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1

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Introduction

In the last two decades substantial funds have been channelled into rural financial markets in low income countries (LIC) to strengthen financial markets [Von Pischke and Adams]. Yet, in most of these countries, the formal financial institutions are still far from being self-sustaining and viable and a large segment of the population is still dependent on informal loans[1/].

Two transactions-costs explanations have been offered for the limited use of formal rural credit in LICs: one focuses on lender's costs and the other on borrower's costs. Gonzalez-Vega developed a model that shows how concessionary interest rates on loans discourage formal lenders from lending to the rural poor, especially when lenders incur relatively high transactions costs for rural lending[2/]. Adams and Nehman show that excessive total costs of borrowing from formal institutions due to high borrower transactions costs may also discourage many rural borrowers from using formal sources of credit[3/]. Ladman added to this by developing a model to show that borrower transactions costs result chiefly from the rationing mechanism employed by formal lenders who face high transactions costs of lending but are unable to cover these costs due to limitations set by the financial authority in the form of fixed, concessionary lending rates.

With controlled interest rates, lenders engage in implicit price setting that involves differential treatment of loan

applicants in terms of loan allocation, disbursement monitoring, and supervision. This implicit price setting procedure enables the lenders to exclude or ration unwanted clients. The activities involved in the screening mechanism lead to increased transactions costs for both borrowers and lenders. In addition, the intermediary also transfers as much of the burden as possible of his own transactions costs to the borrowers, further raising the total costs of borrowing. Cuevas built a model to show that the spread between the total borrowing cost and the explicit interest cost reflects the value of the implicit charges. He then estimated a borrowers' transactions costs function to show the trade-off between the controlled (explicit) interest rate and transactions costs arising from the rationing activities of the lenders.

This paper builds on this earlier work and compares the transactions costs of borrowing from formal and informal sources in Bangladesh to show that borrower transaction costs are higher in the formal market than in the informal market. It will also be shown that a relevant measure of the costs of credit to the borrowers is the effective cost of amount lent[4/]. It will then be shown that the effective cost of formal credit is higher than that of informal loans. Data from a 1981 survey of rural households in 12 villages in Bangladesh are used to estimate transaction costs of borrowing and the resulting effective costs of loans from both formal and informal lenders (Ahmed).

The Model

Borrower costs of credit (BC) include not only nominal interest costs (NI) but also borrower transaction costs (TC). Adams and Nehman defined the "borrower's price of credit" in terms of real net costs of the loan by including the changes in purchasing power (P) over the loan period as:

[1] BC = NI + TC - P.

In a regime of fixed, concessionary lending rates, the share of transaction costs in total borrowing costs has been found to be very high in the formal market [Ahmed, Alam, Cuevas, Nehman, Shahjahan].

An important feature of borrower transactions costs is that they are invariably incurred prior to and at the time of obtaining the loan. Therefore, instead of a simple addition to the interest cost of funds as used by Adams and Nehman, Alam, Cuevas, and others, these transaction costs should be discounted from the loan amount (L) to get a net value of the incremental funds received by the borrower. The difference between the total repayment that is due at maturity and the net addition of funds from the loan proceeds will give a more accurate measure of the total absolute costs of borrowing a given amount of net usable funds. This total cost, expressed as a percent of the net loan received, can be defined as the annualized effective cost of the loan. This effective cost (E) per unit of time can be calculated as:

(2) $E = (1 + r)^n \sqrt{L/(L-TC)} - 1$ where: r is the interest rate; and n is the loan term in years[5].

For borrowers with positive transaction costs, the effective cost will, therefore, be higher than the explicit interest cost of the loan. Also, it can be shown that for a given loan size and fixed interest rate, the effective cost increases with the transactions costs of borrowing. Differentiating equation (2) partially with respect to TC gives:

(3) $\delta E/\delta TC = [(1+r)/n] \sqrt{L/(L-TC)^{n+1}} > 0$

Thus borrowers incurring high transaction costs of borrowing will incur high effective costs of credit.

Effective Costs of Credit in Bangladesh

Costs of credit were calculated from data obtained through a survey of a rural credit market in Bangladesh. The survey area was Raipura Upazilla (similar to a county) in the old Dhaka District (now in Narsingdhi District). A stratified two-stage sampling method was designed for the survey [Cochran, Deming]. Four unions (similar to precincts) were selected in the first stage with a probability equal to the number of households in the villages. The households were then divided into two strata: those who borrowed from the institutional lender, Bangladesh Krishi Bank (BKB), and those who did not borrow from the BKB, Raipura Branch was obtained from the list of BKB borrowers. The remaining households in each primary unit formed the population for the sample of households who did not borrow from BKB. A total of one hundred and twenty-two heads of households were

interviewed for the study, divided equally between those who borrowed from the BKB and those who did not.

In order to reduce the likelihood of inaccurate recall by the interviewees, questions were restricted to activities in the current year only and to infrequent events that are expected to be easy to remember[6/]. Most information regarding loans from the BKB was confirmed by information provided by the bank. Since the chances of forgetting transaction costs are minimal and the information on the loans was accurate, it was assumed that other information provided was also reasonably accurate. Loans from the informal sources, however, were difficult to double-check. As these loans had very little transaction costs, the need for checking was minimized[7/].

In order to avoid questions about amounts spent directly on bribes or gratuities, which many borrowers might feel uncomfortable disclosing, borrowers were asked to report total cash expenditures net of interest payments. Hence the total cash component of transactions costs includes such diverse items as travel expense, food and entertainment expenses, bribes, and losses incurred when borrowers sold in-kind credit (generally fertilizer) to authorized dealers in exchange for cash. Information on the opportunity cost of time associated with processing and obtaining the loan was determined by estimating the value of time the borrower spent away from his work. Care was taken to exclude visits to town not associated with the loan. The cost of each work-day was calculated from the prevailing market wage rate

for male workers in the borrower's profession in that village[8/]. In the case of in-kind loans from informal sources, the market value of the commodity at the time of the loan transaction was used to determine the market value of the loan; similarly, if the repayment was in-kind, then the market value of the commodity (or service) at the time of repayment was used. In case the loan had not yet matured, the market value of the repayment was calculated in terms of market prices prevailing during the interview period.

Of the sixty-one households that did not borrow from the BKB, Raipura Branch, thirty-six (59 percent) obtained funds from informal sources (including friends and relatives) some of them obtaining multiple loans. However, twenty-five (42 percent) did not borrow any funds at all. During the period of study (1980-81), the interest rate on most formal agricultural loans was set at a 12 percent nominal rate (a negative 3 percent real rate) by the Bangladesh Bank[9/]. Ignoring transactions costs, there should be a great demand for funds at negative real interest rates because of the associated income transfer. It is likely that the effect of this low interest rate ceiling on institutional credit is to increase non-interest means of credit rationing by the formal lending institutions. At the same time, interest rates in the informal markets are free to clear the market, and informal lenders are not forced to depend on a non-interest rationing mechanism. Nominal interest rates on informal loans for the sample averaged 42 percent (a 23 percent real rate) with some

small short-term loans carrying rates as high as 120 percent annually.

Table 1 shows the frequency distribution of total transaction costs of borrowing from the BKB by major components: cash costs, and cost of work-days lost. The bottom part of the table shows the frequency distribution of transaction costs of borrowing from the informal sources. It can be seen that the majority of borrowers from BKB incurred costs much above the average transactions costs in the informal market. About 60 percent of BKB borrowers incurred cash costs over Taka 50, and in terms of the opportunity cost of lost work time, about 70 percent incurred costs over Taka 50. Only 3.4 percent of the borrowers from the informal lenders had cash costs over Taka 50 and, considering their opportunity cost of time, only 7 percent incurred costs over 50 Taka[10/].

Table 2 shows the average loan transactions cost by the component costs for various loan size groups. Although total transaction costs are high for large loan sizes, the cost per unit of money borrowed decreases with loan size. Average cash transaction costs increase from Taka 52 for the small loans of Taka 500 or less to Taka 370 for the large loans of over Taka 3,000. The average for the sample is Taka 141. Similarly, the average cost of work days lost increases with loan size from Taka 58 for small loans to Taka 161 for large loans. The average for the sample is Taka 132. The average transactions costs for BKB borrowers ranges from Taka 110 for the small borrowers to Taka

Table 1

DISTRIBUTION OF LOANS BY TRANSACTIONS COSTS OF BORROWING

Account of Transaction Costs (Takas)*	Travel & Misc. Cost Number of Cases	(%)	Opportunity Cost ** Number of Cases	(%)	Total Tr. Cost Number of Cases	(%)
			BORROWERS FROM THE BKB			
0 - 50	24	(39)	18	(30)	9	(15)
51 - 100	14	(23)	16	(26)	8	(13)
101 - 200	15	(25)	15	(25)	13	(21)
201 - 300	3	(5)	10	(16)	11	(18)
Above 300	5	(8)	2	(3)	20	(33)
Total	61	(100)	61	(100)	61	(100)
			BORROWERS FROM INFORMAL LENDERS***			
0 - 50	40	(98)	38	(93)	38	(93)
51 - 100	-	-	2	(5)	1	(2)
101 - 200	1	(2)	1	(2)	1	(2)
201 - 300	-	-	-	-	2	(2)
Above 300	-	-	-	-	-	-
Total (100)	41	(100)	41	(100)	41	

* US$1 = Bangladesh Taka 16.69 in 1980-81.

** Opportunity cost of workdays lost was calculated as: Cost = D x Y; where D is the number of days (or parts thereof) actually spent away from work in connection with the loan, and Y is the estimated daily income foregone by the farmer during that period.

*** Due to multiple loans there are a total of 41 loans for 36 borrowers. US$1 = Bangladesh Taka 16.69 in 1980-81.

Table 2

AVERAGE TRANSACTIONS COSTS AND ANNUALIZED EFFECTIVE COSTS

Size of Loans (Takas)*	No. of Cases	Average Travel & Misc. Costs (Takas)	Opportunity Costs (Takas)	Average Trans. Costs(TC) (Takas)	Ratio of TC to Loan (%)	Nominal Effective Cost (%)
			BORROWERS FROM THE BKB			
0 -500	5	52	58	110	.29	146
501 -1000	25	94	126	220	.28	169
1001 -3000	26	174	129	276	.18	59
Above 3000	5	370	161	531	.07	16
Sample	61	141	132	272	.22	108
			BORROWERS FROM THE INFORMAL LENDERS**			
0 - 500	25	2	2	7	3	57
501 - 1000	3	3	20	23	3	86
1001 - 3000	6	2	57	58	4	63
Above 3000	7	19	16	35	1	24
Sample	41	5	16	21	2	54

* US$1 = Bangladesh Taka 16.69 in 1980-81.

531 for the large borrowers, while the average for the sample is Taka 272. However, as expected, transactions costs as a percentage of loan value decreases with loan size from 29% for the small loans to 7% for the large loans with an average of 22% for the sample. Except for the large loans over Taka 2,000, the transactions costs per Taka of loan is higher than the interest costs of 12 percent. The declining ratio of transaction costs to loan size shows that large borrowers are not as affected by transaction costs as are small borrowers. Thus the rationing mechanism imposes additional costs mostly on the small borrowers who are most likely to be poor and for whom the concessionary interest rates were designed[11/].

In the case of the sample of informal borrowers, the average transaction costs from informal sources are not only low, but they are a relatively insignificant proportion of the loan size. In the informal market, average cash transaction costs increase with loan size but the range is not as wide in absolute value as in the formal market. The sample average is Taka 5 which is only 4% of the loan cost in the formal market. Again, the sample average opportunity cost of time is Taka 15 which is only 12% of the cost in the BKB sample. Average transactions costs are Taka 7 for small loans and rise to Taka 35 for the large loans over Taka 3,000, while the sample average is 21 Taka[12/]. Consequently, the ratio of transactions costs to loan size is much lower than for the BKB loan sample. The ratio of transactions costs to loan size shows that the credit disbursement mechanism

and the loan screening process do not impose significant additional costs on the borrowers. Perhaps, the transactions costs incurred by lenders in the loan screening process are internalized in the explicit interest rate charged.

The last column in Table 2 shows the nominal effective costs of credit for different loan sizes in the two markets. As expected, the nominal effective cost decreases as the size of loan increases. Comparing the effective rates in the two markets, we find that for loans of Taka 1,000 or less the effective cost of 169% is highest in the formal market, while for loans above Taka 3,000 the effective cost of 16% is lowest in the formal market. In fact, for loans over Taka 1,000, the effective costs in the formal market are lower than in the informal market. However, for loans of Taka 1,000 or less, the effective costs in the formal market are much higher than in the informal market. The average effective cost for the sample is about 108 percent in the formal market, which is twice the average effective cost of 54 percent in the informal market. One would have to assume that those BKB clients who borrowed at these prohibitive costs were looking at the early costs as 'sunk costs', or were planning to default on the loan. This comparison suggests that small borrowers would patronize the relatively less expensive informal market, while the large borrowers should prefer to seek the cheaper formal credit.

Table 3 shows the results of Student's T-tests comparing transactions costs and the effective costs of borrowing in the

TABLE 3
HYPOTHESIS TESTING

T-tests comparing cases of samples of BKBN and non-BKB borrowers.*

Testing the hypothesis (HO) that the population means of the two samples are the same for the respective variables. (Monetary values denominated in Takas.)

Variable	Borrower Sample	Mean	Standard Error	T-Value*	DF	Remark
Transaction Costs (Total)	BKB	272.0	36.67	6.74	64.34	Reject Ho
	non-BKB	20.5	7.02			
Tr. Cost as Percent of Loan	BKB	21.7	2.29	8.04	79.83	Reject Ho
	non-BKB	2.4	0.74			
Effective Cost (%) (Nominal)	BKN	107.7	18.57	2.55	87.89	Reject Ho
	non-BKB	54.2	9.81			

*Because of unequal variances, the t-values are approximate values.

formal and informal markets in the sample survey. The hypothesis is tested that the transaction costs and the annualized effective costs are the same in both markets. The T-scores for the different variables tested showed that the samples are from different populations, i.e. transaction costs and the effective costs are significantly different in the two populations, and that they are higher in the formal (bank) market than in the informal market[13/].

Conclusion

The data used in this study are from a small sample in only one country. This limits the ability to draw generalizations about problems of access to rural formal credit in all low income countries. The results, nonetheless, are suggestive and help to clarify the impact of transaction costs on credit demand, as stressed by Adams and Nehman. The results of the sample survey also lends support to the views and explanations of Gonzalez-Vega. The non-interest rationing mechanism of the formal lenders has resulted in the small, poor borrowers being rationed out of the formal market. This allows the large, rich borrowers, who incur relatively small transactions costs, to take advantage of the low, subsidized interest rates. The income transfers via the negative real interest rates, therefore, accrue mainly to these large borrowers. On the other hand, the informal sources provide a much needed alternative to the small borrowers.

By measuring costs in terms of effective borrowing costs, one can more clearly identify the reasons for the limited use of

formal loans in the rural sector, particularly by the small, poor borrowers. The demand for credit, defined as a function of the marginal borrowing costs, follows the normal downward slope with respect to effective borrowing costs. Thus a major policy conclusion evolving from this study is to encourage financial innovations and policies that will lower the effective borrowing costs to non-preferred borrowers. Innovations should be aimed at reducing the transaction costs incurred in rural financial transactions, and policies should be directed at liberalization of the market mechanisms that determine the equilibrium interest rates.

FOOTNOTES

1/ Formal financial institutions include banks, cooperatives and other nonbank financial organizations that are formally recognized by the financial authority to operate as financial institutions.

2/ Transactions costs of lending include expenses incurred by the lender to service the loans, and costs related to the default risks.

3/ Total borrowing costs include the interest costs as well as non-interest transactions costs incurred by the borrower in connection with the loans net of any transfer income due to inflation [Adams and Nehman]. Transactions costs of borrowing can be classified into two categories: (a) Explicit cash costs that include expenditure on travel, entertainment, bribes and gratuities, forced purchase of other lender services and/or products, and other expenses connected with requirements imposed by the lender; and (b) Implicit or opportunity cost of time spent in applying for and obtaining the loan, i.e. the opportunity cost of lost work-time [Ahmed].

4/ The effective cost is the annualized interest payment measured as a ratio of the actual usable funds borrowed.

5/ If the interest rate r is defined as the nominal interest rate, then E is the nominal effective cost. This can be converted into real terms by calculating the real interest rate on the loan, $rr = (r-\dot{p})/(1+\dot{p})$ and using it in place of r in the equation to get the real effective cost; where $\dot{p}$ is the yearly inflation rate. When $0 < n < 1$ (i.e. less than 1 year) then: $E = [L(1 + r,n)/(1 - TC) - 1](1/n)$.

6/ Problems of recall are mostly associated with consumption expenditures. Records of such expenditures are rarely kept. With the length of recall, memory decay of expenditure estimates is fairly common in low income countries [Lynch]. However, one is more likely to remember unusual expenses on such items as bribes and entertainment to get a loan.

7/ The only reliable control information is that provided by other surveys. The data on informal markets in this survey is consistent with those of several other studies such as Shahjahan, Quasem et al, and Chaudhury and Gafoor.

8/ Most bank loans in the survey were taken between October and December of 1980, but some were taken as late as March 1981. The period between August and November is usually the harvest period. The jute harvest is usually in August-September, and the harvest for Aman paddy is more important than that during other periods. The interviews were conducted during the weeding and post-sowing period. Real wages of agricultural labor in Bangladesh, in fact, have been following a decreasing trend since 1968-69 [Khan]. So after accounting for the effect of inflation, it can be reasonably assumed that the nominal wage rate prevailing in the area during the interview period would not be very different from the nominal rate prevailing at the time of taking the loan.

9/ The inflation rate was 15% during 1980-81, and the exchange rate for US$ 1 was Taka 16.69 during the period [Economic Trends, vol. VI, no. 2, 1981].

10/ There was one case of an informal interest bearing loan where the estimate for the opportunity cost of time seems unusually high compared to rest of the sample. Sample averages without this case are reported below.

11/ In most cases, the amount of the loan approved is proportional to the value of the collateral provided. Therefore, it is appropriate to assume that small borrowers are poorer than the large borrowers.

12/ If we exclude the case of one informal borrower with an unusually high cost of lost work-time, then the sample average cost of workdays lost becomes Taka 11, while the sample average transaction costs decreases to Taka 16. As a result, the sample average ratio of transaction costs to loan size falls 2%.

13/ The t-statistics reported are approximate values for samples with unequal variances.

REFERENCES

1. Adams, Dale W and G.I. Nehman (1979), "Borrowing Costs and the Demand for Rural Credit," Journal for Development Studies, vol. 15, no. 2, pp.51-60.

2. Ahmed, Zia U. (1982), "Transactions Costs in Rural Financial Markets in Bangladesh: A Study of A Rural Credit Market," (Unpublished Ph.D. Dissertation, University of Virginia).

3. Alam, Md. Ferdous (1981), "Cost of Credit from Institutional Sources in Bangladesh," Bangladesh Journal of Agricultural Economics, vol. 4, no. 2, pp.51-60.

4. Chaudhury, R.H. and A. Bafoor (1981), "Rural Credit in Bangladesh," Paper presented at the 5th Annual Conference of the Bangladesh Economics Association, April 30-May 3, 1981 (Dhaka, Bangladesh).

5. Cochran, W.G. (1977), Sampling Techniques, 3rd. edition (John Wiley and Sons, New York).

6. Cuevas, Carlos E. (1984), "Intermediation Costs and Scale Economies of Banking Under Financial Regulations in Honduras," (Ph.D. Dissertation, The Ohio State University).

7. Deming, W.E. (1950), Some Theory of Sampling, (John Wiley and Sons, New York).

8. Gonzalez-Vega, C. (1975), "On the Iron Law of Interest Rate Restrictions: Agricultural credit Policies in Costa Rica and in Other Less Developed Countries," (Unpublished Ph.D. Dissertation, Stanford University).

9. Ladman, J.R. (1984), "Loan Transactions Costs, Credit Rationing, and Market Structure: The Case of Bolivia," in Undermining Rural Development with Cheap Credit, edited by D.W Adams, D. H. Graham, and J.D. Von Pischke (Westview Press, Inc., Boulder, Colorado).

10. Lynch, S.G. (1980), "An Analysis of Interview Frequency and Reference Period in Rural Consumption Expenditure Surveys: A Case from Sierra Leone," Working Paper No. 10 (Department of Agricultural Economics, Michigan State University, MI.).

11. Nehman, G.I. (1973), "Small Farmer Credit Use in a Depressed Community Sao Paulo, Brazil," (Unpublished Ph.D. Dissertation, The Ohio State University).

12. Quasem, M.A., M. Alam and J.C. Shaha (1978), "Rural Credit in Bangladesh: A Case Study at Patuakhali," Farm Economy, vol. 1, no. 1 (Dhaka, Bangladesh) pp. 63-92.

13. Shahjahan, M. (1968), Agricultural Finance in East Pakistan, (The Asiatic Press, Dhaka, Bangladesh).

14. Von Pischke, J.D. and D. W Adams (1980), "Fungibility and The Design and Evaluation of Agricultural Credit Projects," American Journal of Agricultural Economics, vol. 62, no. 4.