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RELATIONSHIP LOANS AND REGULATORY CAPITAL: WHY FAIR-VALUE ACCOUNTING IS INAPPROPRIATE FOR BANK LOANS

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Banks have been required to report many securities and all derivatives at fair values under U.S. GAAP rules for many years. Soon, International Accounting Standards will provide some banks with a "fair-value option" for loans, also.[1] A similar movement toward applying fair values to loans may occur in the U.S. in the near future, too.

This paper argues that fair-value accounting is inappropriate for banks' relationship loans from the standpoint of safety-and-soundness supervision—that is, for the purposes of calculating a bank's regulatory capital. The argument is straightforward, although perhaps not obvious.

The prudential issue that determines what should count as regulatory capital is whether the value created by an asset truly functions as capital in an economic sense—that is, as a buffer that can absorb losses to prevent a bank from failing. Regulatory capital is the ultimate, all-purpose hedge against shocks to a bank's assets.

A successful relationship loan creates relationship-specific capital in the sense that a continuing bank-borrower relationship is expected to generate revenues in excess of incremental costs. To create this relationship loan and capital, a bank presumably incurred set-up costs; but these are sunk (and irrecoverable) after the investment is made.

The component of capital represented by the present value of this earnings stream (relationship capital) cannot be liquidated or transferred to others. Thus, it generates a return to the originating bank only as long as it remains a going concern and retains its borrower relationship. But if a component of capital is not available unconditionally to absorb losses suffered on unrelated assets, then it does not serve the economic function of capital. Therefore, the economic value created by a relationship loan—and reasonably reflected in a fair-value

[1] See "Supervisory guidance on the use of the fair value option by banks under International Financial Reporting Standards," Bank for International Settlements, July 2005, http://www.bis.org/publ/bcbs114.pdf.

estimate of the loan's cash flows—should not be included in regulatory capital for supervisory purposes.

The key point we make is that the fair value of a relationship loan is based on its expected cash flows *if and only if held to maturity* (discounted by a rate that reflects the risk of the relationship ending for any reason). By definition, this exceeds the loan's value in premature liquidation. Relationship-specific capital is embedded in the loan and cannot be transferred to others. Therefore, relationship capital will be unavailable if and when needed to serve as a buffer against unexpected losses elsewhere in the bank's portfolio.

The model in the paper shows that this capital disappears when the *bank* is severely distressed because it stands to lose its relationship with the borrower. The key is that we model the investments that the bank makes in a relationship as sunk costs, which cannot be sold to others. Relationship capital is destroyed when the bank-borrower relationship ends. Relationship capital generates value for the bank only as long as the relationship stays in place—i.e., only as long as the bank is a going concern without regard to the loan in question.

Hence, it would be inappropriate to include relationship capital in the fair value of the loan—or in the bank's regulatory capital—even though it contributes to the expected present value of the loan's cash flows. Thus, fair-value accounting is inappropriate for banks' relationship loans.

I. A model of relationship loans

The borrowing firm. Consider a firm with no wealth that needs $\$I$ today ($t=0$) to invest in a project. The firm's project will pay \$1 each period forever starting next period ($t=1$), unless it defaults in some period (with constant probability p_x, where x denotes the type of financing used, which affects the project risk, as explained below). There is no liquidation value to the project after the start-up funds are borrowed and invested. If the firm defaults, its project is worthless from then on.

Transaction loan. The borrower can obtain funds in the capital markets with a "transaction loan," i.e., at arm's length and without generating any "inside information." The appropriate discount rate for the risk of the borrower's project if financed with a transaction loan is $0 < r_{tl} < 1$, where

$$r_{tl} = \frac{1}{1 - p_{tl}}$$

So the present/fair value of the project if financed in the capital market (after financing, because the initial investment is sunk) is the following:[2]

$$\begin{aligned} FV_{transactionloan} &= \left((1-p_{tl}) \frac{1}{1+r_{tl}} \right)^1 + \left((1-p_{tl}) \frac{1}{1+r_{tl}} \right)^2 + \left((1-p_{tl}) \frac{1}{1+r_{tl}} \right)^3 + ... \\ &= \sum_{t=1}^{\infty} \left(\frac{1-p_{tl}}{1+r_{tl}} \right)^t \\ &= \frac{1-p_{tl}}{r_{tl}} \end{aligned}$$

Relationship loan. The borrower also can obtain funds from a bank in the form of a "relationship loan," i.e., where, at some cost to the borrower and/or the lender, they can learn about each other and exchange information (build a relationship). The benefits of the relationship loan are that it produces "inside information" that both enhances the cash flows and reduces the riskiness of the project. One could think of the borrower getting good advice from the bank, while the bank is able to understand the business better, or becomes better able to monitor the loan.

[2] The last line follows from the mathematics of infinite sums.

The net benefit to the borrower of the relationship must be non-negative, or the borrower would not enter the relationship. Likewise for the bank.

We model the benefits of the relationship in two parts. First, the firm's cash flows grow at rate f each period forever, where $0 < f < r_{tl}$:

$$1(1+f)^1,\ 1(1+f)^2,\ 1(1+f)^2,\ \ldots$$

The other benefit of the relationship is that the bank learns more about the project and therefore assigns a lower discount rate, $r_{tl} - b$, to the cash flows, where $0 < b < r_{tl}$. The lower risk of the project means the probability of default in any period is $p_{rl} < p_{tl}$. (We also require that $f + b < r_{tl}$; otherwise, the present value of the loan will be infinite).

Thus, the fair value of the project when it is financed with a relationship loan is:[3]

$$\begin{aligned} FV_{relationshiploan} &= \left((1-p_{rl})\frac{1+f}{1+r_{tl}-b}\right)^1 + \left((1-p_{rl})\frac{1+f}{1+r_{tl}-b}\right)^2 + \left((1-p_{rl})\frac{1+f}{1+r_{tl}-b}\right)^3 + ... \\ &= \sum_{t=1}^{\infty}\left((1-p_{rl})\frac{1+f}{1+r_{tl}-b}\right)^t \\ &= \frac{1-p_{rl}}{r_{tl}-b-f} \\ &\equiv \frac{1-p_{rl}}{r_{rl}} \end{aligned}$$

The fair value of the relationship loan is unambiguously greater than the fair value of the transaction loan because $p_{rl} < p_{tl}$ and $r_{rl} < r_{tl}$:

[3] This model is known in a different context as the Gordon dividend-growth model.

$$FV_{relationshiploan} = \frac{1-p_{rl}}{r_{tl}-b-f} = \frac{1-p_{rl}}{r_{rl}} \succ \frac{1-p_{tl}}{r_{tl}} = FV_{transactionloan}$$

For ease of exposition, let *RC* be the difference between the fair values of the relationship loan and the transaction loan, where *RC* stands for "relationship capital:"

$$\begin{aligned} RC &\equiv FV_{relationshiploan} - FV_{transactionloan} \\ &= \frac{r_{tl}(1-p_{rl}) - r_{rl}(1-p_{tl})}{r_{tl}r_{rl}} \end{aligned}$$

Note that *RC* also represents the fire-sale or liquidation discount on a relationship loan. That is, if a project originally financed with a relationship loan is not in default and the bank needs to sell it to someone else, the loan will be worth only $(1 - p_{tl})/r_{tl}$—the present value of the cash flows without a relationship.

II. Co-existence of transaction and relationship loans

The condition for existence of both the transaction-loan market and the relationship-loan market is that borrowers are indifferent between financing their projects with transaction loans or relationship loans. Therefore, the surplus from the relationship loan—if any—must be captured by the bank. We assume that there are barriers to entry of some type in banking, so the surplus from relationship lending is not competed away to zero.

III. Fair value and regulatory capital

Suppose a bank has assets with fair value of *A* and regulatory capital of *K* before a given relationship loan is undertaken. A transaction loan has NPV = 0, so booking such a loan creates no surplus for the bank.

Once a relationship loan is made and the relationship has been built, on the other hand, the bank's assets and capital using fair values are, respectively:

$$A + FV_{relationshiploan}$$
$$K + RC$$

RC is the capitalized value of the relationship loan to the bank. Should this be included as part of regulatory capital?

Expected and unexpected losses. Expected losses on assets are covered by the risk premium charged above the risk-free rate— $r_{tl} - r_f$ for transaction loans and $r_{rl} - r_f$ for relationship loans. For simplicity, assume $r_f = 0$. The bank's other assets likewise are priced to cover expected losses.

The purpose of regulatory capital is to absorb *unexpected* losses on a bank's assets—the difference between the actual loss, when it occurs, and the risk premium charged for that exposure.

Suppose a transaction loan defaults in period *t*; the expected loss is r_{tl} and the unexpected loss is $1 - r_{tl}$. If a relationship loan defaults in period *t*, the expected loss is $(1+f)^t r_{rl}$ and the unexpected loss is $(1+f)^t (1 - r_{rl})$. Suppose the remainder of the bank's assets are worth zero when they default; the unexpected losses on these assets then are *A* less the risk premiums charged on the assets. Let the unexpected losses on the bank's pre-existing assets be $UL_A = A - R_A$. Because the bank has debt, $UL_A > K$, and the pre-existing bank would be insolvent on a stand-alone basis with probability q, $0 < q < 1$.

A surplus generated by a newly booked asset (the relationship loan) should go into regulatory capital if and only if it is the case that these resources will be available to cover unexpected losses on pre-existing assets, and vice versa. That is, will *RC* be available to absorb

unexpected losses on the pre-existing assets? Will *K* be available to absorb unexpected losses on the relationship loan?

IV. Why relationship capital should not be counted as part of regulatory capital

We can describe the possible states of nature in any given period with a simple two-by-two matrix. Either the bank's pre-existing assets default and are worthless, with probability *q* (row (1)) or not (row (2)). Independently of this, the bank's relationship loan will default and be worthless, with probability *p* (column (A)) or not (column (B)).

Table 1. Value of Relationship Capital Under All Outcome Scenarios

Entries in body of table refer to capital available to cover unexpected losses and their associated *ex ante* probabilities of occurrence.		Outcome of relationship loan	
		(A) Default with probability p	*(B) No default with probability 1-p*
Outcome of bank's pre-existing asset portfolio	*(1) Default with probability q*	0 with prob. pq	0 with prob. q(1-p)
	(2) No default with probability 1-q	K with prob. (1-q)p	K + RC with prob. (1-q)(1-p)

The problem with assigning the fair value of a relationship loan to regulatory capital is highlighted in box (1)(B). With probability q, the bank's pre-existing assets will default (row (1)). Because $UL_A > K$—i.e., the unexpected losses on the pre-existing assets exceeds the pre-existing capital—the bank will try to draw on the relationship loan to cover losses. If the relationship loan also is in default (box (1)(A)), then obviously there is nothing available to satisfy any claims. In box (1)(B), one would think the relationship loan would be available to

cover some of the losses. But the surplus created by the relationship loan, *RC*, cannot be realized in a fire sale. The value of the relationship loan is exclusively *value in use*, not in liquidation.

V. Conclusion

Our model demonstrates that the fair value of a relationship loan should *not* be included as part of regulatory capital. Stated more precisely, the expected economic surplus created by the relationship loan, *RC*, is not available in all of its own non-default states of nature to cover unexpected losses arising elsewhere at the bank. This was shown in the matrix in box (1)(B)—the relationship loan was performing, yet it was not available to cover unexpected losses on the bank's pre-existing assets. Thus, this value should be deducted from regulatory capital.

The issue highlighted here is that the surplus contributed to the bank from a relationship loan must be realized over time by maintaining the relationship with the borrower. This value cannot be transferred to others and it cannot be realized in a liquidation. Thus, for the reasons discussed, it should not be included in regulatory capital.