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Estimating the Cost of Your Bank's Funds

&
Uniformity
in
Assessment

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Reserve is self-supporting and regularly
makes payments to the United States
Treasury from its operating surpluses.

Estimating the Cost of Your Bank's Funds

By Ronald D. Watson[*]

By the time Franklin National Bank finally succumbed in 1974, it had been assured an honored spot in modern banking theory as the textbook example of how *not* to run a bank. One of Franklin's weaknesses was the incorrect method its management used to estimate the cost of the bank's funds.[1] During a period of high interest rates, the bank consistently underestimated the cost of raising money. In fact, the cost of the money that Franklin borrowed to invest was higher than the return on the investments it was making.

Most bankers are far more sensitive to this problem than Franklin's management was, but being aware of how important it is to

know the cost of money and being able to make an accurate estimate of that cost are two very different things. Making good cost estimates takes time and requires a thorough understanding of how investors make their decisions. Further, these estimates must reflect current conditions in the money markets instead of being based on costs in the past; and they must take account of the effect that the bank's choice of a capital structure may have on its cost of funds. Getting an accurate estimate of the cost of funds poses some tough computational problems, but there isn't any other way to find out what rate of return is required to make a profit.

THE OLD WAY: HISTORICAL AVERAGE COSTS

In the past, the most common method of estimating the cost of a bank's funds was to add together all the net expenses (interest, reserve requirements, and other expenses

[*]Ronald D. Watson is Research Officer, Economist, and Assistant Secretary at the Philadelphia Fed, where he has served since 1971. Holder of an M.B.A. from Cornell and a D.B.A. from Indiana, he specializes in finance, banking, and business.

[1]Sanford Rose, "What Really Went Wrong at Franklin National," *Fortune* (October 1974), p. 118.

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less service charge income) of borrowing current funds and divide the total by the amount being borrowed. This gave an historical estimate of the average return that had to be earned on assets acquired with these funds for the bank to break even in its investment activities. If the shareholders were to receive a return on the funds they supplied, a profit margin had to be added to this basic historical cost of funds estimate (see Appendix).

But historical costs can be extremely unreliable as a pricing guide if conditions are changing over time. When interest rates are rising, the average cost of funds already obtained will be below the cost of replacing those funds by new borrowing, and the bank may accept new investments it should reject. When rates are dropping, the historical cost of funds will be higher than replacement costs, and the bank may be led to set too high a standard for new investments, passing up opportunities to make profits. Historical estimates can be unreliable also when a bank's capital structure is changing. If a bank's debt is increasing faster than its equity, for example, it may come to be regarded as a riskier operation, and this perception of added risk may raise the cost of the bank's funds from all sources. It's because of drawbacks such as these that bankers have turned from historical cost estimates to some basic economic principles for generating cost estimates.

THE NEW WAY: A BIT OF THEORY

The theory behind this new cost estimating method starts from a reasonable premise—that bank managers should make investment decisions which make the bank more profitable. This theory rationalizes the rules of thumb that many bankers actually use when they look at profitability—rules such as adding in a desired long-term profit margin as they try to gauge the expected cost of funds over time.

Matching Added Costs With Added Revenues. To obtain the largest profit available,

a bank should compare the expected return from an investment with the current cost of obtaining the money needed to finance that investment. If the return (in the long run) from a new loan or security doesn't exceed the probable cost of financing that asset while the bank owns it, the bank would do better not to acquire it.[2] The added amount that would be brought in by lending one more unit of money to a borrower is the *marginal revenue*. The added amount that would be paid out to procure one more unit of loanable funds is the *marginal cost*.

The use of current information in making the cost of funds estimates is extremely important. The cost of a bank's funds normally will change as market interest rates move. Some cost changes, as for CDs and Federal funds, will be highly visible, while others, as for demand deposits and savings accounts, will not be so obvious. The banker must keep abreast of both. As interest rates rise, a banker will find that other financial institutions will compete more vigorously for these funds, and the depositors themselves will make an effort to shift into the more lucrative investments. To attract and hold these monies a bank may have to step up its advertising, resort to premiums, and expand its menu of depositor services. The result will be a higher cost to the bank for funds from these sources.

Less obvious will be the rising cost of equity funds—the bank's common stock. The target rate that a bank's management sets for returns to shareholders should be adjusted to reflect any changes in yields on other long-term investments. Investors who have the alternative of investing in long-term bonds at 8 or 9 percent with little risk must expect to receive more than that from an investment in common stock, or they will stay with the safer security. When long-term

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[2]Statement of the MC = MR principle is intentionally very general, so that complications such as tied-product returns and discounted future benefits can be accommodated within the definition.

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interest rates rise 1 or 2 percentage points, the return to common shareholders must move by a similar amount. In a competitive money market, the bank's shareholders always will have investment options that offer the current market rates. Even though a bank may not be selling a brand new stock issue in this high-rate environment, it still must aim to earn the competitive rate for its current owners. If it doesn't, the owners would be better off to instruct management to pay the maximum dividend possible. The stockholders then could use the extra dividends to make investments elsewhere at the higher prevailing rates.

When New Costs Don't Match Old. The decision on a new investment should be made on the basis of the cost of new money. Even if a bank were lucky enough to obtain a large pool of funds at rates that are below current market levels, shareholders, who bear the risk of loss, should be the beneficiaries of this good fortune. If historical costs are used to set current loan rates, the benefits of having these relatively cheap funds will be transferred to the borrowers rather than being retained for the common stockholders. If circumstances were reversed, it's unlikely that borrowers would be willing to pay high interest rates on loans from a bank which had unusually *high* average costs. The fact that the bank had the misfortune of being stuck with large amounts of funds acquired when rates were very high wouldn't matter if cheaper sources were available elsewhere. Regardless of costs or the effect on profits available for stockholders, bankers can't charge borrowers a rate that is much higher than rates available elsewhere. So historical costs should not be considered in making today's investment decisions. Rather, the cost of an additional dollar of funds should be compared with the return that will be realized when that additional dollar is invested. So much for the theory.

But how should an estimate of the marginal cost of funds be made? Although averaging historical costs is relatively easy, figuring out the full cost of a new dollar of funds is another matter—especially if it's necessary to estimate the impact that using various sources of funds will have on the cost of other sources.

MARGINAL COST
ESTIMATION METHODS

Two basic options are available to the banker who is trying to make a marginal cost estimate. One is to identify the source of funds that the bank currently is using to raise new money. Once this source is identified, an estimate might be made of the cost of raising another block of these funds. This estimate of the marginal cost of a single source will serve as the *hurdle rate*—the minimum required rate of return—for any new investment of average riskiness. The other strategy is to estimate the marginal cost of each of the sources being employed within the bank. By weighting the cost of new dollars drawn from each source by the amount to be raised from that source, bankers can construct a weighted average of marginal costs. The second method sounds more complex, but it has some advantages over the first that make it worth considering.

The Marginal Cost of a Single Source. The most straightforward approach is to determine which source of funds the bank wants to use, compute its marginal cost, and use that estimate as the hurdle rate. Presumably, the source selected will be the cheapest one available to the bank. For example, if CDs are the source a banker turns to, the cost of additional dollars borrowed in that market is the relevant marginal cost. The interest rate on CDs is easy enough to determine, but this rate is only part of the real marginal cost of these funds.

Suppose a bank—for example, the hypothetical Ninth National Bank—wants to borrow $1 million for expansion. If it turns to the CD market and pays 7 percent, that interest rate is the base for the bank's cost

calculations. But the job of estimating the marginal cost of this source is just beginning. The bank will incur a small cost in acquiring and repaying this money, and that cost should be included in the estimate. Also, there will be a reserve requirement against this source of funds (currently 1 percent to 6 percent, depending on term to maturity);[3] any obligation to keep a portion of the borrowed money in the form of idle cash raises the effective cost of the funds. These adjustments to the basic interest cost are relatively easy to make.

A much more difficult adjustment to the cost is the one required to compensate suppliers of other sources of funds for the added risk created by this new borrowing. Ninth National's leverage—its ratio of debt to equity—will be increased by the addition of more CD funds. Since higher leverage produces more risk for the bank, other creditors and shareholders may not be as willing to continue supplying Ninth National with funds at the same interest rates as before. Depositors

[3]See "Member Bank Reserve Requirements," Federal Reserve *Bulletin*, August 1977, A9.

whose funds are covered by deposit insurance probably won't care. But the holders of big deposits and CDs might, because they are not fully insured, and their concern could cause them to shift their funds to another bank or demand a higher return from Ninth National. In either case, the bank's cost to attract and hold such deposits is likely to rise.

The same thing will occur with the capital note holders and the common stockholders. When they sense that risks are increasing, they'll seek a higher return on their investments. The ones that presently own these securities can't automatically start charging the bank a higher rate for funds that already have been committed, but investors will demand a higher return for any new invested funds. The bank will be obliged to increase its earnings and ultimately its dividends to stockholders in order to compensate them for their higher risk. If it doesn't, the interests of the current shareholders will be harmed, and that would be inconsistent with management's obligation to run the bank in a way which enhances the shareholders' wealth (see THE SINGLE MARGINAL SOURCE CALCULATION).

THE SINGLE MARGINAL SOURCE CALCULATION

Suppose the management of Ninth National is looking for another $100 and wants to raise the money by issuing CDs. It will be obliged to pay the going market interest rate for funds (say, 7 percent). It must then add to this amount several surcharges which raise the effective rate. The cost of reserve requirements on the CD funds might, for example, be 3 percent (annualized), the cost to acquire such funds 0.5 percent (annualized), and the cost of servicing the funds 0.3 percent (annualized). Using the formula

$$\text{cost of funds} = \left[\frac{(\text{interest rate} + \text{servicing costs} + \text{acquisiton costs} + \text{insurance})}{(1 - \text{reserve requirement})}\right],$$

the explicit cost of the CD funds is found to be 0.0804 or about 8 percent.

This is only part of the job. Since the bank now is being more heavily financed with short-term borrowed funds, the risk is greater. Both the other suppliers of borrowed funds and the shareholders may wish to raise the cost of future funds they provide for this bank. This additional indirect cost must be added to the explicit cost estimate. Suppose that raising $100 of new CD funds created $.20 in added costs for other sources of funds. The real marginal cost of the CD funds would be estimated as their explicit cost plus the risk spillover cost:

marginal cost = 8.04 percent + 0.2 percent = 8.24 percent.

Failure to include all of these costs other than interest in the estimate will lead to a hurdle rate for new investments that understates the real cost of new funds.

In any event, it should be clear that the impact which heavy use of one source of funding has on the cost of other sources should be included in any analysis of the cost of marginal funds. This risk spillover cost is very difficult to measure, but it must be included in the calculation. Accordingly, the cost of new CD money can be found only after considering the direct interest cost, any acquisition and servicing costs, reserve requirements, and risk spillover costs. [4]

The same principles apply to estimating the cost of demand and time deposits (handling, acquisition, reserve requirement, and deposit insurance costs are likely to be higher than for CDs) or capital notes (risk spillover may raise the cost of the bank's CDs and uninsured deposits as well as the cost of its common stock). Similarly, the nominal, before-tax cost of new common stock may

[4] A more technical explanation of this calculation can be found in Ronald D. Watson. "The Marginal Cost of Funds Concept in Banking," Research Paper No. 19, Federal Reserve Bank of Philadelphia, January 1977; reprinted with revisions in the *Journal of Bank Research* 8 (Autumn 1977), pp. 136-147

overstate its real cost because it will have the effect of reducing overall risk and is likely to lower the net cost of other debt sources.

Averaging All Marginal Costs. The other approach to calculating a bank's marginal cost is to presume that the institution will be financed during the next few months in pretty much the same way as it's being financed now. Checking and savings accounts will open and close and the bank will experience deposits and withdrawals. But as long as advertising doesn't diminish and services don't deteriorate, total dollars from each retail source will change only gradually. The bank will wind up paying the going rate to hold funds from each of these sources. Similarly, market rates (plus associated costs) will be paid for any CDs sold even if they are simply replacements for maturing issues. Finally, the bank will have to pay competitive returns for capital if it expects to keep access to these sources of funds. In short, the mix of sources doesn't change and the bank must pay current rates for each source used (see THE AVERAGE OF MARGINAL COSTS CALCULATION).

THE AVERAGE OF MARGINAL COSTS CALCULATION

Since figuring out the risk spillover costs is very difficult, the banker might prefer to calculate his explicit marginal costs for each source of funds and average those estimates to find out what the entire pool of funds presently is costing. Suppose that the bank is structured as follows:

	Added Dollars	Explicit Cost*	
Demand deposits	$30	.05	$1.50
Time deposits	40	.07	2.80
CDs	10	.08	.80
Capital notes	10	.09	.90
Common stock	10	.22	2.20
	$100		$8.20

Then Ninth National's estimate would be: marginal cost $= \dfrac{\$8.20}{\$100.00} = 0.082 = 8.2$ percent.

*With acquisition, servicing, and reserve costs included.

If Ninth National is trying to calculate the overall cost of this pool of funds, it will need an estimate of the marginal cost of each source employed. That estimate must include any explicit interest payments, acquisition and servicing costs, deposit insurance, and reserve requirements. Such a calculation will be straightforward for CDs and capital notes but very difficult for demand and time deposits (even if the bank has a reliable cost accounting system). Estimating the percentage of the advertising budget that goes to keeping demand deposit levels steady or the additional advertising that would be required to increase time and savings deposits by a few percent is a very uncertain undertaking. At best it will involve a substantial amount of informed judgment.

When management is satisfied with these marginal cost estimates, an overall average can be calculated by multiplying each estimate by the fraction of the bank's funds that will be raised from this source in the near future. The weighted average will indicate the cost to the bank of buying the funds that will be used for investments or loans made during that time and it will serve as a minimum target rate of return for a new investment of average risk.

For all its complexity, this estimate has an advantage over the single-source cost estimate. With the weighted average approach there is no need to try to calculate the impact that risk spillovers have on the cost of other sources. The present level of the bank's leverage risk already is reflected in the prices of its liabilities and equity securities. If the composition of the pool of funds doesn't change, the risks aren't going to change significantly. The risk spillover that each source of funds creates for the other sources is neutralized in this pooling process and need not be estimated separately. As a result, estimates of the current marginal cost of each source, averaged across all sources, will provide a correct estimate of the bank's pool of funds without further risk adjustments.

CHOOSE YOUR POISON

Both of the cost estimation methods just described have pitfalls. Calculating the marginal cost of a single source such as CDs looks easy. The interest rate is known and the reserve and handling costs are measurable. But estimating the size of the risk spillover adjustment that should be added to the other costs to get the real marginal cost is very difficult.

In addition, one of the basic principles of economic theory is that businesses should tap each source of funds until the cost of the next dollar raised from that source is the same as the cost of a dollar from each other available source. That's the way to maximize profit, since it keeps money costs as low as possible. If a bank concentrates its attention on the cost of just one source, it may lose sight of the availability of funds from other sources that are cheaper.

Computing a weighted average of marginal costs keeps a banker looking at all of his costs simultaneously. Estimating the marginal cost of the bank's demand and time deposits remains a sticky problem, but the uncertainties of calculating risk spillover adjustments are avoided. This method will not provide the manager with the information needed to balance the marginal cost of one source against the marginal cost of another. For that he needs a marginal cost estimate that includes the risk spillover adjustment for each type of funds used. But the banker doesn't have to worry about risk spillover adjustments when he uses this method. He may not be getting the cheapest mix of funds, especially if he has overlooked a relatively cheap source; but he will be getting an accurate estimate of the cost of the pool of funds he's using. In this he has an advantage over his counterpart who computes the marginal cost of a single source but then continues to raise funds from all of the available sources. If the real marginal costs of each source are not really equal, use of the single-source technique will produce a faulty estimate.

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A Sensible Procedure. Both processes produce the right answer when used correctly. And both are difficult to use correctly. The best approach is to remember that both methods can give the right answer. Calculate the bank's cost of funds both ways. Use a sharp pencil. Analyze the cost estimates employed. Think about the effect that leverage risk has on the cost of various sources of funds. Analyze what you're really paying for demand deposits.

If both methods can give a correct answer, the calculations you make should give the same answer. If they do, you have a cost of funds estimate. If they don't, you had better try to figure out why. Do you need better data about your costs? Is the bank being financed with too expensive a mix of sources? Are the institution's costs under both calculations higher than previously thought? Has the bank been adding new business at a loss rather than a profit?

The exercise may be frustrating. It may be disturbing. But a sharp banker has to go through it if he's to do a first-rate job of managing profits.

For Appendix, see overleaf. . .

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APPENDIX

AN EXAMPLE OF HISTORICAL AVERAGE COST CALCULATIONS

Consider the case of the hypothetical Ninth National Bank. This bank gets its funds from demand and time deposits, CDs, subordinated capital notes, and common stock (see BALANCE SHEET). The full cost of each source of funds (interest and servicing cost of all funds obtained from that source) is indicated in parentheses.

NINTH NATIONAL BANK BALANCE SHEET

Cash and due	$100	Demand deposits	(4%)	$300
Investments	300	Time deposits	(6%)	400
Loans	600	CDs	(6%)	100
		Capital notes	(8%)	100
		Common stock	(20%)	100
Total	$1000	Total		$1000

Since management wants to insure that the shareholders' funds earn a return of 20 percent (10 percent after taxes if the tax rate is 50 percent), it must include this profit objective in its average cost of funds estimate.

Demand deposits	.04 x $300 = $12
Time deposits	.06 x 400 = 24
CDs	.06 x 100 = 6
Capital notes	.08 x 100 = 8
Common stock	.20 x 100 = 20 (before taxes)
	$1000 $70

$$\text{Cost of funds} = \frac{\$70}{\$1000} = 0.07 = 7.0 \text{ percent.}$$

Only if Ninth National is able to average a 7-percent return on all invested funds will it be able to pay shareholders that target 10-percent return (after taxes).

Most banks would have little trouble computing this breakeven return, and it would appear to solve the problem of estimating a cost of funds which could be used as a minimum required rate of return (hurdle rate) for new investment decisions. But, this will work only when interest rates are perfectly steady. Otherwise, using actual average costs to set the hurdle rate for new investments will give the wrong answer.

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As an illustration, suppose that the inflation rate increases, and one consequence of this change is a jump in interest rates on most securities. For simplicity, let's say that all rates go up 1 percentage point. The cost of *replacing* all Ninth National's deposits, CDs, and capital funds might now be:

Demand deposits	5%
Time deposits	7%
CDs	7%
Capital notes	9%
Common stock	11% (after taxes).

The weighted average cost of a new pool of funds would be over 8 percent rather than the 7 percent that Ninth National has been paying for its funds. What happens if the bank continues to use that historical cost hurdle rate of 7 percent?

One thing that will happen is that Ninth National might be tempted to take on new loans and investments that yield only 7 1/2 percent. If the bank invests in a $100 bond that yields 7 1/2 percent, it will be earning $7.50 per year. But as long as the composition of the bank's sources of funds doesn't change, the cost of new funds acquired to make that investment is:

Demand deposits	.05 x $30 = $1.50
Time deposits	.07 x 40 = 2.80
CDs	.07 x 10 = .70
Capital notes	.09 x 10 = .90
Common stock	.22 x 10 = 2.20
	$100 $8.10.

Since shareholders are the last to be paid, this shortfall will come out of their part of the bank's income:
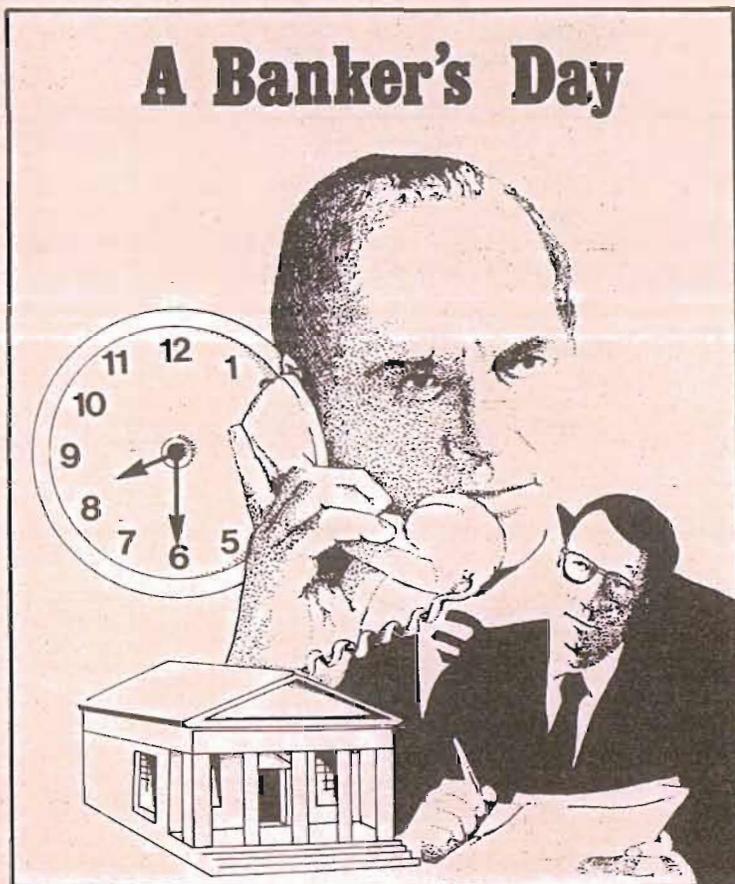
$7.50	income
−5.90	cost of debt sources
1.60	earnings before taxes
−.80	taxes
$.80	earnings after taxes.

$$\text{Return on new shareholder equity} = \frac{\$.80}{\$10.00} = 0.08 = 8 \text{ percent.}$$

This return is not high enough to pay shareholders the return of 11 percent (after taxes) that they expect from their investment in the bank's stock. The ones that are dissatisfied will want to sell their stock and its price will be forced downward. All of the shareholders will be worse off because of the incorrect investment decision.

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A Banker's Day