PN-ABA-334

AGENCY FOR INTERNATIONAL DEVELOPMENT
PPC/CDIE/DI REPORT PROCESSING FORM

ENTER INFORMATION ONLY IF NOT INCLUDED ON COVER OR TITLE PAGE OF DOCUMENT

1. Project/Subproject Number: 936-5315

2. Contract/Grant Number: DAN-5315-A-00-2070-00

3. Publication Date: 6/1/88

4. Document Title/Translated Title:

5. Author(s)
1.
2.
3.

6. Contributing Organization(s): The Ohio State University

7. Pagination: 27p

8. Report Number: 630 # 1469

9. Sponsoring A.I.D. Office: ST/RD

10. Abstract (optional - 250 word limit)

11. Subject Keywords (optional)
1. Rural Financial Markets
2. Credit
3. Transaction Costs
4.
5.
6.

12. Supplementary Notes

13. Submitting Official: John Craypel

14. Telephone Number: 875-4410

15. Today's Date: 8/12/88

DO NOT write below this line

16. DOCID

17. Document Disposition: DOCRD [ ] INV [ ] DUPLICATE [ ]

WORK SHEET

PN-ABA-334
ISN 57108

Economics and Sociology
Occasional Paper No. 1469

TRANSACTION COSTS OF FINANCIAL INTERMEDIATION IN DEVELOPING COUNTRIES

by

Carlos E. Cuevas

June 1, 1988

Agricultural Finance Program
Department of Agricultural Economics
and Rural Sociology
The Ohio State University
2120 Fyffe Road
Columbus, Ohio 43210

Acknowledgements

The author wishes to thank his colleagues and collaborators at Ohio State University for fruitful exchange and support. Research undertaken by the author and reviewed in this paper was supported by USAID/S&T-Washington, USAID Missions in Honduras, the Dominican Republic, Niger and the Philippines, by FAO and the FInafrica Foundation. The views expressed on this paper, however, may not necessarily be shared by these persons and institutions.

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Introduction

Knowledge of the cost structure and production technology of financial institutions is essential for analyzing institutional performance and assessing the adequacy of financial policies. Bank managers need to carefully monitor cost indicators in order to evaluate the performance of their institution over time and in comparison to their competitors, and to assess the profitability of different bank services. Managerial decisions about expansion or contraction of bank activities, as well as the provision of new financial services, must be based on the knowledge of specific features of bank technology such as economies of scale and economies of scope.

Policy-makers, on the other hand, should consider the cost structure and technological parameters of financial institutions when deciding on policy measures that affect the financial system. The effects of reserve requirements, interest-rate ceilings, and branching regulations, among other policies, are conditioned by the ability of banking firms to adjust their operational procedures and resource allocation to the policy measures. More than one bank failure can be traced to inadequate policies that have either under-estimated the costs of providing certain financial services, or over-estimated the market potential of specific areas of activity.

Several studies have addressed the measurement of scale economies and cost complementarities in the production of financial services in developed economies (Benston, Hanweck and Humphrey; Hunter and Timme; Mullineaux; Murray and White; Panzar and Willig). Until recently, however, few studies had focused on the cost-output relationships of financial institutions operating in developing countries.

This paper reviews a number of recent studies on the costs of financial intermediation in developing economies. The countries included in the study are Bangladesh and the Philippines in Asia, Honduras and the Dominican Republic in Latin America, and Niger and Togo in West Africa. Since interest rates vary substantially across countries due to different monetary scenarios, the comparative analysis presented here focuses on the <u>non-financial</u> costs incurred by financial institutions in these countries.

The following section presents a conceptual framework common to most studies reviewed, highlighting the main components of the cost structure of financial intermediaries, and the factors likely to affect the level and behavior of these costs. Subsequently, the different methods used in the country case studies are summarized, before presenting the empirical results involving about fifty banks in the six developing countries indicated above. These results are discussed in two separate sections. First, economies of scale and economies of scope results, along with the costs of lending and deposit mobilization, are analyzed for a subset of the case studies where these estimates were obtained. Secondly, the analysis focuses on the costs of lending in all case studies, and on the importance of assessing risk premia before judging the relative performance of financial institutions. Some concluding remarks follow.

Transaction Costs of Financial Intermediation

Financial transactions entail non-financial costs for all participants in the market, i.e., depositors, borrowers, and financial intermediaries. The level and distribution of these costs among the participants are affected by changes in technology, by changes in consumer preferences and by financial regulations.

Depositors incur search and information costs to select a depository institution, and to perform account transactions (deposits, withdrawals). At the other end, borrowers bear explicit and implicit costs of negotiating, obtaining and repaying loans. For depositors and borrowers, the opportunity cost of time is likely to be a significant component of their transaction costs[1].

Non-financial transaction costs incurred by financial intermediaries may be classified into: (1), costs of mobilizing deposits and (2), costs of lending. The former correspond to resources (labor, capital, materials) utilized in handling deposits accounts, documentation, record-keeping, and issuing statements. Costs of lending refer to costs associated with loan processing, loan disbursement, monitoring, and loan recovery. Gathering information about potential borrowers, assessment of collateral and documentation are among these lending costs.

In addition to the (explicit) resource costs of lending, important consideration should be given to risk costs, i.e., the implicit costs and explicit losses associated with loan default. Almost without exception, accounting provisions for loan delin-

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1 Transaction costs of borrowing are dealt with in Cuevas (1988b).

quency are unrealistic, and follow diverse and usually undisclosed procedures. This introduces serious difficulties into cost and performance comparisons across banks. An attempt to overcome these complexities is made later in this paper.

In summary, financial intermediaries are considered firms which use inputs of real resources to produce financial services (e.g., bookkeeping, loan evaluations, and deposit transactions), given a certain technology. Under this approach, financial assets as well as bank liabilities are considered bank outputs, to the extent that their production cause operating expenses. The treatment of deposits as a bank output is consistent with the "real resource model" approach to modelling the banking firm (Baltensperger), and it has been accepted practice in recent empirical work (Benston, Hanweck, and Humphrey; Benston, Berger, Hanweck, and Humphrey; Cuevas; Hunter and Timme; Srinivasan).

Methods

The methods used in generating the results reported here fall into two categories: (i) econometric analysis of the cost function using pooled time series/cross-sectional data (Bangladesh, Honduras, the Dominican Republic); and (ii), cost-allocation exercises using accounting data for a given time period (the Philippines, Honduras, Niger and Togo). Both methods are consistent with a constrained cost-minimization framework, while differing in the assumptions regarding the underlying technology of production. A summary discussion of the two methods follows.

The Cost-Function (Econometric) Approach

The cost-function (econometric) approach uses the duality relationships between cost and production functions (Varian) to infer properties of the production technology from the knowledge of the cost function. Thus, this approach allows the estimation of parameters such as economies of scale and economies of joint production (scope), without making prior assumptions about the nature of the underlying production function. Also, the method allows assessing the statistical significance of most indicators. The analytical advantages of this method are partially offset by its data requirements. A sufficient number of observations is required to allow enough degrees of freedom in the estimation. Moreover, even though it does not necessarily involve field (branch-level) work, the method does depend on the quality of the information available in financial statements and other bank records.

The general form of the cost function derived from a technology-constrained cost minimization can be written as follows:

$$C = f(q_1, \ldots, q_m, p_1, \ldots, p_n, \Phi) \quad (1)$$

where, C denotes resource costs involved in financial intermediation, q_i is quantity of the ith output, p_j is price of the jth input, and Φ summarizes control variables such as regulation indicators and loan-delinquency, which differ across different studies.

Several issues are important in evaluating the cost function. Two of them will be discussed below: specification, and output definition. Srinivasan and Meyer address the question of the definition of the cost variable in a separate paper. Two other issues, the components of the Φ vector and estimation procedures, will be briefly referred to when presenting the empirical results.

Specification and Properties of the Cost Function

Earlier studies of bank costs in developing countries (Gheen; Nyanin) have provided limited insights into the cost structure and underlying technology of these institutions, due to the choice of very restrictive functional forms for the cost function. In general, the use of Cobb-Douglas or CES specifications implies the adoption of highly restrictive assumptions about the technology utilized by financial intermediaries. Under these specifications, scale economies are forced to remain constant, regardless of the level of output. Thus the corresponding average cost curves are either downward or upward sloping throughout the entire output domain.

The recent studies reviewed here use the translogarithmic (translog) specification. The translog is a flexible functional form which has been found superior to other flexible forms in representing multiproduct cost functions (Caves, Christiansen, and Tretheway). Furthermore, attempts to overcome the limitations of the translog when there are zero output levels (e.g., Box-Cox transformation) result in cumbersome expressions which substantially reduce the analytical usefulness of the cost function (Chavez, Srinivasan).

The translog cost function is essentially a second-order approximation to an arbitrary cost function. For two outputs and two inputs, the translog function is written as follows[2]:

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2 The following discussion of the translog function and its properties relies upon Cuevas (1988a).

$$\ln C = \alpha_0 + \alpha_1 \ln q_1 + \alpha_2 \ln q_2 + \beta_1 \ln p_1 + \beta_2 \ln p_2 + \frac{1}{2}\gamma_{11}(\ln q_1)^2 + \frac{1}{2}\gamma_{22}(\ln q_2)^2$$
$$+ \gamma_{12}\ln q_1 \ln q_2 + \frac{1}{2}\delta_{11}(\ln p_1)^2 + \frac{1}{2}\delta_{22}(\ln p_2)^2 + \delta_{12}\ln p_1 \ln p_2 +$$
$$+ \eta_{11}\ln q_1 \ln p_1 + \eta_{12}\ln q_1 \ln p_2 + \eta_{21}\ln q_2 \ln p_1 + \eta_{22}\ln q_2 \ln p_2. \qquad (2)$$

where, q_1 represents loans, q_2 represents deposits, p_1 denotes salaries and wages, and p_2 represents the price of capital services.

The cost-share equations for the two inputs are derived from equation (2) as:

$$S_j = \beta_j + \Sigma_h \delta_{jh} \ln p_h + \Sigma_i \eta_{ij} \ln q_i, \quad j,h = 1,2, \quad i = 1,2. \qquad (3)$$

where S_j denotes the cost share of input j.

Cost function (2) should be homogenous of degree one in input prices. This condition imposes a set of restrictions on the parameters of equation (2) that is also consistent with the requirement that the sum of the cost shares (3) must equal one:

$$\Sigma_j \beta_j = 1, \ \Sigma_j \delta_{jh} = 0, \ \Sigma_j \eta_{ij} = 0, \quad j,h = 1,2, \quad i = 1,2.$$

Several properties of the cost structure and the underlying production function can be investigated using the translog cost function defined in equation (2). These properties are summarized as follows.

Overall economies of scale, ES, are defined as the percentage change in cost when all outputs increase by a common factor, λ. In equation (2), scale economies are measured as:

$$ES = \frac{\partial \ln C}{\partial \ln q_1} + \frac{\partial \ln C}{\partial \ln q_2},$$

that is,

$$ES = \alpha_1 + \alpha_2 + \gamma_{11}\ln q_1 + \gamma_{22}\ln q_2 + \gamma_{12}(\ln q_1 + \ln q_2) +$$
$$+ (\eta_{11} + \eta_{21}) \ln p_1 + (\eta_{12} + \eta_{22}) \ln p_2. \qquad (4)$$

Scale economies are a function of the output levels, q_1 and q_2; therefore the ES measure is not invariant to scale and is dependent on the output mix. If ES is less than 1, economies of scale exist since costs increase proportionately less than output. Values of ES equal to or greater than 1 imply constant returns or diseconomies of scale, respectively. Partial

economies of scale, ES_i, and marginal costs of each output, MC_i, can be computed from equation (2) as:

$$ES_i = \frac{\partial \ln C}{\partial \ln q_i}, \text{ and } \quad MC_i = \frac{C_i}{q_i}(ES_i) \tag{5}$$

where C_i is the proportion of total costs C attributed to output i. A discussion of the cost-attribution problem under joint production is found in Cuevas (1984).

Cost complementarities (economies of scope) exist in multi-output production when the marginal cost of producing one output declines with increases in production of another output (Murray and White; Panzar and Willig, 1981). In terms of the parameters of the cost function (2), Murray and White indicate that a necessary condition for cost complementarity between loans and deposits is:

$$\gamma_{12} + \alpha_1\alpha_2 < 0 \tag{6}$$

For elasticity of substitution and elasticities of input demand, Uzawa has shown that the Allen partial elasticity of substitution between factors of production, σ_{jh}, can be written in terms of the (dual) cost function as:

$$\sigma_{jh} = \left(\frac{\partial^2 \ln C}{\partial p_j \partial p_h} \Big/ \frac{\partial \ln C}{\partial p_j}\frac{\partial \ln C}{\partial p_h}\right) + 1. \tag{7}$$

In terms of the parameters of the translog cost function (2) and the factor shares (S_j), the Allen partial elasticities of substitution are computed as:

$$\sigma_{jh} = (\delta_{jh} + S_jS_h) / S_jS_h, \quad \sigma_{jj} = (\delta_{jj} + S_j(S_j - 1)) / S_j^2, \quad j,h = 1,2 \tag{8}$$

In addition, the price elasticities of demand for inputs, e_{jh}, are obtained using the estimated values of σ_{ij} and the factor shares (see Binswanger).

$$e_{jh} = \sigma_{jh}S_h, \quad e_{jj} = \sigma_{jj}S_j, \quad j,h = 1,2 \tag{9}$$

It is clear from (7) that if all $\delta_{jh} = 0$, then the elasticities of substitution are independent of factor prices, and equal to one for $j \neq h$. Furthermore, if all $\gamma_{ik} = 0$, $\delta_{jh} = 0$, and $\eta_{ij} = 0$, the cost function (1) reduces to a Cobb-Douglas-type cost function:

$$\ln C = \alpha_0 + \alpha_1 \ln q_1 + \alpha_2 \ln q_2 + \beta_1 \ln p_1 + \beta_2 \ln p_2, \tag{10}$$

with scale economies equal to $(\alpha_1 + \alpha_2)$ and unitary elasticity of substitution.

Definition and Measurement of Output

Output definition has been a matter of concern in cost studies of financial institutions. Recent research, however, suggests that the scale economies results are invariant to the definition of output (Benston, Hanwek, and Humphrey; Cuevas; Hunter and Timme)[3]. The discussion has centered on determining the nature of the financial services provided by financial intermediaries, and the extent to which these services entail the use of real resources, i.e., generate value-added in the institution.

The use of flow versus stock measures is at the same time a conceptual and a practical issue. For example, measuring loans as the flow (number or value) of loan contracts issued during the year would be the preferred measure of loan output, under the assumption that old loans outstanding in the portfolio do not generate value-added (i.e., do not require the use of bank resources). On the other hand, the use of deposit balances, or the number of deposit accounts existing at the end of the period is normally the only option available to the researcher, given the nature of the bank records usually available. However, this stock measure does not capture the "intensity" or "velocity" with which accounts are used, i.e., the number of transactions performed in a period of time, indeed the source of operating expenses for the institution.

The studies reviewed here have used two output definitions: (i) number of loans, and number of deposit accounts, and (ii), value of loans, and value of deposit balances. Outputs have been measured primarily as stocks, under the assumption that the flow of services is proportional to the stock, as well as under the constraints of data availability.

The heterogeneity of loans and deposit accounts have been recognized by introducing average loan-size and average deposit-size as control variables in the estimation. It can be assumed that, everything else constant, lenders perceive large loans as riskier ventures, hence it is hypothesized that the marginal cost of a loan is an increasing function of loan size. However, the increase in marginal cost is expected to be less than proportional to the increase in loan size, thus making the marginal cost per dollar lent a decreasing function of loan size. On the other hand, large deposit accounts are assumed associated with "preferred" customers who receive special or additional services thus representing higher costs for the financial intermediary. It is expected, therefore, that the marginal cost

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3 Economies of scale and other cost indicators appear to be significantly sensitive to the definition of the cost variable (Srinivasan and Meyer).

of handling deposit accounts increases as deposit-size increases, while the marginal cost per dollar mobilized decrease with increases in the average deposit balance.

The Cost-Allocation Method

The cost-allocation method involves the (implicit) assumption of a fixed-coefficient production function, an important contrast with the cost-function (econometric) approach described above. As a consequence, returns to scale are constant by assumption throughout the entire output domain, and most technology indicators are pre-determined under the cost-allocation method.

The major data inputs required by the cost-allocation method are the financial statements for a sample of bank branches in a given time period (e.g., the most recent year), salary and wages of branch personnel, loans and deposits statistics for each branch for the corresponding time period, and the time allocation of bank employees. The latter, a key input in this method, is obtained from field interviews with branch personnel.

The basic assumption of the cost-allocation method is that, with a few exceptions, non-personnel inputs in the production of banking services are allocated to different activities in the same proportions that personnel costs are. This method usually allows the researcher to obtain a very detailed breakdown of the resource allocation in the institution. For example, through an appropriate questionnaire design, it is possible to determine the relative importance of loan evaluation, loan monitoring, and loan recovery activities, within the general classification of lending activities. A similar degree of detail can be acquired in the description of funds mobilization activities.

Since it involves field interviews, the cost-allocation method is necessarily restricted to a rather small sample of bank branches, thus limiting the statistical testing of results. On the other hand, it gives the researcher a better understanding of the activities and procedures performed by the institutions, than that obtained based solely on secondary data.

Cross-Country Comparisons of Cost Estimates

Several factors need to be considered in cross-country comparisons of bank costs. Two of these factors are highlighted here. First, the country's level (stage) of development determines to a great extent the degree of development and maturity of the financial system. It conditions the financial technologies available and/or applicable to the financial institutions. The stage of development of communications and infrastructure has an important impact on the costs associated

with bank procedures, and defines the constraints under which the system must operate. In other words, the "degree of sophistication" of the financial system is closely related to the country's overall development position.

Second, the nature and extent of financial regulations affect intermediation costs in several ways. The availability, characteristics, terms and conditions, and effective rates of return of financial instruments are greatly determined by existing financial regulations, and by the ability and willingness of the monetary authority to enforce them. Different types and strengths of financial regulations, along with differences in the country's overall monetary policy, are reflected in the degree of development of the financial system.

The countries included in the case studies analyzed here vary in their level of economic development from US$144 per capita in Bangladesh to US$790 per capita in Honduras (see Appendix Table). Honduras also shows the highest level of financial development as measured by the ratio of M2 over GDP, the lowest being that of Niger. Bank density is extremely low in Niger where there is one bank branch for every 250 thousand inhabitants, while the highest bank density corresponds to the Dominican Republic with one branch per seven thousand inhabitants.

This section presents first a review of the technology parameters, cost structure and cost indicators estimated in econometric studies.[4] The effects of regulations and other factors included in different studies will be briefly addressed in this first part. Second, the costs of lending estimated or calculated in all case studies reviewed in this paper will be presented and discussed. Emphasis is placed on the costs of agricultural loans in the different countries involved. Finally, the key consideration of loan-recovery performance and default risk in assessing bank performance and viability is highlighted. In spite of the differences in methods and data bases, the results discussed below use comparable definitions of the cost and output variables, and of the relevant cost indicators. When necessary, adjustments have been made to assure the validity of the comparisons presented.

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4 Most of these parameters, as indicated above, are predetermined by the assumptions underlying the cost-allocation approach.

Cost Structure, Economies of Scale, Cost Complementarities and Other Parameters

The econometric studies discussed here correspond to five Banks in Bangladesh (Srinivasan)[5], two banks in Honduras (Cuevas, 1984), and one bank in the Dominican Republic (Cuevas and Poyo, 1986b). All of these studies use the translog cost function, define the cost variable as total non-interest operating expenses, and measure outputs as value of loans and value of outstanding deposit balances. Furthermore, all of them rely upon time-series/cross-sectional branch-level data. In all cases, the estimation of the cost function was undertaken as a cost system with the labor-share equation, using Zellner's seemingly unrelated iterative procedure. The cost-function estimates obtained for Mexico by Chavez, using a translog function, are not included in this review since they are based in bank-level data. Likewise, Camacho's study of Honduras banks is omitted given its differences in approach (profit-function), and data base (bank-level) with the other studies presented in this paper.

Estimates of overall economies of scale (ES), partial economies of scale to the expansion of loans or deposits, and the cost shares of these two bank outputs are summarized in Table 1 for the eight banks referred to above. All estimated parameters were evaluated at the geometric mean of all the variables in the cost equation. Hence, they represent the parameters for the "average branch", i.e. a hypothetical branch described by the geometric means of all variables.

Three banks show important overall economies of scale in Table 1, most notably the public development bank of the Dominican Republic. These banks would therefore substantially benefit from an expansion in both lending and deposit activities. In all other cases, excepting Janata Bank in Bangladesh, the overall ES estimate is not significantly different from one[6], i.e., their technology displays constant returns to scale at the average branch size. It must be recalled however, that the ES measure is not independent of scale effects and output mix (equation (4)). In all cases reported here, the ES value will increase as loans and deposits expand (i.e., the γ_{ii} parameters

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5 The results discussed here for Bangladesh banks are somewhat different from those reported in Srinivasan and Meyer, since they correspond to an specific combination of cost variable/output metric definition, consistent with that used in the other studies. My appreciation to Aruna Srinivasan for making these results available to me.

6 The Janata Bank shows a point estimate fairly close to but still significantly different from one.

are positive), whereas joint-production tends to partially compensate for this effects in most cases (i.e., the estimate of γ_{12} is negative). This implies that, when evaluated for different branch sizes, the ES parameter suggests the existence of unexploited economies of scale for small branches, and diseconomies of scale in large branches. In other words, the average cost surface is U-shaped. When feasible, therefore, banks showing constant returns to scale should attempt to expand small branches and contract large branches to make their sizes approach the average branch size.

An interesting finding in Table 1 is that the values of partial economies of scale tend to follow the cost shares of loans and deposits. Public development banks, devoted primarily to lending with little deposit mobilization activity (hence, a small share of deposits in total costs) show the largest potential cost advantages to the expansion of deposit mobilization (i.e., small values of the partial economies of scale parameters). An extreme case is the public development bank of the Dominican Republic, which had initiated the provision of deposit services only two years before its cost-function was estimated (Cuevas and Poyo). The private commercial bank of Honduras offers a striking contrast with this pattern, with a large share of deposits in total intermediation costs and diseconomies of scale to the expansion of deposit activities. An important implication of these results is that those banks which do not show significant overall economies of scale could benefit from "unbalanced" output growth, emphasizing the expansion of the financial service with the lowest value of partial economies of scale.

The average costs and marginal costs of lending and deposit mobilization for the same eight banks are presented in Table 2. Overall, Bangladesh banks show lower average and marginal costs than the other banks. The public development bank of Honduras displays the highest average costs of lending and deposit mobilization. However, the marginal costs of deposit mobilization for this bank are substantially lower than the corresponding average costs, which is consistent with the partial economies of scale results discussed above.

Two caveats are important in analyzing the findings reported in Table 2. First, costs of lending and costs of deposit mobilization cannot be simply added to arrive at the overall costs of intermediation. Adjustments must be made to account for the share of deposits in the total pool of loanable funds. The costs of mobilizing other funds (e.g., borrowings from the central bank) are likely to be substantially lower, although not

necessarily negligible[7]. Second, low intermediation costs may not necessarily reflect efficient overall performance of the institution, whereas high intermediation costs may indeed reflect wasted resources. This point will be discussed further later in this paper.

The necessary condition for the existence of cost complementarities between loans and deposits was met in all but two cases (last column of Table 2). This indicates that the marginal cost of lending will decrease with increases in the amount of deposits mobilized, and vice versa. This finding highlights the advantages of joint production of banking services compared to specialization in lending. Furthermore, as Srinivasan points out, cost functions capture only the supply-side benefits of joint production, but are unable to account for the benefits it yields to customers. The existence of cost complementarities on the supply side only makes institutional incentives coincide with socially desirable production arrangements.

The studies reviewed here make an important contribution in documenting the magnitudes of elasticities of factor substitution, and the price-elasticities of factor demand in developing-country banking (see Table 3). With the exception of the private commercial bank of Honduras, elasticities of capital/labor substitution are rather low, fluctuating between 0.49 and 0.95 (excluding the extreme case of the Dominican Republic). The same contrast is in general true for the price-elasticities of factor demand, most notably in the demand for labor services[8]. These findings indicate serious rigidities in factor allocation in public development banks and nationalized banks, and a weak response to price signals in these institutions.

Investigating the effects of financial regulations and other factors likely to affect banks' costs is usually constrained by data availability and the lack of appropriate proxies to capture the effect of different regulations. Among the studies included here, only the Honduras study estimated the cost effects of financial regulations (Cuevas, 1984). It was found that

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7 Research in progress in the Philippines (Untalan and Cuevas) found that more than 6 percent of the costs of funds mobilization correspond to borrowings from the central bank. This share reaches almost 18 percent in banks that rely heavily on rediscount funds.

8 For comparison, Murray and White report an elasticity of substitution of 1.74 for British Columbia credit unions, and demand elasticities similar to those shown by the private commercial bank in Table 3.

interest-rate ceilings had a significant cost-increasing effect in both the development bank and the private bank. It was also documented that recourse to targeted funds from external sources (foreign donors and/or the central bank) had a lagged increasing effect on the costs of intermediation for the development bank.

Costs of Lending, Default Risk and Institutional Performance

The lending costs results of studies undertaken over the last four years in six countries are summarized in Table 4. As pointed out earlier, the comparison focuses on the non-financial costs of loan administration, since costs of funds (interest rates) vary substantially (in nominal terms) across countries, due to different monetary conditions. Costs associated with default (risk premia) are not included in Table 4; however, the importance of the default factor when comparing bank performances will be discussed later in this section.

Bangladesh banks show relatively low overall lending costs compared to the other case studies reported in Table 4. Even though the bank branches used in the Bangladesh case studies are primarily rural and agricultural loans predominate in their portfolios, average costs of lending fluctuate between 1 percent and 4 percent. This cost range is comparable to the average figures obtained for non-agricultural loans in other countries, which in turn appear substantially lower than agricultural loans.

Specialized government banks show high loan-administration costs in all countries. The rather low administration costs of public development banks in the Philippines can be partially explained by the large scale of operations of the Philippines National Bank (PNB). PNB operations are based on relatively large loans to agribusiness and agricultural trade enterprises, a factor that may explain the low costs of the Bangladesh Krishi Bank (BKB) as well.

As indicated above, a comparison of (non-interest) lending costs across banks of different countries should take into account two important factors: first, the overall "degree of sophistication" of the banks in question, and second, the different performance in loan recovery associated with the institutions under analysis. The first factor is clearly illustrated by the government development bank of Niger (The "Caisse Nationale de Cr dit Agricole") which stands out as a very simple credit delivery system. In spite of performing a mere input delivery function, and without carrying out essential banking procedures of loan evaluation, monitoring and loan recovery, this bank shows the high administration costs reported in Table 4 (see Cuevas, Graham, and Masini). The case studies in the other countries considered here are comparable in the sense that basic conventional lending practices are generally followed.

Whether this is true for loan recovery practices is a question that the discussion below will help answer.

Default risk must be an important consideration in assessing institutional performance. To illustrate this point, it is convenient to briefly analyze the general expression for (non-financial) lending costs:

$$LC = a + r \tag{11}$$

where, LC is non-financial per unit lending costs, a is per unit loan-administration costs, and r denotes risk premium. In turn, risk premium is calculated as:

$$r = [d/(1-d)](1+a+f) \tag{12}$$

where, d is the default rate, and f is the opportunity cost of funds (Lee and Baker). The expression (12) summarizes the consequences of default, i.e., the loss of principal and uncollected interest, the administration costs incurred in handling the loans in default, and the opportunity cost of these funds. Substituting (12) into (11) allows performing a simple exercise with different values of administration costs (a) and default rates (d) to generate the diagrams in Figures 1 and 2. First, the linear relationship between lending costs and administration costs shifts upward and becomes steeper as the default rate (d) increases (figure 1). On the other hand, the relationship between lending costs and default rate is non-linear, with lending costs increasing at an increasing rate as a function of the default rate (figure 2). The level of administration costs is a shift variable in this relationship.

The foregoing illustrative exercise, however, does not allow for potential trade-offs between resources devoted to loan processing (i.e., administration costs) and loan-recovery performance. This relationship is explored below based on the results of the different case studies under analysis.

Performance in loan recovery appears strikingly different across the banks under comparison. Table 5 shows the default rates estimated based on the past-due ratios reported in the different sources for agricultural loans (column 1) and calculates the risk premia associated with them assuming a homogeneous opportunity cost of funds of 5% (column 3)[9]. Column 4 in Table 5 indicates the total agricultural lending costs resulting from this exercise, excluding the interest paid on deposits and borrowings and the transaction costs of mobilizing these funds.

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[9] Loan default is assumed equal to one-fourth the level of past-due ratios. This assumption, forced by the absence of reliable data on default rates, may bias the comparison across case studies.

The use of default rates based on past-due ratios needs to be taken with caution (see also note 9 above). The usual way of computing these ratios, i.e. overdue balances over total loans outstanding, may bias the comparison across banks if the term structure of their loan portfolio is substantially different. Furthermore, the larger the share of long-term loans not yet due in the portfolio, the larger the downward bias in the measured past-due ratio.

With the foregoing caveats in mind, the last column of Table 5 provides a rough comparison across banks and countries that encompasses both transaction costs of lending and loan recovery performance. Past-due ratios of Bangladesh banks, and consequently total non-interest costs, appear visibly higher than almost all other banks included in the cross-country comparison. The Nationalized commercial banks of Bangladesh, and the public development bank of Honduras belong to the highest cost category. The public development banks of the Dominican Republic, Togo and Niger comprise a second-highest cost category. Rural banks in the Philippines, the public development bank of Bangladesh (BKB), along with Philippine private development banks fall into an intermediate cost category. Finally, private commercial banks (in the Philippines and in Honduras) and the public development banks of the Philippines belong to the lowest cost group.

Perhaps the most important implication of the foregoing discussion is the need to pay close attention to the measurement and reporting of loan recovery performance. The comparison presented in Table 5 highlights the incidence of default rates in building a comprehensive performance indicator for banks' lending activities. An important component of the observed differences across banks and countries may be precisely a different definition of past-due ratios, and a different correlation of this measure with effective loan default losses (see note 9).

On the other hand, the low cost of loan administration found in some banks <u>before</u> considering the risk premia associated with loan default may indicate an insufficient amount of resources allocated to loan evaluation and loan recovery. Hence, loan administration <u>expenses</u> appear low in the books, whereas effective lending <u>costs</u> are strikingly high due to poor recovery performance. This suggests the existence of an important trade-off between the amount and quality of resources allocated to loan processing on the one hand, and loan recovery performance and effective lending costs on the other hand.

Concluding Remarks

The review of a number of recent studies of banking in developing countries has highlighted several features of financial intermediation in these economies. The production of

financial services displays constant or increasing overall returns to scale. Average-cost surfaces were found to be U-shaped in most cases, and substantial differences were observed in the partial economies of scale associated with loans versus deposits. Cost complementarities between loans and deposits exist in the majority of the case studies. These findings indicate that potentially cost-decreasing resource reallocations exist in developing-country banking. Banks could engage in "unbalanced" expansion emphasizing the production of the financial service with the lowest cost-increasing effect. The results analyzed here show that joint production of financial services offers important cost advantages over specialized banking.

The comparison of lending costs in selected case studies in six developing countries highlighted the importance of considering loan recovery as an integral part of an overall indicator of lending performance. Furthermore, the analysis emphasizes the need to appropriately measure loan delinquency, and to reflect the expected loan default losses in the accounting provisions of the institutions.

Why is it that total lending costs, inclusive of risk costs, do not receive more attention from bank managers and policy-makers? Evidently, as underlined above, the explanation relies upon the distinction between the explicit nature of effective bank expenses (i.e., cash outlays), which do not include imputed costs due to expected loan default, and the economic concept of bank costs which does consider the opportunity cost of loan losses. While, in the short run, the management may be primarily concerned with covering operational expenses, in the medium to long term the neglect of loan recovery procedures as well as inadequate accounting provisions for loan default inevitably result in substantial bank bail-outs and reorganizations.

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Table 1

Economies of Scale and Cost Shares of Loans and Deposits in Selected Case Studies

Case Studies	Economies of Scale			Cost Shares	
	Overall	Partial		Loans	Deposits
		Loans	Deposits	%	%
Bangladesh					
Nationalized Commercial Banks					
Agrani	0.95	0.34	0.61	35.83	64.17
Janata	0.90*	0.39	0.50	43.80	56.20
Rupali	0.98	0.36	0.63	36.23	63.77
Sonali	0.77*	0.43	0.34	55.68	44.32
Public Development Bank	0.66*	0.52	0.14	78.29	21.71
Honduras					
Public Development Bank	1.08	0.77	0.31	71.10	28.90
Private Commercial Bank	1.59	0.39	1.20	28.30	71.70
Dominican Republic					
Public Development Bank	0.51*	0.50	0.01	98.05	1.95

Sources: Bangladesh - Srinivasan, 1988,
Honduras - Cuevas, 1984,
Dominican Republic - Cuevas and Poyo, 1986.

* Significantly less than one.

Table 2

Costs of Lending, Costs of Mobilizing Deposits and Cost Complementarities in Selected Case Studies

Case Studies	Cost of Lending		Cost of Deposit Mobilization		Cost Complementarity (condition)[a]
	Average %	Marginal %	Average %	Marginal %	
Bangladesh					
Nationalized Commercial Banks					
Agrani	3.56	1.21	3.90	2.37	-0.04
Janata	3.02	1.19	2.46	1.24	0.01
Rupali	3.78	1.35	2.41	1.51	0.85
Sonali	1.96	0.84	1.29	0.44	-0.02
Public Development Bank	0.89	0.46	2.33	0.34	-0.02
Honduras					
Public Development Bank	10.02	7.64	8.78	2.72	-0.44
Private Commercial Bank	3.39	1.69	5.33	6.71	-0.87
Dominican Republic					
Public Development Bank	8.81	4.43	9.11	0.09	-0.04

Sources: Same as Table 1.

a A negative sign indicates that the necessary condition for cost complementarities is met.

Table 3

Elasticities of Factor Substitution and Price-Elasticities of Factor Demand in Selected Case Studies

Case Studies	Elasticity of capital/labor substitution	Price-elasticities of demand for factors of production			
		labor/labor	labor/capital	capital/labor	capital/capital
Bangladesh					
Nationalized Commercial Banks					
Agrani	0.91	-0.53	0.53	0.38	-0.38
Janata	0.57	-0.31	0.31	0.26	-0.26
Rupali	0.49	-0.28	0.28	0.21	-0.21
Sonali	0.95	-0.30	0.30	0.65	-0.65
Public Development Bank	0.79	-0.15	0.15	0.64	-0.64
Honduras					
Public Development Bank	0.63	-0.45	0.45	0.18	-0.18
Private Commercial Bank	1.24	-0.87	0.87	0.37	-0.37
Dominican Republic					
Public Development Bank	0.06	-0.02	0.02	0.04	-0.04

Sources: Same as Table 1.

TABLE 4

Costs of Loan Administration Estimated in Selected Case Studies for Agricultural and Non-Agricultural Loans. Average Costs in Percent of the Loan Amount, by Type of Loan

Case Studies		Agr. Loans %	Non-Agr. Loans %	All Loans %
Bangladesh[a]	Nationalized Commercial Banks (weighted average)	-	-	2.9
	Public Development Bank (BKB)	-	-	0.9
Philippines	A. 1983[b]			
	Public Development Banks (weighted average)	4.2	2.7	-
	Private Commercial Banks	1.6	2.7	-
	Rural Banks	5.4	3.9	-
	B. 1988[c]			
	Private Development Banks	-	-	5.3
	Private Commercial Banks	-	-	4.3
	Rural Banks	-	-	4.8
Honduras[d]	Public Development Bank	-	-	10.0
	Private Commercial Bank	3.7-8.4[e]	1.0-7.5[e]	3.4
Dominican Republic	Public Development Bank[f]	9.3	n.a.	9.3
	Public Development Bank[g]	8.8	n.a.	8.8
Togo[h]	Public Development Bank	-	-	5.3
Niger[i]	Public Development Bank	9.5	n.a.	9.5

Footnotes on next page.

TABLE 4

Footnotes

a/ Srinivasan, 1988. Data base: branch-level records 1983-1984. Weighted averages calculated by the author using the outstanding loan balances for each bank reported by Srinivasan.

b/ TBAC, August 1985. Data base: banks' financial statements 1983. Weighted averages calculated using the shares in total loans granted in 1983.

c/ Untalan and Cuevas, 1988. Data base: branch-level records and field survey, 1987.

d/ Cuevas, 1984. Data base: branch-level records 1970-1982.

e/ Cuevas and Graham, 1984. Data base: branch-level records 1982, and field survey, 1983. Highest cost of agricultural loans correspond to foreign-funded supervised loans.

f/ Cuevas and Poyo, 1986. Data base: branch-level records 1979-1983.

g/ Cuevas and Poyo, 1986. Data base: branch-level records 1984-1985. Deposit mobilization activity started in 1984.

h/ Cuevas, 1987a. Data base: bank records, 1985.

i/ Cuevas, 1987b. Data base: field surveys, household level (1985) and branch level (1986).

n.a. not applicable

TABLE 5

Cross-country Comparison of Non-Interest Agricultural Lending Costs
Including Risk Premia

Case Studies		(1) Default rate[a/]	(2) Loan Admin. Costs	(3) Risk Premia[b/]	(4) Total Non-Interest Costs (2+3)
		%	%	%	%
Bangladesh	Nationalized Commercial Banks (weighted average)	13.3	2.9	16.5	19.4
	Public Development Bank (BKB)	7.3	0.9	8.3	9.2
Philippines	A. 1983				
	Public Development Banks (weighted average)[c/]	1.8	4.2	1.9	6.1
	Private Commercial Banks	2.5	1.6	2.7	4.3
	Rural Banks	5.8	5.4	6.7	12.1
	B. 1988				
	Private Development Banks	2.5	5.3	2.8	8.1
	Private Commercial Banks	2.5	4.3	2.8	7.1
	Rural Banks	5.8	4.8	6.7	11.5
Honduras	Public Development Bank	8.8	10.0	11.0	21.0
	Private Commercial Bank	1.3	3.4	1.4	4.8
Dominican Republic	Public Development Bank[d/]	7.0	8.8	8.6	17.4
Togo	Public Development Bank	9.8	5.3	11.9	17.2
Niger	Public Development Bank	4.5	9.5	5.4	14.9

Sources: Same as Table 1.

a/ Assumed equal to one-fourth of the reported past-due ratios.

b/ Computed using the formula

$$r = (d/(1-d))(1+a+f)$$

where, r is the risk premium
d is the default rate
a is the loan administration cost
f is the opportunity cost of funds, assumed 5% for all cases.

c/ Default rate corresponds to the Philippine National Bank (PNB) and the Development Bank of the Philippines (DBP) taken together (see note a/ above on default rates).

d/ Only most recent study considered for this table.

Figure 1

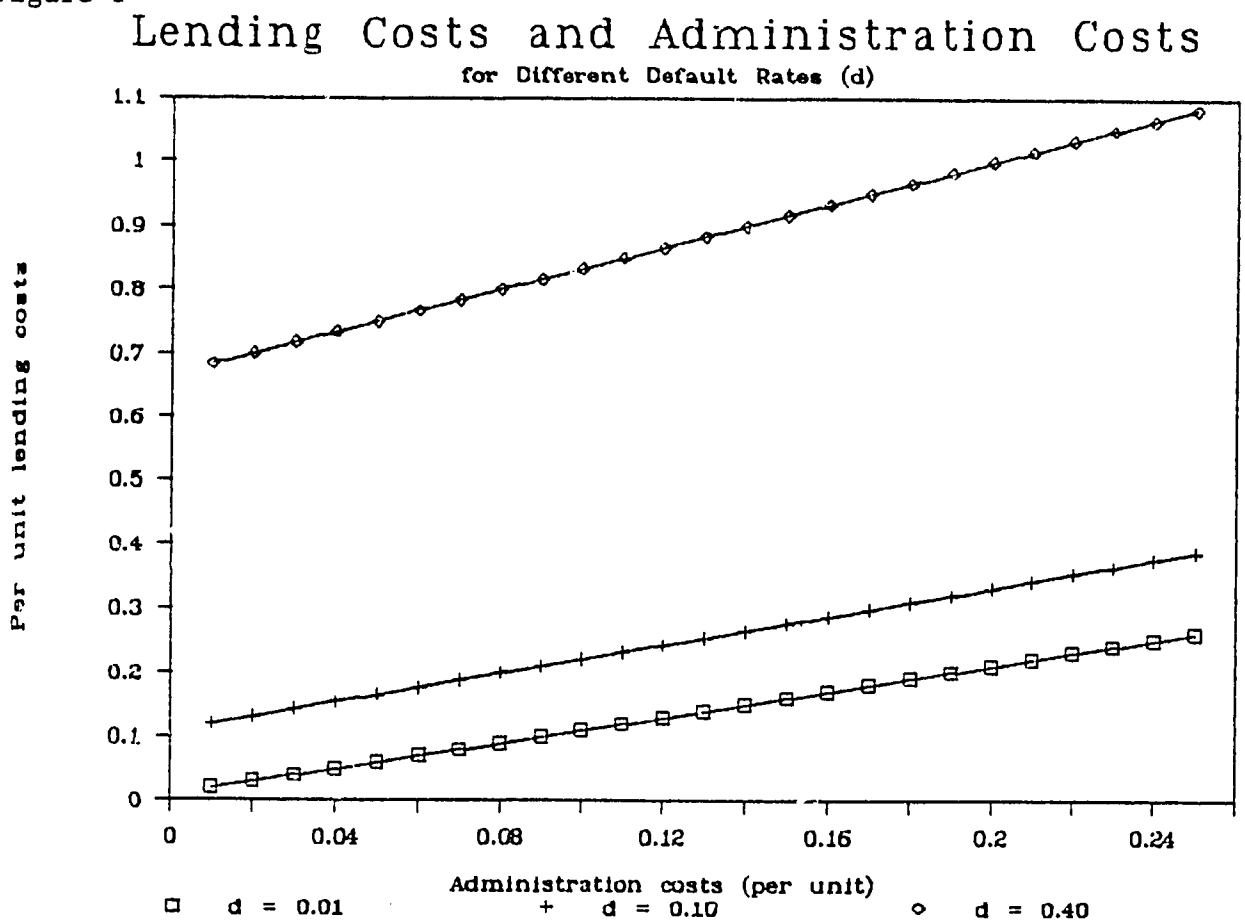
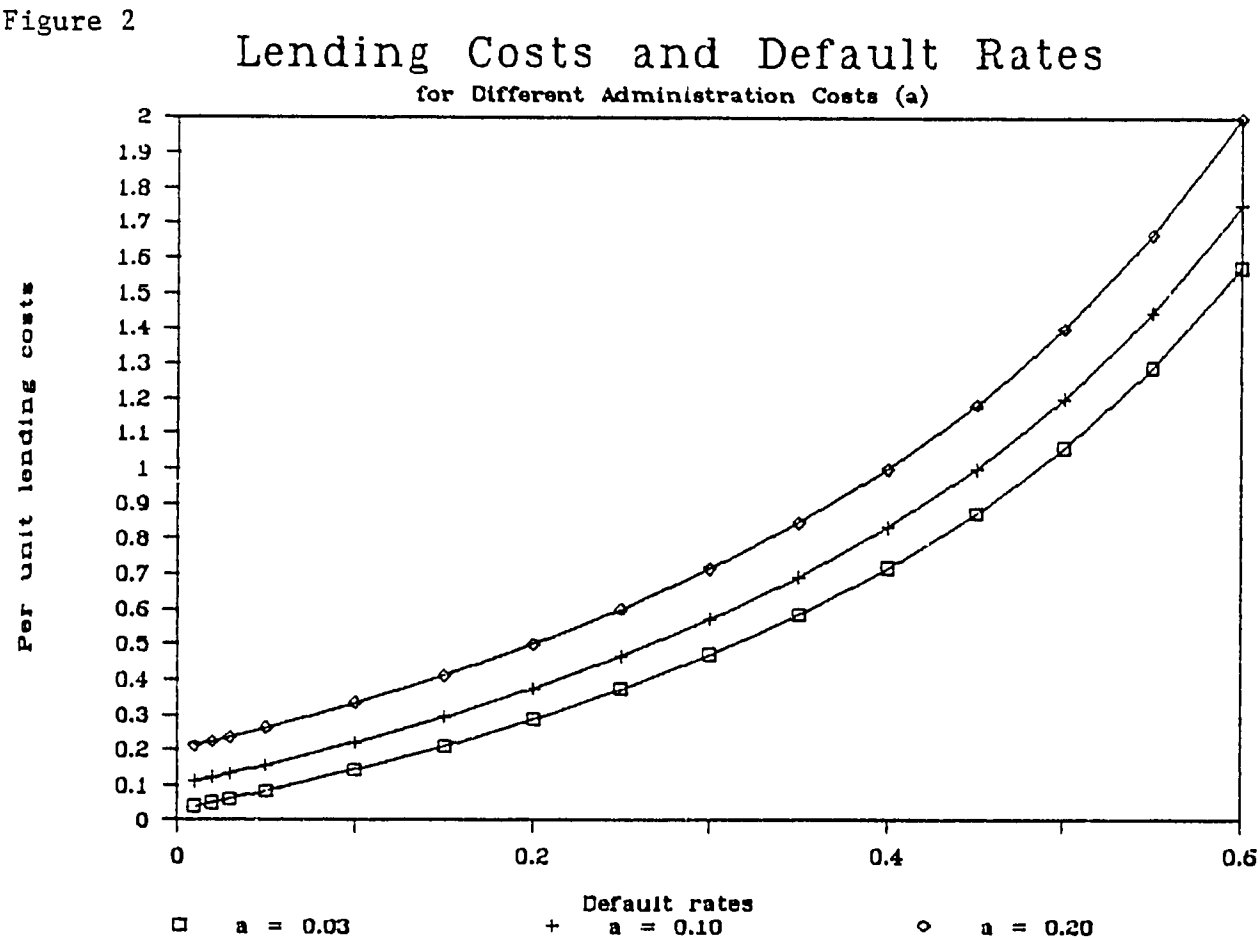


Figure 2



APPENDIX TABLE

Case Studies: Selected Indicators of Countries Involved

Country	GDP per capita 1985, US$[a]	M2 / GDP %	Population per bank branch[b] ('000 inhab.)
Bangladesh	144	27.3	25
Philippines	616	22.6[c]	13
Honduras	790	30.3[d]	15
Dominican Republic	725	23.7[d]	7
Togo	248	45.4	52
Niger	270	15.3	250

Sources: IMF, **International Financial Statistics**. Niger figures from Cuevas, Carlos E., "Rural Finance Profile of Niger", 1986. Togo figures from Cuevas, Carlos E., "Rural Finance Profile of Togo", 1987. Population per bank branch from the author's notes and miscellaneous country studies.

a Exchange rate conversion.

b Includes branches of other (non-bank) financial institutions, but does not include post-office savings offices.

c Includes development banks and savings banks.

d Includes deposits in other financial institutions (line 45 in the **IFS** bulletin).