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Federal Reserve Bank  
of San Francisco

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Winter

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1986

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Economic

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Review

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Number

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1

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The Federal Reserve Bank of San Francisco's Economic Review is published quarterly by the Bank's Research and Public Information Department under the supervision of John L. Scadding, Senior Vice President and Director of Research. The publication is edited by Gregory J. Tong, with the assistance of Karen Rusk (editorial) and William Rosenthal (graphics).

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# Off Balance Sheet Risk in Banking: The Case of Standby Letters of Credit

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*Bank regulators and other analysts worry that the recent rapid growth in standby letters of credit (SLCs) outstanding is a response to more stringent capital regulation and has increased bank risk. This analysis traces the growth of such instruments primarily to the growth of direct-finance markets in a setting of increased overall economic risk. It also finds that SLCs are at least potentially riskier than loans. Although banks may be applying higher credit evaluation standards in partial compensation, the issuance of SLCs nevertheless may warrant some form of capital-related regulation.*

The off balance sheet activities of commercial banks have attracted a lot of attention lately. Regulators, securities analysts and the financial press all have voiced concerns about the rapid growth in such contingent obligations as loan commitments, financial futures and options contracts, letters of credit, and foreign exchange contracts. Although they are not recognized as assets or liabilities on bank balance sheets (hence the term, "off balance sheet activities," or OBS), these contingent claims involve interest rate, credit, and/or liquidity risks. Moreover, because they provide the opportunity for substantially greater leverage than is the case for banks' lending and investment activities, OBS have the potential to increase banks' overall risk.

Ironically, bank regulators' efforts to control risk-taking through more stringent capital regulation may be partly responsible for the growth in OBS over the last few years. Because regulatory defini-

tions of capital adequacy currently do not include OBS, banks may have an incentive to shift risk-taking towards these relatively less-regulated activities. To correct this problem, the federal bank regulatory agencies are considering ways to factor OBS exposure into their formal evaluation of a bank's capital adequacy. Consequently, regulators need to analyze the nature and degree of risk involved in each type of OBS as compared to banks' other activities.

This article examines one off balance sheet activity that has grown quite rapidly over the last several years: standby letters of credit. The first section discusses the uses for standby letters of credit and the reasons for their growth. In the second section, a framework for analyzing the risks associated with standby letters of credit is developed. Unfortunately, data limitations make impossible any definitive statements about the impact of standby letters of credit on overall bank risk. Finally, the paper concludes with some observations about the regulatory treatment of standby letters of credit.

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## I. The Market for Standby Letters of Credit

Of all the off balance sheet activities in which U.S. banks engage, the issuance of standby letters of credit (SLCs) has attracted the most attention lately. Many observers point to the rapid growth in SLCs outstanding over the last few years as well as the prominent role such instruments played in several recent bank failures — most notably, Penn Square National Bank in 1982 — as evidence that SLCs may be increasing bank risk significantly. SLCs outstanding grew from \$80.8 billion in June 1982 to \$153.2 billion in June 1985 — a 90 percent increase over the period. Moreover, most of that growth occurred at the 25 largest banks, which recorded more than a \$40 billion increase in SLCs outstanding.

A letter of credit (LC) is a contractual arrangement involving three parties — the “issuer” (the bank), the “account party” (the bank’s customer) and the “beneficiary.” Typically, the account party and the beneficiary have entered into a contract requiring the former to make payment(s) or perform some other obligation to the latter. At the same time, the account party has contracted with its bank to issue a letter of credit which, in effect, guarantees that by substituting the bank’s liability for that of the account party, the account party will perform according to the terms of the original contract with the beneficiary. Initially, the bank’s obligation under the LC is a contingent one because no funds are advanced to the beneficiary until that party presents the documents that are stipulated in the LC contract.

There are two types of LCs: the more traditional commercial letter of credit which generally is used to finance the shipment and storage of goods, and the standby letter of credit which is being used in connection with a growing variety of transactions, including debt issuance and construction contracts. Unlike the commercial LC, which is payable upon presentation of title to the goods that have been shipped, the SLC is payable only upon presentation of evidence of default or nonperformance on the part of the account party. As such, SLCs typically expire unused, in contrast to commercial letters of credit.

Because SLCs are payable only upon nonperformance on the part of the account party, they are a guarantee of either financial or economic perfor-

mance on the underlying contract.<sup>1</sup> The issuer of the SLC promises to advance funds to make the beneficiary whole in the event of the account party’s failure to perform according to the terms of the contract with the beneficiary. An SLC involving a financial guarantee requires the issuing bank to pay any principal or interest on debt owed the beneficiary by the account party should the latter default. According to a recent survey, just over half of banks’ SLCs outstanding backs some form of debt obligation.<sup>2</sup> An SLC backing a construction contract, in contrast, represents a performance guarantee and requires the bank to make a payment to the beneficiary if the contractor does not complete the project satisfactorily.

By issuing an SLC, the bank is assuming the risk that normally would have been borne by the beneficiary. However, it is the account party that arranges the SLC and compensates the bank for the risk. In return for paying the bank’s fee and reducing the beneficiary’s risk, the account party expects to obtain a higher price for the debt issued to or the services performed for the beneficiary.

In general, the account party will choose to arrange a standby letter of credit whenever the cost of the transaction (that is, the bank’s fee) is less than the value of the guarantee to the beneficiary (as measured by the premium the beneficiary is willing to pay for the account party’s debt or services with the SLC backing). The size of this differential between the bank’s fee and the beneficiary’s willingness to pay for the guarantee depends upon two factors.

First, the value of the guarantee to the beneficiary will depend on the creditworthiness of the issuing bank as compared to that of the account party and the relative costs of obtaining information about the creditworthiness of each. An SLC issued by a bank with a poor credit rating is not likely to be worth much to the beneficiary since the probability of that bank’s default on its obligation may be high. Likewise, an SLC issued by a small, unknown bank may have little value since the cost to the beneficiary of obtaining information to evaluate the bank may be greater than the cost of evaluating the account party and underwriting the risk itself.

These observations are consistent with the data presented in Tables 1 and 2, which show that most SLC issuance occurs at the largest banks and that the higher rated banks tend to do relatively more SLC business.

Second, the size of the differential will depend on the extent of the issuing bank's comparative advantage in underwriting the risk of default on the part of the account party. (Of course, the extent to which the bank's comparative advantage will be reflected in the fees the bank charges depends on the level of competition among issuers of SLCs). With respect

to most beneficiaries, the issuing bank's underwriting costs are likely to be substantially lower because the bank is better able to diversify the risk associated with SLCs and because the bank enjoys certain economies in credit evaluation. For example, the marginal cost of performing an evaluation of the account party is lower for the bank than for the beneficiary because the bank frequently has an ongoing relationship with the account party; this makes the cost of obtaining information much lower for the bank.

**TABLE 1**

**SLC Issuance by Size of Bank  
(Billions of dollars)**

Year-End:	1979	1980	1981	1982	1983	1984	June 1985 (Percent share)
Banks with Assets of Over \$100 MM	34.1	45.7	69.9	98.3	117.4	144.3	153.2 (100)
25 Largest Banks	27.2	36.5	55.5	77.6	91.5	111.2	117.9 ( 77)
10 Largest Banks	24.3	32.0	47.9	65.0	77.1	92.4	96.3 ( 63)
15 Other Large Banks	2.9	4.5	7.6	12.6	14.4	18.8	21.6 ( 14)
All Other Banks	6.9	9.2	14.4	20.7	25.9	33.1	35.3 ( 23)

Source: Quarterly Reports of Condition

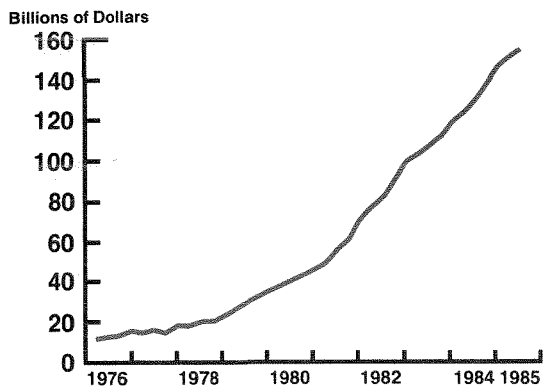
**TABLE 2**

**SLC Issuance of 25 Largest Banks by Bank Rating\***

	Dec 1982 (Billions of dollars)	June 1985	Percent Change
Large Banks (with assets over \$50 billion)	41.6	63.1	51.7
Aaa - Aa (4 banks)	33.4	51.7	54.8
A or less (1 bank)	8.2	11.4	39.0
Medium Banks (with assets of \$10-50 billion)	35.9	54.6	52.1
Aaa - Aa (11 banks)	21.9	37.4	70.8
A or less (8 banks)	14.0	17.2	22.9
Small Banks (with assets under \$10 billion)	0.1	0.2	100.0
A or less (1 bank)	0.1	0.2	100.0

\*Ratings of banks based on latest evaluation in *Moody's Corporate Credit Reports*.

**Chart 1**  
**Standby Letters of Credit**  
**of U.S. Commercial Banks**



### The Growth of SLCs

The almost exponential growth in SLCs outstanding since the late 1970s (see Chart 1) is just one manifestation of a rapidly growing general market for guarantee-type products. In addition to the SLCs that banks offer, surety and insurance companies are now offering such guarantees as credit-risk coverages (which guarantee repayment of principal and interest on debt obligations) and asset-risk coverages, such as residual value insurance and systems performance guarantees. This expansion in the types of coverages offered has given insurance companies a rapidly growing source of premium income. Between 1980 and 1984, the insurance industry's net premiums from such surety operations<sup>3</sup> nearly doubled, rising from \$900 million to \$1.6 billion.<sup>4</sup> Financial guarantees offered by other, specialized providers have grown rapidly as well. Municipal bond insurance, for example, was virtually nonexistent prior to 1981, but now supports an estimated 29 percent, or \$6.4 billion, of new issues of long-term municipal bonds.<sup>5</sup>

Two factors account for this growth in the market for financial guarantees in general, and SLCs in particular. First, the growth over the last ten to 15 years of direct-finance markets has increased the credit-risk exposure of investors who may prefer not to bear such risk. Such direct-finance markets as the commercial paper market have grown rapidly since the late 1960s because borrowers are able to obtain funds more cheaply from them than through inter-

mediaries such as banks. However, this decline in financial intermediation has also meant that the undiversified investors in such markets must bear more credit risk than if they were to invest in the deposit liabilities of commercial banks. Apparently, such an increase in credit-risk exposure is unpalatable to at least some portion of these investors because 15 percent of all dealer-placed taxable commercial paper is supported by some sort of legally binding guarantee and nearly all rated commercial paper also is backed by a bank loan commitment.<sup>6</sup>

The second reason that financial guarantees have grown rapidly over the last several years is that overall economic risk has increased over the same period. The rampant inflation of the late 1970s, the increased volatility of interest rates and business activity of the early 1980s, and the unexpected sharp deceleration in the rate of inflation in the middle 1980s have caused wide swings in asset prices and returns on investment. Consequently, the demand for instruments like SLCs and other guarantees that reduce the risk to the beneficiary has increased tremendously.

Banks' involvement in this market is at once an extension of their traditional lending business and, because SLCs are not funded, a significant departure from it. Like their lending business, banks' issuance of SLCs entails the underwriting of credit risk. In this area, banks enjoy certain economies of specialization that make them lower-cost issuers of financial guarantees. They can easily (that is, without cost) diversify the risk associated with SLCs. Also, banks typically have other lending and deposit relationships with their SLC customers. As a result, the marginal cost to banks of obtaining information to perform a credit evaluation for the purposes of issuing an SLC is very low. Moreover, in contrast to insurance companies, banks do not generally secure their guarantees with a formal collateral arrangement with the account party since they usually have the right to debit the account party's deposit accounts. This lack of a formal collateral arrangement makes banks' SLCs more attractive, but it also increases the bank's risk somewhat. (See the next section for a discussion of SLC risk.)

Given the enormous increase in the demand for guarantees, the fact that banks are low-cost issuers may be sufficient explanation for the rapid growth of

bank-issued SLCs over the last several years. However, banks also may have an incentive to respond to this demand since they can overcome binding regulatory constraints on their lending activities by doing so. For example, at current levels of interest rates, reserve requirements add an estimated 25 to 30 basis points to banks' cost of funds, making bank credit considerably less attractive than other sources of credit.<sup>7</sup> Because SLCs are not funded and are therefore unaffected by reserve requirements, they represent a less costly way of assuming a given level of credit risk.

A more important regulatory constraint that undoubtedly has given banks incentive to issue SLCs is the move towards tougher capital regulation in recent years. Regulators began to express serious concern about bank capital adequacy in the late 1970s as the aggregate capital-to-assets ratio drifted to historically low levels. Then, in December 1981, the Federal Reserve Board (FRB) and the Office of the Comptroller of the Currency (OCC) issued "Capital Adequacy Guidelines" to pressure large banks into improving their capital-to-asset ratios. More formal standards for large banks were imposed in June 1983, and even more stringent standards were imposed on the industry as a whole in March 1985.

Economic theory suggests that the imposition of tighter capital regulations depresses the return on capital, causing a decline in the price of the regu-

lated firm's capital unless the firm can somehow compensate either by reducing its asset base or by increasing the riskiness of its portfolio. Because nonbank competitors are not similarly regulated, a move to shrink assets will not necessarily increase the return on bank capital. Thus, in the absence of other forms of portfolio regulation, capital regulation may induce banks to take on more risk.

Much of bank portfolio regulation is crafted to prevent banks from responding to this incentive, but regulators are concerned that banks' off balance sheet activities may not be adequately covered. The current capital adequacy standards do not formally account for banks' off balance sheet exposure. Consequently, when faced with capital-related limitations on asset growth, banks may have an incentive to shift risk-taking toward SLCs and other off balance sheet activities that do not "use up" capital.

In sum, the growth in banks' SLC issuance is a reflection of an increased demand for financial guarantees both as result of increased reliance on direct-finance as a source of funds and as a result of an increase in overall risk. Banks have been willing to respond to this demand by issuing SLCs because they enjoy certain cost advantages in doing so and because regulatory constraints on their lending activities make the issuance of SLCs more attractive. The next section presents a framework for analyzing the impact of SLC growth on bank risk, as well as an evaluation of the available evidence.

## II. The Risk of Standby Letters of Credit

With the deregulation of many aspects of the banking business, banks have received expanded opportunities for risk-taking. Regulators worry that increasingly risky bank practices could bankrupt the deposit insurance system, which underwrites at least a portion of any increase in bank risk. If banks did not have deposit insurance or if that insurance were priced correctly, the cost of bank liabilities and the price of shareholder equity would fully reflect any increase in bank risk. However, since all banks currently are charged the same premium for deposit insurance regardless of riskiness, and since bank regulators apparently have been reluctant to close large, troubled banks, at least large banks have an

incentive to undertake more risk than they otherwise would.<sup>8</sup>

Consequently, bank regulators have attempted to reduce banks' opportunities (if not incentives) for risk-taking by adopting more stringent capital requirements for the industry. However, because such regulation may induce banks to try to take on more risk, bank regulators worry that the rapid growth in SLCs outstanding in recent years may be increasing overall bank risk, particularly since SLCs now equal 100 percent of aggregate bank capital. (See Chart 2.) Moreover, for the 25 largest banks, the average ratio of SLCs to capital is even higher — 165.4 percent. As a result, each of the three federal

bank regulatory agencies (FRB, OCC and FDIC — Federal Deposit Insurance Corporation) recently proposed that the current capital adequacy regulation be supplemented by risk-based capital guidelines that would explicitly take into account the relative riskiness of broad categories of bank assets and certain off balance sheet items, including SLCs.<sup>9</sup>

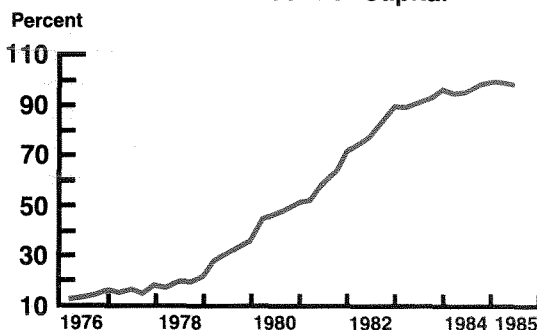
Ideally, risk-based measures of capital adequacy ought to reflect the effect of a bank's SLC exposure on overall risk, taking into account the extent to which SLC risk is correlated with other risk exposures. Unfortunately, such a measure is difficult to develop given currently available data and book-value accounting conventions. Neither can the markets for bank debt and equity provide more than an approximation for this measure since the existence of deposit insurance causes these markets to underprice bank risk. As a result, bank regulators can develop only crude measures of SLC risk based on a comparison with the riskiness of banks' loan portfolios.

Loans are the logical "benchmark" for rating the riskiness of SLCs because both instruments involve credit risk. At the same time, however, a comparison of the two is impeded by some of the differences in their risk characteristics. For example, unlike loans, SLCs generally do not entail interest rate risk and liquidity risk. If the issuing bank must advance funds under the terms of the SLC contract, the interest rate on the resulting loan to the account party typically varies with market rates (plus some mark-up). Moreover, because SLCs generally do not require a commitment of the bank's funds, the risk of loss associated with meeting related cash flow obligations is very small. On the other hand, because SLCs are not funded, they provide the opportunity for a much higher degree of leverage risk than is the case for loans.

### An Options Framework

Options theory can be used to evaluate the relative riskiness of loans and SLCs. However, because the development of an econometric model to evaluate these two instruments is beyond the scope of this paper (and the available data), the discussion that follows is intended only to suggest how this framework might be useful to regulators.

**Chart 2**  
Standby Letters of Credit Outstanding  
as a Percent of Capital



Virtually any financial instrument can be modeled as an option or a series of options. In this case, because the borrower/account party can default on its obligation to the bank, a loan and an SLC both implicitly contain a put option on the assets of the borrower/account party. In other words, the borrower (or the account party) has the right to sell ("put") its assets to the bank at an exercise price equal to the par value of its obligation to the bank. This option will be exercised if the par value of the obligation exceeds the market value of the underlying assets securing the obligation.<sup>10</sup>

Several factors determine the risk of exercise and hence, the value of this option. First, the option's value increases with increases in the exercise price, other things equal. As the par value of the loan or SLC obligation increases, so does the bank's risk. Second, the value of this put option varies inversely with the value of the underlying assets. As the value of the underlying assets securing the obligation falls, the cost of exercising the option also falls, increasing the bank's risk. Finally, the option's value rises with increases in the riskiness of those assets (that is, variance of their price). The greater the chance that the value of the underlying assets will fall substantially, the greater is the risk to the bank.<sup>11</sup>

A comparison of the risk associated with SLCs and loans, then, requires an evaluation of all these dimensions of the two portfolios. Moreover, an evaluation of the impact of SLC risk on bank risk also requires an understanding of the extent to which the returns on the two portfolios are corre-



lated. Unfortunately, data on these aspects of banks' SLC and loan portfolios are not available.

Nonetheless, it still is possible to use an options framework at least to suggest how banks' SLC issuance may be affecting bank risk. To do so, assume that the characteristics of banks' loan and SLC portfolios that are most under management control are identical. In other words, for every given SLC there is also a loan to the same customer with the same term-to-maturity and par value. The essential difference between these two portfolios, then, lies in the relative strength of their collateral arrangements. The loans, for the most part, are formally secured by the borrowers' assets, while the SLCs are not.

In an options framework, this difference amounts to a difference in the relative costs of exercising the put options contained in the loan and SLC portfolios. Because the cost of exercising the SLC-related options is lower, other things equal, the likelihood that they will be exercised is greater, making the SLC portfolio riskier than the loan portfolio. Moreover, this lower cost of exercise means that the value of the SLC portfolio is more sensitive to changes in the variance of the prices of the underlying assets (that is, changes in the financial condition of the banks' customers). For this reason as well, the SLC portfolio is riskier.

In practice, of course, banks' SLC and loan portfolios are not identical. Thus, while SLCs may be riskier than loans in this one respect, banks probably manage the other aspects of the two portfolios in a manner that mitigates some of the greater risk arising from differences in the contractual terms of the loan and SLC instruments. Specifically, the creditworthiness of banks' loan and SLC customers may be very different. Bankers have indicated that, as a matter of policy, they try to reject SLC business from customers for whom default is even a remote possibility. This is in admitted contrast to lending policy, where the standards are somewhat more relaxed.<sup>12</sup> (For a discussion of the other ways banks manage SLC risk, see the Appendix.)

## Evidence

The rather limited data on fees and loss experience suggest that banks do, in fact, manage the risk of the two portfolios differently. First, banks' SLC

fees apparently are lower than the implicit fees they charge on loans. The fees for SLCs for short-term, high quality credits range from 25 to 50 basis points and from 125 to 150 basis points or more for longer term and/or lower quality credits.<sup>13</sup> By contrast, the implicit loan premium for large denomination, variable rate loans is approximately 240 basis points for both short- and longer term credits.<sup>14</sup> This disparity in the fee structures of the two portfolios suggests that the creditworthiness of banks' SLC customers is higher than that of its loan customers.

This evidence on the relative riskiness of SLC and loan portfolios should be interpreted cautiously, however. Fees do not provide a measure of the expected return on equity. After netting out the higher administrative and other expenses associated with loans, it is likely that the expected return on and the risk of SLCs is at least as high as that for loans.

Similarly, the available evidence on the loss experience of loans and SLCs provides some evidence that the creditworthiness of banks' loan and SLC customers is different. Of course, loss experience technically does not measure credit risk because it is an *ex post* measure; however, there should be some correlation over time between risk and observed losses.

Data on SLC losses were last collected in 1978, when a special survey on SLCs was conducted by the staff of the Board of Governors.<sup>15</sup> That survey found that the initial default rate on SLCs averaged 2.03 percent. But because more than 98 percent was recovered, the loss rate on SLCs was extremely low — only 0.03 percent. This low figure compares very favorably to banks' loan loss rate of 0.16 percent in 1979. According to bankers in the Twelfth Federal Reserve District, the loss rate on SLCs has increased somewhat since then, but, compared to loan losses now hovering around 0.65 percent, losses on SLCs still are very low.<sup>16</sup> Once again, however, this evidence should not be interpreted as proof that the risk to bank capital from banks' SLC exposure is less than that from loans.

Finally, evidence from capital markets may provide some insights into the riskiness of banks' SLC portfolios. Of course, this evidence may be biased since prices will reflect the value of any perceived deposit insurance subsidy. Nonetheless,

as long as investors believe that they are not fully protected against loss, they will respond to perceived increases in bank risk by demanding a higher risk premium. Consequently, an evaluation of the market's reaction to the *growth* in SLCs outstanding over time should indicate whether bank risk also has increased.

In a study of the determinants of large banks' CD rates, Goldberg and Lloyd-Davies found that the market had not penalized banks for increasing SLC exposure between 1976 and early 1982.<sup>17</sup> Their model explains the level of the CD rate as a function of the general level of interest rates and of various bank risk characteristics. The effect of banks' SLC exposure on CD rates is treated as having two components: a leverage risk effect (the ratio of bank capital to risky assets, including loans and SLCs) and a credit quality effect (the ratio of SLCs to risky assets — to allow for differences in the credit quality of the loan and SLC portfolios). Based on this model, they found that CD rates rose with increas-

ing leverage and fell with increases in SLCs as a proportion of total risky assets. Since these two factors tended to cancel each other, the net effect on bank risk of an increase in banks' SLC exposure apparently was negligible.

Such a result is perhaps not surprising for two reasons. First, the level of SLCs outstanding was low in relation to other risky assets and to capital for most of this period. Thus, the effects of rapid SLC growth (in percentage terms) may have been swamped by larger (absolute) increases in loan volume. Second, the regression covers a period when bank capital ratios generally were falling. Because banks were not constrained by capital regulation (at least not until the end of this period), they may have had less incentive to increase overall risk through SLC issuance. Moreover, it is significant that Goldberg and Lloyd-Davies found that, despite higher credit quality, increasing SLC exposure did not *reduce* bank risk.

### III. Regulating Standby Letters of Credit

Bank regulators are concerned that the rapid growth in SLCs outstanding over the last several years is an indication that banks are attempting to take on more risk, in part, as a result of increasingly stringent capital regulation. This paper has suggested that while capital regulation may have played a modest role in the growth of SLCs, the primary reason for such growth has been an increase in the demand for financial guarantees generally. Whether this growth has increased bank risk is still open to question.

In some respects, SLCs are (potentially at least) more risky than loans, but the available evidence suggests that banks may be applying higher credit evaluation standards for SLCs than for loans to compensate for the riskier features of the SLC instrument. At the same time, however, this paper has suggested that it would be a mistake to infer from this evidence that SLCs necessarily pose less risk to capital than do loans. It is hard to believe that with the implicit subsidy to risk-taking provided by the deposit insurance system, banks actually would conduct their SLC business in a manner that entails *less* risk than lending.

Currently, bank regulators place only rather limited restrictions on banks' SLC activities. They require only that banks (1) include SLCs with loans for the purposes of calculating loan concentrations to any one borrower (the limit is 10 percent of capital) and (2) apply the same credit evaluation standards for SLCs as for loans. However, because of the greater riskiness of the SLC *instrument* as well as the greater potential for capital leverage with SLCs than with loans, some form of capital-related regulation of SLCs may be justified.

Capital adequacy regulation with respect to SLC exposure ought to do two things. First, from a bookkeeping perspective, it should ensure that institutions that are likely to experience larger losses also have a larger capital buffer to absorb those losses. Second, ideally, it should provide a structure that penalizes banks for attempting to increase overall risk through increases in SLC risk or leverage.

Accordingly, one can evaluate the risk-based capital adequacy concept that is under consideration at the federal bank regulatory agencies. Under this approach, SLCs outstanding would be added to assets for the purpose of calculating a new, risk-

based capital ratio. Moreover, because it is thought that at least certain types of SLCs may entail less risk than loans, those SLCs would be accorded a lower weight in the calculation of that ratio. For example, the FRB's proposed guidelines assign a weight of 1.0 to most types of SLCs, but a weight of only 0.6 to a few types, such as performance-related SLCs.

The advantage of this basic approach is that it is easy to administer. Also, it provides a means of ensuring that as banks' SLC exposure grows, so too will their capital buffer. The disadvantage is that it treats all SLC portfolios (and all loan portfolios, for that matter) as having the same level of credit risk. Clearly, this approach will impose a higher capital cost on the banks that have higher quality SLC portfolios than is the case for banks with lower quality portfolios. As a result, the former may have an incentive to compensate for this implicit penalty by taking on more credit risk in their SLC portfolios.

## APPENDIX

Banks seek to manage SLC risk in several ways. First, through the fees they charge, banks require compensation in proportion to the risks they assume. Consequently, SLC fees vary with the term of the SLC and the credit rating of the account party. For short-term, high-quality credits, fees currently range from 25 to 50 basis points on the outstanding amount, while fees on longer term and lower quality credits range from 125 to 150 basis points or more.

Second, banks attempt to reduce credit risk on longer term commitments by requiring periodic (usually annual) renegotiation of the terms of the agreement. For example, SLCs backing the commercial paper of nuclear fuel trusts typically have a three-to four-year term, but are renewable each year at the bank's option. This arrangement helps protect the bank against deterioration in the creditworthiness of the account party over the term of the SLC.

However, such arrangements are not always adequate. One large bank that issues SLCs to back industrial development bonds analyzes its risk exposure in terms of the life of the bonds (usually 20 years). It has chosen this measure instead of the life of the SLC (typically five years) because at the

To overcome this problem, the regulators could, in theory, adopt a more sophisticated measure of SLC risk along the lines of the options model outlined in this paper. Such a measure would enable regulators to take variations in the credit quality of individual portfolios into account when assigning risk weights. However, it would be difficult to administer since considerably more data on the characteristics of individual portfolios would be needed. Instead, the regulators have chosen simply to recognize the inherent weaknesses in any capital adequacy ratio and to emphasize that such ratios — even those that attempt to adjust for risk — are meant only to supplement the bank examiner's judgement. Ultimately, they argue, the bank examiner must decide whether an institution's capital is adequate based on such qualitative considerations as the quality of earnings and management and overall asset quality as measured by the level and severity of examiner-classified assets.

expiration of the SLC, if the account party's financial condition has deteriorated such that it cannot obtain another SLC, the bondholders can declare the borrower in default under the terms of the bond indenture and thus require the bank to cover any losses.\* In this case, the shorter term of the SLC does not necessarily limit the bank's exposure. Likewise, a bank may be liable for the repayment of commercial paper debt if it is unwilling to renew its SLC since the bank's unwillingness most likely would result in the account party's inability to refund its debt.

Third, although SLCs frequently are unsecured, the terms of the bank's contract with the account party provide another measure of protection against loss. Typically, the bank's agreement with the account party stipulates that the bank may: 1) require the account party to deposit funds to cover any anticipated disbursements the bank must make under the SLC, 2) debit the account party's account to cover disbursements, 3) call for collateral during the term of the SLC, and 4) book any unreimbursed balance as a loan at an interest rate and on terms set by the bank.\*\* In the event of the account party's bankruptcy, such conditions, of course, do not pro-

tect the bank against loss in the same way that a formal collateral agreement would. Under most circumstances, however, they do provide sufficient incentive for the account party to satisfy the terms of the underlying contract.

A fourth way that banks can manage the credit risk involved in SLC issuance is through portfolio diversification. (This approach, of course, cannot reduce systematic risk.) Banks that specialize in issuing certain types of SLCs — backing commercial paper issued by nuclear fuel trusts, for example — still can diversify by buying and selling participations in SLCs. By selling a participation in an SLC it has issued, a bank in effect reinsures some of the risk. If payment must be made to the beneficiary and the account party is unable to make reimbursement, the issuing bank and the bank that purchased a share of the SLC will share in the resulting losses. Under a participation arrangement, the issuing bank will be liable for the full amount of the SLC only if the participating bank were to fail. Participations of SLCs accounted for 11 percent of the \$149.2 billion in SLCs outstanding as of March 1985.

Finally, in response to growing regulatory concern over banks' SLC exposure, banks are beginning to manage risk by placing limitations on SLC growth. A number of large banks have established some multiple of capital (for example, 150 percent) as a limit on the amount of their SLCs outstanding. In addition to administratively imposed limitations, the commercial paper market tends to limit SLC growth as well. Since SLC-backed commercial paper trades as an obligation of the SLC issuer, excessive SLC issuance will reduce the value of the issuing bank's guarantee as well as the price of its own commercial paper.

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\* Based on information from an informal survey of large banks in the Twelfth Federal Reserve District conducted in August 1985.

\*\*See Lloyd-Davies' article on standby letters of credit in *Below the Bottom Line*, a staff study of the Board of Governors of the Federal Reserve System, January 1982, for a more detailed discussion of the contractual terms of the LC agreement.

#### FOOTNOTES

1. Historically, banking laws have prohibited banks from offering financial and performance guarantees in order to preserve the traditional separation between banking and commerce in this country. Standby letters of credit (and commercial letters of credit, for that matter) are not technically guarantees, however, since the issuing bank's obligation under an SLC is to advance funds upon presentation of certain documents regardless of whether the underlying contract between the beneficiary and the account party has been performed to both parties' satisfaction.

2. Senior Loan Officer Opinion Survey conducted by the Federal Reserve System in August 1985.

3. Insurers traditionally have issued surety bonds which are, technically, performance guarantees. Lately, they have become active issuers of financial guarantees. Revenue from these two lines of business are reported together as revenues from surety operations.

4. Eric Gelman, et al, "Insurance: Now It's a Risky Business," *Newsweek*, November 4, 1985.

5. Senior Loan Officer Opinion Survey, August 1985.

6. Senior Loan Officer Opinion Survey, August 1985.

7. This estimate is based on the opportunity cost, at current interest rates, of the 3 percent marginal reserve requirement on large CDs.

8. For a more detailed discussion of the deposit insurance system and the risk-taking incentives it creates, please see the articles by Barbara Bennett and David Pyle in the Spring 1984 issue of the Federal Reserve Bank of San Francisco's *Economic Review*.

9. The Federal Reserve Board's proposed rules on risk-based capital guidelines were set forth in *Federal Register*, January 31, 1986, p. 3976. The comment period for this proposal extends until April 25, 1986.

10. For unsecured debt and SLCs, the relevant price is the value of the bank's prorated share of the firm's assets in a bankruptcy proceeding.

11. Black and Scholes have shown that an option's value is determined by the riskiness of the underlying asset (that is, variance of return on the asset), the option's term to maturity, and the level of the risk-free interest rate, as well as the level of the exercise price and the market value of the underlying asset.

12. Based on information from an informal survey of large banks in the Twelfth Federal Reserve District conducted in August 1985.

13. *Ibid.*

14. Survey of Terms of Lending at Commercial Banks, May 1985, conducted by the Federal Reserve System.

15. Peter Lloyd-Davies, "Survey of Standby Letters of Credit," *Federal Reserve Bulletin*, December 1979, pp. 716-719.

16. August 1985 survey of large 12th District banks.

17. Michael Goldberg and Peter Lloyd-Davies, "Standby Letters of Credit: Are Banks Overextending Themselves?," *Journal of Bank Research*, Spring 1985, pp. 28-39.

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