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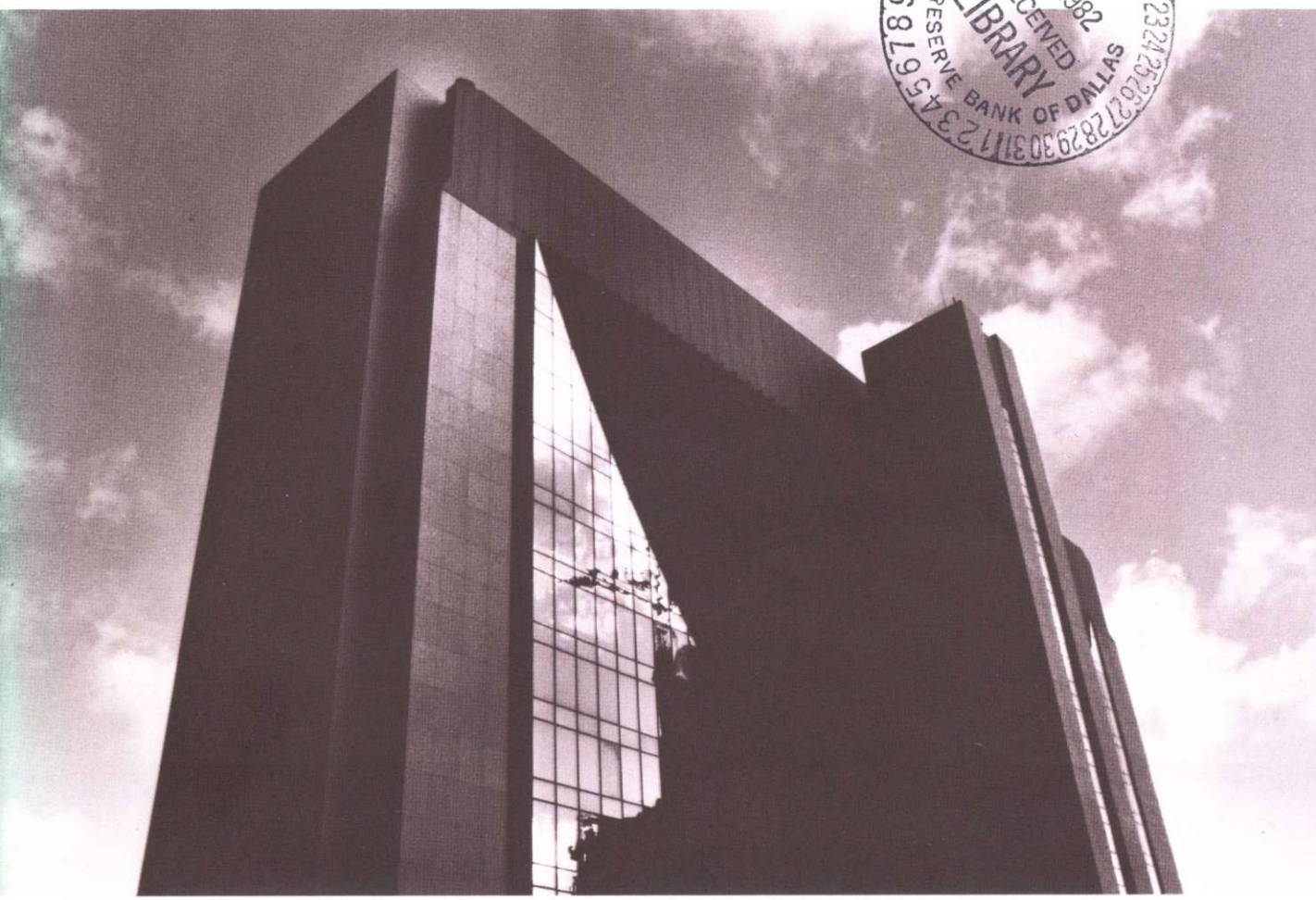

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*Eximbank Lending: A Federal Program That Costs Too Much**

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Too good to be true may be a tired phrase, but it seems to fit the claims made for a large, relatively obscure federal agency, the Export-Import Bank of the United States (Eximbank).[1] This agency tries to encourage the exporting of U.S. goods and services, primarily by offering loans to foreign importers at rates cheaper than they could get elsewhere. In doing this, Eximbank claims to cost its owners, U.S. taxpayers, nothing, since it does not receive money from Congress and is run instead much like a private firm. In fact, some say, the agency may actually be benefiting taxpayers, since its books usually show a profit.

To economists, despite Eximbank's profit, the fact that the agency offers loans at below-market rates is a sure sign of a subsidy for which someone, usually taxpayers, must pay. An accounting profit merely means Eximbank's recorded income is exceeding its recorded expenses. For an economic profit—that is, a real benefit to taxpayers—Eximbank's income must exceed its recorded expenses plus its owners' *opportunity cost,* a payment to taxpayers for investing their funds in this agency rather than somewhere else. Recent data show clearly that, in order to offer loans at below-market rates, Eximbank has been giving taxpayers a below-market return on their investment. The difference between the return they could have been making and Eximbank's return has thus been the agency's hidden cost to taxpayers.

Were Eximbank a private firm rather than a government agency, one must suspect that its owners would have pulled out long ago in favor of a truly profitable enterprise. Just how large the owners' hidden cost is matters for the continuation of a government program, though. If the cost is fairly small, the program may be justified by some greater benefits to society as a whole which the program provides as side effects.

Several studies of Eximbank's lending program have tried to measure its hidden direct cost, or subsidy. Using simple measures of the opportunity cost of taxpayers' funds, they have generally concluded that the subsidy exists and is moderate. These estimates of the subsidy have been small enough for supporters of Eximbank to argue, apparently successfully, that the subsidy is dwarfed by the program's large positive side effects on, for example, export demand and employment. Overall, supporters have said, the benefits to society of Eximbank's lending program far exceed its costs.

My study of Eximbank's lending program points to quite a different conclusion. A formal cost-benefit analysis of the program, it improves on previous studies by using a theoretically defensible measure of the opportunity cost of taxpayers' invested funds to evaluate the benefits they receive from Eximbank lending. Based on the costs and benefits coming directly through Eximbank, my study concludes that during the years studied, 1976–80, Eximbank's lending program was indeed subsidized and much more heavily than previous studies have suggested. According to my estimates, this program's annual costs exceeded its benefits by an average of about $200 million. The subsidy increased substantially over the sample

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[1] In fiscal 1980, Eximbank ranked third among the U.S. government's direct loan programs. The top five had the following loan obligations or commitments: Agricultural Credit and Insurance, $7.5 billion; Rural Housing Insurance Fund, $6.8 billion; Export-Import Bank, $5.5 billion; Agricultural Price Supports, $4.9 billion; Federal Housing Administration, $3.0 billion (U.S. President, various dates).

period and by 1980 may have reached as high as $650 million.

Obviously, side effects, or indirect benefits, would have to be significant to overwhelm direct costs of that magnitude. Whether or not they are is highly questionable. Eximbank's indirect benefits are extremely hard to identify, much less measure. Some arguments about side effects benefiting society are flawed, and some can be countered with arguments that the effect is a cost, not a benefit. Given this ambiguity, and my new estimates of the subsidy, it seems inappropriate to count on indirect benefits to justify a costly government program like Eximbank lending.

Eximbank's Ends and Means

Eximbank's current broad objective has evolved somewhat haphazardly over its nearly 50-year history. When first chartered by executive order in 1934, the bank's objective was to promote trade just between the United States and the Soviet Union. During the worldwide depression before World War II, its objective was expanded to include assisting in domestic U.S. recovery and providing credits which were unobtainable from private sources. During World War II, Eximbank was used strategically, providing export credits to U.S. allies, and immediately after the war, it served as a reconstruction lender to western Europe. In the 1950s, the agency's attention shifted primarily to less-developed nations, particularly those in Latin America, serving as a development bank to the western hemisphere. Finally, in the 1960s, Eximbank changed its emphasis once more, away from developmental projects and toward the explicit promotion of U.S. exports. This last change of focus originally reflected governmental concern over the gradual deterioration in the U.S. trade position. The policy has continued to the present day, and Eximbank is now best described as a general export credit agency of the United States government.[2]

A general rationale for this type of government agency is usually found in the problems inherent in cross-border trade. For example, the buyers and sellers involved in export transactions are often thousands of miles apart and know little about one another. Because of this distance and unfamiliarity, importers may be unwilling to pay in advance of arrival and inspection of the goods, but exporters may be unwilling to extend credit. Without some kind of government intervention to overcome such problems, it is thought, many export transactions would not be made.

Eximbank has designed several programs aimed at making the export of U.S. goods and services less problematic. One program is insurance which Eximbank offers to U.S. exporters. For a premium, the bank will insure against default by the importer/borrower. Moreover, it will insure against forms of risk which are unique to cross-border lending: for example, the possibility that war, revolution, expropriation, or currency inconvertibility may render the importer unable to pay even if it is willing. Since the proceeds of insurance are assignable to banks, the insurance policy stands as excellent collateral for third-party financing and is often used in that way. Insurance is available for short- and intermediate-term credits, of up to five years maturity. The Eximbank insurance program is quite large, with about $6 billion of policies in force as of September 1980 (Export-Import Bank, various dates).

Eximbank's long-term support takes the form of either loans made directly to foreign borrowers or loan guarantees given to private U.S. financial institutions. These two forms of support are often combined in a single package in which Eximbank agrees to be repaid after the private lender. The effect is to create a short-maturity guaranteed loan for the private lender (usually a commercial bank) and a long-maturity loan for the agency.

By far the largest of Eximbank's operations is its direct lending program. As of September 1980, its outstanding direct loans totaled $13.8 billion (Export-Import Bank, various dates). The longest maturity on these loans is normally 12 years, although exceptions may be made under special circumstances. In recent years, the average maturity of new loans has been about 7 years (U.S. President, various dates). Most typically financed by Eximbank are exports of long-lived capital goods, especially aircraft and machinery, goods which are produced by a handful of large U.S. corporations.[3] Interest rates are always fixed for the life of the loan, and Eximbank will commit to a rate up to 180 days in advance of lending without charging a commitment fee.[4]

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[2]See Rendell 1976 for an excellent discussion of Eximbank's origins and early history.

[3]In 1980, for example, 27 percent of the bank's loans went to finance Boeing Company exports. Another 40 percent went to Westinghouse, Combustion Engineering, McDonnell Douglas, Western Electric, Lockheed, and General Electric (Reilly 1981, p. 42).

[4]More complete discussions of the loan, guarantee, and insurance programs, their terms and conditions, may be found in Export-Import Bank, undated. A brief but excellent description is provided in Continental Bank, undated.

The Subsidy: Where It Comes From and Where It Goes

In many ways, Eximbank operates much like a private commercial bank. It borrows in one market and lends in another, it is exposed to risk of default and risk of interest rate fluctuations, and it usually earns an accounting profit. Also like a private corporation, Eximbank is financed partly with debt and partly with equity, the equity being composed of an initial investment (of $1 billion by the U.S. Treasury) and retained earnings (of about $2.2 billion so far).

In other ways, Eximbank is different from a commercial bank, however. It has a highly specialized loan portfolio composed exclusively of export credits, and as discussed above, it has a large insurance program. In addition, Eximbank has special advantages given to it by Congress. It borrows from the Treasury at a risk-free rate of interest, through the Federal Financing Bank, and it pays no taxes. Its equity is held by the government sector and is not required to earn a market rate of return for the agency to stay in business.

These special advantages over commercial banks let Eximbank offer low interest rates on its loans and yet still show a profit in most years. Eximbank's authority to borrow funds at a risk-free rate of interest through the Federal Financing Bank helps it profit; commercial lenders with loan portfolios as risky as Eximbank's must pay a premium over the risk-free rate when they raise funds in private credit markets.[5] Cheap funds aren't enough to let Eximbank profit, though, since on average it charges importers even less than the risk-free rate of interest. In order to show a profit while lending at rates lower than those at which it borrows, Eximbank exploits another of its special advantages. It finances some of its lending with equity instead of credit and pays its equity holders, U.S. taxpayers, less than a market rate of return on their investment. As a result of this equity financing, Eximbank loans out more money than it borrows, and the total amount of interest it earns on its low-priced loans usually exceeds the total amount of interest it pays on its higher-priced debts. The difference between interest earned and interest paid shows up in Eximbank's books as a profit.

As noted earlier, however, this profit actually indicates a loss for U.S. taxpayers. To record the accounting profit, remember, Eximbank pays taxpayers a smaller return on their investment than they could have received elsewhere. (In economic terms, Eximbank does not cover the opportunity cost of using taxpayers' funds.) During 1976–80, for example, the agency's return on equity averaged 4½ percent. Had taxpayers' investment in Eximbank been invested elsewhere, it could have earned much more and so made taxpayers better off. If paid to the Treasury on behalf of taxpayers, the higher earnings could have been passed on to them through lower taxes. If Eximbank had simply been shut down and taxpayers' investment returned to them, they individually could have earned the higher market return on their funds. The difference between Eximbank's earnings and the earnings available in the private marketplace, then, is the amount taxpayers lose as a result of Eximbank's effort to encourage exporting by offering importers cheap loans. It is obviously taxpayers who pay for this subsidy.

Who actually gets the subsidy is not quite so obvious. When subsidized financing is available to buyers of a good, sellers can and will raise their prices. Who captures the subsidy therefore depends on how the quantities of goods demanded and supplied are affected by changes in the good's price, that is, on the shapes of the good's demand and supply curves. These shapes are not easy to determine and can, of course, be considerably different for different types of goods. I will not attempt to define these curves for the various types of exports supported by Eximbank lending. In general, though, it is reasonable to assume that the curves are shaped in a way that causes the subsidy to be shared to some extent between buyers and sellers, in this case, foreign importers and U.S. exporters.

The Cost-Benefit Framework

The fact that Eximbank's direct lending subsidy exists can be demonstrated and its size estimated using a form of cost-benefit analysis. This procedure is frequently used by economists to appraise the desirability of investing in public projects such as dams, subways, and airports (Boyd and Kwast 1981, Layard 1972). The basic framework is fairly simple, closely akin to the capital budgeting procedure used by private enterprises in reaching their investment decisions.

For a public project, first its costs are identified and estimated, including those incurred directly by the govern-

[5]Eximbank loans are indeed risky, and, as explained in the box on the agency's accounting procedures, it has had significant losses due to loan defaults and restructuring.

ment and any indirect costs which may be borne by individuals and firms in the private sector. Next the project's benefits, both direct and indirect, are identified and estimated. All costs and benefits must be quantified, and this may be especially difficult for indirect costs and benefits—for example, assigning a dollar value to lives saved by a better highway or the recreational value of a reservoir. Nevertheless, to be able to compare all costs and benefits, everything must be put in explicit dollar magnitudes.

Since costs or benefits may occur in future periods as well as in the present, and people value dollars available to invest now more than dollars promised later, some way must be adopted to put all these estimates on the same *present value* basis. The rate used to discount costs and benefits must be chosen carefully. It must represent the best rate of return the public's resources could have earned on a comparably risky project (again, the opportunity cost of using these resources). In that way, the costs and benefits of the public sector project, when discounted and compared, will properly indicate where society would benefit most from having its resources invested.

Comparing those discounted values is, naturally, the final step of a cost-benefit analysis. If society's present value of estimated benefits exceeds its present value of estimated costs, the project can be expected to produce net public benefits and, accordingly, should be undertaken. Otherwise, it should be passed up.

My Procedure

Eximbank's direct lending program already exists, of course, so what my cost-benefit analysis will actually be doing is determining whether or not it should exist, and if not (as I suspect), how big the cost to taxpayers has been. The procedure I use includes all of the basic steps of the standard procedure, but not quite in the usual order. Since the indirect costs and benefits of Eximbank lending are very hard to identify and measure, I begin by ignoring them and work simply with direct costs and benefits. Once the difference between the direct effects has been estimated, I discuss the most frequently cited indirect effects. Before estimating anything, though, I identify the appropriate way to define, discount, and compare direct costs and benefits. Then, since selecting a discount rate is so important to a proper estimation of costs and benefits, I spend a lot of time doing that carefully. In order to do all the calculations of costs and benefits efficiently, that is, I postpone all their quantifications until after a discount rate has been defined and estimated.

The first task, then, is identification. For Eximbank's lending program, *direct costs* per period, C_t, are the dollar amount of new direct loans the agency grants in year t. These loans can be considered a form of direct government investment, that is, resource-using expenditures like the building of a subway system or a dam. Since the agency's costs are confined to each year, they do not have to be discounted. Its *direct benefits* do, however; in each year they are the future stream of payments Eximbank will be receiving on the year's lending. Thus, in year t, the costs C_t produce the benefit stream $B_t = b_{t+1}, b_{t+2}, \ldots, b_{t+n}$, where b represents payments on both the principal of Eximbank loans and the interest on those loans and n is their maturity in years. Then, using the standard discounting equation, the present value of direct benefits, Γ_t, is

$$(1) \qquad \Gamma_t = \sum_{i=1}^{n} [b_i/(1+m_t^*)^i]$$

where m_t^* is a discount rate (not yet defined).

This equation does not show all that must be considered when computing the present value of Eximbank's benefits, though. In particular, it does not explicitly show how the agency's stream of payments on loans varies over time. Recall that Eximbank often cooperates with private financial firms in making export loans. In such arrangements, it takes the long maturities on a particular credit, and the private lender takes the short maturities. Operationally, the borrower pays a constant amount of interest and principal in each year, but principal payments go first to the private lender, until its portion of the loan is paid off, and then to Eximbank. The result is that Eximbank's cash flows exhibit a discrete increase part way through the life of a loan.

This can be written into the equation representing the present value of Eximbank's benefits. To do that, let ψ be the delay in payments to Eximbank as a percentage of average loan maturity and m_t be the average rate of interest on Eximbank's new loans. Further, assume its loans are to be repaid semiannually, as is standard for the agency. Then equation (1) becomes

$$(2) \qquad \Gamma_t = (C_t/m_t^*)\Big(m_t\{1-[1+(m_t^*/2)]^{-2n}\} + [n(1-\psi)]^{-1} \times \{[1+(m_t^*/2)]^{-2n\psi-1} - [1+(m_t^*/2)]^{-2n}\}\Big)$$

which is a more useful definition of the present value of direct benefits.[6] [Derivation of (2) is straightforward, but tedious, and will not be presented.]

Finally, comparing the present value of direct benefits to direct costs, the net present value of benefits, N_t, is defined simply as

$$(3) \qquad N_t = \Gamma_t - C_t.$$

If, as I expect, $N_t < 0$, this implies that direct costs exceed direct benefits and that the public is providing a *subsidy* of amount $-N_t$ to Eximbank's lending program.[7]

To compute the present value of Eximbank's benefits, I use a risk-adjusted private market rate, m_t^*, that is, a rate which a competitive private firm would have charged had it made the same loans Eximbank did. It can be shown that this discount rate correctly represents the opportunity cost of the public's resources if private capital markets are perfectly competitive and if the government investment under consideration is in a risk class available to the private sector (Holmstrom 1980, Sandmo 1974). Scores of empirical tests have shown that private U.S. capital markets are extremely efficient and perfectly, or at least nearly perfectly, competitive.[8] Thus, the first condition is approximately met. The particular type of government investment considered here, dollar-denominated export loans, is routinely held by private commercial banks, and these banks issue securities that are publicly traded. Thus, there is reason to believe that Eximbank's investments are in a risk class available to the private sector. It follows that a risk-adjusted private market discount rate is appropriate here.

Estimating the Risk-Adjusted Discount Rate

A Formula for a Very Good Proxy

The next task is to actually estimate the risk-adjusted private discount rate, m_t^*. Unfortunately, that rate cannot be found directly: meaningful data on the terms of private export loans are almost impossible to obtain. Commercial banks rarely disclose the terms of individual loan contracts. Published data on average loan rates are of little value for this purpose, since the effective cost of a bank loan may depend on commitment fees, compensating balances, collateral requirements, and many other terms not publicly disclosed.

Previous studies of Eximbank's lending subsidy have responded to this data problem by using estimates based on generally undefensible definitions of the discount rate. Since the appropriate rate is not available, some studies have simply selected a rate that is available, like a corporate or government bond rate. Others have tried to get a feel for what the discount rate might be by subjectively examining the credit market during their sample periods. These techniques leave the studies open to criticism and generally of questionable value.

To avoid that result for my study, I try to firmly ground my estimates of the discount rate in economic theory. I circumvent the data problem by taking advantage of a well-known principle from financial economics: in equilibrium, a value-maximizing firm will set the marginal rate of return on its assets equal to the marginal cost of its capital. Thus, an estimate of the latter is also an estimate of the former, at least in equilibrium. The *cost of capital* is the cost of raising funds, either debt or equity, in the securities markets (see the box). While not a simple task, estimating this cost is easier than trying to find meaningful data on loan rates. To estimate the risk-adjusted private discount rate, therefore, I try to estimate what theory suggests should be a very good proxy: the cost of capital which would have confronted Eximbank had it been a private financial intermediary. In that case, it would have had to pay taxes, borrow in corporate debt markets, and earn a market-determined rate of return on equity, so I take all of that into account in my calculations. The idea is to produce estimates of the cost of capital which are comparable to the loan rates that Eximbank would have had to charge (just to break even) had it received no special treatment from the government.

It can be shown that when a private firm is financed partly with debt, L, and partly with equity, E, and seeks to maximize its market value, V, ($V = E + L$) this objective will be achieved by acquiring assets up to the point at which

$$(4) \qquad m^* = [r_e(1-K)/(1-\tau)] + r_l K$$

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[6]The rate earned by Eximbank is actually somewhat lower than the effective rate of interest paid by the borrower because of the delay in principal repayments.

[7]Noninterest operating costs of Eximbank should, in principle, be included in C_t. This is not done here because I have no basis for allocating overhead expenses between direct lending and the other programs. Noninterest operating costs are relatively small, however, typically amounting to less than 2 percent of total expenses (Export-Import Bank, various dates).

[8]For an excellent review of empirical tests of capital market efficiency, see Dyckman, Downes, and Magee 1975.

where τ is the firm's tax rate (assumed constant), r_e is the cost of equity capital, r_l is the cost of debt, and $K = L/V$. [For simplicity, I have omitted time subscripts in (4) and will do so hereafter. Condition (4) is derived in the Appendix.] The left-hand side of (4) is the marginal rate of return on the firm's assets, which is, of course, what I want to estimate. In value-maximizing equilibrium, this is set equal to a weighted average of the costs of debt and equity capital. The weights, $K = L/V$ and $1 - K = E/V$, are in market values and must sum to 1. The required rate of return on equity is adjusted by the factor $1/(1-\tau)$, reflecting the fact that returns to equity are taxable at the corporate level.

Estimates of the Components of the Cost of Capital

Although I now have a formula defining the discount rate, actually estimating that rate is still a relatively complicated procedure. It involves estimating all the parameters of equation (4)—r_l, r_e, K, and τ—that is, all the components of the cost of capital that Eximbank would have faced had it been a private firm.

To estimate r_l, I can use some published data on the general cost of borrowing in the market. To estimate r_e, K, and τ, however, I need a sample of commercial banks with operating characteristics as similar as possible to those of Eximbank.[9] As shown in Table 1, the sample banks I have chosen share three important characteristics: they are large, they emphasize corporate as opposed to consumer or mortgage lending, and a substantial proportion of their loans is to foreign corporations or governments. The idea is, had Eximbank been a private bank, it would have been similar to those in the sample. Historical averages of data from the sample banks are therefore used to estimate the values of r_e, K, and τ that would have confronted Eximbank.

My sample period is the five years 1976–80. I make two different estimates for both the cost of debt, r_l, and the cost of equity, r_e, in each year studied. This lets me estimate a range of values for the discount rate, m^*; that is, it lets me establish its general size, a more reasonable goal than pinpoint accuracy. The superscripts h and l denote high and low values, respectively. In what follows, a caret or hat ($\hat{}$) on a variable denotes an estimated value and a tilde ($\tilde{}$) denotes a random variable.

☐ The Tax Rate, τ

I estimate Eximbank's tax bracket as the arithmetic average tax rate for the sample banks, $\hat{\tau}$, and for simplicity, assume that marginal and average tax rates are equal. As indicated in Table 2, the average tax rate for this group of banks was quite stable in 1976–80 at about 37 percent.

☐ The Cost of Debt, r_l

I assume that if Eximbank had been a private firm, it would have borrowed at the long-term corporate bond rate. Since how its debt would have been received by the market is not clear, two different rates are assumed, Moody's Aaa and A, denoted $\hat{r}_l^l$ and $\hat{r}_l^h$, respectively. All five sample banks have term debt outstanding, and all are rated Aaa or Aa. Therefore, the assumption of an A rating for Eximbank is

Defining the Cost of Capital

Financial economists frequently refer to the *cost of equity capital* or the *required rate of return on equity*, identical concepts. This rate of return, my r_e, is a market concept, not an accounting concept, and it is important to distinguish between the two.

Consider an imaginary corporation which earns D dollars per share of common stock and pays out all its earnings in the form of dividends. If its stock sells for P dollars per share in the marketplace, then $r_e = D/P$. Here r_e is the *market* rate of return, the rate that will actually be earned by an investor who buys the stock for P dollars per share. The *accounting* rate of return on equity is defined as $D/B0$, where $B0$ is the book value per share. Naturally, market and book values can be very different.

Note also that, since r_e is defined in terms of the market value of the firm's stock, it is determined by market forces of supply and demand. For example, if investors believe that our imaginary company has for some reason become riskier, they will sell its shares in the market, causing P to fall and r_e to rise. This process will continue until r_e just equals the rate of return which investors require given their revised risk perceptions—hence, the name *required rate of return on equity*. A comparable but more complicated version of r_e can be derived when future earnings per share are uncertain and when the firm retains all or part of its earnings. This is equation (6).

The *cost of debt* or *required rate of return on debt*, r_l, is defined in the same way. Assume that the imaginary company has bonds outstanding and that each bond pays I dollars in annual interest. Then, if B is the market value of a bond, $r_l = I/B$. Like r_e, r_l is determined by market forces of supply and demand.

[9]The sample firms are actually bank holding companies. Most large commercial banks have the holding company form of organization, and in almost all cases it is holding company shares that are traded in the equity market.

Table 1

Operating Characteristics of the Sample Banks and the Export-Import Bank

December 1980

	Total Assets ($ billion)	Total Loans* as a Percentage of Total Assets	Percentages of Total Loans	
			Commercial & Industrial Loans	Foreign Loans
Citicorp	114.9	66%	55%	57%
Chase Manhattan Corporation	76.2	62	61	57
J.P. Morgan & Company	52.0	51	78e	55
First Chicago Corporation	28.7	59	45	39
First National Boston Corporation	16.0	55	73	39
Export-Import Bank	14.1	98%	n.a.	100%

*Loans and lease financing
e = estimated
n.a. = not available

Sources: Annual reports of the sample banks and the Export-Import Bank of the United States

intentionally conservative. Table 2 shows the Aaa and A rates over the sample period along with the average rate of interest on the new debt Eximbank issued. The value of Eximbank's government guarantee was obviously substantial, reducing interest costs by an average of about 50 basis points below the Aaa rate and about 115 basis points below the A rate.

☐ *The Cost of Equity, r_e*

One common way to estimate the cost of equity capital for private firms is to use the Capital Asset Pricing Model (CAPM).[10] Under the appropriate assumptions (Litzenberger, Ramaswamy, and Sosin 1980), the CAPM predicts that

$$(5) \quad r_e = r_f + \beta[E(\tilde{r}_m) - r_f]$$

where

r_e = the cost of equity

r_f = the risk-free rate of interest

$E(\tilde{r}_m)$ = the expected rate of return on the market portfolio of all assets

$\beta = \text{cov}(\tilde{r}_e, \tilde{r}_m)/\text{var}(\tilde{r}_m)$

$\tilde{r}_m$ = the realized rate of return on the market portfolio

$\tilde{r}_e$ = the realized rate of return on a given common stock.

(Here cov = covariance and var = variance. A stock's β, or *beta*, measures the degree to which its returns move with the overall market. An average stock, which moves proportionately with the market, has a beta of 1.)

In (5), the cost of equity capital is equal to the risk-free rate of interest plus a firm-specific risk premium. The firm-specific risk premium is, in turn, the product of a market risk premium, $E(\tilde{r}_m) - r_f$, and the firm's β. In this study,

[10] See Litzenberger, Ramaswamy, and Sosin 1980 for a discussion of such applications in the public utilities industry.

Table 2

Estimates of the Cost of Capital and Its Components

	1976	1977	1978	1979	1980
The Tax Rate, $\hat{\tau}$ †	36.5%	36.0%	38.6%	35.7%	37.3%
The Cost of Debt					
Moody's Corporate Bond Rates					
A Rate, $\hat{r}_l^h$	9.1%	8.5%	9.1%	10.2%	12.9%
Aaa Rate, $\hat{r}_l^l$	8.4	8.0	8.7	9.6	11.9
Average Interest Rate on Eximbank's New Debt	7.9	7.3	8.3	9.4	11.2
The Cost of Equity					
High (risk premium 6.1), $\hat{r}_e^h$	11.1%	11.4%	13.2%	16.2%	17.5%
Low (risk premium 2.2), $\hat{r}_e^l$	7.2	7.5	9.4	12.3	13.6
The Cost of Capital					
High, $\hat{m}^{*h}$	10.0%	9.4%	10.2%	11.5%	13.7%
Low, $\hat{m}^{*l}$	8.8	8.5	9.4	10.6	12.5
Average Interest Rate on Eximbank's New Loans, m	7.8	8.1	8.5	8.3	8.3

† Tax liability as a percentage of income before taxes and security gains and losses

Sources: Annual reports of the sample banks and the Export-Import Bank of the United States; *Federal Reserve Bulletin; Value Line;* U.S. President, various dates; my equations (4) and (5)

estimates of β for each sample bank are taken from *Value Line*, and the risk-free rate of interest is simply represented by the three-month Treasury bill rate. Estimating $E(\tilde{r}_m)$ is harder, since this is a market expectation and, over considerable periods of time, realized rates of return may be different than expected rates. However, Ibbotson and Sinquefield (1979) found that over a very long period of time (1926–78) the average risk premium on Standard & Poor's 500 market index was 6.2 percent. My estimates assume that this relationship was maintained, or that $E(\tilde{r}_m) - r_f = .062$. I compute the cost of equity capital for each year, for each of the five sample banks, according to (5). Then for each year I estimate the expected rate of return on Eximbank equity, $\hat{r}_e^h$, as the arithmetic average of returns for the sample banks. These are shown in Table 2.

Another common way to estimate the cost of equity capital for private firms is to capitalize an expected stream of future dividends. If, for example, the future expected growth rate in dividends per share is $E(\tilde{g})$ ad infinitum, and current dividends and current price per share are D and P, respectively, it can be shown that

$$(6) \qquad r_e = (D/P) + E(\tilde{g}).$$

In equilibrium, P will be set so that r_e just equals the market's required rate of return, given the perceived risk of the stock (see the box on the cost of capital).

D and P are easily measured, but $E(\tilde{g})$ is another

expectations variable which cannot be observed directly. As a proxy measure for $E(\tilde{g})$, I use historical growth rates in dividends per share over the period 1976–80. I assume that investors use historical data to form their expectations and that, as of 1980, they expected past growth trends to continue. For each sample bank, $E(\tilde{g})$ is estimated in this way, and the bank's dividend/price ratio is computed at the end of 1980. Summing these two provides an estimate of each bank's cost of equity capital as of that date.[11]

Finally, Eximbank's cost of equity is estimated as the arithmetic average of the individual sample banks' cost of equity capital. Defining $(\hat{D/P})_{1980}$ as the sample average dividend/price ratio at yearend 1980 and $E(\hat{g})_{1980}$ as the sample average expected growth in dividends per share at yearend 1980, I can compute the yearend cost of equity:[12]

$$(7) \quad (\hat{r}_e^l)_{1980} = (\hat{D/P})_{1980} + E(\hat{g})_{1980}$$
$$= .062 + .074 = .136.$$

This estimate of Eximbank's 1980 cost of equity is considerably lower than that obtained using the CAPM (.136 versus .175) and implies an average risk premium of only about .022 instead of .061.[13] The reason for the discrepancy is unclear, since both methods are based on expectations variables which must be proxied. I may have incorrectly estimated the expected growth in dividends, the market risk premium, the banks' betas, or some combination of these. Therefore, in the following computations I use two separate estimates of the cost of equity: a high estimate assuming a risk premium of .061 and a low estimate assuming a risk premium of .022.

☐ *The Market Weight, K*

In equation (4), K is defined in terms of market values of L and E; that is, $K = L/(E+L)$. Therefore, I must estimate the market values of debt and equity which would have been observed had Eximbank been a private firm. Published balance sheet data are not good proxies for market data here because Eximbank earned substantially below-market rates of return on both debt and equity. The approach I use is to estimate L and E by discounting the relevant cash flows from the income statement.

To estimate the market value of equity I discount profits, net of predicted taxes, at the cost of equity capital. Thus, if π = the total profits Eximbank reported and $\hat{E}$ = the estimated market value of equity, then

$$(8) \quad \hat{E} = \pi(1-\hat{\tau})/\hat{r}_e.$$

The market value of debt is estimated in a similar way. In this case, however, I invoke the simplifying assumption of a flat term structure, which permits the valuation of Eximbank debt as if it were of infinite maturity. That is, I capitalize interest payments only, ignoring the repayment of principal. Over the sample period the yield curve had a positive slope about as often as a negative one, so the assumption of a horizontal term structure is reasonable, at least on average.[14] Therefore, with I = the total interest expense Eximbank reported, the market value of Eximbank debt is estimated as

$$(9) \quad \hat{L} = I/\hat{r}_l.$$

Table 3 shows the estimated market values of debt and equity, as well as the accounting values reported by Eximbank, in each of the sample years, 1976–80. It shows two estimates of each market value, one derived with the high cost of capital, the other with the low.

As could be expected, given the below-market rates of return, estimated market values are consistently lower than accounting values, reflecting a probable bias in the accounting data. On average, the accounting value of debt exceeds its market value by 28 percent or 37 percent, depending on which estimate is used. Much more striking, the average accounting value of equity exceeds its market value by 333 or 477 percent. The result is that financial leverage (debt as a percentage of equity or assets) is much greater when computed with market values than it is with accounting data. Or, put another way, Eximbank is much

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[11] I have tried several alternative methods to estimate the historical rate of growth in dividends per share. The results are not particularly sensitive to the method used.

[12] Nearby dates have been checked to be sure the dividend/price ratios as of the end of 1980 are not abnormal. They do not appear to be.

[13] Ibbotson and Sinquefield (1979) estimated the market risk premium to be .062. The average risk premium for my sample banks is slightly lower, .061, because the average beta is less than 1.

[14] With publicly available data, the maturity structure of all Eximbank debt outstanding during the sample period cannot be determined. According to the Office of Management and Budget, however, the average maturity of newly issued Eximbank debt has consistently been about 7 years. Invoking the heroic assumption that all debt issues had a 7-year original maturity, the average maturity of outstandings was approximately 3½ years.

I have estimated the market value of Export-Import debt assuming a 3½-year maturity, and these estimates are quite similar to those based on the assumption of an infinite maturity. This reflects the fact that the yield curve is generally quite flat beyond a few years maturity.

more highly levered than one would conclude from examining its balance sheet.[15]

Estimates of m^*

Now I have all the parameter estimates that equation (4) requires to compute the private cost of capital, m^*, which, remember, is my proxy for the market rate private firms would have charged for the loans Eximbank made. My estimates of m^* are in Table 2 where, again, there are high and low estimates for each period. The high estimate, $\hat{m}^{*h}$, assumes the A bond rate and a 6.1 percent risk premium on equity, whereas the low estimate, $\hat{m}^{*l}$, assumes the Aaa bond rate and a 2.2 percent equity risk premium. For comparison, Table 2 also shows the average rate actually earned on new Eximbank loans, m. Notice that, in every year, $m < \hat{m}^{*l} < \hat{m}^{*h}$; the realized rate of return on Eximbank lending was always less than both estimates of the private cost of capital, or the rate private firms would have received. This, of course, suggests that Eximbank was lending at below-market, subsidized rates.

Estimating Eximbank's Lending Subsidy

My Estimates

With the hardest part of the job completed, I can now return to the basics of cost-benefit analysis—quantifying costs and benefits, discounting benefits, and comparing costs and benefits in search of Eximbank's lending subsidy.

Except for one item, Table 4 shows all the additional data required for my computations. It shows the total amount of new direct loans Eximbank made in each year, which are the direct costs of its lending, C. It also shows the average rate of interest on those loans when they were first issued, m, and their average maturity, n. These data, remember, determine the direct benefit stream, B, attributable to each year's loans. The item missing from Table 4, needed to compute the present value of direct benefits, is an estimate of ψ, the delay in payments to Eximbank which results from the agency sharing loans with private financial firms. In a detailed study of Eximbank's lending practices in 1979–80, Baron (1981) found that the average delay in principal repayments to the agency was about 40 percent of a loan's term to maturity; that is, on a ten-year loan, for example, Eximbank would begin receiving principal repayments after the fourth year. In computing the present value of benefits according to equation (2), therefore, I assume that $\psi = 40$ percent.

Using these data with my estimates of the discount rate, m^*, in equations (2) and (3) results in the net present values of benefits shown in Table 4. Since all of these values are negative, they are actually net costs. That substantiates the suspicion that in 1976–80 Eximbank lending was consistently subsidized by U.S. taxpayers.

The cost to taxpayers does not appear to have been small or stable, especially lately. According to the low and high estimates, the subsidy averaged between $168 million and $248 million per year. It increased substantially during the last two sample years, more than doubling in both 1979 and 1980, and by 1980 it was somewhere between $521 million and $653 million. These increases can be partly explained by increased Eximbank lending during 1979–80, but they were also due to an increased spread between the rates private firms would have charged on Eximbank's loans (the opportunity cost of taxpayers' funds) and the rate Eximbank charged. This increased spread is reflected in the *subsidy rate*, shown in the last two columns of Table 4, which measures the dollar amount of the subsidy as a percentage of the dollar amount of loans made. Even though lending increased considerably in the last two sample years, the subsidy rate did too, and by 1980 it was between 15 and 20 percent. These results clearly reflect a major Eximbank policy shift which began in early 1978. At that time, the agency announced an aggressive policy of supporting U.S. exports by lending more and at lower rates relative to market rates (Burnett 1979, Reilly 1981). Apparently the policy was successful, at least in the sense that it greatly increased the subsidy.[16]

Other Studies' Estimates

My estimates of Eximbank's lending subsidy improve on previously available estimates. As pointed out earlier, the discount rate I used to compute the subsidy is well-grounded in economic theory, whereas the rates other studies used are not. A comparison of our results shows

[15]Eximbank has long maintained that it is better capitalized than the largest private banks (U.S. Congress 1981b, pp. 13–14), and that is true if one compares accounting data. In 1980, for example, the accounting ratio of debt to total assets was an average of .960 for sample banks, compared with .772 for Eximbank. If this ratio is computed with market values, however, Eximbank's advantage shrinks considerably. The 1980 sample bank average was .973, while Eximbank had a value between .934 and .944.

[16]The policy also produced some problems for Eximbank. Reported profits declined by about 50 percent in 1980, and losses are projected for 1981, 1982, and beyond. A recent General Accounting Office study was extremely critical of the bank, questioning the adequacy of its loss reserves and its ability to survive without appropriated funds (U.S. Congress 1981b).

Table 3

Reported Accounting Values and Estimated Market Values* of Eximbank Capitalization

	Total Debt, L ($ million)			Total Equity, E ($ million)			Total Capitalization, V ($ million)			Leverage** (%)		
	Book Value	Market Value		Book Value	Market Value		Book Value	Market Value		Book Value	Market Value	
		$\hat{L}^l$	$\hat{L}^h$		$\hat{E}^l$	$\hat{E}^h$		High	Low		High	Low
1976	8,169	6,173	5,698	2,719	1,018	660	10,888	7,191	6,358	75.0	85.8	89.7
1977	8,785	7,792	7,334	2,850	1,172	771	11,635	8,964	8,105	75.5	86.9	90.5
1978	8,709	7,323	7,001	2,954	909	647	11,663	8,232	7,648	74.7	88.9	91.5
1979	8,936	7,026	6,613	3,078	830	630	12,014	7,856	7,243	74.4	89.4	91.3
1980	10,807	7,139	6,586	3,187	506	393	13,994	7,645	6,979	77.2	93.4	94.4

*Two market value estimates are shown.
The *high* values are calculated using the low discount rate and the *low* values using the high rate.

**Total debt as a percentage of total assets

Sources: Export-Import Bank, various dates; my Table 2 and equations (8) and (9)

Table 4

Estimates of the Costs, Benefits, and Subsidy of Eximbank Lending

	Costs			Benefits		Subsidy		Subsidy Rate	
	New Loans Made ($ million)	Average Rate of Interest	Average Maturity (Years)	Present Value ($ million)		Net Present Value of Benefits ($\Gamma - C$, $ million)		Subsidy as a Percentage of Loans Made	
				High	Low	High	Low		
	C	m	n	$\hat{\Gamma}^l$	$\hat{\Gamma}^h$	$\hat{N}^l$	$\hat{N}^h$	$-\hat{N}^l/C$	$-\hat{N}^h/C$
1976	2,206	7.8%	8	2,148	2,032	−58	−174	2.6%	7.9%
1977	1,789	8.1	6	1,713	1,658	−76	−131	4.2	7.3
1978	1,260	8.5	7	1,220	1,178	−40	−82	3.2	6.5
1979	1,629	8.3	7	1,483	1,429	−146	−200	9.0	12.3
1980	3,288	8.3	7	2,767	2,635	−521	−653	15.8	19.9

Sources: Export-Import Bank, various dates; U.S. President, various dates; my Table 2 and equations (2) and (3)

how misleading ad hoc techniques have been.

To compare results, though, my estimates of Eximbank's lending subsidy must first be translated into the rate spread referred to in the last section. Previous studies have not used my cost-benefit framework and so do not have net present value estimates which can be directly compared to mine. However, they have estimated the difference between the opportunity cost of funds and Eximbank's loan rate, my $m^* - m$ (or at least the components necessary to compute this spread).

Table 5 compares several other studies' estimates of the rate spread to mine. Each of the previous studies used a different measure of the opportunity cost of funds, and again, unlike mine, none of these measures was derived from an explicit theoretical framework. A study by Wallen (which only estimated the subsidy for 1980) used long-term government bond rates (U.S. Congress 1980), and one by the Congressional Budget Office (CBO) used the Aaa corporate bond rate (U.S. Congress 1981a). A study by the Office of Management and Budget (OMB) used a judgemental estimate of this cost, an estimate determined by subjective analysis of credit market conditions (U.S. President, various dates).

The comparison shows clearly that, while earlier studies found a subsidy in Eximbank lending too, their ad hoc methods of estimating m^* caused them to greatly underestimate the subsidy, particularly in 1979 and 1980. In other words, the cost to taxpayers of Eximbank's direct lending program has been much greater than estimated before.

Indirect Effects of Eximbank Lending

This, of course, means that justifying Eximbank's lending program is much harder than before. To be worth continuing, the program must be producing large positive side effects which more than offset its large net direct costs to taxpayers. That cannot be clearly demonstrated yet. Several indirect benefits are often attributed to Eximbank

Table 5

Comparison of Rate Spread Estimates of Eximbank's Lending Subsidy

Rate Spread = [Estimated Discount Rate, m^*] − [Average Interest Rate on Eximbank's New Loans, m]

	Wallen	CBO	OMB †	This Study $\hat{m}^{*l} - m$	This Study $\hat{m}^{*h} - m$
1976	n.a.	.01%	2.20%	1.00%	2.20%
1977	n.a.	−.48	1.90	.40	1.30
1978	n.a.	.35	1.50	.90	1.70
1979	n.a.	1.35	n.a.	2.30	3.20
1980	2.85%	3.50	2.20	4.20	5.40

n.a. = not available

† In some years, the OMB used a range of opportunity rates, and in those instances, to compute a rate spread for this table, I chose the midpoint. The OMB published no subsidy estimates for 1979.

Sources: U.S. Congress 1980, 1981a; U.S. President, various dates; my Table 2

lending, but they are very difficult to evaluate. So far, no one has been able to quantify them. (An attempt to do so is beyond the scope of this study.) In fact, no one has yet been able to conclusively argue that the alleged social benefits are truly benefits. Some of the attempts at such arguments are seriously flawed, and some are met by arguments that the effects in question might also be social costs. This leaves us with an ambiguity about the indirect effects of Eximbank lending that is beyond the current ability of standard economic analysis to resolve.

A Way to Correct Market Failure in Export Finance?

Some have argued that Eximbank lending benefits society by maintaining the optimal amount of export financing, an amount which private financial firms would not otherwise supply (Rendell 1976). The reason usually given for this alleged market failure is that most private financial firms do not have sufficient expertise to assess the risk of export loans. As discussed earlier, export loans involve risks not generally encountered in other types of lending, including the risk of government expropriation (*sovereign risk*) and the risk that the foreign borrower will be unable to obtain dollars to repay the loan (*convertibility risk*). Assessing such unusual risks requires unusual efforts from a lender, and most private firms are not prepared to make those efforts. This means, it is argued, that not many private firms are willing or able to lend in the export market (Rendell 1976, U.S. Congress 1981b). Without government intervention, therefore, the supply of export financing would be inadequate.

This argument overlooks the size composition of the U.S. financial intermediary industries, especially commercial banking. While it is true that most private financial firms have no expertise in cross-border lending, large commercial banks such as those in my sample certainly do. They lend in many countries around the world, and, in doing so, routinely assess both sovereign and convertibility risk. Although the number of domestic banks which fit this description is limited (to perhaps 30), they hold about half of the nation's banking assets. Why couldn't these banks provide an adequate amount of export financing?[17]

A case can be made, in fact, that Eximbank lending is costing society by interfering with private market efficiency rather than benefiting us by enhancing it. Private market failure is most often associated with markets which have few borrowers and lenders, infrequent trading, or risks that cannot be diversified. None of these characterizes the world market for dollar-denominated cross-border loans. But Eximbank lending could be reducing the efficiency of this large competitive market by crowding out private financial firms which cannot compete with its officially subsidized terms. The extent of such crowding out is hard to assess since Eximbank has been operating long enough to create its own market niche. Given this argument, and the large existing banks, however, there is no doubt that many of the loans the agency made could have and would have been made by the private sector, though at somewhat higher rates (U.S. Congress 1981b, pp. 26–27).

An Offset for the Effects of Other Nations' Subsidies?

At least two arguments are made that Eximbank's subsidized export credit benefits U.S. society by offsetting the effects of other nations' export subsidies. Neither of the arguments is persuasive.

One says that matching other nations' subsidies prevents them from distorting the industrial composition of the U.S. economy. Such matching, the argument goes, ensures that the kinds and quantities of the goods being produced here are those which our private market would prefer. The view is set out in a recent study by Cruse and Whitsitt (1981, p. 1).[18] For Eximbank's subsidized loans, their study finds

> . . . an economic rationale and justification in the neutralization of foreign official export credit—not on the grounds of equity to U.S. exporters, but on the basis that subsidized

[17] Another reason often given for a failure in the market for export financing is that both sovereign risk and convertibility risk apply to entire countries or even regions of the world and are not easily diversifiable. This makes export lending simply too risky for risk averse private financial firms, it is argued, so that they are unlikely to supply the quantity or form of export finance the market demands. Often cited as evidence of such market failure is the fact that in recent years commercial banks have become virtually unwilling to make long-term fixed-rate export loans. Therefore, it is reasoned, Eximbank must "fill the gap" (U.S. Congress 1981b).

This argument overlooks the fact that export finance is available from a number of private sources, not just banks. For example, dollar-denominated fixed-rate debentures may be sold by foreign importers or U.S. exporters, either in the United States or in the Eurobond market. Private market alternatives are available, at least to firms with sound credit ratings. In this respect, there is little difference between export and domestic finance, since most commercial banks prefer short maturities and/or floating rates on all their lending. If this preference is evidence of market failure, therefore, it is a general malaise not confined to export lending.

[18] Although Cruse and Whitsitt are economists at Eximbank, they stress that their study is a "Personal Paper" which does not necessarily reflect the official positions of the agency.

> Eximbank credits allow the "true" market (instead of foreign governments) to determine the scope and structure of the U.S. industrial base.

Although this argument is viscerally appealing, it is flawed. Say Eximbank were actually benefiting us to some extent by offsetting other nations' financing in an effort to preserve "the scope and structure of the U.S. industrial base." Nevertheless, if that is our objective, Eximbank is a costly way to try to achieve it. Remember, the subsidy in Eximbank lending is almost surely shared with foreign importers, and in this context they are unintended and unnecessary beneficiaries. A more efficient way to try to reach our objective would be to directly subsidize domestic consumption of the appropriate goods.

But that matching other nations' financing actually provides any social benefit of this type is not clear; it may instead interfere with the market and so be a social cost. From a global perspective, all export subsidies are indeed a source of distortion. That is, they increase the production of export goods above the market-determined, presumably efficient level. U.S. subsidies increase the total production of export goods just as subsidies from other nations do. In this global context, Eximbank lending does not offset other nations' distortions; it adds to them.

Yet, some people argue that Eximbank's responses to foreign subsidies benefit U.S. society in another way: by stimulating the demand for U.S. goods and U.S. workers and so maintaining the nation's optimal amount of both exports and employment (Roberts 1980, U.S. Congress 1981b).

The benefit to employment is elusive. Sector-specific government programs such as Eximbank lending may increase labor demand in the industries involved, and this effect may be measured statistically (Bayard and Orr 1980). That does not mean, however, that a nation's aggregate employment has necessarily been favorably affected; employment opportunities can be shifted among industries without increasing total employment. There is, in fact, a continuing debate among economists on the general question of whether government policies like Eximbank lending, which attempt to induce the demand for goods, actually have much, if any, sustained effect on aggregate employment (Lucas and Sargent 1979). This question is beyond the scope of my study. Given the debate, however, the effect of Eximbank lending on aggregate employment in the United States is certainly not clear.

Nor is it clear how much effect subsidized financing has on the long-run demand for U.S. exports. The alleged benefit could easily be a cost. Liberalization of one nation's official credit terms is likely to evoke a policy response by others, and the chain reaction may never end. Some governments have recognized this problem and since 1973 have negotiated to reduce official subsidies to export finance. In 1978 the United States signed the Agreements on Guidelines for Official Supported Export Credits, which put voluntary limits on interest rates and repayment terms. These are generally viewed as ineffective, since signatory nations have frequently violated the guidelines, and attempts to negotiate further restrictions have had only limited success (Aboaf 1981, Pine 1981, U.S. Congress 1981b). Nevertheless, the negotiations themselves represent official recognition that competitive subsidization of export finance may be self-defeating rather than beneficial.

A Foreign Policy Tool?

This logically brings us to still another way Eximbank's lending program is sometimes said to benefit society, namely, as an instrument of official foreign policy (Roberts 1980, U.S. Congress 1981a, b). In particular, the argument goes, Eximbank's lending terms can be strategically manipulated so as to influence the outcome of trade negotiations such as those mentioned above. In recent years, Eximbank has been used as a sort of club to wield over the heads of other major exporters. For example, the government of France has been viewed as particularly uncooperative in bargaining with the United States, and in response Eximbank has offered uniquely favorable terms on some export transactions in which France is the main competitor (Aboaf 1981).

An analysis of the strategic political value of the Eximbank lending program is far beyond the scope and expertise of this study. However, I offer two observations. Over the period I studied, 1976–80, the United States made little detectable progress in achieving its objectives through trade finance negotiations (Aboaf 1981, Pine 1981, U.S. Congress 1981b). So if actual results of negotiations are any measure of Eximbank's strategic value, that value is miniscule, at best. Admittedly, things might have gone even worse had Eximbank not existed. But then again, they might have gone better. A recent CBO study (U.S. Congress 1981a, p. x) did analyze Eximbank's strategic role, and it concluded that

Eximbank's Questionable Accounting Procedures

The actual subsidy in Eximbank lending is probably greater than my estimates indicate because my estimates are based on income data reported by the bank. For two reasons, Eximbank's reported profits are overstated by some unknown amount.

First, unlike private banks, Eximbank is not obliged to follow generally accepted accounting principles, and it doesn't. It is not required to make realistic provisions for loan losses or write off bad loans in a timely way. In fact, according to a General Accounting Office study of Eximbank (U.S. Congress 1981b, p. 14),

> No loans were written off in fiscal years 1979 and 1980, and only $8 million in loans has been charged off against income since 1934. For example, no determinations of uncollectibility have been made for delinquent loans of $26.4 million made in 1946 to the then recognized government of China and $36.3 million made to Cuba before 1961 when a prior government existed.

Second, Eximbank's interest income is probably overstated. Inevitably, some loans made by any lender have a sort of questionable status. That is, they are delinquent, and yet there remains a reasonable chance that they will ultimately be collected. Private banks typically put such loans on a *nonaccrual basis*, which means that interest on these loans can be shown as income, but only as it is actually collected. Eximbank does not follow this procedure. Its reported interest income includes accrued interest which has not been collected yet—and may never be. In recent years, this type of interest has become a sizable component of Eximbank's reported income. In 1978, accrued interest on delinquent loans accounted for 7.9 percent of the bank's reported net income. In 1979, this share virtually doubled to 15.7 percent, and then in 1980 it ballooned up to 84.5 percent. (See U.S. Congress 1981b, p. 17.)

export loans may be an important foreign policy tool, as the original circumstances of Eximbank's founding attest. But if that is its purpose, then control over loans might better be placed more directly under those responsible for foreign economic and political policies.

Conclusion

Half a billion dollars or more is quite a sum for taxpayers to pay each year for such tenuous indirect benefits. That's about how much Eximbank lending has been subsidized lately, according to my cost-benefit analysis. It is the most theoretically defensible study of the program done so far, and it estimates the subsidy to be large and growing rapidly. Previous studies of this program appear to have underestimated its subsidy—and my study may have too, considering Eximbank's unorthodox accounting methods (see the box). Even without taking that into account, however, Eximbank's lending program appears to be a program which society would be better off without.

Appendix
Deriving the Risk-Adjusted Cost of Capital

Here I show how to derive the formula I use in the text to estimate my proxy for the appropriate rate at which to discount the returns on Eximbank lending. What the formula [equation (4) in the text] represents is the rate private firms would have received, had they made Eximbank's loans, written in terms of the cost of capital Eximbank would have faced, had it been a private firm.

To begin to derive this formula, define V as the total market value of a private firm which is financed partly with debt, L, and partly with equity, E. Both debt and equity are risky, and r_l and r_e are the expected rates of return which investors require on these claims. Further, defining $\bar{I}$ as the expected interest payments and $\bar{\pi}$ as expected profits,

$$\text{(A1)} \quad V = L + E = (\bar{I}/r_l) + (\bar{\pi}/r_e).$$

If r_a = the expected rate of return on the firm's assets before taxes, A = total assets, and τ = the corporate tax rate, assumed constant, then

$$\text{(A2)} \quad \bar{\pi} = (r_a A - r_l L)\,(1-\tau).$$

I assume that the firm's assets are in a given risk class known to investors and abstract from the question of optimal capital structure by assuming that, if one exists, the firm is at it with

$$\text{(A3)} \quad L/V = K$$

a constant. Product or factor markets may be imperfect, so that

$$\text{(A4)} \quad \partial r_a/\partial A \leq 0.$$

The firm's objective is to maximize its market value, V, net of the cost of acquiring assets, A, or

$$\text{(A5)} \quad \max_A (V-A)$$

subject to equations (A1), (A2), (A3), and (A4). After rearrangement, the necessary condition which satisfies (A5) is

$$\text{(A6)} \quad r_a + Ar_a' = [r_e(1-K)/(1-\tau)] + r_l K.$$

The left-hand side of (A6) is the equilibrium marginal rate of return on the firm's assets, which is what I want to estimate. Let's call this m^*. In value-maximizing equilibrium, m^* is set equal to a weighted average of the expected rates of return on debt and equity. The weights, $K = L/V$ and $1-K = E/V$, are in market values and must sum to 1. Finally, the required rate of return on equity is adjusted by the factor $1/(1-\tau)$, reflecting the fact that returns to equity are taxable at the corporate level, whereas returns to debt are not.

In general, $V > A$ when (A6) holds. In the special case of perfect competition in the product and factor markets, (A6) simplifies to

$$m^* = r_a = [r_e(1-K)/(1-\tau)] + r_l K.$$

Scale is indeterminate, and in this case $V = A$.

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