commission and other relevant agencies.

5. Country Examples of Sovereign Balance Sheets

As it was mentioned earlier, the BSA approach allows debt managers to have a comprehensive view of assets and liabilities in a snapshot. It is of particular interest for low income developing countries which lack of a centralized debt management unit and often face institutional problems over the coverage of debt management. Building a balance sheet for the public sector is already a challenging task and, scrutinizing intra-governmental relations in depth would most likely be at least a good managerial exercise for practioneers. Adding other sectors to the balance sheet is a step forward which very few countries are up to take. In this sense, this section will focus on the public sector examples and briefly describe how the BSA approach has been used to sparkle ALM analysis and concepts in Ethiopia, Argentina, Bolivia and how it was applied in Brazil about a decade ago.

a) Ethiopia

According to the National Bank of Ethiopia[10], the country has experienced steady growth for a decade, averaging 11.2% p.y. from 2003-2010. Economic growth has been supported by robust export growth and public enterprise investments. One of the main policies has been the contraction of base money, with NBE (National Bank of Ethiopia) ceasing to finance the budget and sales of foreign exchange. As a result of this foreign exchange intervention, gross official foreign reserves have declined to under two months of import coverage. The budget execution has been prudent, but increased domestic credit to public enterprises has been providing fiscal impulse, potentially imposing risks to the balance sheet.

[10]NBE Annual Report http://www.nbe.gov.et/publications/annualreport.html

Having that said, it will be shown how an initial simple balance sheet was built for Ethiopia in conceptual terms with some specific data. Supposedly, this was meant to motivate authorities to conduct further analysis and to build up on the preliminary balance sheet[11].

The institutional set up in Ethiopia basically consists on the monetary authority – National Bank of Ethiopia (NBE) – running the monetary policy and operating in the interbank market on a daily basis, but also issuing Treasury Bills. These are tendered with 4 maturities, 28, 91, 182, 364 days. Any financial institution can take part in the auctions subjected to a minimum amount. NBE is also responsible for banking supervision.

On the other side, there is the MOFED – Ministry of Finance and Economic Development – which allocates budget, administrates public finances, formulates development policies and mobilizes external resources. With limited access to the market, most of the funding comes from external sources. Hence, contractual debt with multilateral institutions is usually the type of debt managed by the Ministry.

Clearly, there is an institutional arrangement that does not favor the issuance of government bonds other than those conducted by NBE. There is not a term structure cultivated by the Treasury, which is set within the MOFED, to issue bonds seeking to finance government's expenditures. Contrasting to that, NBE has been consistently keeping interest rates below inflation rates and there is heavy monetary financing by the public sector. In addition to this, financing largely relies on bank credit.

Table 5 shows a proposed qualitative balance sheet to the Ethiopian government, built after discussions held with the MOFED and the NBE. The underlying idea was to build a description of the main financial assets that are under the influence of these two key institutions inside the government and induce the respective staff to name the type of risk exposure adherent to each asset or liability, for didactic purposes.

In this sense, another institutional aspect that emerged is the quasi-fiscal apparatus used by the Central Government to promote investment. There is a set of funds financed and managed by the public sector which are bounded to other government agencies policies

[11] The BSA was introduced in an UNCTAD's mission on Dec-12 on Assets and Liability Management and Debt Portfolio Analysis Workshop.

or MOFED. Though the precise nature and operational structure under those needed further clarification, it eventually became clear that some of the funds were susceptible to commodity risk.

Concessions and investment schemes are also on the government's radar, but the format these initiatives will assume is yet to be designed. The program includes, airports, railways, roads, housing and are subjected to line ministries policies. Some of the financing would come from the issuance of debt with credit institutions and are subjected to interest rate risk for the government.

Another interesting aspect that appeared in the discussion was the relationship with regional governments. Central government has provided loans to local governments and has guarantees against those entities. In case of non-performing loans, it can arrest legal transfers towards up the credit owed by them. In theory, this mechanism was described to work properly, buy yet requires further investigation.

Table 5 – Ethiopian Tempted Balance Sheet[12]

Asset			Liability		
Description	**Risk**	**institutions**	**Description**	**Risk**	**institutions**
INTERNATIONAL RESERVE FUND			PUBLIC SECTOR DEBT		
Cash Foreign Currencies	FX risk	NBE	Central Gov't Debt		
Balance with Foreign Correspondents	FX risk	NBE	**Domestic Debt**		
Foreign Securities	FX risk / interest rate	NBE	**Direct Advances**	refinancing risk	MoFED
Gold	Commodity price risk	NBE	**Bonds**	refinancing risk	MoFED
SDR	FX risk	NBE/MoFED	**T-Bills**	refinancing risk/ interest rate	MoFED
PRGF-HIPC Assistance (IMF)	FX risk	NBE			
			External Debt	refinancing risk/ interest rate/ FX risk	MoFED
			IDB		
INVESTMENT FUNDS	Comodity risk	MoFED	**IMF**		
Water Fund		WWCE	**Bilateral**		
Sugar Fund		sugar dev't co.	**Other Multilateral**		
Railway Fund		railway co.	**Private Banks**		
Road Fund		road authority	State Owned Companies - SOE		
Other Funds		To	**Domestic Debt**		
			External Debt		
CONCESSIONS	Interest rate risk	Line Ministries			
Airports			REGIONAL GOV'T		
Ports			**MOFED subsidies on Local Gov't loans**		
Roads					
Railways			CONTINGENT LIABILITIES		
Land lease			**DBE loans to the public**		DBE credit risk
Rental Housing		NBE			
MARKETABLE SECURITIES (receivables)	Market risk	MoFED	NATIONAL BANK OF ETHIOPIA -NBE - Relationship with the Central Gov't		NBE
			Treasury SINGLE ACCOUNT held at the NBE		
RIGHTS OVER THE DBE -other official financial institutions	Depends on the loan	MoFED	***NBE own Balance Sheet***		
			Monetary Base (M1)	liabilities	
			Repurchase Agreements (if any)	liabilities	
REGIONAL GOV'T			*NBE Credits to financial institutions*	assets	
MOFED relations with Local Government		MOFED	*NBE Bills to DBE (5y)*	assets	
			MOFED securities on NBE	assets	
NATIONAL BANK OF ETHIOPIA -NBE - Relationship with the Central Gov't		MOFED			
Treasury SINGLE ACCOUNT held at the NBE					
NBE Bills to DBE					
Domestic Debt					
Direct Advances	MoFED				
Special bonds	MoFED				

Source: MoFED, NBE, UNCTAD. Note: This table does not represent an official depiction of the Ethiopian Balance Sheet and was put together solely for didactic purposes within a specific context.

On the liability side, standard domestic and external debts are included. Special attention was given to the external debt due to balance of payments problems observed in the past and the shortage of international reserves. Currently, it is clear that FX-reserves surpassed foreign currency liabilities by more than three times. Again, these are not official estimates and were built only for didactic objectives of illustrating how an initial step could be made to introduce the balance sheet for the government.

[12] Qualitative list proposed by MoFED, NBE and author's comments.

b) Bolivia

Bolivia has been working on initiatives to develop a risk management analysis after a debt relief that has cut debt levels and stabilized it to around 31% of GDP in 2012. External debt represents around 48% of total debt and is mostly described by concessional loans with multilaterals, bilateral organisms and, more recently, by a 10-years bond issued in the external market. Hence, the debt is relatively long and the costs are not high.

However, from the risk management perspective, the external debt would represent a risk if the government were not building up FX-reserves. Most of the external inflows come from exports of hydrocarbons that have grown steadily in the past few years. Because the maturity profile has a sizable concentration in the next ten years, specially in 2022 (due to a 10y bond issued abroad), the government has been seeking to fund it domestically or through other external sources, preparing themselves from a transition period towards the end of concessional borrowing.

The BSA could be useful to jump start the risk analysis of the government financial stance and to shed some light in other sources of potential volatility. Government revenues are heavily dependent on the commodities cycle and the public sector has been building international reserves also to buffer against an abrupt downturn in hydrocarbon prices. Some risks are posed in that respect because there is a fixed exchange rate regime, which maintenance could deplete the level of official reserves under a stressful scenario.

Another aspect that the BSA could provide useful insights is the presence of contingent liabilities arising from various sources. For example the *fideicomiso*- financial arrangements dedicated to fund infrastructure and other investment or expenditures that are not fully recorded in the government accounts. Though some *fideicomiso* are on-the-budget, its investment plans are still to be better detailed and may well represent a source of liability that could be absorbed by the public sector, if the projects are not as good as initially estimated. Further investigation must be done in this area to clarify on

the nature of those financial schemes. Hence, there have been initial attempts to build a public sector balance sheet by the Ministry of Finance.

c) Argentina

The Argentinean crisis in 2001-2002 is well documented in the literature[13]. Although the crisis rooted from deep macroeconomic imbalances, it also derived from weaknesses in the private sector's balance sheets. A lot of attention has been put on the inconsistencies between Argentina's fiscal and exchange rate policies, its difficulties to promote fiscal adjustments during a prolonged recession, the weaknesses in the public-sector balance sheet, and the government's large stock of foreign-currency debt [IMF, (2004)]. On top of this, bank and corporate sector balance sheet mismanagement exacerbated FX-rate exposure adding critical volatility to the system. Then, balance sheet approach was used in helping to explain how vulnerabilities in the private sector augmented the underlying weaknesses in Argentina's public sector, and also contributed to intensify the crisis in 2001–02[14].

From that period to the present, the Argentinean government has accessed the external market intermittently, where funding has been relying mostly on domestic sources. Recently, efforts have been made to come up with an ALM approach, considered to be a more complete risk analysis tool available to the Public Sector. In turn, this would allow authorities to have a broader and more integrated view of both sides of their balance sheet.

Aside from providing information and enabling analysts to have another perspective of the fiscal side, ALM facilitates the design of financing strategies adapting the characteristics of financial liabilities to the assets at hand, with positive pay offs on debt sustainability, risk perception and, eventually, favoring cost reduction.

[13] See Roubini, (2001); Goldenstein and Turner,(2004).
[14] A complete description of the precedents and unfolding events can be found in IMF, (2004).

By the end of 2011, the Argentinean DMO[15] put together a balance sheet for the public sector. As it has been described, the balance sheet considers only financial assets and liabilities. From the asset side, it includes financial instruments (cash deposits, loans, securities, receivables), gold deposits, SDDS. They can either be denominated in book values, or mark-to-market if such.

The liabilities are evaluated as the difference between the original nominal value and the amortization (with accrued interest). Arguably, this would bring less volatility to the liability side when compared to mark-to-market approach.

Table 6 displays the results as of Dec-11 in notional and risk-related terms. The public sector financial net worth is negative in AR$ 212 bn (about 11.5% of GDP). This is a result of the accumulation of AR$ 405 bn in assets and AR$ 617 bn in liabilities. The sheet is clustered in non-financial public sector (SPNNF) items, local governments (state and municipalities) and monetary authority (BCRA).

Table 6 – Balance Sheet for the Argentinean Public Sector

Asset			AR$ mn	Liability			AR$ mn	Mismatch	
			405,155.0				617,070.0		
Description	Risk	institutions	amount	Description	Risk	institutions	amount	AR$ mn	% GDP
Sub Total			167,530.0	Sub Total			407,741.0	(240,211.0)	-13.0%
Deposits in AR$	fixed rate		130,512	Central Gov't Debt					
Finacial Trusts	fixed rate		4,897	**National Debt**	fixed rate		1,252	110,319	6.0%
Mutual Funds	fixed rate		4,798	**National Debt**	fixed rate		32,981		
Cash (Receivables)	fixed rate	SPNNF	2,533			SPNNF			
Other	fixed rate		1,812						
Equity	floating rate		16,462	**National Debt**	floating rate		41,940	(25,478)	-1.4%
----	Inflation-linked			**National Debt**	inflation-linked		63,854	(63,854)	-3.5%
Deposits in FX	FX-rate		6,516	**National Debt**	FX-rate		200,409	(261,198)	-14.2%
				National Debt	FX-rate		67,305		
Sub Total			858.0	Sub Total			42,726.0	(41,868.0)	-2.3%
Deposits of states*and Municipalit	fixed rate		858	**Local Gov't Debt (Provincias)**	fixed rate		535	323	0.02%
----	floating rate	Local Gov't		----	floating rate	Local Gov't	5,741	(5,741)	-0.3%
----	inflation-linked			----	inflation-linked		329	(329)	-0.02%
----	FX-rate			----	FX-rate		36,121	(36,121)	-2.0%
Sub Total			236,767.0	Sub Total			166,603.0	70,164.0	3.8%
Rights for Repos	fixed rate		25,903	**Obligations for Repos**	fixed rate		24,437	(37,827)	-2.1%
				LEBAC	fixed rate		39,293		
----	floating-rate			**NOBAC**	floating-rate	Central Bank (BCRA)	44,889	(44,889)	-2.4%
Loans to the Financial System	inflation-linked	Central Bank (BCRA)	2,074	----	inflation-linked			2,074	0.1%
Contributions to International Org	FX-rate		9,225	**Obligations with International Org**	FX-rate		5,230	150,806	8.2%
FX-Reserves	FX-rate		199,565	**Counterpart of C to OI**	FX-rate		3,899		
				Current Accounts on Foreign Curre	FX-rate		24,621		
				Other	FX-rate		24,234		
Memo	AR$ mn			**Net Worth**				**-211,915.0**	**-11.5%**
GDP-linked securities	25,254								
in local currency	4,057								
in foreign currency	21,197								
Holdouts	12,840								
Paris Club non-performing debt	39,736								
GDP 2011	1,842,022								

Source: ONCP, Wright (2013).

Some points can be highlighted. The overall net worth is a consequence of the central government net debtor condition in AR$ 240 bn. The majority of that debt (14% GDP)

[15] ONCP- Oficina Nacional de Crédito Público . See ONCP, (2012)

is foreign currency linked, while 1.4% of GDP is in floating rate and, because of earlier debt exchange occurred in the past, around 3.5% of GDP emerged as inflation-linked debt. Regional governments also represent an important source of indebtedness (2.3% of GDP)[16]. Central Bank differs from the other official entities and it holds a positive net worth of 3.8% GDP.

More importantly, Table 7 resumes the type of exposure observed in the balance sheet, which allows one to prompt on the mismatches instantly. Clearly, foreign exchange rate exposure across the public sector pops up and raises the need of further investigation on the structure of those liabilities, with possible policy implications. Because of instability in international liquidity, a slowdown in external trade, restricted access in the international capital market and the challenges in maintaining/accumulating foreign exchange reserves, the referred mismatch may be even more severe and this type of exercise could serve as a side indicator for the authorities.

Table 7 – Net Financial Position by Risk Exposure – AR$ bn

	Fixed Rate	Floating Rate	Inflation-linked	FX-rate
AR$ mn	**72,815**	**-76,108**	**-62,109**	**-146,513**
% GDP	**4.0%**	**-4.1%**	**-3.4%**	**-8.0%**

Source: ONCP, Wright (2013).

As it has been argued, the balance sheet approach is more complete when other key sectors are included, as counterparty risk may also arise from the interrelation across sectors. Nonetheless, ONCP has managed to map out a great deal of the current asset-liability structure to the public sector, despite partial data missing on local government, and has given an important initial step in risk management. Subsequently, it adopted another approach towards further analysis on debt sustainability and then introduced stochastic financial analysis combined to optimal portfolio theory to derive debt management strategies. Similar approach was taken by the Brazilian DMO in the early 2000's.

[16] Data is lacking on "Provincias" (similar to states). Hence, only municipalities are covered.

d) Brazil

The Brazilian economic stabilization process has nearly completed two decades. After years of price instability, there were automatic indexation schemes to protect savings and investments value, which, in turn, fueled the next round of price adjustments, self-fulfilling expectations on rising inflation, resulting in a vicious cycle.

In this context, there were underdeveloped term structures, incapable to distribute intertemporal wealth through traditional market instruments. Instead, an overnight rate culture widespread on the economy where financial instruments were concentrated in the very short term. To remark that, between 1990 and mid-1995, there was virtually no fixed rate bonds in the domestic debt portfolio, while overnight linked bonds and FX-linked bonds dominated the federal debt portfolio. Despite the success of the stabilization plan in bringing prices to acceptable levels (compared to other stable countries) it did not change the local financial community's short-term preferences of securities and investments linked to the overnight rate.

The ensuing maintenance of high short term interest rates preserved their attractiveness. There wasn't any other type of instrument that could provide, simultaneously, high return, low risk, and daily liquidity. The so called LFT – Treasury floating rate bills - naturally became an important source of public funding, especially in moments of high risk aversion.

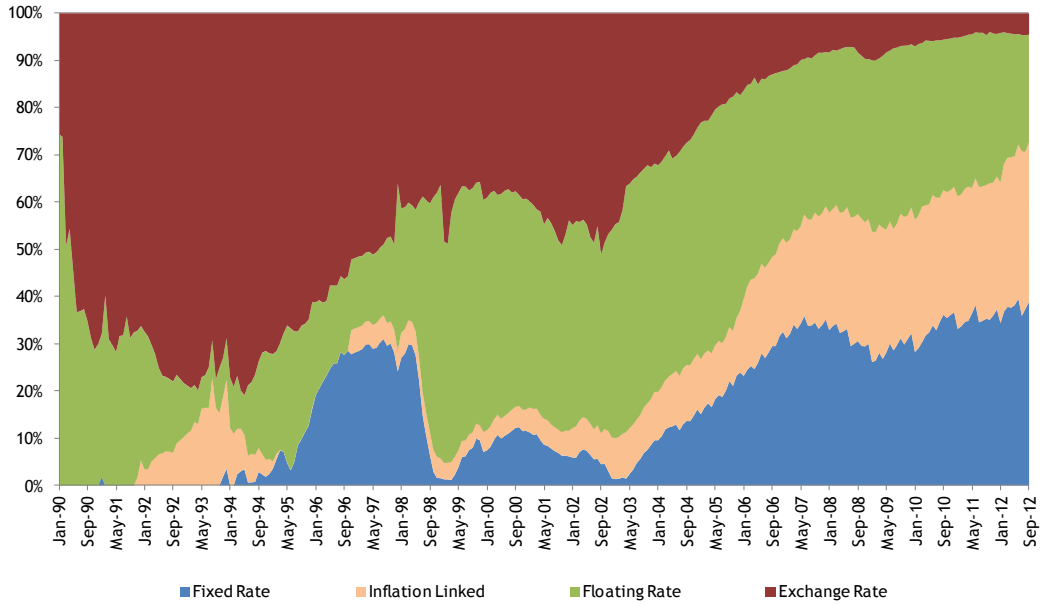
The term structure remained underdeveloped [17] as of 1999-2000. Despite mild improvements in macroeconomic fundamentals, direct indexation to monetary policy reference rate was a source of high market risk for the public debt, in an illiquid bond market, characterized by shallowness and near term concentration.

As market sentiment deteriorated during 2002, about 90% of the overall federal debt was linked either to the foreign exchange or to the floating rate. Gradually, the DMO was able to swap its structure by issuing fixed rate and inflation-linked bonds[18]. Figure 3 shows a historical view of that change.

[17] In parallel, the issuance of external debt in the foreign capital market gained importance as a funding source.

[18] For further examination of this type of strategy, see Papaioannou, (2009), Brazilian National Treasury website- Debt Reports.

Figure 3 – Brazilian Federal Public Debt Profile



Source: Brazilian National Treasury

This BSA example will show how the Brazilian government was able to systematically adopt a transition strategy to revert a liability side worrisome situation where roll-over, interest and foreign exchange risk agglutinated in the debt portfolio, in parallel with asset accumulation, especially those regarding external reserves. Even though a more sophisticated framework was used in order to control the debt and to establish a long term financing strategy, early stages of risk management used BSA to disseminate the need to tackle the deteriorated debt profile and to sediment long term objectives towards a more stable and less risky debt composition.

The usefulness of this type of exercise can be described as the following: the approach aimed at analyzing the net mismatch between the federal government's assets and liabilities from the viewpoint of various bonds types, as well as associated maturity and cash flow. It was an additional reference debt managers used for medium and long-term planning. For that time being, this instrument was essentially indicative.

As of 2002-4, the government sequenced a series of measures to highlight the necessity to promote changes in debt outlook, consisting in putting together and comparing the most relevant data on assets and liabilities managed by the central government. To illustrate, floating rate liabilities were exceeding assets in around 12% of GDP in 2004. Because the government couldn't generate assets to match that, the necessity to

diminish this type of security (LFT) in the portfolio was reinforced. It could also be drawn from the table that inflation linked assets surpassed similar liabilities in about 1% of GDP. It became clear this issue had to be addressed and debt strategies were devised to explore that.

Table 8 – Brazil – Illustrative Balance Sheet for the Central Government - 2004

INDEX	RESPONSIBILITY	ASSET	BRL bn	INDEX	RESPONSIBILITY	LIABILITY	BRL bn	MISMATCH (BRL bn)	% GDP
TOTAL			**1076.16**				**2095.1**	**(1018.94)**	**(23.45)**
INFLATION LINKED			**450.47**	**INFLATION LINKED**			**407.55**	**42.92**	**0.99**
Whosale Price Index	NT	Contract with States and Municipalities	315.22	Whosale Price Index	NT	NTN-C	58.73		
	NT	Provisional Measure	50.01		NT	Other Securities	16.2		
	NT	Privatization Loan to Rio de Janeiro -BANERJ	10.9						
	NT	Royalties - States	8.96	Consumer Price Index	NT	NTN-B	332.62		
	NT	Other Whosale Price Index	65.38						
FX-LINKED			**407.32**	**FX-LINKED**			**103.08**	**304.24**	**7.00**
	NT	Contract with State Companies	6.32	USD	NT	Brady Bonds	0.22		
		Other			NT	Globals	70.3		
					NT	Contracts	22.78		
	CB	FX-SWAP	0	EUR	NT	Euro Bonds	9.78		
	CB	Net FX Reserves	401						
FLOATING RATE			**200.09**	**FLOATING RATE**			**748.47**	**(548.38)**	**(12.62)**
Selic	NT	Contracts	20.95	Selic	NT	LFT			
TR	NT	Agreements	35		NT	Other	507.66		
TJLP	NT	Contracts -TJLP - Long Term	144.14		CB	Repo -1 month	3.72		
					CB	Interest-SWAP	60		
						Other Deposit	1.82		
				TR	NT	Securitized Debt	81		
						Other	93		
				TJLP	NT	Securities	1.27		
FIXED RATE			**18.28**	**FIXED RATE**			**836**	**(817.72)**	**(18.82)**
	NT	Diverse Programs	18.28		NT	LTN	246		
					NT	NTN-F	210		
					NT	Global BRL	10		
					CB	Repo (45d-60days)	370		

Source: Brazilian Central Bank, Brazilian National Treasury

The table above already incorporate the advances occurred throughout 2003 and 2004, which resulted in an improved balance sheet. Similar tables were constructed to monitor those items periodically. To unfold this point, because of rapid accumulation of FX-

reserves and concomitant reduction in external debt and local FX-linked debt, currency risk was sharply mitigated in those years. In that sense, there has been concomitant asset accumulation by the Central Bank, giving leeway to the Treasury to redeem local debt exposed to foreign currency. It is also worthy to mention that, as previously indicated, because the federal government had assets linked to inflation indexes against local governments, it gave vent to put in place a debt issuance strategy to explore this segment improving diversification and lengthening debt structure.

It is important to emphasize that this was a simple exercise conducted by the DMO to illustrate the imbalances perpetrated in the debt structure. It also permitted to see the important buffers that diversification could yield if properly explored in formal debt strategies. Eventually, the Brazilian National Treasury launched other analytical frameworks to conduct risk management in a more rigorous and complete way calibrating costs and risk under stochastic scenarios[19]. Eventually, other market advances were introduced and debt structure achieved a much more comfortable structure where about 60% was in fixed rate or inflation linked securities (as of July 2007).

[19] See Brazilian National Treasury and World Bank, (2008), Part 2, chapter 3 and Optimal Composition https://www.tesouro.fazenda.gov.br/en/publications/optimal-composition

Table 9 – Balance Sheet into perspective – Case Studies

Country	Risk Exposure / Diagnosis	Strategy used to Mitigate Risks	Comments
Ethiopia	1. FX-rate risk on External Debt contracts as the most important source of funding. 2. Interest rate risk due to the concessions financing scheme – issuance of floating rate debt. 3. Contingent Liability risk – Loans to Local Gov't	1. Initiatives to build up liquidity cushion on hard currency 2. Strategy yet to be defined 3. Creating mechanisms to block cash transfers from the Central Gov't to Local Gov't as guarantees.	• There are important imbalances in the assets vs liabilities accounts. • As for risk (3), the blocking mechanisms have yet to be tested in an event of non-performing loan.
Bolivia	1. FX-rate risk on External Debt – concessional loans and a single 10y outstanding Global Bond. FX-reserves are sizable and constitute a buffer for those liabilities. 2. Commodity-risk – High dependence on hydrocarbon exports to create economic dynamism and to generate revenues 3. Contingent Liability risk – *Fideicomiso* funding investment projects without proper evaluation.	1. Accumulation of FX-reserves have been important to offset the risks. 2. Strategy yet to be defined – ideally to diversify the economy. 3. Attempts to bring all *fideicomiso* to the budget and define methodologies to assess the projects to be funded by this channel.	• Still, a fixed FX-rate regime may represent a risk to the balance sheet under and adverse external shock or downturn in commodity prices.
Argentina	1. FX-rate risk is the most important source of exposure. External Debt is sizable compared to hard currency denominated assets.	1. Debt managers have been making efforts to shrink FX-linked debt while increasing the share of floating rate and inflation linked debt in the local market.	• Restricted access to the international capital market, decrease in foreign trade (exports) have hindered the capacity to roll over the outstanding debt and to build up FX-reserves . • Local price instability has troubled the government to issue securities in the local market. • However, BSA have been helpful to compile information about the Public Sector financing structure and contributed to assess the correct risk perception and to design suitable debt strategies.
Brazil	1. FX-rate risk was off-set while FX-reserves were built on. 2. Inflation-linked debt found a natural hedge on the asset side 3. Floating rate debt has not been matched 4. Some assets are not liquid.	1. Debt redemptions and buybacks were put in place. 2. Central Gov't held inflation linked assets (cash flows) against States and Municipalities 3. Floating rate liabilities have moved closer to long term optimal levels. 4. Studies have been made to securitize some of the illiquid assets.	• Balance Sheet was important to jump start a clear strategy moving from a risky debt structure towards a more comfortable position.

6. Conclusions

Despite all the benefits described in this article, the BSA approach holds a few short comings [IMF, (2004)]. To begin with it should be seen as a conceptual framework to oversee the types of exposure a given sovereign is bounded to, assessing its vulnerabilities and related policy options, given the prevailing political and economic environment. As pointed earlier, it is very hard to use BS to do cross country comparisons, as opposed to other traditional economic indicators.

It does not include off-balance sheet transactions, a topic that has definitely gained importance in the recent past. The subprime crisis revealed the banking industry devised instruments to unload important operations from their balances which allowed them to increase their leverage on a large scale, posing significant risks to the overall system. It has been demonstrated that in some countries, such transactions could be used to implicitly increase the riskiness of the government balance sheet, posing moral hazard issues on the discussion on whether the central government should support those sectors [Lewis, (2010)] and [IMF (2004)].

A complete assessment of underlying risks needs to consider the probability distribution of relevant shocks. Nonetheless, it is very hard to associate a distribution adherent to more realistic hypothesis due to the abnormal nature of shocks[20]. For instance, under a fixed or pegged exchange rate regime, a situation of clear and meaningful misalignment would raise the level of concern related to the vulnerabilities pointed out by the BSA. Thus, it would require urgency from policy makers to intervene in anticipation of triggering events.

Policy makers should keep in mind that the BSA is an useful framework to minimize financial risks while adjusting imbalances on the economic structure. Such an approach

[20] See Taleb, (2007).

could be used to evaluate the soundness of the financial system, currency and maturity composition of external debt and optimal reserve accumulation. Noteworthy, this may require a lot of policy coordination and institutional strength, a topic that shouldn't be underestimated.

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