Post-liberalisation Efficiency and Productivity of the Banking Sector in Pakistan

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MOTIVATION FOR THE PRESENT STUDY

It has been long debated in economic literature whether financial markets play a significant role in economic growth and development. [For review see Gertler (1988) and Levine (1997)]. Findings of some recent empirical literature show that well-functioning financial system plays an instrumental role in economic growth, and the causality runs from finance to growth [for cross country evidences see King and Levine (1993, 1993a); Levine and Zervos (1998); Levine, Loayza and Beck (1999); Beck, Levine, and Loayza (1999)]. This, in turn, has led to a search for the key factors that determine the better functioning financial markets. Within the banking sector, efficiency is the core concern of both academics and bank officials. A number of studies have sought to measure the efficiency of financial institutions, to identify the factors that contribute to efficiency of financial system, and to recommend the ways to attain the peer group efficiency levels [Berg (1993); Leaven (1999); Berger and Mester (1997); Miller and Noulas (1996)].

These empirical findings suggest a healthy competitive financial market pave the way for efficient market participants that leads to overall efficiency of the system and hence productivity. Following this notion, liberalisation of financial markets has been initiated to improve the performance of financial institutions both in developed and developing countries. Some empirical tests have been carried out to measure the effects of liberalisation and deregulation of financial institutions on the efficiency and productivity of banking sector. The results of these studies vary across the

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countries. For review see, for example, Berger, Hunter and Timme (1993) and Kaparakis, Miller and Noulas (1994).

After liberalisation of seventies in United States, many studies have sought to measure banking efficiency [Miller and Noulas (1996); Kaparakis, Miller and Noulas (1994); and Elyasiani and Mehdian (1990)], but only two have explicitly related their finding with the liberalisation [Humphrey and Pulley (1997) and Berger and Humphrey (1991)]. Both the studies observe decline in banking efficiency but other studies come up with somewhat different findings. For example, Miller and Noulas (1996) found inefficiency to be 5 percent in large US banks, while other studies have reported efficiency losses are around 30 percent of the cost [Berger and Humphrey (1991); Berger, Hunter and Timme (1993) and Berger, Hancock and Humphrey (1993)]. Similar findings have been observed in Japan after financial liberalisation [Drake (2000); Fukuyama (1995)]. The efficiency in these countries is found out to be directly associated with leverage [Berger and Humphrey (1991)], but Leaven (1999) found that high leveraged private and family owned banks in five South Asian countries though efficient and profitable in pre-crises period, but after crises these banks were inefficient. In Europe, Deregulation after European economic integration has some positive impact on banking sector efficiency, except Italian banking sector record efficiency regress. But the efficiency gaps within countries have increased rather to converge [Casu and Molyneux (2000)]. The Norwegian banking has experienced productivity growth after deregulation and that mainly came from improvement in efficiency in small banks operation [Berg, Forsund and Jansen (1992)].

In Turkish banking industry, after financial liberalisation, efficiency regress has been reported. Moreover private and foreign owned banks did not perform better than the state owned banks [Denizer, Dinc and Tarmcilar (2000)]. In Tunisian banking sector after liberalisation no significant efficiency improvement have been observed but private owned banks were turned out to be more efficient than the public sector banks [Cook, Hababon and Roberts (2001)]. In China, efficiency gains have been observed [Bhattacharyya, Bhattacharyya, and Kumbhakar (1997)]. Recently Hardy and Patti (2001) came up with the findings that some efficiency improvements have been recorded in case of Pakistan. They also found that average cost X-inefficiencies are less pronounced than revenue X-inefficiencies. Further, the nationalised and denationalised banks were successful in gaining cost efficiency and hence profitability. This study use econometric technique that has some disadvantages as compared to mathematical technique.[1] Further, Berger, Hunter and Timme (1993) has noted

"The lack of correspondence among the efficiency levels and rankings for the different measurement approaches suggests that more research comparing this techniques is needed".

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[1]Discussed at length below, in Section IV.

Following these facts, we apply Data Envelopment Analysis (DEA) techniques to analyse banking sector efficiency in the post reform era of 1993–98. We compare our findings with that of Hardy and Patti (2001) and also look for the differences in results, if arise. Our conclusions may be helpful to policy-makers and bankers. To further analyse the results, we decomposed technical efficiency into pure efficiency component and scale efficiency component. In addition, we also test for factor productivity growth using Malmquist productivity index, which decompose productivity indices into efficiency change and technological change and than further break down efficiency change indices into pure technical change index and scale efficiency change index. To our knowledge, no prior study has been carried out to measure banking sector productivity growth in Pakistan.

The next section provides a brief overview of banking industry in Pakistan. Section III provides a theoretical link among financial liberalisation, efficiency and productivity of banking sector. In Section IV we discuss the methodological issues. Section V presents a debate on the selection of input output for the present study. Section VI analyses and interprets results. Finally the last section summarises findings of the paper.

1. AN OVERVIEW OF PAKISTANI BANKING SYSTEM

Like other developing countries, banking sector is the major source of funding to the non-financial sector. Within banking sector, the nationalised banks are playing major role in the process of financial intermediation. In early years of independence financial activity was largely in private sector but in early 1970s in drive to expand the public sector 13 banks were merged into 5 banks that remained under government control till late eighties.

The financial liberalisation programme was initiated in December 1998 with help of WB/IMF under Financial Sector Adjustment Loan (FSAL). The purpose was to reduce the fragmentation of financial markets and to develop capital market by, interalia, (i) establishing a more efficient public debt system; and (ii) allocating credit in response to market signals by raising concessional rates of interests and limiting directed credit schemes; and second, to strengthen the health and competitiveness of banking systems by (i) recapitalising and restructuring the Nationalised Commercial Banks (NCB's) and increasing their accountability; (ii) improving prudential regulations and supervision of financial institutions; and (iii) allowing private banks to enter the market [Ayub (1996)]. Though after financial liberalisation a number of new private and foreign banks have come into the market but their combined share is half of the total nationalised bank's share (see Table 1). The current structure of schedule banks in Pakistan is given in Table 1. Private scheduled banks and foreign banks are many in numbers but nationalised banks take most of the share of banking activity in Pakistan. The nationalised and denationalised scheduled banks take lead in covering the mass market with their large branch

Table 1

Structure of Pakistan's Banking Sector

Type of Schedule Bank	No. of Banks	Branches	Assets as Percentage of Total	Deposits as Percentage of Total	Advances as Percentage of Total
Nationalised Scheduled Banks	4	4696	49.3 %	53.0 %	48.7 %
De-Nationalised Scheduled Banks	2	2039	15.3 %	16.4 %	14.4 %
Specialised Banks	4	533	6.3 %	0.9 %	10.2 %
Private Scheduled Banks	15	553	12.1 %	12.0 %	10.0 %
Foreign Banks	21	82	16.9 %	17.6 %	16.6 %
Total	46	8003	100 %	100 %	100 %

Source: State Bank of Pakistan.

network, while private and foreign banks are concentrating in the large cities and in the centres of business activities.

The spread between weighted average deposit and lending rates has increased from 3.2 percent in 1988 to 7 percent in 1998 that reflect the increased inefficiencies in the system. Further, the average spread of foreign banks was 40 percent higher than the average spread of private domestic banks during 1998 and 1999 [KPMG (2000)]. The indicators of financial development show some improvement over the last few years [Khan (1995)]. Regarding management soundness of banking sector SBP annual report (2001) narrates 'given the qualitative nature of management, it is difficult to judge its soundness just by looking at financial accounts of the banks'. However, for the quick reference a few ratios may provide some crude idea about management quality (see Annex 1 for key ratio).

2. THEORETICAL LINK BETWEEN FINANCIAL LIBERALISATION AND EFFICIENCY AND PRODUCTIVITY GROWTH

In this section, we develop a theoretical link that how financial liberalisation leads to efficiency gains and productivity growth. There can be a number of sources by which financial liberalisation would lead to efficiency and productivity growth to the financial sector and then to the other sectors of the economy.

Firstly, the liberalisation of financial services paves the way for other market participants, private and foreign, within each sector. The enhanced competition forced them to reduce cost, diversify products through innovation, provide better services to client, broader the client base to minimise risk and to retain clients provide maximum return on their investment or lowest cost on their lending. This

ultimately leads to gains in efficiency and productivity of the overall sector and the one who remains inefficient finally leaves the market.

Second, financial liberalisation of dominated banking sector allows a parallel growth of equity and debt markets that further intensify the outside pressures and forced banks to review the cost of intermediation and thus leads to efficiency and productivity growth.

Thirdly, the reduced costs of financial intermediation along with better customer service and diversified products help in mobilising more saving that is than used to finance prudent investments. These efficient investments finally leads to greater productivity and hence GDP growth.

3. METHODOLOGY

The technical efficiency of a decision-making unit[2] (for our study a bank) is measured by deriving the locus of efficient production plans of best practising banks (called the efficiency frontier) and measuring the distance of input-output combination of each bank relative to this frontier. Scale efficiency is then measured by taking the difference from the best point on the efficiency frontier. In literature there are two techniques to measure efficiency frontier. One is econometric based parametric frontier technique proposed by Aigner, *et al.* (1977). The other is mathematical non-parametric linear programming technique, called Data Envelopment Analysis (DEA).

There are, however, a few benefits and limitations of both techniques. Former is based on the assumption that some maximising behaviour is present that can be estimated through some functional form (like cost, profit and production etc.). But there is no priori ground for making such assumption, and therefore non-parametric approach may be preferred [Button, *et al.* (1992)]. Moreover, till now there is no agreed functional form,[3] therefore, one remain in doubt about the true efficiency estimate as results may be mudded with mis-specification of econometric model. Lastly, it is also difficult to use stochastic frontier technique when one is dealing with multiple input and multiple outputs. The benefit of using stochastic frontier techniques is that they address econometric issues by incorporating noise in the model, thus allowing noise to be isolated from inefficiencies. Also, the stochastic frontier technique can be used to measuring allocative inefficiency, when price data is available.

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[2]Decision-making unit (DMU) is the standard term used in efficiency literature for banks. But hereafter we use Bank(s) instead of DMU(s) for the ease of the reader.

[3]See for example, Mc-Allister and Mc-Manus (1993) as evidences to note that Translog and Box-Cox functional form does not perform well in estimating scale and scope efficiencies. Berger and Mester (1997) conclude that Fourier Flexible is superior in estimating efficiencies as compare to Distribution Free Approach and Translog. Also see Altunbac and Chakravarty (2001) who find that Fourier Flexible is not good in predicting efficiency/inefficiency.

The Data Envelopment Analysis (DEA) seeks to measure the efficiency of a bank relative to other similar banks with simple restriction that all banks lie on or below the efficient frontier [Seiford and Thral (1990)]. The benefits in using DEA are that (1) input prices and cost information, that are usually difficult to obtain, are not required, (2) it identify targets based on peer group performance to become efficient, (3) it also identifies the sources of inefficiencies, productivity and growth. Finally, it is important to note that DEA technique is not without its own limitations. Major criticism of DEA is that it does not allow noise and therefore is not insensitive to outliers.

For practical purposes technical efficiency can be described as the ability of the firm to maximise output from a given set of inputs, or minimise inputs while achieving same level of output. In former, one deals with minimising cost without reducing output level, while the latter emphasis in increasing output subject to given cost level. Each entails a different approach to measure technical efficiency. The literature suggests input oriented approach for cost reducing efficiency frontier and output oriented approach for output maximising efficiency frontier. In the present paper both the input-oriented and the output-oriented efficiency approaches have been adopted.[4] The two approaches help in understanding the desired policy action subject to constraints.[5] To calculate technical efficiency we estimate Equation (2), given below, and to isolate pure technical efficiency from scale efficiency we add a restriction to the same equation (see scale efficiency section).

To calculate productivity indices we applied Malmquist productivity index approach that decomposes productivity change into technical efficiency change and technical progress change. The idea of Malmquist productivity index was initially proposed by Caves, *et al.* (1982) in the parametric frontier framework. Based on their work, Berg, *et al*. (1992) extended the idea of the Malmquist index to non-parametric frontier. The Malmquist productivity index seeks to compare the performance of a bank between period t and t + 1, relative to technology at period *t*.

This approach is based on a solution of a sequence of linear programming (LP) problems. We describe output oriented Malmquist productivity index as:[6]

$$M_0\left(Y_{t+1}, X_{t+1}, Y_t, X_t\right) = \left[\frac{D^{o^t}(X_{t+1}, Y_{t+1})}{D^{o^t}(X_t, Y_t)} \times \frac{D^{o^{t+1}}(X_{t+1}, Y_{t+1})}{D^{o^{t+1}}(X_t, Y_t)}\right]^{\frac{1}{2}} \quad \dots \quad (1)$$

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[4]Although in literature input efficiency have largely been addressed, but Berger, Hancock and Humphry (1993) and English, *et al*. (1993) find out output inefficiencies account for 25 percent in US banking industry.
[5]The two approaches produce same results for overall efficiency but different results emerge when scale and pure components are isolated.
[6]Input oriented Malmquist productivity index can defined on the same lines.

Where, Mo = Malmquist index; X = Input Matrix; Y = Output Matrix; Do = Distance Function; t = Time. Equation (1) represents the productivity of bank at point (X_{t+1}, Y_{t+1}) relative to point (X_t, Y_t). This Malmquist index is infact a geometric mean of Cave, *et al.* (1982) proposed Malmquist productivity indices at time t and $t+1$. To interpret result if $M > 1$ than it indicate growth in productivity from period t to $t+1$, which itself result form either growth in technical efficiency or technological progress or even product of both.

To calculate Equation (1) we have calculated four LP problems each for four-distance function in Malmquist index. We begin by assuming that there are 'k' banks and each bank utilises varying amount of 'n' different input to produce 'p' different outputs. It is assumed that each bank must consume inputs and produce some positive outputs and therefore Y and X are non-negative column vectors of outputs and inputs respectively. In matrix form $Y_{(t)}$ would represent $(p \ X \ k)$ matrix of observed outputs and $X_{(t)}$ would denote $(n \ X \ k)$ matrix of observed inputs for each year (t). With these notations we follow constant returns to scale (CRS) output oriented LP to solve four Distance functions.

$$[D^{o^t}(X_t, Y_t)]^{-1} = Max_{\theta,\lambda}\theta$$
$$St$$
$$-\theta y_{i,t} + Y_t \geq 0,$$
$$x_{i,t} - X_t\lambda \geq 0,$$
$$\lambda \geq 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

The remaining three LP problems can easily be form on the same line:

$$[D^{o^{t+1}}(X_{t+1}, Y_{t+1})]^{-1} = Max_{\theta,\lambda}\theta$$
$$St$$
$$-\theta y_{i,t} + Y_{t+1} \geq 0,$$
$$x_{i,t+1} - X_{t+1}\lambda \geq 0,$$
$$\lambda \geq 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

$$[D^{o^t}(X_{t+1}, Y_{t+1})]^{-1} = Max_{\theta,\lambda}\theta$$
$$St$$
$$-\theta y_{i,t+1} + Y_t \geq 0,$$
$$x_{i,t+1} - X_t\lambda \geq 0,$$
$$\lambda \geq 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

$$[D^{o^{t+1}}(X_t, Y_t)]^{-1} = Max_{\theta,\lambda}\theta$$

St

$$-\theta y_{i,t} + Y_{t+1} \geq 0,$$

$$x_{i,t} - X_{t+1}\lambda \geq 0,$$

$$\lambda \geq 0 \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (5)$$

Note that θ and λ for above four LPs may take different values and all of four LPs must be calculated for each DMU in the sample. Malmquist productivity index of Equation (1) can further be decomposed into two components.

$$M_o^{t,t+1} = \left(\frac{D_o^{t,t+1}(Y_{t+1}, X_{t+1})}{D_o^t(Y_t, X_t)}\right)\left[\left(\frac{D_o^t(Y_t, X_t)}{D_o^{t+1}(Y_t, X_t)}\right)\left(\frac{D^{o^t}(Y_{t+1}, X_{t+1})}{D^{o^{t+1}}(Y_{t+1}, X_{t+1})}\right)\right]^{1/2} \quad \ldots \quad (6)$$

$$M_o^{t,t+1} = E_o^{t,t+1} \times TC_o^{t,t+1} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (7)$$

Where, $E_o,t+1$ measures change in technical efficiency between period t and $t+1$, while $TC_o,t+1$ measures change in production technology that shift production frontier in two periods. Thus, Malmquist productivity index measures productivity growth/regress that results from two components, namely efficiency improvement/ decline and technological progress/regress.

Scale Efficiency

To isolate scale efficiency index and pure technical change index from technical change index we add a convexity restriction $(N1/\lambda)$[7] to Equations (2) and (3). Thus by adding two additional LPs for each bank we can decompose constant return to scale (CRS) technological efficiency change index into scale efficiency and 'pure' technical efficiency indices also called variable return to scale (VRS) efficiency.

Mathematically

$$TE_{CRS} = TE_{VRS} X SE \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (8)$$

Where; TE_{CRS} = Technical efficiency; TE_{VRS} = Pure technical efficiency; and

SE = Scale efficiency.

From Equation (8), we get

$$SE = TE_{CRS} / TE_{VRS} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (9)$$

Similarly we can isolate pure efficiency index from scale efficiency change index, with only the difference that *TE* score is replaced with *TE* change index both for constant return to scale and variable return to scale.

[7]Where N1 is a NX1 vector of ones.

4. INPUT OUTPUT SPECIFICATION

Input and output specification is critical to banking efficiency studies [Berg, *et al.* (1992)]. Input output specification itself depends on how one defines banking activity. Economists look at bank from five different angles (for review of different approaches and how they are applied in the empirical literature [see, for example, Favero and Papi (1995) and Colwell and Davis (1992)]. These approaches are (1) production approach, (2) intermediation approach, (3) asset approach, (4) user cost approach, and (5) value added approach.

Followers of production approach view banks as producers of deposits and loans, by employing labour and capital. Thus, input output specification is clear. This approach has been applied in early banking studies [for example, see English, *et al.* (1993); Elyasian and Mehdian (1990) and Sherman and Gold (1985)]. Another commonly used approach in the literature is the intermediation approach, which view banks as intermediators of financial resources. Here, banks are seen as to make expenditures (interest, labour and other operating) to collect deposits, and convert those deposits into earning assets like loans and securities. Within the intermediation approach deposits are sometime treated as inputs [Miller and Noulas (1996)], while other studies take deposits as output [Resti (1997)]. Some midway approaches have also been adopted by dividing deposits into produced and purchased, which are then treated as output and input respectively [Berger and Humphery (1991)]. This approach has been most widely applied in the recent literature [See for example, Laeven (1999); Denizer, *et al.* (2000) and Drake (2000)].

In this paper we utilise intemediation approach. In our definition, banks undertake labour expenditure, interest expenditures and other operating expenditure to intermediate between savers and investors and hence collect deposits, issue loans and make investment in securities.[8]

5. DATA AND RESULTS

For the present study we have taken data for the post reform period of 1993-98 (six years) for 37 scheduled banks in Pakistan from Banking Statistics of Pakistan 1998-99 published by the State Bank of Pakistan.[9] These banks are selected in the sample because complete series of data for these banks was available (a prerequisite for Malmquist technique). Many data editing have been done for the typographical errors. During the course of estimation equation 2–5, we have generated information on eight indicators of efficiency and productivity. Technical efficiency (TE), pure

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[8]Labour expenditures is the summation of establishment cost and director's fee, while other expenditures are obtained by subtracting labour and interest expenses form total expenditures.

[9]We exclude period 1989–92, because major reforms were undertaken in that period and banks were struggling for their establishment. For names of the banks in the sample see Appendix 2.

technical efficiency (PTE), scale efficiency (SE), total factor productivity change index (TFPCH), technical efficiency change index (EFFCH), technological change index (TECHCH), pure efficiency change index (PECH) and scale efficiency change index (SECH).

Figures describing technical efficiency[10] performance of Pakistan's banking sector are presented in Fig. 1 and Fig. 2. The descriptive statistics of both output oriented and input oriented technical efficiency and its components—pure technical and scale efficiency score—is given in Table A-1 and Table A-2 (respectively) in Appendix 3.
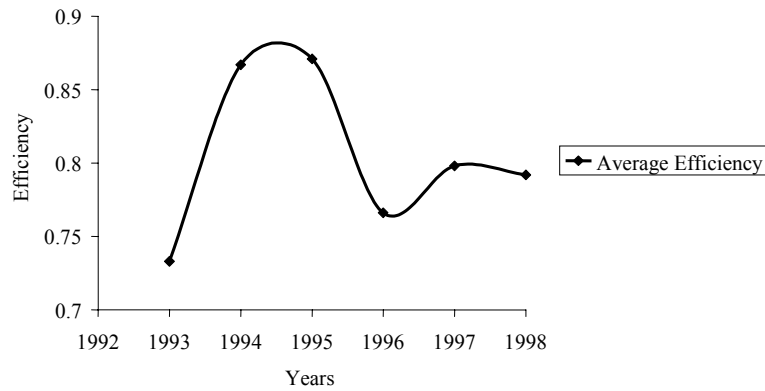
Fig. 1. Technical Efficiency of All Banks.
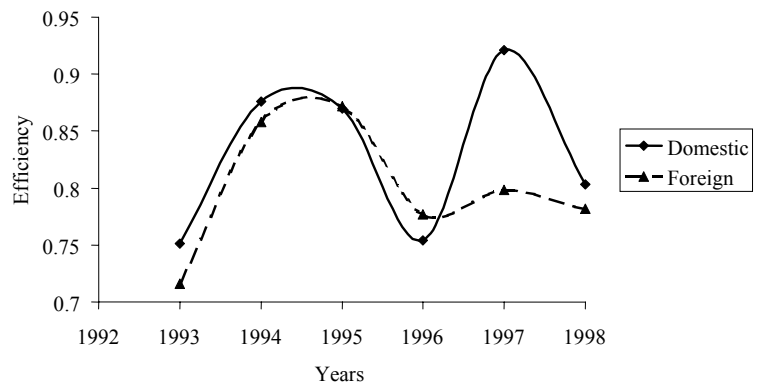
Fig. 2. Comparison of Technical Efficiency.

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[10]From here after, for this section, the word 'efficiency' refer to technical efficiency, except otherwise mention.

The inefficiency in the banking sector was largest in 1993 that stand with an average of 26.7 percent and lowest in 1995 with average of 87.1 percent. On average the inefficiencies in the banking industry for the six-year tuned out to be 18.6 percent. The efficiency trend is marginally declining but no final conclusion can be drawn due to huge year to year variation. But one trend is quite clear that, on average, the foreign owned banks were poor performers.

Since average numbers do not tell the whole story therefore we divide the efficiency score into three different groups. Good performers (efficiency range (eff) eff > 0.9), average performers (0.75 < eff < 0.9) and poor performers (eff < 0.75). Than we analysed that how many banks were actually the source of inefficiency for the whole sector. The number of banks in each group, their type (ownership) and share is given in Table 2.

Table 2

Breakdown of Inefficiency into Different Groups

Years	Avg. Ineff.	Domestic No.	Domestic Share	Foreign No.	Foreign Share	Total No.	Total Share
		A Eff > 0.9					
1993	27	5	1	6	0	11	1
1994	13	10	8	10	3	20	11
1995	13	11	5	10	5	21	10
1996	23	6	2	7	2	13	4
1997	14	13	2	6	4	19	6
1998	21	9	6	6	9	15	15
Avg.	16	8	3.4	6	3.3	14	6.7
		B 0.9<Eff < 0.75					
1993	27	4	7	1	2	5	9
1994	13	4	11	4	15	8	26
1995	13	2	6	3	9	5	15
1996	23	2	4	2	5	4	9
1997	14	3	9	4	14	7	23
1998	21	2	5	5	11	7	16
Avg.	16	2	6	3	8	5	14
		C Eff > 0.75					
1993	27	9	37	12	53	21	90
1994	13	4	31	5	31	9	62
1995	13	5	38	6	37	11	75
1996	23	10	45	10	42	21	87
1997	14	3	20	8	51	11	71
1998	21	7	30	8	41	15	80
Avg.	16	5	28.7	7	36.4	12	66.4

Source: Author's estimates.

Note: Avg. ineff refer to average inefficiency in each year.

Share is given in percent and share in each group is rounded to whole number.

As it is evident from the table most of the inefficiencies are caused by only a few of the banks. Roughly 77 percent of overall inefficiency are due to on average 14 banks. Certainly these banks are not same for all six years but most of the time these were the foreign owned banks. Within domestic banks nationalised and denationalised banks either fall into A or B groups. The local banks are performing marginally better, in each group, than the foreign banks.

Among 10 most efficient banks, over last six years, 6 were domestic and 4 were foreign, while among 10 least efficient banks only 3 were domestic and 7 were foreign. Contrary to the general thinking we find that, on average, National Bank of Pakistan (NBP), Habib Bank of Limited (HBL) and United Bank Limited (UBL),[11] were among 10 efficient banks. While in 10 least efficient banks two were specialised banks that may turn out to be inefficient because they do not make efforts to bring deposits, which we have taken as output in efficiency measurement. On the basis these results we can say liberalisation financial institutions successful to the extent that it stimulated the efficiency of domestic banks and nationalised banks especially experience performance growth, while foreign banks are the poor performers.

Average pure technical efficiency performance of Pakistan's banking industry is graphically represented in Fig. 3–5.

Out of total 18.6 percent inefficiency component of pure efficiency was found out to be 10.5 percent for the six years. Component of pure inefficiency was larger in 1993 and 1996 with an average inefficiency of 15.9 percent and 15.8 percent respectively for two years. Component of pure inefficiency was larger due to foreign bank than domestic banks with a share of 9.3 percent out of 17 percent for domestic banks and 11.6 percent out 20 percent for foreign banks. As represented by two overlapping gridlines of efficiency that the result does not vary significantly with input oriented approach, both for total and when decompose by ownership.[12]

Again among 10 most efficient banks 7 were domestic and 3 were foreign banks, while among 10 least efficient banks 4 were domestic and 6 were foreign. The analysis suggests foreign banks were both overall and pure inefficient compare to their counterpart domestic banks and financial liberalisation seems to result in efficiency gains for domestic banks only.

Average scale efficiency performance of Pakistan's banking industry is graphically represented in Fig. 6–8.

Out of total 18.6 percent inefficiency component of scale inefficiency, on average, was found out to be 9 percent, which is relatively smaller than pure inefficiency. These findings give support to earlier findings that scale issues are not

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[11]Though the performance of UBL has declined during last two years.

[12]Since it appeared that results are unaffected by input or output oriented approach, therefore, we decide to report only those results in the text that have been generated through output orientated approach. One may refer Appendix 4 for input oriented results.
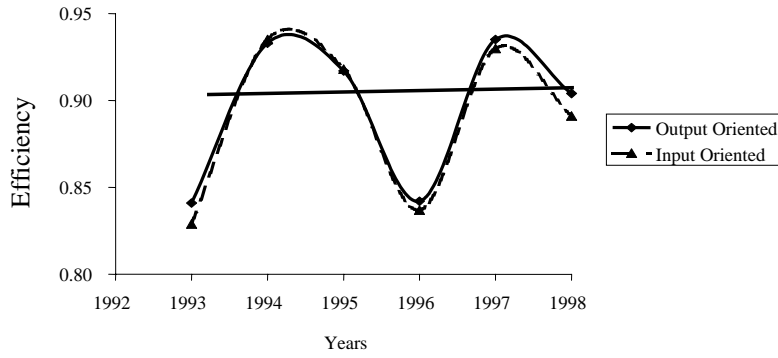
Fig. 3. Pure Technical Efficiency of all Banks.
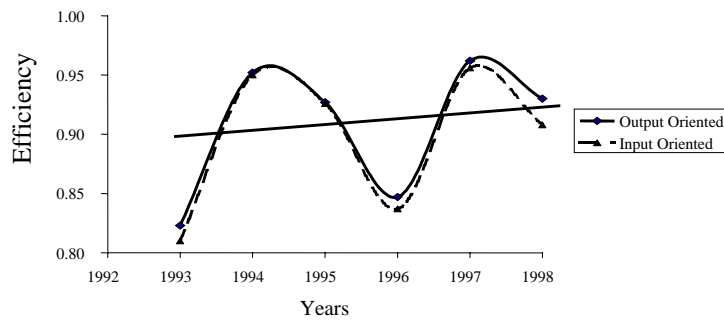
Fig. 4. Pure Technical Efficiency of Domestic Banks.
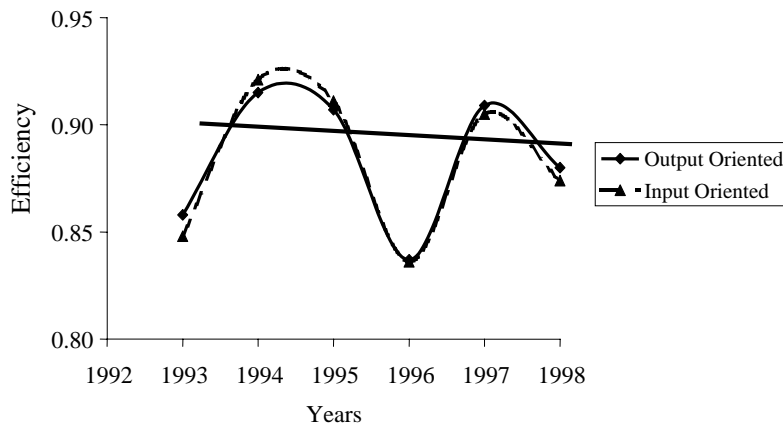
Fig. 5. Pure Technical Efficiency of Foreign Banks.
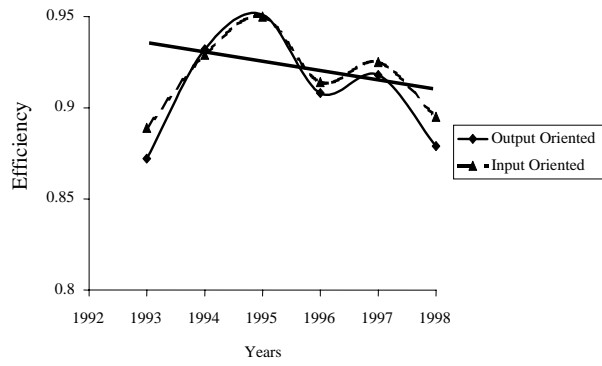
Fig. 6. Scale Efficiency of all Banks.

Fig. 7. Scale Efficiency in Domestic Banks.

Fig. 8. Scale Efficiency of Foreign Banks.

important than inefficiencies in banking [Berger and Humphrey (1991); Berger and Humphrey (1993) and Berger and Timme (1993)]. Component of scale inefficiency was larger in 1993 and 1998 with an average scale inefficiency of 12.9 percent and 12.1 percent respectively for two years.

When look into 10 most efficient and 10 least efficient banks, it was turned out that 4 domestic banks fall into each category. In sum, most foreign banks were both scale efficient and sca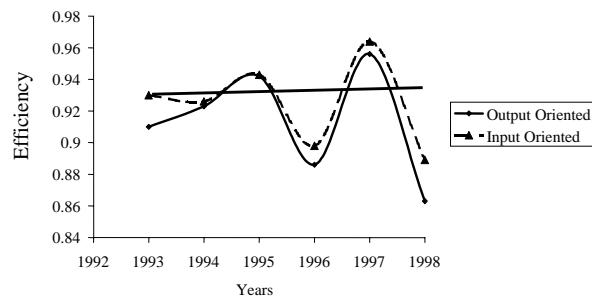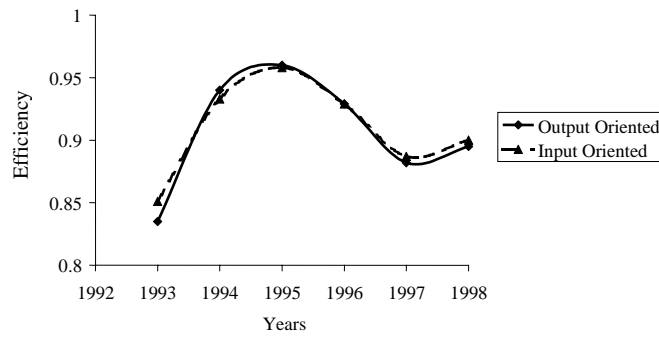le inefficient, while domestic banks were average performers in terms of scale efficiency. From this result any justification regarding the regulatory differences for branching, for two types of banks, can be ruled out. It is solely due to poor performance of foreign banks that contributing towards overall inefficiency of banking system. The justification for such findings comes from the findings of cross-country work, including Pakistan, by Claessens, *et al.* (1998)

> "foreign banks tend to have higher interest margins, profitability and tax payments than domestic banks in developing countries and opposite is true in the developed countries".

This suggests that the foreign banks focus on profit making than the service delivery. Our results show that financial liberalisation successful to the extent that it stimulated the efficiency of domestic banks, especially nationalised and denationalised banks, over time. From this it emerges that the competition within the banking sector has increased. But more rigorous results can be found with enlarged data set, incorporating both pre and post liberalisation period. Our findings are consistent with earlier findings by Hardy and Patti (2001) to the extent that the performance of local banks, especially nationalised banks have improved, but we are unable to find overall efficiency improvements for the sample period. Such results may be found if compared with pre-liberalisation as base period. Further, we find that a few large domestic banks that government is seeking to privatise at the name that they are performing inefficient, fall into 10 most efficient banks. Therefore, government. should be cautious in advancing its privatisation program, as she may lose a good asset that may be not generating enough revenues due to some other factors (like slow down of economy, mis-pricing of their products and govt. interference etc.). Therefore, we believe that efficiency may be enhanced through addressing regulatory issues or resolving governance problem and it would be interesting area for future research.

Since the Malmquist Productivity Index use one previous year information to measure the productivity index. Therefore, Table 3 and Table 4 report the summary of annual means from 1994–1998 (five years) for input oriented and output oriented productivity indices respectively. Interpretation of these indices is simple, if the total factor productivity index is greater than 1 than it means a growth in the productivity relative to the pervious year. Similarly, if the efficiency change index is greater than one then it implies that the overall banking efficiency has improved relative to pervious year. Same interpretation applies to other indices. Here it is important to note that the technical efficiency score give entirely different information then the

Table 3

Descriptive Statistics of Output-oriented Malmquist Productivity Index

Year	INDICES	Mean			SD			Max			Min		
		Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total
1994	EFFCH	1.239	1.272	1.209	0.3825	0.3083	0.3419	2.011	1.722	2.011	0.604	0.711	0.342
	TECHCH	0.853	0.732	0.758	0.2331	0.2118	0.2277	1.290	1.342	1.342	0.452	0.262	0.228
	PECH	1.205	1.098	1.127	0.2589	0.2252	0.2448	1.790	1.663	1.790	0.994	0.717	0.245
	SECH	1.016	1.161	1.073	0.1716	0.2009	0.1987	1.351	1.633	1.633	0.604	0.938	0.199
	TFPCH	0.988	0.924	0.916	0.1826	0.2766	0.2346	1.410	1.393	1.410	0.752	0.186	0.235
1995	EFFCH	1.001	1.018	1.006	0.1055	0.0621	0.0852	1.324	1.125	1.324	0.824	0.861	0.085
	TECHCH	0.883	0.881	0.878	0.0856	0.0867	0.0850	1.071	1.044	1.071	0.722	0.724	0.085
	PECH	0.969	0.997	0.981	0.0560	0.1038	0.0841	1.006	1.354	1.354	0.840	0.850	0.084
	SECH	1.032	1.026	1.026	0.0828	0.0734	0.0771	1.324	1.233	1.324	0.972	0.831	0.077
	TFPCH	0.884	0.896	0.883	0.1252	0.0984	0.1108	1.120	1.098	1.120	0.694	0.736	0.111
1996	EFFCH	0.896	0.898	0.868	0.3208	0.1940	0.2596	1.903	1.462	1.903	0.596	0.697	0.260
	TECHCH	1.204	1.711	1.344	0.2958	0.9885	0.7719	1.608	4.714	4.714	0.535	1.063	0.772
	PECH	0.918	0.934	0.912	0.1258	0.1957	0.1634	1.095	1.455	1.455	0.625	0.653	0.163
	SECH	0.973	0.969	0.951	0.2877	0.1225	0.2159	1.903	1.312	1.903	0.577	0.632	0.216
	TFPCH	1.009	1.580	1.167	0.1883	1.0853	0.8303	1.490	4.714	4.714	0.635	0.771	0.830
1997	EFFCH	1.287	1.061	1.131	0.3161	0.2433	0.2999	1.727	1.611	1.727	0.636	0.542	0.300
	TECHCH	0.827	0.699	0.718	0.2955	0.2073	0.2587	1.672	0.955	1.672	0.452	0.236	0.259
	PECH	1.164	1.111	1.118	0.2018	0.2101	0.2050	1.601	1.499	1.601	1.000	0.562	0.205
	SECH	1.103	0.953	1.011	0.2082	0.1084	0.1793	1.565	1.075	1.565	0.636	0.731	0.179
	TFPCH	1.026	0.778	0.813	0.2805	0.3488	0.3374	1.416	1.539	1.539	0.452	0.172	0.337
1998	EFFCH	0.868	0.991	0.909	0.1806	0.2059	0.2011	1.175	1.348	1.348	0.490	0.598	0.201
	TECHCH	1.148	1.022	1.069	0.2408	0.1098	0.1936	1.752	1.407	1.752	0.821	0.926	0.194
	PECH	0.965	0.975	0.962	0.0887	0.1534	0.1245	1.138	1.323	1.323	0.752	0.662	0.124
	SECH	0.898	1.017	0.945	0.1529	0.1393	0.1562	1.032	1.282	1.282	0.490	0.598	0.156
	TFPCH	0.996	1.009	0.971	0.3226	0.2120	0.2677	2.058	1.407	2.058	0.555	0.583	0.268

Table 4

Descriptive Statistics of Input-orientated Malmquist Productivity Index

Year	INDICES	Mean			SD			Max			Min		
		Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total
1994	EFFCH	1.2387	1.2722	1.2559	0.382	0.308	0.34	2.011	1.722	2.01	0.604	0.711	0.604
	TECHCH	0.8529	0.7317	0.7907	0.233	0.212	0.23	1.290	1.342	1.34	0.452	0.262	0.262
	PECH	1.2344	1.1306	1.1811	0.286	0.252	0.27	1.890	1.643	1.89	0.994	0.73	0.73
	SECH	0.9918	1.1311	1.0633	0.146	0.195	0.18	1.216	1.633	1.63	0.604	0.927	0.604
	TFPCH	0.9877	0.9236	0.9548	0.183	0.277	0.23	1.410	1.393	1.41	0.752	0.186	0.186
1995	EFFCH	1.0009	1.0178	1.0096	0.105	0.062	0.09	1.324	1.125	1.32	0.824	0.861	0.824
	TECHCH	0.8827	0.8812	0.8819	0.086	0.087	0.08	1.071	1.044	1.07	0.722	0.724	0.722
	PECH	0.9704	0.9904	0.9807	0.054	0.064	0.06	1.006	1.149	1.15	0.83	0.841	0.83
	SECH	1.0307	1.0287	1.0297	0.083	0.047	0.07	1.324	1.168	1.32	0.972	0.979	0.972
	TFPCH	0.8837	0.8962	0.8901	0.125	0.098	0.11	1.120	1.098	1.12	0.694	0.736	0.694
1996	EFFCH	0.8959	0.8978	0.8969	0.321	0.194	0.26	1.903	1.462	1.90	0.596	0.697	0.596
	TECHCH	1.2037	1.7108	1.4641	0.296	0.988	0.77	1.608	4.714	4.71	0.535	1.063	0.535
	PECH	0.9048	0.9295	0.9175	0.123	0.191	0.16	1.000	1.444	1.44	0.603	0.674	0.603
	SECH	0.9844	0.9707	0.9774	0.282	0.104	0.21	1.903	1.223	1.90	0.64	0.668	0.64
	TFPCH	1.0087	1.5797	1.3019	0.188	1.085	0.83	1.490	4.714	4.71	0.635	0.771	0.635
1997	EFFCH	1.2870	1.0606	1.1708	0.316	0.243	0.30	1.727	1.611	1.73	0.636	0.542	0.542
	TECHCH	0.8272	0.6989	0.7614	0.295	0.207	0.26	1.672	0.955	1.67	0.452	0.236	0.236
	PECH	1.1737	1.1064	1.1391	0.217	0.212	0.21	1.658	1.569	1.66	1	0.545	0.545
	SECH	1.0966	0.9573	1.0251	0.208	0.105	0.18	1.564	1.092	1.56	0.636	0.731	0.636
	TFPCH	1.0263	0.7781	0.8988	0.280	0.349	0.34	1.416	1.539	1.54	0.452	0.172	0.172
1998	EFFCH	0.8684	0.9910	0.9314	0.181	0.206	0.20	1.175	1.348	1.35	0.49	0.598	0.49
	TECHCH	1.1478	1.0219	1.0831	0.241	0.110	0.19	1.752	1.407	1.75	0.821	0.926	0.821
	PECH	0.9481	0.9740	0.9614	0.118	0.160	0.14	1.150	1.379	1.38	0.691	0.694	0.691
	SECH	0.9163	1.0196	0.9694	0.145	0.142	0.15	1.032	1.282	1.28	0.49	0.598	0.49
	TFPCH	0.9961	1.0086	1.0025	0.323	0.212	0.27	2.058	1.407	2.06	0.555	0.583	0.555

technical efficiency change index because the technical efficiency score measures the efficiencies for a particular bank for a particular year while the efficiency change index measures efficiency improvement over pervious year. Table 3 and Table 4 reports descriptive statistics of output oriented and input productivity indices for 1994–98 period respectively.

The productivity growth in banking have been observed in only 1996 which were 16.7 percent, in remaining 4 years banking industry has observed a productivity decline. Productivity decline was largest in 1995 with an average decline of 18.7 percent. On average banking industry has observed a productivity regress of 5.7 percent over the last five year it implies banks are employing inferior input-output combinations. Both domestic and foreign banks were equally affected by the productivity regress. If we look at the sources of productivity regress than it turn out that the technological regress is the major source of productivity regress. The technological regress was highest in 1994 with an average technological regress of 24.2 percent. After 1994 there are some technological growth. On average, Pakistani banking industry has observed a technological regress of 7.2 percent over last five year. The other component of the productivity change is the efficiency change index. Although earlier we come to know that inefficiencies in Pakistani banking system are significantly larger but these inefficiencies have remain more or less constant over last five years as with an average growth of 1.7 percent for five years. The reason for this positive growth is that there are largest gains of 20.9 percent in efficiency in 1994, because of poor base year of 1993, which we find earlier to be the most inefficient year for banking. Similarly, efficiency regress was largest in 1996 with 13.2 percent for similar reason.

When we explore whether these efficiency improvements have come from pure technical change or from scale efficiency change, than it turn out that with output oriented approach all the efficiency improvements were from pure efficiency change while scale efficiency remain stagnant over five year.[13]

SUMMARY AND CONCLUSION

In this paper we applied non-parametric, DEA, to assess the efficiency and productivity of banking industry in Pakistan for 1993–1998 period. The aim was to explore the post financial liberalisation effects on efficiency and productivity as positive growth is assumed at times of liberalisation. We come up with the findings that in case of Pakistan neither the productivity growth nor the efficiency improvement has been observed. Inefficiency in overall system is more or less stagnant, while the efficiency composition within the industry has changed, local banks, especially nationalised banks, except one, have improved their performance. Our sample consists of 37 banks out of which 18 were domestic owned while 19

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[13]For input-oriented approach we get more or less same results.

were foreign owned. Yearly efficiency estimates—pure technical and scale efficiency—suggests that domestic owned banks have marginally outperformed foreign owned banks. The overall average inefficiency for the sample of banks over six-year period turned out to be approximately 20 percent.

Other significant finding is that productivity indices suggest poor performance of banking sector that is mainly due to technological regress, resulting from inferior input-output combinations. To improve their performance they must focus on service delivery by increasing the product variety and broadening the customer base and at the same they have to reduce intermediation cost, to be efficient and competitive. Finally, the efficiency of banking sector does not grown satisfactory as it record an average growth of 1.2 percent over five years that may be overestimated due to poor base for 1993.

In the future research, it would be interesting to find out the determinants of efficiency and also to test whether the crude ratios of performance also correlates with the individual bank efficiency. With the present results of overall productivity regress it would be interesting to retest the finance growth hypothesis, especially in developing country context, because financial liberalisation has started during late eighties, after which Pakistan economy has not perform well. Therefore, poor performance of banking sector may be due to poor performance of real sector, rather than vice varsa.

Syed Fawad Ali Rizvi

Appendices

Appendix 1

Key Performance Ratios of Banks in Pakistan

Key Ratios	Years	Specialised	Denationalised	Nationalised	Private	Foreign
Personnel Expense to	1990	0.705	N.A.	0.814	N.A.	0.517
Administrative Expense	1991	0.731	0.804	0.803	N.A.	0.481
	1992	0.741	0.789	0.729	0.445	0.493
	1993	0.794	0.807	0.744	0.450	0.482
	1994	0.766	0.803	0.726	0.488	0.489
	1995	0.776	0.797	0.726	0.486	0.490
	1996	0.758	0.778	0.719	0.491	0.494
	1997	0.817	0.771	0.720	0.475	0.457
	1998	0.822	0.766	0.636	0.470	0.476
Expenditure to Income	1990	0.813	N.A.	0.961	N.A.	0.744
	1991	0.811	0.952	0.948	N.A.	0.686
	1992	0.817	0.925	0.877	0.610	0.618
	1993	0.805	0.932	0.867	0.618	0.666
	1994	0.890	0.930	0.911	0.793	0.723
	1995	0.890	0.920	0.938	0.785	0.814
	1996	0.874	0.974	1.796*	0.792	1.434
	1997	0.928	0.967	1.008*	0.863	0.843
	1998	1.504	0.966	1.057*	0.897	0.942
Administrative Expense to	1990	0.382	N.A.	0.336	N.A.	0.243
Total Expense	1991	0.418	0.363	0.332	N.A.	0.265
	1992	0.439	0.345	0.334	0.368	0.225
	1993	0.422	0.350	0.342	0.287	0.203
	1994	0.461	0.354	0.339	0.234	0.176
	1995	0.443	0.381	0.305	0.233	0.165
	1996	0.452	0.340	0.281	0.225	0.184
	1997	0.428	0.311	0.229	0.187	0.163
	1998	0.350	0.327	0.280	0.172	0.163
Administrative Expense to	1990	0.308	N.A.	0.324	N.A.	0.168
Total Income	1991	0.327	0.345	0.315	N.A.	0.211
	1992	0.345	0.319	0.293	0.226	0.142
	1993	0.317	0.326	0.299	0.179	0.134
	1994	0.396	0.329	0.312	0.177	0.131
	1995	0.381	0.350	0.293	0.180	0.134
	1996	0.371	0.332	0.442	0.180	0.483
	1997	0.385	0.301	0.233	0.163	0.139
	1998	0.345	0.317	0.292	0.153	0.156

Source: Author's estimates.

*Figures are not comparable because banks created provision for bad loans first time in the history that lead to large losses for one nationalised bank. The losses were so large that the SBP has to inject equity to save bank from default.

Appendix 2

Names of Scheduled Banks Included in Sample

Domestic Banks	Foreign Banks
1. Agriculture Development Bank of Pakistan	1. AlBaraka Islamic Bank Ltd.
2. Federal Bank of co-operatives	2. ABN AMRO Bank
3. Industrial Development Bank of Pakistan	3. American Express Bank Ltd.
4. Punjab Provincial Co-operative Bank Ltd.	4. ANZ Gindlays Bank (Now Standard Chartered Grindlays Bank)
5. Allied Bank of Pakistan Ltd.	5. Bank of America
6. Askari Commercial Bank Ltd.	6. Credit Agricol Banque
7. Bank Al-Habib Ltd.	7. Bank of Tokyo Ltd.
8. Bolan Bank Ltd.	8. Citibank N.A.
9. First Women Bank Ltd.	9. Deusche Bank A.G.
10. Habib Bank Ltd.	10. Doha Bank Ltd.
11. Bank Al-falah	11. Emirates Bank International Pjsc
12. Agriculture Development Bank of Pakistan	12. Habib Bank AG Zurich
13. Federal Bank of Co-operatives	13. Hong Kong Sanghi Banking Corporation Ltd.
14. Industrial Development Bank of Pakistan	14. Internation Finance Investment Commerce Bank Ltd.
15. Punjab Provincial Co-operative Bank Ltd.	15. Mashreq Bank Psc
16. Allied Bank of Pakistan Ltd.	16. Rupali Bank
17. Askari Commercial Bank Ltd.	17. Societe Generale (French and International) Bank Ltd.
18. Bank Al-Habib Ltd.	18. Standard Chartered Bank Ltd.
	19. Trust Bank Ltd.

Appendix 3

Table A-1

Descriptive Statistics of Technical Efficiency Obtained through Output-oriented DEA

		Technical Efficiency					Pure technical					Scale				
Year	Bank Type	Mean	Ineffi-ciencies	SD	Max	Min	Mean	Ineffi-ciencies	SD	Max	Min	Mean	Ineffi-ciencies	SD	Max	Min
1993	Domestic	0.751	24.94	0.1937	1	0.347	0.823	17.69	0.1825	1	0.470	0.910	9.02	0.0989	1	0.658
	Foreign	0.716	28.37	0.2112	1	0.442	0.858	14.19	0.1633	1	0.519	0.835	16.47	0.1661	1	0.442
	Total	0.733	26.71	0.1993	1	0.347	0.841	15.89	0.1714	1	0.47	0.872	12.85	0.1409	1	0.442
1994	Domestic	0.876	12.37	0.3029	1	0.397	0.952	4.81	0.0899	1	0.700	0.923	7.65	0.1569	1	0.397
	Foreign	0.858	14.17	0.1247	1	0.63	0.915	8.52	0.1155	1	0.688	0.940	6.04	0.0769	1	0.655
	Total	0.867	13.29	0.1431	1	0.397	0.933	6.72	0.1041	1	0.688	0.932	6.83	0.1211	1	0.397
1995	Domestic	0.870	12.98	0.5132	1	0.526	0.927	7.30	0.1301	1	0.588	0.942	5.81	0.1254	1	0.526
	Foreign	0.872	12.81	0.1256	1	0.667	0.907	9.25	0.1090	1	0.687	0.960	3.96	0.0669	1	0.762
	Total	0.871	12.89	0.1422	1	0.526	0.917	8.30	0.1184	1	0.588	0.951	4.86	0.0988	1	0.526
1996	Domestic	0.754	24.59	0.7668	1	0.363	0.847	15.28	0.1569	1	0.625	0.886	11.41	0.1230	1	0.564
	Foreign	0.777	22.27	0.1702	1	0.511	0.837	16.34	0.1412	1	0.608	0.929	7.07	0.1130	1	0.511
	Total	0.766	23.40	0.1771	1	0.363	0.842	15.82	0.1470	1	0.608	0.908	9.18	0.1184	1	0.511
1997	Domestic	0.921	7.91	0.9449	1	0.617	0.962	3.81	0.0931	1	0.711	0.956	4.40	0.0918	1	0.636
	Foreign	0.798	20.24	0.1466	1	0.509	0.909	9.10	0.1235	1	0.562	0.882	11.76	0.1313	1	0.509
	Total	0.858	14.24	0.1523	1	0.509	0.935	6.52	0.1115	1	0.562	0.918	8.18	0.1183	1	0.509
1998	Domestic	0.803	19.73	1.2100	1	0.432	0.930	7.03	0.1264	0	0.591	0.863	13.70	0.1837	1	0.432
	Foreign	0.782	21.82	0.1786	1	0.452	0.880	12.01	0.1434	0	0.477	0.895	10.53	0.1586	1	0.452
	Total	0.792	20.81	0.1930	1	0.432	0.904	9.59	0.1359	0	0.477	0.879	12.07	0.1696	1	0.432
						Summary of Overall Sample Period											
6 Year Avg.	Domestic	0.829	17.09	NA	1	0.347	0.907	9.32	NA	1	0.470	0.913	8.67	NA	1	0.397
	Foreign	0.801	19.95	NA	1	0.442	0.884	11.57	NA	1	0.477	0.907	9.30	NA	1	0.442
	Total	0.814	18.56	NA	1	0.347	0.895	10.47	NA	1	0.470	0.910	8.99	NA	1	0.397

Note: For over all summary statistics we calculate Mean, Max and Min therefore we do not report Standard Deviation (SD) of annual descriptive statistics as it may be misleading.

Table A-2

Descriptive Statistics of Technical Efficiency Obtained Through Input-oriented DEA

Year	Bank Type	Technical Efficiency					Pure Technical					Scale				
		Mean	Ineffi-ciencies	SD	Max	Min	Mean	Ineffi-ciencies	SD	Max	Min	Mean	Ineffi-ciencies	SD	Max	Min
1993	Domestic	0.751	24.94	0.1904	1	0.347	0.810	19.01	0.1980	1	0.372	0.930	7.02	0.0856	1	0.658
	Foreign	0.716	28.37	0.2112	1	0.442	0.848	15.20	0.1791	1	0.484	0.851	14.95	0.1697	1	0.442
	Total	0.733	26.71	0.1993	1	0.347	0.829	17.05	0.1869	1	0.372	0.889	11.09	0.1395	1	0.442
1994	Domestic	0.876	12.37	0.1636	1	0.397	0.950	5.01	0.0921	1	0.703	0.926	7.43	0.1578	1	0.397
	Foreign	0.858	14.17	0.1247	1	0.630	0.921	7.91	0.1062	1	0.730	0.933	6.69	0.0879	1	0.655
	Total	0.867	13.29	0.1431	1	0.397	0.935	6.50	0.0993	1	0.703	0.929	7.05	0.1250	1	0.397
1995	Domestic	0.870	12.98	0.1615	1	0.526	0.926	7.37	0.1306	1	0.584	0.943	5.73	0.1255	1	0.526
	Foreign	0.872	12.81	0.1256	1	0.667	0.911	8.91	0.1101	1	0.684	0.958	4.23	0.0757	1	0.742
	Total	0.871	12.89	0.1422	1	0.526	0.918	8.16	0.1191	1	0.584	0.950	4.96	0.1018	1	0.526
1996	Domestic	0.754	24.59	0.1884	1	0.363	0.837	16.26	0.1687	1	0.563	0.898	10.23	0.1146	1	0.640
	Foreign	0.777	22.27	0.1702	1	0.511	0.836	16.39	0.1403	1	0.637	0.929	7.05	0.1113	1	0.511
	Total	0.766	23.40	0.1771	1	0.363	0.837	16.33	0.1526	1	0.563	0.914	8.60	0.1125	1	0.511
1997	Domestic	0.921	7.91	0.1345	1	0.617	0.956	4.41	0.1100	1	0.625	0.964	3.58	0.0895	1	0.636
	Foreign	0.798	20.24	0.1466	1	0.509	0.905	9.48	0.1287	1	0.545	0.887	11.26	0.1336	1	0.509
	Total	0.858	14.24	0.1523	1	0.509	0.930	7.01	0.1211	1	0.545	0.925	7.52	0.1192	1	0.509
1998	Domestic	0.803	19.73	0.2118	1	0.432	0.908	9.19	0.1584	1	0.500	0.889	11.11	0.1792	1	0.432
	Foreign	0.782	21.82	0.1786	1	0.452	0.874	12.58	0.1463	1	0.486	0.900	10.00	0.1530	1	0.452
	Total	0.792	20.81	0.1930	1	0.432	0.891	10.94	0.1512	1	0.486	0.895	10.54	0.1640	1	0.432
Summary of Overall Sample Period																
6 Year Avg.	Domestic	0.829	17.09	NA	1	0.347	0.898	10.21	NA	1	0.372	0.925	7.52	NA	1	0.397
	Foreign	0.801	19.95	NA	1	0.442	0.883	11.75	NA	1	0.484	0.910	9.03	NA	1	0.442
	Total	0.814	18.56	NA	1	0.347	0.890	11.00	NA	1	0.372	0.917	8.29	NA	1	0.397

Note: For over all summary statistics we calculate Mean, Max and Min therefore we do not report Standard Deviation (SD) of annual descriptive statistics as it may be misleading.

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Comments

This paper is a good attempt in a difficult area. Pakistan has been introducing financial sector reform for more than one decade. Major progress has been made in many areas of the banking and financial sector. In fact, Pakistan's banking sector is not only much stronger today than 12 years ago but it is also stronger in comparison to other countries in the region. After one decade of reform, Pakistan's banking and financial sector has been transformed from a repressed system to a dynamic system. Some of the developments that have taken place are summarised as follows:

— Until 1991 monetary and credit management was carried out by direct allocation of credit and credit ceilings. This system has gradually been replaced with indirect monetary instruments such as open market operations (OMOs). The State Bank of Pakistan (SBP) manages domestic liquidity through OMOs and regular T-bill auction.
— Three nationalised commercial (UBL, MCB, Allied) banks have been privatised. The second largest bank (HBL) is very close to privatisation.
— A four tier structure of corporate governance, disclosure and transparency have been introduced.
— Minimum paid up capital has been raised form Rs 0.350 million to Rs 1.0 billion with effect from January 1, 2003.
— Legal difficulties in loan recovery have been removed.
— Consumer financing has been allowed.
— Mortgage financing by commercial banks have been encouraged.
— Micro finance and SME Banks have been established.
— Evaluation of banks by credit rating agency has been made mandatory.
— Inter-rate is now market-based.
— Foreign exchange regime has been liberalised. Exchange rate is now determined in inter-bank. As opposed to managed float, Pakistan's exchange rate regime is now free float.
— Strengthening of the State Bank's capacity for supervision and prudential regulations.
— Separation of Core and none Core activities of the SBP.
— Quality of information disclosure and enhancing the standards of accounting and auditing.

The current heavy reliance in many countries on the banking system to fund long-term investment is rather misplaced. There is a need to broaden and deepen the local capital market. It is in this background that Pakistan has introduced wide-ranging reform in capital market.

Coming back to the paper under review, the findings of the paper suggest that the efficiency in the banking sector has not improved during the period covered in the study. This finding is somewhat contradictory to an earlier study on Banking Reform and Bank Efficiency completed in the IMF. This study shows that the principal effect of financial market reforms seems to have been the increase in the both revenues and costs. This suggests that much of the benefit of reform was passed on to consumers of bank output (borrowers) and those supplying banks with inputs (depositors). The reform programme, however, did not lead to a rise in overall profitability. The public sector banks and the privatised banks nevertheless made progress in improving cost-efficiency and their relative profitability improved noticeably. The difference in results seems to be on account of methodology adopted in these two papers. The study under review used non-parametric Malmquist productivity index approach while the study conducted in the IMF used Translong Profit Function. There is a need to examine the issue of methodology.

The ideal way to conduct an exercise like the one done in the study under review is to compute various efficiency indices for the period prior to reform and then compare with the post-reform period. In particular, before going into methodology and results it is appropriate to provide information pertaining to followings:

— What happened to the spread between lending and deposit rates during the pre- and post-reform period?
— What happened to the cost of intermediation?
— What happened to administrative costs of various banks?
— What happened to key financial development indicators during the pre- and post-reform period?

The interpretation of result is too technical for general readers. The author should try to explain the results in non-technical way, that is, the economics behind the result should be highlighted. If the efficiency and productivity of the banks have not improved after liberalisation, the author must give reasons as to what went wrong.

On the whole, this was a nice attempt but much more effort in the line of above suggestions would make the study more useful.

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