



Financial sector liberalization, bank privatization, and efficiency: Evidence from Pakistan

Emilia Bonaccorsi di Patti ^{a,*}, Daniel C. Hardy ^b

^a *Banca d'Italia, Research Department, Via Nazionale 91, 00184 Rome, Italy*

^b *IMF, Monetary and Financial Systems Department, 700 19th St. NW, Washington, DC 20431, United States*

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Abstract

The Pakistani banking system has been transformed over the past 15 years through liberalization, the entry of private banks, the privatization of public-sector banks, and the tightening of prudential regulations. The effects of these changes on bank productivity and relative efficiency are investigated using various techniques. Bank productivity in terms of profits has increased, and new entrants have been efficient, but the dispersion of efficiency remains wide. The privatized banks improved their profit efficiency in the period immediately following their privatization, but in the subsequent years only one significantly improved its efficiency, whereas the other did not differentiate itself in terms of efficiency from the remaining state-owned banks. The new private domestic banks generally proved to be among the most efficient, and sometimes out-performed the foreign banks.

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* Corresponding author. Address: Banca d'Italia, Servizio Studi, Via Nazionale 91, 00184 Rome, Italy.
E-mail addresses: ebonacco@chicagogsb.edu (E. Bonaccorsi di Patti), dhardy@imf.org (D.C. Hardy).

1. Introduction

A large number of industrialized, developing and transition countries have liberalized their banking and financial systems over the past two decades (see [Fanelli and Medhora, 1998](#), for a survey). These reforms have included such measures as the licensing of private domestic banks, the lifting of barriers to foreign entry, the privatization of public financial institutions, the introduction of market-based securities, the liberalization of interest rate restrictions and the removal of quantitative controls on lending. The principal aims have generally been to raise both the level and the efficiency of the allocation of investment, and to enhance the provision of financial services to all sectors of the economy.

Given the importance of the financial sector and its influence on other sectors, evaluating the degree to which these aims were achieved is important. However, in many countries, and especially in developing countries, convincing evidence regarding this issue is only now accumulating. One source of evidence is the behavior of macroeconomic variables such as savings and investment rates and real growth, which may have changed following financial sector reforms.¹ The main drawbacks of this approach lie in the difficulty of isolating the effects of financial market reforms, the small number of observations typically available for any one country, and the heterogeneity of experiences across countries.

Evidence is also available from analyses of the financial sector itself, and on assessments of changes in the structure and performance of the sector following reform. Where data at the microeconomic level are available, the pre- and post-reform performance of banks and other financial institutions can be observed. In particular, it is possible to estimate the effects of reforms on productivity, costs, revenues and profitability of the financial institutions in the country. When reform has included also privatization of some institutions, the availability of microeconomic data is particularly valuable, because changes in the performance of individual institutions or groups of institutions can be related to changes in their ownership and governance.

The approach based on econometric methods to estimate efficiency and productivity changes has been followed by [Grabowski et al. \(1994\)](#), [Berger and Mester \(2003\)](#), and [Humphrey and Pulley \(1997\)](#), for example, in looking at the US experience with bank deregulation, and by [Lozano-Vivas \(1998\)](#) for Spanish banks. Fewer econometric studies of the effects of reform on the financial sector are available for developing countries ([Gilbert and Wilson, 1998](#), and [Leightner and Lovell, 1998](#), are early examples), mainly because of the lack of microeconomic data. Generally, the results in these studies suggest that financial sector reform does enhance financial sector efficiency, although in many instances profit (and revenue) performance improves more than cost efficiency. Liberalization does not necessarily lead to a reduction in the dispersion of relative efficiency. In a freer environment, banks with good management may have more scope to pull ahead of the others.

¹ Examples include [Johnston and Pazarbasioglu \(1995\)](#), and, specifically regarding Pakistan, [Khan and Aftab \(1994\)](#) and [Khan and Hasan \(1998\)](#).

These findings are consistent with the results of studies employing other performance measures. Public sector banks are usually found to be among the least efficient (e.g. Berger et al., 2005), and countries with banking systems with large shares of state ownership are found to be associated to poor economic performance (e.g. La Porta et al., 2002; Barth et al., 2004). Domination of the financial system of developing countries by state-owned banks may lead to lower GDP growth, less intermediation, and lower employment in smaller enterprises (Berger et al., 2004). Privatization tends to be followed by some performance improvements, both in developing (Nakane and Weintraub, 2005; Beck et al., 2005; Haber and Kantor, 2005) and developed countries (e.g. Owens et al., 2000).

The approach that focuses on the performance of the financial sector to evaluate the effect of reform does have certain limitation. At a general level, much of the benefit of reform may accrue to others outside the sector, such as clients who receive higher quality services, higher returns on savings, and better access to financing. Measurement difficulties are also common, and apply not only to the quality of outputs and inputs but also to such activities as loan assessment. In many cases, as in Pakistan before the 1990s, problem loans are often rolled over, with past losses recognized only after reform. Hence, the benefits of reform may take time to fully emerge. Another problem is that the effect of privatization may be difficult to distinguish from the effect of reforms more generally, and from the effect of foreign ownership, because in many countries the privatized banks were acquired by foreign investors (Bonin et al., 2005). Foreign-owned banks in developing nations are usually found to have superior performance compared to domestic institutions, and the expansion of branches or subsidiaries of foreign banks can have a large and generally positive effect on a banking system (Claessens et al., 2001).

In the present study, we evaluate the impact of the banking system reforms introduced during the 1990s in Pakistan, which included the privatization of a significant share of bank assets and the licensing of private banks, together with improved supervision, higher capital requirements, and other institutional and regulatory changes. The banking system reform was part of more general reform of the financial system and monetary management. Hence, the performance of the entire banking system as a whole is likely to have been affected in two ways. First, reforms modified the general business conditions under which banks operate, by deregulating interest rates, eliminating directed credits, liberalizing foreign currency deposits, and introducing market-based government securities. Second, changes in management and ownership, more intense competition in the sector, new regulations on recognizing impaired loans and provisions for their recovery, etc., are likely to have changed the productivity of banks.

To evaluate the effects of reform we perform two separate analyses. The first analysis focuses on the impact of the reforms on the average costs and profits of banks. We measure the total changes in average costs and profits prior and post reform, and decompose them into those attributable to productivity shifts and those due to changes in business conditions, following the methodology proposed by Berger and Mester (2003). The change attributable to productivity thus estimated includes

movements of the best practice and changes in the average efficiency of banks, i.e. the distance with respect to the industry best practice.

Since the reforms are likely to have affected some banks more than others, in the second analysis we estimate individual efficiency scores of banks, i.e. measures of performance relative to the best practice frontier, and compare the average efficiency across bank types (state-owned, privatized, domestic private and foreign banks) and over time. Banks that were privatized may be expected to have improved their relative performance, compared to those that have remained state-owned. Also, effects on pre-existing institutions may differ from those on new entrants because they were subject to different constraints.

Both analyses employ bank level data from 1981 to 2002. We consider a pre-reform period (1981–1992), a period after the first wave of reforms (1993–1997), and a third period when major new reforms were introduced (1998–2002). Given that outliers may exert an undue influence on estimation results in the relatively small sample available, we apply the Least Absolute Deviation (LAD) estimator in addition to the OLS and GLS estimators to fit the profit and cost functions, and compare the results.

Section 2 outlines the recent evolution of the Pakistani banking system and the reforms introduced starting in the late 1980s. Section 3 explains the two estimation procedures used and defines the data set. The results are presented in Section 4, and Section 5 concludes.

2. The evolution of the Pakistani banking system

In the pre-reform period, the activities of the financial sector in Pakistan were largely directed by the government as a means to implement its development strategy. The domestic banks had all been fully nationalized and consolidated in 1974 with the objectives of directing bank credit towards specific sectors and ensuring government funding. Foreign banks continued to operate but held a small market share and a limited number of branches. In the second half of the 1980s, the share of bank assets that were controlled by the government through six national banks was over 90% (Table 1). The residual market share was held by roughly 25 foreign banks (including representatives of major international banks), operating in urban areas and niche markets; their branching was limited by regulation.

Banks were given detailed instructions on the allocation of credit to specific sectors and to finance the general government, and a plethora of administrative interest rates were set for various purposes. Fees were also regulated in detail. Prudential regulation, particularly capitalization and provisioning requirements, were weak. In this environment, banks had little incentive and scant means to mobilize additional savings, reduce operating costs, or make lending decisions based on creditworthiness.

Reforms of financial markets and banking sector activities were initiated in the late 1980s (see Appendix, Khan and Aftab, 1994; Ul-Haque and Kardar, 1995; Ul-Haque, 1997, and State Bank of Pakistan, 2003). The system of administered interest rates was streamlined and loosened starting in 1989–1990. The share of

Table 1
Bank loans and deposits, shares by type of bank

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<i>Advances</i>											
State-owned	92.0	75.6	68.6	68.7	62.8	58.6	55.5	49.7	49.9	51.4	50.1
Privatized	0.0	14.4	15.5	14.7	16.5	17.5	17.6	17.3	17.8	17.7	17.9
Domestic private	0.0	0.0	3.2	4.1	6.1	8.8	10.0	12.3	12.8	12.8	15.1
Foreign	8.2	10.4	13.1	12.5	14.8	15.3	17.2	20.7	19.6	17.9	16.7
<i>Deposits</i>											
State-owned	93.0	75.7	69.7	66.1	63.5	61.1	57.0	53.1	54.9	56.6	56.3
Privatized	–	14.0	15.6	16.0	16.8	17.6	17.0	16.8	16.8	18.0	17.4
Domestic private	–	–	2.9	4.1	5.2	7.0	8.2	10.3	10.6	10.5	12.3
Foreign	7.0	10.3	11.6	13.8	14.6	14.2	17.7	19.8	17.7	14.8	14.1

Source: State Bank of Pakistan (2003).

credit directed to particular sectors was reduced in 1989, and bank-by-bank credit ceilings eliminated in 1992. New prudential regulations were introduced in 1989 and strengthened in 1992, while the State Bank of Pakistan (the central bank) enhanced its supervisory capacity. A system of auctioning government securities was established, and regular auctions for six-month bills and longer-term bonds began in 1991 (Hardy, 2000). The Pakistani authorities also liberalized exchange controls, permitting starting in 1990 the opening of foreign currency deposits by both residents and non-residents. Balances in these accounts grew rapidly, especially in the foreign banks.

The authorities sought to liberalize access to the financial sector by licensing domestic private banks starting in 1991. Ten new private Pakistani banks were licensed in 1991, and other private banks entered later. In addition, two state-owned banks (Muslim Commercial Bank and Allied Bank of Pakistan), accounting for 14% of the loan market, were privatized in stages: the privatization of Muslim Commercial Bank began with the sale of 26% of the shares to the private sector in 1991. In January 1993, a further 49% of the shares were divested and control was transferred to the buyers. The privatization of Allied Bank Limited started with the sale of 26% of the shares following the “Employee Stock Ownership Plan”; the control of the banks was transferred to the Employee Management Group. A further 25% of the shares were sold to the private sector in 1993 (see State Bank of Pakistan, 2003). A minority stake in United Bank was sold in 1993.² By 1997, there were still four major state-owned commercial banks, but they faced competition from 21 domestic banks (including the two privatized banks) and 27 foreign banks. Although a moratorium on new banks was introduced in 1995, the opening of new branches by the

² In 1997, a 100% controlled subsidiary of Habib Bank Limited, named Habib Credit and Exchange Bank Limited, was privatized through the sale of 70% of shares to a strategic buyer. Subsequently, the bank was renamed Bank Alfalah Limited. In most of the literature on Pakistan, this sale is not considered as a privatization, presumably because HCEB was not one of the six nationalized banks.

new private banks and the foreign banks was eased.³ The state-owned banks were required to close unprofitable branches and were prevented from opening new branches (State Bank of Pakistan, 2003).

The asset share of state-owned and privatized banks diminished to 70%; the remaining nationalized banks alone held about half of banking system assets. The new private domestic banks increased their market share to 10% of loans by 1997. The foreign banks had also increased their market share, but they remained focused on wholesale business and larger, internationally known clients (Mian, 2004).⁴

Another structural break occurred in 1997–1998. From the end of 1997, banks were required to maintain an 8% minimum risk-weighted capital ratio, and loan classification and provisioning requirements were tightened. This led to the recognition of large loan losses, especially in the state-owned banks. The State Bank of Pakistan was also empowered to set guidelines for the recovery of bad or doubtful loans, and launched a program that included an amnesty scheme, the establishment of new banking courts for the recovery of loans, and the strengthening of the asset recovery departments of the state-owned banks. As a result of market and supervisory pressure, starting from September 1997, three of the state-owned banks and the two privatized banks introduced plans to reduce staff and close unprofitable branches.

These structural reforms were disrupted by renewed macroeconomic difficulties in 1998–1999, which involved depreciation and balance of payment difficulties. Importantly, the convertibility of foreign currency deposits was suspended, which was especially detrimental to the foreign banks that held a large share of these deposits. Macroeconomic conditions have since improved, as has bank performance, but the profitability of the banking sector has remained low until recently, with high costs not being fully compensated by increased revenues. Additional structural reforms in the financial sector have been initiated. For example, United Bank was sold by tender to a foreign group in late-2002, and minority stakes in Habib Bank and the National Bank of Pakistan were sold in several transactions during 2001–2003.⁵

3. Empirical design

3.1. Measurement and sources of changes in profits and costs

The regulatory and structural changes affecting the financial sector in Pakistan may be expected to have created strong incentives for all banks to cut costs and gen-

³ The moratorium was motivated by the authorities' concern over the proliferation of banks. One effect of this moratorium was to preclude new foreign entry.

⁴ From 1997, a foreign bank wishing to enter the Pakistani market was required to incorporate as a domestic bank under local law and regulations. A foreign bank already operating in Pakistan could retain its old status, or be converted into a local commercial bank, subject to a requirement that the foreign ownership share be no more than 49%. From 2001, foreign banks were allowed to open up to 25 branches, and in 2004 this limit was raised to 50.

⁵ The privatization of Habib Bank was completed after the end of the sample period. First Women's Bank is treated as a nationalized bank because it is jointly owned by the nationalized banks.

erate more revenue, increasing the average productivity of the industry as a whole. However, intensified competition might also have driven down monopoly rents, reducing bank profits. The reforms have also affected some of the business conditions under which banks operate, such as interest rates and the composition of bank portfolios (reforms of operations of monetary policy, credit ceilings etc.). Some of the effects of reforms may have been offset by adverse macroeconomic conditions in the post-reform period. In addition, the imposition of stricter prudential regulation and supervision led to the recognition of past bad loans on the books of the largest banks.

Given the scope and depth of reforms in Pakistan, rather than focusing solely on privatization and the performance of the privatized banks, it is more appropriate to evaluate the systemic effects on of all the reforms on the banking sector as a whole. The relative performance of groups of banks, including the privatized banks, is evaluated separately employing efficiency measures.

Since the reforms could have had quite different effects on costs and profitability, we follow Berger and Mester (2003) and Kumbhakar et al. (2001) and measure the performance of banks using the concepts of both profit and cost productivity, rather than focusing on measures based on output levels.⁶ Because no one reform measure was decisive, we prefer to compare performance across periods and across types of banks defined by regulatory and other structural features, rather than to single out individual events.

The first step is to compute gross changes in profits and costs and separate them into: (i) changes in productivity, which includes the effects of movements of the best-practice and changes in the average efficiency of individual institutions (distance from the best-practice); and (ii) changes in business conditions. To this end, the relevant profit or cost function needs to be estimated for different periods and compared over time, and then changes allocated to the two broad categories of effect. We consider the alternative profit function in which profits are maximized given output levels, input prices and other business conditions, instead of the standard profit function (Berger and Mester, 1997). The standard profit function is based on the assumption that firms are price takers in all markets, output prices are well measured, and firms can easily adjust output levels. However, in the case of Pakistan, some market power may influence prices, especially in rural markets. Moreover, the high level of aggregation of outputs and the computation method of their prices is such that measurement error in prices may be large. Finally, especially in the pre-reform period, banks could not freely adjust output levels because of regulatory constraints, so a model in which banks have fixed outputs and adjust prices seems more suitable.

In each period τ , the alternative profit function can be written as

$$\ln(\pi_{it} + \theta_\tau) = f_\pi(y_{it}, w_{it}, z_{it}, v_t) + \ln u_{\pi i} + \ln \varepsilon_{\pi it}, \quad (1)$$

⁶ Revenue performance is implicit in the difference between profit and cost performance.

where π_{it} is the variable profits of bank i in year t . The term θ is a scalar that is added to every bank's profits before taking the logarithm to correct for negative values of profits. Variable profits are a function of a vector of outputs y , a vector of variable input prices w , a vector of fixed netputs z (inputs or outputs), and environmental and structural variables v . The term $u_{\pi i}$ is a bank-specific efficiency term that represents the reduction in bank i 's profits due to persistent “ X -inefficiency,” and is thus constant across the estimation period. The bank that has the highest $u_{\pi i}$ is presumed to be located on the best-practice profit efficiency frontier. The term $\varepsilon_{\pi i}$ represents a random error that is assumed to be multiplicatively separable from the rest of the profit function.

Denoting two periods by s and t , the change in the average practice profit function can be written as

$$\begin{aligned} \Delta \text{TOTAL}_{\pi} &= \hat{\pi}_s(\bar{x}_s) - \hat{\pi}_t(\bar{x}_t) = [\hat{\pi}_s(\bar{x}_s) - \hat{\pi}_s(\bar{x}_t)] + [\hat{\pi}_s(\bar{x}_t) - \hat{\pi}_t(\bar{x}_t)] \\ &= \Delta \text{BUSCON} + \Delta \text{PROD}, \end{aligned} \quad (2)$$

where $\hat{\pi}_{\tau}$ is the predicted profit function in period τ ($\tau = s, t; s > t$) setting the explanatory variables x_{τ} (including the $u_{\pi i}$ term) at their average value for the industry in each period.⁷ As shown in Eq. (2), the total change in the predicted profits for the average bank (ΔTOTAL) can be decomposed into two components. The first component (ΔBUSCON) is due to the change in the business conditions (x_{τ}) for the average bank. It is given by the difference in predicted profits from the average practice function estimated for period s , evaluated using the different business conditions of period s versus period t . The second component is the change in productivity (ΔPROD) resulting from the changes in the estimated parameters of the function and in the average efficiency of the industry. It is computed as the predicted profit from the average-practice function in period s applied to the business conditions from period t , minus the predicted profits from the average practice function from period t applied to business conditions in period t .

The change in productivity includes the effect of shifts in the best-practice profit frontier and those of changes in inefficiency, i.e. the average distance of banks' profits from the best-practice. These two components can be further decomposed as in Berger and Mester (2003). However, in the case of Pakistan, given the limitation of the data, we prefer to estimate only the change in productivity without carrying out the full decomposition. The average efficiency is estimated separately, as described in Section 3.2. In the analysis below, data for s and t are panels, and we employ the estimated function in each period to compute the decomposition of the total change into ΔBUSCON and ΔPROD for the average bank between the different periods.

⁷ The changes can be computed as ratios of levels of predicted profits (Berger and Mester, 2003). We prefer computing them as a differences in percentage points rather than ratios because in some cases one of the two components is negative and a ratio of the two would not be easy to interpret. In addition, our predicted profits and costs are expressed as a percentage of total assets, so it is intuitive to interpret the results as differences in percentage points.

Profit performance is a more comprehensive measure than cost and revenue performance because it includes both effects. Some reforms may have the effect of raising costs, but could be beneficial to both bank owners and bank clients if higher costs reflect improved service quality. Investing more in screening loans may likewise increase both costs and revenues, besides improving the allocation of credit. It is possible that banks before reform achieved relatively low measured costs but low profitability because they “skimp” on such tasks as loan monitoring and risk management.

Yet, financial sector reform might have a modest impact on banks’ profitability if, for example, greater pressure to achieve cost efficiency were offset by more intense competition and lower margins. In this case, the welfare gain from financial sector reform may accrue not so much to bank shareholders as to the users of bank services. We examine the effects of reform also on costs, estimating the total change and its decomposition, following the same method described for profits. The cost function, based on the assumption that output levels and input prices are given and the firms optimize choosing input levels, can be specified as

$$\ln(C_{it}) = f_C(y_{it}, w_{it}, z_{it}, v_{it}) + \ln u_{Ci} + \ln \varepsilon_{Cit}. \quad (3)$$

The change in costs can be decomposed in the same way as for profits into the change in cost productivity and the change due to the difference in business conditions.

3.2. Efficiency estimation

The change in profit or cost productivity can be the result both of firms becoming on average more efficient over time, and of improvements in the best-practice banks. Certain reforms are likely to have affected some banks much more than others. In addition, for Pakistan it could be the case that average productivity is strongly influenced by the behavior of a small number of banks that experienced significant losses. Hence, we evaluate separately the efficiencies of different types of institutions and compare them over time.

Since we have panel data for each subperiod, we follow the “distribution free” method to compute individual bank efficiency measures (Berger, 1993). This method assumes that efficiencies are relatively stable over time whereas random errors average out. Efficiencies are obtained by averaging the residuals from the pooled estimation of the profit function (and the cost function) for each subperiod over which efficiency and the regulatory environment are assumed to be stable.⁸ A reasonable number of degrees of freedom are available to estimate each equation, and the distributional assumptions required are relatively weak.

In the case of the profit function estimation, the efficiency score of bank i is defined as the deviation of the predicted profits of bank i from the predicted profits

⁸ In the literature the equation is often estimated each year separately and the error term for each bank is averaged across periods to obtain an estimate of that bank’s efficiency. The pooled estimation was dictated by the small number of banks in Pakistan.

of a best-practice bank facing the same exogenous conditions. We compute the score as

$$EFF_{\pi i} = \frac{\hat{\pi}_i}{\hat{\pi}_{\max}} = \frac{\left\{ \exp \left[\ln \hat{f}(\bar{x}_i) \right] \times \exp \left[\ln \hat{u}_i \right] \right\} - \theta_{\tau}}{\left\{ \exp \left[\ln \hat{f}(\bar{x}_i) \right] \times \exp \left[\ln \hat{u}_{\max} \right] \right\} - \theta_{\tau}}. \quad (4)$$

The predicted profits are evaluated at the mean of each bank over time. Cost efficiency is computed as ratio of the minimum value of the average residual to the average residual of bank i :

$$EFF_{C_i} = \frac{\hat{C}_{\min}}{\hat{C}_i} = \frac{\exp \left[\ln \hat{u}_{\min} \right]}{\exp \left[\ln \hat{u}_i \right]}. \quad (5)$$

The difference between the efficiency scores and unity represent the loss in potential profits, or the excess in potential costs that each bank could recover if it were fully efficient under the same exogenous conditions. Efficiency scores can be compared across types of banks in each subperiod. We also compare the efficiency scores and efficiency ranks of the privatized banks before and after privatization.

3.3. Data and definitions of variables

Data were obtained from various editions of the publication *Money and Banking Statistics* issued by the State Bank of Pakistan, which contains annual information on the main balance sheet entries and revenue and expense items for all banks operating in Pakistan. The full sample covered the period from 1981 through 2002. We divide the sample into three subperiods, the first covering the years 1981–1992 before privatization and removal of constraints on bank operations, a second 1993–1997 period, by when the privatization and liberalization had taken effect, and 1998–2002 after other reforms.⁹ We separate the second from the third period because the latter is characterized by a further tightening in prudential regulations, macro-economic disturbances and associated institutional changes (such as the restriction on foreign currency deposits), which may have affected bank performance.

Data were collected on licensed banks for which adequate time series were available. Several specialized credit institutions were excluded from the sample, as they were subject to different regulations and may have operated in distinct markets. For 1982–1997, the sample includes seven state-owned banks, of which two were privatized in 1991–1992, 22 foreign banks, and four private domestic banks, for which reliable data begin in 1993. For 1998–2002, the number of private domestic banks in the sample increases to 17. The published data were corrected for a number of manifest typographical errors, and a small number of outliers were identified and deleted, leaving a total sample of 545 observations.

⁹ The first subperiod could be further divided into a pre-reform period 1981–1987, and a reform period 1988–1992. The results of interest turned out not to be qualitatively very different when this refinement is adopted, and for the sake of brevity are not reported.

A question that arises in the study of banks concerns how to identify bank output since banks generally provide a variety of intermediation and transaction services, and often these activities are bundled together. We follow the “intermediation approach” (Sealey and Lindley, 1977), in which liabilities are considered as inputs and assets are considered as outputs. Labor, physical capital and other operational items are considered as inputs that generate costs. Financial equity capital is considered as a quasi-fixed input because it changes slowly and because its price is difficult to measure (see Berger and Mester, 1997). Certain indicators of a bank’s main lines of business, such as its reliance on interbank funds and foreign currency deposits, may also be treated as quasi-fixed.

Given the limitations of the available data,¹⁰ we use two indicators of bank output, namely, loans and advances (y_1), and other earning assets (y_2), which comprise holdings of government securities and bills purchased and discounted, balances with other banks, and other investments. Similarly, we use a comprehensive indicator of financial inputs (purchased funds), defined as the sum of deposits and amounts due to other banks. The unit price of purchased funds (w_1) is defined as total interest expenses and fees divided by total purchased funds. A further distinction between different financial prices is not possible because interest and fee costs are aggregated in the reported data. In addition, we are not able to account for the quality of output, in part because loan loss provisions are not separated from other non-specified costs in the earlier data.¹¹

We modify the standard intermediation approach because of the lack of data on the number of employees to measure labor costs per employee. We assume that non-interest operating costs are incurred both in acquiring earning assets and in obtaining funds as inputs, including providing services to depositors. Therefore, we include non-interest unit costs, given by wage and administrative expenses divided by the sum of earning assets and payable liabilities (w_2).¹² We treat the sum of equity capital and reserves (z_1) as a fixed netput, since capital is an alternative to deposits and interbank borrowing in the financing of the bank’s operations. Finally, we include fixed assets as another fixed netput (z_2).

For each bank, the prices of earning assets and purchased funds are computed as exogenous market prices, given by the weighted average of prices of other banks, where the weights are given by the market shares of the relevant input or output. All financial variables are in 1995 national currency (deflated by the CPI). The variables used are summarized in Table 2, which also includes summary statistics. The evolution of some of the main variables is shown in the figures.

¹⁰ Assets and liabilities, and costs and revenues are reported with a high level of aggregation. In addition, the published classification of assets and liabilities and income statement items has changed over time so that further aggregation was necessary to have data comparable across 1982–1997 and 1998–2002.

¹¹ When regulations were tightened in Pakistan, banks had to make a stock adjustment in provisions for losses incurred over many past years.

¹² One might want to exclude depreciation and rent from variable costs, but in the data set used here these items cannot be distinguished from other items such as lighting and telephone charges, which are variable costs.

Table 2
Variables employed in the profit and cost functions

Variable	Pre-reform period: 1981–1992		First reform period: 1993–1997		Second reform period: 1998–2002		
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	
No. of observations	249		140		156		
	(Millions of Pakistani rupees, deflated by CPI; 1995 = 1)						
<i>Π</i>	Profits before tax	272	436	338	702	403	2064
<i>C</i>	Costs	2429	4724	3264	6,009	5595	9,494
TOTA	Total assets	39,900	78,200	44,600	83,100	64,800	123,000
<i>y</i> ₁	Loans	13,000	24,800	13,400	25,200	28,900	50,800
<i>y</i> ₂	Other earning assets	11,900	24,700	15,100	30,500	21,400	43,800
<i>z</i> ₁	Equity capital	1056	2152	1283	1920	4082	7763
<i>z</i> ₂	Fixed assets	82	159	166	485	1031	2120
		(Rates)					
<i>w</i> ₁	Price of purchased funds	0.060	0.004	0.070	0.007	0.046	0.012
<i>w</i> ₂	Unit operating cost	0.016	0.008	0.013	0.005	0.015	0.007
<i>w</i> ₃	Money market rate	0.076	0.011	0.108	0.013	0.085	0.017
GDPGR	Annual real GDP growth (percent)	6.216	1.115	3.458	1.586	3.781	0.994
FXDEP	Foreign currency deposits at banks/total deposits	0.045	0.094	0.325	0.059	0.229	0.087
DEPB	Borrowed funds from banks/ total purchased funds	0.170	0.142	0.106	0.072	0.217	0.185

Source: Money and Banking Statistics, State Bank of Pakistan, various years.

We employ a general definition of profits, defined as profits before tax, given by total revenues minus total costs, because variable profits cannot be computed from the available data. Total costs *C* are given by the sum of interest costs and fees, wage and non-wage operating expenses plus other expenditures. The latter includes in the later period provisions for loan losses, which are not reported separately in the earlier periods. For this reason we include as variable costs the item “other costs,” although we cannot determine if they are variable or fixed.

In the profit and cost functions, profits, costs and prices are normalized by the money market interest rate (*w*₃) to impose linear input price homogeneity. Although not necessary, the constraint is imposed on the profit function as well. This normalization is also an implicit way to control for differences over time in the regulated interest rates first, and in market conditions later.

In all specifications, profits, costs, outputs and fixed netputs were divided by total assets (TOTA) in order to account for differences in size between institutions and control for heteroskedasticity. In an alternative specification (not shown) we normalized by equity capital. We prefer the normalization by total assets because in Pakistan capital requirements and provisioning regulations were tightened considerably during the sample period, and the state-owned banks received periodic capital injections.

We included the real rate of growth of GDP (GDPGR) as a proxy for macroeconomic factors, and the ratio of foreign currency deposits to total deposits (FXDEP)

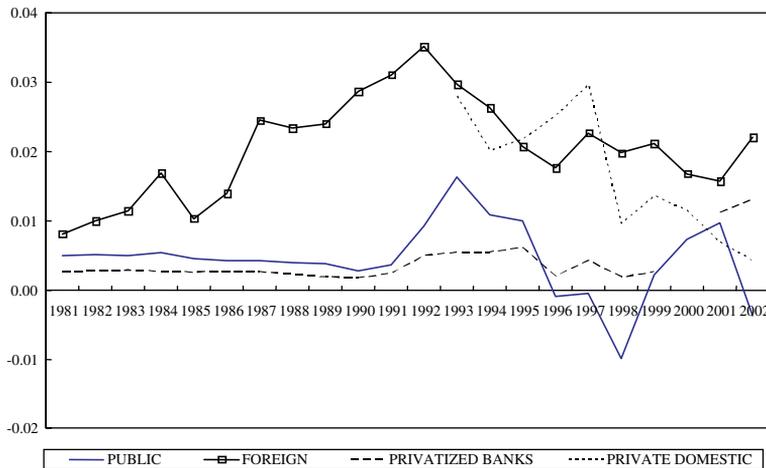


Fig. 1. Total profits to total assets.

as a proxy for the relative importance of foreign currency deposits. Foreign currency deposits and the corresponding foreign currency assets constituted an important source of revenue for certain banks in certain periods, but their use was restricted after 1998. Only aggregate data on FXDEP are available. We also included the ratio of funds borrowed from other banks to deposits (DEPB) for each bank as an indicator of a bank’s specialization in wholesale rather than retail operations. Since information on non-performing loans is not available for the entire period, we cannot control for shifts in aggregate risk.¹³

Fig. 1 depicts the paths of profits for different categories of banks, relative to their total assets. It is apparent that profitability became more variable, notably around the time of the 1998–1999 macroeconomic shocks. The profitability of foreign banks and private domestic banks has tended to decline. The privatized and state-owned banks showed increased but rather volatile profitability after 1992. An incipient recover in profitability can be detected in 2001–2002. Figs. 2 and 3 illustrate the pattern of revenues and costs. The period after 1992–1993 is characterized by a rise in both costs and revenues. The foreign banks initially had relatively low costs, but seem to have converged following the reforms. The banks that were privatized do not appear to have been very different from the other public sector banks before the reforms, but subsequently their revenues rose relatively quickly. The new private banks had comparatively low costs and low revenues in first two years of activity, but then caught up.¹⁴ Fig. 4 shows the rise in capitalization ratios as regulations were tightened.

¹³ In addition, the aggregate level of non-performing loans would be problematic because it would be strongly influenced by the series of reforms tightening loan classification.

¹⁴ Ul-Haque and Kardar (1995) and State Bank of Pakistan (2003) contain further discussion of the balance sheet and revenue and expenses ratios of banks in Pakistan.

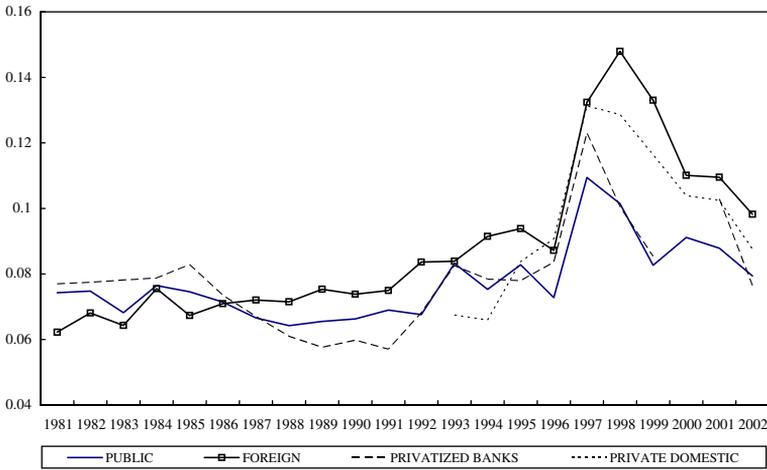


Fig. 2. Revenue to total assets.

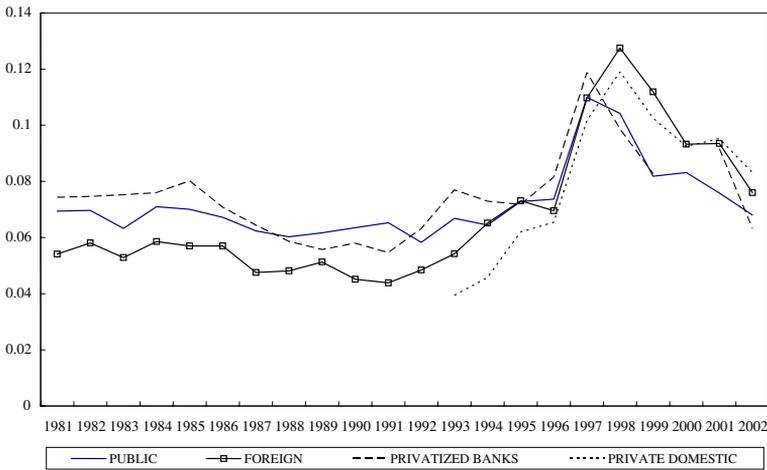


Fig. 3. Costs to total assets.

3.4. Model specification and estimation

The available data impose a particularly parsimonious specification of the profit cost functions, since we estimate the functions for each of the three periods separately (respectively, 1981–1992, 1993–1997 and 1998–2002). We use a simplified translog functional form.¹⁵ Thus, for the full sample, Eq. (1) is assumed to take the form:

¹⁵ The limited number of observations available preclude the adoption of a more flexible specification.

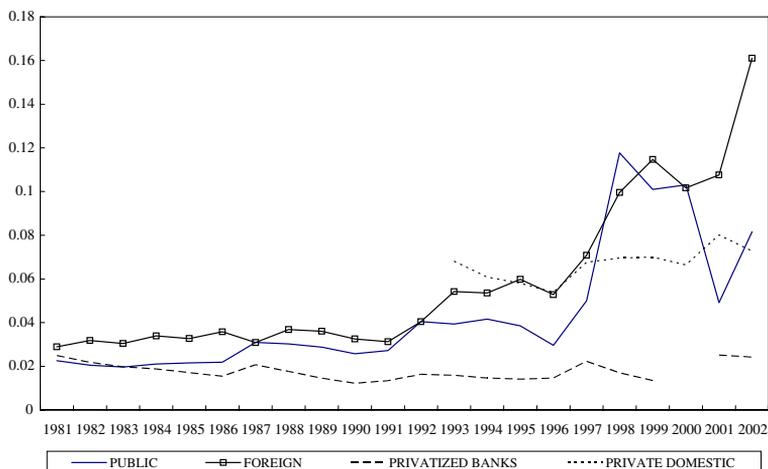


Fig. 4. Equity to total assets.

$$\begin{aligned}
 & \ln[(\pi/w_3 \text{TOTA}) + \theta] \\
 &= \alpha + \sum_{i=1}^2 \beta_i \ln(w_i/w_3) + \frac{1}{2} \sum_{i=1}^2 \sum_{j=1}^2 \beta_{ij} \ln(w_i/w_3) \ln(w_j/w_3) \\
 &+ \sum_{i=1}^2 \gamma_i \ln(y_i/\text{TOTA}) + \frac{1}{2} \sum_{i=1}^2 \sum_{j=1}^2 \eta_{ij} \ln(y_i/\text{TOTA}) \ln(y_j/\text{TOTA}) \\
 &+ \delta_1 \ln(z_1/\text{TOTA}) + \delta_2 \ln(z_2/\text{TOTA}) + v_1 \ln \text{GDPGR} + v_2 \ln \text{DEPB} \\
 &+ v_3 \text{FXDEP} + v_4 \text{FXDEP} \cdot \text{FORBK} + \ln u_\pi + \ln \varepsilon_\pi, \tag{6}
 \end{aligned}$$

where the variables y , w_i , z_i are those described in Section 3.2; time and bank subscripts have been dropped for clarity. We include an interaction term between FXDEP and a dummy variable (FORBK) equal to 1 for foreign banks, 0 otherwise, because the foreign banks are known to have been especially active in the market for foreign currency deposits during the 1990s. The equation for the cost function is similar. The scalar θ is added to the profits of each bank to be able to take logs even when profits were negative and is equal to the minimum value of profits in the period plus unity. We dropped the cross-products between the y_i and w_i , between w_i and z_i , and between y_i and z_i to have sufficient degrees of freedom.

We estimate the profit and cost functions for each of the three subperiods, pooling observations of all banks, without regard to their efficiency levels, to obtain average-practice results. The model is estimated by OLS, as is standard in the distribution-free approach, and also by LAD.¹⁶ Given that panel data is available, we also

¹⁶ In the standard application of the distribution-free method, a different function is estimated cross-sectionally for every year of data. The number of banks in Pakistan is so small that the data have to be pooled.

estimate the profit and cost equations by GLS, modeling the efficiency term as a bank random effect and accounting for heteroskedasticity and autocorrelation in the error terms. In this model the average residual over time coincides with the estimated individual random effect.

4. Results

4.1. Overall estimation results

We estimated the profit and cost functions for the three subperiods including all banks for which data were available to obtain the average practice profit and cost functions. For the sake of brevity we do not report the estimated functions, but a few results are worth pointing out. Overall, the fit is satisfactory for all three periods considering the relative parsimony of the specification, with R^2 ranging from 0.30 to 0.60. Higher R^2 statistics are achieved for the cost function than for the profit function. The estimated coefficients on most of the exogenous variables (prices and quantities) are insignificant due to collinearity in the translog specification. The coefficient of GDP growth is generally not statistically significant.¹⁷ The estimated derivatives show that, on average in this period, the increase in foreign currency deposits was associated with a decline in profitability, but the marginal effect was smaller for the foreign banks. In the first two subperiods, the variable DEP_B has a negative and statistically significant coefficient in the cost function, that is, interbank funding is correlated with lower costs.

4.2. Decomposition of changes in profits and costs

The estimated average-practice functions are used to estimate and decompose changes in productivity across periods, based on Eq. (2), for profits and costs. We add a factor to correct predicted values so that they are equal to the sample means in each period before performing the decomposition.¹⁸

As shown in Table 3, average industry profits relative to assets increased between the pre-reform period (1981–1992) and that after the first round of reforms (1993–1997), but then declined in the third period (1998–2002). The decomposition indicates that profit productivity rose significantly between the pre-reform and the second period, but business conditions contributed to an opposite effect, albeit of a

¹⁷ In another specification (not shown), we included among the environmental variables the Herfindahl index of deposits but our results did not change qualitatively. We prefer to exclude it because deposit and loan markets were likely geographically segmented in Pakistan, particularly in rural areas, and we cannot compute local market concentration. The national concentration index would capture the increase in the number of institutions and the effect of other variables that are strongly trended, but not necessarily the degree of competition faced by banks.

¹⁸ This procedure is used by Berger and Mester (2003). We use an additive factor instead of a multiplicative factor because in some cases the latter would be negative when predicted profits are negative.

Table 3
Decomposition of changes in average profits

Period	Profits			Costs		
	OLS	GLS	LAD	OLS	GLS	LAD
CHANGE 1998–2002/1981–1992 (Second reform period compared to pre-reform period)						
ΔTOTAL	–0.42	–0.42	–0.42	4.32	4.32	4.32
ΔPROD	1.16	0.60	0.21	5.15	5.65	1.22
ΔBUSCON	–1.58	–1.02	–0.64	–0.82	–1.33	–1.11
CHANGE 1998–2002/1993–1997 (Second reform period compared to first reform period)						
ΔTOTAL	–0.72	–0.72	–0.72	2.47	2.47	2.47
ΔPROD	1.58	1.28	–0.18	4.59	4.42	3.61
ΔBUSCON	–2.30	–2.00	–0.55	–2.12	–1.95	–1.14
CHANGE 1993–1997/1981–1992 (First reform period compared to pre-reform period)						
ΔTOTAL	0.30	0.30	0.30	1.85	1.85	1.85
ΔPROD	3.24	3.88	1.99	–0.83	–0.76	–1.11
ΔBUSCON	–2.94	–3.58	–1.69	2.69	2.61	2.96

Changes are expressed in terms of percentage points of total assets and are evaluated at the sample means. ΔTOTAL is the difference between average profits as a percentage of total assets in the two periods.

slightly smaller magnitude. This result is consistent across estimation methods although the magnitudes of the changes due to productivity and business conditions are smaller when the profit function estimated with LAD is employed.

The decomposition yields somewhat inconsistent results across estimation techniques when the second and the third subperiods are compared. The OLS and GLS results point towards an increase in profit productivity, whereas the LAD results suggest a modest decline in productivity after 1997. All three estimation methods yield a negative contribution from the change in business conditions between the second and the third subperiod. Note that, according to all estimators, changes between the second and third period are smaller than those between the first and the second, which suggests that the first round of reforms had the major impact, or that later reforms possibly did not yet have their full effect during the sample period.¹⁹ The recognition of non-performing loans and the increase in provisioning have likely had a major impact on profitability in the third period, and the high level of aggregation of the data does not make it possible to control for the effect of past lending policies.

The average bank has increased its costs per unit of assets by more than 4 percentage points between the first and the third subperiod (Table 3). More than half of the change has occurred between the second and third subperiods, after the reforms. The decomposition of the total change into productivity and business conditions shows that the average bank increased its cost productivity between the pre-reform (1981–1992) and the second subperiod (1993–1997), as the average costs per unit of total assets have declined by 0.8 percentage points. However, cost productivity

¹⁹ There are indications that bank performance continued to improve in more recent years.

deteriorated after 1997. The dynamics of business conditions were unfavorable between the first and second subperiods, pushing average costs upwards, and favorable thereafter, but have not fully offset the decline in cost productivity.

The differences between the behavior of profits and costs imply that the total change in revenues has been positive. Changes in business conditions (mainly input prices and output quantities) contributed to the increase in revenues between the first and the second subperiod, and revenue productivity increased in both the second and third subperiods for the average bank. The weight of evidence suggests that profit productivity has tended to increase, while improvements in measured cost productivity were limited to the first round of reform. Again, the increase in costs following the deterioration in productivity could be due to the tighter provisioning requirements in the third period as bank performance seems to have improved after the end of the sample period.

4.3. Efficiency

In the second step of the analysis, we estimated the average deviation from best practice (*X*-inefficiency) in terms of profits and costs. In particular, we computed individual institution efficiency scores for each of the subperiods based on the residuals from the profits and cost functions, which are estimated jointly for all banks employing Eqs. (4) and (5), respectively. In all cases, higher scores indicate greater efficiency and the best-practice bank has a score equal to unity. We then averaged the individual scores by type of bank to assess how the reform affected their relative efficiency. We would expect that reform have the least effect on foreign banks whereas they should have improved the efficiency of state-owned banks and especially the privatized banks under new management. Nevertheless, liberalization could also have widened scope for dispersion in performance because of the loosening of constraints on portfolio allocation and other aspects of banks' business activities.

As shown in Table 4, over 1981–1992, when only public sector and foreign banks operated, estimated average cost inefficiency is of the order of 20% for all types of banks. Profit inefficiency shows greater dispersion than cost efficiency across bank categories (it is also larger on average, which is not surprising given that profits are of an order of magnitude smaller than costs). The average efficiency score of foreign banks is the highest.²⁰ The banks that eventually were privatized had the lowest cost and profit efficiency. Here, as for the later periods, the OLS and LAD results are usually closer to each than to the GLS results, although the differences are not large.

In the second subperiod (Table 4), average inefficiency of foreign banks remains more or less stable. These banks are on average less profit efficient than the new private domestic banks (though by most measures the most efficient bank is foreign). Their cost efficiency is comparable. The profit efficiency of state-owned banks improves on average, even if some of these banks have negative efficiency (meaning that

²⁰ Given the small number of observations we cannot perform *t*-tests on the means.

Table 4
Average efficiency by type of bank

	Method	Foreign		State-owned		To be privatized			
		Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.		
Pre-reform period: 1981–1992									
Profits	OLS	0.61	0.27	0.33	0.26	0.18	0.04		
	GLS	0.49	0.24	0.22	0.21	0.10	0.03		
	LAD	0.57	0.26	0.32	0.27	0.17	0.04		
Costs	OLS	0.80	0.10	0.82	0.07	0.77	0.04		
	GLS	0.81	0.11	0.81	0.09	0.74	0.05		
	LAD	0.82	0.10	0.84	0.07	0.80	0.05		
Number of banks		22		4		2			
		Domestic Private		Foreign		State-owned		Privatized	
		Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
First reform period: 1993–1997									
Profits	OLS	0.65	0.28	0.55	0.28	0.26	0.38	0.29	0.06
	GLS	0.66	0.29	0.56	0.30	0.25	0.36	0.24	0.03
	LAD	0.60	0.25	0.56	0.29	0.25	0.36	0.28	0.06
Costs	OLS	0.83	0.07	0.83	0.10	0.83	0.12	0.82	0.03
	GLS	0.83	0.07	0.82	0.11	0.83	0.13	0.81	0.02
	LAD	0.76	0.06	0.74	0.11	0.75	0.11	0.72	0.01
Number of banks		5		18		4		2	
Second reform period: 1998–2002									
Profits	OLS	0.01	0.88	0.39	0.27	0.03	0.29	0.22	0.27
	GLS	-0.02	1.00	0.42	0.30	0.04	0.28	0.28	0.34
	LAD	0.03	0.65	0.37	0.28	0.06	0.23	0.17	0.20
Costs	OLS	0.77	0.09	0.81	0.12	0.88	0.07	0.84	0.09
	GLS	0.74	0.09	0.79	0.12	0.87	0.08	0.82	0.08
	LAD	0.78	0.10	0.82	0.12	0.87	0.05	0.87	0.07
Number of banks		16		17		4		2	

they waste more than 100% of their potential profits). It should be noted that minimum costs are achieved by a state-owned bank (in the OLS and GLS models) despite low profit efficiency; as mentioned, this may be because of “skimping” on risk management, etc. in the pre-reform period. The two privatized banks have higher profit efficiency in this period, but their cost efficiency is roughly the same as in the previous period, and similar to that of the average of the remaining state-owned banks. Thus, the first round of reforms had effects in line with expectations and with the findings in other studies (e.g. Berger et al., 2005).

The dispersion of efficiency is very high in the third subperiod. The number of banks facing losses and negative profit efficiency is higher than during 1993–1997. The cost efficiency of the private domestic banks declines, and their average profit efficiency falls, due to some banks with large negative profits. A similar pattern is observed for the foreign banks, although their average efficiency remains higher than the domestic private banks, and for the state-owned banks and privatized banks.

Overall, cost efficiency is only slightly lower than in the previous period. The best practice is achieved by foreign and domestic private banks. The higher dispersion in the efficiency scores in 1998–2002 is consistent with the intuition that the liberalization of interest rates and credit ceilings, combined with considerable macroeconomic volatility, gave room for different portfolio choices of banks; in the early, highly regulated period, all banks of one type tended to cluster around similar behavior.

Since efficiency scores are obtained from residuals of the estimated functions, their magnitude is influenced by the ability of the function's specification to describe the data. It could be the case that, in the later period, the profit function is estimated with less precision because of changes in the treatment of non-performing loans and provisioning, which are likely to have affected banks in a heterogeneous way. In order to obtain a more robust measure, we compare the ranking of banks across efficiency measures and over time. As shown in Table 5, the efficiency ranks are highly correlated across estimation methods, although the correlations are somewhat lower in the later period, when all variables were subject to larger shocks.

The correlations among variables are more diverse and shift over time. In the period 1981–1992, cost and profit efficiency ranks show a positive correlation of around 0.35; for the period 1993–1997, cost efficiency ranks are negatively correlated with profit efficiency ranks; in the period 1998–2002, cost and profit ranks are uncorrelated. These results suggest that pre-reform profitability was largely determined by success in minimizing costs; after reform, there is more divergence, and the allocation

Table 5
Correlation among efficiency ranks

	Profit OLS	Profit GLS	Profit LAD	Cost OLS	Cost GLS	Cost LAD
Pre-reform period: 1981–1992						
Profit-OLS	1.00					
Profit-GLS	0.99	1.00				
Profit-LAD	0.98	0.98	1.00			
Cost-OLS	0.37	0.34	0.39	1.00		
Cost-GLS	0.38	0.35	0.41	0.97	1.00	
Cost-LAD	0.38	0.34	0.41	0.97	0.97	1.00
First reform period: 1993–1997						
Profit-OLS	1.00					
Profit-GLS	0.99	1.00				
Profit-LAD	0.99	0.99	1.00			
Cost-OLS	-0.25	-0.20	-0.23	1.00		
Cost-GLS	-0.23	-0.18	-0.21	1.00	1.00	
Cost-LAD	-0.24	-0.19	-0.24	0.93	0.95	1.00
Second reform period: 1998–2002						
Profit-OLS	1.00					
Profit-GLS	0.98	1.00				
Profit-LAD	0.99	0.99	1.00			
Cost-OLS	0.03	0.00	0.00	1.00		
Cost-GLS	0.03	-0.01	-0.01	0.98	1.00	
Cost-LAD	0.03	0.04	0.02	0.94	0.91	1.00

Table 6
Efficiency ranks of privatized banks

	Bank 1		Bank 2		Number of banks in sample
	Profit efficiency rank	Cost efficiency rank	Profit efficiency rank	Cost efficiency rank	
1982–1992	25	15	16	22	28
1993–1997	21	17	23	14	33
1998–2002	32	20	13	7	38

Note: The ranks are averages of ranks obtained with OLS, LAD and GLS.

of funds across different assets becomes more important. The variation in these correlations underscore the importance of looking at more than one dimension of bank performance, especially when input and output quality cannot be measured: banks that are more efficient in terms of costs may be so because they are producing outputs of low quality; banks that are more profit (and revenue) efficient are better at generating value added even if they employ more resources to do so.

Ranks can be employed to evaluate the change in relative performance of the two privatized banks (Table 6). Averaging ranks over estimation methods, one of the banks at first improved its profit efficiency rank after privatization, but lost position in the last sub-period, largely due to a drop in its cost efficiency rank and a deterioration in revenue performance compared to the other banks. The second bank, in contrast, increased its rank in terms of cost efficiency and eventually also profit efficiency. Indeed, in the last period included in our sample, the second privatized bank was ranked much higher than the remaining state-owned banks (the best state-owned bank ranked 20th in profit efficiency), mainly because of better revenue performance.²¹

Allowing for the increase over time in number of banks in the sample, privatization seems on balance to have improved the relative performance of the banks concerned, and especially one bank. Most of the improvement was on the revenue side. The different relative performance of the two privatized banks may reflect the different modes of privatization because one bank was sold to strategic investors and the other to insiders.

5. Conclusions

Financial market deregulation and liberalization has transformed the banking systems of a large number of countries over the last two decades, and especially in some developing countries. Pakistan was one such country which, starting in 1988, very substantially de-regulated interest rates and the allocation of credit, liberalized entry into the sector, privatized major state-owned banks, and introduced modern prudential regulation and supervision.

²¹ Considering Bank Alfalah (former Habib Credit and Exchange Bank Limited) as a privatized bank, we can compare its ranking between 1993–1997 and 1998–2002. Before privatization, the bank was ranked 6th in terms of profit efficiency and 15th for cost efficiency. After privatization, the ranks became: 23rd and 14th, respectively.

The two empirical analyses presented in this paper attempt to measure the effects of the financial sector reform on the profit and cost productivity of the Pakistani banking sector, and on the efficiency of groups of banks (state-owned, foreign, private domestic and privatized). To assess these effects, profit and cost functions are estimated, on which basis the total change in these variables is decomposed into variations in productivity and business conditions. In addition, measures are obtained of the efficiency of banks and how they changed over time. Different estimation techniques were used (OLS, GLS, and LAD); the productivity decomposition and the efficiency estimates were generally robust to the technique used.

The results suggest that the first round of financial market reform in 1991–1992 led to a moderate increase in profits due to an increase in profit productivity that more than offset the negative effects of changes in business conditions. The higher profitability was the result of revenues increasing more than costs compared to the period before the reforms; cost-cutting does not seem to have been a major phenomenon. Whether this reflects higher quality, greater availability and variety of products goes beyond the scope of what is feasible with the banking data available, particularly in the case of Pakistan.

It is more difficult to derive conclusions for the period after 1997. In the more recent years, the data show much greater variability over time, a number of banks recorded substantial losses, and the dispersion in profits across types of banks increased substantially. The source of this variability includes not only macroeconomic disturbances, but also the imposition of banking regulation that required full and early recognition of doubtful and bad loans (much of the increase in costs is included in extraordinary items in the income statement) and substantial restructuring at several major banks. Under these conditions, the ability of the profit and cost models to predict actual average bank behavior is not fully satisfactory. The empirical analysis shows a decline in profitability in 1998–2002, due to a negative contribution from business conditions that more than compensated an increase in profit productivity after the second round of reforms. The increase in costs is attributable to a decline in cost productivity greater than the reduction in cost attributable to changed business conditions.

The comparison of average efficiency by group of banks shows that, in all three periods, state-owned bank are the least efficient, consistent with the findings in the literature.²² The privatized banks improved their profit efficiency in the period immediately following their privatization; in the last period, one of the two significantly improved its efficiency, whereas the other did not differentiate itself in terms of efficiency from the remaining state-owned banks. The new private domestic banks generally proved to be among the most efficient, and sometimes out-performed the foreign banks.

Thus, the liberalization and reform, including the privatization of major banks, seems to have led to generally superior bank performance between 1993 and 1997.

²² These results are broadly comparable to those in Ali Rizvi (2001), who concentrates more on estimating economies of scale and scope in the later period.

The immediate impact of the second round of reform does not appear to have been as positive for banks because of the deterioration in business conditions and, most likely, the time lag before regulatory changes such as tighter policies on loan quality assessment and provisioning achieve their full effect.

Acknowledgments

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Appendix A. List of main banking sector reforms 1990–2000 (source: State Bank of Pakistan, 2003)

Privatization

1990 – The Banks (Nationalization) Act 1974 amended to pave the way for privatization of the nationalized commercial banks (NCBs).

April 1991 – The privatization of state-owned banks started with the sale of 26% of the shares of Muslim Commercial Bank to a consortium of industrialists. Another 49% shares were divested in two steps in February 1992 and January 1993 (25.9% to the public in an offering and 24% to the consortium that had acquired the first stake sold).

September 1991 – 26% of the shares of Allied Bank Limited were sold to the private sector (insiders). In 1993 further 25% of shares were sold to the private sector.

Opening of new banks

August 1991 – Permission was granted to open 10 private domestic banks and licenses were granted to three foreign banks. In later years, further eight domestic and three foreign banks were established.

Institutional strengthening

January 1990 – Setting up of Credit Information Bureau within the SBP to collect data on borrowers from the lending institutions in the country and disseminating it to banks and financial institutions.

August 1991 – National Credit Commission was set up to review the existing policy and institutional arrangements for the allocation and flow of credit in the economy.

January 1992 – The government extended supervisory jurisdiction of the SBP to the Non-Bank Financial Institutions (NBFIs) including leasing companies, investment banks and housing finance companies etc. The SBP set up the NBFIs Regulation and Supervision Department. In 1997, the then two Banking Inspection Departments and this department were restructured as three Banking Supervision Departments (BSDs).

January 1992 – SBP issued prudential regulations for banks that became mandatory in July 1, 1992.

February 1993 – The SBP was empowered to frame guidelines for facilitating recovery of bad and doubtful loans.

February 1994 – SBP was granted autonomy. Issuance of three more ordinances on January 21, 1997, which were approved by the parliament in May 1997, further strengthened this autonomy.

April 1995 – Effective from April 20, 1995, all NBFIs were required to be rated by a SBP approved rating agency. The same rule was extended to commercial banks in June 2000.

January 1997 – Banks meeting specific requirements would be eligible to offer fund management and other investment advisory services only through exclusive subsidiaries.

May 1997 – The Pakistan Banking Council (PBC), established to look after the affairs of the NCBs, was dissolved through an amendment in the Banks (Nationalization) Act, 1974.

August 1997 – SBP issued directives to banks to prepare accounts for the year ending December 31, 1997, in conformity with International Accounting Standards (IAS).

December 1997 – Banks were instructed to apply the system of risk-weighted capital, in line with the Basle Accord (8% capital requirement). Minimum paid up capital requirements of Rs. 500 million were imposed. This minimum paid up requirement for banks was doubled in December 2000 to Rs. 1000 million with half of the increase i.e. up to Rs. 750 million to be achieved by December 2002. CAMELS framework was adopted to ascertain the performance of banks and Non-Bank Financial Institutions on the basis of off-site and on-site surveillance.

May 1998 – The SBP made equity support to UBL amounting to Rs. 21 billion on May 4, 1998, and Rs. 9.7 billion to HBL on June 27, 1998.

1997–1998 – Downsizing and restructuring of state-owned banks and Development Finance Institutions. Public sector banks and DFIs were asked to prepare action plans for restructuring and downsizing of their organizations in order to reduce the financial intermediation cost. Accordingly, through various incentive schemes from 1997 to 1999, work force of these institutions was reduced from 99,954 to 81,079, while 815 loss-making branches were closed.

September 2000 – Establishment of Corporate & Industrial Restructuring Corporation (CIRC) to promote revitalization of the economy by reviving sick indus-

trial units. The CIRC will take over the non-performing loans of the national banks and the development finance institutions.

Non-performing loans

August 1992 – Directives were issued to banks for provisioning and classification of NPLs. The classification of loans includes the categories: substandard, doubtful or loss, depending on whether interest or principal is overdue. Provisioning against substandard, doubtful and loss loan categories were required to be made at the rate of 20%, 50% and 100% respectively.

November 1993 – Banks were directed to lay down quarterly recovery targets as percentage of the overdue obligation. They were also required to submit progress report on recovery in relation to targets set on quarterly basis.

February 1997 – In order to provide the necessary legal framework to expedite the recovery of bad and doubtful loans, the two existing recovery laws were repealed and replaced with a new comprehensive law, the Banking Companies (Recovery of Loans, Advances, Credits and Finances) Act 1997. The Federal Government established 34 banking courts to admit cases of loan defaults below Rs. 30 million. Cases above Rs. 30 million were assigned to judges from High Courts.

June 1997, December 1997 – SBP introduced two separate incentive schemes to provide opportunity to loan defaulters to pay their overdue loans and to reschedule and regularize the remaining amounts.

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