Management efficiency in minority- and women-owned banks

Iftekhar Hasan
and William C. Hunter

Studies of the differences in operating performance of minority- and nonminority-owned commercial banks date back to the 1970s and early 1980s.[1] The focal point of much of this research was to investigate the long-term viability of minority-owned institutions. Some studies investigated declining lending trends among minority institutions (Boorman and Kwast 1974 and Meinster and Elyasiani 1988), while others concerned the possible adverse consequences of these trends on the economic development of the inner cities (for example, Kwast and Black 1983). As more attention is devoted to economic development prospects in our nation's core urban centers, the question of what role minority-owned banks (and other specially designated banks, including those owned by women) might play in the economic development of these communities naturally arises.[2]

Studies comparing the economic performance of minority- and nonminority-owned banks, for the most part, have revealed that the minority-owned banks have tended to be smaller, somewhat less profitable, and more expenditure prone than comparable groups of nonminority banks (Colby 1993). In addition, earlier studies reported that minority-owned banks tended to operate with lower ratios of equity capital to assets, to employ more conservative asset portfolio management policies, and to post higher loan losses than their nonminority peers (Brimmer 1971, Boorman and Kwast 1974, Bates and Bradford 1980, and Kwast 1981).

In contrast to these negative findings, a more recent study by Meinster and Elyasiani (1988) found that minority-owned banks had significantly improved their capital ratios and decreased their holdings of liquid assets, while expanding their use of purchased funds. The authors also reported that there were no significant differences in the pricing and asset-liability management decisions in the overall financial performance of minority-owned banks compared with a sample of nonminority-owned banks. However, Meinster and Elyasiani observed that banks owned by African Americans continued to reflect the financial performance characteristics associated with minority-owned bank performance in the 1960s and 1970s.

Caution must be exercised when comparing minority-owned with nonminority-owned banks on the basis of broadly defined markets or locational attributes. Studies by Clair (1988), Hunter (1978), and Mehdian and Elyasiani (1992) suggest that only when the two sets of banks are operating in identical or very similar market areas (in terms of economic and demographic characteristics) with similar customer bases is it safe to attribute differences in operating performance to differences in ownership and/or customer ethnicity.

Given the inherent difficulty in constructing samples of minority- and nonminority-owned banks which serve identical market

Iftekhar Hasan is an associate professor of finance at the New Jersey Institute of Technology (SIM). William C. Hunter is a senior vice president and the director of research at the Federal Reserve Bank of Chicago.

areas, it is not surprising to find mixed conclusions in the literature assessing the long-term viability of minority-owned banks as engines of community economic development.[3]

In this article, we follow an approach similar in spirit to that used by Mehdian and Elyasiani (1992) in conducting an analysis of the operating performance of minority- and women-owned banks and comparable nonminority-owned banks from the perspective of production efficiency.[4] Instead of simply comparing the operating performance of a distinct sample of minority- and women-owned banks with a distinct sample of nonminority-owned banks, we compare the operating performance of our minority and nonminority sample banks relative to a set of so-called best-practice banks. This set of best-practice banks, which can include all types of banks regardless of ownership, represents those institutions which produce their financial products and services at the lowest cost using the most efficient mix of productive inputs or factors of production. Thus, unlike the older literature which infers managerial inefficiencies for minority-owned banks from simple comparisons of financial ratios, this article measures such managerial inefficiencies directly from the banks' cost (production) functions. We are thus able to determine which banks—various categories of minority- or women-owned and nonminority-owned—are more efficiently managed.[5]

Much of the literature examining the performance of minority banks is descriptive or based on regression analyses which lack well-developed theoretical underpinnings. In this article, we use production theory and modern econometric procedures to extract information on managerial efficiency in the production of financial services. Essentially, we estimate a firm-specific management efficiency measure for each bank in our sample using a standard bank cost function. As suggested by the earlier literature comparing the operating performance of minority- and nonminority-owned banks, differences in management efficiency among our sample banks could be due to a host of factors. Differences in managerial efficiency could result from differences in operating strategies, organizational structures, primary market areas, or customer bases. Below, we attempt to identify some of the determinants of observed managerial inefficiencies in our sample banks.

The empirical approach

In carrying out our empirical analysis, we use the methodology developed by Aigner et al. (1977) and Meeusen and Broeck (1977)—the stochastic cost frontier approach (described briefly below)—to calculate a measure of production efficiency (an inefficiency score) for each bank in our sample. These scores are used to gain further insight into the determinants of inefficiency.

Following Aigner et al. (1977) and Meeusen and Broeck (1977), a firm's cost function, that is, the relationship among the firm's total cost of producing various products or services, the products or services themselves, and the prices of the inputs used to produce these products or services may be written as

$$1) \quad TC_f = f(Y_i, P_k) + \varepsilon_f \quad f = 1, ..., n,$$

where TC_f represents the firm's total costs, Y_i represents the various products or services produced by the firm, P_k represents the prices of the inputs used by the firm in the production of the products or services, and ε represents a random disturbance term which allows the cost function to vary stochastically, that is, it captures the fact that there is uncertainty regarding the level of total costs that will be incurred for given levels of production. The uncertainty in the cost function can be further decomposed in the following manner:

$$2) \quad \varepsilon_f = V_f + U_f.$$

In equation 2, V represents random uncontrollable factors that affect total costs (such as weather, luck, labor strikes, or machine performance). These factors (and their impact on costs) are assumed to be independent of each another. They are identically distributed as normal variates and the value of the error term in the cost relationship is, on average, equal to zero.

The U term in equation 2 represents firm-specific cost deviations or errors which are due to factors that are under the control of the management of the firm. Such factors include the quantity of labor, capital, or other inputs hired or employed in the production of the firm's products and services and the amount chosen to be produced.[6]

The stochastic frontier cost function approach maintains that managerial or controllable inefficiencies only increase costs above frontier or best-practice levels, and that the random fluctuations or uncontrollable factors can either increase or decrease costs. Since uncontrollable factors are assumed to be symmetrically distributed, the frontier of the cost function, $f(Y_i, P_k) + e$, is clearly stochastic. In practical terms, the *U* component of the error term in the cost function given by equation 2, representing managerial inefficiency, causes the cost of production to be above the frontier or best-practice levels. Jondrow et al. (1982) estimated a firm's relative inefficiency using the ratio of the variability of the *U* and *V* terms in equation 2, which is measured by the ratio of the standard deviation $Q = s_u / s_v$, where s_u and s_v are the standard deviations of *U* and *V*. Small values of *Q* imply that the uncontrollable factors dominate the controllable inefficiencies.

In summary, the stochastic frontier approach incorporates a two-component error structure—one being a controllable factor and the other a random uncontrollable component. The controllable component consists of factors controllable by management.[7]

The cost function

To estimate the error term in the cost function given by equation 2 and to calculate each bank's efficiency index, we statistically fitted an empirical cost function of the following form:

$$3) \quad lnTC_f = \alpha_0 + \Sigma\alpha_i \, lnY_i + \tfrac{1}{2} \, \Sigma\Sigma a_{ij} \, lnY_i \, lnY_j + \Sigma \, \beta_k \, lnP_k + \tfrac{1}{2} \, \Sigma\Sigma \, \beta_{kh} \, lnP_k \, lnP_h + \Sigma\Sigma \, \gamma_{ik} \, lnY_i \, lnP_k + \varepsilon_f,$$

where TC_f represents total costs, Y_i represents the *i*th output, P_k represents the price of the *k*th input, ε_f is the disturbance term, and *ln* represents the natural logarithm. The cost function in equation 3 is a standard translog cost function. In fitting this cost function, standard homogeneity and symmetry restrictions were imposed.[8]

The sample data and variable definitions

The data for each sample bank examined were obtained from commercial bank "Reports of condition and income" filed with bank regulators. Average data for the four

TABLE 1

Frequency distribution of sample banks

A. Minority-owned commercial banks

	African American	Women	Hispanic American	Asian American	Native American	Total
Total	35	5	21	29	5	**95**
National charter	11	3	10	11	3	**38**
State charter	24	2	11	18	2	**57**
Bank holding company	17	5	8	10	1	**41**
De novo banks	3	0	0	7	0	**10**
Federal Reserve member	13	4	11	14	3	**45**

B. Nonminority-owned commercial banks

Total	National charter	State charter	Bank holding company	*De novo*	Federal Reserve member
127	66	61	59	6	82

Source: Federal Reserve Board of Governors, "Report of condition and income 1992," Washington, DC, magnetic tape, (April 1994).

quarters of 1992 was used. The sample was composed of all minority and women's banks and a comparable sample of nonminority-owned banks operating in 1992. The selection of comparable nonminority banks was based on size, location, market served, and start-up date. Initially, a nonminority-owned bank of similar size, established in the same year, with its headquarters in the same city as each sample minority or women's bank was identified. In cases where comparable banks could not be located, we expanded the search to encompass the metropolitan statistical area (MSA) of the minority- or women-owned sample bank. If we were unable to find a match in the same MSA, we selected an institution from a similar MSA market within the same state. This selection procedure resulted in a total of 127 banks being classified as comparable nonminority institutions. Panels A and B of table 1 provide data on the characteristics of the groups of banks.

Variable definitions

In the empirical cost function in equation 3, total costs (*TC*) were defined to include all labor and physical capital expenses, as well as the interest expense incurred by the bank, that is, the total costs of inputs used to produce the bank's various outputs. Four outputs were included in the cost function and were measured as the dollar value of (1) all money market assets, Y_m; (2) commercial and industrial loans, Y_c; (3) other loans, Y_l; and (4) other bank outputs, Y_o, which were proxied by annual noninterest income service charges, excluding gains and losses on foreign exchange transactions.

Labor, physical capital, and funds (including deposits) were treated as inputs used in the production of bank assets. With respect to input prices, the price of labor, P_1, was calculated by dividing total salaries and fringe benefits by the number of full-time equivalent employees (including bank officers). The price of physical capital, P_2, was defined to be equal to the ratio of total expenses for premises and fixed assets to total assets. The price of funds, P_3, was computed by taking the ratio of total interest expense (paid on deposits, federal funds purchased, securities sold under agreements to repurchase, demand notes issued to the U.S. Treasury, mortgage indebtedness,

TABLE 2

Mean values of key ratios

	Non-minority	All minority	African American	Women	Hispanic American	Asian American	Native American
Commercial loans	12.41	11.92	11.16**	17.00**	11.71	25.31***	10.32
Residential mortgage loans	18.17	13.57***	13.89***	7.88**	11.57***	10.91**	12.30**
Liquid assets	33.17	36.07	35.78	41.19**	41.48**	23.59***	45.68**
Delinquent assets	1.51	1.46	1.49	1.03*	1.05*	2.04**	1.15
Time deposits	40.19	43.48	42.75	33.52*	44.09	48.02**	48.49**
Retail deposits	13.12	14.49	13.93	7.12**	11.78	11.91	9.48
Interest expenses	2.97	3.08*	2.98	3.04	3.09*	3.10*	2.87
Noninterest operating expenses	4.01	4.33***	4.92***	4.17**	4.72**	4.97***	4.57**
Return on assets	.554	.485	.681**	.948**	.821**	–.309***	.568
Return on equity	5.91	5.78	7.41***	9.39**	9.61***	–.023***	5.53
Equity	9.03	8.86	7.83	7.87	7.48	11.15*	8.62

***, **, and * are significantly different from nonminority banks at the 1 percent, 5 percent, and 10 percent levels, respectively.

Note: All ratios except return on assets and return on equity are relative to total assets.

Source: Federal Reserve Board of Governors (1994).

subordinated debts and debentures, and other borrowed money) to the sum of total funds.

Empirical results

Table 2 provides some key balance-sheet and income expenditure ratios for the sample banks in our study. When minority- and women-owned banks were grouped in one category, called all minority, their asset portfolios and financing strategies were similar to those of nonminority banks, for the most part, except for a lower ratio of residential mortgage loans to total assets. In addition, the two groups' mean return on assets (ROA) and mean return on equity (ROE) were not significantly different. However, while African-American-owned banks had almost identical asset and financial statistics to those of nonminority banks, other minority- and women-owned banks were quite different from nonminority banks. Women-owned banks, for example, had higher ratios of commercial loans and liquid assets to total assets than nonminority-owned banks, but lower ratios of residential mortgage loans to total assets. They also posted lower ratios of time deposits and retail deposits to total assets than nonminority banks. On the other hand, Asian-American-owned banks had higher ratios of commercial loans and delinquent assets to total assets than nonminority-owned banks, as well as higher ratios of time deposits to total deposits. These banks also posted lower ratios of residential mortgage loans and liquid assets to total assets than nonminority-owned banks. In terms of profitability, the Asian-American-owned banks experienced negative returns over the sample period, while the other minority- and women-owned banks showed positive returns.

The descriptive statistics also show a significant difference in both the interest and noninterest operating expense categories between the groups of banks. The minority- and women-owned banks posted significantly higher ratios of noninterest operating expenses to total assets than did the nonminority banks. With respect to the ratio of interest expenses to total assets, all minority-owned banks again posted significantly higher ratios. However, among the minority- and women-owned banks, only the Hispanic-American and Asian-American banks had higher ratios of interest expenses to total assets.

Table 3 presents statistics for the variables used to estimate the cost function in equation 3. The input prices of minority- and women-owned banks exhibited a mixed pattern compared with those of the nonminority banks.

TABLE 3

Means for variables used in translog cost function

	Nonminority	As a percent of assets	Minority	As a percent of assets
Cost function inputs				
Price of labor	35.79 (16.83)	—	31.99* (7.12)	—
Price of capital	2.54 (1.88)	—	3.17** (3.21)	—
Price of funds	.036 (.017)	—	.032 (.007)	—
Cost function outputs *(mil.)*				
All money market assets	29.15 (48.95)	26.11 (16.10)	33.81 (70.05)	28.36 (15.70)
Commercial/industrial loans	12.93 (49.21)	12.41 (9.91)	14.45 (37.38)	11.97 (7.89)
Other loans	18.11 (79.37)	17.97 (30.04)	16.52 (65.43)	11.06** (28.12)
Other bank products and services	1.85 (7.61)	1.75 (7.50)	1.66 (4.10)	1.45* (1.01)
Total assets *(mil.)*	**102.3 (192.7)**	—	**120.8* (23.3)**	—
Total costs *(mil.)*	**7.54 (12.99)**	**7.87 (6.57)**	**8.43* (14.68)**	**7.80* (1.80)**

**, * Difference in means significant at the 1 percent and 5 percent levels, respectively.
Note: Standard deviations are in parentheses.
Source: Federal Reserve Board of Governors (1994).

While the price of funds at all of the sample banks was similar, the prices paid for capital inputs by minority- and women-owned banks were significantly higher, on average, than those paid by the nonminority banks. On the other hand, the prices paid for labor inputs were significantly lower at the minority- and women-owned banks. Despite this difference, total measured costs were significantly higher at the minority- and women-owned banks. In terms of asset allocation, the nonminority banks had a higher percentage of assets in commercial and industrial loans, other loans, and other bank products and services, but operated with a lower percentage of assets in the money market category than did the minority- and women-owned banks.

Management inefficiency

Higher capital input prices at minority- and women-owned institutions relative to the control group suggest inefficiency, particularly in light of the more liquid asset portfolios held by the minority- and women-owned banks.

Using the parameter values and standard errors of the residuals obtained from estimating a normalized version of the translog cost function in equation 3, inefficiency scores for the sample banks were calculated. The descriptive statistics displayed in table 4 suggest that both groups of banks produced products and services at a higher cost than necessary, that is, a perfectly efficient bank would have an inefficiency index of zero. The average inefficiency score of the minority- and women-owned banks was higher (31.4 percent) than the average inefficiency score of the nonminority-owned banks (24.8 percent) and the difference was statistically significant at the 5 percent level. Thus, on average, it appears that the minority- and women-owned banks were relatively inefficient institutions.

Asian-American-owned banks experienced the highest level of inefficiency (36.2 percent), followed by African-American (34.8 percent), Hispanic-American (33.1 percent), and Native-American banks (32.0 percent). Banks owned by women were more efficient than any of the other minority-owned banks but less efficient than the average nonminority bank. The results also indicated that the holding company structure was the most efficient structure for the minority- and women-owned banks. This could be the result of difficulties encountered by minority- and women-owned banks that are not affiliated with holding companies in adapting customer and

TABLE 4

Inefficiency score for sample banks

		Inefficiency score		
	Mean	Standard deviation	Minimum	Maximum
Nonminority banks	.248	.192	.056	.914
Minority banks	.314*	.105	.068	.966
African-American banks	.348*	.093	.032	.902
Women's banks	.267*	.168	.041	.925
Hispanic-American banks	.331*	.126	.035	.936
Asian-American banks	.362**	.110	.069	.955
Native-American banks	.320*	.098	.046	.928
National chartered banks	.318*	.108	.037	.944
State chartered banks	.320*	.112	.050	.958
Bank holding companies	.302**	.083	.074	.903
De novo banks	.347*	.148	.062	.941
Federal Reserve institutions	.332*	.130	.048	.921
Combined sample	2.710	.182	.035	.966

**, * Significantly different from nonminority sample banks at the 1 and 5 percent levels, respectively.
Source: Federal Reserve Board of Governors (1994).

service delivery systems in unique markets. It could also be due simply to a lack of managerial experience at these banks.

The relationship between firm inefficiency and bank characteristics was estimated using the following Tobit regression model:[9]

$$U_i = a_o + b_1 MINORITY + b_2 LIQUID\ ASSET + b_3 COMMERCIAL\ LOAN + b_4 RETAIL\ DEPOSIT + b_5 ASSET + b_6 BHC + b_7 DE\ NOVO + b_8 NATIONAL + b_9\ 3\text{-}FIRM + b_{10} FEDMEMB + e_i,$$

where U_i = individual bank's inefficiency score,

MINORITY = minority- or women-owned indicator variable (1 for minority- and women-owned banks and 0 otherwise),

LIQUID ASSET = ratio of liquid assets to total assets,

COMMERCIAL LOAN = ratio of commercial loans to total assets,

RETAIL DEPOSIT = ratio of retail deposits to total deposits,

ASSET = total assets,

BHC = bank holding company dummy (1 if the financial institution is some form of bank holding company and 0 otherwise),

DE NOVO = *de novo* banks (1 for banks established within the last three years and 0 otherwise),

NATIONAL = national or state charter (1 for national chartered and 0 for state chartered banks),

3-FIRM = three firm deposit concentration ratio of respective metropolitan statistical market, and

FEDMEMB = Federal Reserve membership (1 for members and 0 otherwise).

In examining the determinants of inefficiency among the sample banks, we included variables related to portfolio composition (*COMMERCIAL LOAN*) and liquidity (*LIQUID ASSET*), financing or funding sources (*RETAIL DEPOSIT*), organizational characteristics [for example, whether the bank was a member of the Federal Reserve System (*FEDMEMB*) or organized as a holding company (*BHC*)], charter type (*NATIONAL*), market concentration (*3-FIRM*), and whether the sample bank was a *de novo* bank (*DE NOVO*).

While it is difficult to state *a priori* how each of these factors will influence bank inefficiency, it seems reasonable to expect *de novo* banks to be less efficient than other banks, and banks operating in concentrated markets to be less efficient than those operating in very competitive markets.

The regression results presented in table 5 show that the coefficient on the minority/women ownership dummy variable was positive and statistically significant. This implies that these banks were less efficient than their nonminority counterparts. Lending in the commercial and industrial loan category was also found to be associated with higher levels of inefficiency, while the bank holding company organizational structure was found to be associated with lower levels of inefficiency. As was expected, newly established banks tended to be less efficient than other banks and banks operating in less competitive markets tended to be less efficient than banks operating in more competitive, less concentrated markets.

Conclusion

Management efficiency has always been an important topic in banking research. Previous studies comparing the operating performance of minority- and women-owned banks with that of nonminority banks often reached mixed conclusions. This may have been due to the difficulty of identifying groups of minority and nonminority banks that are comparable along such dimensions as size and customer base. This article reported on the results of research which examined differences in the operating performance of minority- and women-owned banks from the viewpoint of production efficiency. Instead of simply comparing the operating performance of a distinct sample of minority- and women-owned banks with a distinct sample of nonminority-owned banks, we compared the operating performance of all of our sample banks relative to a set of best-practice banks. This set of best-practice banks, including all types of sampled banks regardless of ownership ethnicity or gender, represents those institutions that produced their financial products and services at the lowest cost using the most efficient mix of productive inputs or factors of production. Thus, unlike the older literature which suggests managerial inefficiencies for minority-owned banks from simple

TABLE 5

Regression analysis
Dependent variable: inefficiency score

Independent variables	Tobit	
	Coefficient	Standard error
Intercept	.149	.024**
Minority	.058	.032*
Liquid asset	–.188	.112
Commercial loan	.060	.036*
Retail deposit	.132	.097
Asset	–4.7E-6	6.7E-6
BHC	–.073	.038**
De novo	.149	.061**
National	.223	.157
Fedmemb	.045	.036
3-firm	.092	.039***
Equation	Chi-Square = 142.06 * d.f. = 211	

***, **, and * are significant at the 1 percent, 5 percent, and 10 percent levels, respectively.
Source: Federal Reserve Board of Governors (1994).

comparisons of financial ratios, we measured such managerial inefficiencies directly from the banks' cost (production) functions.

We examined the performance of a sample of minority- and women-owned and nonminority-owned banks operating during 1992. The results of our analysis indicated that, on average, while banks from both the minority- and women-owned and the nonminority categories were inefficient, the average minority- or women-owned bank was significantly more inefficient than the average nonminority bank. Among the sampled minority- and women-owned banks, the women-owned banks were the most efficient. Banks owned by Asian Americans were the least efficient among the minority-owned banks, followed by banks owned by African Americans and Hispanic Americans, respectively. *De novo* status was found to be a key factor accounting for higher levels of inefficiency. One explanation for this finding could be the lack of experience at *de novo* banks in serving new markets and customer bases. Another factor found to be important in determining the level of inefficiency among the sampled banks was the level of market concentration. The less competitive and more concentrated the bank's local market, the higher its level of inefficiency.

NOTES

[1]In this article, minority-owned banks include those owned by African Americans, Hispanic Americans, Native Americans, and Asian Americans. For a summary of history and trends in minority ownership of commercial banks see Price (1990).

[2]The recent controversy surrounding the acquisition of Indecorp, a leading Chicago minority-owned bank by ShoreBank Corporation, a nonminority-owned bank known internationally for its development efforts, is a case in point. See Wilke (1995).

[3]In this regard, Dahl (1995) offers a methodology which can potentially resolve this sample matching problem and, thus, contribute to our understanding of the observed differences in the operating performance of minority- and nonminority-owned commercial banks.

[4]Meinster and Elyasiani (1988) analyzed the 1984 year-end performance of a sample of 80 minority and 80 nonminority banks using a nonparametric efficiency technique—data envelopment analysis—based on linear programming principles. This technique assumes that all deviations from the best-practice cost frontier—including those due to random uncontrollable factors—are due to inefficient management. The stochastic frontier cost function approach used in this article does not assign deviations from the frontier caused by random uncontrollable factors to inefficient management.

[5]Research to date suggests that differences in managerial ability to control costs or maximize revenues account for as much as 20 percent of banking costs, while scale and scope inefficiencies account for only about 5 percent of costs. Thus, it is important to determine if there are significant managerial efficiency differences among banks owned by different ethnic and gender groups to draw more useful conclusions on long-term viability issues. See Berger et al. (1993).

[6]This inefficiency term is derived from a zero-mean normal, $N(0,\sigma_u^2)$, distribution truncated below zero. See Aigner et al. (1977) for a discussion and derivation of the cost function and error term structure given in equation 2.

[7]See Cebenoyan, Cooperman, and Register (1993) for a related estimation technique applied to thrift institutions.

[8]Symmetry requires that $\alpha_{ij} = \beta_{ji}$ and $\alpha_{hk} = \beta_{kh}$. The duality of the firm's cost and production function was preserved by imposing the following conditions: $\Sigma\beta_k = 1$, $\Sigma\beta_{hk} = 0$, and $\Sigma\gamma_{ik} = 0$.

[9]The Tobit regression model was used to eliminate the possibility of biased ordinary least square estimates where the dependent variable and error terms in the regression format are truncated normal variables (Amemiya 1973).

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