

PRIORITIES FOR THE MANAGEMENT OF CONTINGENT LIABILITIES

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INTRODUCTION

Contingent liabilities are obligations or guarantees to provide financial support if certain thresholds are crossed. Through explicit contractual commitments or implicitly, governments assume such liabilities in the pursuit of several policy objectives—some worthy and others dubious. When they assume contingent liabilities, governments shift the risks from private agents on to themselves. By so doing, they hope to create financial incentives for policy priorities without an immediate financial outlay. Contingent liabilities, therefore, offer an apparently easy financing mechanism to fiscally constrained governments (see chapter four by Allen Schick). However, such exposure can create sizeable fiscal risks. This chapter discusses strategies to contain government risk exposure while pursuing prudent objectives. Other chapters in this section deal further with the measurement and management of specific fiscal risks.

A three-pronged approach is proposed. First, comprehensiveness is required to ensure that policymakers are aware of both the range of risks faced and also the time period over which they may materialize. Accordingly, the paper builds on the medium-term frameworks for fiscal and asset-liability management to address such “hidden risks” as contingent government

liabilities, the volatility of expenditures and revenues, and asset erosion. Second, within this overall approach, risk management requires new methods of budgeting and a more extensive use of liquid reserves as well as hedging mechanisms. Finally, governments have a role in helping develop financial risk management markets since private agents would then be better able to manage their own risks and that would ultimately reduce the contingent risks governments take on.

Strategies to manage government contingent liabilities have acquired more prominence following the East Asian crisis. Governments in the crisis countries, as in many others, had insured bank depositors with the intent to contain systemic risk (since a panic withdrawal of deposits from the banking system can cause economy-wide distress). However, deposit insurance is being questioned by some because when depositors are protected, incentives for prudent lending decline (Vieira da Cunha and Brock 1997 and Garcia 1999). Country experiences discussed in the following chapters indicate that contingent liabilities can also provide a financing mechanism for transitions, as from a planned to a market economy or from public to private ownership of infrastructure. In such transitions, the government's regulatory commitments require reinforcement. However, as the East Asian experience once again shows, contingent obligations in such situations have proven expensive when they substitute for fundamental economic reform (see chapter twenty by Ashoka Mody). An environment of poor record-keeping, lax regulatory regimes, and misaligned prices, exacerbates the moral hazard, to which contingent liabilities are inherently susceptible. Governments also have social obligations to maintain economic activities (e.g., U.S. Government's support of Chrysler Corporation) and incomes above minimum thresholds (e.g., minimum pension rights; see Smetters 1998 and Leechor 1996).

Even when potentially valuable, contingent liabilities need to be undertaken with care because they can easily reduce discipline in the markets and lead to economic inefficiencies and, eventually, to high budgetary costs and economic disruption. Discipline is lost, in part, because those in receipt of the guarantees have reduced incentives to act diligently. Discipline is also lost because contingent liabilities typically are not valued for the expected payments that may occur and are sometimes not even recorded systematically. As such, because they do not require an immediate cash payment, they become a mechanism for deferring payments into the future. While it is the case that these future payments may never materialize because the risky events may not occur, experience shows that implied and explicit guarantees are often called and, when that happens, they create budgetary stress.

For the management of government fiscal position, it is also important to note that contingent liabilities have a non-linear payment schedule. For example, if the extent of government liabilities depends upon the level of demand in the economy and a 10 percent drop in demand increases contingent liabilities by 7 percent, then a further 10 percent drop in demand will increase contingent liabilities by more than (and often significantly more than) an additional 7 percent. The reason for this is straightforward. The first drop in 10 percent is cushioned in part by the surpluses in the activity supported by the guarantee (for example in the banking sector, the existing capital and loan loss provisions will take the first hit). However, a further drop does not benefit from the cushion and hence translates into a liability for the guarantor, a liability that grows more rapidly as the shock intensifies. Non-linearity also arises because incentives worsen as the slack declines: “If the (bank’s) franchise value has been eroded, even minor deteriorations in the balance sheet can encourage risk-taking strategies that may trigger the government guarantee” (Vieira da Cunha and Brock 1997). It is for this reason that contingent liabilities can be a treacherous policy tool if appropriate bounds are not placed.

On account of these concerns with contingent liabilities, governments have begun to explicitly deal with them in a variety of ways. The most important discipline is to limit the assumption of contingent liabilities, especially those that are in lieu of economic reform. However, in this chapter, our focus is on the management of contingent liabilities that are assumed. In such a situation, the objective of risk management is to align the demand for funds with the internal supply of funds (Froot, Scharfstein, and Stein 1994). Private companies and financial institutions have benefited from using enterprise-wide risk management strategies and financial markets to manage and hedge risk. Governments also could significantly improve their performance by actively managing their risks. There are several country experiences to build on. Australia and South Africa use a medium-term expenditure framework to address the risks of expenditure sustainability and to make governments accountable for their macroeconomic and demographic assumptions. Other countries, including Belgium, Colombia and New Zealand, have experimented with asset and liability management approaches, to match currency, interest rate, and maturity risks in their portfolios of direct liabilities and assets. Canada, the Netherlands, and the U.S. have incorporated analysis of selected contingent liabilities and tax expenditures into their budgetary frameworks, requiring budget allocations and reserve funds to reflect the present value of future potential obligations and foregone revenues.

Several governments also use derivatives and “exotic” debt instruments to hedge risks in the government asset and liability portfolios. The integration of European markets has made it possible to pool risk across countries, and has thus enabled financial markets to provide insurance against risks until recently uninsurable, such as crop risk and disaster risk. Financial markets have typically welcomed government risk management initiatives (in the early 1990s, for instance, New Zealand government witnessed a rapid improvement of the terms of its sovereign borrowing once announcing and implementing its risk management strategy; after the

Asia crisis, sovereign credit rating agencies have increasingly discussed contingent liabilities in their country risk analyses). However, while derivative products have allowed firms to subdivide, isolate, and swap various financial risks, such instruments are double-edged. They allow for better management of risks and they also create new financial exposures that are not easily quantifiable.

The next section outlines an extension of the medium-term fiscal framework to incorporate risk management. Budgeting for contingent liabilities, reserve holding, and hedging are then discussed. This is followed by a review of mechanisms to transfer risks back to the private sector. The concluding section includes a summary “toolkit” for contingent liability management.

AN EXPANDED FISCAL MANAGEMENT FRAMEWORK

The objective is to establish a framework to cover all types of risks faced by governments. In addition, the framework must be such that fiscal opportunism is contained, implying that the consequences of present actions for future years are transparently recognized.¹ A goal for the expanded framework is to promote risk-awareness culture in government. With such a framework in place, the critical tasks of monitoring and reporting hidden fiscal risks have then to be implemented.

A risk management framework

The goal of government risk management is to ensure that a government has the cash available to meet its obligations and deliver its budget programs. Risks facing a government arise, in the first instance, from the structure of its revenues, assets, and contingent and direct

¹ The medium-term Expenditure Framework (MTEF), as applied in Australia, New Zealand, and South Africa, tackles fiscal opportunism by requiring policy makers to analyze and disclose the assumptions and medium-

liabilities. In turn, the revenues, assets, and liabilities are influenced by government fiscal policies and their implementation and, also, by such exogenous variables as disasters and shifts in commodity prices.

To be useful, risk management must be comprehensive in tackling major fiscal risks facing the government. Earlier studies focused on risks embedded in the government debt portfolio (Missale 1999) and contingent liabilities (Lewis and Mody 1997 and Polackova 1998). Also, Easterly (1997) has pointed out that fiscal illusion allows governments to reduce cash deficit by eroding its asset base. On the revenue side, commodity price volatility has attracted renewed interest.

To capture all main sources of risks facing government, two matrixes can be used. According to the *Fiscal Risk Matrix* (developed by Polackova 1998), the government faces obligations arising from its either direct or contingent liabilities, both of which are either explicit or implicit (Chart 1). Direct liabilities will arise in any event; contingent liabilities only if a particular event occurs. Explicit liabilities are based on either a law or a contract. Implicit liabilities are based on public expectation and political pressures. These different liabilities create risks, which include:

- refinancing risk (short maturities or maturity bunching under restricted access to debt markets) emerging from the direct and guaranteed debt portfolio;
- liquidity risk (risk of having to sell assets at loss) emerging from maturity mismatch between assets and liabilities and from rigidities in the government's capacity to raise revenues and cut expenditures;

term (3-5 years) implications of their budget proposals, and to be accountable for any departures from their targeted levels in year-by-year decision-making.

- currency risk (exchange rate risk and cross-currency risk, exposure to short-term exchange rate volatility) arising from the currency structure of government debt and exchange rate guarantees, which is partly offset by the currency structure of foreign reserves and the current account flows;
- interest rate risk (floating interest rate) in the direct and guaranteed debt portfolio;
- commodity price risk (swings in the price of oil, rice and similar), which affect government contingent liabilities as well as its budgetary revenues and expenditures;
- derivative risk (risk of large losses from the use of derivative instruments) facing the central bank as well as the government;
- medium- and long-term sustainability risk, which includes issues of debt sustainability and expenditure sustainability (for instance, pension expenditures in an aging society);
- political risk (risk of political weakness and of insufficient commitment to fiscal stability) affecting both the value of government liabilities and assets; and
- operational risk (poor valuation and risk assessment, system errors, poor organizational structures, corruption and fraud) that may emerge in government debt management, in central bank reserve management, in the pursuit of asset sales and recovery, and in privatization.

As Richard Hemming has outlined in chapter two, policy makers can also distinguish short-term fiscal risks (macroeconomic volatility, commitments), medium- and long-term fiscal sustainability issues (debt dynamics, baseline projections and stress-scenarios, demographic trends), and structural weaknesses (the share of non-discretionary spending, revenue structure, fiscal management capacity, and market access in sovereign borrowing).

A second tool is *Fiscal Hedge Matrix* (Chart 2), which illustrates the different sources of potential revenues to cover government obligations. These sources also are direct and contingent, either explicit or implicit. Direct explicit sources reflect the government's legal power to raise income from its existing, tangible assets. Direct implicit sources are also based on the existing assets, but these are not under the government's direct control and, thus, may offset fiscal risks to a limited degree only. Contingent explicit sources relate to the government's legal power to raise finances in the future from sources other than own assets. Finally, contingent implicit sources are not available to the government until a major fiscal pressure occurs and even then, require the government to make a special case for their utilization.

Chart 1 Government Fiscal Risk Matrix

<i>Sources of Obligations</i>	<i>Direct</i> (obligation in any event)	<i>Contingent</i> (obligation if a particular event occurs)
<p>Explicit</p> <p>Government liability as recognized by a law or contract</p>	<ul style="list-style-type: none"> • Sovereign debt (loans contracted and securities issued by central Government) – amounts and structure • Expenditure composition (non-discretionary spending, sensitivities) • Expenditures legally binding in the long term (civil servants’ salaries and pensions) 	<ul style="list-style-type: none"> • State guarantees for nonsovereign borrowing and obligations issued to subnational governments and public and private sector entities (development banks) • Umbrella state guarantees for various types of loans (mortgage loans, student loans, agriculture loans, small business loans) • Trade and exchange rate guarantees issued by the state • State guarantees on private investments • State insurance schemes (deposit insurance, income from private pension funds, crop insurance, flood insurance, war-risk insurance)
<p>Implicit</p> <p>A moral obligation of Government that reflects public and interest-group pressures</p>	<ul style="list-style-type: none"> • Future public pensions (as opposed to civil service pensions), if not required by law • Social security schemes, if not required by law • Future health care financing, if not required by law • Future recurrent costs of public investment projects 	<ul style="list-style-type: none"> • Default of a subnational government or public / private entity on non-guaranteed debt / obligations • Banking failure (support beyond state insurance) • Cleanup of liabilities of entities being privatized • Failure of a non-guaranteed pension fund, employment fund, or social security fund (protection of small investors) • Default of central bank on its obligations (foreign exchange contracts, currency defense, balance of payments) • Bailouts following a reversal in private capital flows • Environmental recovery, disaster relief, military financing

Chart 2 Government Fiscal Hedge Matrix

<i>Sources of financial safety</i>	<i>Direct</i> Based on the stock of existing assets	<i>Contingent</i> dependent on future events, such as value generated in the future
<i>Explicit</i> based on government legal powers (ownership and the right to raise revenues)	<ul style="list-style-type: none"> • Assets recovery (workout and sales of nonperforming loans and sales of equity) • Privatization of state-owned enterprises and other public resources • Recovery of government loan assets (resulting from earlier direct government lending) 	<ul style="list-style-type: none"> • Government revenues from resource extraction and sales • Government customs revenues • Tax revenues <ul style="list-style-type: none"> • minus tax expenditures (exclusions, exemptions and deductions, which reduce taxable income) • minus revenue commitment (to subnational governments) • minus revenues sold forward (commodity forward sales) and pledged as a collateral (partly at risk) • Savings from expenditures cuts • Hedging instruments and (re-)insurance policies purchased by the government from financial institutions
<i>Implicit</i> based on government indirect control	<ul style="list-style-type: none"> • Central bank risk-adjusted net worth (mainly “excess” foreign reserves adjusted for their liquidity) 	<ul style="list-style-type: none"> • Profits of state-owned enterprises • Contingent credit lines and financing commitments from official creditors • Current account surpluses across currencies

Monitoring hidden fiscal costs and risk

The two matrixes (Charts 1 and 2), once filled with country-specific items, allow the government to identify the exact scope for its risk management. Government medium-term fiscal planning must reflect the implications of risks identified in the fiscal risk matrixes. Towards that end, reporting and administrative measures need to be adopted. Also required are the adoption of financial safeguards, which are discussed in the next section.

Reporting. To ensure proper attention to fiscal risks, it is critical for governments to regularly issue a separate *statement of contingent liabilities, tax expenditures and other fiscal risks*. Governments of Australia, Canada, Netherlands, New Zealand, and the United States offer good practice to follow. Their fiscal statements list the various sources of fiscal risk, discuss their nature and sensitivities, implications on future fiscal position and allocative efficiency in public spending, and where applicable provide their face and/or estimated value.

The experience in many countries has indicated that the failure of various agencies, such as subnational governments and other public entities, state-guaranteed funds, state-owned enterprises, and large financial institutions and banks may end up government implicit obligation to deal with. While such agencies would not be subject to government fiscal reporting unless covered by an explicit government guarantee, disclosure requirements need to cover also such implicit sources of fiscal risk, including their less visible variants like guarantees issued by subnational governments, environmental commitments of enterprises, and off-balance-sheet items of financial institutions.

Designing risk management functions. Although the organizational set up for risk management will be specific to every country, some general principles apply both in the private sector (Box 1) and in the public sector. These include centralization of risk-taking authority (the Ministry of Finance to approve any risk taking), separation of risk monitoring (internally by the

debt management office and externally by the supreme audit institution) from risk taking, and linkage between risk-taking, budgeting, and debt management. For risk management, as well as for traditional public finance management, such control structures and accountability are crucial to ensure transparency and reduce scope for fraud and corruption.

As a part of monitoring its risk exposures, governments, more so than risk managers in the private sector, also needs to monitor behavioral determinants of fiscal risks. These include performance (moral hazard) and legality of claims under its guarantee contracts and tax rules, and performance of entities that are not explicitly supported by the government but may directly raise fiscal pressures.

Policy-makers need to be accountable for adequacy of the risk analysis and assumptions. Therefore, in more advanced fiscal management framework, the role of independent audit (and the supreme audit institution) extends beyond its conventional limits to cover all aspects of government risk analysis and risk management. With respect to implicit risks, whether or not government decides to disclose its exposure, medium-term fiscal strategy will be at risk if not accompanied by confidential contingency plans on how to proceed when implicit and indirect risks materialize.

Box 1 Division of Responsibilities

Large banks, including JP Morgan and Deutsche Bank, have divided the functions of designing and authorizing new transactions, analysis, and record keeping among three different offices. The front office centralizes designing of financial instruments and has the exclusive authority to enter into new derivative and debt transactions. Its objective is to ensure required levels of available cash and optimize overall return-risk ratio. Middle-office provides analysis of future obligations and payoffs, and their sensitivities for the entire portfolio. Finally, back-office is responsible for record keeping and maintaining comprehensive databases.

Maintaining these functions independent of each other improves transparency and control of portfolio risks, and it prevents the front office from exceeding their predetermined risk exposure limits.

Governments of Ireland and Sweden, among others, have successfully applied such division of responsibilities in their debt management. Many governments have successfully centralized the authority to issue debt, guarantees, tax exemptions, and other off-budget programs. Further, they should now expand the scope of risk management and adjust organizational structures and responsibilities accordingly. See Nars, 1998.

FINANCIAL TOOLS FOR RISK MANAGEMENT

Budgeting for the full expected present value of costs from credit and insurance programs governments helps highlight the costs of fiscal risks supplementing other less demanding reporting tools noted above. Analysis and stress-testing of the impact of various types of risks helps to identify the government's residual, unhedged risk exposure in a comprehensive asset and liabilities framework. Preparing for "unexpected," or unlikely but severe, losses prevents the political backlash associated with redirecting scarce public resources to cover the sudden increase in costs, obviates the need for political battles over additional funding, and eliminates the perception that any sudden increase in costs represents program mismanagement. Setting up reserves or using financial hedges can protect against such rare events. Because the United States government did not reserve against unexpected losses, it incurred high political costs as a result of the \$130 billion in losses charged to the United States taxpayer during the thrift crisis of the 1980s.

Budgeting. While reporting contingent liabilities and other fiscal risks is a step forward, it is valuable to estimate the value of these liabilities and to budget for them. Allen Schick (chapter 4) has outlined several important principles for government budgeting.² Chapters by Murray Petrie and Allen Schick have highlighted that since no cash is spent from the budget when the government assumes a contingent obligation or provides a tax exemption implies that cash-based accounting systems fail to detect such fiscal risks.

From contingent claims analysis are derived two basic concepts that underlie the management of contingent liabilities. These are the *expected (that is most likely) costs* and the *unexpected (that is maximum likely) costs* of the contingent liabilities. Expected costs are the

² See also Lewis and Mody (1997). For specific suggestions in a country-context see Brix, Ghanem and Islam (1999), Brix, Papp and Schick (1999), World Bank (1999d) and World Bank (2000).

average costs (or payments made under the guarantee) over the different scenarios modeled in the contingent claims analysis. Expected costs are thus a measure of the likely payments that will need to be made. As such, the expected costs are also a measure of the subsidy implied by the issuance of the guarantee. From a policy point of view, the expected cost estimate can be used to judge whether the government would be willing to support the project through an equivalent cash, up front subsidy.

The first step in the budgeting process is the measurement of expected costs. Estimates are required of the probability that the guarantee will be called and the payment obligation if that happens. But generating these forecasts of the future relies, at least in part, on past data. Various actuarial and econometric methods have been used (see Lewis and Mody 1997 for a summary). Gaining favor over these methods is contingent claims analysis, which essentially simulates many different scenarios that may unfold in the future and determines the payments that would be required under those different scenarios. While even under contingent claims analysis, some past parameters are required to generate the flow of future outcomes, the consideration of different scenarios reduces the dependence of the results on the past parameters. In the context of developing countries, contingent claims analysis has been used to estimate contingent liabilities for infrastructure projects in Colombia (see Lewis and Mody 1997 for a description) and for Malaysian infrastructure projects (see Mody, chapter sixteen in this book). Models estimating value at risk are an example of

Box 2 Budgeting for risk in the private sector

Programs of contingent support are often akin to put options, which create the obligation, but not the right, to buy an asset at certain predefined strike levels. Charging the full option price when writing (selling) an option, as is typical in the private sector, amounts to immediately fully provisioning the expected cost of contingent support. The price of an option reflects the present value of the future possible loss, which may be incurred by the underwriting institution. As illustrated by the Black-Scholes formula, the price increases with the time to expiry (e.g., maturity of the guaranteed loan) and with the volatility of the underlying asset (e.g., share price of the enterprise the debt of which is under the guarantee). Financial institutions charge the full option price immediately at time of selling the option. The amount is then used either to build reserves or to buy a hedge. See Hull, 1997.

contingent claims analysis (for an application of value at risk models to estimating contingent liabilities of developing country central banks, see Blejer and Schumacher 1998).

Unlike the cash-based budgeting and accounting system, the use of accrual or present value budgeting requires the recording of the expense and appropriating against it the expected cost of the action at the time the transaction is undertaken.³ Adoption of a present value method of guarantee budgeting simply forces agencies to set aside resources up front for the expected costs of the guarantee issued (see Box 2 for a private sector analog). But a full accrual-based accounting system, though desirable, is not always necessary. International accounting standards, for instance, require only *probable* contingent liabilities (contingencies with relatively high probability of realization) to be included in the balance sheet, leaving the others in a separate statement of contingent liabilities.

Stress-testing. A simple approach to showing the possible medium-term implications of fiscal risks for the overall fiscal position, is to apply *stress-testing* to the government's medium-term fiscal projections.⁴ For instance, related to a specific program, stress-testing will show how normal and extreme changes in the underlying factors (e.g., commodity price) over the next 3, 6, and 12 months affect its fiscal cost. More importantly, stress-testing detects key medium-term fiscal vulnerabilities of government. The portfolio approach to stress-testing addresses the whole range of fiscal risks identified in the fiscal risk matrixes and, taking into account their correlation, shows their overall possible fiscal impact. Results of stress-testing will be critical

³ In chapters three and four, Murray Petrie and Allen Schick explained that under an accrual accounting and budgeting system all actions receive equivalent treatment and thus the choice between various forms of government support can be made on the basis of their intrinsic merits rather than being driven by budgeting and accounting conventions. Use of a present value system may or may not affect cash-based estimates of the government's fiscal deficit. Depending whether the effect on the deficit is recorded when money is transferred from the budget to a contingency fund (then no effect is recorded when a guarantee is called and paid for from the contingency fund) or only when actual cash payments are disbursed from the program account.

⁴ Stress-testing is estimating sensitivity of expected fiscal cost to normal and abnormal changes in the underlying assumptions with respect to specific risks.

for government risk management to re-estimate periodically the sensitivities of its risk exposure with respect to changes in the underlying assumptions (that is to mark to market the expected fiscal cost), and to decide on a hedging strategy accordingly.

Reserves. Once a government can assess its risk tolerances and goals, in terms of both which risks and the level of loss it is willing to bear, it can establish reserves against unexpected losses (“risk capital”) within its credit and insurance programs. To do so, however, a government needs to determine whether reserves will be set based on the additive unexpected loss exposure of each guarantee, or on a portfolio value-at-risk (VaR) approach, to account for portfolio diversification, what the investment policy of the reserves will be once they are established, and where the reserves should reside (for a more detailed discussion, see Lewis and Mody 1997).

Reserves have opportunity cost. Their opportunity cost is particularly high in bad times and in poor countries. The opportunity cost of not having reserves, however, may be much higher when government is stuck unprepared with a sudden increase in its obligations, or drop in revenues. For governments that find themselves unable to obtain favorable credit in such situations, fiscal crises become a reality with all its negative consequences.

Further problems with reserves: they may be inadequate and/or misused. Arguably, politicians will always find ways to tap reserves even for purposes other than those originally intended. The experience in many countries indicates that neither laws nor rules prevent misuse.

There are at least two possible approaches to improve reserve adequacy and reduce possible misuse. First, for countries with developed capital markets, Cohen (1999) proposed to create a reserve fund, clearly specify its role, require full transparency about its funds, and sell its shares to private owners. Market mechanisms would serve to discover the share price of the reserve fund, primarily reflecting on the adequacy of its capitalization and of its use.

Furthermore, if established to cover government contingent liabilities, Cohen suggests limit government obligations to the size of the reserve fund. This way, policy-makers would be under market pressure to assess risks and capitalize the fund adequately.

Second, for countries with underdeveloped capital markets, a reputable foreign institution may be entrusted the task of managing the reserves in a risk-free manner (possibly, against with default insurance). A contract would specify permissible claims on reserves and make other claims subject to a penalty and ex-ante public disclosure.

Hedging. Hedging does not fully substitute for reserves, since all contingencies cannot be foreseen and market hedges are not available for contingencies that can be visualized. However, where hedging is possible, it may be superior to building reserves for governments with good capacities and control mechanisms. Some fiscal costs may be negatively correlated.⁵ Creating additional government programs with the sole objective of risk pooling, however, would be a questionable practice for government. Therefore, hedging and purchase of reinsurance may need to complement pooling.

Take a government that largely depends on taxing revenues from copper sales. When copper price goes down, the government is short of revenues. If its access to borrowing is limited, it has to cut public expenditures abruptly. Instead of building revenue stabilization fund, the government can look for possibilities to stabilize its fiscal performance by structuring its obligations so to reflect copper prices. For example, the government may attempt to link its liabilities to the source of volatility, that is to issue bonds that offer a yield inversely linked to copper price. Structuring liabilities according to the sources of volatility in government portfolio of contingent liabilities and revenues reduces the overall volatility in the future fiscal outlook and

⁵ Pooling less than perfectly correlated risks (e.g., hurricane, drought and fire) would allow the government to reduce the volatility in the total long-term cost of its insurance programs.

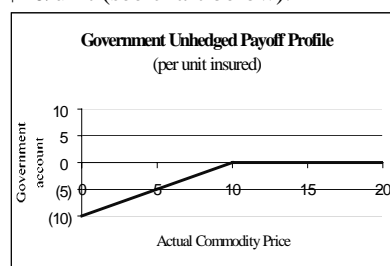
thus offers an alternative to stabilization reserve funds. When revenues are low, debt service will become less expensive and vice versa. Private insurance companies have similar experience in issuing catastrophe bonds,⁶ which offer lower yield when a hurricane occurs than when it does not. The government may also purchase customized derivatives that will deliver positive payoff, inversely related to copper price, when copper price drops below a specific threshold.

Similarly, government may find ways to hedge risks present in its obligations portfolio.⁷ Many governments, most notably Ireland, Sweden and Hungary, have utilized interest rate swaps, currency swaps, currency forwards, and other derivatives to achieve desired risk profile in their debt portfolio. Belgium and Colombia, among others, have explored asset liability management possibilities to line risk exposure of their direct liabilities to the profile their assets and potential revenues.

Possibilities to hedge risks of contingent liabilities have been explored mainly with respect to minimum price support policies and

Box 3 Securitizing Government Risk

How to hedge the risk of price support policies? Suppose the government offers a minimum price guarantee on a commodity. Assuming the floor price set at \$10/unit, government pays the difference between the floor and actual price if the actual price falls below \$10/unit (see chart below).



This payoff exactly illustrates that providing price support policy equals to shorting a put option (selling the right to sell commodity at a specified minimum price). To hedge against possible losses, the replicating strategy suggests buying puts from international financial intermediaries. The cost to the government is the difference between the total fees collected by the government from the commodity producers (if possible in an auction) and the price paid by the government for the put. The strategy allows the government to convert its fiscal cost from the form of an unknown contingent liability to a fixed, up-front payment.

⁶ Catastrophe bonds are obligations whose interest and principal payments are linked to a catastrophe event. For example, they could call for reduction in interest and/or principal, or for extension of maturity if losses related to the underlying event exceed the trigger level. This arrangement is called reinsurance protection. See Insurance Services Office, Inc. 1999.

⁷ *Hedging* refers to the strategy of protecting oneself against losses arising from changes in market conditions (Hull, 1997). *Replication*, attempts to eliminate a risk by developing a strategy that would “perfectly” offset gain/losses arising from changes in market conditions. This strategy includes *dynamic hedging strategies* (discussed in this section), or entering into a *perfectly offsetting transaction*.

crop insurance. To hedge their risk exposure, several governments (for example, in Colombia and Mexico) have been purchasing futures and customized forward contracts. Ideally, they pass the price of these contracts to the farmers (see Box 3). Some financial instruments, such as, catastrophe bonds linking their yield inversely, for example, to the occurrence of drought would help to hedge risks of contingent liabilities (crop insurance) and revenue decline (low taxable product).

But derivatives are also dangerous and the borderline between hedging and speculation sometimes difficult to draw. Recent experiences of companies and hedge funds have reconfirmed that the derivatives that provide less than a perfect hedge may generate risks on their own. Also, the use of derivatives is risky if risk management objectives and strategy across the entire risk portfolio are not clear. Portfolio approach allows for unbundling of risks and their correlations and sensitivities. Risk management strategy helps decide which risk components to hedge. For government as well as for private companies applies that ad hoc availability of new hedging instruments, and attractions of financial engineering, should never drive risk management decisions. Potentially risky hedging techniques include dynamic hedging strategy (see Box 4).

Box 4 Dynamic Hedging

Dynamic hedging means *rebalancing*, that is readjusting, a hedging mechanism as its underlying assumptions change, with the objective of maintaining *delta* neutrality¹. Sensitivity analysis provides an estimate of the changes in portfolio value (fiscal cost) for a given change in the underlying assumptions. Effectiveness of dynamic hedging, however, depends heavily on the assumptions used to derive portfolio value (fiscal cost) and on the depth of accessible financial markets. Experience has shown that dynamic hedging is able to replicate the changes in portfolio value closely if the underlying assumptions are reduced to tradable variables (e.g., foreign exchange and interest rates, stock market index). However, the strategy loses its effectiveness when assumptions include non-tradable variables (e.g., GDP growth). This is because it is very difficult to find a transaction that would offset (delta hedge) the risk associated with changes in a non-tradable variable. Therefore, for greater sensitivities of the portfolio value (fiscal cost) to non-tradable variables, dynamic hedging strategy may be very ineffective or even counterproductive.

Delta Hedge in Practice

Suppose that the current spot price of a stock is \$100, and the current price of a 6 months call option on this stock is \$10. Each such call option gives its holder the right to buy 100 stocks at \$100 in six months. Further, assume that the *delta* of the option is 50 percent (this means that if the price of the stock changes by a small amount, the price of the option will change by 50 percent of that amount). The holder of the call option could hedge his position by selling short, that is borrowing to sell, 50 stocks. Then, any gain (loss) on the option position will be offset by a loss (gain) on the stock position. For example, if the stock goes up by \$1 (producing a loss of \$50 on the stocks held), the call option will go up by 50 percent*\$1*100 shares = \$50 (producing an offsetting gain). Thus, the net position (option + stocks) is *delta neutral*. However, since changes in the option assumptions (spot price of the stock, its volatility, interest rate, and time to maturity) change the option's delta, the investor's position remains delta neutral for only relatively short time. Therefore, as the option delta changes, the stock position needs to be adjusted accordingly. These periodic adjustments are known as *dynamic hedging*

¹ Delta refers to the partial derivative of the option price with respect to the price of the underlying security ($\Delta = \partial f / \partial S$). In other words, it expresses the rate of change of the option price with respect to changes in the price of the underlying asset. See Hull, 1997.

Therefore, before government starts exploring the use of derivatives and managing its risks actively, two steps are necessary. First, top policy-makers, rather than the Treasurer or debt managers, need to specify primary objectives for government risk management. Objectives of government risk management will depend on the following questions: To what extent government can rely on ad hoc borrowing and tax increases? To what extent should government require matching its expected fiscal pressures with its expected fiscal revenues? This, in turn, will depend on the extent, to which government can afford to restructure or default on its budget programs (are arrears permissible?) and on its obligations (of both contingent and direct nature). Second, hedging, similarly to public finance management, requires sound institutions and good control mechanism.

MINIMIZING FISCAL RISK IN POLICY DESIGN

Governments can use two principal approaches to privatize their risks: through the development of financial risk markets and better risk sharing mechanisms. While risk markets represent the long-term solution, more effective risk-sharing may be the practical short-term strategy.

Over the long-haul, governments can help develop the markets for risk instruments, thereby reducing their direct role. The questions to ask are: Are the risks, for which government coverage is sought, truly uninsurable in the private sector? How to make these risks insurable? For instance, large international insurers, if encouraged to access the local market, may be able to pool risks uninsurable in a small economy. Derivatives, such as futures⁸ and options⁹, can be made accessible to local market agents. Where private risk markets are developed, traditional government contingent obligations arising from disaster risk insurance, crop insurance, and minimum price policies may not be needed. Market-based alternatives can also be fostered for deposit insurance. For example, new financial instruments, such as currency and interest-rate swaps and currency forwards, may help domestic banks to protect against their risk exposures, thus reducing their demand for government guarantees. Finally, government may protect domestic market agents and citizens against risks by allowing for greater international risk pooling.

⁸ Future contracts are arrangement between two parties to buy or sell an asset at a predetermined future time and price. These contracts are normally traded on an exchange. A similar arrangement, a *forward contract*, can be made with a financial intermediary over-the-counter, without involving an exchange. For background on derivatives see Hull, 1997.

⁹ Option contracts give the holder the right but not the obligation to buy (call option) or to sell (put option) an asset at a predetermined future time and price. This predetermined price is known as the *strike price* and the predetermined date is known as the *expiration or maturity date*. At the time of purchase, the buyer of an option contract pays an *option price* to the option writer. *Option pricing analysis*, most often employing the Black-Scholes formula serves to set the option price. For background on options see Cox and Rubinstein, 1985.

Where markets for risk continue to remain undeveloped, governments can share risks with the private sector. Developing a good risk-sharing mechanism requires a clear understanding of the underlying risks and also clear policy objectives (see Box 5). Also, helping the risk sharing would be a more careful consideration of alternative financial instruments through which the financial support is provided. For simple examples of possible approaches to reduce government risk exposure in the context of broader asset liability management and risk management frameworks, see Chart 3. For selected forms of government support, Chart 4 illustrates their usual risk coverage and fiscal cost, and suggests possible private sector solutions.

Box 5 Government Price Support Programs to Farmers

International markets are not always able to offer adequate instruments, such as futures, options, or insurance policies, to protect farmers against the volatility of their particular product. In reality, it may be difficult for a farmer to sell (short hedge) futures on its product to make the final selling price certain and thus protect against losses due to a possible future reduction in its price. The government may thus still be the only source of protection. In many countries, this protection comes in the form of a price support program, which gives the farmers a guarantee of a minimum price for their output. Such programs generate for the government an obligation to pay farmers the difference between the market price and the guaranteed minimum price should the price of their product drop below the minimum price.

If price support turns out to be the preferred choice of government support, how should the program be designed to minimize both moral hazard on the side of the farmers and the future fiscal cost on the government side?

Obviously, the amount of product guaranteed must be limited—by a nominal ceiling, per farmer or on total amount, and/or by charging the farmers a fair fee per unit of guaranteed product.¹ In addition, support paid to farmers should just sustain their care of just the right amount of plants. Therefore, the program may be efficiently designed as a put spread, setting not only the minimum price but also the maximum amount of support paid to farmers per unit of product. For instance, if minimum price is set at 100 and maximum amount of government support at 20, government pays support of 15 if actual price is 85 but no more than 20 even if actual price drops well below 80.

Changing tastes that may cut demand for a particular commodity (such as lamb meat recently), causing its drop in price, erode the rationale of the commodity's strategic importance. Thus, the risk of a continuous drop in demand does not belong to the government. Also, risks that the quality of (and thus the price that can be charged for) domestic product drops compared to the quality and price of international competitors, or that new technology and fertilizers drive prices down permanently, do not belong to the government. These are reasonably well under the farmers' control. Thus, price support program would become effective only if the reasons of low price are temporary and clearly and entirely out of the farmers' control.²

¹ For a particular minimum price, the Black Scholes options pricing formula allows to determine the fee. As Cox and Rubinstein, 1985 explain, the only required variables for the calculation will be the given minimum price, the actual price, volatility of actual prices over past years, and the time to expiration (number of years ahead for the minimum price guarantee to apply). Alternatively, the government may sell the limited amount of per-unit price guarantees in an auction.

² Even when markets do not offer instruments of adequate protection to individual farmers, they may offer hedging or reinsurance instruments on a larger scale and customized basis to government (for example, customized derivative contracts over the counter, or reinsurance policy).

Chart 3 Reducing Government Risk Exposure

<i>Source of Risk</i>	<i>Reduce Risk in Design</i>	<i>Reduce Exposure for Risks Taken</i>
Guarantees	Cover only selected risks, such as political/policy risks	Adjust risk exposures in direct liability and assets portfolio (e.g., reduce exposure to the pertinent currency if exchange rate risk is covered by the guarantee) Establish reserve fund for all guarantees Limit total benefits paid to the amount available in the reserve fund Insure reserve adequacy by transforming the reserve fund into a public company with shares freely traded ¹
Disaster insurance	Cap maximum benefit Insure middle rather than first portion of loss	Catastrophe bonds issued by government (possibly for a basket of likely disasters) Reinsurance purchased by government for risks in excess of a threshold that is deemed fiscally bearable
Deposit insurance	Cap maximum benefit Insure middle rather than first portion of loss Implement sound regulatory and supervision frameworks	Establish separate reserve fund Limit total benefits paid to the amount available in the reserve fund Insure reserve adequacy by transforming the reserve fund into a public company with shares freely traded ¹
Price support	Auctioning policies Cover only selected risks, such as political/policy risks	Purchase pay-off replicating derivatives Purchase reinsurance
Implicit guarantees to banks and enterprises	Make announcements and act to minimize moral hazard	Ensure contingent credit line from IMF
Privatization and asset sale	Find a strategic investor (future revenue) Maximize privatization revenue	Use proceeds to reduce government liabilities or future obligations
Purchase of bad assets	Pay market price Encourage market mechanisms for bad asset management Make announcements and act to minimize moral hazard	Sell bad assets quickly
Tax exemption	Cap maximum amount exempted	
Commodity tax	Demand base payment independent of commodity price	Issue commodity-linked bonds Purchase commodity-linked derivatives Purchase insurance
Repayment of direct lending	Require collateral	Purchase default insurance

¹ Interest of the fund shareholders' would contribute to ensuring reserve adequacy, that is to charging guarantee beneficiaries, such as banks, adequate premiums. This arrangement loosely imitates arrangement suggested by Cohen, 1999 and discussed above.

Chart 4 Risks, Maximum Likely Fiscal Cost, and Private Sector Solution

<i>Type</i>	<i>Coverage</i>	<i>Maximum Fiscal Cost</i>	<i>Allowing for Private Sector Solution</i>
Credit Guarantees	Debt service and losses due to default	Principal plus interest plus possible penalty by the creditor for default	Credit enhancement Share risk with creditors
Guarantee on minimum return from private pension funds	Minimum absolute amount (monetary value) Minimum relative amount (share of average wage)	Guaranteed amount times the number of pensioners Average wage share times the number of pensioners	Sound regulatory framework for pension funds and the overall financial markets, minimal distortions in labor markets and the real economy
Project Guarantees	Design and development Construction risk Operating risk (cost overrun, delays) Demand / revenue risk Financial risk (exchange rate, interest rate) Force majeure Environmental risk Political and policy risk	Very large if not capped	Encourage private investors to obtain insurance in the markets instead of government guarantee Share risk with private investors
Disaster Insurance	Losses due to disasters	Very large if not capped	Encourage direct access to international insurers and reinsurers
Deposit Insurance	Banking failure	Face value of all deposits if not capped	Disclosure of information on bank performance and management, international competition, low limits on the deposit amounts guaranteed
Price Support	Minimum price of a product /commodity	Guaranteed minimum price minus actual price, multiplied by quantity	Encourage direct access to international derivatives markets
Implicit guarantee on various obligations	Explicitly: None Implicitly: Arrears and default on obligations to creditors, investors, employees, managers, owners, and other parties	Very large – obligations minus reserves (financial institutions), financing gap (enterprises), obligation for service delivery (subnational governments)	Sound regulatory framework for financial management, reporting requirements, audit, and public disclosure Make announcements and act to minimize bail-out expectations

For implicit contingent liabilities, risk sharing is applied ex post. As Honohan (1999) argues, however, fiscal cost is lower (and government crisis management more efficient) if government has an ex-ante, confidential contingency plan (for example, deciding ex ante which stakeholders—domestic depositors in local currency, domestic depositors in foreign currency, foreign depositors, creditors, and shareholders—to assist and how much before a crisis occurs). Similarly, the central government can draw limits, either in confidentiality or publicly, for its responsibilities in case that a subnational government goes bankrupt (for instance, to ensure water supply but not mayor’s salary).

Box 6 Margin Calls to Collateralize Risk

Investment banks periodically monitor their credit risk exposure on clients’ portfolios against pre-determined uncollateralized limits, and require clients to make collateral “penalty” payments for excess mark-to-market value of potential loss over the limit. The limit is defined ex ante, as part of the contractual agreement between the bank and the client, often in terms of both most likely loss and value at risk facing the bank with respect to specific sector, region, or market segment. For a specific portfolio, when assumptions underlying its risk analysis deteriorate, the bank requires the client (a “margin” call) to immediately make a collateral payment equal to the excess of the mark-to-market potential loss over the limit.

Learning from the practice of margin calls applied by investment banks (see Box 6), government may be able to reduce moral hazard in the markets and its own risk exposure by requiring beneficiaries of its programs to make collateral payments when their performance deteriorates. The collateral

“penalty” would be calculated as the increase in the mark-to-market fiscal cost.¹⁰ This practice would encourage the beneficiaries of government programs to limit their own risk exposure and generate resources for government contingency reserve fund when government risk exposure increases. But it would demand tight monitoring of performance in the real and financial sectors.

¹⁰ Marking to market means adjusting risk analysis to changes in the original assumptions. Government may need to reassess assumptions that underlie its risk analysis several times a year and adjust its risk management approaches accordingly. Deteriorating fundamentals imply an increase in government subsidy. Consistency with government overall policy objectives and spending envelopes for sectors would require affected sectors to reduce other support programs and contribute more to the contingency reserve fund. Alternatively, the required increase in reserve fund would raise fiscal deficit.

CONCLUDING REMARKS

Globalization and deepening of financial markets offer governments new opportunities to manage fiscal risk. To benefit from these opportunities, policy makers need to better understand fiscal risks, and build risk awareness and accountability for dealing with fiscal risks throughout the public sector.

Risk management entails three complementary tasks: mitigation of the risk at source, transferring the risk to parties better able to bear the risk, and monitoring and managing any residual risk that cannot be mitigated or transferred. Ultimately, as noted in the introduction, risk mitigation is the most desirable long-run strategy since it reduces the vulnerability of the economy to shocks and hence reduces the government's direct and indirect contingent liabilities. Mitigation is also beneficial because it can be typically associated with strategies that enhance efficiency of resource use, thus enabling faster growth and lower risk. Thus, for example, a power sector that is organized to permit competitive generation and distribution will foster efficient use of resources while at the same time lowering the risks arising from excessive installation of capacity. Risk would also be more effectively transferred to private providers than under the current system. Similarly, in the banking sector, a cap on government protection of depositors will increase the incentives of bankers to improve due diligence and project selection, lowering risk and the wasteful use of resources. However, as these examples show, risk mitigation strategies cannot be implemented overnight since they require fundamental sectoral reforms.

In the short-run, then, several specific measures are needed to monitor and manage fiscal obligations that arise from the government's role as the residual risk bearer, i.e., as the entity that bears all economic risks not specifically assigned under tight contractual arrangements to other parties. First, a basic set of housekeeping measures should be undertaken. These include:

- ◆ Make the Ministry of Finance responsible for taking the full stock of all guarantees issued, for recording the explicit or implied guarantees, assessing the likelihood that the Government may be called on to make payments under these obligations, and for monitoring of these contingent liabilities.
- ◆ Create a list of early warning indicators that signal the likelihood of realization of guarantees (e.g., in the banking system: rate of credit growth to the private sector and exchange rate movements; in infrastructure: demand growth in relation with existing capacity).
- ◆ Identify contingent liabilities that imply significant risks, no longer serve a significant social or economic purpose, or can be replaced by market insurance.

Second, since legal, regulatory, and political hurdles stand in the way of moving from current budgetary practices to a full accounting and budgeting for contingent liabilities, government could implement certain intermediate measures to manage its exposures. Some of these intermediate measures include:

- ◆ Establish nominal, nonbudgetary control mechanisms for contingent liabilities, such information disclosure on government exposures, establishing of credit quotas (exposure limits), and earmarking of future funds to cover guarantee costs.
- ◆ Establish the basis for measuring expected (most likely) and unexpected (maximum likely) costs of various contingent liabilities, and for managing the risks of each specific contingent liability.
- ◆ Develop government risk management strategy that would guide policy makers in day decisions involving government risk exposure.
- ◆ Build an audit capacity with respect to fiscal risk analysis and fiscal risk management. An internal and external audit of tasks like monitoring and disclosing risks of contingent liabilities, structuring and implementing of guarantee contracts and of implementing

government risk management strategy, would create the appropriate checks within the system.

Finally, new institutional arrangements and capacities will be required for the government to move toward budgeting for risk (which, ideally, would be supported by accrual-based accounting and budgeting systems) and, overall, toward managing fiscal risk in a comprehensive asset and liability management framework, that is in a single portfolio of government risks arising from government direct and contingent liabilities and from future revenue sources.

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