Economics and Sociology
Occasional Paper No. 1480

SCALE AND SCOPE ECONOMIES IN RURAL BANKING: EVIDENCE FROM BANGLADESH

By

Aruna Srinivasan* and Richard L. Meyer**

Selected Paper Presented at
the Annual Meetings of the
American Agricultural Economics Association
Knoxville, Tennessee, August 1988

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

* Economist, Federal Reserve Bank of Atlanta, Atlanta, Georgia.

** Professor of Agricultural Economics, The Ohio State University, Columbus, Ohio.

SCALE AND SCOPE ECONOMIES IN RURAL BANKING : EVIDENCE FROM BANGLADESH

ABSTRACT

A system of cost equations is estimated for rural bank branches in Bangladesh using two different approaches to measure bank costs and output. There were significant differences in results obtained under the production and intermediation approaches. The average bank branch displayed decreasing returns to scale under the intermediation approach.

SCALE AND SCOPE ECONOMIES IN RURAL BANKING: EVIDENCE FROM BANGLADESH

The movement during the past few years towards development of banking systems in less-developed countries, especially in the rural areas, has raised questions concerning the long-run viability of these institutions. A number of issues have been identified (Meyer and Srinivasan): Are the margins authorized for financial institutions sufficient to cover costs? Are the level of subsidies required to support institutions too large to be sustained by their governments? Are there economies of scale in financial intermediation in developing countries? Are loan loss reserves and interest margins adequate to cover projected loan losses?

There are several cost constraints that affect banks in the rural areas of developing countries. Rural banks are more seasonal in lending and deposit-taking than other banks. The nature of risk, timing of payments, amount of loans, and customer relationships are also generally different from other banks. Perhaps even more important than these characteristics are the cost implications of the regulatory environment in which many banks operate. Policies such as reserve requirements, interest rate controls, and credit allocation that are designed to achieve certain economic objectives can also increase intermediation costs. Rediscounting is commonly used to subsidize rural credit and to partly offset the higher costs resulting from other policy instruments. An important objective for the financial sector should be a steady decline in intermediation costs so interest rates charged to borrowers are decreased and returns to savers are increased.

In the recent past, a few studies have been conducted to estimate the costs of financial intermediation in developing countries. The consensus that emerges from this research is that resource costs of financial intermediation are significant and the viability of many banks may be threatened if these costs are not covered (Cuevas). These studies, by and large, focus on the non-financial costs incurred by financial institutions. The traditional approach, termed the "production approach", is appropriate for answering questions regarding the operational efficiency of banks. However, it has severe limitations in evaluating the viability of banks, since interest expenses are

ignored in the estimation of the cost function. As a result, cost properties such as economies of scale and scope may be biased.

This paper proposes to use an alternative approach – the "intermediation approach" – to examine the economic viability of a sample of rural bank branches in Bangladesh.[1] Financial as well as non-financial costs incurred by banks are considered and the resulting cost characteristics are compared with those obtained from the traditional approach. This new approach also adjusts for any biases in scale and scope economy estimates due to differences in the size and mix of sources of funds across banks, an important consideration because many institutions receive a large amount of their resources from central banks. The Bangladesh case is especially interesting because the banking system is heavily regulated and there do not appear to be any studies evaluating the rural intermediation costs of financial institutions.

This paper begins with a brief discussion of some of the key regulatory policies influencing rural banking in Bangladesh. The second and third sections describe the model, data and empirical results. Some concluding remarks follow.

RURAL BANKING IN BANGLADESH

The rural financial system in Bangladesh is dominated by the four nationalized commercial banks (NCBs) – Agrani, Janata, Rupali, Sonali – and the agricultural development bank, Bangladesh Krishi Bank (BKB). The NCBs are active both in lending and deposit mobilization, and have branches throughout the country. BKB, on the other hand, specializes in making agricultural loans (although it does accept deposits), and is confined to rural operations. Among the policies that have been used to shape the direction of the financial system and control its activities, the branching policies of the Bangladesh Bank (the central bank) probably have the greatest influence on the rural operations of these banks. From 1977 until 1981, a "two-for-one" branching policy was in effect which required commercial banks to open two new rural branches for each new urban branch licensed. As a result, the number of rural bank branches increased

[1] Viability as defined here does not include default risk considerations.

three-fold from 1977 to 1982 (Khalily, Meyer and Hushak). There is speculation that the rural branch expansion was intended to serve as a conduit for the allocation of agricultural credit to target groups. The policy may also have had the effect of reducing customer-incurred transaction costs in the rural areas. However, the economic viability of these branches is open to question.

The interest rate policy, which has consisted of a combination of ceilings on lending rates and higher deposit rates, has resulted in less favorable interest spreads for rural than for urban branches. There are two major implications of this interest rate structure. First, it is a disincentive for branches to aggressively mobilize rural deposits for rural lending. Second, if this rate structure does not cover operating costs, banks must subsidize rural operations with more profitable urban operations.

Finally, the Bangladesh Bank has made active use of refinance polices in the field of rural credit. Perhaps this policy was intended to offset the disincentives of higher deposit rates on rural deposits and lower lending rates on rural loans. For example, during the early 1980s, rural credit could be refinanced up to a maximum of 50 percent of loans made at an interest rate of 6 percent with a maximum lending rate of 12 percent. At the same time, the weighted average bank interest rate paid on all deposits was 7 to 7.5 percent. Thus it was logical for banks to mobilize rural deposits for urban lending and use refinance funds rather than deposits for rural lending.

THE MODEL

The approach used in this paper was to estimate a translog cost function for a sample of branches in which costs are assumed to be dependent on output levels and input prices (Benston, Berger, Hanweck, and Humphrey; Murray and White). The general form of the translog can be written as follows,

$$\ln C = \alpha_0 + \sum_{i=1}^{m} \alpha_i \ln q_i + \sum_{j=1}^{n} \beta_j \ln p_j + \tfrac{1}{2} \sum_{i=1}^{m}\sum_{k=1}^{m} \gamma_{ik} \ln q_i \ln q_k$$

$$+ \tfrac{1}{2} \sum_{j=1}^{n}\sum_{s=1}^{n} \lambda_{js} \ln p_j \ln p_s + \sum_{i=1}^{m}\sum_{j=1}^{n} \theta_{ij} \ln q_i \ln p_j \qquad (1)$$

where q_i is the quantity of the ith output, p_j is the price of the jth input, and ln denotes natural logarithm. It is possible to derive a system of cost-share equations directly from the translog cost function by differentiating (1) with respect to p_j,

$$M_j = \frac{p_j x_j}{C} = \frac{\partial \ln C}{\partial \ln p_j}$$

$$\text{or } M_j = \beta_j + \sum_{s=1}^{n} \lambda_{js} \ln p_s + \sum_{i=1}^{m} \theta_{ij} \ln q_i \qquad (2)$$

where M_j is the cost share of the jth input.

Among the economically important properties that can be derived from the cost function are economies of scale and scope, and the average and marginal costs of lending and deposit mobilization (Benston et al.; Mester; Murray and White). In this study, overall economies of scale, S, are defined as,

$$S = \sum_{i=1}^{m} \frac{\partial \ln C}{\partial \ln q_i}$$

$$\text{or } S = \sum_{i=1}^{m} \alpha_i + \sum_{i=1}^{m} \sum_{k=1}^{m} \gamma_{ik} \ln q_k + \sum_{i=1}^{m} \sum_{j=1}^{n} \theta_{ij} \ln p_j \qquad (3)$$

Values of S less than one imply increasing returns to scale. Partial economies of scale, S_i , can be computed from (3) as,

$$S_i = \frac{\partial \ln C}{\partial \ln q_i} \qquad (4)$$

If S_i is less than one, then partial scale economies exist.

Panzar and Willig have shown that a sufficient condition for economies of scope to exist between any two products is the existence of cost complementarities between the products. Cost complementarities exist between q_i and q_k if,

$$\frac{\partial^2 C}{\partial q_i \partial q_k} < 0$$

An approximate condition for cost complementarity suggested by Denny and Pinto in terms of the parameters of the translog function is,

$$\gamma_{ik} + \alpha_i \alpha_k < 0$$

DATA AND DEFINITIONS

The cross-section, time-series data used in the estimation of (1) and (2) were taken from the semi-annual income-expense statements of 190 rural bank branches of the four nationalized commercial banks and Bangladesh Krishi Bank, during the years of 1983 and 1984. Quarterly data on loans and deposits were obtained from the central bank. In order to evaluate the robustness of the scale and scope economies to different methodological approaches used in banking research, these measures are evaluated using two ways of measuring bank outputs and costs i.e., production vs. intermediation approach (Berger et al.). Under the production approach, banks incur labor and capital costs by producing loan and deposit accounts of various sizes. Operating (non-financial) costs are specified in the cost function, and number of accounts are used as the output metric, while average account sizes are specified to control for other account characteristics (Kolari and Zardkoohi).

Under the intermediation approach, banks intermediate deposits and other borrowings into loans and other assets. Total operating plus interest costs are specified and the value of loans and deposits measured in takas are the output metric (Sealey and Lindley).[2] Under both approaches, the value-added criterion is used to determine which of the bank liability and asset categories should be treated as bank outputs. For instance, funds borrowed from the head office entail almost no operating expenses or value added, and so are treated as intermediate inputs with interest costs only. Deposits, on the other hand, are treated as outputs since considerable value added is entailed in the form of safekeeping, liquidity, and payments services to depositors. The maintained assumption is that borrowed funds entail no scale or scope economies. The empirical results from applying the production approach may be termed "operating cost" scale and scope economies, and those from the intermediation approach may be called "total cost" scale and scope economies.

---

[2] Taka is a unit of Bangladeshi currency, where TK 25 = $1 during the period under study.

The input price definitions are common to both approaches. The price of labor is defined as total personnel costs divided by the total number of employees. The unit cost of capital is calculated by dividing the sum of capital expenses (rents and depreciation) by the value of deposits and loans at the end of the period.

Table 1 gives the mean values of the variables in the sample. Operating costs account for approximately half of total costs in Agrani, Janata, and Rupali. In contrast, interest expense constitutes a significant portion of total costs in Sonali and BKB. Nearly three-fourths of the total cost of BKB branches consists of interest payments on funds borrowed from the head office. Labor represents a far greater share of total costs than capital in all banks, reflecting the labor-intensive technology used in rural banking. The average size of a branch (measured by adding deposits and loans) is largest for Sonali and BKB compared to the other three banks, but the combination of assets and liabilities is quite different among the banks. Loans exceed deposits by a wide margin in BKB, they are roughly equal in Sonali, but deposits exceed loans in the remaining NCBs. Average deposit size is particularly small for BKB compared to the other banks, while average loan size is fairly similar for all the banks except Agrani. Under the maintained assumption that borrowed funds entail no scale or scope economies, the production approach would overestimate the economies of scale. The bias is expected to be more pronounced for BKB because of its heavy reliance on borrowed funds.

In the empirical section that follows, the same functional form is applied to the same data sets for the five banks for both the production and intermediation approaches to establish what, if any, are the qualitative differences between the results of the two approaches. Maximum-likelihood estimates were obtained by estimating the cost equation (1) and the labor share equation (2) using the iterative seemingly unrelated equations (SURE) technique. The share equation corresponding to capital was omitted. Restrictions implying homogeneity of degree one in input prices and symmetry were imposed.

Table 1

MEAN VALUES FOR THE COST FUNCTION VARIABLES[a/]

VARIABLE	BANK				
	AGRANI	JANATA	RUPALI	SONALI	BKB
Total Cost[b/] (TK)	1,055,278	757,888	849,640	802,026	1,149,764
Operating Cost (TK)	550,860	328,958	461,806	261,244	239,982
Interest Expense (Deposits) (TK)	270,642	319,726	387,834	540,782[c/]	89,692
Interest Expense (Borrowed Funds)[d/] (TK)	233,776	109,204	39,188	–	820,090
Price of Labor (TK/employee)	19,840	12,186	15,892	12,118	16,226
Price of Capital (TK)[e/]	0.0024	0.0036	0.0016	0.0038	0.0012
Labor Share	0.72	0.73	0.80	0.77	0.81
Capital Share	0.06	0.14	0.08	0.10	0.07
Deposits (TK)	4,565,000	5,308,674	6,003,013	6,455,717	1,417,470
Loans Outstanding (TK)	3,924,740	3,557,767	3,030,026	6,054,897	12,390,417
Average Deposit Size (TK)	2,080	2,450	2,893	2,988	1,000
Average Loan Size (TK)	4,490	3,496	3,773	3,280	3,832
Number of Branches	40	43	19	46	42

[a/] Average for the pooled sample, 1983 and 1984.

[b/] Total Cost = Operating Cost + Interest Expense (Deposits) + Interest Expense (Borrowed Funds).

[c/] Total Interest Expense.

[d/] Borrowed Funds include transfer of deposits from surplus to deficit branches as well as refinance funds.

[e/] Capital costs per taka of total deposits and loans.

EMPIRICAL RESULTS

Due to space considerations, the estimated parameters and t-ratios for the ten estimated equations (two for each bank) cannot be reported here.[3] The R^2 were reasonably high and most of the parameters were of the expected sign and were significant. Using the estimated coefficients of the cost function, it is possible to investigate the production structure of the Bangladeshi banking system.

Table 2 shows that the economies of scale estimates at the sample means (row 1) differ vastly under the two approaches. Use of the production approach suggests that the "average" Agrani and Rupali branches are in the constant returns to scale range, while operating cost scale economies appear to prevail in Janata, Sonali and BKB. Under the intermediation approach, however, there are diseconomies of scale at all banks. Further, total cost diseconomies are most pronounced at BKB, which interestingly enough also exhibited the highest cost advantage under the production approach. There are two plausible explanations for this contrast. First, as hypothesized, the production approach involves an innate bias towards economies of scale. Measured economies under the production approach are biased by a branch's choice of producing deposits or borrowing funds from the head office (in other words expanding the loan portfolio without expanding the deposit portfolio). The production approach may find more scale economies than appropriate as branches with larger loan portfolios employ a higher proportion of borrowed funds. This bias is more pronounced for BKB and is reflected in the estimates for overall scale economies under the two approaches. Interest expense on borrowed funds constitutes 41 percent of total costs in BKB compared with less than 25 percent in the three other banks for which data are available. Intermediation approach scale economies are thus moderated by borrowings from the head office which have no scale economies by assumption.

---

[3] For a full discussion of the results see Srinivasan.

Table 2

COST STRUCTURE OF BANKS IN BANGLADESH

COST CONCEPT[a/]	BANK				
	AGRANI	JANATA	RUPALI	SONALI	BKB
(A) PRODUCTION APPROACH					
1. Economies of Scale (S)	0.90	0.82	0.94	0.77	0.67
F-test for H_0: S = 1	(2.28)	(18.10)*	(0.30)	(91.64)*	(84.80)*
Partial Economies of Scale					
2. S_1, Deposits	0.49	0.46	0.64	0.36	0.14
3. S_2, Loans	0.41	0.36	0.30	0.41	0.52
4. Share of Deposits in total costs	54.74%	56.04%	68.14%	47.14%	21.37%
5. Share of Loans in total costs	45.26%	43.96%	31.86%	52.86%	78.63%
Costs of Mobilizing Deposits					
6. Average Costs	1.59%	1.44%	1.90%	1.09%	0.63%
7. Marginal Costs	0.78%	0.67%	1.21%	0.40%	0.09%
Costs of Lending					
8. Average Costs	6.49%	5.49%	6.53%	2.34%	1.06%
9. Marginal Costs	2.65%	1.99%	1.95%	0.95%	0.55%
Overall Intermediation Cost					
10.Average Costs	8.08%	6.93%	8.43%	3.43%	1.69%
11. Marginal Costs	3.43%	2.66%	3.17%	1.35%	0.64%
12. Cost Complementarities	0.08	0.31	0.02	-0.02	0.34
t-test for $H_0 : \gamma_{ik} + \alpha_i \alpha_k = 0$	(0.56)	(0.62)	(0.05)	(-0.45)	(1.53)
(B) INTERMEDIATION APPROACH					
1. Economies of Scale (S)	1.26	1.10	1.17	1.20	1.66
F-test for H_0: S = 1	(38.33)*	(8.39)*	(4.87)*	(31.12)*	(110.25)*
Partial Economies of Scale					
2. S_1, Deposits	0.68	0.55	0.73	0.44	0.11
3. S_2, Loans	0.57	0.55	0.44	0.76	1.55
4. Share of Deposits in total costs	54.45%	50.10%	62.61%	36.37%	6.57%
5. Share of Loans in total costs	45.55%	49.90%	37.39%	63.63%	93.43%
Costs of Mobilizing Deposits					
6. Average Costs	6.67%	6.53%	4.73%	2.68%	2.87%
7. Marginal Costs	4.56%	3.61%	3.45%	1.17%	0.31%
Costs of Lending					
8. Average Costs	9.13%	10.23%	7.80%	5.67%	4.30%
9. Marginal Costs	5.22%	5.63%	3.40%	4.32%	6.67%
Overall Intermediation Cost					
10.Average Costs	15.80%	16.76%	12.53%	8.35%	7.17%
11. Marginal Costs	9.78%	9.24%	6.85%	5.49%	6.99%
12. Cost Complementarities	0.94	0.03	0.65	0.12	0.42
t-test for $H_0 : \gamma_{ik} + \alpha_i \alpha_k = 0$	(3.12)*	(0.38)	(1.13)	(1.26)	(0.84)

a/ Evaluated at the geometric means of the variables in the models.

* Indicates significance at the 1 percent level.

The other reason that scale economies may be more quickly exhausted in the intermediation approach is that smaller accounts cost more per taka and average account sizes decrease with numbers of accounts at the margin for both loans and deposits.[4]

The measures for partial economies of scale (rows 2 and 3) under the production and intermediation approaches suggest increasing returns to scale in both deposit mobilization and lending for all the banks. The only exception is BKB which shows decreasing returns to scale in lending under the intermediation approach. This finding reflects heavy reliance by BKB on borrowed funds to expand its loan portfolio without expanding its deposit portfolio.

The shares of lending and deposit mobilization in total costs (rows 4 and 5) are somewhat similar for Agrani, Janata, and Rupali banks across the two models. Sonali and BKB, however, with their relatively higher dependence on borrowed funds, show a significantly higher share for lending costs under the intermediation approach. The patterns observed here are consistent with Sonali and BKB's heavy reliance on refinance funds and greater participation in the loan-targeting programs of the government designed to expand rural loans. Lower interest rates on rediscount funds relative to deposits act as a disincentive for mobilizing deposits.

As expected, overall intermediation costs are higher under the intermediation approach in all cases, ranging from 7 percent to over 15 percent (rows 6 – 11). These numbers are estimates of the minimum interest rate that should be charged for the banks to break-even.[5] Only Sonali and BKB can break-even at the interest rate of 12 percent permitted on agricultural loans during the early 1980s. Note that the marginal costs of lending are higher than the marginal costs of deposit mobilization under both approaches. This finding is consistent with the data in Table 1 that show average loan size is greater than the average size of a deposit account.

The statistic used to test for cost complementarity (row 12) is not a linear function of the estimated parameters; so standard errors were calculated using the approach suggested by

---

[4] Within a bank, the degree of scale economies was strongly influenced by the size of the branches. Smaller size branches were characterized by increasing returns, whereas constant and decreasing returns were found for larger branches.

[5] These estimates exclude provision for bad debt, and implicitly assume that all loans made are recovered.

LeCompte and Smith concerning the variance and covariance of the product of random variables.[6] The hypothesis that there were no cost complementarities present for any of the output combinations cannot be rejected. In fact, nearly all of the scope estimates are close to zero, implying a separable cost function. These results are unexpected because of regulatory constraints which force the banks to emphasize agricultural lending at the expense of other potentially profitable types of lending activity. Economies of scope potentially arise from the sharing of a joint input such as credit information collection. There is anecdotal evidence of minimum loan screening by banks in Bangladesh, implying that information obtained through deposit behavior of clients is of little value in screening loans. This conjecture is clearly tentative. An alternative explanation could involve size. That is, as branch size expands, economies of scope may be exhausted. However, this does not adequately explain why all of the point estimates are uniformly close to zero. That is, the diseconomies of scope also seem to disappear.

CONCLUSIONS

This study presents estimates of scale and scope economies, and average and marginal costs for a sample of rural bank branches of five major banks in Bangladesh. All these measures are evaluated using two different approaches to measuring bank costs and output: the production and intermediation approaches, which emphasize operational efficiency and economic viability, respectively. Some of the measures were significantly different between the two models, suggesting that using results from the production approach alone may lead to biased and misleading policy conclusions.

For instance, the overall scale economies suggest further expansion of bank branches under the production approach, while diseconomies prevail under the intermediation approach. There was no evidence of scope economies between loans and deposits. Non-cost considerations such

---

[6] The variance of the product of two random variables x and y is:
$\sigma^2_{xy} = \sigma^2_x \sigma^2_y (1 + \rho^2_{xy}) + \bar{x}^2 \sigma^2_y + \bar{y}^2 \sigma^2_x + 2\bar{x}\bar{y}\rho_{xy}\sqrt{\sigma^2_x \sigma^2_y}$
and the covariance of xy and another random variable, z, is given by:
$\sigma_{(xy,z)} = \bar{y}$ covariance(x,z) + $\bar{x}$ covariance(y,z).

as customer convenience and diversification to reduce risk may explain why banks supply these outputs jointly. The estimates of the average interest and operating costs obtained under the new approach take into consideration the size and mix of the sources of funds across banks. As the discussion in the preceding section suggests, at the then prevailing lending rate for rural loans (12 percent) three of the five banks had negative spreads. If the costs of default are incorporated into the analysis, there is reason to believe that the spreads will turn even more negative.

These findings highlight the importance of using the intermediation approach to adjust for differences in the size and mix of sources of funds across banks in Bangladesh. The intermediation approach focused on the weakness of the rural banking system to sustain itself. Rural branches have become little more than retail lending operations, relying on rediscount funds. The methods used in this study are also of relevance in other low-income countries characterized by branch banking systems. The practice of establishing concessionary rediscount facilities in central banks to transfer funds from the government or donors to the ultimate lenders is common in less-developed countries. Therefore, the possible bias in the production approach needs to be considered in cost function estimation.

REFERENCES

Benston, George J., Allen N. Berger, Gerald A. Hanweck, and David B. Humphrey, "Economies of Scale and Scope in Banking," Research Paper in Banking and Financial Economics, Board of Governors of the Federal Reserve System, 1983.

Berger, Allen N., Gerald A. Hanweck, and David B. Humphrey, "Competitive Viability in Banking: Scale, Scope, and Product Mix Economies," Research Paper in Banking and Financial Economics, Board of Governors of the Federal Reserve System, 1986.

Cuevas, Carlos E., "Costs of Financial Intermediation: Recent Cross-Country Evidence and the Case of Bangladesh," Economics and Sociology Occasional Paper No. 1395, The Ohio State University, 1987.

Denny, M., and C. Pinto, "An Aggregate Model with Multiproduct Technologies," in M. Fuss and D. McFadden, editors, Production Economies: A Dual Approach to Theory and Applications, Amsterdam : North-Holland, 1978.

Khalily, M.A.B., Richard L. Meyer, and Leroy J. Hushak, "Deposit Mobilization in Bangladesh: Implications for Rural Financial Institutions and Financial Policies," Bangladesh Development Studies, 15(1987): 85-117.

Kolari, James, and Asghar Zardkoohi, Bank Costs, Structure, and Performance, Lexington, MA : D.C. Heath, 1987.

LeCompte, Richard L.B., and Stephen D. Smith, "Regulation and Cost Structures: The Case of Savings and Loans," Working Paper, Texas Christian University, Fort Worth, TX and Georgia Institute of Technology, Atlanta, GA, 1987.

Mester, Loretta J., "A Multiproduct Cost Study of Savings and Loans," Journal of Finance, 42(1987): 423-445.

Meyer, Richard L., and Aruna Srinivasan, "Policy Implications of Financial Intermediation Costs in Bangladesh," Economics and Sociology Occasional Paper No. 1389, The Ohio State University, 1987.

Murray, John D., and Robert W. White, "Economies of Scale and Economies of Scope in Multiproduct Financial Institutions: A Study of British Columbia Credit Unions," Journal of Finance, 38(1983): 887-902.

Panzar, John C., and Robert D. Willig, "Economies of Scope," American Economic Review, 71(1981): 268-272.

Sealey, C.W. Jr., and J.T. Lindley, "Inputs, Outputs, and a Theory of Production and Cost at Depository Institutions," Journal of Finance, 32(1977): 1251-1266.

Srinivasan, Aruna, "A Multiproduct Cost Study of Rural Bank Branches in Bangladesh," Unpublished Ph.D. Dissertation, The Ohio State University, 1988.