

Risk Management of Contingent Liabilities Within a Sovereign Asset-Liability Framework

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ABSTRACT

Important research has already been made on the potentially destabilizing fiscal impact of contingent liabilities. Additional insights can be gained by working within a broader conceptual framework based on the government's balance sheet. This approach would place contingent liabilities alongside other sovereign exposures arising from both assets and liabilities. A number of sovereigns using asset-liability frameworks have assigned risk monitoring and policy formulation functions for managing risk originating from CL to debt offices. It seems to be a logical step extending the infrastructure available for risk management of sovereign debt to CL, since techniques and skills required are in both cases the same. Given the risks involved for most emerging economies from recent crises, it is expected that this pattern will be followed by more countries in the future.

Risk Management of Contingent Liabilities Within a Sovereign Asset-Liability Framework

I. Introduction

The focus of this paper is the insight gained into managing sovereign contingent liabilities (CL) by considering their risks together with those of other government assets and liabilities. Important research has already been made on the potentially destabilizing fiscal impact of CL, which can mask the true fiscal situation of a sovereign¹. Additional insights can be gained by working within a broader conceptual framework based on the government's balance sheet. This approach would place contingent liabilities alongside other sovereign exposures arising from both assets and liabilities, in order to systematically identify and then quantify both the interaction between the various risk types and total sovereign risk. Although CL have characteristics which imply a specific approach to their valuation, there are more similarities than differences with other balance sheet items when it comes to identifying and quantifying sovereign risk.

The balance-sheet approach also has implications for risk management of CL. In general, risk can be managed at a decentralized level, as for example, by sub-national entities and SOE. However, for many developing countries it may be convenient to have central government monitoring of significant balance-sheet risks, including those originating in CL, so as to ensure that actions of third parties do not increase its exposure as guarantor of last resort. In some cases, the central government may wish to go beyond this and to manage residual public-sector risk, risk that remains unhedged at a sub-national or SOE level. This allows the central government to address risk from a portfolio perspective, taking into account correlations between different types of risks.

Also, the central government may deem it convenient to establish policy guidelines for decentralized CL risk-management that promote good governance and reflect the sovereign's risk tolerance. Such guidelines may include principles such as establishing caps on CL risk, risk-sharing, neutralizing budgetary incentives in favor of CL compared to direct loans or subsidies, as well as disclosure and accountability. These principles may be applied even more strictly in countries where particular economic and financial vulnerabilities and/or a weak risk-management capacity produce a low risk tolerance.

The central government may take on private-sector risk if it implies systemic risk, such as in the case of a financial sector crisis. In this case, risk can be partly controlled *a priori* with effective regulatory structure and tight supervision. Additional risk coverage by the central government, beyond systemic risk, is a matter of political economy policy. In any case, those policies should take into account their complete fiscal implications and be expressed in a set of clear rules that govern the sovereign's commitments.

A sovereign asset and liability management (ALM) framework also has organizational implications for the government. Depending on the country's context, economic vulnerability and risk-tolerance, some kind of centralized arrangement that systematically addresses risk-issues in a transparent and explicit manner may be advisable. This could imply assigning, either to a formal asset-liability management unit or to the government's debt office, the responsibility for reviewing the risk of the entire balance sheet, establishing policies for sub-national government units, and monitoring of risk at various levels of the balance sheet. In some countries, the debt management

¹ See Polackova, Hana (1998), Shick, Allen(1999), and Kharas, Homi (1999)

office has a significant role to play in monitoring and managing an important part of sovereign risk, because of the fact that it directly manages part of the liabilities and is frequently involved in granting guarantees to other state entities. Whether or not the debt office ends up performing this function, the ALM approach strongly suggest the need for strengthening the typical middle-office function of risk analysis at different levels of the public sector.

The degree of risk-management centralization, both in policy and organizational terms, may depend on the macroeconomic context, on risk tolerance and risk management capacity, and on the type of institutional and political arrangements, such as the degree of political decentralization, etc. The more vulnerable the sovereign is to shocks and the weaker its risk-management capacity, as well as that of the rest of the public sector and indeed the private sector, the more stringent central government guidelines and monitoring should be. This is particularly important with regards to CL, which are often hidden and unaccounted for. The central government may end up not only monitoring and managing balance-sheet risks, but also promoting a risk-management culture in the rest of the public sector.

The paper is divided into eight sections including this introduction. Section 2 describes the ALM practice used in the private sector as an appropriate framework for the analysis and management of sovereign risk. Although governments have different objectives than those of corporates, and therefore a different conceptualization of risk, the same portfolio management principles can be applied to sovereign risk identification and strategies for controlling risk. Section 3 discusses the government balance sheet as the conceptual framework for applying ALM. It differs from the traditional accounting balance sheet in that it includes only those items affecting sovereign risk, as defined in the previous section. Contingent liabilities are treated as on-balance sheet items, as they are major contributors to sovereign risk. Section 4 discusses risk identification in an ALM context, with particular focus on its application to CL. In this framework it can be seen that risks affecting CL are no different from those affecting assets and direct liabilities, and that the techniques used to quantify CL risk are similar to the ones used for estimating risk of other balance sheet items. The analysis of risk in the government balance sheet also helps to better understand the typical vulnerabilities of emerging economies, particularly those relating to CL. Section 5 focuses on CL risk quantification by first giving a description of different valuation techniques and then emphasizing on simulation analysis, which is the same type of technique used for risk analysis in a sovereign ALM context. Section 6 covers risk management of CL, suggesting some general principles as an introduction to best practice. Section 7 deals with organizational issues that stem from the risk management discussion. Finally, section 8 documents some practical applications of the two former sections with country examples.

II. The ALM framework

A. ALM approach for a private firm

The asset liability management (ALM) framework for risk management has been in use for a few decades by banks and other financial institutions², and has subsequently been adopted by other private sector agents. Traditionally, it starts with the characterization of a firm as a profit or net worth maximizer under conditions of uncertainty. Faced with budgetary restrictions, the firm seeks to reduce risk stemming from the unpredictability of business conditions until that point when the corresponding cost becomes higher than the risk reduction benefit. Risk within this context can thus

² See Bitner, John (1992) and Fabozzi, Frank (1990)

be measured as the volatility of net worth or profits; more precisely, risk is perceived as potentially diminishing profits, or worse still, zero or negative net worth i.e. bankruptcy.

The ALM approach gives insights on the way a firm can manage both assets and liabilities in order to reduce the volatility of net worth by applying some basic principles of portfolio management, like diversification and hedging. Indeed, a central argument of the ALM framework is to contain risk by matching the financial features (e.g. interest rate characteristics) of the assets and liabilities, as then one side of the balance sheet will be hedged –or immunized- by the other side.

Matching, however, does not need to be complete. In fact, normally banks borrow from the public at short maturities and lend at longer maturities and their return is partly a function of managing the risk embedded in the maturity transformation. This draws attention to liquidity risk as one of the critical exposures faced by these firms: when liabilities cannot be rolled over or assets cannot be liquidated, a bank may face liquidity difficulties, which, if prolonged, may lead to insolvency.

For risk management purposes, the ALM framework suggests that risks that cannot be hedged can nevertheless be controlled through diversification. Banks apply this principle spreading their loan portfolios by industry or geographically. Also, in the case of assets that run the risk of not being recovered, the ALM approach would propose the creation of provisions equivalent to the expected loss, and the maintenance of reserve capital in an amount equivalent to the unexpected loss.

In sum, the ALM framework helps firms analyze situations that can threaten their main objective of profit maximization, by processing the information contained in the balance sheet, deriving from there the potential risks, quantifying them, suggesting ways to reduce risk and providing guidelines to manage residual risk.

B. An ALM approach for sovereigns

Governments are expected to deliver certain services to society, for which society pays taxes. Like corporates, sovereigns' future net worth is subject to uncertainty, depending on a number of unpredictable factors; e.g. business cycles, political events, developments in foreign markets, etc. Unlike corporates, however, governments are not profit or net worth maximizers, and have the capacity to raise taxes, if necessary. These two distinctive features have important implications for sovereign risk definition and for the application of the ALM framework.

For a sovereign, therefore, risk could loosely be defined as the possibility that services delivered have to be severely curtailed for a given level of taxes, or that taxes will have to be increased to maintain a given level of government services, both of which could result from different situations, including sovereign illiquidity and insolvency. More formally, the government's objective, and by association, its risk definition, could be derived from the two streams of economic literature that deal with the optimal combination of taxes and debt³. As will be shown, the tax-smoothing and the default risk literature provide a well defined objective for the government: to manage assets and liabilities in such a way as to minimize the need to raise taxes or the need to curtail services when faced with unexpected shocks causing a permanent fall in fiscal revenues or a rise in the value of liabilities.

³ For analysis on government objectives from the tax smoothing perspective see Missale, Alessandro (1997) and Barro (1995). For the default risk perspective see Alesina (1992)

In the first place, the tax-smoothing literature proposes that higher long-term growth is more likely to be achieved if tax variability is minimal, since it reduces uncertainty. Taxes, other than lump sum, create inefficiencies as they distort economic decision-making and volatile tax rates create significant losses inasmuch as they complicate long-term investment decisions, depress consumption and possibly channel excess savings into short-term financial instruments. However, sufficiently volatile debt service, or liquidity risk, may oblige the government to raise taxes and can actually threaten default as there is a limit to the government's ability to raise taxes.

In the second place, the default risk literature emphasizes the costs of default in debt-servicing, including: i) output losses from economic recession ii) financial institutions' bankruptcies, possibly leading to systemic risk, either directly because the entities hold government debt in their portfolios, or indirectly, as a consequence of the economic recession iii) income redistribution from debt-holders to non debt-holders iv) loss of reputation and higher costs of future borrowing, and v) higher funding costs for private sector borrowing as a result of the government's reputational loss.

The two streams of literature therefore suggest that the government should avoid raising taxes, not only because this decreases welfare, but specially because this erodes the cushion that protects it from incurring significant default costs.. That cushion -namely, their ability to raise taxes- is the very especial asset of governments, and at the same time it constitutes governments' net worth. Consequently, balance sheet and off-balance sheet items, including CL, should be managed in a manner consistent with the objective of maintaining the level of services the government is expected to deliver without raising more taxes.

By avoiding situations in which shocks cause liabilities to permanently exceed assets, the government avoids the need to raise taxes, protects its net worth and keeps it for emergency circumstances for which there is no possible hedge. For the sovereign's balance sheet management, this entails that asset and liabilities should fall or rise together when responding to movements in interest rates or exchange rates, or, in other words, that liabilities should be immunized with assets, at least against shocks on the financial variables.

Thus, the same ALM framework used by private firms could be applied to a sovereign balance sheet. Mismatches between the financial characteristics of assets and liabilities risk having to raise taxes and erode government's net worth. A mismatch of currency of denomination, tenor, interest-rate refixing period and liquidity of the instruments, could result in a gap between the value of the assets and that of liabilities, as a response to market movements or due to an illiquid market context which makes liability refinancing more difficult. The ALM framework would thus require a thorough analysis of the sensitivity of both sovereign assets and liabilities, including CL, to the financial variables that determine their performance over time.

Nonetheless, it should be noted that both assets and liabilities are also sensitive to macro-economic variables and that immunization in this case can be far more complex. Useful insights can be gained from analyzing the assets' sensitivities to these variables, and whether they add to the sovereign's risk, for instance, in terms of excessive dependence on a narrow economic base. In a sense, sovereigns could take the assets as a given, as fiscal flows may be dependent on structural macroeconomic variables of the economy, and may be less flexible to changes than a financial entity's asset flows. The ALM framework would then suggest that risk-management focus on the liabilities, as will be discussed in section 6.

In theory, this risk identification should analyze asset and liability *portfolios*, in order to evaluate the interrelation among the different types of exposures, so as to take advantage of

diversification benefits, and to manage aggregate risk dimensions. A more systematic and holistic approach to risk management can thus be implemented, as opposed to dealing with individual balance-sheet items. Another advantage of the all-inclusive, portfolio approach is that it implies a higher likelihood of identifying and perhaps better managing, systemic risk scenarios, when the various sovereign exposures of both asset and liabilities are triggered at the same time. This is the worst-case event that is rarely modeled, but that has the most important implications for macro-economic stability and growth.

Risk, or the mismatch between assets and liabilities, can be measured either in present value or in cash flow terms, whichever is more convenient or useful. However, the complexity of the government cash flows and the importance of analyzing liquidity risk through time make cash flows a preferred vehicle for analyzing sovereign risk.

Finally, the same principles of diversification and provisioning used by the private sector in risk management also hold for sovereigns. Nonetheless, governments may have less flexibility in diversifying their portfolios, and a limited ability to build reserves against unexpected losses. Section 6 discusses in detail a number of tools available to governments for risk-management.

III. The conceptual government balance sheet

Governments, unlike corporates, do not normally draw up balance sheets. Instead, their main financial reports are the budget and the estimate of public sector borrowing required to finance it. The budget typically consists of a report of expected cash inflows and outflows for the year, and as such, is not intended to reflect the fundamental, long-term financial condition of the sovereign.

Budgets regularly use cash accounting, which is one of the causes of the substantial growth of contingent liabilities in some countries inasmuch as they appear to be a cheaper source of financing when compared with subsidies or direct loans, as the latter do register an immediate expense using up the government's spending capacity⁴. Accrual accounting, as will be discussed later, is more neutral when the government decides on the vehicle for resource allocation and it is more effective for controlling spending.

Nevertheless, for the evaluation of the sovereign's risk exposures, the budget is not enough; instead, a more adequate framework for the analysis of the government financial condition is provided by the sovereign balance sheet⁵. Since this departs from the traditional type of budgetary analysis, two points merit further comment.

First, although balance sheet items are normally treated as stocks, both assets and liabilities can be measured and expressed as present values or as cash flows. In fact, information for some items like tax revenues is primarily available as a flow, and the stock is computed by discounting the cash flow. For other items, like foreign reserves, the stock is known and some assumptions on interest rates are necessary to convert them into flows. As will be shown in section 4, for complex risk analysis it is more convenient to work with cash flows, even though fundamentally they are merely expressing the value of assets and liabilities in another form.

A second and more important consideration relates to the items to be included for running a solvency test. The criteria for inclusion has to do with the focus of the analysis, namely, sovereign

⁴ The contingent liability will only be accounted for as an expense until default or underperformance occurs. See Shick (1999) pg. 11

⁵ Traditional measures of fiscal deficit and adjustment programs judged on those traditional measures also lack the more complete picture given by the entire balance sheet. See Easterly (1998)

risk. This risk has been defined as a situation in which external shocks force a sovereign to raise taxes in order to maintain the expected level of services, or worse, when the capacity to raise taxes has been exhausted, its inability to service its financial liabilities in general. Consequently, items that may cause greater indebtedness, or that may help the sovereign fulfill its financial commitments, should be included. This leads to the exclusion of assets that do not generate financial flows and the inclusion of contingent liabilities.

Indeed, some items that would normally be part of the accounting balance sheet can be irrelevant for this analysis, namely, illiquid assets such as national parks, military equipment, official buildings, etc. Some SOE may also fall into this category, although a strong case can be made for including them in balance sheet if they are part of a privatization program.

On the liability side a critical role is played by CL, that according to the traditional accounting principles, are off balance sheet items⁶. In some cases CL pose such an enormous threat to tax stability, that they represent the major source of sovereign risk, and as such should be included in the balance sheet.

In sum, the conceptual balance sheet referred to in this paper is an economic one⁷. It can be seen as the accounting balance sheet modified to include only those items representing potential financial obligations, or that can effectively be used to meet those obligations. The difference is economic net worth, and as explained, the government's objective is to avoid eroding net worth by raising taxes.

Based on this conceptual balance sheet, the ALM approach provides useful insights on the sovereign's exposure, as the following examples illustrate. If, for instance, assets tend to be denominated in local currency, then liabilities should also be denominated in local currency; issuing debt or contingent liabilities in foreign currency exposes the sovereign to the risk of a local currency devaluation. Similarly, if the sovereign has few real assets that generate financial flows, holding commitments indexed to inflation exposes the sovereign to the risk of an increase in inflation.

This type of assessment can be done without actually computing the so-called economic balance sheet⁸, allowing sovereigns to identify major exposures and adopt strategies that greatly reduce its vulnerability. In fact, a number of OECD countries, most notably Belgium and Denmark, built their debt management strategies based on an ALM approach without actually computing the current balance sheet. It should therefore be emphasized that the conceptual balance sheet is more an organizing framework that helps to identify the main sources of risks and the potential strategies that can help reduce it, rather than a set of numbers from which actual risk can be directly quantified.

In practice, the main government assets are future fiscal surpluses. These are usually denominated in local currency, and tend to be largely insensitive to the movement of short-term interest rates and to inflation. Hence, when liabilities are denominated in local currency, have long duration and are not indexed to inflation indices, it is unlikely that the government will be forced to raise taxes to respond to a shock in these financial variables. Risk therefore can be minimized based on the previous analysis, without actually computing the balance sheet.

⁶ According to the Accounting Standards, a liability can only be recognized in the balance sheet when it is likely to generate an outflow of resources that can be reliably measured. See Shick (1999), pgs 3-4.

⁷ It is worth noting that modern accounting theory is also moving in the same direction.

⁸ Few countries publish even an accounting sovereign balance sheet. One such country is New Zealand, whose balance sheet can be consulted at the web page of the Treasury www.treasury.govt.nz, and another more recent example is Colombia, see Echeverry (1999).

Nonetheless, quantification of the economic balance sheet plays a critical role in the consolidation of the government's fiscal position. As a number of analysts have pointed out, the international experience shows that significant fiscal risk arises from CL that sovereigns keep hidden from the budgetary system. In this sense, transparency and disclosure of CL is the first step towards proper risk management. Quantification of the conceptual balance sheet may also be required for a more rigorous analysis that attempts to determine the asset and liability portfolios the sovereign may wish to hold as a function of the cost/risk trade-off and the sovereign's risk tolerance.

The following is a summarized illustration of a government's conceptual balance sheet.

Conceptual Government Balance Sheet	
Assets	Liabilities
	Direct Liabilities
PV of fiscal revenues	PV of fiscal expenditures
Foreign exchange reserves	Net market value of sovereign debt ⁹
Marketable securities	
Onlending (e.g., IBRD loans)	Contingent Liabilities
Investments in SOEs	Explicit contingent liabilities
Investment in infrastructure (e.g. roads)	Implicit contingent liabilities
	Equity
	Net worth of government estate

Following the above rationale, the assets included are mostly financial. The difference with the traditional accounting balance sheet lies in the inclusion of CL in the liabilities, and the exclusion from the assets of government investments in national parks, military equipment, and the property portfolio.. However, there might be cases when even some of these assets should be included, as in the case of sovereigns that include their property portfolio in their privatization programs. As mentioned, the particular content of the so-called conceptual balance sheet depends on the particular country being analyzed.

The following items are the CL that may play a role in a sovereign economic balance sheet.

Contingent Liabilities are obligations that materialize if a particular event occurs. They can be explicit, if the sovereign contractually acknowledges its responsibility to cover the beneficiary under specific circumstances, or implicit, when the government is expected to do so because it has a "moral" obligation, in most cases related to a high opportunity cost of not intervening. In the conceptual balance sheet, CL are recorded as the present value of expected costs for the government, and not as the face value of those liabilities¹⁰.

⁹ Includes the monetary base and is net of Central Bank holdings of government debt.

¹⁰ In some cases however a sovereign may decide to record the face value of the CL as an expenditure to discourage its use as did The Netherlands when guarantees were first incorporated into the budget, see Shick (1999) pg. 29-30.

Explicit contingent liabilities

- i). Credit guarantees: the government accepts to fulfill the obligations of the guaranteed entity if it fails to repay a loan. This mechanism is frequently used with subnationals, SOE's and private firms participating in a privatization process. Insurance against losses on bank deposits are also a type of credit guarantee.
- ii). State insurance schemes: this is a mechanism by which governments insure against losses on crop failures, natural disasters or guarantees a minimum return on private pension funds.
- iii). Legal proceedings and disputes: legal claims against the state may arise from property damage by public projects, malpractice in public hospitals, claims against army or police forces, tax in dispute, claims against sub-nationals and SOE's, and others. Once the court settles against the government, it becomes a direct liability.

Implicit contingent liabilities

- i). Financial system bail-out: the financial sector may generate a huge economic cost if lack of government intervention allows a systemic crisis to develop. As illustrated by the East Asian experience, this item could be the most important CL on a sovereign's balance sheet. Even governments of industrialized countries such as Sweden and the USA have in the past intervened beyond their contractual obligation. Standard & Poor's has developed a methodology to measure the size of this CL and its estimates are readily available.
- ii). Fixed exchange-rate regime: the adoption of a currency peg as a foreign exchange policy implies that the central bank stands ready to defend it by buying or selling foreign reserves until excess supply or demand are cleared. Thus the regime entails a contingent liability for excess demand for foreign exchange that could deplete the country's international reserves. This contingency might be triggered either as a consequence of poor macro policies, or as a result of exogenous capital flows over which the government has less control.
- iii). Corporate sector bail-out: the government may bail out corporate entities, because of externalities. In Korea, banks' dependency on chaebols implied that not helping the latter would have resulted in the bankruptcy of the financial system. Although difficult to estimate, this item can be calculated from information of previous government interventions, ownership concentration in the corporate sector and linkages between government banks and corporates.
- iv). Uncovered losses or default on non-guaranteed debt issued by subnationals, SOE's or central bank: because of reputation and potential credit risk reappraisal from rating agencies, governments may choose to honor those obligations, even when they have not backed them explicitly. The less explicit the commitment, the harder it is to quantify this CL. Complexity increases with the number of variables that should be estimated, such as entities that might be bailed out, size of the potential default and timing. Past experience can be an indicator¹¹
- v). Cleanup of liabilities of privatized entities: governments may have to take over obligations of entities to be privatized, in order to attract investors¹²

¹² For an illustration see the case of Hungary in Polackova (1999a) pg. 20-24

- vi). Disaster relief: natural disasters, the dismantling of nuclear plants and environmental recovery are force majeure events that compel the government to assume the costs involved and which are difficult to predict¹³.
- vii). Critical social and welfare functions: failure of private pension or social security funds could become government obligations in some countries because it is believed that social services ultimately are an obligation of the government¹⁴.

IV. Contingent Liabilities and Sovereign Balance Sheet Risks

The risk of a potential shock forcing the government to raise taxes can be analyzed in terms of a potential fall in assets, an increase in liabilities or a combination of the two. However, for the purposes of the present analysis four different sources are identified: i) decreased net fiscal flows ii) reduced asset values iii) increased direct liabilities and iv) increased CL.

i) A severe contraction in tax revenues or a significant expansion of government expenditures caused by external shocks may cause a fiscal shortfall, that in turn may induce a tax hike and increase the likelihood of sovereign default. As is later argued, non-G7 countries are more exposed in this sense because of specific features of their economies.

ii) A second source of risk is decreased asset value, such as a fall in international reserves, or financial losses registered by SOE's and by sub-national entities. Underlying factors such as the defense of a fixed exchange rate, the collapse of the price of main commodity exports, and credit or liquidity problems of public entities could cause the fall in asset value, with significant risk to the government.

iii) A third source of risk to the government is an increase in the value of direct liabilities relative to asset value. As government expenditures have already been mentioned, this alternative refers mainly to debt and tends to reflect debt-servicing volatility caused by fluctuations of exchange and interest rates.

iv) Last but not least, if significant CL unexpectedly materialize, there is the risk that taxes may have to be raised. Various explicit and implicit CL could trigger this situation, including credit guarantees, bailouts of financial and/or public enterprises, insurance for major natural disasters, etc.

A brief mention has already been made of different events that could negatively impact the stability of taxes. This leads to the question of whether the underlying factors threatening tax stability are different for traditional balance-sheet items, and for CL. It will be argued that potential tax volatility may result from either risks in the macroeconomic fundamentals or from risks in financial variables, and that these two generic underlying factors affect CL, as well as regular assets and liabilities. Although macroeconomic and financial risks are interrelated and can be modeled together, they are separated for the purpose of the following analysis.

¹³ In the case of Colombia, Echeverry finds out that during the last decades, the country has experienced a severe earthquake once every four years and a flood of major consequences every two years. He estimates a corresponding contingent liability of about 1.1% of 1997 GDP. See Echeverry (1999)

¹⁴ For an illustration see the case of the pension reform in Hungary in Polackova (1999a)

i) Macroeconomic risk: demand or supply shocks, such as a deterioration in terms of trade, may trigger an economic contraction and lead to increased government expenditures, reduced tax reserves and possibly inflation.

ii) Financial risk: a second type of risk inherent to financial variables. Financial risk includes:
a) market, b) liquidity, and c) credit risk.

a) Market risk is understood as the uncertainty in the value of sovereign balance sheet items, due to movements in financial variables such as exchange, interest rates and commodity prices.

Exchange rate risk tends to be significant. As evidence shows, local currencies in emerging economies display a pattern of infrequent and unusually large jumps. A number of these currencies have from time to time shown fundamental overvaluation, providing an opportunity for speculative attacks and massive devaluations. Since assets are largely denominated in local currency, whereas a substantial part of the liabilities is denominated in foreign currencies, devaluations have depleted sovereign assets, and made direct and contingent liabilities more expensive, thereby forcing the government to increase taxes and in some cases threatening to provoke a default since the capacity to raise taxes has been taken to the limit.

Similarly, SOE and sub-nationals with foreign currency debt can face serious difficulties in the timely servicing of foreign debt, for their revenues are largely in domestic currency. Liquidity problems may trigger explicit and implicit CL, particularly when reputational risk has significant externalities. A massive devaluation could also trigger exchange-rate guarantees issued to infrastructure projects. It could also cause a liquidity crisis in a banking system having a significant short-term foreign currency debt, (which in turn may require a government bailout in order to avoid systemic crisis), or bring about the insolvency of public sector enterprises with foreign currency debt.

Domestic and foreign interest rate shocks may have similar effects as those described above for exchange-rate shocks. If liabilities have a duration significantly shorter than that of assets, the cost of servicing domestic debt may greatly increase when there is a significant and prolonged tightening in monetary policy, thus endangering the tax stability objective. This can also be the case of a prolonged defense of a fixed exchange rate. However, if interest rates display a mean-reverting pattern, the negative impact on the sovereign's net worth may be inferior to that of an exchange rate shock. In any case, a marked increase in interest rates can make debt servicing more expensive, erode the financial situation of SOE and sub-nationals, induce a contraction of aggregate demand and affect the health of the financial system, all of which tend to induce an increase of taxes and subsequently increase the risk of default.

b) The second financial risk is liquidity risk. Assets and liabilities may register mismatches in maturities and liquidity, with assets having longer maturities, or less liquidity, than liabilities. Most commonly, this situation arises as a result of an accumulation of short-term obligations that cannot be rolled over and where governments lack the funds to service the obligations. CL can also generate liquidity risk insofar as they behave like American options, which can be called at any time; they can thus trigger a liquidity crisis, especially with implicit CL that tend to be large by nature, the most striking example being a financial sector bailout. Another special feature of CL is that normally there are no assets readily available to match those liabilities, given the lack of

budgetary procedures that account for the expected cost and the deficiency of reserves against unexpected costs.

c) Credit risk refers to a debtor's inability to fulfill its financial obligations. Credit risk for the central government can originate from both sides of its balance sheet, namely, from its assets and from its CL. In particular instances the two may be connected, such as when SOE or sub-nationals have central government equity and at the same time expect the government to intervene in case of financial difficulties caused by excessive leverage, for example.

Different aspects of credit risk affect the government cash flow in varying degrees. On the asset side, a deterioration in the financial situation of SOE, sub-nationals and even the Central Bank, may reduce the cash flows the government expects to receive from those assets. If financial difficulties increase, explicit guarantees given by the central government may be called, and if they deteriorate further, these entities could face a liquidity crunch or a solvency problem that could trigger a more significant cash outflow from the government, in terms of a bail-out.

The degree of credit risk to the government originating in CL depends largely on the degree of central government intervention in the rest of the public sector and the economy. At one extreme there is small sized government with limited assets in vital sectors and enterprises, which promotes a strong autonomy of public entities, very restricted explicit CL and virtually non-existent implicit CL. Moral hazard is not an issue. At the other extreme, there is ample intervention of the government in the economy reflected in a wide variety of investments in the real sector, management intervention by the central government in entities it invests in, widespread issuance of explicit CL and the de facto acceptance of implicit CL. The two typologies result in different CL credit risk implications for the central government's cash flows.

From the previous analysis it can be concluded that CL are exposed to the same types of risks, both macroeconomic and financial, that affect assets and other liabilities. The ALM framework shows that situations that may force the government to induce tax instability can arise from different sources; hence the importance of looking at the entire balance sheet.

This kind of analysis is particularly important for non-G7 economies, for the above-mentioned risks are more significant than in their G7 counterparts, and therefore require better monitoring and management. Emerging economies tend to be more prone to financial and economic instability than their counterparts in industrialized countries, as the following examples show:

- i) They have more volatile business cycles since their economies tend to be less diversified: GDP and government revenues sometimes depend excessively on one or two economic sectors or commodities. Price swings and negative terms of trade can have excessive effects on these economies' asset flows, without offsetting flows on the liability side.
- ii) In some countries, there is an inherent trend for pro-cyclical fiscal policies that mismatch fiscal revenues and expenditures in the downturn of the economic cycle. In effect, because of pent up demand that builds up during recession, governments can not run a restrictive fiscal policy in periods of economic expansion, whereas in recessions, government expenditures are highly inertial and difficult to cut.

iii) Emerging market countries generally lack developed deep and liquid capital markets, which forces them to have short term domestic currency debt with increasing refinancing risk and/or incur foreign currency debt with consequent currency risk. Since assets are mainly long term and denominated in local currency, this represents a major cause of vulnerability.

This vulnerability seems to be aggravated by the role played by CL. The following examples highlight only a few important CL: guarantee issuance, the implicit backing of the financial system, a fixed exchange-rate regime and the potential bail-out of SOE and sub-nationals.

i) Many non-industrialized countries are in the process of privatizing their infrastructure, searching for benefits including new infrastructure development, reduction of budgetary subsidies and improvements in operation of existing infrastructure¹⁵. Sovereigns may extend guarantees in order to implement this process, and thus promote private sector participation in desirable economic areas, or obtain funding for socially desirable projects. These are important CL that may eventually bring problems to the sovereign's ALM.

ii) Financial sectors of emerging market countries often lack adequate regulation and supervision which makes it easier for the banks to exploit the implicit backing of the government by adopting riskier positions. This situation is aggravated when the country opens its capital account, for banks already in a vulnerable position are exposed to more risk, especially to the volatility of capital flows.

iii) Some emerging economies have used a fixed exchange-rate regime as an anchor to help reduce inflation. This may sometimes lead to maintaining an overvalued exchange rate, that is an invitation for speculators to make profits when the central bank starts losing significant reserves.

iv) If the public sector is relatively large within the economy, sovereign balance sheet statistics will result in a complex layering of explicit risks. If there is an additional dimension of moral hazard arising from implicit CL, more privatized economies do not necessarily imply less risk for the central government, as was learned from the East Asian crisis. CL in particular are generally not clearly identified and documented.

V. Risk Measurement-Valuing Contingent Liabilities

The first step in quantifying risk is to value CL, in terms of the present value of future net costs that the government expects to incur by accepting such liabilities. The CL value can be estimated in various ways, including actuarial techniques, econometric and financial models, and contingent claim analysis.

Actuarial techniques are widely used in the insurance industry. They estimate the future pattern of losses based on historical tendencies. For results to be statistically significant, both a large database and a highly stable distribution of losses to be insured are required. This method can be explained with an example of an explicit guarantee extended by the central government to cover a portion of social security or health benefits. The actuarial method computes the CL's expected cost as the nominal or face value of the guarantee, times the probability of the guarantee being used, where the probability is based on the historical frequency of such guarantees being called. If a large part of the population receives social security or health benefits guarantees for a sufficiently long

¹⁵ This is the case of transitional countries that are shifting the role of the government from directly financing and providing services, to guaranteeing that the private sector will accomplish particular outcomes

period and maintains the same pattern of using them, on average the estimation will be right. However, this technique has some limitations that make it difficult to extend its application beyond these cases. Firstly, there is insufficient data on specific events that triggered the use of CL in the past. Secondly, even when such data is available, the micro and macro economic context may have changed in such a way that the assumption of a stable distribution of expected costs does not hold. Thirdly, the CL must involve large samples, so that diversification can substantially reduce the variance on the aggregate.

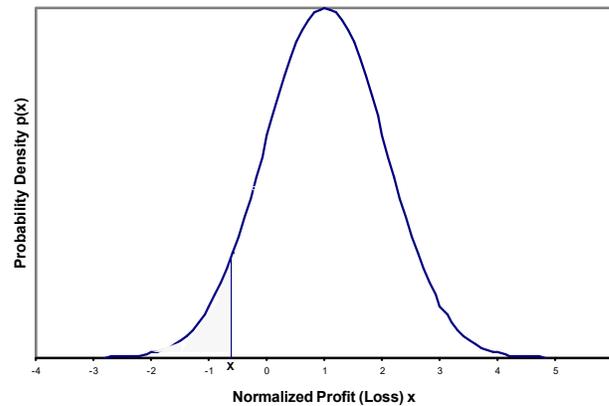
Econometric and financial models recognize the potential instability of the expected cost of CL, since those costs are triggered by economic and financial variables whose behavior can change over time. Instead, the government's expected CL cost -or the mean of the distribution- is calculated with models that forecast the underlying economic and financial variables that cause the CL to be called, but no attempt is made to measure the variance. These models are also used to assess the impact of different assumptions regarding the economic variables on the government's expected cost, in order to obtain a sense of the individual risk profile of a particular CL. This technique is frequently applied to CL incorporating credit risk, whose behavior is a function of the general state of the economy. However, econometric and financial models also require substantial data inputs, do not provide an estimation of the variance of CL costs, and do not offer the minimum variance resulting from large samples used in the actuarial technique.

Since both actuarial and econometric models focus on the mean of the CL costs, these techniques offer limited information to compute risk. An alternative approach based on option valuation techniques presents a richer description of the behavior of CL and provides an estimate of the variance of the distribution, which is the key component to value risk. Two of the techniques used to value options that have been applied to CL are contingent claim analysis and simulation analysis.

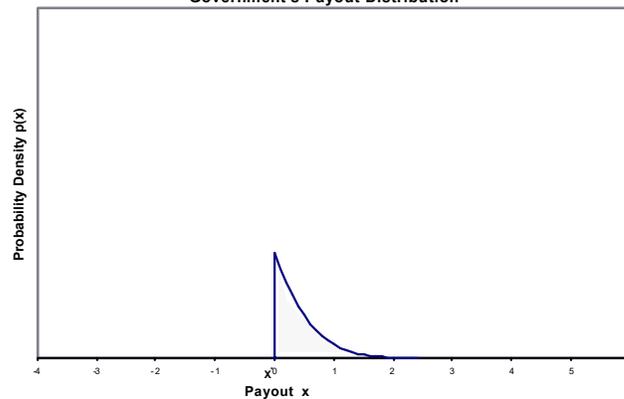
Contingent claim analysis is based on the concept that a CL is an option, in the sense that it can be exercised if a certain event occurs. The distribution of the pay-out for the government issuing a CL therefore looks like the truncated distribution of an option pay-out. Consider, for instance, a credit guarantee granted by the government on a loan to a SOE. The risk to the government is that the SOE may experience financial difficulties to the point where it is forced to discontinue its debt servicing, thus forcing the lender to call the guarantee and transfer the loan obligation to the government.

This example can be illustrated in the following graphs. In graph 1, the profits of the SOE are depicted as the risk factor that may trigger the guarantee. It is assumed that profits are normally distributed about a mean, assumed to be 1 in this case. At a point X, the losses experienced by the SOE will absorb the firm's equity, forcing the SOE to default on its debt and causing the lender to exercise the option. Graph 2 displays the distribution of the government cash flow. If the option is not exercised, the cash outflow will be zero; if it is exercised, the cash outflow is equal to the value of the guaranteed loan, less any recovery from the SOE. For simplicity's sake, it is assumed that the government's net exposure under the guarantee is equal to any losses realized by the SOE in excess of the equity. The distribution of the government's potential exposure is therefore the same as the distribution of the SOE's income truncated at point X.

GRAPH 1
SOE Profit (Loss) Distribution



GRAPH 2
Government's Payout Distribution



Thus, as graph 2 illustrates, contingent claim analysis not only gives the expected value of the government losses as the area under the curve, but also the dispersion i.e. the risk of facing unexpected losses. Before referring to the decomposition of a CL value into the expected value and a risk premium, it is important to understand how a CL can be valued.

A useful perspective for this purpose is that of the lender. From his point of view, if the SOE does not pay, the government does –guarantees are options that protect lenders against default. Thus, a loan to the SOE backed by a guarantee is like having a risk free loan. In this sense, the government guarantee can be valued as the difference between the price of a risky and the price of a risk free loan. Alternatively, if those loans are traded in the market, the put option can be valued based on the value of the loan, its price variance, the term of the option and the risk free interest rate. This is how contingent claim analysis can be used to value a credit guarantee or in general any CL.

The advantage of this type of model is that the value of the option can be calculated directly from the value and the variance of an underlying asset, in this case the loan being guaranteed, the term of the option and the risk-free interest rate. This has enabled the application of the technique to value a variety of CL, such as loan guarantees, guarantees supporting corporate failure, mortgage guarantees and insurance products. In the USA for instance, the Office of Management and Budget

applies option technology to estimate future expenses derived from such CL as deposit insurance, pension insurance and mortgage guarantees.

A more important advantage of these models is that they allow to decompose the value of the CL into the expected value and a risk premium. The difference between the pricing that results from the option model and the expected cost is precisely the market value of risk. In a simulation model this can be thought of as the market value of the capital allocated for risk, while the expected cost is similar to provisioning expenses.

To better illustrate the application of estimating both the expected value and the variance of the cost of the CL, the same example of a credit guarantee given to a lender in favor of an SOE might be considered. In effect, the above-mentioned credit guarantee can be treated as if the government was borrowing the funds and on-lending them to a SOE. This unbundling highlights the role of the government as a financial intermediary. According to the ALM framework, a bank in a similar situation should deal with credit risk in order to price the loan to the SOE: moreover, it should first provision against expected losses, then allocate capital against unexpected losses and, with that information, compute the risk premium on the operation. Replicating the same principle, the government could build budget provisions, set aside reserves and finally calculate the true cost of the CL¹⁶

Options therefore can be seen as simulation models that allow a richer description of the behavior of CL. Actuarial techniques, as well as econometric and financial models, value CL on the basis of the expected value of the losses that the implicit or explicit commitment entails for the government. Options not only provide the expected value of losses, but also the variance of the distribution of government losses, which is a more appropriate measure of risk. Hence, actuarial techniques as well as econometric and financial models can be seen as special cases of option simulation.

Nonetheless, it should be recognized that data may not be available for most CL. In fact, if there were a market for the majority of the underlying assets in which the CL could be unbundled, there would probably be little need for the government to accept those CL and the corresponding risk would be handled by the private sector from the start. Data availability therefore is the main limitation to derive the price of CL directly from option pricing models.

Still, if options cannot be applied directly, they can be recreated from a simulation of the risk factors that trigger CL. In the illustration given above, this is like simulating the distribution of the SOE's profits depicted in graph 1, and from there deriving the CL pay-out shown in graph 2, rather than assuming that the market will provide it.

This simulation technique could then be used for a number of CL, replicating the distribution of crop results, financial system performance, occurrence of natural disasters, and so on. Nonetheless, in order to simulate them, information on the parameters of such distributions is required. It can be found in historical statistics collected by the government, or from evidence of other countries that have dealt with those CL for longer periods. In the absence of statistics from which the mean and the variance can be derived, it will still be possible to recur to a Bayesian type of simulation in which the distribution of a occurrence of a natural disaster, for instance, collapses into the probabilities of binary events: either the disaster happens, or it does not.

¹⁶ Section 6 addresses the implications that contingent claim analysis has for risk management purposes, namely: (i) if the government should charge the beneficiaries the "fair value" of the CL, (ii) if the government should provision expenses in the budget for an amount equal to the expected cost of the CL, and (iii) if the government should set aside reserves against risk, or if there an alternative and less expensive way to deal with this issue.

One important aspect is that the simulation techniques described here are inherently part of the same type of techniques used to measure risk in the broader balance sheet context. When modeling risk for debt service relative to the government budget, for instance, it is often difficult to have a direct estimation of the debt service volatility vis-a-vis government revenues. Instead, debt service has to be simulated from a given distribution of exchange rates and interest rates, for which a common approach is to derive the distribution parameters as a combination of historical information and judgmental input.

On the other hand, the simulation of any CL, like SOE profits in the above mentioned example, is a function of economic and financial variables that are the same ones that generate risk for other balance sheet items i.e. interest and exchange rates and macro-economic shocks. In theory, it would therefore be possible to find the elasticity of the value of a CL to changes in the independent variables and therefore quantify the portfolio effects of CL. With this information, it would be feasible to design a portfolio composition that uses diversification to minimize overall risk.

These considerations also have organizational implications as the teams in charge of risk measurement for debt are already familiar with simulation techniques and with the factors that generate risk. In this sense, and as will be suggested in section 7, there might be some advantages in having a centralized ALM team expanding the use of risk analysis techniques to the entire government's balance sheet and eventually to advice on macro hedging for the residual risk that results from the interaction of the different balance sheet items.

To summarize, contingent claim analysis is a technique that values CL either directly, or by simulating the spectrum of developments that may cause the CL to be triggered. It allows to estimate not only the mean, but also the variance of the potential CL costs. On the one hand, this feature explains why contingent claim analysis tends to produce higher estimates for the CL value compared to the more traditional techniques whose valuation is centered exclusively on the mean. On the other hand, the analysis provides an estimate of risk as the variance of the distribution of the government expenditure, which corresponds to the difference between the CL value minus the expected cost of the CL. Since very few of those CL have underlying assets that actually trade in the market, direct computation of the CL price and its risk from option modeling might be the exception. More generally, techniques that allow to simulate the risk factors that trigger CL are required. Not only are these simulation techniques part of the same technology used to quantify risk for regular assets and liabilities, but also the risk factors -macroeconomic shocks and financial variables- are the same ones that endanger the government objective of tax stability and can ultimately produce a default on the government's financial obligations. This commonality suggests the possibility of finding the elasticity of CL to those risk factors, in order to better understand their portfolio effects and to allow the construction of a portfolio that minimizes the risk of asset and liability mismatches.

VI. Risk Management

The first step in defining a CL risk-management policy is to determine the risk exposure that the government is willing to take. It is a political economy decision on the part of the central government as to whether it will manage only its own narrow balance-sheet risk, or whether it will also cover some of the risks generated in other parts of the public sector, and indeed in the private sector. Systemic risk originating outside of the central government balance sheet will most likely be

covered, even if it originates in the private sector. However, there is an ongoing discussion with regards to the appropriate limits of the central government's granting further risk insurance and guarantees, e.g. in order to promote growth and development. This topic goes beyond this paper, which limits itself to underlining that there should be a strategy for dealing with CL risk, and that risks taken on by the central and sub-national government should be addressed explicitly and systematically and be incorporated into a broader balance sheet management of sovereign risk.

These strategies are precisely what most governments of non-industrialized economies lack. In a sense, CL in emerging economies have not been the result of deliberate political economy decisions, but rather have been accumulated "passively" as a result of the lack of explicit policies addressing sovereign risk management, combined with budgetary systems that favor CL over other forms of government financial support. In these cases, governments need to measure the CL risk inherited in that manner, evaluate their own risk-management capacity, and decide to what extent they will continue using CL in the future. If the analysis shows that CL are inefficient vehicles of public finance vis a vis other instruments and excessively risky for the government, it may be highly convenient for the government to implement an explicit policy which severely restricts the issuance and acceptance of CL. Countries like New Zealand and Argentina claim that not even financial system problems represent a CL for the government. These are examples of explicit political economy decisions to limit moral hazard by not accepting certain CL, as are the cases of debt defaults by the City of New York in the 70's and, more recently, by Gitic in China, where the governments did not intervene in order to avoid default.

For those governments that either accept to cover some of the risks generated in other parts of the public sector, and in the private sector, or that inherit a stock of CL from previous administrations, there are two broad approaches to risk management: decentralized or centralized. The difference between the two refers to the existence of a body in the central government that oversees risk for the entire balance sheet, and helps design risk-management policies both for the central government and for other entities whose risk is being covered. As will be shown in section 8, the United States is an example of decentralized management with a number of regulatory bodies that control risk for different CL without a central coordinating entity.

Centralization, however, seems to be the path followed by countries that did experience severe difficulties associated with debt management. Countries like New Zealand, Belgium, and Ireland, that experienced severe fiscal crises and high indebtedness which put macro stability at risk in the 70's and 80's, decided to create a debt office that was assigned the responsibility of managing what was then considered to be the biggest risk for the government: sovereign debt. Partly as a result of their success, and partly because of economies of scale, some of these same offices subsequently expanded their scope of influence, in order to deal with the risk of the entire government balance sheet, including CL. This trend, and the advantages in terms of positive externalities, have encouraged other countries to adopt a similar centralized strategy, most notably Colombia and South Africa.

It is worth noting that economies of scale may be significant. In effect, and as discussed in section 5, the simulation techniques used for valuing and quantifying CL risk are the same type of techniques used to measure risk in a broader balance sheet context and in particular for sovereign debt. Therefore, the same skills and technology are required in both cases. Investment in human capital and systems for an adequate functioning of a debt office may take various years, and once it is available it makes sense to extend it into an ALM office.

Thus, the trend for centralized risk management can be related to the size of the risks being managed and probably to the economies of scale that result from extending to CL the infrastructure

available for risk management of sovereign debt. Both conditions seem to take place in most emerging economies. The more vulnerable the sovereign is to shocks and the weaker its risk-management capacity, as well as that of the rest of the public sector and indeed the private sector, the more stringent central government CL guidelines and monitoring may have to be. The central government may end up not only monitoring, and even managing residual balance-sheet risks, but also promoting a risk-management culture in the rest of the public sector. In this sense, it may want to bring out guidelines for CL risk identification, quantification and management. This may be especially applicable in the case of developing countries. In some cases, the central government may wish to go beyond this and to manage residual public-sector risk, risk that remains unhedged at the sub-national or SOE level. This allows the central government to address risk from a portfolio perspective, taking into account correlations between the different types of risks.

No matter whether risk management is centralized or decentralized, moral hazard must be contained. The policies in place should therefore ensure that beneficiaries of government backing will behave as if the support had not existed, and that they will not undertake excessive risk increasing the exposure of the guarantor of last resort. Two types of policies could be considered depending upon the degree of influence the central government has on CL beneficiaries: policies designed for the public sector, and policies directed to the financial system.

The following principles could be useful for containing risk of CL granted to the public sector:

- i). Promote disclosure and accountability with regards to all CL
- ii). Contemplate risk-sharing mechanisms and, whenever possible, refrain from covering risks that are under the control of the beneficiary, for this creates moral hazard. One way of risk sharing is pricing the CL and charging the corresponding value to the beneficiaries. Another way is to establish collateral requirements from the beneficiaries. In general, blanket risk guarantees should be unbundled into their different dimensions, in order to determine the best way to implement risk sharing among the different parties. It is convenient to determine what party can best manage specific types of risk. Important progress in this area has been made in the domain of project finance, and valuable insights can be incorporated into public sector risk management.
- iii). Promote good governance of sub-national entities and SOE's, by delegating risk and promoting the ALM balance sheet approach described above at a sub-portfolio level, making sub-national entities accountable for managing their own risk and CL guidelines for state and municipal governments, whereby their financial autonomy is lost once a pre-established and quantifiable level of CL risk is reached.
- iv). Ensure that CL compete on equal footing (e.g. in budgetary terms) with other forms of financial support, such as direct subsidies, tax exemptions, loans, etc, so that CL choices does not lessen public finance efficiency
- v). Provision expected costs in the budget to make CL costs visible and in some cases build reserves against unexpected losses, possibly using the risk quantification methodologies mentioned above. Provisioning of expected losses should always be made, but the level of reserves will depend on the sovereign's risk aversion and its ability to withstand unexpected losses.

For the decentralized government sector, the experience of industrialized countries shows that proper accounting, using a medium-term horizon, with controls on direct and contingent indebtedness, disclosure of the financial information, performance measurement and accountability, have significantly reduced if not eliminated the risk of these CL.

In those cases where the government cannot promote the former principles because the CL is implicit and there is limited control, as is the case of the financial sector, the central government should encourage good governance and risk management with an effective regulatory structure and tight supervision. This includes specific limits on risk taking, minimum capital requirements, and periodic reports to an oversight institution for monitoring purposes. A sound financial system reduces the credit risk of the sector, diminishes the likelihood of a government intervention and the size of the CL. In turn, however, the good health of the financial sector depends on prevailing macro-economic policies and on risk management practices in the private sector.

The central government should also take the necessary actions to avoid the extension of systemic risk beyond the financial sector; again in this case, risk can be partly controlled *a priori* with effective regulatory structure and supervision on the involvement of the financial system with the corporate sector. The Glass Steagal act in the United States can be understood as an example of restriction of implicit CL to the banking system, whereas the involvement of the Korean government in the rescue of the Chaebols offers an illustration of a systemic risk originated in the private sector that surpasses the limits of the financial system. As mentioned, additional risk coverage by the central government, beyond systemic risk, is a matter of political economy policy. In any case, those policies should take into account their complete fiscal implications and be expressed in a set of clear rules that govern the sovereign's commitments.

VII. Organizational implications

A comprehensive sovereign ALM framework has important organizational implications for the government. For some countries, it shows the convenience of having some kind of centralized arrangement that systematically addresses CL risk-issues in a transparent and explicit manner, such as:

- i) a formal asset-liability management unit (e.g. as in New Zealand or South Africa) that analyses the sovereign's balance sheet risk, and
- ii) independent centralized operational units, that nonetheless feed information into a centralized sovereign risk evaluation, possibly implemented by the debt management office, where the skills and techniques are the same for debt management and for sovereign risk management

A centralized organizational scheme of this sort may be particularly helpful for developing countries, with the particular kind of vulnerabilities mentioned above, and with low tolerance for risk. However, other frameworks can be equally useful in countries with other characteristics. For example, the USA does not have a centralized ALM monitoring of CL arising from the financial sector, but rather a decentralized scheme monitored and supervised by different agencies. However, even the USA tries to centralize an evaluation of guarantees and risk-covering instruments in the Department of Treasury, in order to standardize budgeting procedures and better control their budgetary impact. Although the best organizational arrangement for any given country may depend on the macroeconomic context, on risk definition, on technical capacity for risk-management, and on the type of institutional and political arrangements, such as the degree of political decentralization, recent country experiences show a trend towards centralized arrangements. As explained, this trend is related to the size of the risks been managed and economies of scale present in the process.

Whatever the organizational arrangement decided on, the most important element is that it should contribute to the institutional exercise of ALM and include CL within the risk-management exercise (e.g. promote clear objectives, such as avoiding budgetary shocks and protecting net worth; establishment of clear guidelines for managing CL risk, assure mechanisms for quantifying risk-return trade-offs of CL; risk-identification using a conceptual balance sheets, periodic reporting to higher authorities within a clear system of delegation, a comprehensive information system on CL, etc.)

Typically, this will imply the need to strengthen the strategic analytical units, or the “middle offices”, responsible for risk analysis and policy. In the case of the debt management offices it is important that the middle office group not be responsible for operational matters, such as funding, extending guarantee contracts or on-lending to SOE. CL should be one of the most important elements to be analyzed by the middle office staff.

One organizational mechanism which helps promote CL risk management within an ALM framework is to create a Sovereign Risk Management Committee, that would establish basic policies and monitor sovereign risk on a periodic basis, from an overall sovereign perspective. Again, its characteristics would be different depending on how risk is being processed, monitored and managed within the government. A committee of this type might be more important in those cases where risk-management is more delegated and/or where a large public sector means that the layering of different kinds of risks is very complex, and/or where specific sub-national interests are very strong.

In some countries, the debt management office has a significant role to play in monitoring and managing an important part of sovereign risk. This is precisely because of the fact that it directly manages part of the liabilities, is frequently involved in granting guarantees to sub-national government, and has staff with the necessary skills for managing risk. However, it must closely coordinate with the fiscal authorities and the central bank in monitoring the sovereign balance sheet as a whole.

There would probably be a need to coordinate between various government units in order to assure the existence of a comprehensive statistical base that would enable the necessary monitoring on the part of government agencies and supervisory entities. The importance of this base tends to be underestimated, in view of its significance for sovereign risk management. As mentioned before, this may involve statistics from both the public and the private sector.

Needless to say, it is essential for top government officials to give full support to CL risk management within an ALM framework and its policy and organizational implementation. Without Ministerial backing, the whole exercise will be unsuccessful, because it requires significant effort and financial resources for aspects such as information systems improvement, reporting, creation of middle offices and training of their staff in risk-management.

VIII. Examples of CL risk management with elements of sovereign ALM

A. New Zealand

The context is one of fiscal control, and government balance-sheet risk management, and is interesting inasmuch as it forces political accountability and transparency. The Fiscal Responsibility Act of 1994 requires the government to follow a set of principles of responsible fiscal management, under conditions of transparency and accountability including: i) management of the risks facing

the government, and ii) achieving and maintaining government net worth, albeit defined in strictly accounting terms.

These balance-sheet risk management objectives were reflected in the organizational reforms of the public sector. The Treasury's operational responsibilities now include, among others, i) liabilities management, ii) monitoring Crown assets, iii) the management and production of a complete balance sheet of the public sector. The Asset and Liability Management Branch, under direct responsibility to the Secretary of the Treasury, advises on government financial policy as it relates to government ownership and balance-sheet interests. It manages the Crown's sovereign debt portfolio, provides advice on the performance and management of ownership risks in SOE and advises on the governance of public sector entities. It is responsible for producing the Financial Statements of the Government of New Zealand. These inform Parliament how public resources are being used, and report the government's assets and liabilities, together with its revenue, expenses and cash flows, and contingent liabilities and commitments. Both quantifiable and non-quantifiable CL are closely monitored.

Within this framework, the government takes a series of measures to contain moral hazard and limit CL risk to the central government. For example, SOE are required to operate on the basis of principles and procedures contained in the State-Owned Enterprises Act 1986, that promotes efficiency, commercial criteria and autonomy from the central government. The SOE borrow in their own names and on their own credit, in most cases without a guarantee or other form of credit support from the Government. Government policy requires that SOE disclaim in loan documentation the existence of such guarantees or credit supports.

This organizational and policy ALM framework allows CL to be disclosed and analyzed, and generally contained at a sub-national level, as central government intervention is strictly limited. However, the emphasis tends to be on disclosure in accounting terms, and no evaluation is made of expected or unexpected costs, nor of provisioning from the budget and reserve creation. CL are given an accounting treatment and left as an off-balance sheet item, until they are triggered and only then are they incorporated within the balance sheet. Thus, the cost to policy makers is couched more in terms of political scrutiny, and less in terms of financial, budgetary cost.

B. United States

The objectives of the Federal Credit Reform Act of 1990 are those of revealing long-term program costs, to compare the cost of alternative forms of government assistance, to compare the benefit to the borrower vs. the cost to the government, and to make the Department of Treasury ultimately responsible. Thus, there is disclosure and transparency with new loans and guarantees and CL in general. In addition, the Treasury must budget for the estimated present value cost of new obligations, prior to the approval of new CL such as loan guarantees, as well as new direct loans. Thus, policy-makers feel a direct financial, budgetary impact of CL, and these are placed on the same footing as other forms of central government financial assistance.

One of the consequences is that programs are better structured to increase cost-sharing with borrowers, and risk-sharing with creditors. A medium-term horizon is used, and accrual accounting helps direct the attention to the effects of CL in terms of medium-term cash flow risk (expressed in discounted terms). A cash-based system of budgeting creates biases, in terms of just accounting for expected cash outlays associated.

One disadvantage is that the problem of variance around expected costs, the coverage of unexpected losses is not included as part of the cost of a program.

C. The Netherlands

The Netherlands has set a single budget ceiling within each sector for expenditures and guarantees. The sector decides on the form of assistance within the joint ceiling. The objective is to make sector ministries cash-neutral in choosing policy instruments e.g. between direct loans and guarantees, and to minimize the government's risk exposure.

Guarantees and their risk analysis need to be approved by the MoF. The government guarantees are disclosed in terms of face value (in order to disincentive their use), and the full face amount of the government obligation is transferred from the sectoral budget allocation to a central reserve fund.

D. Canada ¹⁷

CL by federal departments and Crown corporations in Canada amounted to nearly \$70 billion in 1997-98, representing about 8% of GDP. About two-thirds of the CL relate to loan and loan guarantees, mostly for borrowing undertaken by Crown corporations. The government's current loan and loan guarantee policy was established in 1986, as a response to significant losses incurred in the early 1980's mostly due to ad hoc loan guarantee programs which resulted in large cash payouts. The government began to implement accrual accounting with the explicit recognition that allowances need to be established for those cases where expected losses with respect to contingent liabilities could be reasonably estimated.

The policy is based on the following principles:

- *Budgetary recognition of subsidies and concessions*: with respect to loans, any interest-rate subsidy or other concessions are treated as part of budgetary expenditures
- *Demonstrated need*: the sponsoring department must demonstrate that the project could not be financed on reasonable terms and conditions without a government loan or guarantee
- *Satisfactory rate of return*: an economic analysis is made to demonstrate that the project's expected cash flow is adequate to cover repayment of the guaranteed debt, interest and operating cost and yield a satisfactory rate of return
- *Real private sector equity at risk*: no project is considered for a government guarantee where private equity sponsors are not supplying a substantial portion of funds required from their own resources.
- *Lender risk-sharing*: bankers should be prepared to lend funds under conditions where they would bear at least 15% of the net loss associated with any default
- *Upside benefit*: where the government is requested to bear significant downside risks, considerations should be given quid pro quo on the upside should the project prove to be successful.
- *Cost recovery*: fees are set for loan guarantees to recover the estimated cost of future losses and help cover administrative costs
- *Up-front provisioning* for all loans and loan guarantees: the latter will be provisioned up-front at the time that they are made. The provision will be determined based on the risk assessment. Sponsoring departments are required to fund these provisions from either the fees they charge or from their annual appropriations.
- *Approval of MoF and Parliament*: all new loan and loan guarantee programs and changes to existing programs must be approved by the Minister of Finance. Parliamentary authority is

¹⁷ Resolving Institutional Problems of Contingent Government Liabilities, Presentation to PREM Seminar Washington D.C., July 14, 1999

required for all new loan and loan guarantee programs. Such programs are subject to a limit that can only be changed by Parliament.

- *Ongoing review and audit:* Departments and Crown corporations are required to submit regular reports on their CL. These are published on an annual basis as notes to the government's financial statements. The estimates of the CL and losses are audited annually by the Auditor General of Canada, who is independent of the government and reports directly to Parliament.

E. Colombia

The Constitution of 1991 allowed private capital in public services and infrastructure development, and in order to encourage private sector participation, public entities guaranteed the servicing of projects' financial liabilities, and then proceeded to grant even wider guarantees. Guaranteed risks include demand or traffic, prices, revenue, cost overruns, inflation, exchange rates, tariff scheme and regulatory frameworks. The disadvantages of this scheme included:

- lack of an established policy over which risks should be guaranteed
- in the first generation of guarantees, private sector parties enjoyed returns higher than corresponded with the risks undertaken
- crude methodologies were used to quantify CL and their possible effects for the nation's budget
- the budgetary framework favored the substitution of explicit liabilities by implicit ones. The budgetary period is of only one year, so that the financial impact of guarantees is only reflected partially in the year in which they are given. This is an incentive to use instruments that do not require an immediate budgetary register, and allows the evasion of the real costs of CL.

By 1997, CL in these sectors summed 1.6% of GDP, equivalent to 20% of that year's total investment in infrastructure. In the last three years, actual guarantee payments have exceeded the budgeted amount by 118%.

A law was passed in 1998 (Law 448) in order to increase the budgetary discipline of these CL, to recognize and value CL, to create the Contingent Fund of Public Entities and to assure that transfers to this Fund had the same priority as debt servicing. Thus, a formal and standardized procedure to value and budget these liabilities is being designed. The General Directorate of Public Credit must approve the methodology for valuing the CL. Public entities must do yearly transfers of resources to the Contingency Fund, according to a specific payment plan, in order to cover expected losses of the CL. The liability value, payment plan and deposits are adjusted to reflect the remaining life of the contract. If the CL were to be called, the entities have access to the accumulated deposits. This scheme thus improves the liquidity of guarantees.

In the interim, the central government must include guarantees within the credit ceiling limits approved by Congress. At the sub-national level, guarantees have to be included in the indebtedness

Colombia's efforts to improve on the management of CL have also included the draw up of an economic balance sheet. Based on Bill Easterly paper¹⁸ which emphasizes on the need to measure the budget deficit looking at the public sector net worth instead of focussing on the change in public sector liabilities, Juan Carlos Echeverry, from the national Planning Department, tests the sustainability of the Colombian fiscal situation by estimating a complete balance sheet for the government, including contingent liabilities¹⁹.

¹⁸ See Easterly (1998)

¹⁹ See Echeverry (1999)

Data of the general balance sheet elaborated by the Nation's General Accountant for 1997 are used as a baseline, and then adjusted for coverage and errors. Some items are recalculated, while others –mainly contingent liabilities- are included for the first time. The public net worth is then computed as the difference between assets and liabilities, desegregating short term assets and liabilities to find a liquidity acid test.

The findings show that a more complete analysis of the balance sheet would be less optimistic than the official estimates: a positive net worth of 62% of GDP according to the official figures, would be substituted by a negative net worth representing 69% of GDP, mainly as a result of the recalculation of pensions. This clearly shows that the fiscal situation in the medium and long term is unsustainable and that drastic structural reforms are needed. However in the short term the situation does not seem to be so critical since short term assets are greater than short term liabilities by 1% of GDP.

Some of the reforms suggested along the lines of this study are the reform of the pension system, particularly the system covering education and health sectors, the creation of the Fund for Territorial Liabilities so that sub-nationals will be obliged to fund and make provisions for their obligations, downsizing the public sector by merging and eliminating entities, and the increase in taxes in order to deal with financial crisis and with natural disasters.

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