Methods of Loan Guarantee Valuation and Accounting

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Partial government guarantees of private financing can be an effective tool for maintaining public-private partnerships. Loan guarantees that cover some or all of the risk of repayment are frequently used by governments to pursue policy objectives–supporting priority infrastructure projects or corporations in financial distress. Studies show that guarantees are extremely valuable–the value of a guarantee increases with the risk of the underlying asset or credit, the size of the investment, and the time to maturity. The flip side of a guarantee's value to a lender is a cost to the Government. Such a cost is not explicit, but is nevertheless real. To the extent, these liabilities have a subsidy component, careful risk sharing, valuation, and accounting mechanisms are important. This paper describes methods of guarantee valuation, reports estimates of guarantee values in different settings, and summarizes methods of guarantee accounting and their implications. While the old method recorded guarantees only when a default occurred, new methods seek to anticipate losses, create reserves, and channel funds through transparent accounts to ensure that costs of guarantees are evident to decision makers. We describe the federal U.S. Credit Reform Act of 1990 to illustrate accounting trends.

Loan guarantees that cover some or all of the risk of debt repayment have, in the past, been frequently used by governments to pursue a variety of policy objectives, including protecting bank depositors, promoting exports and foreign investment by domestic firms, supporting ailing industrial sectors, and even bailing out specific firms in financial distress. Today, an important goal is the financing of infrastructure. Rather than directly financing infrastructure projects, governments, especially in developing countries, are increasingly using guarantees to stimulate private lending to such projects. Partial guarantees–or guarantees targeted to specific policy or regulatory risks inherent in infrastructure sectors–mitigate those risks that the private sector cannot evaluate or will not bear. At the same time, such partial guarantees can substantially diminish the financial obligation of the government, where the only alternative is for the government to fully finance the project and bear all risks.

Researchers find that loan guarantees are of significant value, providing substantial comfort to lenders, especially as the underlying risk and the term of the loan increase. A guarantee's value to a lender, however, implies a cost to the government. Such a cost, and the consequent obligation, are not always explicit, but are nevertheless real. When providing a guarantee, a government incurs a *contingent* liability, or a liability that is conditional on some future event. Although contingent liabilities do not demand immediate payment, future obligations are expected, and these require careful accounting and administration. When the magnitudes of liabilities incurred are large and not adequately accounted for, payments resulting from default can result in significant intergenerational inequity (Iden 1990).

This paper does not examine the arguments for supporting specific policy objectives through guarantees. Rather it takes as its starting point the provision of a guarantee and focuses on the requirements for managing obligations that consequently accrue. To that end, the paper: (1) highlights the financial characteristics of guarantees; (2) describes methods of guarantee valuation and reports estimates of guarantee values in different settings, and (3) summarizes existing and emerging methods of guarantee accounting.

Most governments do not account for the contingent liabilities that are incurred when an investment is guaranteed. Government budgets are typically on a cash basis, thus a *direct loan* of $100 made from government revenues is recorded as an outflow of $100. But a *government guarantee* of a $100 loan made by a private lender is recorded as a zero outlay, since nothing has been spent in that accounting period. The guarantee is accounted for only when a default occurs and the obligation has to be honored. Fiscal prudence is maintained by setting a largely arbitrary upper limit on the total value of guarantees. Guarantees are counted against this upper limit in various ways, including, in extreme cases, at the full face value of the underlying loans guaranteed plus interest payments due, even though the expected probability of default is significantly less than one.

History shows that guarantees do get called and, along with their significant implicit subsidy values, have a serious impact on budgeting . Defaults on guaranteed loans for infrastructure projects in the nineteenth century arose partly from poor design of guarantees—all risks were transferred to the government—but in recent decades, guarantees have been an important policy instrument in the United States (Eichengreen 1995). Guarantee programs include loan guarantees to corporations, deposit insurance, mortgage guarantees, and trade and exchange rate guarantees. During the 1970s, contingent liabilities of the U.S. government grew at an extremely high rate. These liabilities did not show up explicitly in the budget; however during the late 1980s, policy makers and the public felt the cost of such liabilities, particularly of the federal deposit insurance scheme that followed the crisis in the savings and loan industry (Bosworth, Carron and Rhyne 1987, Iden 1990, CBO 1989, and Towe 1993). That crisis began the search for more prudent accounting concept methods. Similarly, defaults on loan guarantees in Canada during the 1980s led to new budgetary practices for accounting of contingent liabilities.

A systematic accounting system is needed to accurately reflect government liabilities and to improve the government's resource allocation. Guarantees should be recorded in the budget at the present value of their *expected payments minus guarantee fees received*. Such a methodology creates a more accurate picture of government liabilities (and implicit subsidies) and provides the government with a tool to decide between alternative projects.[1] Such procedures have been implemented, to varying degrees, in the United States in 1992 under the requirements of the Credit Reform Act and also in Canada. Other countries considering increased use of guarantees are actively examining the prospects of introducing new accounting methodology for guarantees. In the U.S. introducing the new methods revealed significant hidden subsidies and redirected funding among competing programs.

This paper brings together two streams of research on valuing guarantees and on accounting for government's contingent liabilities. Although a significant body of research exists on valuing contingent claims such as futures, options contracts, and other exotic derivative

[1]Similarly, loans provided by the government should, for budgetary purposes, be recorded at the value of the subsidy rather than the full value of the principal amount.

securities, the application of these pricing techniques to government liabilities is recent (Lewis and Pennachi 1994; Kau, Keenan and Muller 1993; Ronn and Verma 1986). Researchers have also independently looked at the issue of budgeting for such liabilities. However, there is no single treatment of valuation and accounting of contingent liabilities. Bringing the studies together in one overview increases understanding of contingent claims and should also provide policymakers with benchmarks and guidelines for decision making. Examples are drawn primarily from developed countries—especially the United States–where substantial experience has accumulated. The analytical methods and findings should be of value to developing countries, too, since their use of guarantees is increasing.

This paper describes the financial characteristics of guarantees, and then summarizes several studies evaluating gains from loan guarantees. Principles for management of contingent liabilities are outlined, and developments under the U.S. Credit Reform Act are then described and illustrated with the case of the U.S. Eximbank. The last section highlights the potential benefits of government guarantees, but cautions that effective deployment requires risk sharing with beneficiaries, valuation of liabilities incurred, and strict accounting.

Financial characteristics of loan guarantees

For illustrating the nature of a guarantee, it is useful to begin by considering a risk-free loan (or a loan which carries no risk of default). Such a loan is equivalent to a risky loan with a loan guarantee.

$$\text{Risk-free Loan} \equiv \text{Risky Loan} + \text{Loan Guarantee}$$

The above identity holds when the guarantee is iron-clad, i.e., when there is no risk that the guarantor will default on its commitments. In practice, no guarantee is completely free of default-risk and its value depends ultimately on the creditworthiness of the guarantor. To the extent, governments are more creditworthy than private guarantors, government guarantees are more likely to be honored. However, governments can also renege on their commitments. Mechanisms such as escrow accounts can be used to bolster the credibility of a guarantee; however, they also add to the cost of financing.

For our immediate purpose, however, it is useful to assume a "risk-free" guarantee–one that will be definitely honored. Consider, then, an example adapted from Merton and Bodie (1992). A borrower buys a loan guarantee for $1, then borrows $10 at the risk-free rate of 10 percent after surrendering the guarantee to the lender. Thus, the borrower effectively receives $9 in return for a promise to pay back $11. The implicit rate (in this case 22.22 percent) reflects both the risk-free rate as well as a charge for the guarantee. The transaction could also be viewed as the lender making a default-free loan of $10 and providing a guarantee on that loan as well for one dollar. Since the risk-free borrowing rate is 10 percent, the premium (22.22 -10 = 12.22 percent) reflects the default risk of the borrower as perceived by the lender.

Maintaining incentives

When a guarantee is provided, the incentives of the debt holders in monitoring the performance of the firm are diluted or even eliminated. For example, government guaranteed loans for infrastructure projects in the late nineteenth century were not monitored, leading to diversification of funds and frustration of public interests (Eichengreen 1995). Different approaches can be used to maintain the incentives, although in each approach one or another objective is foregone.

Consider a guarantee that cover only part of the risk. Therefore, in our example above, if the borrower obtains a partial guarantee, then its cost of borrowing should be between 10 percent (for completely risk-free) and 22.22 percent (when all risk is borne by the lender). A partial guarantee has positive incentive effects. Since only part of the transactions are covered by the guarantee, the borrower has incentive to be efficient and the lender has an incentive to monitor the borrower's activities. For example, auto insurance deductibles give a driver the incentive to drive carefully. Similarly, the World Bank's guarantee, covers only a portion of the risks, leaving intact incentives for the private parties to contain and manage commercial risks.

Risks due to adverse selection, or the inability of lenders to distinguish between good and bad risks, leads to rationing of credit. By guaranteeing only a portion of the risks, guarantors are able to create a filter that attracts those better positioned to assess and manage risk. Also, the guarantor can add value where it has credibility and expertise in project and financial analysis. If the guarantor has the expertise to evaluate projects at a cost lower than other financial institutions, then costs due to adverse selection can be reduced further.

Exploiting the structure of the debt to maintain incentives can be an alternative or complement to using partial guarantees. For example, if debt has senior and junior components, with senior debt holders having the first right on debt repayments, then a guarantee of senior repayments dilutes incentives for risk mitigation (Jones and Mason 1980). This occurs because, once guaranteed, senior debt holders lose their monitoring incentives. The incentives of junior debt holders are more complex. In general junior debtors have a continued, and even increased incentive to monitor, especially if the guarantor is perceived as unable to impose a discipline on the senior creditors. However, being costly, the extent of monitoring will depend upon expected benefits. When the value of the firm is low relative to its debt, junior debt holders also have reduced incentives to monitor because they foresee limited gain from improved performance of the firm. By the time senior debtors have been repaid, the value of the firm's assets may be close to exhaustion.

In contrast, guaranteeing junior debt strongly maintains the incentives of the senior debtors to remain diligent. (This conclusion apparently conflicts with the finding of a 1988 study by Selby, Franks and Karki; but in that study, guarantee of junior debt is accompanied by a *de facto* guarantee of senior debt and so the incentive effects disappear). Even when appropriately structured to maintain the incentive effects, however, Jones and Mason (1980) note that the cost of guaranteeing junior debt is higher than the cost of guaranteeing an equal amount of senior debt. This occurs because the existence of prior claims (senior debt) increases the likelihood of a payment default on junior debt. One suggestion they offer to minimize the cost of the guarantee is to include restrictions on dividend payments as part of the guarantee covenants.

Guarantee as a put option

A guarantee may also be viewed as a put option. A risk-free loan, which we noted above is equivalent to a risky loan and a guarantee, is also equivalent to a portfolio of a risky loan and a put option. A put option gives the owner the right, but not the obligation, to sell an asset for a pre-specified price (the exercise price) on or before a certain maturity date. A guarantee is a put option on the assets of the firm with an exercise price equal to the face value of the debt.

Consider the following: let V be the value of a firm and F be the face value of its debt. For simplicity, assume there are no coupon payments and all the debt matures on a specified date. Also consider a put option purchased by the lender on the assets of the firm, with an exercise price F. As a practical matter, the put option need not be on the assets of the firm itself, since these are unlikely to be liquid and tradable; rather, the goal should be to identify other assets that are heavily correlated with the value of the firm. These may include the prices of the firm's inputs and outputs (Babbel 1989).

Two scenarios are possible, one where the value of the firm is less than F and the other where it is greater than F. When V is greater than F, full repayment of debt can be expected and the put option is not exercised so its value is zero. However, when V is less than F, then the put option is exercised and has a net value of F-V, with the lender receiving the exercise price, F, for assets which are worth V. Also, when V is greater than F, the value of the risky bond is F. But when V is less than F, the value of the bond is V since debt holders are priority claimants on assets of the firm. The value of the risk-free bond is always F, by definition. The difference between the value of the risky bond and the risk-free bond is, as table1 shows, also the value of the put option.

Table1: Guarantee as a put option

	V > F	V < F
Value of risky debt	F	V
Value of put option	0	F-V
Value of risk-free debt	F	F

Therefore, from the above analysis it follows that:

Value of Risky Loan = Value of Risk-free Loan - Value of Put Option.

But we also know that the:

Value of Risky Loan = Value of Risk-free Loan - Value of Loan Guarantee.

A comparison of the above two equations indicates that the value of the guarantee can be estimated by computing the value of the put option.

Identifying a guarantee as an option serves both a substantive and a practical purpose. Though the value of a guarantee could apparently be measured as the present value of future guarantee payments, in practice this is not possible except in the simplest cases because the guarantee value depend on parameters which are changing over time. The guarantee, or option, value is thus sensitive to factors such as the time to maturity, the volatility of the underlying asset, the value of the underlying asset, and the claims of other debt and equity holders. To capture the time-varying effects of these and other parameters, a fully specified dynamic model is needed, as in contingent claims, or option pricing, analysis.[2] The use of present value methods is also

[2] Option pricing techniques are a class of contingent claims valuation methods. Contingent claims analysis usually refers to the general framework for "pricing" or costing out various claims that are contingent on certain triggering events or conditions but are not necessarily linked directly to a tradable security. Options pricing on the other hand is viewed as the subset of contingent claims analysis associated with pricing financial option products based on an underlying tradable security.

complicated by the fact that the discount rate to use for contingent claims such as loan guarantees is not apparent. The appropriate discount rate should reflect only systematic risk (or risk that is inherent in the market and cannot be diversified away), but for contingent claims such as call and put options, no methodology exists for estimating a measure of their non-diversifiable risk.

Academics and practitioners have therefore relied on methods which price contingent claims as functions of more fundamental claims such as stocks and bonds. Contingent claims valuation methods have been extensively used to value loan guarantees. Deposit insurance provided by Federal Deposit Insurance Corporation in the United States is a major example (Ronn and Verma 1986, Pennachi 1987a, Pennachi 1987b). In Box1, we present a brief description of the well-known Black-Scholes option pricing methodology.

Box 1: The basic Black-Scholes option pricing analysis

A guarantee is valuable to a lender because, if the borrower fails to meet debt repayment obligations, the guarantee ensures precontracted payments. Since the lender has, in effect, an option to sell the debt at a preagreed price, a guarantee is akin to a put option. Such an option–which can be on various underlying assets (bonds, stocks, currencies, or commodities)–gives its owner the right to sell that asset for a specified price (called the exercise price) on or before a certain date. If the option can be exercised only at maturity, it is referred to as an European option; in contrast, an American option can be exercised anytime prior to maturity.

The price paid by the owner of the option is referred to as the option premium. A fair premium is equal to the present value of the cash flows from the option. The methodology used to compute this premium is referred to as option pricing or, more generally, as contingent claims valuation.

In 1973, Fisher Black and Myron Scholes achieved a significant breakthrough when they determined the premium for an European stock option in terms of parameters that are directly observable or may be estimated using historical data (the current price of the underlying asset, the volatility of the return on the asset, time to maturity, the exercise price of the option, the risk-free rate of interest). Assumptions underlying the Black-Scholes analysis for stock options include: (i) the stock price follows a particular stochastic–Ito–process and pays no dividends during the life of the option; (ii) given the price today, the stock price in the future has a log-normal distribution; (iii) the risk-free rate of interest and the asset volatility are constant; and (iv) there are no transaction costs or taxes.

Consider, as an illustration, a put option on a stock whose current price is $100, the exercise price is $90, the risk-free interest rate is 10 percent per annum, the volatility is 50 percent per annum, and the option expires in six months. The Black-Scholes formula prices such an option at $6.92. A higher exercise price, longer time to maturity, and greater volatility would lead to a higher option price.

Underlying the Black Scholes valuation model is the concept of *no arbitrage*–alternative assets with identical future cash flows and risk characteristics should have the same price today. A central result in modern corporate finance, the Modigliani-Miller theorem on the equivalence of debt and equity, is based on this concept. In the context of options, the basic method employed relies on being able to from, at a specific moment in time, a riskless portfolio of the option and the underlying asset. The no arbitrage condition implies that such a riskless portfolio will earn the instantaneous risk-free interest rate and thereby determines a partial differential equation which describes the evolution over time of the relevant variables. It is possible to form the riskless portfolio by appropriately choosing the number of stocks and options in the portfolio. Since both the underlying stock and the option are affected by the same sources of uncertainty, there is a correlation between the stock price and the option price; hence the riskless asset is formed by buying either the asset or the option and selling the other.

Subsequent researchers have been able to relax the Black-Scholes assumptions and hence extend the conditions under which derivative securities can be priced. Cox and Ross (1976) discuss option pricing under alternative processes, including processes with jumps. Merton (1976) discusses option pricing when the underlying returns are discontinuous. Geske (1979) discusses valuation of compound options–a stock option is compound when, for example, it is valued not in terms of the stock price, but is based on the underlying value of the firm. Roll (1977) derives an analytical formula for American call options with stocks whose dividends are known. Hull and White (1987) discuss option pricing on assets with stochastic volatilities.

Source: Hull (1993), Black and Scholes (1973), and Merton (1973).

Value of guarantees to lenders and other (indirect) beneficiaries

When a full or partial guarantee is provided to a lender, the risk of repayment is lowered, resulting in lower interest charges. Studies show that the pecuniary value of guarantees–the full extent of the possible saving in interest costs–is often very large. As may be expected, the value of a guarantee increases with the volatility (or risk) of the underlying asset or credit, the size of the investment, and the time to maturity. Guarantee values of 15 percent of the underlying debt are not uncommon and can often be much larger in risky and long-maturity situations.

The value of a guarantee is shared by the guaranteed debt holder, the borrower, and others who have claims on the assets of the firm. The actual recipients of the guarantee may benefit little from the guarantee, unless the provision of the guarantee was *unexpected*. Equity holders benefit indirectly since they are able to borrow at a lower rate. Non-guaranteed, debt holders, however, may be worse off.

A clarification is in order. Guarantee values referred to here are the *gross* values, or the effect that guarantees have on reducing spreads charged by bond holders and other lenders. Since the guarantee holder pays a premium or a fee for the guarantee, a *net* value calculation must be made to determine if the gain from lower financing cost is greater than the fee paid. Implicit in the discussion below is that a net positive gain accrues to the guarantee recipient, and this net gain results from the assessment made by the guarantor that the market valuation of the project risk is greater than the true risk (the guarantor in turn spreads its risks of default over a large number of projects). Bland and Yu (1987) who estimated the cost of borrowing minus the guarantee fee (for 445 insured and 694 uninsured bonds offered in 1985) found the net gain to be positive and inversely related to credit ratings.

The discussion in this section is organized by the method of guarantee valuation. The first method is the “rule of thumb" approach which uses the market value of the debt (or relevant underlying variables) and compares it with a risk-free asset to determine the value of guaranteeing the risky debt. The method is approximate in most cases since it does not account for the full time-varying nature of the assets. However, it may be the only practical approach when sufficient data is not available. The second method is the market-valuation method, where similar assets with and without guarantees are compared, and it is assumed that the market accounts for the value of the guarantee. Finally, results of studies using option pricing methods are surveyed. Procedures for estimation of option values differ depending upon: (1) specific features of the underlying credit (e.g., whether the debt is junior or senior), and (2) specific features of the guarantee (e.g., whether the guarantee is partial or full and whether it is available for the full time to maturity).

Rule of thumb methods

To illustrate the principles of guarantee valuation, Merton (1990) estimated the implied value of loan guarantees for ten corporate bonds as the difference between the known *market price* and an estimated *default-free price* (table 2). These bonds were not actually guaranteed, but carried an implied cost of being guaranteed.

On May 19, 1990 none of these ten bonds were in default and the market prices used were the closing prices reported in *The Wall Street Journal* (May 11, 1990). The default free prices of these bonds were estimated by discounting the expected principal and coupon payments at 9 percent, approximately the rate on treasury bonds and notes on that date.[3] To estimate the value of the guarantee as the difference between the market price and the default-free price, Merton also assumed that there are no call provisions, i.e., none of these bonds could be retired prior to maturity. If such call features or other options are present, the rule of thumb method is inappropriate and option pricing methods are needed.

[3]The present value of a claim is its value in current dollars. The price of a bond is the present value of future cash flows (principal and coupon payments) discounted at an appropriate rate which reflects the risk of these cash flows. If there is no default risk associated with payments, then the appropriate discount rate is the yield on treasury securities of similar duration.

Table 2: Implied values of guarantees on corporate bonds

		Bond Price ($)		Guarantee Value ($)	
Company	Years to maturity	Default-free Price	Market Price	Implied Value	Percent of Market Price
Continental Airlines	6	109.12	66.00	43.12	65.3
MGM/UA	6	118.24	63.38	54.86	86.6
Mesa Capital	9	127.36	95.50	31.86	33.4
Navistar	4	100.00	89.00	11.00	12.4
Pan Am	4	147.23	58.63	88.60	51.1
RJR	11	88.80	70.88	17.92	25.3
RJR Nabisco	11	141.35	76.88	64.47	83.9
Revlon	20	117.25	80.75	36.50	45.2
Union Carbide	9	102.89	92.25	10.64	11.5
Warner Communications	3	124.11	97.00	27.11	27.9

Source: Merton (1990)

Note: Implied guarantee value = default free price - market price

The estimated implied value of the guarantees is rather high, varying from a low of 11.5 percent to a high of 87 percent of the market price. One explanation is that the bonds chosen were of lower grade. Moreover, the benchmark here is completely risk free which is rarely the case, and often the guarantees in practice are partial in nature.

A simple back of the envelope calculation of this type is appropriate when the guarantee covers the full term of the debt. In such a situation one can convert the risky debt into risk free debt and compute the value of the guarantee as the difference between the two. However, in most situations, such as when guarantees are partial in terms of coverage (for example, covering only interest payments), secondary market debt prices do not indicate the default probability of each and every payment, and it is more appropriate to use contingent claim valuation methods.

Despite its limitations, the rule of the thumb method is used because the detailed information needed for more sophisticated valuation is often not available. One application is in sovereign risk assessment by U.S. agencies providing guarantees to investors or exporters.

Effective 1993, federal agencies such as Commodity Credit Corporation (CCC), Export-Import Bank (Eximbank), and Agency for International Development (AID) are required to operate under a uniform sovereign risk assessment method, primarily to compute subsidy costs for budgetary purposes. The problem here, unlike in the Merton example, is that the market price of the underlying sovereign debt is not known. The procedure thus requires the use of credit rating methods to slot the debt into established rating categories and estimate the risk premium as equal to the premium of traded bonds in the same category.

A two-step process is followed: first, countries are placed in risk categories, and then subsidy costs for each category (and varying time-periods) are established. A sovereign risk rating scale from 1 to 11 has been established.[4] A score of 1 indicates that payment problems are unlikely, and a score of 11 indicates severe expected losses on most debts. The rating is transformed into a risk premium representing credit risk for a particular country. The interagency group has correlated its ratings with ratings of Moody's and Standard and Poor's. Once a country is slotted into a particular risk category, a risk premium is calculated as the historical average of the risk premiums of commercial bonds (with same ratings) over investment grade bonds. The subsidy cost is calculated as the difference between the present value of loan payments at the treasury rate and a rate which is the sum of the treasury rate and the risk premium. Some of the estimates obtained are shown in table 3. As the maturity and the risk level rise, the expected gross cost of the guarantee increases. To protect against future payments from such large contingent subsidy costs, either fair premiums or appropriations are required to be set aside in reserves.

[4]The eleven categories are A, B, C, C-, D, D-, E, E-, F, F-, F-- .

Table 3: Subsidy cost rates for different risk ratings and loan maturities

Risk Category	Subsidy rate [(subsidy cost divided by loan size)x100]			
	1 year	5 years	10 years	30 years
A	0.2	0.8	1.3	3.1
B	0.4	1.2	2.1	3.6
C	0.8	2.3	4.1	9.7
C-	1.8	4.5	6.5	13.6
D	3.7	8.7	11.2	20.4
D-	5.2	11.4	16.1	27.5
E	8.0	16.4	24.6	38.6
E-	11.6	23.0	33.4	48.9
F	17.9	33.9	46.5	61.8
F-	23.4	42.4	55.6	69.6
F- -	32.4	54.6	67.3	78.4

Source: GAO (1994)

Market values with and without guarantees

Where comparable instruments with and without guarantees are traded, guarantee values are the difference in prices between the two securities on the assumption that the market has fully assessed the coverage provided by the guarantee. Such is the case where standardized guarantees are issued, for example, with municipal infrastructure investment programs in the United States. Market valuation is also possible where market values of a security exist before and after a guarantee.

Hsueh and Kidwell (1988) studied the Texas School Board Guarantee Program which received a full faith and credit guarantee of the State Government, raising the credit of the bond issued to a AAA rating. They found that interest cost savings are highest for low-rated bonds. Savings ranged between a high of 98 basis points for bond issues rated Baa prior to credit enhancement, to 40 basis points, for bond issues originally rated A; districts rated AA did not achieve any cost savings. The risk-free interest rate prevailing was just over 9 percent, implying a greater than 10 percent savings in interest costs for the lower grade bonds. The study also found that there are many more bidders for bonds that have a low intrinsic credit rating but are accompanied by a state guarantee. Of note to public policy consideration was that as the supply of AAA rated bonds increased following the introduction of the guarantee program, municipalities not covered by the program had to pay about 50 basis points more than those benefiting from the guarantee had to pay.

Private insurance firms also provide guarantees of local government debt repayments. Typically, however, their coverage is limited to a portfolio of bonds that has relatively low levels of default risk. In contrast, public guarantors are compelled to take on greater risks for equity considerations (Hsueh and Kidwell 1988). Quigley and Rubinfeld (1991) examine the cost of borrowing following credit enhancement via private insurance (guarantees) in the after-market for municipal bonds during 1987-1989. They observed the same bond with and without a guarantee and found, on average, that insurance lowered the yield on municipal debt by 14 to 28 basis points for unrated bonds or bonds rated Baa-1 or lower, relative to an average yield to maturity of 7.8 percent for an uninsured bond. The lower gains from private insurance in the after-market compared with those from Texas state guarantees discussed previously, suggests that the inherent risk of the bonds insured in the after-market is lower and the gains smaller.

A study of loan guarantees used to bail out Chrysler Corporation shows that the U.S. Government's commitment to alleviate the company's financial distress made a very significant difference to financing costs (Chen, Chen, and Sears 1986). The method adopted measured returns to the company's equity and debt following specific government announcements and actions towards implementing the guarantee program. Both the announcements and specific actions resulted in gains to equity and bond holders. An interesting finding is that the gains to equity owners were greater than gains realized by debt holders who were directly guaranteed. The authors suggest that, as residual claim owners, equity holders benefit significantly even when the guarantee is targeted only to debt repayments. Their finding justifies an innovative pricing approach used for the guarantee. In the past, when the government had bailed out corporations in financial distress (such as Lockheed in 1971), the tax payers had, in effect, taken the downside risk but had not gained from the upside when the companies recovered. Pricing for the Chrysler loan guarantee corrected this asymmetry and included not only a 1 percent fee on outstanding debt but also warrants on the company's equity.

A study on loan pricing in the context of project finance also finds that guarantees create significant value to the project (Kleimeier and Megginson 1994). The mean spread over LIBOR in the sample loans was 100 basis points. A loan that had a guarantee benefited from a reduction in spread of 45 basis points. A limitation of this study, however, is that it does not distinguish between the extent of guarantee provided and the source (host government, export-import bank, or private sponsor).

Applying the theory of contingent claims to guarantee pricing

Unlike the market-based analysis described above, which compares several slightly different instruments to arrive at "implied" guarantee values, contingent claims models focus on valuing the guarantee based on the underlying dynamics of the assets and liabilities behind the guarantee. If these underlying dynamics conform to a broad class of models, contingent claims analysis allows us to estimate—through numeric simulation or direct computation—the value of the guarantee based on the payout structure implied by the guarantee. In evaluating firm-specific guarantees, input into a contingent claims model typically includes the market value of the firm's assets, the book value of the firm's debt, the volatility of the underlying assets and liabilities, and the time horizon of the guarantee. (For an explanation of contingent claims analysis see Box 8.1 and Merton 1990).

An early application of option pricing methods for pricing guarantees is by Sosin (1980) and this is a useful starting point because the main findings are echoed in other studies. The guarantees he examined had provisions similar to the steel program which was initiated in June 1978 by the Department of Commerce of the U.S. government to guarantee loans to firms in the steel industry.[5] The guarantee program was meant for instances where financial assistance was not

[5]The authors mention that, the first recipient of the guarantee program was Korf Industries, who received a guarantee for 90 percent of the $21,250,000 loan extended to it by sixteen banks.

otherwise available. The maximum amount guaranteed was 90 percent of the value of the loan. At least 15 percent of the cost of the project was to be supplied as equity capital or as a loan repayable in no less time than the guaranteed loan. There was no charge for the guarantee.

The value of a guarantee and who benefits from it depend on the structure of the financing. Under the steel program, the new debt, which received the guarantee, was subordinate to the existing debt. As a result, the guarantee had no value for senior debt holders. Holders of the new subordinated debt received the guarantee but also had to accept lower returns. The main gain thus went to the equity holders who benefited from the lower interest rates on the new debt and also as residual claimants to the value of the firm.

The value of the guarantee is shown to be most sensitive to the underlying risk of the firm (σ) and the maturity of the loan. Table 4 shows the guarantee value as a ratio of the new investment; it is illuminating also to view the guarantee benefits in terms of interest savings.

Table 4: Sensitivity in guarantee values and interest rate benefits

	G/I			Interest rate benefit (basis points)		
σ	5 years	10 years	15 years	5 years	10 years	15 years
0.15	0.1	3.7	13.8	3	48	141
0.25	3.7	18.6	35.6	93	216	467
0.35	12.5	35.4	54.2	157	663	893

Source : Sosin (1980)

Note: G/I is the ratio of guarantee value to size of investment; I (size of investment) =20, σ is a measure of the project's riskiness, s (fraction of equity) =0.75.

Guarantee values are low when risk and maturity are low but can rise very rapidly to assume substantial levels. For a 10-year loan, the value of the guarantee is 3.7 percent of the value of the new investment when the standard deviation of asset values is 0.15, but it rises to 35.4 percent when the standard deviation rises to 0.35. Similarly, as loan maturities increase, guarantee values become extremely large. This is intuitive, since the value of any option goes up with maturity because there is a higher probability of the option being exercised.[6] Note that the highest interest savings are in the hundreds of basis points. The guarantee value also rises when the firm is highly leveraged (not shown in table 4, but reported by Sosin). This follows because as the share of debt in financing rises, the conditional probability of default on junior debt rises.

Another application of option pricing method for pricing guarantees is by Baldwin, Lessard and Mason (1983). The authors illustrate the use of contingent claims analysis for determining the value of guarantees for two firms with very different characteristics: a guarantee on a $200 million loan to International Harvester (IH) and to Dominion Textiles (DT). The relevant firm characteristics are in table 5.

Table 5: Risk profile and guarantee value ($ million)

	IH	DT
Business risk (standard deviation of annual returns in percent)	40	20
Current liabilities	$2330	$178
Long term obligations	$1866	$220
Annual payouts	$304	$41
Market value of equity	$247	$153
Value of firm	$2618	$584
Value of guarantee	$166	$10

Source: Baldwin, Lessard and Mason (1983)

The value of the guarantee was obtained via numerical simulations as outlined in the paper by Jones and Mason (1980). Even though the guarantee is for the same amount, one can clearly see that the value of the guarantee is higher for International Harvester, because of its high business risk, which is also reflected in the low market value of the equity in relation to the value of the firm. In addition, the current liabilities in relation to firm value are also much higher for International Harvester. These factors add up to a higher probability of default for International Harvester, hence a higher guarantee value.

[6] The model used by Sosin to price the guarantees is based on Merton (1977).

In an assessment of a U.K. government guarantee of corporate debt, Selby, Franks and Karki (1988) estimate the value of a loan guarantee to International Computers Limited (ICL). In March 1981, the British Government guaranteed a £200 million new borrowings by ICL. The motives were two-fold. ICL was a major employer with 24,000 employees; it was also the sole manufacturer of computers in Britain and the government did not want ICL to be taken over by a foreign company. The existing debt was of various maturities.

Since ICL debt was not actively traded, Selby, Franks and Karki measured the value of the firm indirectly. Using the market value of equity and standard deviation of return on equity—which they estimate to be 1.0—the authors numerically estimate the market value of the firm's assets and the standard deviation of return on these assets.[7] For a loan maturity of two years, the value of guarantee was estimated as £83.38 million, assuming that new debt was junior to existing debt. Of this, over half (£42.56 million) is a subsidy to the project, which, in turn, is over a quarter of the value of the loan. The rest of the guarantee value (£40.83 million) accrued to senior bondholders. This wealth transfer to senior bondholders followed from the structure. Default on the junior debt triggers early redemption of the senior bond at its face value. The longer the maturity of the senior bond, the lower the prevailing market value of the bond is likely to be relative to its face value and the higher the wealth transfer to senior bondholders. Such a structure negates the usefulness of guaranteeing junior debt since, by *de facto* guaranteeing of senior debt, the incentive of senior bondholders to monitor the firm's performance are diluted, if not eliminated.

When guaranteed debt has the same seniority as unguaranteed debt, the transfer to nonguaranteed bondholders is much less and can even be negative since they have to share the proceeds of the assets with the guaranteed debt holders. Also, since prior claims are eliminated the subsidy value of the guarantee falls to just over 10 percent, reducing the risk of default.

Another application of contingent claim valuation for pricing guarantees is to value interest payment guarantees on developing country debt (Borensztein and Pennachi 1990). Using results

[7] The transformation is based on a relationship derived by Merton (1974).

from option pricing theory, the market price of the interest payment guarantee is estimated as if the guarantee were to be traded in financial markets.

The value of the guarantee is estimated as a portfolio of two put options. When underlying conditions are good, all debt payments can be made and the guarantee is not called (this they model as a long position in a put with exercise price D (1+ij), where D is the principal of the debt and ij is the interest rate applicable for the jth payment). When conditions are especially poor, then the full guarantee on all interest payments would be called (modeled as a short position in a put with exercise price D). The authors of this approach proxy country debt conditions using the price of the developing country debt in secondary markets. A feature of their estimation, which is not present in the earlier studies cited, is that they allow for the interest rate to vary, creating an additional source of uncertainty that raises the value of the guarantee.

The guarantees referred to are four-year guarantees on a floating rate perpetuity with semiannual coupons tied to the six month U.S. Treasury-bill yields. The results of their estimation indicate that the value of a hypothetical current interest payment guarantee for four years ranges between the full value of interest payments when the market price of that debt is about 30 cents on the dollar to half of all interest payments when the market price of debt is 60 cents on the dollar. The high values of the guarantees essentially reflect the very low market valuation of the debt and the low variance found in the history of debt values (making it unlikely that values would increase enough to prevent triggering the guarantee).

The option price approach reveals a higher value of the four-year interest payment guarantee than would the “rule-of-thumb” approach. Thus the market values the debt at a higher level (and hence has a lower implicit value of the short-term interest payment guarantee) because it is more concerned—and more optimistic—about long-run repayment.

Management of contingent liabilities: General principles

In the past, guarantees were often implicitly treated as free, and were recorded in government budgets only when a guarantee was called to make good on a payment default. At the time the guarantee was made, no liability was recorded in government accounts and hence no reserves were created for the contingency that the guarantee may be called. Seguiti (1988) draws attention to budgetary practices in Italy, where even though interest subsidies by the government are accounted for in the budget, guarantees are reported if and only if default occurs. Prior to the Credit Reform Act of 1990, contingent liabilities were not recorded in the U.S. budget.

Experience with loan guarantees in Canada makes the case for proper accounting. In the first half of the 1980s, about C$3 billion were spent in paying off the guarantees or in providing supplementary budget finance to beneficiaries of guarantees. To guard against such contingencies in the future, the Canadian government, in 1986, instituted management and budgetary procedures to minimize the risk of large disruptive payments.

The studies reviewed in the previous section demonstrate that, far from being "free," guarantees are of great value. A guarantee's value to investors and lenders implies a cost to the provider. When markets have full information, the value is identical to the cost (expected payment to cover default). Where market perceptions are more pessimistic than warranted, the cost may be less than the value. Thus, except when the market assessment is truly out of line with underlying conditions, governments providing guarantees must prudently manage their exposures.

General principles for managing contingent liabilities include: sharing risks with private lenders to ensure they have incentive to monitor the projects, charging fees to create the right incentives for use of guarantees and to build reserves in the event of default, and finally, instituting a rational system of accounting.

Risk sharing with lenders

The principle of risk sharing with the lender is becoming more widely accepted and practiced. For guarantees benefiting private firms or projects, it is common to limit the guarantees to debt payments and to not cover equity, since equity holders are presumed to be willing to take on greater risks in return for a higher expected return. Though equity may not be explicitly covered, as discussed, it benefits from the guarantee to debtholders.

Further risk sharing occurs when less than 100 percent of the debt or only a limited time-span during the life of the debt are covered. In Canada, risk sharing is an explicit part of the government's guarantee policy and an attempt is made to keep the government's exposure to the minimum level. Developing country governments seeking private power projects have also sought to keep their exposure limited to sovereign or political risks, requiring the private investors to bear commercial risks. However, because the power purchaser is often a government agency with a poor credit rating, the government ends up taking the commercial risk as well. Appropriate policy reform that privatizes the power company and allows commercially viable tariffs will be needed to ultimately shift commercial risk to private parties. Thus effective risk sharing is a function of policy reform.

Charging for guarantees

Government guarantees are often not priced and, when they are, there is no clear rationale to them. For example, in the program for supporting the steel industry described by Sosin (1980), no fees were charged. Guarantees provided by governments to cover political risks in infrastructure projects are also typically free. In some instances, this is beginning to change. Export credit agencies traditionally provided risk coverage at low cost and incurred large losses. Now export credit agencies are beginning to charge guarantee fees based on the riskiness of the underlying credit. While the fees tend to vary substantially, they can be as high as 10-15 percent of the value of the loan (Zhu 1994).

Pricing of guarantees is highly desirable because it creates a market test for guarantees, reduces the inevitable temptation of private lenders to seek all available guarantees, shifts the cost of guarantees to the consumers of services provided rather than to the general taxpayer, and provides ongoing information on the value of available guarantees.

In addition to charging a fee for guarantees to cover downside risk, governments may seek to share in the upside potential through the acquisition of warrants. This was the case in the Chrysler loan guarantee. The possibility of using such warrants is also an element of Canadian Government's policy on loan guarantees, though this option has so far not been used.

Accounting principles

Consider a prior situation when guarantees are (implicitly) assumed to have no costs in the year the commitment is made. In fact, if fees are collected, the guarantee program actually reduces the budget deficit. This creates an incentive to issue guarantees. In particular, guarantees are preferred to loans, which are counted at their full face value. A more appropriate accounting system based on the expected net present value cost commitment of a government places loans and guarantees on an equal footing.

A simple numerical example illustrates the basic issues. Consider a direct loan of $1,000 and a loan guarantee for an underlying loan of the same amount. Assume that the subsidy costs for both are $200 each.[8] The guarantee carries a fee of $10. Table 6 displays the budget authority and outlay figures that would be recorded under a cash budget system as it existed in the United States prior to credit reform, as well as the figures recorded under an expected net present value cost budget system currently employed for the U.S. budget.[9] Thus, prior to accounting reform, the full

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[8] In this example, as in the rest of this paper, we make no attempt to assess the relative merits of direct loans versus loan guarantees as instruments of government support. The example assumes that the subsidy value under either instrument is the same. Liability under either instrument can be reduced by appropriate structuring. A guarantee can be partial, providing coverage only against specific triggering events or requiring copayments, as discussed above. But risk-sharing is also possible where direct loans are provided by the government if a condition of the loans is significant equity participation by private interests.

[9] The budget authority permits a government agency to enter into financial obligations depending on which expenditures or outlays are undertaken.

amount of the direct loan is recorded in the budget authority and outlay. No budget authority is recorded for the loan guarantee, however, since no cash outflow is presumed. In fact, the guarantee fee of $10 is recorded as a negative outlay or an inflow.

However, since the underlying opportunity cost to the government is the same under either action, the loan and the guarantee should be recorded at their subsidy cost of $200. Thus the new accounting system decreases the outlays for loans and increase outlays for guarantees in the year of disbursement. The subsidy appropriation of $200 for the guarantee and the guarantee fee of $10 must be set aside as reserves, which earn interest. This amount covers future claims due to defaults by borrowers. A contingent liability program is *funded* when the premiums for the guarantees and reserves created through budgetary appropriations are equal to the expected payments. Liabilities are *fair* when the premiums are paid for by those who benefit from the guarantees (Towe 1993).

Table 6: Accounting for loans and guaranteed loans, before and after accounting reform

	Budget Authority	Outlay
Before accounting reform		
Direct Loan	1,000	1,000
Loan Guarantee	0	- 10
After accounting reform		
Direct Loan	200	200
Loan Guarantee	200	200

Source: Adapted from CBO (1991)

Valuing contingent claims

A key task is to value contingent claims that arise from issuing the guarantee. A first useful step, as in Canada, is to distinguish between two types of guarantees: guarantee for programs and guarantees for *ad hoc* projects. Programs provide guarantees to a large pool of risk bearers (as in student loan or mortgage programs). In contrast, *ad hoc* guarantees are made to specific companies in financial distress, where the government views the rescue of the company to be in the national interest, or for high risk new development–this rationale is not unlike that advanced in developing countries for attracting private finance to infrastructure projects.

For programs, assessment of contingent liabilities is usually straightforward and is often based on history of defaults. However, either when past data is not available, or when it is not a reliable guide to future liabilities, a forward-looking risk-based assessment needs to be made. Where appropriate, option-pricing models can be an aid in specifying underlying asset dynamics to estimate risk-based premia. Today, the U.S. government is beginning to use these sophisticated methods to measure costs of government contingent claims. Option pricing methods can also be used for ad hoc projects where the project or the firm either has directly measurable market values and riskiness measures or appropriate proxies (Babbel 1989).

However, option pricing methods have limited applicability for newer projects because such projects do not have sufficiently long histories to provide needed data. Market-based methods are also typically not possible because there do not exist enough traded securities with and without guarantees to estimate guarantee values.

Instead, more direct measures of default need to be estimated. One procedure could be to use methods employed by credit rating agencies. These agencies categorize project risks in great detail to place projects in a rating category that summarizes the risk of default. Traded securities in that risk category could then be used to estimate the value of the guarantee as the difference between the value of risk-free debt and the present value of risky debt of a similar maturity. Where even such estimates are not possible, it is still worth imputing an approximate cost to guarantees. In Canada, a requirement on the part of all government departments seeking *ad hoc* guarantees from the Finance Ministry is that they set aside 25 percent of the value of the underlying loan from their regular appropriations. Future payments, resulting from defaults, are charged against the amounts thus set aside. This creates a clear opportunity cost for the beneficiary department when seeking a guarantee. The value of 25 percent was arrived at somewhat arbitrarily and therefore does not differentiate risks by projects. With experience, greater refinement of valuation will occur. It is also well to remember that even when estimates are more "sophisticated", they suffer from a series of measurement errors stemming from inappropriate assumptions on the loss distribution and the parameters of the distribution. Hence, all estimates need to be subjected to stringent sensitivity tests.

Moreover, the value of the contingent claim depends not only on the underlying risk but also on the time period over which the risk is covered. The longer the period of coverage, the greater the exposure, the value of contingent claims recorded in the budget for otherwise identical projects would be higher for the one with longer duration debt. A corollary of the time dimension of guarantee valuation is that the value of the contingent claim will change (typically decline) over time. Not surprisingly, the U.S. Credit Reform Act requires a continual valuation of contingent liabilities. Although potential claims decrease because of the passage of time, they may increase because certain risks have been accentuated.

U.S. Credit Reform Act

To illustrate and elaborate on the principles outlined in the previous section, we present here the salient features of the U.S. Credit Reform Act of 1990. The presentation begins with the objectives of this act and its coverage. The system of new accounts created to implement the Act is described. Finally, we illustrate the budgetary implications of this Act for the U.S. Export Import Bank.

Features of the Credit Reform Act

In 1990, the U.S. government passed the Federal Credit Reform Act (CRA). The key objective of this Act is to measure more accurately the cost of federal credit programs. The Act requires that the cost of interest subsidies and defaults in credit programs be estimated on a discounted present value basis when new credit is extended and that these costs be recorded in the federal budget. By estimating the subsidy cost of federal credit—and reflecting them in the budget—credit programs are made equivalent to other federal spending in the budget. When appropriately implemented, the CRA lays the basis for a more rational and efficient allocation of budgetary resources.

The CRA applies to almost all federal loan and loan guarantee programs. However, federal insurance activities (such as deposit insurance, pension insurance, crop insurance, flood insurance) are excluded from credit reform.

Under the CRA (beginning fiscal year 1992), the budget reflects the budget authority and outlays needed to cover the subsidy cost associated with new loans and loan guarantees. In their annual request for appropriations, federal agencies include estimates of subsidy costs for new loans and guarantees. According to the CRA, the subsidy cost of a loan guarantee is "the present value of cash flows from estimated payments by the government (for defaults and delinquencies, interest rate subsidies, and other payments) minus estimated payments to the government (for loan origination and other fees, penalties, and recoveries)" (GAO 1994). Subsidy costs for a particular loan or loan guarantee are charged against the appropriation of the federal agency. New loans seeking a guarantee cannot be disbursed unless the amount of the subsidy has been appropriated by Congress. The full subsidy cost is recorded as an outlay when the loan or the guaranteed loan is disbursed. Recall that, prior to credit reform, the budget recorded no outlays when private loans were guaranteed. In addition, the CRA mandates that costs of credit assistance be reestimated and reflected in the budget at the beginning of each fiscal year following the year in which the disbursement was made.

Not everyone agrees that the CRA was a wise move. For instance, Weil (1992) argues that budgetary accounting is a veil, that does not necessarily have substantial implications in a world where the government and all agents discount actions undertaken. Thus, whether the guarantee is accounted for at the start or when the default occurs should not influence taxes or welfare, though under the CRA budget deficit estimates will be higher earlier on, then lower later on. Weil concedes that when agents are "myopic," reserving against contingent liabilities induces the right behavior. He adds that the CRA introduces accounting inconsistencies by including only some guarantee programs and excluding others.

Dropping large-ticket programs (such as deposit insurance) from the purview of the CRA indicates a political imperative to restrict the levels of budgetary deficit. For this reason, he is skeptical of the subsidy calculations that will be made for programs under the CRA. In particular, he cautions against the use of option-pricing techniques, which are highly sensitive to the assumptions used. Finally, Weil notes that when the government does guarantee a loan, it does not always have to self-insure by taking the guarantee on its own books. Where possible, it should sell the guarantee, thereby eliminating the need to continuously monitor the loan performance and make revenue adjustments in response.

In a comment, Taylor (1992) argues that the CRA was but one element in meeting the objectives of the 1990 Budget Act, which created caps on discretionary spending and linked entitlement spending with taxes. The consequent system required that any new entitlement program be paid with a cut in other programs or an increase in taxes. Excluding loan guarantees from the discipline imposed by the CRA would have led to an explosion of loan guarantees, given the caps being placed on budgetary spending. Although the inconsistency created by not including all guarantee and insurance programs under the CRA is undesirable, the exclusion of loan guarantees from budgetary discipline would be worse.

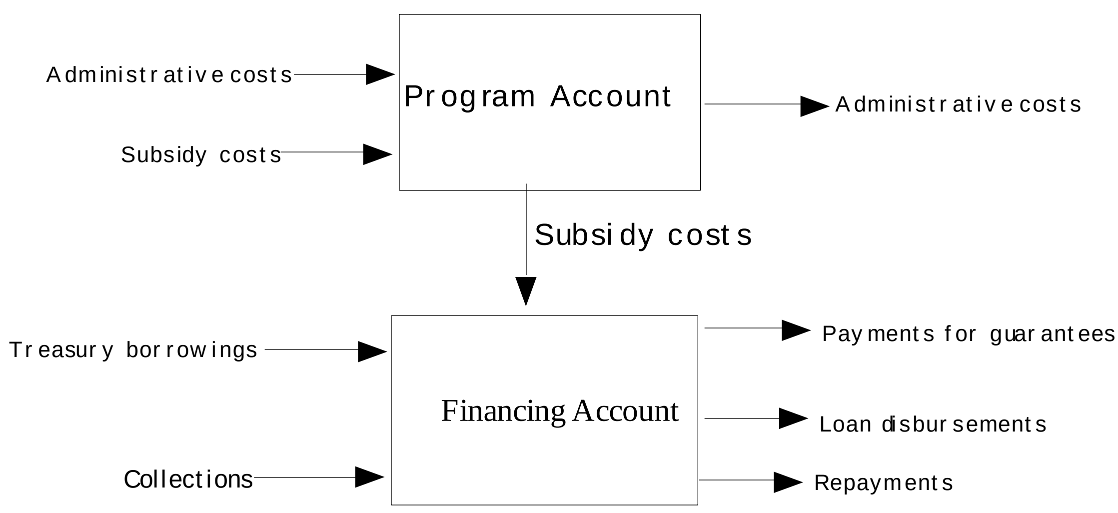
System of accounts

The Credit Reform Act created five accounts for each federal agency that administers credit programs. These are: (1) the credit program account, (2) the financing account, (3) a liquidating account, (4) the non-credit account, and (5) and a receipts account. Subsidy costs are to be expressed in terms of budget authority and outlays in the program and the financing accounts. There are separate financing accounts for loans and guarantees.

The program account of the beneficiary agency receives appropriations from the U.S.

Congress for administrative and subsidy costs of a credit activity.[10] For the agency, the budget authority is equal to the appropriations, and its outlays are the subsidy costs that occur when the loans are disbursed. Thus, in their annual request for appropriations, the agencies need to include estimates of subsidy costs for new loans and guarantees. If an agency exhausts its subsidy appropriations in a fiscal year, it cannot provide further credit assistance in that year. When a loan or a guaranteed loan is disbursed, the financing account receives the subsidy costs from the program account. In addition, the financing account records borrowings from the Treasury, guarantee fees, recoveries from past loans and payments due to defaults. If the subsidy estimates are accurate, the financing account inflows and outflows should balance over time.

Figure 1: System of Accounts under credit reform



Source: GAO (1994)

[10]Details of budgeting for administrative costs under credit reform can be found in CBO (1992).

The liquidating account is a temporary account that handles liabilities incurred through loans and guarantees made before the October 1, 1991. This continues the cash treatment used before the CRA. It has permanent, indefinite budget authority (that is, it does not need annual appropriation) to cover any losses. The non-credit account is for non-credit activities such as grants, which were earlier included with credit accounts. The receipts account collects any negative subsidies for cases where the federal activity shows a profit.[11]

Budgeting for Eximbank

Here we illustrate how credit reform affects budgeting for U.S. Export Import Bank (Eximbank). The Eximbank guarantees loans made by lenders to exporters of U.S. goods. Prior to credit reform, the Eximbank's net cash flows were recorded in the unified budget. Measures of new credit assistance were reported in the credit budget, which placed limits on new loan obligations and guaranteed loan commitments. The Appendix to the President's budget reported Eximbank's income statements and balance sheets. The operating income in any year lumped together payments from decisions reached in many different years. Thus, the account system did not provide even a rough estimate of the cost of credit assistance in any given period.

Table 7 presents how credit reform would affect accounting for Eximbank in the unified budget. Before credit reform, the Eximbank revolving fund would have simply shown net outlays of - $823.1 (administrative expenses would have been paid from a separate salaries and expense account). The negative outlay represents receipts in excess of disbursements. Under the provisions of credit reform, the estimated subsidy costs (sum of the subsidy cost for loans and guarantees) would be reflected in the budget in Eximbank's program account and would be separated from Eximbank's non-subsidized cash flows. When the loan or guaranteed loan is disbursed, the financing account would receive the subsidy cost for that particular loan. The liquidating account will handle all loans and guarantees made before October 1, 1991.

[11]When subsidy costs are negative, no appropriations are required. For such a program, the negative budget authority and outlays are transferred from the financing account and recorded in the federal budget as proprietary receipts. These receipts are not available for use by the agencies unless the authority to do so is provided by law.

Table 7: Budgetary treatment of Eximbank (in millions of dollars)

	Pre-credit reform outlay	Post-credit reform outlay
Existing revolving fund	-823.1	
Program account		264.8
Financing account (loans)		425.6
Financing account (guarantees)		-458.5
Liquidating account		-1014.0

Source: OMB (1995)

The outlays would consist of disbursements of tied aid, disbursements of subsidy costs associated with credit assistance, and payment of administrative expenses. All other cash flows would be treated as a means of financing and be recorded on the financing account, which is not part of the budget.

Conclusions

As instruments for supporting private enterprise and attracting private finance to priority endeavors, guarantees provide significant value. Their value increases with the underlying riskiness of the project and the maturity of the loan being guaranteed. This survey shows that the value in the high-risk, high-maturity loans can be worth hundreds of basis points of interest costs or, equivalently, expected default payments can be a very substantial portion of the loan.

Any policy using guarantees thus needs to address several trade-offs. By guaranteeing the lending the government takes on the risk of default and thereby reduces the incentives of the lenders and project sponsors to actively monitor project performance. To create the incentive for continued project monitoring as well as for filtering out those who have a low ability to manage risk, governments seek to share risks with private lenders by guaranteeing less than the full loan. The amount of risk sharing in the cases surveyed has not been large, but governments are increasingly conscious that they need to lower their exposure and, as the Canadian example shows, there is likely to be greater movement in this direction. The value of the guarantee also depends upon the structure of financing. Guaranteeing junior debt creates incentives for senior debt holders to be vigilant, but raises expected costs to the guarantor.

The high value of loan guarantees, losses experienced, and trends towards greater budgetary discipline have led to countries adopting a more rational approach to accounting for subsidies. While the old method recorded guarantees only when a default occurred, new methods seek to anticipate losses, create reserves, and channel funds through transparent accounts to ensure that costs of guarantees are evident to decision makers. The phenomenon of credit reform is relatively new. Although problems exist in estimating subsidy costs, we believe that over time it will be easier to estimate these costs more precisely. Better data would enable predicting future performance on the basis of past experience and would also permit the use of sophisticated contingent claim valuation methods for pricing the guarantees.

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