Assessing Development Finance Institutions
A Public Interest Analysis

Jacob Yaron
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(Continued on the inside back cover.)
Assessing Development Finance Institutions

A Public Interest Analysis

Jacob Yaron
Foreword

Development finance institutions have been a prime vehicle used by governments and donors in their economic development efforts. These institutions have served as a conduit for channeling credit to priority sectors, often at concessional terms, and have aimed to achieve social and economic goals that were believed to have been neglected by market forces.

The assessment of development finance institutions has always been problematic. Widely used financial profitability ratios, which have been useful in assessing regular, profit-maximizing financial institutions, are likely to be inadequate for development finance institutions, as many of the subsidies received by these institutions are not accounted for in their income statements. A methodology that would consider the substantial differences between profit-maximizing financial intermediaries and development finance institutions has been long overdue.

This study was initiated in response to the need to introduce public interest assessment of development finance institutions’ performance. This type of assessment involves taking full account of the overall social costs entailed in operating a development finance institution, including all subsidies received by the institution. The methodology offered in this study departs significantly from the present overreliance on information available in conventional accounting procedures and profitability ratios. By providing a meaningful, comprehensive analysis of the real costs associated with maintaining a development finance institution, the methodology suggested in the study seeks to enrich the dialogue among governments, donors and development finance institutions’ managements to ensure proper allocation and use of scarce resources. It is also intended to promote improved assessment of and public debate on the desirability of development finance institutions’ continued operations by making their costs transparent and subject to regular review vis-à-vis their priority among other public expenditures.

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For several decades, international donors have focused on creating and strengthening development finance institutions (DFIs). Many of these institutions, however, have encountered problems such as loan defaults, high operating costs, insolvency and subsidy dependence. Financial profitability ratios such as return on equity and return on assets have long been used to assess the performance of these institutions, but these measures have not proven useful in explaining the cost of maintaining their continued operations.

This paper claims that much of the subsidization required to keep DFIs afloat has not been captured by conventional accounting procedures, which, among other things, were not designed for this purpose, and that past DFI profitability measures have provided governments, donors and DFI managements with an inadequate picture of the actual cost of DFI operations.

The Subsidy Dependence Index (SDI), suggested in the paper, is a user friendly tool aimed at providing a more comprehensive public interest analysis and measurement of DFI financial performance and subsidy dependence. This type of analysis involves taking full account of the overall social costs entailed in operating a DFI, including all subsidies received by the institution. The SDI is instrumental in (1) placing the total amount of subsidies received by a DFI in the context of its activity level (interest earned on its loan portfolio), similar to calculations such as effective protection, domestic resource cost and job creation cost; (2) tracking progress made by a DFI in reducing its subsidy dependence over time; and (3) comparing the subsidy dependence of DFIs providing similar services to a similar clientele.

The SDI complements conventional financial analysis and improves the evaluation of financial institutions that are subsidy recipients. In effect, the SDI goes beyond financial analysis into the area of economic analysis by providing a meaningful picture of the cost side of DFI operations, only part of which is captured in conventional financial data.

The SDI computation expands and enriches traditional financial analysis in three principal aspects, since (1) it quantifies the impact of subsidies received that affect the DFI’s financial performance, resolving the issue that much of the value of the subsidies is not recorded in the DFI income statement; (2) it suggests an index that measures the overall subsidy received by the DFI, against its prime source of income—the interest earned on its loan portfolio; and (3) it imputes cost of capital of the DFI’s equity. This final aspect resolves the issue of "costless" equity, thereby allowing a more meaningful comparison of the financial and economic costs of DFIs that are characterized by different equity-to-assets ratios.

Finally, the SDI addresses the need to improve the measurement of progress made toward "the phasing out of credit subsidies, the assumption by the fiscal budget of funding responsibility for any remaining subsidies, and the reduction and/or rationalization of directed credit lines," as required by the "World Bank Policies Guiding Financial Sector Operations" (para 17).
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Introduction

The establishment of development finance institutions (DFIs) was encouraged, sponsored and supported by governments and donors, including the Bank. The premise was that because of market failure, an intervention in the financial market could overcome risk aversion of creditors and entrepreneurs, a shortage of term credit and lack of experience in long-term financing of investments. The perception of market failure justified the allocations of scarce government resources through DFIs, which were usually subsidized. The DFI was expected to be a catalyst in financial intermediation, extending long-term credit and contributing to economic development through removal of bottlenecks associated with credit shortage.

The assessment and measurement of DFIs' contributions to economic development in their respective countries are complex and beyond the scope of this paper. However, assessment and measurement of the financial performance of DFIs have been carried out routinely in Bank staff appraisal reports, usually using standardized accounting and financial measurements. Conventional accounting procedures that report on profit (loss) and return on assets or equity, however, are not designed to capture systematically and routinely the full value of subsidization. Governments and international donors have consistently focused on partial and often meaningless profitability data and related financial ratios produced by conventional accounting procedures, while grossly overlooking the heavy subsidization of DFIs. A comprehensive view of DFIs' costs, which include implicit and explicit subsidies, has been ignored. As for materiality, the subsidies received by DFIs have often far exceeded the profit (loss) presented in DFIs' audited financial statements.

The objective of this paper is to provide a comprehensive method of assessing and measuring the overall financial costs involved in operating a DFI and quantifying its subsidy dependence. The paper suggests moving away from overreliance on the financial profitability ratios of conventional accounting procedures in the financial analysis of DFIs. An index to measure a DFI's financial performance is proposed—the Subsidy Dependence Index (SDI). The SDI aims at providing a public interest analysis of DFI financial performance and subsidy dependence. This type of analysis involves taking full account of the overall social costs entailed in operating a DFI, including the full value of all subsidies received by the institution. The SDI makes explicit the subsidy needed to keep the institution afloat, much of which is not reflected in conventional accounting reporting. The proposed SDI is a user friendly device that is simple to calculate because it does not require collecting detailed information on a DFI's operational costs. The SDI is instrumental in:

1. placing the total amount of subsidies received by a DFI in the context of its activity level, represented by interest earned on its loan portfolio (similar to calculations of effective protection, domestic resource cost or job creation cost);

2. tracking a DFI's subsidy dependence over time;

3. comparing the subsidy dependence of DFIs providing similar services to a similar clientele.
Financial sector operations staff can enrich their dialogue with borrowing countries by using the SDI as a routine instrument measuring a DFI’s performance at appraisal, supervision and completion of projects. As with any other financial measurement tool, however, the SDI is only as accurate as the data used to compute it.

The paper begins with an examination of the development of DFIs, followed by a description of the SDI and a discussion of how to resolve problems associated with computing it. It ends with an analysis of the SDI’s contribution to the assessment of a DFI’s financial performance. Computation of the SDI for two DFIs, the Agricultural Development Bank of Pakistan (ADBP) and the Agricultural Credit Corporation (ACC) in Jordan, for two years (1987 and 1988) is included in Appendixes I-V.
Rationale for DFIs' Establishment

Initially, DFIs were established to resolve what economists saw as crucial market failures in developing economies: the shortage of long-term credit to finance long-term investments and the perceived socially unjustified risk aversion of savers and creditors. DFIs, widely sponsored by states and international donors, were expected to resolve the term credit shortage, as well as to acquire and disseminate skills necessary to assess investment projects and borrowers' creditworthiness. The DFIs were intended to become self-financing by increasingly mobilizing resources from domestic financial markets, primarily through deposits and securities sales. Hence, the DFIs were designed to be catalysts for the development of domestic capital markets, emphasizing term financing.

*World Development Report 1989* states:

The most common type of nonbank intermediary in developing countries is the development finance institution (DFI). Most are public or quasi-public institutions that derive much of their funding from the government or from foreign assistance. Originally, they were intended to provide small and medium-size enterprises with the long-term finance that the commercial banks would not supply. During the 1970s that mandate was broadened to include the promotion of priority sectors. Using government funds, DFIs extended subsidized credit to activities judged unprofitable or too risky by other lenders. In practice, the DFIs found it difficult to finance projects with high economic but low financial rates of return and remain financially viable at the same time (page 106).

The premise underlying the DFIs' role changed significantly during the 1970s. In many instances, private sector financial institutions were especially weak, and distorted macroeconomic and financial sector policies adversely affected their emergence and performance. International donors increasingly supported state-owned DFIs, which in effect substituted for self-sustaining, private financial institutions. The rationale for the administrative intervention in the financial market shifted from resolving a general shortage of investment financing to channeling credit to what were believed to be underserviced priority sectors or targeted clientele.

The Inadequacy of Conventional Financial Reporting in Assessing DFIs' Financial Performance

Presently, the Bank staff appraisal reports with credit components usually include a routine conventional financial analysis of the DFI involved. This analysis is generally based on data gathered from the DFI's audited financial statements. Much of the analysis is typically focused on the profitability of the intermediary involved, as reflected in financial profitability ratios such as return on assets and return on equity. Rarely, however, is supplementary information provided on the value of implicit and explicit subsidies received by the DFI. There is no routine, standardized methodology that requires the
assessment and measurement of the DFI's subsidy dependence or changes that occur over time in the DFI's subsidy dependence. However, much of a DFI's presented profit often could not have been obtained without significant subsidization.

This paper recommends enriching the quality of DFIs' financial and economic reporting by gathering information on their subsidy dependence. This intent, however, begs a crucial question: Why is this supplementary information on subsidy dependence needed for assessing DFIs' financial performance in developing countries and not equally necessary for evaluating the financial performance of other enterprises operating in the same economic environment, where subsidies are prevalent?

In contrast to the profit maximizer, which does not differentiate between profit that is subsidy-dependent, as long as continued subsidization is ensured, and profit that is fully subsidy-independent, subsidy dependence is crucial to DFIs' performance assessment. The social cost of DFIs' operations, of which subsidy constitutes a significant share, is essential to determining the social justification for their existence and continued operation, because DFIs are generally public or quasi-public institutions. To illustrate the futility of the current financial reporting system, one may ask, for example, what is the meaning of a DFI's return on equity of 20 percent, when 50 percent of the DFI's financial obligations constitute concessional borrowed funds from the central bank (rediscouning facilities), carrying an interest rate significantly below market deposit interest rates, and one-third of its payroll cost, 80 percent of its loan losses and all training expenses are assumed by the government?

Furthermore, breaking away from applying financial prices of inputs and outputs and instead using shadow prices reflecting the social cost of investing in the real goods sectors have become a common practice in assessing and measuring the social desirability of investments. Applying economic shadow prices permits calculation of the economic rate of return (ERR), which often diverges from the financial rate of return (FRR). Application of the SDI calculation seeks to achieve a similar goal: to measure more accurately the social cost involved in a DFI's continued operation. There is, however, a difference between the ERR's and the SDI's approaches: the SDI does not claim to fully assess and measure the social benefits of allocating resources through a DFI to the real goods sectors. The SDI, however, better estimates the social cost of the subsidy involved, by applying approximate market interest rates to the financial resources used by the DFI.
Self-Sustainability

The financial self-sustainability of a DFI is achieved when the return on equity, net of any subsidy received, equals or exceeds the opportunity cost of funds. This assumes a profit maximizer's approach, whereby funds will be diverted to an alternative use when a higher return can be obtained elsewhere. Subsidy dependence is the inverse of self-sustainability. The most common subsidies provided to DFIs have been (1) interest rate differences between the market deposit interest rate and rates paid on concessional borrowed funds; (2) assumption by the state of foreign exchange losses on foreign currency-denominated loans; (3) obligatory deposits of other banks in a DFI at a below-market rate; (4) direct reimbursement of some or all operating costs incurred by a DFI; (5) reserve requirement and forced investment exemptions for deposit-accepting DFIs; (6) direct financial transfers; and (7) tax exemption.

A 1990 Bank study attempted to shed light on the elusive issue of DFI self-sustainability; it states:

The concept of sustainability as applied to a financial intermediary is neither clear nor simple. A DFI may be considered "sustainable" if it is able to maintain its lending operations with a reasonable level of profitability over time. However, in distorted economic environments, profitability is necessary but not sufficient to ensure sustainability. Financial and economic profitability may diverge substantially in such environments, due to policy distortions.

Although the dilemma most DFIs face is outlined above, the issue of self-sustainability, and in particular how to assess and measure it, remains unclarified. When DFIs' self-sustainability is a result of explicit and implicit subsidies, a question arises: What are the overall costs of keeping a DFI afloat?

The Subsidy Dependence Index (SDI) assesses and quantifies subsidy dependence. Its assessment and calculation require the application of certain procedures as well as judgment. The consistent application of these procedures and judgments from period to period is more important than the absolute accuracy of the figures included in the SDI computation. The SDI is a ratio that measures the percentage increase in the average on-lending interest rate required to compensate a DFI for the elimination of subsidies in a given year while keeping its return on equity equal to the approximate nonconcessional borrowing cost. The index assumes, for simplicity, that an increase in the on-lending interest rate is the only change made to compensate for loss of subsidy. Although removal of subsidies received by a DFI

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1 Tax exemption rarely has a major impact on DFI financial performance. Using before-tax data to assess DFIs would engender simplicity and uniformity.


3 In reality, there are several ways in which a DFI might respond to a loss of subsidy, such as elimination of its loss-generating activities, application of stricter loan approval procedures or more aggressive loan collection. Also, a significant increase in the on-lending interest rate is likely to influence demand and loan losses.
is not always politically feasible or desirable, measurement of any subsidy is always warranted economically and politically.

Calculating the SDI involves aggregating all the subsidies received by a DFI. The total amount of the subsidy is then measured against the DFI’s on-lending interest rate multiplied by its average annual loan portfolio, because lending is the prime activity of a supply-led DFI. Measuring a DFI’s annual subsidies as a percentage of its interest income yields the percentage by which interest income would have to increase to replace the subsidies and provides data on the percentage points by which the DFI’s on-lending interest rate would have to increase to eliminate subsidies.4

**Computation of the Subsidy Dependence Index (SDI)**

The amount of the annual subsidy received by a DFI is defined as:

\[ S = A (m-c) + [(E * m) - P] + K \]

where:
- \( S \) = Annual subsidy received by the DFI
- \( A \) = DFI concessional borrowed funds outstanding (annual average)
- \( m \) = Interest rate the DFI would be assumed to pay for borrowed funds if access to borrowed concessional funds were eliminated
- \( c \) = Weighted average annual concessional rate of interest actually paid by the DFI on its average annual concessional borrowed funds outstanding
- \( E \) = Average annual equity
- \( P \) = Reported annual profit (before tax) (adjusted, when necessary, for loan loss provisions, inflation, etc.)5
- \( K \) = The sum of all other annual subsidies received by the DFI (such as partial or complete coverage of the DFI’s operational costs by the state)

The financial ratio that is suggested as a subsidy dependence index (SDI) is:

\[ \text{SDI} = \frac{S}{LP * i} \]

where:
- \( \text{SDI} \) = Index of subsidy dependence of DFI
- \( S \) = Annual subsidy received by the DFI (see above)
- \( LP \) = Average annual outstanding loan portfolio of the DFI
- \( i \) = Weighted average on-lending interest rate paid on the loan portfolio of the DFI

\[ (LP * i)(\text{SDI}) = S \]

Therefore, change in interest income (interest earned on a DFI’s outstanding loan portfolio) is equal to subsidies.

4 Subsidy (S)

5 Without adequate provisions for loan losses, profitability data are likely to be misleading where arrears constitute a serious problem. See Chapter 3 for elaboration.
The SDI by itself does not clarify how the subsidy was used and whether most benefits accrued to clients or were consumed by an inefficient bureaucracy. The latter question, though important, requires far more detailed data and even then is often subject to interpretation (see Chapter 4). The advantage of the SDI is its simplicity, and as such it focuses exclusively on the intake of subsidy, i.e., the value of subsidy received by a DFI. The SDI should be seen in some instances as a lower bound because full financing of DFI activities is likely to be difficult at current market borrowing rates (m) if a DFI’s financial performance is dismal. However, calculating this lower bound is vital to ascertaining either the DFI’s progress toward self-sustainability or the social desirability of its continued subsidy dependence.

An SDI of zero means that a DFI achieved full self-sustainability. An SDI of 100% indicates that a doubling of the average on-lending interest rate is required if subsidies are to be eliminated. Similarly, an SDI of 200% indicates that a threefold increase in the on-lending interest rate is required to compensate for the subsidy elimination. A negative SDI indicates that a DFI not only fully achieved self-sustainability but that its annual profits, minus its capital (equity) charged at the approximate market interest rate, exceeded the total annual value of subsidies, if subsidies were received by the DFI. A negative SDI also implies that the DFI could have lowered its average on-lending interest rate while simultaneously eliminating any subsidies received in the same year.

**Deficiencies of Relying on Conventional Accounting**

Two main problems face the analyst who must rely on conventional accounting data to measure the financial performance of DFIs: the difference between expense and income (including reimbursement of specific expenses by state or donor) captured and reflected in the DFI income statement and those expenses and income not recorded in the DFI income statement and the lack of a design in conventional accounting practices to reflect and appropriately report on all types of subsidies received by a DFI.

Conventional accounting practices measure the cost of funds priced at their actual cost. The opportunity cost of a DFI’s borrowed funds, that is, the cost the DFI would have to pay for its funds if access to concessional funds were eliminated, is not taken into account. The SDI calculation assumes that the volume of the DFI’s outstanding loan portfolio remains unchanged. Hence, the change caused by subsidy elimination should be implemented only on the liabilities side of the DFI’s balance sheet, through substituting concessional borrowed funds with voluntary savings, obtained at a market deposit interest rate. Thus if the central bank loans to a DFI at 2%, conventional accounting practices list the cost of the loan at 2% p.a. However, if the cost of alternative nonconcessional funds is 12% p.a., then the SDI considers the 10% difference in interest rate on those funds and identifies this subsidy received by the DFI. The rationale is if the subsidized DFI paid only 2% p.a. on central bank rediscounting facilities, instead of the prevailing market deposit rate of 12% p.a., the accounting profit and the financial ratios measuring the DFI’s profitability would not convey that such ratios were only obtained due to the significant subsidy embodied in the cheap central bank rediscounting facilities. Providing a DFI with concessional funds is the most common method of subsidization, yet calculating the value of the subsidy implicit in the DFI’s concessationally borrowed funds requires information not included in the DFI’s financial statements. The same is true for the DFI’s equity.
Assigning a Cost to Equity

If the DFI does not earn a profit greater than or equal to the market rate, a subsidy is embedded in the low (or negative) return on equity that falls below the imputed cost of nonconcessional borrowed funds. The SDI formula assigns a cost to equity. The DFI is a public or quasi-public institution, so assigning a cost to equity accounts for the opportunity cost to the government of maintaining a certain level of equity in the DFI. The imputed cost of equity is then netted out from the DFI's profit to measure the extent to which the DFI benefited from the subsidy when the opportunity cost of equity is considered 

\[(E \times m) - P\]

The resources devoted to the DFI's equity have many other potential uses. The assignment of a cost to equity ensures that when investing in a subsidiary's equity directly, or indirectly by allowing a DFI to retain its earnings, the opportunity cost of the DFI's equity is taken into account. A cost should be imputed to equity regardless of whether a DFI distributes dividends. The DFI owner (society or government) can be regarded as a holding company. The holding company has many investments in various subsidiaries and can achieve an optimal level of risk and return with respect to the overall level of its investments, not necessarily for each subsidiary. The government may increase or decrease investment in each of its subsidiaries: the resources that constitute a DFI's equity all belong to a government capital pool. Disinvestment means disbursing dividend payments from the DFI to the state, whereas investment may mean allotting new capital to the DFI's equity, or allowing the DFI to retain its profit without paying it out as a dividend. The dividend policy of the DFI or injections of new paid-up capital do affect the subsidy dependence of the DFI by reducing (dividends paid) or increasing (injections of paid-up capital) the DFI's average annual equity that is assigned using imputed cost of capital. Thus, the SDI captures this fact by attributing a cost to equity, the weighted average of which is affected by the DFI's dividend payment or increase in capital as measured by the weighted average annual equity.

Therefore, the measurement of the financial performance of a government investment in DFIs should not be affected by the equity-to-assets ratio (gearing ratio) of a specific subsidiary (DFI) involved. A DFI with a high equity-to-assets ratio might seem to be performing better since it requires less subsidy for a given volume and complexity of operations: its equity is presented as costless in standard accounting terms, whereas the financial obligations of a more-leveraged DFI incur interest costs. Yet the equity of the less-leveraged firm has opportunity costs not counted in accounting terms. To resolve the gearing ratio bias in measuring DFI subsidy dependence, the cost of capital is imputed. This approach was advocated by Professor R.N. Anthony, who wrote:

... accounting should adopt the concept of interest used in economics, specifically ... interest on the use of both debt and equity capital should be accounted for as an item of cost—the cost of using capital—and ... should be recorded in the same way as other items of cost are recorded.\(^6\)

The next step is to determine the appropriate opportunity cost of capital for a DFI's equity. For a profit maximizer, a clear difference in risk between equity and borrowed funds exists, as J.D. Von Pischke claims:

Greater return to equity than to debt is consistent with the greater risk assumed by equityholders than by creditors, and with the underlying relationship between risk and returns: the greater the

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risk, the greater the returns from bearing the risk. Greater returns are necessary to attract liquidity to risky investments.  

The SDI, however, uses the approximate market borrowing rate as the imputed cost of DFI equity because the conventional notion that equity is riskier than borrowed funds, and therefore requires a higher return, does not generally apply to DFIs. Most DFIs are public institutions, government-owned or perceived to be supported by the state when confronting financial difficulties. Commercially oriented creditors would not lend to these DFIs without an explicit or implicit government guarantee of repayment of the loaned funds. The same would be true of depositors and voluntary savers. Consequently, the difference between the risk of and return on a DFI's equity and its borrowed funds does not really exist for the typical DFI. Therefore, the SDI applies the same imputed price or interest rate to be paid on nonconcessionally borrowed funds to both equity and concessionally borrowed funds. The average annual equity (E) is multiplied by the imputed interest rate charged on the DFI's borrowed funds (m), and the actual annual profit before tax (P) is then subtracted from the total to obtain a component of the DFI's annual subsidy.  

Calculating the SDI for a Sample DFI

A DFI's audited financial statements should provide the data required to calculate the SDI, even when the accounting systems are not well developed. Often there are no separate presentations of voluntary and obligatory deposits (both demand and time deposits) held by other financial institutions or state enterprises in the DFI at below-market interest rates. However, these data are not difficult to gather. Whenever the interest rate the DFI pays on the obligatory deposits (c) is lower than the approximate market rate paid on nonconcessional funds borrowed (m), the difference (m-c) multiplied by the average annual amount involved (A) should be treated as a subsidy. Concessional DFI long- and short-term borrowings need not be discrete. Similarly, a loan received by a DFI in foreign exchange when the state assumes the foreign exchange losses without an adequate fee constitutes concessional borrowing that should be treated as a subsidy and therefore included in the SDI calculation. The imputed cost of nonconcessional borrowed funds minus the financial costs already recorded in the DFI income statement and related to this foreign exchange-denominated loan (such as interest and possibly part of the foreign exchange loss paid by the DFI) should apply to the average annual outstanding loan denominated in foreign exchange.

---


8 Relatively low levels of capital produce very high debt-to-equity ratios that do not uniformly portray changes; for example, a 1% increase in the capital-to-assets ratio from 4% to 5% changes the debt-to-equity ratio from 24:1 to 19:1, whereas a 1% increase from 10% to 11% changes the debt-to-equity ratio from 9:1 to 8.1:1.
DFI Sample Numerical Illustration
(Data in the balance sheet below are average annual balances)

<table>
<thead>
<tr>
<th>ASSETS</th>
<th>LIABILITIES &amp; EQUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash 100</td>
<td>Demand deposits 100</td>
</tr>
<tr>
<td>Short-term investments 50</td>
<td>Savings accounts 300</td>
</tr>
<tr>
<td>Loan portfolio 800</td>
<td>Concessional borrowed funds 500</td>
</tr>
<tr>
<td>Fixed assets 50</td>
<td>Equity 100</td>
</tr>
<tr>
<td>Total assets 1,000</td>
<td>Total liabilities &amp; equity 1,000</td>
</tr>
</tbody>
</table>

Income Statement

Interest earned

- on loans (15%) 120
- on short-term investment (12%) +6

Total income 126

Interest paid

- on savings accounts (10%) 30
- on borrowed funds (8%) +40

Total interest paid 70

Gross margin 56

Administrative cost -48

Profit before tax 8

Assumptions

1. Rate of interest earned on loan portfolio (i) 15%
2. Rate of interest earned on securities 12%
3. No interest earned on demand accounts 0%

4. Rate of interest paid on savings accounts 10%

5. Rate of interest paid on concessional borrowed funds (i.e., central bank rediscouting facilities) (c) 8%

6. Mobilizing and servicing cost of savings accounts (one component of total administrative costs) 2%

7. Cost of savings mobilization and servicing (m) (10% + 2%) 12%

8. Reserve requirement 0%

9. No other subsidies received (K = 0)

The presented financial income of the sample DFI above indicates a profit before tax of 8, or a return of 8% on the average annual equity. The SDI calculated for the DFI above would generate the following information regarding the total value of subsidy received by the DFI when no reserve requirements prevail:

\[
S = 500 (12\% - 8\%) + [(100 \times 12\%) - 8] = 24
\]

and the subsidy dependence index indicates:

\[
\text{SDI} = \frac{500 (12\% - 8\%) + [(100 \times 12\%) - 8]}{800 \times 15\%} = \frac{24}{120} = 0.2 = 20\%
\]

An SDI of 20% means that an increase of 20% in the on-lending interest rate, i.e., an increase of 3 percentage points from 15% p.a. to 18% p.a., would be required to eliminate the subsidy received by the DFI. If such an interest rate increase were undertaken, the SDI would be 0.

\[
\text{SDI} = \frac{500 (12\% - 8\%) + [(100 \times 12\%) - 8] - 24}{800 \times 18\%} = 0
\]

The increase in the interest rate by 3 percentage points would nullify the subsidy since the profit would increase up to the point where it is equal to total subsidies.\textsuperscript{9} Table 1 (page 13) indicates the effect of

\textsuperscript{9} For simplicity, the average equity is assumed not to increase when profit increases as a result of an increase in the on-lending rate. Alternatively, one may consider the increased income as an immediate payout dividend.

\textsuperscript{10} A 3% increase in the DFI's on-lending rate will increase income by 24 (800 x 3%), which will nullify the entire subsidy of 24. A clarification is required: The 3% increase in the DFI's on-lending rate would eliminate the subsidy received by the DFI in that the DFI continues to benefit from concessional funds but simultaneously charges higher on-lending interest rates; considering the DFI's profit and the opportunity cost of its equity, the DFI's subsidy is eliminated.
using imputed financial costs of concessional borrowed funds and equity as well as the links between the DFI’s recorded income and its computed SDI.

Other Subsidies

K in the subsidy dependence equation represents all other miscellaneous subsidies that a DFI might receive. These include subsidization of training costs, free use of government facilities and vehicles, free computer facilities, full or partial exemption from the deposit reserve requirement and full or partial guarantee by the state of loan repayment by subborrowers in default. This list is not exhaustive, but it includes some of the more common subsidies. Additionally, K might not be accurately quantifiable. In this case, however, the lower bound of the SDI can still be obtained, generating valuable information on the subsidy dependence of the DFI involved.
<table>
<thead>
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<th>Assets</th>
<th>Recorded</th>
<th>Imputed</th>
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<tr>
<td>Loan portfolio</td>
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<td>Fixed assets</td>
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<table>
<thead>
<tr>
<th>Liabilities &amp; equity</th>
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<tr>
<td>Equity</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>1,000</td>
<td></td>
</tr>
</tbody>
</table>

**Computation**

**Income statement**

Accounting profit $8

**Imputed charges**

<table>
<thead>
<tr>
<th>Difference in interest (12% - 8%) on borrowed funds</th>
<th>($500)</th>
<th>(20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest (12%) on equity</td>
<td>($100)</td>
<td>(12)</td>
</tr>
<tr>
<td>Loss, when subsidy is taken into account</td>
<td></td>
<td>(24)</td>
</tr>
</tbody>
</table>

\[ SDI = \frac{24}{800 \times 15\%} = \frac{24}{120} = 0.2 = 20\% \]
How to Avoid Potential Pitfalls in Calculating the SDI

This chapter includes discussion of the impact of the following variables on the SDI calculation: (1) provisions for loan losses, (2) reserve requirements, (3) seasonality problems, (4) recommended methods for finding the approximate deposit market interest rate, (5) nonfinancial services granted by DFIs, (6) inflation adjustment, (7) cross-subsidization within the DFI, and (8) compensatory balances. Often, two basic adjustments to DFI financial statements are not adequately addressed or are completely ignored: (1) adequate provision for loan losses—usually a serious issue when loans in arrears are common; and (2) adjustment for inflation for DFIs operating in a highly inflationary environment. These two adjustments, whenever necessary, regardless of whether the SDI is calculated, are essential to understanding DFI financial performance and are imperative to complying with international accounting standards. These adjustments generate no additional work exclusively needed for the SDI calculation: the additional work, when needed, is essential to make DFI statements compatible with sound international accounting standards.

Provision for Loan Losses and Its Impact on Adequate Measurement of DFI Profit

In many instances, a DFI's provision for loan losses is underestimated, and consequently its profit is overstated. The tolerance of unrecognized bad debts in a DFI's loan portfolio constitutes a subsidy that should be accounted for appropriately. The Bank's operational directive on financial sector operations (OD 8.30) tackles this issue:

Determining asset quality is perhaps the most important aspect of the financial analysis of an FI, and requires minimum uniform supplementary financial data usually not provided in the basic financial statements (page 4, Annex A, para 9).

Adequate SDI computation is contingent upon adequate profit recognition compatible with generally accepted accounting principles. Sound assessment of provision for DFI loan losses, when overdues are material, is a prerequisite to an assessment of the financial performance and derived financial results of the DFI involved. Adjusting a DFI's financial statement for loan losses provision is, whenever necessary, an integral part of assessing the DFI's financial performance and, in particular, verifying whether the value of the DFI's loan portfolio net of provisions for loan losses, equity and profit has been overstated as a result of understated loan losses provision. The SDI is calculated using data from the DFI's financial statements, which must be adequate and reliable. When a DFI's adjusted financial statements (adjusted for loan losses provision) are used to rate the DFI's creditworthiness, the SDI can be conveniently calculated; the caveats regarding the DFI's financial statements would also apply to the SDI.

However, there is a possibility of calculating only the lower bound of the SDI. Suppose that all the data required for the SDI calculation are available, except overdues data. It is known, however, that
the DFI's annual provision for loan losses is underestimated, and consequently the resulting profit was overstated. In this case, the DFI's profit figure can be used in calculating the SDI, subject to the knowledge that the resulting SDI figure is only a lower bound, because the profit is overstated. The adjustment of a DFI's annual profit for loan losses provision requires, however, some clarifications. First, no interest should be accrued on nonperforming loans. Second, the denominator in the SDI formula (LP*i) should only refer to the average annual net outstanding loan portfolio (i.e., LP = the average annual unadjusted loan portfolio minus (-) the average outstanding provision for loan losses). The following example provides an illustration of an SDI calculation, with and without adjustment for loan losses provision, based on the data presented in a sample DFI's financial statements on page 10, whereby no provision for loan losses was made. The illustration highlights the difference and the impact that such a provision may have in assessing the DFI's financial performance and its subsidy dependence as measured by the SDI.

To simplify the computation, suppose that K = 0. Suppose also that the DFI did not provide for loan losses at all, and accrued interest of 3 on nonperforming loans in the amount of 20 (15% x 20) was recorded as interest income. These loans became nonperforming at year start, which for simplicity is assumed also to be the first year of operations, and are perceived to be beyond recovery in their entirety. The impact on the SDI, when provision for loan losses and accrued interest on nonperforming loans are taken into account, is as follows. The initial SDI (before loan loss adjustment) indicates that an increase of 20% in the on-lending interest rate, or an increase of 3 percentage points from 15% p.a. to 18% p.a., would be required to fully eliminate the subsidy received by the DFI. However, when a loan loss adjustment is made, the following changes should be introduced:

1. Interest earned, in view of the cancellation of accrued interest on nonperforming loans, would be reduced by 3, from 120 to 117.
2. Writing off loan losses of 20 would increase the DFI's annual expenses by 20. As a result of (1) and (2), the annual profit of the DFI, which was 8 before the loan loss adjustment, would become a loss of 15 (8-3-20=-15)
3. An additional change is the subtraction of the bad loans from the average annual loan portfolio. The average annual gross loan portfolio, originally 800, would be reduced to a net loan portfolio of 780 to reflect loan losses of 20.

The adjusted SDI would therefore be:

\[
\text{SDI (adjusted for loan losses provision)} = \frac{500 \times (12\% - 8\%) + [(88.5 \times 12\%) + 15]}{780 \times 15\%} - 0 = \frac{45.62}{117} = \frac{0.3899}{1} = 39.0\%
\]

The SDI (adjusted for loan losses provision and removal of recorded interest earned on nonperforming loans) indicates that an increase of 39.0% in the on-lending interest rate, or an increase

---

11 \((96+(-96-15)) / 2 = 88.5\). Initially, average equity was 100 and annual profit 8, which implies opening equity of 96 and year-end equity of 104. The need to provide against loan losses not only turned an annual profit into a loss, but also decreased the average annual equity from 100 to 88.5. (Note that the 88.5 is a reflection of adjustments in interest earned on nonperforming loans \([3]\) and in increased expenses \([20]\).) This is captured in the SDI calculation by charging a smaller equity with the imputed cost of capital.
of about 6 percentage points, from 15% p.a. to 20.9% p.a., is required to fully eliminate the subsidy received by the DFI. This example demonstrates that even a modest adjustment for loan losses provision (only 2.5% of the average outstanding loan portfolio was assumed to become a loan loss [20/800]) would have a dramatic effect on the SDI, as well as on the DFI’s reported profitability. (The reported profit fell from a profit of 8 to a loss of 15, i.e., return on average annual equity decreased from 8% to a negative return on equity of about 17%.) Because many DFIs have enormous unrecognized bad debts, it is essential to clarify the adequacy of the provision for loan losses. Again, the additional workload, when needed, to adjust the financial statements for loan losses is not related to the SDI calculation: it is essential to rendering the DFI financial statements meaningful and straightforward.

Reserve Requirement Adjustment

Reserve requirements should be carefully considered when measuring the SDI. The SDI measures the required increase in the DFI’s on-lending interest rate if subsidies received by the DFI through concessional borrowings and costless equity were eliminated. To "replace" the concessionaly borrowed funds and equity, the DFI would have to mobilize voluntary savings at a cost equal not only to the interest rate to be paid on nonconcessional funds, but also to the interest rate to be paid on the increase in voluntary saving, required to meet the reserve requirements, whenever reserve requirements exist in the country. It is also assumed that the DFI cannot increase, at least not in the short run, the value of demand accounts, because the DFI would have likely done this if it had been able to, assuming that demand accounts are the DFI’s cheapest source of financial resources. No discussion is detailed here on the issue of forced investment and the impact of exemption from it on the SDI calculation. However, the treatment of the forced investment issue is identical to that of reserve requirements. To determine the change (net increase) in reserve requirements, concessationally borrowed funds and equity are divided by a factor (1 minus [-] reserve requirement in percentage terms), and the value of the sum of the actual concessationally borrowed funds and equity, before their replacement by voluntary savings, is subtracted from this. When the DFI has some type of overall legal exemption from the reserve requirement, demand accounts should be included in the equation to reflect the value of reserve requirement exemption and treated the same as borrowings and equity. However, if the DFI really were to deposit in reserves or forced investment, it may receive, in some instances, interest on those reserves or forced investments. Hence, the total impact of the reserve requirement on the level of subsidy (S) consists of the increase in savings mobilization that is generated by taking into account the reserve requirement, multiplied by the difference between the market deposit interest rate of nonconcessional borrowed funds (m) and the deposit interest rate offered by the central bank or the return on forced investments (i).

The calculation below illustrates the computation of the SDI for a DFI benefiting from reserve requirement exemption. All data related to the DFI below are identical to the first illustration presented on page 10, whereby the initial calculation of SDI indicated 20%, except that three changes are introduced: the assumptions that reserve requirements prevail in the country (20%), that the DFI benefits from reserve requirement exemption and that the return on the reserve requirement is 3% p.a.

Assumptions

1. Rate of interest earned on loan portfolio (i) 15%

\[12 \frac{-15}{(96 + (96 - 15))/2} = -16.95\%\]
2. Rate of interest earned on securities 12%
3. No interest earned on demand accounts 0%
4. Rate of interest paid on savings accounts 10%
5. Rate of interest paid on concessional borrowed funds (i.e., central bank rediscounting facilities) 8%
6. Mobilizing and servicing cost of savings accounts (one component of administrative costs) 2%
7. Cost of savings mobilization and servicing (m) (10% + 2%) 12%
8. Reserve requirement 20%
9. Rate of interest paid on reserve requirement deposited with central bank 3%

The financial outcome of the DFI presented above indicates a profit before tax of 8, or a return of 8% on the average annual equity.

Assume for simplicity that \( K = 0 \). Because the DFI's deposits are assumed to be exempt from the reserve requirement, the impact of this exemption on the SDI is reflected in the calculation below:

\[
S = A(m-c) + (E\times m) - P + K + \left[ - (A + E + D) \right] \left( m - t \right)
\]

where:
- \( r \) = The reserve requirement (percentage)
- \( D \) = Deposits
- \( t \) = Rate of interest earned by the DFI on reserve requirements with the central bank

Therefore, using the figures on the balance sheet above, the SDI calculation yields:

\[
SDI = \frac{(500+100+400)}{(800 * 15\%)}
\]

\[
= \frac{(24 + 22.5)}{120} \quad = 0.388 \quad = 38.8\%
\]

In the example presented in Chapter 2, in which the reserve requirement was not considered, the SDI was 20%. However, when reserve requirement exemption exists, it influences subsidy dependence. The higher the reserve requirements, the higher their impact on the SDI; the higher the return on reserve
requirements (or forced investment), the lower the impact of the reserve requirement exemption on the SDI.

Seasonality Problems

The use of the annual averages based on values at year-start and year-end for concessional borrowings, equity, deposits and loan portfolio may misrepresent the actual weighted average value of these balances and consequently adversely affect the accuracy of the SDI, due to important seasonal variations, such as those found in agricultural activities or one-time changes in equity. For instance, if the DFI raises capital by selling equity in the second month of the fiscal year, the numerator underestimates the change by using an annual average. Monthly data on balances would drastically reduce the risk of such misrepresentation. Although they are usually available at the DFI’s headquarters, they are not often available for desk review by an analyst.

Finding the Approximate Deposit Market Interest Rate ($m$)

The approximate market rate that a DFI would pay on financial resources in the absence of concessional borrowed funds is difficult to establish, particularly in undeveloped financial markets. However, the SDI provides information on order of magnitude and trends; therefore, precision is not that essential. For example, treasury bill rates (with adequate risk premia) could serve as a reference rate for nonconcessional borrowed funds. Reference rates can also be based on bank commercial paper or certificates of deposit with maturities of six months to one year. These rates are legitimate references for the DFI market borrowing interest rate, when adequate adjustments for the risk involved, maturity and administrative costs are made. As previously mentioned, in some instances when the DFI’s financial performance is dismal, it cannot be realistically expected that the DFI is capable of mobilizing saving or borrowing at the above prescribed rates. These rates can be instrumental, however, in calculating the lower bound of the SDI.

In highly inflationary economies, a DFI may receive a form of implicit subsidy, if legal interest rate ceilings that are significantly below inflation prevail in the country. If there is a legal ceiling for the interest rates charged by commercial banks or other entities from which the DFI might borrow, then even if this interest rate is the one that the DFI would have to pay in the absence of concessional borrowing, an inflation subsidy would still be implicit. This is because the prevailing interest rate does not adequately reflect the cost of voluntary savings, which is distorted significantly by legal ceilings as the DFI must only pay the legal ceiling rate (significantly below the inflation rate) to the creditor. Thus, in these rare cases of long-prevailed saving in highly inflationary economies without indexation, at rates below inflation, to account for the subsidy provided by the deposit rate ceiling, the inflation rate, plus a premium of a few points to cover estimated administrative costs, should be used as a better proxy for the approximate market deposit rate the DFI would have to pay in the absence of an interest rate ceiling.

Nonfinancial Services Granted by DFIs to Ultimate Borrowers

The provision of nonfinancial services by a DFI requires special attention when measuring its SDI. In several instances, nonfinancial services are provided by the DFI as an integral and inseparable part of an extended loan, without charging the subborrower separately for the service. Furthermore, the DFI usually has no adequate costing system capable of reflecting the cost it incurs through provision of
these nonfinancial services. The DFI’s inability to achieve financial viability is often blamed on the necessity (by law or tradition) of providing these services when no income is earned by the DFI in return. A typical example is the frequent provision of technical assistance by national agricultural banks as an integral part of the loans extended. It is therefore desirable to separate, insofar as possible, the costs associated with the nonfinancial services to obtain a clearer picture of how much of the DFI subsidy dependence is actually explained by the provision of nonfinancial services. Applying more accurate cost estimates to the nonfinancial services is likely to serve a latent function, by generating a public debate on the cost and benefits of the existing arrangement. This may lead to further elaboration on whether privatizing the technical assistance, eliminating it altogether or agreeing on direct transfer from the fiscal budget to directly cover the DFI’s related expenditures is the preferred solution. Breaking out the costs and subsidies associated with each service could also be instrumental in comparing different DFIs since they offer different mixes of financial and nonfinancial services. Furthermore, the rationales for subsidizing the different elements/activities may vary and should be analyzed separately, not aggregately (see Chapter 4).

**Inflation Adjustment**

Sometimes there will be a need to adjust a DFI’s financial statements for inflation. This need arises because in a highly inflationary environment, a DFI’s unadjusted financial statements can be deceptive. As with the loan loss issue, the inflation adjustment of a DFI’s financial statements (and the derived profit) is not additional work generated exclusively by the SDI calculation: the required work is needed to render the DFI’s financial statements meaningful. To the extent that the DFI’s financial statements are meaningless or misleading, the SDI calculated on the basis of unadjusted statements, when inflation adjustment is needed, will also render meaningless or misleading information.

**Distortionary Effects of Inflation**

A company’s conventional financial statements are based on the assumption that the monetary unit is stable. Under inflationary conditions, however, the purchasing power of money declines, causing distortion of some crucial figures of the conventional financial statements, especially net income and nonmonetary assets’ value. In other words, during a period of inflation, the values of assets and some cost items (such as depreciation of fixed assets), as recorded in the financial statements, tend to be understated. To provide worthwhile information, these figures should be revalued. Shortcut procedures can provide approximate revalued figures, thereby overcoming the main distortions that predominate in conventional financial statements of companies reporting in an inflationary economy.

Recent developments related to inflation accounting are:

1. A new International Accounting Standard (IAS 29) was issued in July 1989, establishing the framework for meaningful and uniform financial reporting in inflationary economies. This international standard specifies the adjustment requirements and has become operative for financial statements covering periods beginning on or after January 1, 1990.
2. The Bank operational directive on financial sector operations (OD 8.30) requires Bank borrowers in countries where the cumulative inflation rate over three years is approaching or exceeds 100% to adjust their financial statements in accordance with IAS 29.\(^\text{13}\)

**Advantage of IAS 29**

IAS 29 has relatively few requirements for adjusting financial statements of a company reporting in a "hyperinflationary economy." The figures in the resulting adjusted statements should convey the same meaning as those derived from conventional financial statements when stable prices prevail.\(^\text{14}\) Unlike the scenario of underestimated loan losses provision, inflation adjustment requires caution to avoid double counting. When DFIs’ financial statements are already adjusted for high inflation, then a proxy for the imputed cost of equity is already taken into account by the mere nature of the adjustment, as required by IAS 29. This implies that there is no need to repeat applying the same routine procedure related to the DFI’s equity through the SDI calculation. The difference between applying the imputed cost of equity through IAS 29 and through the SDI is that IAS 29 applies zero cost of capital for equity in real terms (this is essentially how the real purchasing power of a DFI’s equity is maintained over a given period), whereas the SDI assigns the approximate market deposit interest rate, which is likely to reflect inflation expectations and to be higher than zero real interest rates. Hence, to maintain consistency in comparing SDIs of DFIs operating in non-highly inflationary environments and those operating in highly inflationary environments, only the difference between the approximate market deposit interest rate and the zero real interest rate should be applied to a DFI’s equity operating in a highly inflationary environment for which financial statements were adjusted as required by IAS 29.

**Cross-Subsidization**

Cross-subsidization is often practiced within the same DFI. This begs the question whether the SDI can still be used to provide meaningful information and serve as an instrumental tool in assessing the financial performance of the DFI involved. In reality, cross-subsidization within the DFI may cause, at worst, only some measurement problems. It will, however, change nothing that is relevant to the need to better assess the DFI’s subsidy dependence while breaking away from conventional financial profitability ratios. The variety of means by which cross-subsidization is practiced is virtually unlimited, yet the methods that commonly prevail are quite limited. To clarify the issue, assume that one-half of the value of the loan portfolio reflects loans extended at concessional interest rates to the targeted group, while the other half is lent at market rates. Similarly, the DFI is benefiting from some concessional central bank rediscounting facilities aimed at reducing on-lending interest rates to the "concessional" borrowers and activities. In such a scenario, initially the SDI can be calculated for the DFI involved, without distinguishing between the two components of the subsidized and nonsubsidized loan portfolio. The resulting SDI is still important, since it indicates the total value of subsidies received by the DFI as measured against its average annual loan portfolio (LP). Some additional steps are needed, however, to clarify the SDI for the concessional segment of the loan portfolio. To the extent that available data allow,

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\(^\text{13}\) Bank OD 8.30 requires that financial statements be based on the inflation accounting principles laid down in International Accounting Standard 29 (Annex A, para 4 [d]). Furthermore, the OD calls for financial and loan collection performance that "taking inflation into account, avoids the erosion of . . . capital" (page 16, para 65 [c]).

\(^\text{14}\) For elaboration on this subject, see "Inflation Adjustments of Financial Statements: Application of International Accounting Standard 29," by Yaaqov Goldschmidt and Jacob Yaron (World Bank Working Paper 670, 1991), in which numerical illustrations of inflation adjustment are included.
special attention should be given to verifying sources of subsidies and applications of subsidies related to the target group (or activity) on behalf of which subsidies are received and applied. A caveat: loan losses as an application of subsidy should be presented separately for (1) the concessional targeted portion of the loan portfolio, and (2) the balance of the nonsubsidized loan portfolio. This calculation obviously requires several other clarifications such as the share of the administrative costs that is associated with the concessional loan portfolio (e.g., if free agricultural extension is provided by the DFI, clearly this cost as well as any reimbursement of this cost by the government would constitute elements of the SDI calculation for the concessional part of the loan portfolio). Accuracy is not that essential, since a reasonable assessment in the absence of a developed cost-accounting system can be used effectively. The equity (net worth) of the DFI may be considered as servicing the concessional as well as the nonconcessional loan portfolio. Therefore, allocating the DFI's equity in proportion to the relative shares of the two segments of the loan portfolio, the concessional and the nonconcessional, could reasonably solve this issue.

Compensatory Balances

Compensatory balances—wherein a part of the subloan rather than the full value is actually extended to the borrower—require special attention. The balance is left with the DFI, often accruing interest to the borrower, though almost always at an effective rate below the effective on-lending interest rate charged on the loan. This implies a lower effective amount of loan and a higher effective interest rate. Hence, the SDI's denominator would be affected through a decreased loan portfolio (LP) and increased interest rate earned on the loan portfolio (I). The net change would be a smaller denominator, or reduced amount of interest earned on the effective loan portfolio. The SDI would therefore increase in view of the reduced denominator.
The SDI's Contribution to Assessment of a DFI's Financial Performance

Advantages

The SDI is instrumental in resolving the deficiencies in assessing a DFI's performance that result from relying on financial profitability ratios and accounting procedures used in the measurement of DFI profitability. In particular, through applying imputed cost of subsidized financial resources, such as concessional borrowed funds and equity, taking into account the value of reserve requirement exemptions and all other explicit and implicit subsidies received by the DFI, the SDI provides a more complete and meaningful picture of the overall cost required to keep a DFI afloat, while significantly enriching understanding of the cost associated with the DFI's continued operations. The SDI, however, does not enable its user to make generalizations about the socioeconomic value of a DFI's operations. Avoiding overclaiming is therefore imperative because the SDI only measures the extent to which a DFI relies on subsidization to maintain its current level of operations. Hence, the SDI cannot provide a full assessment of the DFI as a development institution. Even if an institution has a large, positive SDI, it is possible that all of the subloans made by that institution have had a strong, favorable impact on income levels and economic development, i.e., the cost of the DFI's operations in the form of the SDI is known, while its development or income redistribution impact—its social benefit—is not dealt with by the SDI.

A high SDI, however, challenges the analyst by calling for some indication and assessment of the social desirability of a DFI's continued operations. Therefore, in using the SDI to compare DFIs within the same country or even to chart a DFI's progress in attaining subsidy independence, the effectiveness of the DFI and the clientele it serves must be considered. A generalization can be made only when a similar clientele is served and similar services offered. Institution A with an SDI of 100% cannot necessarily be said to be less socially justified in terms of development objectives than Institution B with an SDI of 20% if A serves the lowest income strata of the population, while B serves those with high incomes. The only generalization that can be made is that A is more dependent on government subsidization, and the benefit or impact of its performance should be weighed against the subsidy involved. The computation of the SDI requires the unearthing of implicit and explicit subsidies. Therefore, its computation, when coupled with an analysis of the development impact of a DFI, could enable a government to gain a better idea of the per-dollar impact it obtains from that DFI. This could allow comparison with other government development operations, their expenditures and related benefits. This can only occur, though, with additional study of the DFI's economic impact.

Even more care must be taken in comparing the SDIs of institutions in different countries. Here too, a generalization can be made only when a similar clientele is served and similar services offered. Comparing similar DFIs in different countries with significantly different SDIs can be helpful, however, in attempting to determine the reasons for these differences. In comparing the SDIs of DFIs performing in different economic environments, one should verify that the comparison is made in the right context, i.e., that the DFIs concerned provide similar services to similar clientele. Conversely, one should not assume a priori that providing different financial services to different clientele would yield an identical
level of DFI subsidy dependence. The analyst must prove whether a higher SDI is justified by development (or welfare) impact.

The SDI versus Conventional Accounting Procedures

Examples of SDI calculations related to two DFIs, the Agricultural Development Bank of Pakistan (ADBP) and the Agricultural Credit Corporation (ACC) in Jordan (see below), demonstrate the significant gap in assessment of a DFI's financial performance using conventional accounting procedures versus the SDI. Reliance on conventional accounting (often just bookkeeping procedures) is deceptive, if the purpose is actually to assess the overall financial cost of keeping the DFI afloat. The SDI can be instrumental in assessing and measuring a DFI's progress in reducing its subsidy dependence, when the type of clientele and financial services offered do not change drastically over time. The SDI can be used as an initial reference point in a plan aimed at subsidy reduction, whereby quantified milestones may be included in a program aimed at making a DFI gradually more subsidy-independent.

Although the SDI measures the subsidy dependence at the intake, i.e., at the level of the DFI receiving the subsidy, the analyst may wish to go further and analyze the main components and beneficiaries of the subsidies. In the analysis of subsidy beneficiaries, one may clarify the SDI share that is explained by the DFI's use of on-lending interest rates below inflation (i.e., how much would the SDI have been reduced had the DFI applied on-lending interest rates equal to inflation), or by its provision of free technical assistance to ultimate borrowers. In reference to components of the SDI, it is relatively easy to comprehend the specific contribution of each factor to the SDI and to determine which factors are not reflected in conventional accounting procedures (e.g., the value of the subsidy component generated by access to cheap central bank rediscounting facilities). With this detailed picture, a statement of sources and applications of a DFI's gross profit and subsidy, as illustrated in Table 2, can be obtained and is likely to be instrumental. A quantified analysis, insofar that data availability allows, could enrich the dialogue regarding the cost, estimated benefits and resultant justification for each application of the subsidy involved. A DFI's financial reporting system should be designed to facilitate this analysis.

Table 3 (page 25) and Figure 1 (page 26) summarize the differences between the financial performance measurements of conventional accounting procedures and of the SDI for two DFIs (ADBP and ACC). (For the detailed SDI calculations, see Appendixes I-V.)

**ADBP—Pakistan**

The conventional financial profitability ratios indicate a high return on equity for 1987 that significantly decreased in 1988, though still indicating reasonable return. Providing a profoundly different picture, the SDI indicates that ADBP was heavily subsidy-dependent. ADBP would have had to increase its on-lending interest rate in 1987 by 52%, or by 6.2 percentage points from 11.9% p.a. to 18.1% p.a., to fully eliminate 1987 subsidies. The situation worsened in 1988 when the SDI reached 61%. ADBP would have been required to increase its on-lending interest rate by 61%, or by 6.9 percentage points from 11.3% p.a. to 18.2%, p.a., to fully eliminate 1988 subsidies.
### Table 2: Statement of Sources and Applications of a DFI's Subsidies and Gross Profit Net of Subsidies Recorded in Income Statement and before Provision for Loan Losses and Tax

<table>
<thead>
<tr>
<th>Sources</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) Subsidies not recorded in the DFI's income statement:</strong></td>
<td></td>
</tr>
<tr>
<td>1. subsidy received through concessional borrowing A(m-c)</td>
<td>E) Lending below inflation rate (or market interest rate)</td>
</tr>
<tr>
<td>2. subsidy received through &quot;costless&quot; equity (E*m)</td>
<td>F) Loan losses provision</td>
</tr>
<tr>
<td>3. subsidy received through reserve requirement exemption</td>
<td>G) Provision of free services (e.g., technical assistance)</td>
</tr>
<tr>
<td>4. free use of government computer facilities (an example of K)</td>
<td>H) Tax</td>
</tr>
<tr>
<td><strong>B) Subsidies recorded in the DFI's income statement:</strong></td>
<td></td>
</tr>
<tr>
<td>1. government's assumption of, for example, 50% of loan losses (K)</td>
<td>K) Other: (specify)</td>
</tr>
<tr>
<td>2. government's reimbursement of, for example, 10% of personnel costs (K)</td>
<td></td>
</tr>
<tr>
<td><strong>C) Profit before subsidies recorded in income statement, loan losses provision and tax</strong></td>
<td></td>
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<tr>
<td><strong>D) Other: (specify)</strong></td>
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<tr>
<td><strong>Total sources of subsidies and gross profit before subsidies recorded in income statement, loan losses provision and tax</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total applications of subsidies and gross profit before subsidies recorded in income statement, loan losses provision and tax</strong></td>
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Table 3: Comparison between Return on Equity and SDI

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<th>ADBP - Pakistan</th>
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<th>ACC - Jordan</th>
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<tr>
<td>Return on average annual equity (in %)</td>
<td>19.2</td>
<td>12.8</td>
<td>0.2</td>
<td>0.0</td>
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<tr>
<td>SDI (in %)</td>
<td>52.0</td>
<td>61.0</td>
<td>246.0</td>
<td>224.0</td>
</tr>
</tbody>
</table>

**ACC—Jordan**

The conventional financial profitability ratios indicate a small, negligible return on equity in 1987, and a break-even point of zero return on equity in 1988. In contrast to this tolerable scenario, the SDI indicates an enormous dependence on subsidy in 1987, with some improvement for 1988, though still far from financial self-sustainability. ACC would have had to increase its on-lending interest rate in 1987 by 246% from 3.5% p.a. to 12.2% p.a., or by 8.7 percentage points, to fully eliminate 1987 subsidies. In 1988, the conventional accounting measurement indicates minor deterioration in return on average annual equity from 0.2% to 0.0%. The SDI, however, indicates an opposite trend: moderate progress was made toward subsidy independence, whereby the SDI declined from 246% in 1987 to 224% in 1988.

The gap between the SDI and the financial profitability ratio of return on equity would be larger when the DFI:

1. benefits from concessional funds that account for a large share of the DFI's financial liabilities and a large gap exists between the concessional borrowing interest rate and the approximate market deposit interest rate;

2. has a large equity-to-assets ratio;

3. benefits from reserve requirement or forced investment exemptions;

4. benefits from various other subsidies regardless of whether they are recorded in the DFI's income statement.
Figure 1: Comparison between Return on Equity and Subsidy Dependence Index (SDI)

ADBP - Pakistan
- 1987: 52%
- 1988: 61%

ACC - Jordan
- 1987: 0.2%
- 1988: 0.0%

Return on average annual equity
Subsidy Dependence Index (SDI)
Conclusion

Governments and donors have heavily subsidized DFIs for many years, yet when evaluating the financial performance of DFIs, they have not taken this subsidization appropriately into account. The Subsidy Dependence Index (SDI), suggested in the paper, is a user friendly device aimed at more comprehensive and meaningful measurement of DFI subsidy dependence. When properly used, it helps galvanize understanding of costs and services associated with DFIs' continued operations. It reveals hidden costs not currently considered and highlights services that are extended to clients, thereby contributing to a more comprehensive assessment of the social costs and benefits related to maintaining DFIs.

The SDI encourages evaluation of the subsidy embodied in concessional borrowing, the opportunity cost of equity and other subsidies that are not made obvious by conventional accounting procedures and the presentation of financial statements. Analysts can use the SDI as an instrument for monitoring a DFI's progress toward subsidy independence, for comparing similar DFIs and for contrasting the cost of a DFI with separate analyses of its benefits. The SDI, however, is only as accurate as the data used to compute it. Finally, the analyst should not use the SDI as an exclusive indicator of whether to continue the present course of a DFI. Rather, the index should serve as a tool to be used as part of an evaluation of a DFI in the context of its cost and development impact.

The SDI is a public interest analytic tool that enriches the measurement of the financial performance of DFIs. The Bank's recently issued Operational Directive 8.30, "Financial Sector Operations," recognizes the need for financial reporting requirements for DFIs that differ from those required for banks (OD 8.30 Appendixes A1, A2, A3, A4). The SDI expands and promotes this approach by ensuring that a meaningful assessment of the social resources used in facilitating DFI operations and services will be obtained.
Table A-1: Data and Assumptions Related to the Calculation of the Subsidy Dependence Index (SDI)

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<tbody>
<tr>
<td>a. Deposit rate or yield on government bonds (%)</td>
<td>8.3</td>
<td>8.3</td>
<td>7.5</td>
<td>7.5</td>
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<tr>
<td>b. Mobilizing cost (in %)</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>c. Total [c = (a+b)]</td>
<td>10.3</td>
<td>10.3</td>
<td>9.5</td>
<td>9.5</td>
</tr>
<tr>
<td>d. Reserve requirements in percentage of deposits</td>
<td>30.0</td>
<td>30.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>e. Return on reserve requirements (in %)</td>
<td>6.0</td>
<td>6.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Average annual on-lending interest rate (%)\(^1\): 11.9 11.3 3.53 3.74

On-lending interest rate required to eliminate subsidies (%): 18.1 18.2 12.2 12.1

\(^1\) Interest earned as a percentage of average loan portfolio.
Appendix II

Pakistan: SDI for ADBP

1987

The information below summarizes the subsidies received by ADBP based on data from its 1987 audited and unadjusted financial statements.

When reserve requirements are not considered, the subsidy is formulated as follows:

\[ S = A(m - c) + [(E*m) - P] + K \]

However, when the effect of a reserve requirement is considered, the value of the subsidy is calculated with the following formula:

\[ S = A(m - c) + [(E*m) - P] + K + [(A + E + D) - (A + E + D)] (m - t) \]

\[ A(m-c) = 14,584 (.103 - .043) = 875.0 \]
\[ (E*m) = 2,029 * .103 = 209.0 \]
\[ P = 390 \]
\[ LP = 16,142 \]
\[ i = 11.9\% \]
\[ (1 - r) = .70 \]
\[ t = .06 \]
\[ K = \text{negligible} \]
\[ D = 243 \text{ (average annual deposits)} \]

Without considering reserve requirements:
\[ S = 875.0 + 209.0 - 390 = 694 \]

With a reserve requirement of 30%, the subsidy becomes
\[ S = 875 + 209 - 390 + [(14,584 + 2,029 + 243)/.7 - (14,584 + 2,029 + 243)] (.103 - .06) = 694 + 311 = 1,005 \]

SDI = \( \frac{S}{LP \cdot i} \)
\[ = \frac{1,005}{(16,142 \cdot .119)} = .52 = 52\% \]
Findings

1987 ADBP on-lending interest rate = 11.9%
Interest rate required to eliminate subsidies = 18.1%

Thus, an increase in the average on-lending interest rate of 52 percent or 6.2 percentage points, from 11.9% to 18.1%, is necessary to eliminate 1987 subsidies. The new interest rate was calculated by multiplying the on-lending interest rate by the SDI and adding the result of this operation to the on-lending interest rate.

Comparison with standard financial ratios

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<table>
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<tbody>
<tr>
<td>Return on average annual equity</td>
<td>19.2%</td>
</tr>
<tr>
<td>Return on average annual assets</td>
<td>2.1%</td>
</tr>
</tbody>
</table>
Appendix III

Pakistan: SDI for ADBP

1988

The information provided below summarizes the subsidies received by ADBP based on data from its 1988 audited and unadjusted financial statements.

When reserve requirements are not considered, the subsidy is formulated as follows:

\[ S = A(m-c) + [(E\times m) - P] + K \]

However, when the effect of a reserve requirement is considered, the value of the subsidy is calculated with the following formula:

\[ S = A(m-c) + [(E\times m) - P] + K \left[ \frac{(A + E + D)}{(1 - r)} - (A + E + D) \right] (m - t) \]

\[
\begin{align*}
A(m-c) &= 17,986 \times (.103 - .042) = 1,097 \\
(E \times m) &= 2,529 \times .103 = 260 \\
P &= 325 \\
LP &= 20,483 \\
i &= 11.3\% \\
(1 - r) &= .70 \\
t &= .06 \\
K &= \text{negligible} \\
D &= 680 \text{ (average annual deposits)}
\end{align*}
\]

Without considering reserve requirement:

\[ S = 1,097 + 260 - 325 = 1,032 \]

With a reserve requirement of 30%, the subsidy becomes

\[ S = 1,097 + 260 - 325 + \left[ \frac{(17,986 + 2,529 + 680)}{.7} - (17,986 + 2,529 + 680) \right] (.103 - .06) = 1,032 + 390 = 1,422 \]

\[ \text{SDI} = \frac{S}{(LP \times i)} = \frac{1,422}{(20,483 \times .113)} = .61 = 61\% \]
Findings

1988 ADBP on-lending interest rate = 11.3%
Interest rate required to eliminate subsidies = 18.2%

Thus, an increase in the average on-lending interest rate of 61 percent or 6.9 percentage points, from 11.3% to 18.2%, is necessary to eliminate 1988 subsidies. The new interest rate is calculated by multiplying the SDI by the on-lending interest rate and adding the result of this operation to the on-lending interest rate.

Comparison with standard financial ratios

Return on average annual equity 12.8%
Return on average annual assets 1.4%
Appendix IV

Jordan: SDI for ACC

1987

The information below summarizes the subsidies received by ACC based on data from its 1987 financial statements.\(^\text{15}\)

When reserve requirements are not considered, the subsidy is formulated as follows:

\[
S = A(m-c) + [(E * m) - P] + K
\]

However, when the effect of a reserve requirement is considered, the value of the subsidy is calculated with the following formula:

\[
S = A(m-c) + [(E * m) - P] + K + \left[\frac{(A + E + D)}{1 - r} - (A + E + D)\right] (m - t)
\]

\(A (m-c) = 16,507 (9.5\% - 3.2\%) = 1,040\)

\((E * m) = 12,671 * 9.5\% = 1,204\)

\(P = 21\)

\(LP = 28,776\)

\(i = 3.53\%\)

\((1 - r) = .91\)

\(t = 0\)

\(K = 0\)

\(D = 189\) (average annual deposits)

Without considering reserve requirements:

\(S = 1,040 + 1,204 - 21 = 2,223\)

With a reserve requirement of 9\%, the subsidy becomes:

\(S = 1,040 + 1,204 - 21 + [(16,507 + 12,671 + 189)/(.91) - (16,507 + 12,671 + 189)] (.095) = 2,223 + 276 = 2,499\)

\(SDI = (S)/(LP*i)\)

\(= 2,499/(28,776 * .0353) = 2.46 = 246\%\)

\(^{15}\) For both 1987 and 1988, there is no indication whether adequate provision for loan losses was made. Therefore, the SDI calculation may reflect only the lower bound of the SDI.
Findings

1987 ACC on-lending interest rate = 3.53%
Interest rate required to eliminate subsidies = 12.2%

Thus, an increase in the average on-lending interest rate of 246 percent or about 8.7 percentage points, from 3.53% p.a. to 12.2% p.a., is necessary. The new interest rate is calculated by multiplying the SDI by the on-lending interest rate and adding the result of this operation to the on-lending interest rate.

Comparison with standard financial ratios

Return on average annual equity  0.2%
Return on average annual assets  0.0%
The information below summarizes the subsidies received by ACC based on data from its 1988 financial statements.

When reserve requirements are not considered, the subsidy is formulated as follows:

\[ S = A(m - c) + [(E \times m) - P] + K \]

However, when the effect of a reserve requirement is considered, the value of the subsidy is calculated with the following formula:

\[ S = A(m - c) + [(E \times m) - P] + K + \left( \frac{(A + E + D)}{1 - r} \right) \]

\[ A(m - c) = 18,161 \times (9.5\% - 3.7\%) = 1,053 \]

\[ (E \times m) = 13,081 \times 9.5\% = 1,243 \]

\[ P = 5 \]

\[ LP = 30,859 \]

\[ i = 3.74\% \]

\[ (1 - r) = .91 \]

\[ t = 0 \]

\[ K = 0 \]

\[ D = 193 \text{ (average annual deposits)} \]

Without considering reserve requirements:

\[ S = 1,053 + 1,243 - 5 = 2,291 \]

With a reserve requirement of 9%, the subsidy becomes:

\[ S = 1,053 + 1,243 - 5 + \left( \frac{(18,161 + 13,081 + 193)}{.91} - (18,161 + 13,081 + 193) \right) \times .095 \]

\[ = 2,291 + 295 = 2,586 \]

\[ SDI = \frac{S}{(LP \times i)} \]

\[ = \frac{2,586}{(30,859 \times .0374)} = 2.24 = 224\% \]
Findings

1988 ACC on-lending interest rate = 3.74%
Interest rate required to eliminate subsidies = 12.1%

Thus, an increase in the average on-lending interest rate of 224 percent or about 8.4 percentage points, from 3.74% to 12.1%, is necessary to eliminate 1988 subsidies. The new interest rate is calculated by multiplying the SDI by the on-lending interest rate and adding the result of this operation to the on-lending interest rate.

Comparison with standard financial ratios

Return on average annual equity 0.0%
Return on average annual assets 0.0%
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