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Research Department

Provisioning, Charge-Offs and the Willingness to Lend

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Summary

Since 1982, most major banks have increased their capital relative to their assets and many banks have made substantial provisions and/or taken significant charge-offs against loans to countries which have experienced debt servicing difficulties. This paper examines the impact of these developments on the willingness of banks: (1) to participate in new rounds of concerted lending and (2) to resume spontaneous lending.

Our primary focus is the decision to participate in concerted lending--a new loan on which part of the expected return is an improved prospect that the borrower will repay its outstanding indebtedness to the lender. When a bank's existing claims against the borrower plus the new loan exceed the bank's capacity to bear loss, provisioning will reduce the incentive to participate by reducing the extent to which potential losses can be shifted to third parties. When a bank is not overexposed to the borrower, but book values matter to creditors and regulators, provisioning will also reduce the bank's willingness to participate, since it reduces the cost of recording a decline in asset values and capital. In addition, specific provisioning or charge-offs against loans to a particular borrower directly reduce the expected return on new loans to that borrower since the bank can no longer hope to avoid them by making new loans. Moreover, the bank may be obliged to make a similar provision or charge-off against any new loans to the borrower.

Trends in specific provisioning since 1982 have increased the difficulty of achieving collective action. Banks that earlier perceived the smallest expected returns from new loans because of their relatively small

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exposures, appear to have taken much larger specific provisions than banks with large exposures. This has reduced their incentive to participate in concerted lending still more relative to banks with larger exposures.

We conclude that recent policy measures aimed at strengthening banks in the wake of the international debt crisis have reduced the willingness of banks to make concerted loans. Particularly troublesome are mandatory, specific provisioning requirements and charge-offs, which may deter some banks that otherwise would be willing to make bail-out loans. A major concern is the possibility that improvements in the economic prospects of individual countries that might otherwise encourage the resumption of spontaneous lending will not be met with prompt adjustments in provisioning requirements. The "basket of countries" approach to mandatory provisioning used by regulators in most creditor countries tends to be inflexible in this regard, since regulators have little discretion to change the classification of individual countries. The U.S. approach of classifying individual countries allows regulators the discretion to adjust classification as needed, although such discretion can also invite political pressures on classification decisions.

I. Introduction

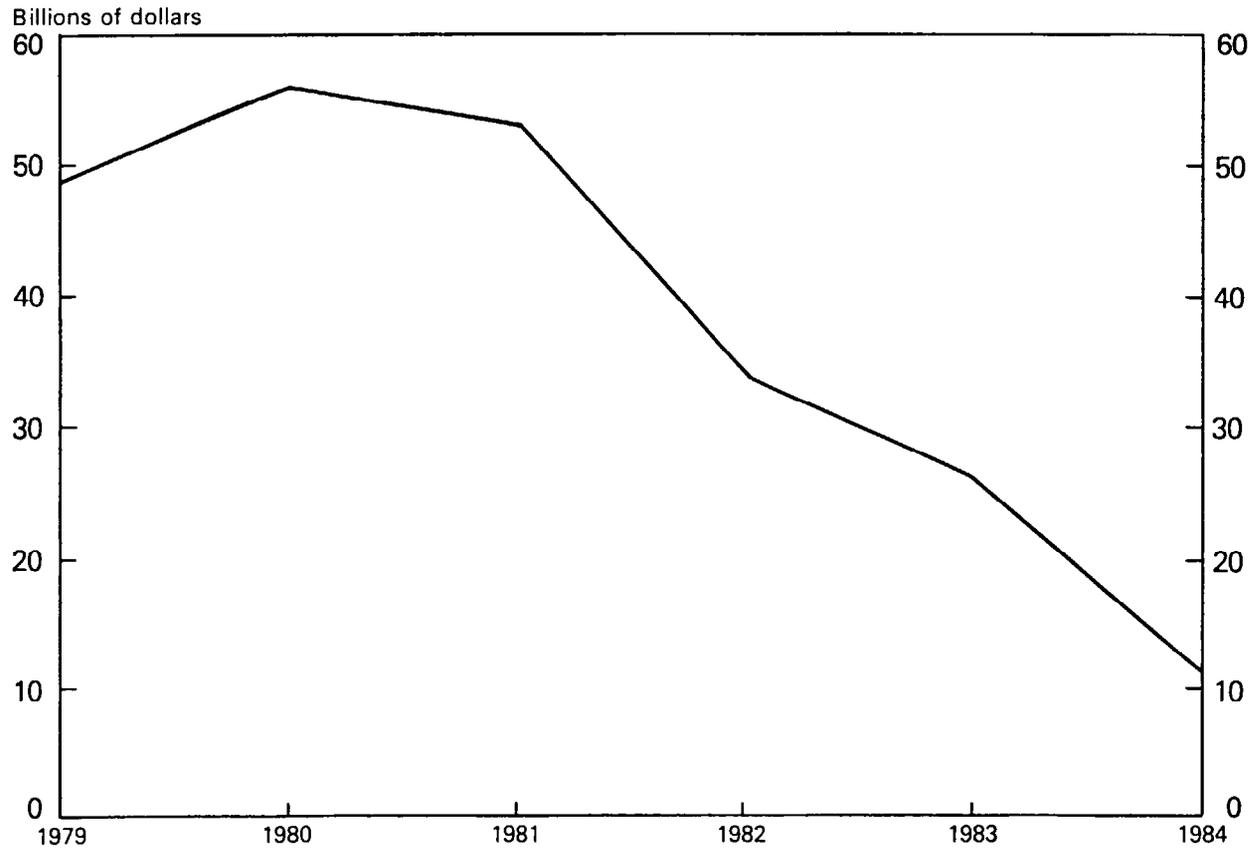
It is sometimes alleged that provisioning or charge-offs against outstanding loans to countries experiencing debt-servicing difficulties will influence the willingness of banks to make additional loans to those and perhaps other countries. The purpose of this paper is to examine the impact of provisioning and charge-offs in the context of an analysis of the factors influencing cross-border lending generally.

Since the Mexican debt crisis in mid-August 1982, the volume of new lending to developing countries has dropped sharply (see Chart 1). Indeed, from 1983 through 1984 the reported stock of outstanding claims on all non-OPEC developing countries increased by only \$20.8 billion, ^{1/} an amount less than the flow of concerted lending to five Latin American countries that arranged new-money packages in connection with International Monetary Fund adjustment programs. This suggests that the volume of lending not related to such programs, often termed "spontaneous lending," was

^{1/} This estimate, reported by Terrell and Mills (1985), is based on the quarterly series reported by the Bank for International Settlements (BIS), which has been adjusted for exchange rate changes.

CHART 1

BANK LENDING TO DEVELOPING COUNTRIES 1979-84



Source: M. Watson, D. Mathieson, R. Kincaid and E. Kalter. *International Capital markets, Developments and Prospects*, Occasional Paper No. 43, Table 1.



negligible. ^{1/} Although the unusually high level of real interest rates may well have reduced the demand for new bank loans, it seems likely that a considerable portion of the observed decline in the volume of new lending is attributable to a reduced willingness of banks to supply new loans to developing countries. Anecdotal reports in the financial press indicate that additional rounds of concerted lending may become much more difficult as well.

Clearly an increased flow of lending depends mainly on the resumption of sustained growth in the world economy, a decline in real interest rates to normal levels and the restoration of economic health in the major borrowing countries. We treat these factors which determine the probability of repayment as exogenous. Our focus is on a subsidiary and rather technical problem: to what extent do provisioning and charge-off policies influence the willingness of banks to make new loans?

Section II considers the impact of provisioning on a bank's willingness to make a "bail-out" loan when the bank is not concerned about recording losses on its balance sheet and income statements. Section III considers the impact of provisioning on a bank's willingness to make bail-out loans when the bank is in fact concerned about recorded book values. Section IV broadens the analysis to examine how provisioning may affect the problem of achieving collective action among the many banks that share claims against country borrowers. Section V looks ahead to the possible re-emergence of spontaneous lending, and considers whether prior provisioning will retard or accelerate the process. The last section summarizes the main conclusions of the papers.

II. Bail-Out Lending and Provisioning When Book Values Do Not Matter

1. Provisions and charge-offs

In common parlance, "provisioning" means "to take preparatory measures." For a bank this means an increase in its capacity to protect creditors or insurers from loss. Although definitions differ across

^{1/} Terrell and Mills (1985, p. 8) suggest that the reported change in outstanding claims may understate the amount of new lending because reported claims are reduced by loan charge-offs, sale of claims to non-bank investors, exercise of official guarantees, and repayments of principal (including reductions of interest rate arrearages). Furthermore, some developing countries that are considered to be the best credit risks have been able to issue capital market instruments such as floating rate notes which are not captured in the BIS reporting network. Nonetheless, there is little doubt that the amount of spontaneous lending has been very low.

accounting systems, "provisioning" that increases a bank's capacity to bear loss necessarily involves an allocation of revenues during a reporting period to a liability or reserve account corresponding to an increase in assets, as illustrated at the top of Table 1. Provisioning that does not increase the capacity to bear loss is cosmetic. A further discussion of the relationship between provisioning, the capacity to bear loss and bank capital is contained in Appendix I.

Provisions that appear on the balance sheet at a reporting date may be specific or general. Specific provisions are tied to a particular asset and are usually recorded as a liability. They are usually not included in the bank's capital for the purpose of evaluating capital adequacy. In contrast, general provisions usually are treated as capital. ^{1/} General provisions may be part of a capital account on the right side of the balance sheet, or (as in the U.S. convention) a loan loss reserve that is deducted from total assets on the left side.

In contrast to provisioning which involves crediting an asset account to reflect a retention of earnings, write-downs and charge-offs (which we use interchangeably) refer to balance sheet adjustments that instantaneously reduce the stated value of a specific asset. As illustrated in the second panel of Table 1, the charge-off may be taken against a decline in specific provisions, or against either of the two types of general provisions.

The traditional system in the U.S. involves provisioning through increases in a contra-asset, loan loss reserves, with charge-offs of specific assets taken against this account, as in part III of Table 1. Recently, the U.S. has also adopted a procedure for making specific provisions against cross-border loans to specified countries. These provisions are credited to a liability account designated the Allocated Transfer Risk Reserve (ATRR). In regulatory evaluation of capital adequacy, a bank's "primary capital" is defined to include the loan loss reserve but not the ATRR.

2. Bail-out loans and spontaneous loans

Whether and how the provisions that a bank has made influence the willingness to make new loans depends on how lending decisions are determined. We explore two cases. "Spontaneous loans" are to countries that are successfully servicing their old debt and are expected to continue to do so. Such countries can borrow on the same market terms from both new lenders and lenders to which they are already indebted. We defer a consideration of the theory of spontaneous lending until Section V.

^{1/} This is a highly controversial issue, however. See Revell (p. 226). The rationale for this difference in treatment will be discussed later.

Table 1. Illustrative Account Entries

I. Provisioning: Balance sheet changes corresponding to revenue retentions (OA>0).

Specific Provisioning		General Provisioning	
+OA	+SP	+OA	+C
			or
		+OA (+ LLR)	

II. Instantaneous balance sheet changes (OA=0)

Charge-off (Write-down)	
-SA	-SP
	or
-SA	-C
	or
-SA	
(-LLR)	

III. U.S. Arrangements

General Provisioning		Charge-Off (write-down)	
+OA		-SA	
(+LLR)		(-LLR)	
<u>Specific provisioning</u>			
+OA	+ATTR		

Definitions:

- SA = Specific asset
- OA = Other assets, equal to revenues retained during the period
- SP = Specific provisions, a liability account
- C = Capital account
- LLR = Loan loss reserve
- ATTR = Allocated transfer risk reserve

Spontaneous lending disappears when the borrower's ability to service outstanding indebtedness falls into doubt. This is, of course, the situation which confronts many developing countries in 1986.

When the servicing of outstanding credits depends on new loans, referred to as "bail-out loans," only banks with existing claims on the borrower will be willing to participate. This is because part of the anticipated return on a bail-out loans is an improvement in the borrower's prospects for servicing outstanding debt. A bank that does not have outstanding claims on the borrower cannot share in this part of the expected return and thus will anticipate a lower expected return on the bail-out loan than existing creditors. 1/

This problem could be alleviated if the new lender could obtain a prior claim against the borrowers; but unsecured lending contracts usually contain priority rules that prevent this. 2/ These rules effectively freeze past lending relationships until the servicing of past loans no longer depends on new loans and spontaneous lending can be regenerated.

Casual observation indicates that banks which have voluntarily made substantial provisions against their cross-border loans to specific countries are often the most reluctant to make bail-out loans to these countries. This does not necessarily imply, however, that the provisions are a cause of the reluctance to make new loans. We will show below that the incentive for a bank to make new loans to a country experiencing debt servicing problems increases with the bank's outstanding exposure to that country. At the same time banks with relatively small exposures are also more likely to provision against old loans, partly because their capacity to do so is likely to be greater. 3/ Thus, a tendency to make large provisions and a disinclination to make new loans are both the consequence of relatively small exposure.

1/ A new lender could achieve the same expected return as existing creditors if the new lender made the bail-out loan and purchased the outstanding claims on the borrower from the existing creditors. If the new lender paid any price greater than zero for the outstanding claims, however, the expected return to the new lender would be less than to existing creditors.

2/ Negative pledge clauses prevent the borrower from subordinating the lender's claim in subsequent loan transactions, and pari passu clauses assure that any privileges accorded new creditors will be extended to old creditors.

3/ In addition, a bank with provisions equal to 100 percent of its exposure to a given country can inform the market that it has zero exposure, which may be advantageous when shareholders and creditors are uneasy about the prospects of a particular borrower and when disclosure is limited.

To determine the independent influence of provisioning requires a model of bail-out lending. This section is based on the model developed in Appendix III. Two assumptions are maintained throughout. The first is that bankers, tax authorities, regulators, investors and bank creditors ignore accounting magnitudes that differ from market values. Hence, only market values matter. We recognize that this assumption is a polar case, but it yields results which provide a useful benchmark against which we can assess the implications of assuming that accounting values also matter. In addition, a model based on this assumption does have some empirical relevance. Substantial evidence exists that equity investors focus on market rather than book values. Moreover, several major banks employ management information systems based on market values (imputing market values where necessary to assets that are not traded), suggesting that at least some banks make decisions based on market values. The case where book values matter is considered in Section III.

The second major assumption is that only a single lender is involved. This is manifestly not true in contemporary debt servicing problems where the challenge of achieving collective action is very important. Nevertheless, it is convenient to consider the simpler case before proceeding to the more complex one, which is examined in Section IV.

The analysis below begins with three additional assumptions which are relaxed in sequence.

a. The bank's capacity to bear losses exceeds its outstanding claim against the borrower plus the required bail-out loan. (Thus, the bank would not fail if the bail-out loan is not successful).

b. The bank is not subject to constraining capital requirements, nor to penalties if capital falls below some minimum level.

c. The bank maximizes expected profits and is not subject to any risk constraints.

3. The basic case

Given the assumptions specified above, a bank will be more willing to make a bail-out loan: (i) the higher is the probability that the loan along with the bank's old claim against the borrower will be repaid; (ii) the lower the general level of interest rates (which affects the bank's alternative use of funds); ^{1/} (iii) the higher the spread on the

^{1/} This is true even though the bail-out loan is priced at a margin above the market rate of interest. A rise in the market rate of interest increases both the contractual interest payment and the cost of funds. On balance, this reduces the willingness to lend because the increase in the cost of funds is certain, while the return from the new loan is not.

new loan over the risk-free rate; and (iv) the larger the bank's old claims against the borrower.

Obviously the better the prospects that the borrower will repay, the more willing the bank will be to make the bail-out loan. This probability depends on a number of factors including macroeconomic conditions in the world economy and the country in question that are taken as given for the purpose of this paper. But the probability of success also depends on whether a bail-out loan of adequate size is made. We focus on the probability of repayment that is associated with the bail-out loan size which yields the maximum probability of success. 1/

Given all the other factors, a bank is more willing to make a bail-out loan when its outstanding claims on the borrower are large because the recovery of those claims is part of the return on the bail-out loan, and the larger the claims the higher the return. This is a fundamental difference between spontaneous and bail-out lending. In spontaneous lending a bank is either indifferent to the amount of its outstanding claim against the borrower, or if the bank is risk-constrained, its willingness to make new loans will decline as the volume of its old claims rises.

To the extent that a bail-out loan to one borrower is perceived to affect the probability of repayment of outstanding loans to other borrowers, the relevant measure of outstanding claims may be much larger than the claims on the specific borrower seeking a new loan. Such interconnections may be economic or political.

In this basic model of bail-out lending, provisioning does not matter because it does not affect any of the factors that determine a bank's willingness to lend. The same is true of charge-offs. Although outstanding claims do influence the willingness to make new loans, the accounting value of such claims is irrelevant. The exposure concept that matters in the lending decision is the maximum amount the bank could collect from the borrower if the borrower is able and willing to repay the debt in full. Charge-offs affect this magnitude only if accompanied by explicit debt forgiveness. In the absence of forgiveness, a bank's claim on the borrower is reduced only if the outstanding balance is repaid (or if the asset is sold). 2/

1/ See the first section of Appendix III for further discussion of this assumption.

2/ The repurchase of outstanding obligations at a discount has been a regular feature of the resolution of several past debt crises. See Sachs (1982). Apart from a limited volume of swaps with, and outright sales to entities in borrowing countries, purchases of discounted debt have played no role in the current crisis.

4. Exposure exceeds bank capital

If the bank's existing exposure to the borrower plus the bail-out loan required to maximize the probability of repayment exceeds the shareholder's equity, the bank may be more willing to extend a bail-out loan than in the basic case where claims against the bank do not exceed the shareholder's equity. The reason is that shareholders will obtain full benefit if the bail-out loan is successful; but if it fails, the part of the loss that exceeds shareholder's equity will be borne by creditors and/or insurers. ^{1/} Thus, the ability to shift potential losses to third parties increases the willingness to lend.

An implication of both the basic and the modified model is that countries that have larger absolute amounts of outstanding debt should find it easier to obtain bail-out loans, while an implication of the modified model is that banks that have greater exposures relative to capital should be more willing to make bail-out loans. This seems broadly consistent with the evidence. As shown in Tables 2 and 3, the major share of new lending by U.S. banks to Latin American countries between 1982 and 1984 went to Brazil and Mexico, the two countries with the largest debt to banks. Furthermore, the 24 largest banks with much higher ratios of exposure to capital than the smaller banks, accounted for all of the increases in outstanding loans to these countries.

We do not know whether bail-out loan decisions today are being influenced by the expectation that part of the risk of loss is borne by third parties. Yet for some major banks, exposures relative to book capital are so large, and the repayment prospects of loans to major borrowing countries appear to be so interrelated, that the possibility cannot be disregarded.

As in the basic case, charge-offs will not affect the willingness to make new loans (because changing the accounting value of exposure does not affect the bank's claims against the borrower), but provisioning may. When exposure to the borrower plus the necessary bail-out loan exceeds the bank's capacity to bear loss, provisioning that increases the capacity of the bank to bear loss may diminish the willingness to extend a bail-out loan. This point may be of some contemporary relevance since many of the most heavily exposed banks have substantially increased their capital since August 1982. For example, the nine U.S. money center banks increased their primary capital by 39 percent from December 1982 to June

^{1/} This assumes that the third parties do not anticipate that the bank is shifting an additional risk onto them and charge an appropriate risk premium.

Table 2. Change in Loans Outstanding to Major Latin American Borrowers 1/

(In billions of U.S. dollars)

	All U.S. Banks			9 Money Center Banks		
	12/82	6/85	Change	12/82	6/85	Change
Latin American Total	70,619	72,352	1,733	42,423	44,355	1,932
Mexico	24,287	25,372	1,085	13,094	14,045	951
Brazil	21,955	24,732	2,777	14,166	16,060	1,895
Argentina	8,576	8,449	(127)	5,552	5,596	45
Chile	5,887	6,303	415	3,199	3,642	443
Colombia	3,663	2,616	(1,047)	2,584	1,890	(694)
Peru	2,450	1,881	(569)	1,318	1,029	(289)
Others	3,801	2,999	(802)	2,511	2,093	(418)
Bank Capital	70,600	98,800	39.9%	29,000	39,000	35.5%
Latin American Total as % Bank Capital	100%	73%		146%	113%	
	15 Large Banks			Other Smaller Banks		
	12/82	6/85	Change	12/82	6/85	Change
Latin American Total	14,309	15,289	981	13,887	12,708	(1,180)
Mexico	5,071	5,429	358	6,122	5,898	(224)
Brazil	4,327	5,188	861	3,462	3,484	21
Argentina	1,823	1,924	102	1,202	928	(274)
Chile	1,288	1,330	43	1,401	1,331	(70)
Colombia	537	398	(138)	543	328	(215)
Peru	697	533	(165)	434	319	(115)
Others	567	487	(80)	724	420	(304)
Bank Capital	13,500	19,500	44.4%	28,100	40,000	42.3%
Latin American Total as % Bank Capital	106%	78%		49%	32%	

Source: Country Exposure Lending Survey, 6/1/83 and 11/6/85

1/ Excluding Venezuela.

Table 3. U.S. Bank Claims on Five Countries That Received Concerted Loans

(In billions of U.S. dollars)

Group of Banks	Outstandings			Concerted Lending 1983-1984	Implied Other Lending
	12/82	12/84	Change		
All U.S. banks	60,931	64,137	3,206	9,200	(5,994)
9 Money center banks	36,714	39,420	2,706	5,543	(2,837)
15 Large banks	12,454	13,366	912	1,880	(968)
Other small banks	11,763	11,351	(412)	1,776	(2,188)

Source: Country Exposure Lending Survey, 6/1/83 and 4/19/85.

1/ The total, \$9.2 billion, is the new-money component of financial packages arranged in connection with IMF programs for Argentina, Brazil, Chile, Mexico, and Peru (Terrell and Mills (1985)). The allocation across groups of banks is based on the assumption that the shares were proportional to each group's outstanding claims on the five countries as reported for 12/82.

1985, 1/ while there was only an 8 percent increase in their claims on the five Latin American countries for which concerted lending programs have been established.

The analysis to this point indicates that charge-offs will have no impact on the willingness to make a bail-out loan. Provisioning will not have an impact either unless the bank's potential claims on the borrower exceed its capacity to withstand a loss. When this is the case the volume of bail-out loans available to the borrower will decline as over-exposed banks increase their capital.

1/ See Country Exposure Lending Surveys, 11/6/85. Some of this increase in primary capital reflects issues of subordinated debt, which do not add to the capacity to bear loss.

5. Binding capital requirements or penalties for capital deficiencies

If a bank is not overexposed but is subject to a binding capital requirement, its willingness to make a bail-out loan is reduced. The higher are the capital requirements and the higher the bank's cost of capital, the less the willingness of the bank to make a bail-out loan. Under these conditions, provisioning would increase the willingness to make bail-out loans because it would tend to relax the capital constraint.

A bank may be subject to a penalty if its capital position falls below some specified level. While the bank can always eliminate the penalty by increasing its capital, in which case the analysis of binding capital requirements applies, it may be less costly to pay the penalty. Since the cost of capital for some banks may be prohibitively high, this case may be relevant.

Clearly, if the bank's capital is so high that it would not suffer a penalty whether it makes the bail-out loan or not, the loan decision will be unaffected by the prospect of a penalty. If capital is lower, however, in a range where the bank would have to pay a penalty if it makes the bail-out loan and the loan fails but not otherwise, the prospect of paying the penalty reduces the willingness to make the loan. Since an increase in capital will reduce the penalty if the loan is made and fails, under these conditions provisioning will have the same effect as in the case where capital requirements are binding; it will increase the willingness to lend.

If capital falls to the range where the bank would pay a penalty if the bail-out loan is not made or if the loan is made and fails, but not if the loan is made and succeeds, provisioning reduces the willingness to lend just as when the bank is overexposed.

The introduction of capital constraints and penalties implies that provisioning may affect the bail-out loan decision well before the point where the bank's exposure to the borrower exceeds its capital. Provisioning will increase the willingness to lend if the bank is subject to constraining capital requirements, or if the bank can avoid subjecting itself to the risk of paying a penalty by not making the bail-out loan. However, if capital falls below this range, provisioning has the opposite effect. Provisioning thus reduces the willingness to lend even before the point is reached where the bank's exposure to the borrower exceeds its capital.

6. Risk neutrality

The assumption that banks maximize expected profits implies that they attach no cost to variance in their total profits. This assumption of risk-neutral bank behavior does not, however, imply that the shareholders of banks are also risk-neutral; risk-averse shareholders can reduce the variance in their own income by diversifying their portfolios.

The assumption of risk-neutral bank behavior is widely used and defended. Tobin (1982, p. 523), for example, has recently observed that "Risk-neutrality seems the appropriate assumption for the firm. A bank is managed by specialists engaged in taking a long sequence of risks... and can expect bad luck and good luck to 'average out.' That is, the long-run variance of the profits associated with any given policy is much smaller than the short-run variance."

Other considerations, however, may lead to risk-averse behavior:

(i) The bank may be closely held by managers who cannot diversify because the bank is the major part of their human and financial capital. This would be unusual among the major banks that are heavily involved in international lending, but may be relevant to some small banks. (ii) Shareholders may prefer that the bank minimize the risk of bankruptcy because they would lose the going-concern value of the bank (or be subject to some other default penalty) if it were to be closed. ^{1/} (iii) The managers of the bank may be risk averse because they perceive that their position may be jeopardized by sharp declines in bank profits. Even though shareholders might prefer that the bank maximize expected profits, monitoring costs may be too high to prevent the managers from imposing a risk constraint. (iv) Bank regulatory and supervisory authorities may limit the bank's ability to take risks in order to reduce the risk of bankruptcy to socially acceptable levels, or to prevent the bank from taking undue advantage of implicit or explicit deposit insurance or emergency liquidity assistance.

If a bank's objective to maximize expected profits is subject to a binding constraint that the probability the bank will fail not exceed some specified level (which may be imposed by regulators, owners or managers), the willingness to make a bail-out loan will be influenced by provisioning. Increases in the bank's capacity to bear loss relax the constraint by allowing the bank to make loans that increase the anticipated variance of profits to levels that previously would have been unacceptable. This could include bail-out loans that the bank was constrained from making before.

Presumably this case would apply only to a bank that was not over-exposed. Such a bank is likely to have small exposures. A bank with an exposure so large that the sum of its outstanding claims on the borrower and the required bail-out loan exceeds shareholders' equity is undoubtedly in violation of any risk constraint it may have had. We have discussed how this could happen in another paper. ^{2/} The excessive risk exposure of such a bank is unintentional, reflecting prior mistakes or unanticipated bad luck.

^{1/} See Herring and Vankudre (1985).

^{2/} See Guttentag and Herring (1986 a).

How does a bank behave after it has unintentionally violated its self-imposed risk constraint, and cannot honor it immediately without going out of business? This is an unexplored theoretical question. Our surmise is that the bank would try to generate retained earnings as rapidly as possible in order to return to its risk constraint. But the quickest way of generating reserves internally is to maximize expected profits. Thus, the risk constraint becomes irrelevant to the bail-out loan decision and, just as before, provisioning which increases the bank's capacity to bear loss will reduce the willingness to make such a loan.

In sum, if a bank is subject to a binding risk constraint, provisioning may increase its willingness to make a bail-out loan. Such banks, however, are likely to have small exposures. If a bank is overexposed in the sense that its outstanding claims on the borrower plus the required bail-out loan exceed the bank's capacity to bear loss, provisioning will reduce its willingness to make the loan. This is clearly true if the bank is risk-neutral, and our surmise is that it is also true if the bank were risk constrained *ex ante*, but finds itself in violation of the risk constraint *ex post*.

III. Implications of Provisions and Write-Downs for the Supply of Bail-Out Loans When Book Values Matter

The amount and type of provisions reported by banks on their balance sheets, as opposed to their real capacity to bear losses, may be important *under conditions where book values matter*. *Book values matter* to banks because under some circumstances they affect the attitudes of investors or creditors, the actions of supervisors or regulators, the bank's tax liability, or the compensation of management. These possible impacts are discussed in Appendix II.

If the provisioning reported by a bank, as distinguished from increases in its capacity to bear loss, affects market perceptions, regulatory actions, management compensation or tax payments, it will also affect the willingness of a bank to make new bail-out loans.

1. Book values and the incentive to make bail-out loans

When bank managers perceive a cost in reporting a decline in the market value of an asset, the incentive to make a bail-out loan will be enhanced. By making a bail-out loan, the bank not only has a chance of retrieving its outstanding claims on the borrower, but also the bank can delay--perhaps indefinitely--charging-off its outstanding exposure by enabling the borrower to stay current on interest payments.

In Appendix III we assume that the bank perceives a cost to reducing the stated value of claims on the borrower that is proportional to the book value of those claims. This cost becomes part of the opportunity cost of not making the bail-out loan since the outstanding exposure must be charged off if the bail-out loan is not made. It is also a negative component of the expected return on the bail-out loan since in the event the bail-out loan fails, both the bail-out loan and the outstanding exposure must be charged off. But since the opportunity cost is certain, while the failure of the bail-out loan is uncertain, on balance there is an increased incentive to make the bail-out loan.

2. Voluntary provisioning and charge-offs

When book values matter, provisioning will reduce the incentive to make a bail-out loan because it reduces the perceived cost of recording asset value declines that could be avoided by making the loan. As noted in Appendix II, a major reason banks are reluctant to record declines in asset values is that such declines cause corresponding declines in the bank's book capital, which may trigger adverse reactions from creditors or regulators. This effect would hold even if the provisioning does not affect the bank's capacity to bear loss, provided the bank anticipates that creditors or regulators will act as if provisioning does have this effect. 1/

In addition, charge-offs and provisions against loans to a specific borrower may deter bail-out loans to that borrower, for two reasons. First, the expected return on the bail-out loan will decline when specific provisions or charge-offs reduce the decline in reported income or asset values that would occur if the loan is not made. Second, additional loans would require similar provisions or charge-offs. Thus, a bank that has taken a 50 percent specific provision against its loans to country A has both halved the potential drop in its book capital from not making a bail-out loan to A, and has placed itself in a position where it may be obliged to make a 50 percent provision if it does make a bail-out loan.

When book values matter, new loans that are subject to specific provisions are less attractive than loans for which provisioning is unnecessary. Accountants may not require that provisions be placed on new loans with short maturities such as trade credits or interbank placements. The presumption is, however, that medium-term credits in support of balance of payments adjustment programs should not be treated differently from outstanding claims.

1/ See Appendix I for a discussion of how book capital may differ from the capacity to bear loss.

Ordinarily, a bank would not voluntarily make provisions that would constrain it in the future from making loans it would otherwise care to make; but, of course, foresight is imperfect. The condition of a borrower may unexpectedly improve after the provision was taken and conservative accounting practice is likely to preclude a prompt reversal in provisioning requirements. A reversal of provisions usually requires that the borrower's credit standing be completely restored. A partial restoration is not sufficient.

3. Mandatory specific provisions

The same problem arises in the case of mandatory, specific provisions that oblige banks to credit special liability accounts equal to some percentage of total claims against a specific country or a "basket" of countries. In the U.S., requirements are specified against individual countries. In Canada, Japan, the Netherlands, Spain, Sweden, and Switzerland the requirement is specified against a basket or several baskets of countries, the number of baskets ranging from one (in Japan and Canada) to five (in Spain).

Unless supervisors and regulators change requirements as soon as a borrower's prospects change or exempt new loans from old requirements, mandatory provisioning will reduce the expected return from new loans. Under the "basket of countries" approach to mandatory provisioning, sensitivity of the provisioning rule to improvement in the status of any one country in the basket is likely to be small, discouraging new loans to such countries. If, as in some countries, the rule is completely mechanical so that, for example, the basket includes all loans to every country that has undergone a rescheduling exercise over the previous five years, provisioning requirements will deter the resumption of lending even if there is a dramatic improvement in a country's economic condition.

The U.S. approach of classifying individual countries appears to be much more flexible. The U.S. authorities have been careful to exempt certain categories of new lending from the Allocated Transfer Risk Reserve, ^{1/} and they have made clear their intention to revise the classification of a country as soon as conditions warrant a revision. ^{2/} This added flexibility, of course, imposes the burden of discretion on U.S. authorities, and may subject them to political pressures to revise classifications prematurely, or to delay adverse classifications unduly.

^{1/} These categories are usually short-term credits. Thus far, the supervisory authorities have found it difficult to exempt medium-term credits which are most useful for supporting balance of payments adjustment programs.

^{2/} Turkey is the most notable case of a country that has been upgraded.

IV. Provisioning and the Difficulties of Achieving Collective Action

To this point we have assumed that total claims against a country are held by one lender. In fact, many lenders are involved and the need for collective action is an important problem. After a brief review of the problem, 1/ we shall focus on how provisioning affects it.

The problem of collective action arises when no individual lender has an incentive to make the full bail-out loan unilaterally, but lenders have a collective interest in making the loan. The larger the number of individual lenders, the smaller the incentive for any one lender to take action in the group interest, and the greater the difficulties in achieving collective action. The incentive for individual lenders to take collective action diminishes as the need for collective action increases.

This means that the model of bail-out lending developed above which assumes a single lender indicates the maximum volume of lending that might be expected in a regime of many lenders. The actual volume of lending will approach that maximum to the degree that efforts to induce individual lenders to behave in the collective interest are successful.

In addition to the bargaining costs inherent in obtaining agreement among a large number of independent decision-makers, anticipation of the difficulties of achieving collective action may discourage individual lenders from participating. An individual lender's expectation that a bail-out loan will succeed depends not only on the lender's perception of the borrower's capacity and willingness to repay, but also on expected behavior of other creditors toward the debtor. A bank expecting that other lenders will not participate will assign the bail-out loan a lower probability of success than if the bank could count on each lender to contribute a proportionate share. Anticipations of difficulty in organizing a bail-out loan may well become a self-fulfilling prophecy.

Another impediment is that individual banks may expect that they can free-ride on a bail-out loan made by other lenders. A bank is more likely to expect that it can free-ride if it believes that other lenders would be willing to make bail-out loans in excess of their proportionate shares of the outstanding claims on the borrower. This belief is plausible if there are political reasons for official entities to grant subsidies or extend bail-out loans to the borrower. It is also plausible if other lenders are known to be much more heavily exposed. 2/

1/ For a more extensive discussion, see Herring (1985).

2/ This is an advantage of having an unimportant exposure. The more heavily exposed banks may attempt to persuade the prospective free-rider to participate by threatening to withhold the bail-out loan; but this is unlikely to be a convincing bargaining ploy since the heavily exposed banks clearly have much more to lose in the event the bail-out loan is not made.

The difficulties in achieving collective action among banks with outstanding claims on a troubled debtor country increase with differences between the banks regarding a variety of factors that bear on their willingness to make bail-out loans. Some banks, for example, have collateral relationships with the debtor that would be jeopardized if the bail-out loan fails while other banks don't. Some banks have more leeway to deduct provisions from taxable income than others, and some place greater value on international cooperation. Some banks with relatively small exposures may believe that they can obtain a competitive advantage vis-à-vis more heavily exposed banks if the bail-out loan is not made. But perhaps the most important differences between the banks are in the extent of their exposures relative to their capacity to absorb reductions in book capital and income. These last two factors may be affected by prior provisionings.

Banks with relatively small exposures appear to have taken much larger specific balance sheet provisions than have banks with larger exposures. On the assumption that book values matter to the first group of banks, these provisions have reduced the return to them from bail-out lending because part of the return from such lending--the ability to delay reductions in book capital and income--disappears when the reductions have already occurred. In addition, when specific provisions have been taken against loans to a given borrower, new loans may be subject to the same provisions. Thus, specific provisioning trends have caused the perceived returns on bail-out loans to decline most for many of the banks which, because of their relatively small exposures, faced relatively low expected returns before provisions were made.

The upshot is that trends in specific provisioning have tended to increase the differences in expected returns on bail-out loans between the heavily exposed and lightly exposed banks, and thereby made collective action more difficult.

V. The Impact of Provisioning and Charge-Offs on Spontaneous Lending

The hallmark of a spontaneous loan is that it yields the same expected return to lenders who do and lenders who do not have outstanding claims on the borrower. Spontaneous loans are made only to borrowers in good standing who are expected to remain in good standing. Since the outstanding claims on the borrower are expected to be serviced on time, whatever the decision of existing creditors regarding a new loan, the repayment of outstanding exposure is not part of the expected return on a spontaneous loan.

We will examine the impact of provisioning and charge-offs on spontaneous loans under two assumptions: (i) that banks maximize the expected value of profits, and (ii) that banks maximize the expected value of profits subject to a binding risk-constraint.

1. Factors depressing the expected return on spontaneous loans

A variety of powerful forces are working against the resumption of spontaneous lending to developing countries. Mandatory provisioning is but one among the many factors that have increased the perceived risk and cost, and reduced the expected return on new spontaneous loans.

Probably the most important reason for the decline in spontaneous lending is the sharp decline in expected return on cross-border loans to a large number of developing countries that has occurred since 1982. We have previously argued that prior to the Mexican debt crisis in August 1982, expected returns were overestimated for a number of reasons. 1/

(1) Banks may have been subject to disaster myopia, disregarding the possibility of major shocks carrying low, but unknown probabilities.

(2) Banks may have placed undue reliance on the efficacy of short-maturities to protect themselves against debt-servicing difficulties.

(3) Banks may have believed governments or international institutions would protect them against severe loss if debt-servicing problems affected most major banks.

(4) Banks may have drawn excessively optimistic inferences from inadequate data concerning the current condition and outstanding indebtedness of major countries.

Events since 1982 have provided a powerful corrective. Indeed, it seems likely that for the indefinite future, risks will be overestimated. The same decision-making mechanisms that gave rise to disaster myopia before 1982 are likely to lead to overestimates of the risk of a major shock in light of recent experience regarding payments interruptions on sovereign debt. Short maturities have provided uncertain protection against payments problems. In some instances they have been rescheduled on the same basis as other debt. 2/ The anticipated implicit guarantees from governments and international agencies have so far proved disappointing. In the wake of a series of unpleasant surprises, inadequate data are now regarded with suspicion rather than optimism.

The regulatory response to the debt crisis since 1982 is also likely to retard the resumption of spontaneous lending. Banks in most countries have been pressured to increase their capacity to bear loss. Higher

1/ These hypotheses are described in much greater detail in Guttentag and Herring (1986 a).

2/ Indeed, in one instance, only short-term claims were rescheduled.

capital asset ratios increase the required rate of return on all assets subject to the ratio and thus harden the terms on which new loans will be made. Many countries have put into place systems for taking cross-border loans into account in evaluating capital adequacy, and for imposing mandatory provisions against troubled foreign debt. These measures are an abrupt departure from the earlier era when transfer risk was not subject to systematic regulation. Cross-border loans are also subject to a much greater degree of public disclosure.

The public reaction which preceded and accompanied many of these regulatory measures is perhaps even more harmful to prospects for a resumption of spontaneous lending than the regulatory measures themselves. In the United States particularly, banks were under heavy political attack for "wasting money abroad while domestic needs were unsatisfied." Banks may well demand a higher expected return from new foreign loans to compensate for potential political costs.

Finally, the wave of deregulation that is sweeping around the world is giving banks access to new activities and new geographic markets in several countries with high per capita incomes. It is generally anticipated that the expected return on loans and investments in the advanced industrial countries will be much higher than in the era before 1982. This will increase the opportunity cost of spontaneous loans to developing countries.

2. The impact of provisioning on risk constraints

When banks are risk-constrained the outstanding exposure to a given country has a negative impact on the willingness to make new loans to that country even though the outstanding loans are in good standing. The impact is greater the larger is the anticipated covariance with the rest of the portfolio, 1/ and the smaller the bank's capacity to bear loss. Provisioning will increase the willingness to make new loans because it increases the capacity to bear loss.

We have argued that before 1982, banks underestimated the correlation of risks among loans to different countries, believing that their portfolios of cross-border loans were highly diversified. 2/ They tended to ignore systematic linkages associated with potential increases in real interest rates that would affect all borrowing countries, and with potential funding problems that would face developing countries in the event

1/ For a formal analysis of one such model of bank behavior, see Guttentag and Herring (1986 c).

2/ See Guttentag and Herring (1985 b) for an elaboration of this argument.

of a deterioration of confidence in their creditworthiness by the banking community. These mistakes will not soon be repeated. Indeed, in view of the recent unfavorable experience, there may be a tendency for such linkages to be exaggerated. This tendency may well be reinforced by mandatory provisioning requirements against loans to baskets of developing countries, since such requirements imply that the countries in a basket are linked.

When anticipated covariances are large among a group of loans which constitute a significant proportion of a bank's capital, new lending to individual countries within the group may be deterred even though each exposure considered separately is a small proportion of total capital. Under such circumstances, provisioning should increase the bank's willingness to make new loans because it enables the bank to accept a higher degree of exposure or covariance and still remain within its risk constraint.

Ironically, specific provisions that have had the effect of discouraging bail-out lending in the years prior to a country's return to creditworthiness may indirectly contribute to a revival of spontaneous lending by a risk-constrained bank. With loans to developing countries static, the growth of the bank gradually reduces the extent of covariance of new loans to developing countries with the rest of the portfolio. Thus, the negative short-run impact of specific provisioning on the willingness to make bail-out loans, may have a positive effect on the willingness to resume spontaneous lending in the long run. We would view any such effect, however, as of very small importance relative to the powerful forces operating in the other direction.

VI. Summary and Conclusions

This paper examines the impact of provisioning and charge-offs against outstanding cross-border loans on the willingness of banks to make new loans. We define provisioning as an increase in a bank's capacity to bear loss through earnings retention, while recognizing that sometimes the provisions that appear on balance sheets are strictly cosmetic. Provisioning may be general, in which case it is sometimes recorded as an increase in the capital account, or it may be tied to a specific asset, in which case it is usually recorded as an increase in a liability account. A charge-off or write-down is an instantaneous reduction in the balance sheet value of a specific asset.

Our primary focus is the decision to supply a bail-out loan--a new loan on which part of the expected return is an improved prospect that the borrower will repay its outstanding liabilities to the lender. In the simplest version of our model of the supply of bail-out loans, neither provisioning nor charge-offs affect the loan decision. This version of

the model assumes: (i) that the bank's existing claims against the borrower plus the required bail-out loan are less than the bank's existing capacity to bear loss; (ii) that the bank is neither subject to binding capital requirements nor to penalties if capital falls below some minimum level; (iii) that the bank maximizes expected profits; (iv) that all decisions by banks, bank creditors, shareholders and regulators are based on market values; and (v) that only a single lender is involved. These assumptions are relaxed in turn.

When a bank is "overexposed" in the sense that its existing claims against the borrower plus the bail-out loan exceed the bank's capacity to bear loss, its willingness to make a bail-out loan will increase. If the loan fails, some of the loss will be borne by creditors or insurers rather than the bank's shareholders, whereas, if the loan succeeds, the full benefit accrues to shareholders. Under the conditions, provisioning will reduce the incentive to make bail-out loans by reducing the extent to which potential losses can be shifted to third parties. This result is extremely robust. Provisioning always reduces the supply of bail-out loans from an overexposed bank regardless of whether any of the other specified assumptions are relaxed.

The major international banks which are the most heavily exposed, have also been the most willing to make bail-out loans. While none of these banks has claims on any one country that exceed its capacity to bear loss, the repayment prospects of some troubled debtor countries may appear to be so interrelated that some banks may perceive themselves to be overexposed to a group of such countries. If this perception has influenced their lending policies, our model implies that these banks will be less willing to make bail-out loans as their capital increases. Since 1982, the capacity of these banks to bear loss has increased at a much faster rate than their claims on the troubled debtor countries.

If the bank is subject to capital requirements which are enforced by imposing cash penalties on the bank that are proportional to the size of the capital deficiency, the impact of provisioning (given its exposure) depends on the bank's capital relative to the required minimum. When a bank's capital falls to the level where the bail-out loan decision begins to be influenced by the prospect of having to pay a capital deficiency penalty, provisioning would increase the willingness to make a bail-out loan. ^{1/} But if the bank's capital falls further to the point where it can avoid a capital deficiency penalty only by making a successful bail-out loan, provisioning will reduce the willingness to lend. Thus, the

^{1/} The penalty begins to impinge on the loan decision at the point where the bank would be subject to a capital deficiency penalty if it makes an unsuccessful bail-out loan, but not if it refuses to make a bail-out loan.

introduction of a capital penalty reinforces the pessimistic inference regarding the impact of provisioning on the willingness of major banks to continue making bail-out loans. Under the current regulatory regime in which there is intense pressure on banks to raise their capital-to-asset ratios, provisioning may continue to have a negative impact on the willingness to make bail-out loans even after capital has grown to the point where a bank is no longer overexposed.

Modification of the model to permit risk-averse behavior by the bank also has divergent implications for the influence of provisioning. If the bank is subject to a binding risk constraint, provisioning may increase the willingness to lend. This may well be the case for lightly exposed banks but such banks have little incentive to increase their exposure in any event.

If a bank has inadvertently violated its risk constraint, however, provisioning is likely to reduce the willingness to lend just as in the case where the bank is overexposed. Such a bank may determine that the most expedient way of returning to its preferred risk position is to maximize expected profits and build up its capital position through retained earnings. This case may apply to the most heavily exposed banks which otherwise have the strongest incentive to lend.

The assumption that all decisions are based on market values is clearly implausible in some instances. Banks outside the U.S. have good reason to believe that adverse changes in book values will affect perceptions of both equity investors and creditors because of the limited public disclosure of information concerning bank soundness. And even in the U.S. where equity investors demand and receive a great deal of information, banks have reason to be concerned about the impact of bad news on relatively unsophisticated depositors. Many regulatory constraints, including capital requirements, are also based heavily on book values. When book values matter to a bank, the deterrent effects that provisioning may have on the willingness to make bail-out loans, is enhanced.

If a bank has a loan on its balance sheet at a value that exceeds the market value of the loan and bank managers perceive a cost in reporting a decline in the book value of the loan, the return on a bail-out loan is increased. In addition to the expected return on the loan (including the possibility of retrieving its outstanding claims), the bail-out loan enables the bank to delay writing down its exposure by giving the borrower the means to stay current on interest payments. Under these conditions, provisioning will reduce the incentive to make the bail-out loan. Since provisioning constitutes a rise in the bank's capital, it reduces the cost of recording a decline in asset values and capital. This effect would hold even if the provisioning does not affect the bank's capacity to bear loss, so long as the bank perceives that creditors or regulators will act as if a change in book capital is a change in the bank's capacity to bear loss.

When book values matter, specific provisioning or charge-offs against loans to a given country, may deter bail-out loans to the same borrower. The specific provisions and charge-offs reduce the write-down that would be required if the bank does not make the bail-out loan, and oblige the bank to make similar provision and charge-offs if it does make the loan. Once provisions or charge-offs have been taken, conservative accounting practices may preclude a prompt reversal when the borrowers prospects improve.

The same problem arises in the case of mandatory specific provisions, which can inhibit new lending by banks that would not have voluntarily made such provisions. Even more serious is the possibility that the requirements will not respond quickly to improvements in the condition of a borrower. The "basket of countries" approach to mandatory provisions used by regulators in most creditor countries tends to be inflexible in this regard, since regulators have little discretion to change the classification of individual countries. The U.S. approach of classifying individual countries allows regulators the discretion of adjusting classifications as needed, but such discretion can also invite political pressures on classification decisions.

A model of bail-out lending that assumes a single lender indicates the maximum volume of lending that might be expected in a regime of many lenders. The actual volume of lending will approach that maximum to the degree that efforts to induce individual lenders to behave in the collective interest are successful. Many factors influence the degree to which collective action occurs, of which the most important are differences among the banks in the extent of their exposures relative to their capacity to absorb reductions in book capital and income.

These differences have been exacerbated by trends in specific provisioning. Banks with relatively small exposures appear to have taken much larger specific provisions than banks with large exposures. To the degree that book values matter, this has caused the perceived return on bail-out loans to decline most for the lightly exposed banks who faced the smallest expected returns before provisions were taken. Unless this effect is offset by the relaxation of self-imposed risk constraints associated with general provisioning, it can be expected that these banks will become increasingly reluctant to participate in new rounds of concerted lending.

The upshot is that the return on bail-out lending to the major heavily exposed banks is being eroded by general provisioning that increases their capacity to bear losses relative to their exposures. The return to the smaller and less exposed banks is being eroded by specific provisioning.

A variety of powerful forces are working against the resumption of spontaneous lending to developing countries that re-establish their creditworthiness. The mandatory provisioning requirements adopted by the supervisory authorities in most creditor countries are among the many factors that have increased the perceived risks and costs associated with new loans to developing countries.

On the other hand, to the extent that provisioning has increased the capacity to bear loss, banks that are subject to a risk constraint should be more willing to make spontaneous loans. Such banks are concerned both with the size of their exposure to any one borrower and the covariance of that exposure with the remainder of the portfolio. Over time, increased provisions should enable these banks to make new, spontaneous loans without violating their risk constraint.

Similarly, specific provisions that discourage bail-out loans in the short to medium term, may indirectly contribute to the resumption of spontaneous lending by risk-constrained banks. To the extent that claims on the borrower remain static while the rest of the loan portfolio expands, these banks will grow out of their risk-constrained positions so that they are once again willing to make spontaneous loans. This is faint grounds for optimism, however, since in the absence of adequate bail-out loans in the short to medium term, it is difficult to see how creditworthiness can be re-established.

Provisioning, Capital and the Capacity to Bear Losses

This note attempts to clarify the relationships between provisioning, bank capital, and a bank's capacity to bear loss.

1. Accounting logic and the capital account

As illustrated in Table 1, general provisioning increases the stated value of a bank's capital while specific provisioning does not. Charge-offs reduce the stated value of the bank's capital if prior provisioning has been general but not if prior provisioning has been specific. Is there any logic to these differences in outcome for the bank's capital?

This depends on what the bank's capital account is intended to measure. We take the traditional view that credits and debits to the capital account should reflect corresponding increases and decreases in the bank's capacity to bear loss. This would be the case, for example, in a world where well-developed market quotations existed for the claims held by banks, and banks periodically marked assets and liabilities to market. In such a world, charge-offs and capital gains would be accompanied by matching changes in bank capital which in turn would reflect changes in the capacity to bear loss. General provisioning in the form of revenue retention would also increase the capacity to bear loss.

In a world of known asset values and mark-to-market rules, however, there would be no such thing as specific provisioning. Specific provisioning can be viewed as a partial adaptation of accounting practice to a situation in which reliable information on asset values may not exist, and book values are maintained at historical cost until sufficient evidence accumulates to justify a charge-off.

Under such conditions, specific provisioning is a plausible way to deal with emerging information that strongly suggests that either (i) a specific asset may have declined in value, but the extent of the decline and the probability of later recovery are very uncertain; or (ii) a group of assets has almost certainly declined in value, but the extent to which specific assets in the group will ultimately be subject to loss is again very uncertain. A presumption underlying the use of specific provisioning is that uncertainty is likely to decline over time, leading either to a reversal or a charge-off at some point.

This suggests why specific provisioning has emerged as an issue in connection with cross-border loans. Because there is a strong presumption that substantial losses have occurred on loans to countries that are having debt-servicing difficulties, yet the exact amount and distribution among specific countries remain uncertain, specific provisioning appears

to be the most appropriate procedure. General provisioning is inappropriate because the shock to asset values has already occurred, although it undoubtedly would have been the appropriate response before August 1982.

Hence, application of the accounting principles described earlier, including specific provisioning, may produce changes in the capital account that reflect changes in the capacity to bear loss. But in practice reported changes in the capital account may diverge sharply from changes in the bank's capacity to bear loss.

2. Accounting practice and the capital account

If banks have discretion over the choice of accounting procedure to use and disclosure is incomplete, the choice may be influenced by a variety of factors having little or nothing to do with presenting an accurate picture of the bank's condition. For example, a bank may engage in general general provisioning even though specifically identifiable losses have occurred. In general, however, specific provisioning, which would not exist if asset values were known and assets were marked to market, is most vulnerable to misuse and misinterpretation.

(a) Specific provisions and charge-offs

The presumption that specific provisions are temporary is shaky in the case of cross-border loans. Unlike domestic loans, where a loss point can be definitively established when a borrower terminates operations and is liquidated, a definitive loss point on cross-border loans to (or guaranteed by) sovereign governments occurs only when a loan is repudiated, restructured on a concessionary basis, or sold below book value. ^{1/} Barring such a definitive event, there is always a chance, however slight, that the full value of the loan may be recovered.

A bank may also have an incentive to delay charge-offs because of concern that the charge-off may weaken its bargaining position vis-à-vis the borrower, and reduce the probability that the loans will ultimately be repaid. Specific provisions against country loans may thus exist for an indefinite period before loans are charged off or returned to good standing. ^{2/} Since specific provisions are not usually included in a bank's stated capital, however, this does not distort stated capital as a measure of the bank's capacity to bear loss.

^{1/} As we note below, the equity markets have marked loans down to their estimated market values notwithstanding the obvious imperfections of the secondary markets country loans.

^{2/} In other contexts, charge-offs may occur prematurely. For example, a bank may charge off loans in order to obtain tax deductions, or to reduce the asset base on which required capital is calculated.

(b) Specific provisioning and the capacity to bear loss

References by banks to specific provisioning such as, "We have set aside \$X dollars during the quarter in anticipation of losses that may arise on our loan to Y," are often intended (or interpreted) to mean that the bank has increased its capacity to bear losses by \$X. In fact, this is the case only if the revenue retention associated with the specific provisioning is an addition to retentions that would otherwise have been made. 1/ If specific provisioning is at the expense of general provisioning, the bank's capacity to bear loss is not affected.

Thus, it may be quite misleading to base assessments of the extent to which banks have increased their capacity to withstand losses from cross-border loans on the size of provisions established against these loans. For example, the recent International Bank Credit Analysis (IBCA) report 2/ that West German banks have reserves equal to 20 percent or more of their Third World loans while American banks have reserves equal to 5 percent or less conveys a meaningful comparison of relative capacities to bear loss only if other provisions and reserve accounts are similar. 3/ What matters is not the size of specific accounting provisions against questionable claims, but the bank's total capacity to absorb loss relative to the total size of such claims.

A similar point can be made with regard to mandatory requirements for specific provisions which have been imposed on banks by the supervisory authorities in a number of major creditor countries. In general, mandatory provisioning cannot be expected to increase banks' capacity to bear loss unless banks are also subject to binding minimum capital requirements. Otherwise, there is no reason to believe that total retentions from revenues will be larger than they would have been in the absence of mandatory provisioning.

In the United States, where capital requirements have been strictly enforced only recently, most large banks have had capital ratios above the required minimum. Under these conditions, there is no assurance that additions to the special liability account (ATRR) enhance the capacity of U.S. banks to absorb loss.

1/ Such accompanying evidence as a cut in the customary dividend to shareholders or a reduction in leverage may indicate that the decision to make a specific provision was also a decision to increase retentions. Of course, retentions that increase the capacity to bear loss may be accompanied by an increase in expected losses, and in the case of specific provisions this is expected.

2/ See the Financial Times, November 11, 1985.

3/ And if the relative leverage and the riskiness of loan portfolios have not changed.

Why Book Values May Matter

1. Book values and efficient markets

Financial economists steeped in the efficient markets literature, are skeptical that book values matter. Many would argue that equity prices must accurately reflect all private and public information about the bank regardless of the accounting conventions and decisions adopted by the bank. 1/ Yet bankers believe strongly that book values matter, as indicated by the vigor with which they object to supervisory suggestions or orders that asset values be reduced. 2/ We believe that there is some substance in bankers' concerns.

The conditions required to assure that markets are efficient are not necessarily met in all markets for bank equities and debt instruments. Outside the United States, the general practice is to disclose very limited information to the public, and this practice is often encouraged and abetted by supervisory authorities. In some countries banks are encouraged to disguise fluctuations in income and the market value of assets by making allocations to hidden reserves during good times and drawing from these reserves in bad times. If markets have no information other than that publicly reported by the banks, these practices may succeed in their objective of bolstering the confidence of investors and creditors in the bank's soundness and stability. A sudden write-down in reported values under these conditions could have a disruptive effect on confidence.

Efficient market proponents argue (see Benston, 1979) that competitive markets provide managers with strong incentives to disclose information that markets demand. Such pressures, however, are not sufficiently strong to compel disclosure of hidden reserves in any jurisdiction where disclosure is not mandated.

Lack of disclosure may also reflect the fact that markets do not demand much information in countries which allow hidden reserves. Creditors, whose interest in the condition of a bank is limited to the downside only, often are prepared to rely on the presumption that government will protect them against loss in the event of failure. Investors would

1/ For a classification of concepts of efficiency and a survey of the literature by one of its most important contributors see E. Fama (1970).

2/ For a variety of objections see the testimony of bankers from several nations before the House of Lords Select Committee on the European Communities Annual Accounts of Banks (1981). In general the supervisory authorities have been very reluctant to require charge-offs of sovereign debt.

like more information since they are interested in the up-side as well as the down-side of a bank's prospects; but investors in publicly held banks realize that they cannot be provided with information that does not go to creditors as well, and they see their own interest as better served if creditors do not have it. 1/

A more persuasive case can be made that the market for equities of major U.S. banks engaged in cross-border lending, is efficient. In the United States, public disclosure is extensive and includes disclosure of significant exposures to transfer risk. Such information can be combined with data on market discounts from face value available in the financial press 2/ to produce estimates of the depreciation in the true value of bank cross-border portfolios. Such exercises are routinely performed by security analysts specializing in bank equity shares.

The evidence suggest that U.S. banks have only limited scope for using balance sheet cosmetics to encourage equity markets to take a more optimistic view of their condition. The average market value of equity shares of the major U.S. banks has been well below their book value for some years, 3/ indicating that investors see through at least some of the accounting conventions used by banks. Kyle and Sacks (1984) show that some of the divergence between market values and book values is attributable to discounts applied to the book value of claims on troubled debtor countries. Other studies suggest that bank equity markets revalued bank stocks very quickly following the Mexican debt crisis in August 1982. 4/

The markets for uninsured deposits, however, is another matter. Bank creditors generally do not invest much time or money in evaluating banks, and tend to classify banks as either safe or questionable. Banks

1/ See Guttentag and Herring (1986 b) for an elaboration of the argument that shareholders of banks will prefer a low level of disclosure.

2/ For example, Lascelles in the Financial Times (1985) recently reported substantial secondary market discounts on sovereign loans. Market prices, quoted as a percent of face value, were "Brazil 75 to 82 percent, Mexico 78 to 82 percent, Argentina 63 to 67 percent, Venezuela 81 to 84 percent, Chile 67 to 71 percent, and Peru 32 to 36 percent." The secondary market in sovereign loans is undoubtedly very imperfect and may reflect "distress sale" prices and thus a downward bias in valuation. (See Guttentag and Herring (1986 c) for a description of the "Swap" market in country loans.)

3/ For a convenient summary of recent trends in the market price of bank equities as a percentage of book value, see various editions of the annual review published by the Bank Securities Department of Salomon Brothers, A Review of Bank Performance.

4/ See Schoder and Vankudre (1980), and Cornell and Shapiro (1986).

fear that a sharp drop in reported earnings or a major charge-off of reserves may cause a significant number of creditors to shift the bank into the questionable category, raising its cost of funds and perhaps causing losses from the hurried sale of illiquid assets. Banks as creditors of other banks tend to act in much the same way unless they have a long-term relationship with the borrowing bank. 1/

In the United States the growing importance of money market funds as holders of uninsured bank deposits has exacerbated this problem. While the managers of these funds may be quite sophisticated in terms of their ability to evaluate the soundness of banks, their clients are generally unsophisticated investors who would become alarmed if they knew their fund was holding claims against a bank that figured prominently in adverse news reports. As a result, fund managers are among the first to withdraw deposits from a bank that reports unexpectedly low earnings or a reduction in capital.

In summary, banks outside the U.S. have good reason to believe that adverse changes in book values will affect the perceptions of both equity investors and creditors because of the low level of information disclosure and the lack of demand for better information. And even in the United States where equity investors demand and receive a great deal of information, banks have reason to be concerned about the impact of bad news on relatively unsophisticated depositors.

2. Book values and regulation

Book values may also matter to banks because they matter to regulators. Capital requirements, for example, are defined in terms of book values. If a bank's capital falls below the regulatory minimum, the bank may be subject to closer surveillance than usual, and it may lose its freedom of action on mergers and acquisitions, dividend payments, branch expansion, advertising expenditures, and even loan policy. Indeed, a serious shortfall in book capital that is not remedied quickly can be cause for merging the bank or replacing the management.

To be sure, regulators also obtain information not publicly reported that allows them to delve beneath book values and make various types of discretionary adjustments that in the regulator's judgment provide a

1/ See Guttentag and Herring (1985 a) for an analysis of the reaction of the interbank market to bad news about a borrowing bank.

better representation of the bank's true condition. These adjustments, however, are almost always to write-down asset values, deflate income, or recognize liabilities not previously recognized. 1/

3. Management compensation

Management compensation systems are often tied to accounting measures such as the growth in reported income or income per share. This provides managers with an incentive to minimize book losses. Compensation plans that provide long-term stock options, in contrast, reward management on the basis of market values and may offset accounting illusion to some extent.

4. Taxes

In considering the impact of book values on the actions of creditors, investors, and regulators, as well as on their own compensation, bank managers have an incentive to make the condition of the bank appear better than it is. In their relationship to the taxing authority, however, the opposite is the case. In general, higher reported losses result in lower tax payments, provided the tax authority accepts the bank's report of losses.

In some countries tax regulations are so liberal that banks are encouraged to make provisions that exceed declines in market values. 2/ In the United States, in contrast, tax-deductible allocations to loan loss reserves are limited by formula, and charge-offs against the reserve that would permit corresponding increases in the allocation must be documented by the bank or required by the regulator. Hence, the tax system of the U.S. does not provide an incentive to write-down book values.

The provisioning reported by a bank, as distinguished from increases in its capacity to bear loss, affects market perceptions, regulatory actions, management compensation or tax payments. Hence, it may also affect the willingness of a bank to make new bail-out loans.

1/ Presumably the reason for this is that supervisors assume, probably with good reason, that banks will find a way to factor all favorable adjustments into the book values reported to the supervisor, leaving it to the regulator to find the unfavorable ones. Supervisors, furthermore, have the same asymmetrical attitude toward banks as creditors, in the sense that they are interested in down-side potential only. For this and other reasons supervisors do not favor mark-to-market rules, although the growing difficulty of making discretionary judgmental adjustments in book values associated with the increasing complexity of banking operations, may force them to move in this direction.

2/ Some banks are reported to have made provisions equal to 100 percent of their exposure.

Bail-Out Loans

The distinguishing characteristic of a "bail-out loan" is that part of the expected return on the loan is the improved prospect that the borrower will repay its outstanding indebtedness to the lender. ^{1/} A lender is faced with the need to make a bail-out loan when the borrower's ability to service outstanding indebtedness has fallen into doubt.

The model of bail-out lending in this appendix assumes throughout that only a single lender is involved ^{2/} and that this lender is risk-neutral. The implications of dropping these assumptions are discussed in the text. In addition, we make the following assumptions which are progressively relaxed as we develop the model.

- The bank is not constrained by capital requirements.
- The bank's capacity to bear losses exceeds its outstanding claims against the borrower plus the required bail-out loan. (Thus, the bank would not fail if the bail-out loan is not successful.)
- The bank is not penalized so long as its capital position is above zero.
- Accounting magnitudes that differ from market values are ignored by creditors, investors, tax authorities and regulators so that only market values matter to the bank.

The basic model

A bank that seeks to maximize the expected return to its shareholders will make a bail-out loan only when the total expected return on the new loan (including the improved prospect of collecting the old loan) is at least equal to the opportunity cost of funds. It is convenient to begin by assuming that the opportunity cost of making the bail-out loan is the risk-free rate. ^{3/} From this condition, we can derive an explicit expression for the maximum bail-out loan which the lender would be willing to advance. Let

^{1/} This can be interpreted as the increase in the expected value of the old loan if the bail-out loan is made.

^{2/} If several lenders are involved, the opportunity cost should be adjusted to reflect the lender's expectation that it can ride free on the bail-out loans made by other lenders. See Herring (1985) for a discussion of this aspect of the problem.

^{3/} In equation (3) below we characterize the opportunity cost of the bail-out loan as the return the bank could achieve by repaying its own cost of funds.

- L = the amount of the new "bail-out" loan;
- E = the lender's outstanding claims on the borrower;
- i = the risk-free interest rate;
- r = 1 + i;
- z = the spread above the risk-free rate on the bail-out loan;
- w = r + z;
- p = the exogenously determined probability that E + L will be repaid in full;
- 1-p = the probability that no repayment will be made;
- k = the capital/asset ratio required by law or regulation
- s = the expected return which investors demand on the banks's equity;
- K = the bank's capacity to bear loss. 1/

The largest bail-out loan the bank will be willing to make equates the expected return from the loan with the opportunity cost of funds: 2/

$$p(E + Lw - L) - (1-p)L = Li \tag{1}$$

The first product on the left-hand side of the equation is the expected net return if the loan succeeds and the second product is the expected net loss if the loan falls. 3/ Solving this expression for L, the maximum bail-out loan the bank would be willing to make is:

1/ This is equivalent to the value of shareholders' equity, valued for this purpose on the assumption that E is in good standing.

2/ Note that this is equivalent to the condition that the gross expected return from the loan equal the gross opportunity cost of funds: $p(E+Lw) = Lr$. Subtracting L from each side of this equation yields (1). We have chosen to emphasize net expected returns rather than gross returns because net returns (not gross returns) influence behavior in the case where shareholders can shift part of the loss of L to third parties.

3/ For convenience, it is assumed that the outstanding claims would be entirely lost in the absence of a bail-out loan and that the outcome of the bail-out loan is either repayment of the entire outstanding balance including the bail-out loan or loss of the bail-out loan and the outstanding claims. Nonetheless, intermediate outcomes may be readily accommodated. Since loan decisions depend solely on the expected value of loan outcomes--the product of the outcome and the probability that it will be realized--can be easily reinterpreted in terms of alternative outcome/probability pairs.

$$L_M = (pE)/(r-pw) \quad (2)$$

where $K \geq E+L$.

The denominator is positive because by definition, the expected return on the bail-out loan (pw) is less than the risk-free return (r). The maximum bail-out loan the bank will be willing to make is larger the higher the exogenously-determined probability of success and the higher the promised return on the new loan. An increase in the general level of interest rates will diminish the maximum amount the bank is willing to lend. 1/ Finally, the larger the bank's outstanding exposure to the borrower, the larger the maximum bail-out loan it would be willing to make.

We have treated p , the probability that the bail-out loan will succeed, as exogenous, even though in a more general model, p would depend on the size of the bail-out loan. 2/ Bail-out loans of different sizes would carry different probabilities of success. We assume that the particular value of p which enters (2) is the value associated with L^* , the loan size which yields the maximum probability of success, which depends on a number of factors that are exogenous to the model. A bank's lending decision will depend on L_M relative to L^* . If $L_M > L^*$, the bank will lend L^* because that will yield the highest expected profit. If $L^* > L_M$, the bank will not make any bail-out loan because if it is unprofitable to make a loan large enough to maximize the probability of success, it will also be unprofitable to make a smaller loan. For example, if L_M calculated from equation (2) is, \$4.54 3/ and $L^* > \$4.54$, the bank will not make a bail-out loan. If $L^* = \$4.54$, the bank will lend \$4.54, and if $L^* = \$3.0$, the bank will lend \$3.0.

When capital requirements are binding

If the bank is subject to binding capital requirements, 4/ then equation (2) must be amended to reflect the cost of the additional capital necessary to support the bail-out loan. It is plausible to assume that

1/ This is true even though the bail-out loan is priced at a margin above the risk-free rate. On balance a rise in the level of interest rates reduces the willingness to make a new loan because the cost of funds is certain, while the return from the new loan is not.

2/ As well as a host of other factors such as macroeconomic conditions that are beyond the control of both the bank and the borrower.

3/ For purposes of this illustration the following parameter values were assumed: $p = .5$, $r = 1.1$, $w = 1.1$, $E = 5$, $K = 20$.

4/ We are grateful to D. Mathieson and D. Folkerts-Landau for suggesting that we analyze this case.

a binding capital requirement will raise the opportunity cost of making the loan because shareholders (who hold the residual claim on the bank's earnings) will always demand a higher expected return than depositors (who have a prior claim). ^{1/} Denoting the required capital/asset ratio as k , and the rate of return on the bank's equity as s , the cost of funds for the bail-out loan is $Li(1-k)+Lsk$. Substituting this expression for the opportunity cost of funds in (1) yields a new expression for the maximum bail-out loan the bank would be willing to make:

$$L_M = [pE]/[r-pw+k(s-i)]. \quad (3)$$

where $\underline{K} > E+L$.

Since $s > i$ an increase in the required capital/asset ratio will reduce the maximum bail-out loan.

We have derived this result as if the capital/asset ratio were generally applicable to all assets in accordance with current U.S. regulations; but the result applies equally to cases where k is set with regard to the bail-out loan. For example a risk-weighted capital requirement establishes a particular k for the bail-out loan. Mandatory provisions will have a similar impact. Thus increases in the risk-weighting or in mandatory provisioning will reduce the willingness to make a bail-out loan. General provisioning which raises the bank's capital above the required level relaxes the capital constraint so that (2) becomes the relevant equation and the willingness to lend increases.

When the bank is overexposed

When the bank's total exposure to the borrower exceeds the shareholders' equity position in the bank, the bank is overexposed and may be willing to extend a much larger loan than the previous analysis would imply. (For ease of exposition, we shall resume the assumption that capital requirements are not binding.) Since shareholders cannot lose more than their capital position in the bank, their computation of net expected returns must be amended to reflect the truncation of expected losses when the bank's total exposure to the borrower, $E + L$, rises above the shareholder's capital position, K :

$$p(E + Lw - L) - (1-p) \min(L, K-E) = Li. \quad (4)$$

^{1/} The Miller-Modigliani theorem does not apply to banks because implicit or explicit government guarantees make it unnecessary for creditors to charge the bank a higher risk premium when equity declines.

Just as before, the maximum bail-out loan the bank is willing to advance equates the expected net return with the opportunity cost of the loan. In this more general statement of the expected return to the shareholders, the expected loss increases with the size of the loan until the point at which the loan equals the part of the bank's capital position that is not exposed to the borrower. Beyond that point the expected loss to the shareholders remains the same (since no capital remains to be lost) even though the size of the loan increases; as a result expected profits decline more slowly as the bail-out loan (plus the outstanding claims on the borrower) exceeds the bank's capital position.

Figure A.1 illustrates this point for two banks which have identical exposures to the borrower, but different capital positions. For bank B, exposure to the borrower is 50 percent of capital, while for bank C, exposure is 75 percent of capital. ^{1/} Bank C can shift losses to third parties when the loan size exceeds \$5 billion while bank B cannot shift losses until the loan exceeds \$10 billion. Consequently, bank C will be willing to make a substantially larger bail-out loan than bank B. Moreover, for any given loan size, bank C perceives at least as high a net expected return as bank B.

The very large exposures relative to capital ^{2/} of several major banks raise the possibility that some banks may be making decisions on the basis of the segment of the expected profits function that applied when $K - E < L$. For this segment the maximum acceptable bail-out loan is:

$$L_M = (E - K(1-p))/(1-p(i+z)) \quad (5)$$

where $K < E+L$.

Just as in (3), the bank will be willing to make a larger loan, the higher the probability that the bail-out loan will succeed, the lower the level of interest rates, and the larger the bank's exposure to the borrower. What is strikingly different, however, is that in this case the bank's capital position directly affects the bank's willingness to lend. The lower the bank's capital position, the larger the maximum acceptable bail-out loan.

^{1/} For purposes of this illustration the following parameter values were assumed: $p = .5$, $r = 1.1$, $i = .1$, $w = 1.1$, $E = 10$, $K = 20$ for bank B and $K = 15$ for bank C.

^{2/} It should be noted that the exposure relevant to such an assessment should include claims on all borrowers whose repayment prospects would be adversely affected if the bail-out loan is not extended.

When the capital shortfall is subject to penalty

A bank may be subject to a penalty if its capital position falls below some specific level, K^* . ^{1/} We shall assume the penalty is smaller than the cost of increasing the bank's capital; otherwise the bank would increase its capital rather than incur the penalty and the previous capital-constrained case applies. It is convenient to express the penalty as an explicit percentage charge, t , against the capital shortfall, $t(K^*-K)$, even though in practice it may take a variety of forms such as constraints on expansion, restrictions on dividend payments and so on.

The penalty will have an impact on the decision to make a bail-out loan only if exposure to the borrower is large enough so that the failure of the bail-out loan would cause a shortfall from the bank's specified level of capital, K^* . For $K > K^* + L + E$, the bank would not have to pay the penalty even if the bail-out loan fails and so the penalty is irrelevant and (2) describes the maximum bail-out loan. The penalty will matter, however, when K falls below this amount. Precisely how it matters depends on whether the bank would be subject to a penalty even if the bail-out loan is not made.

Consider the first case where $K^* + L + E > K > K^* + E$ in which the bank's capital would fall below K^* if the bail-out loan fails, but would remain above K^* if the bail-out loan is not made. In this instance, the expected return from the bail-out loan must be revised to include the cost of the penalty that would be incurred if the bail-out loan should fail:

$$p(E+Lw-L) - (1-p)(L+t(K^*-(K-L-E))) > Li \quad (6)$$

for $K^* + E + L > K > K^* + E$.

The maximum bail-out loan the bank would be willing to advance is:

$$L_M = \frac{Ep - (1-p)t(K^*-(K-E))}{r - pw + (1-p)t} \quad (7)$$

for $K^* + E + L > K > K^* + E$

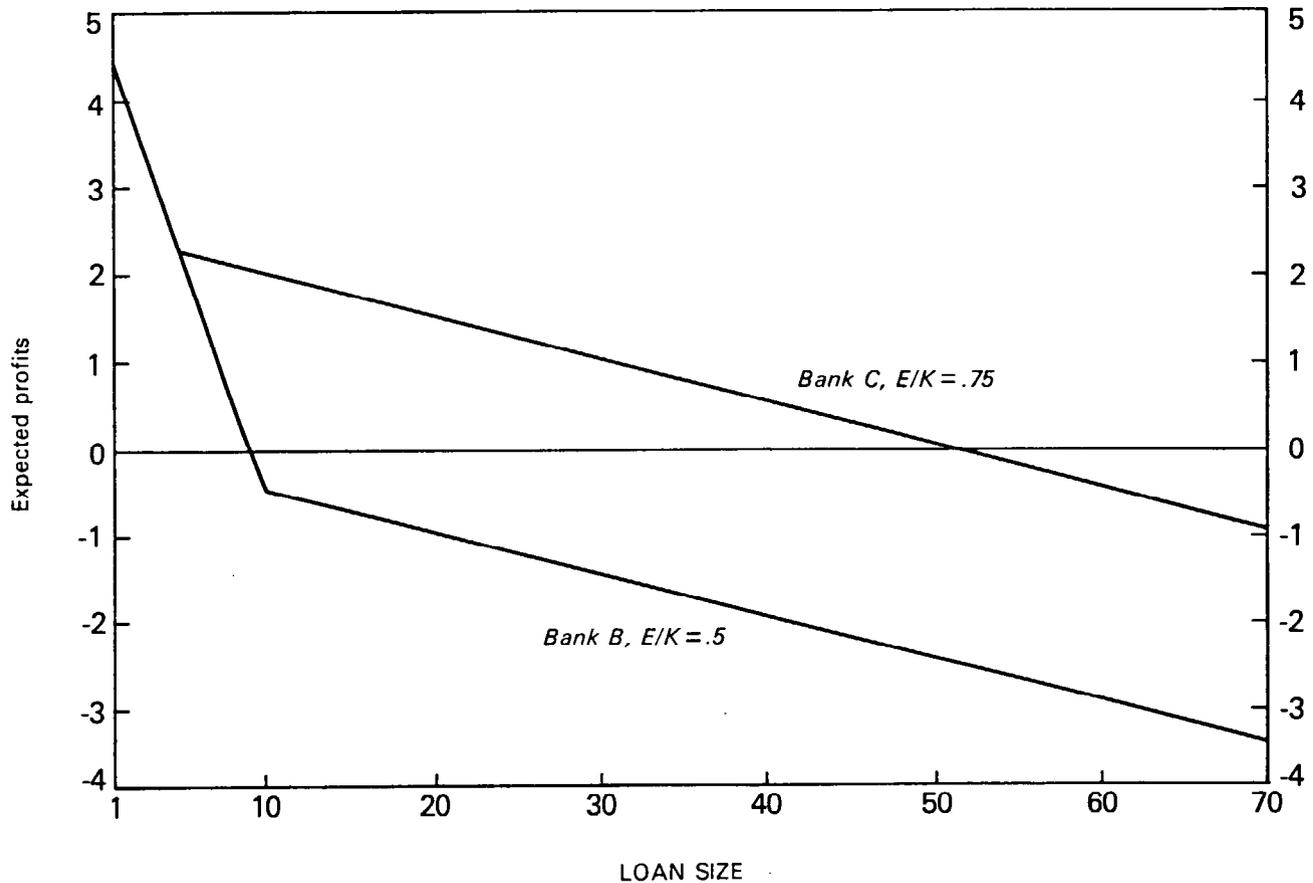
The partial derivative of (7) with respect to K is positive, so that as K rises from $K = K^* + E$ to $K = K^* + E + L$, an increase in K will increase the bank's willingness to make a bail-out loan. In effect, as K increases, the size of the potential penalty decreases and has a smaller and smaller impact on the decision to make a bail-out loan.

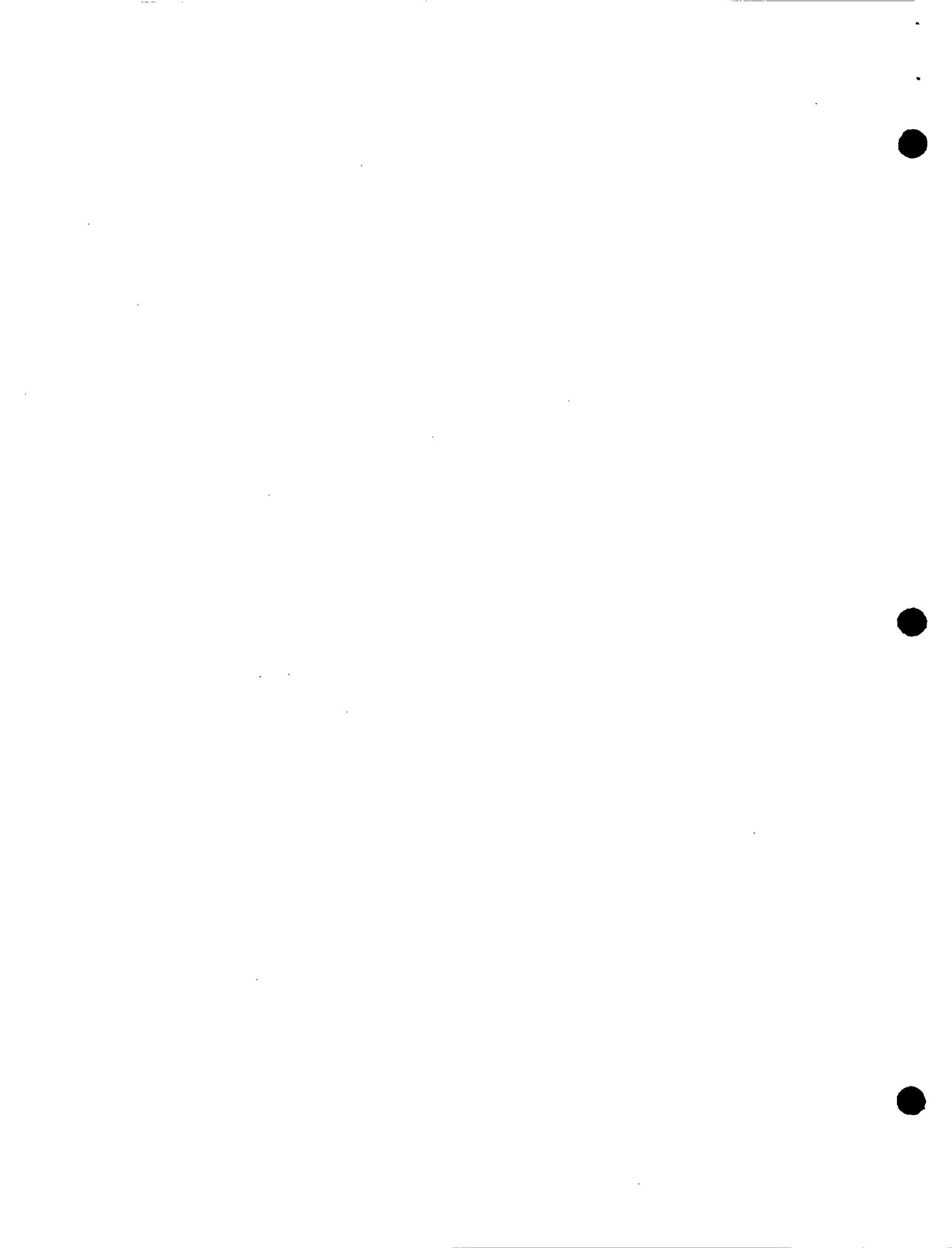
^{1/} We are grateful to A.D. Crockett for suggesting that we analyze this case.

FIGURE A. 1.

MAXIMUM BAIL-OUT LOAN SIZE

(In billions of dollars)





The impact of an increase in capital on the willingness to lend differs, however, when K falls within the range $K^*+E > K > L+E+t(K^*-(K-E-L))$ and $K-E-L > 0$. When the bank's capital is within this range, the bank would be obliged to pay a penalty if the bail-out loan is not made (and E is consequently charged off) and also if the bail-out loan is made and fails (so that both E and L must be charged off). Moreover, since $K > L+E+t(K^*-(K-E-L))$, the entire loss including the penalty is borne by the shareholders. In this case, the expected return must be adjusted to reflect both the cost if the bail-out loan is made and fails and the cost if the bail-out loan is not made:

$$p(E+Lw-L) - (1-p)(L+t(K^*-(K-E-L))) > Li - t(K^*-(K-E)) \quad (8)$$

where $K^*+E > K > L+E+t(K^*-(K-E-L))$ and $K-E-L > 0$.

This implies that the maximum bail-out loan that the bank would be willing to make is:

$$L_M = \frac{Ep + pt(K^*-(K-E))}{r - pw + (1-p)t} \quad (9)$$

where $K^*+E > K > L+E+t(K^*-(K-E-L))$ and $K-E-L > 0$.

The partial derivative of (9) with respect to K is negative. In contrast to the previous case, an increase in capital within this range will reduce the willingness to lend because the penalty which must be paid if the bail-out loan is not made declines as K rises. This response is even stronger if the bank's capital falls within the range $L+E+t(K^*-\max[(K-E-L, 0)]) > K > L+E+t(K^*(K-E))$. In this case the bank's shareholders will pay a penalty if the bail-out loan is not made and E is charged off, but since K is not large enough to cover the loss of L and the penalty on the additional shortfall, the shareholders would not pay the full penalty if the bail-out loan fails. Thus, on balance, the penalty provides an incentive to make the bail-out loan.

If the bank's capital is less than E , the penalty is irrelevant. Since the bank's capital would be depleted if E were charged off, the penalty does not influence the loan decision; under circumstances in which the bank would be obliged to pay, it would be unable to pay. Hence, (5) describes the bank's behavior and just as in (5), capital increases reduce the willingness to lend.

When book values matter

When bank managers perceive a cost in reporting a decline in the market value of an asset so that book values matter, the incentive to make a bail-out loan will be enhanced. By making a bail-out loan, the

bank not only has a chance of retrieving the outstanding loans but also, by enabling the borrower to stay current on interest payments, the bank can delay--perhaps indefinitely--charging off its outstanding exposure.

The preceding analysis may be extended to this more complicated case by adjusting the opportunity cost of making the bail-out loan to reflect the perceived cost of charging-off the outstanding exposure if the risk-free investment is chosen and the bail-out loan is not made. The perceived cost of charging-off a loan can be expressed as the product of q times the book value of the bank's claims on the borrower. The loss in the event that the bail-out loan fails must also be increased to reflect the perceived cost of charging-off both the outstanding exposure and the bail-out loan.

If losses are fully borne by shareholders, the expected return to the bail-out loan, and the opportunity cost with which it is equated become:

$$p(E + Lw - L) - (1-p)[L + q(E + L)] = Li - qE \quad (10)$$

where $K \geq L+E$.

This condition implies that the maximum loan the bank will be willing to undertake is:

$$L_M = \frac{pE(1 + q)}{r - pw + q(1+p)} \quad (11)$$

where $K \geq L+E$.

The higher the perceived cost in accepting a charge-off, the larger the maximum bail-out loan. ^{1/}

As before, the fact that the loss to shareholders cannot exceed their capital position implies that there is a kink in the expected profit function at loan size $K < L+E$. The general expression for the expected return to shareholders is thus:

$$p(E + Lw - L) - (1-p)\min[K-E, L+q(L+E)] = Li - qE \quad (12)$$

^{1/} As a first approximation the cost is likely to be a decreasing function of the gap between the book value of the bank's capital position K , and the capital position which regulators or creditors deem prudent, K^* , so that $q = q(K-K^*)$ and $q' < 0$.

In the case where the bank is overexposed so that $K < L + E$, the maximum bail-out loan is:

$$L_M = (E(1+q) - K(1-p)) / (i - p(z+1)) \quad (13)$$

where $K < L + E$

Equation (13) is the same as equation (5) except that the return on the bail-out loan is higher for any given set of values of the other variables. And as before, the willingness to make a bail-out loan declines as K increases until $K = E + L$ at which point further increases in K have no effect. If q is a declining function of K , 1/ which is plausible, the decline would be more rapid than that implied by equation (5).

1/ This is plausible because the greater the bank's ability to absorb losses, the smaller the advantage in avoiding a charge-off.

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