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Financial Reforms and Banking Efficiency: Case of Pakistan

Usman Ahmad¹

Abstract

This paper attempts to analyze the performance of the banking sector of Pakistan in the light of second generation reforms on the domestic scheduled banks by using data from 1990 to 2008. For this purpose I used Non Parametric Data Envelopment Analysis (DEA). The analysis revealed an overall improvement in the efficiency of commercial banks. It implies that financial sector reforms, particularly the second phase of reforms, improved the efficiency of the commercial bank in Pakistan. After the reforms, pure technical efficiency increased as compared to scale efficiency and it was found that the overall efficiency of the industry has increased due to pure technical efficiency. The study concludes that the reforms were successful in improving the efficiency of the domestic commercial banks in Pakistan.

1. Introduction

Financial sector plays a formidable role in the economic development. A very close relationship exists between financial sector growth and economic growth. An efficient financial sector is necessary for the optimal use of financial resources of the country. Economic development can be achieved by using existing resources more abundantly without any change in the production process or by combining already employed resources in a better way (Saeed, 2005).

Pakistan's financial sector consists of commercial banks, foreign banks, development finance institutions, micro finance companies (leasing companies, investment banks, discount houses, housing finance companies, venture capital companies, and mutual funds), modarabas, stock exchanges and insurance companies.

After Nationalization during 70's the banking sector in Pakistan dominated by government owned institutions which are inefficient (Haque, 1997). The main problems faced by the sector was: that most of the financial assets was owned by Nationalized Commercial Banks (NCBs) which suffered from a highly bureaucratic approach, overstaffing, unprofitable branches,

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poor customer services, and a high ratio of non-performing loans. The banking industry faces high taxes, which affect its profitability and attractiveness for new entrants; and the banks are typically focused on trade and corporate financing with a narrow range of products. They have not diversified into consumer and mortgage financing (Haque, 1997 and Limmi, 2001).

Given the state of the banking sector, the Government of Pakistan initiated the macroeconomic and financial sector restructuring program under the guidance of the International Monetary Fund (IMF) in 1996. The World Bank and Japanese Government also co-financed the banking sector adjustment loan (BSAL) to support this effort of the government. The main goal of the program was to improve the efficiency in financial markets through separating ownership and management, and strengthening the accountability mechanism.

Following the agreement and guidelines provided by the donors in the program, the Government of Pakistan and State Bank of Pakistan has taken different steps and initiated a numerous reforms. The reform program can be divided into two phases. The first phase began in 1997, and reforms in this era were related to the recovery of non-performing loans, retrenchment of surplus staff, closure of over-extended branches, privatization of banks, the introduction of international accounting standards, strengthening of prudential regulations, and the establishment of banking courts. When the reforms slowed down somewhat in 1999, the Government of Pakistan requested the World Bank in 2000 to help revive its implementation program, focusing on bank privatization as the next critical step in the process. Therefore, the World Bank continued to support this structural adjustment program in the banking sector, and approved a US\$300 million credit for the Pakistan Banking Sector Restructuring and Privatization Project.

The second generation banking reforms project focused on reducing the cost structure of the state-owned banks for the sake of efficiency and to facilitate their sale, complete privatization of partially privatized banks, liberalizing bank branching policy, reduction in taxes on banks, facilitating loan collateral foreclosure, integration of national savings schemes to the financial markets, discontinuing the mandatory placement of foreign currency deposits by the commercial banks, and strengthening the central bank to play a more effective role as a regulator of the banking sector.

The efficiency of the banking sector has been widely discussed by researchers all over the

world. For example, Akhigbe and McNulty (2003) investigated the profit efficiency of small US commercial banks, Dogan and Fausten (2002) analyzed the productivity growth in Malaysian banking, Sathye (2001) empirically investigated the X-efficiency both technical and allocative in Australian banks, Battese et al (2000) studied the effect of the deregulation on the Swedish banking industry, Avikran (2000) investigated the productivity of four major trading banks and six regional banks in Australia, Laeven (1999) used DEA to estimate the efficiencies of the commercial banks in Indonesia, Korea, Malaysia, Philippines and Thailand, Berger and Hannan (1998) also in part examine the U.S. bank efficiency, Battese, Heshmati and Hjalmarsson (1998) examine the efficiency of labor utilization in the Swedish banking industry and Berger, Leusner and Mingo (1997) investigate the branch efficiency of U.S. commercial banks.

However, there are few studies discussing the efficiency and economies of scale in the banking sector of Pakistan. For example, Akhter (2002) estimated the efficiencies of commercial banks in Pakistan using cross section data for 1998. Hardy and Patti (2001 and 2003) studied the effects of financial reforms on Pakistan's banking sector for the period 1981-1997. Rizivi (2001) analyzed the productivity of banking sector in Pakistan for the period 1993-1998. Burki and Niazi (2003) investigated the impact of policy reforms on performance of commercial banks with a unique panel data from Pakistan's banking sector over the period 1991– 2000. Qayyum (2007) investigated the banking efficiency over the period 1991-2005. Ahmad (2009) calculated the total factor productivity (TFP) of Pakistani banks by using data for the period 1991-2005.

These studies used the data for 2005 and/or earlier years and do not capture the impact of recent financial reforms on the banking efficiency of Pakistan. Therefore, there is a need for a comprehensive assessment of the impact of financial sector reforms. We attempt to assess whether the efficiency of the banking sector improved or not during the period of second generation reforms by using the data from 1990 to 2008. The study period were divided into three periods, pre- reform period (1991-1997), First Phase of Reforms (1998-2001) and Second Phase of Reforms (2002-2005 & 2008). The next section provides an overview of the status of banking and reforms in Pakistan, Section Three elaborates the methodology and the Fourth Section provides the empirical findings. The Final Section concludes the study.

2. Banking in Pakistan

Financial sector of Pakistan consists of central bank, commercial banks, specialized financial institutions, insurance companies, stock exchanges and development finance institutions. However, commercial banks are most important component and play a crucial role in the financing of economy. Commercial banks mobilize the savings and thus play a vital role in enhancing the productive capacity of the economy. Habib Bank, the first Muslim owned bank, was established in Bombay (Mumbai) in 1941. After independence, on 1st July 1948 the State Bank of Pakistan (SBP), the central bank, was established. The SBP was jointly owned by the government and the private sector. In the following years, the government set up a fully state owned bank, namely the National Bank of Pakistan, to assume commercial banking functions and to carry out treasury tasks.

In 1990, there were three supervisory/regulatory bodies for the financial sector: (1) The SBP dispensing its functions under the SBP Act, 1956, (2) The Pakistan Banking Council (PBC), monitoring the performance of nationalized commercial banks under the Banks (Nationalization) Act, 1974, and (3) the Corporate Law Authority (CLA), regulating the equity market under the Securities and Exchange Ordinance, 1969.

Table 1: Private and Foreign Scheduled Banks Established In 1991

Metropolitan Bank Limited,	Bank AI-Habib Limited
Faysal Bank Limited	Bank of Punjab
Mehran Bank Limited	Union Bank Limited
Askari Commercial Bank Limited	Prime Commercial Bank Limited
Republic Bank Limited.	Capital Bank Limited
Schon Bank Limited,	Habib Credit & Exchange Bank Limited
Prudential Commercial Bank Limited	Platinum Commercial Bank Limited
Bank of Khyber	Trust Bank Limited
Soneri Bank Limited	Bank AI-Falah Limited
Indus Bank Limited	Oman International Bank
Bolan Bank Limited,	Gulf Commercial Bank Limited
Bank of Ceylon	

Source: FSA 1990-2000

In order to encourage private sector participation, enhance efficiency and promote competition among banks, the Banks (Nationalization) Act, 1974 was amended during 1991, allowing the private sector to open banking companies. Subsequently, in August 1991, ten new Pakistani commercial banks were permitted to commence their operations (Table.1). Until the

end 1994, a number of commercial banks and non-banking financial companies (NBFCs) were given authorization/licenses to commence business.

The privatization process started by selling, 26% shares of the Muslim Commercial Bank (MCB) to the private sector in April 1991. By January 1993, a further 49% of shares of MCB were disinvested to the transfer of its management and control to the buyer. In September 1991, 26% of the shares of Allied Bank Limited (ABL) were also disinvested under the Employee Stock Ownership Plan and the management and control of the bank was handed over to the Employee Management Group. A further 25% of shares of ABL were sold to the private sector in August 1993. In the same year, the government decided to sell 26% of the shares of United Bank Limited (UBL) and transfer its management to the private sector. Initial attempts to privatize UBL failed because of various technical reasons. Privatization of NCBs was a key element in the government agenda.

In November 1993, the SBP directed banks to set quarterly recovery targets, submit progress reports, and form strategies to improve their future recovery process. In August 1997, the SBP revised the disclosure standards and banks were asked to submit their annual accounts on new formats in line with international accounting practices. At the same time, a system was put in place whereby the performance of each bank and Nonbank Financial Institutions (NBFIs) was evaluated under CAMELS (*C-Capital adequacy, A-Asset quality, M-Management quality, E-Earnings, L-Liquidity and S - Sensitivity to Market Risk*) which involves the analysis of six indicators which reflects the financial health of financial institutions: Capital Adequacy, Asset Quality, Management Quality, Earnings, Liquidity and Sensitivity to Market Risk, and Systems and Controls and CAELS (*Capital Adequacy, Asset Quality, Earnings, Liquidity and Sensitivity*)

During 1996-97, amendments were made in the Banking Companies Ordinance 1962 and the State Bank of Pakistan Act 1956. The government continues the program of reforms. These reforms are: first, the Pakistan Banking Council was abolished and its functions are bounded to the SBP. The State Bank of Pakistan is now expected to monitor and oversee the workings of the banking sector in the country. Second, the State Bank of Pakistan Act, 1956 has been amended whereby full and exclusive authority has been given by the Government of Pakistan to the State Bank to regulate the banking sector, to conduct an independent monetary policy and to set limits

on government borrowing from the State Bank. Third, all appointments and removals of Chief Executives and Board of Nationalized Commercial Banks and Development Financial Institutions are now required to be made with the approval of the State Bank of Pakistan. Fourth, The Banking Tribunal Ordinance, 1984 and the Banking Companies (Recovery of Loans) Ordinance, 1997 were repealed and these were replaced by Banking Companies (Recovery of Loans and Advances, Credit and Finance) in October 1997.

In 2001, the SBP was divided into three parts: the SBP, as Central Bank, SBP Banking Services Corporation, and National Institute of Banking and Finance (NIBAF). The Securities and Exchange Commission of Pakistan (SECP) replaced CLA (Corporate Law Authority) as an independent regulatory body for the capital market. Implementation of the Basel II regime of minimum capital adequacy will continue and the regime was introduced at the beginning of 2008 with the obligatory application of the Standardized Approach to credit risk and the Basic Indicator Approach to operational risk for all commercial banks. This followed a year (2007) in which all banks had been required to run the new regime in parallel with the old Basel I regime. Banks already have made major advances in implementing the new framework although many are still facing challenges in areas like integrated risk management policy and collateral management.

Deposit base rose to Rs 4.1 trillion and gross advances to Rs 3.3 trillion by September 2008. Supported by the growing financial intermediation process, banks' aggregate profitability rose from Rs 63.3 billion in 2005 to Rs 73.3 billion by 2007 and Rs 46.0 billion for half year 2008. In September 2008, the 4 largest banks accounting for 58% of all branches but only 47% of the total deposits generated 78% of all profits in the banking sector. Recapitalization and prudent lending has lowered banks' net non-performing loans (NPLs) to around 2.0 percent. Banks' capitalization and quality of assets have helped raise the risk weighted capital adequacy ratio to 12.1 percent, well above the regulatory minimum of 8.0 percent. Among different segments of the financial sector, the banking sector has grown most in relative terms.

Following its privatization, which started in the 1990s, the banking sector has gained dynamism and financial strength. As of June 30, 2008, the deposit base has risen to Rs. 4.1 trillion and advances (net of provisions) to Rs. 2.9 trillion. Supported by the growing financial intermediation process, banks' profitability rose to Rs. 73 billion in 2007 (and Rs 46 billion for

first half year 2008), the proportion of non-performing loans gauged according to Net NPL to Net Loans ratio has been well contained and was 1.1 by December 2007 and 1.3 in June 2008. The overall assets of the banking sector have also increased from Rs. 3.6 trillion in December 2005 to Rs. 5.5 trillion by June 2008. While some liquidity strain has been witnessed in the second half of 2008, the sector stands on sound footing with regard to its ability to face market shocks. The GOP's Medium Term Development Framework for 2005-10 conservatively estimates that USD 150 billion (Rs. 12.0 trillion) will be required for such investments over the period it covers.

The formal sector mainly means different types of banks (and other types of financial institutions). Only 15% (25 million) of the population of 160 million has bank accounts and less than 4% (5.5 million) are borrowers; only one quarter of households has a member with a bank account. Moreover, while two-thirds of the population resides in rural areas, only 25% of total bank depositors and 17% of total borrowers reside in rural areas; in value terms the shares of rural customers are even smaller, only 10% and 7% of the total value of deposits and advances, respectively. Limited access to services is also evidenced by the low level of branch penetration in rural areas, where there are less than 2,500 branches for a population of 105 million people or an average of 42,000 inhabitants per branch. SBP projects financial penetration ratios to be raised through an enabling policy environment and the various outreach programs described above from a national coverage of 19,000 persons per bank branch in 2007 to 15,000 in 2012 and 12,000 in 2017. The coverage of ATM outlets is projected to increase from 57,000 persons per ATM in 2007 to 12,000 in 2017.

3. Methodological Framework

Efficiency studies have used parametric and non-parametric approaches. The latter is a mathematical programming based approach and typically known as the Data Envelopment Analysis (DEA) approach. It uses the observed values of inputs and outputs and attempts to find which of the firms in the sample determine an envelopment surface. Firms lying on the surface are deemed to be efficient and receive a value of unity. Firms that do not fall on the surface (below the frontier) are deemed to be inefficient and capture a value of less than unity. Hence, all deviations from the estimated frontier represent inefficiency. Firms under the DEA approach are referred to a decision-making unit (DMUs). Data Envelopment Analysis (DEA) is used to

estimate the output frontier. Distance functions are estimated under Constant Returns to Scale (CRS) and Variable Returns to Scale (VRS) assumptions.

Modern efficiency measurement begins with Farrell (1957) to define a simple measure of firm efficiency, which could account for multiple inputs². He pointed out that the efficiency of a firm consists of two components: technical efficiency (TE) and allocative efficiency (AE). The technical efficiency reflects the ability of a firm to obtain maximal output from a given set of inputs, and allocative efficiency reflects the ability of a firm to use the inputs in optimal proportions, given their respective prices. By calculating technical and allocative efficiency we can get a measure of total/ overall/economic efficiency³. The efficiency concepts are explained in the following subsections by using input/output oriented measures and constant returns to scale (CRS) / variable returns to scale (VRS) assumptions.

A: Input-Oriented Measures

The input oriented measures of efficiency can be explained using similar framework to Farrell (1957). For the sake of simplicity let us consider a bank using only two inputs (x_1 and x_2) to produce a single output (y), under the assumption of constant returns to scale. The CRS assumption allows one to represent the technology using unit isoquant and the knowledge of the unit isoquant of the fully efficient firm permits the measurement of technical efficiency shown by SS' in Figure 1.1. If a given bank uses quantities of inputs, defined by the point P, to produce a unit of output, the technical inefficiency of that firm could be represented by the distance QP, which is the amount by which all inputs could be proportionally reduced without a reduction in output. Traditionally this is expressed in percentage form by the ratio QP/OP , which represents the percentage of that inputs that could be reduced. The output oriented technical efficiency (TE_o) of a bank is measured by the ratio

$$TE_o = OQ/OP \quad (1.1)$$

Which is equal to one minus QP/OP . It will take a value between zero and one and also provides an indicator of the degree of technical inefficiency of the banks. A value of one indicates the firm is fully technically efficient. For example, the point Q is technically efficient

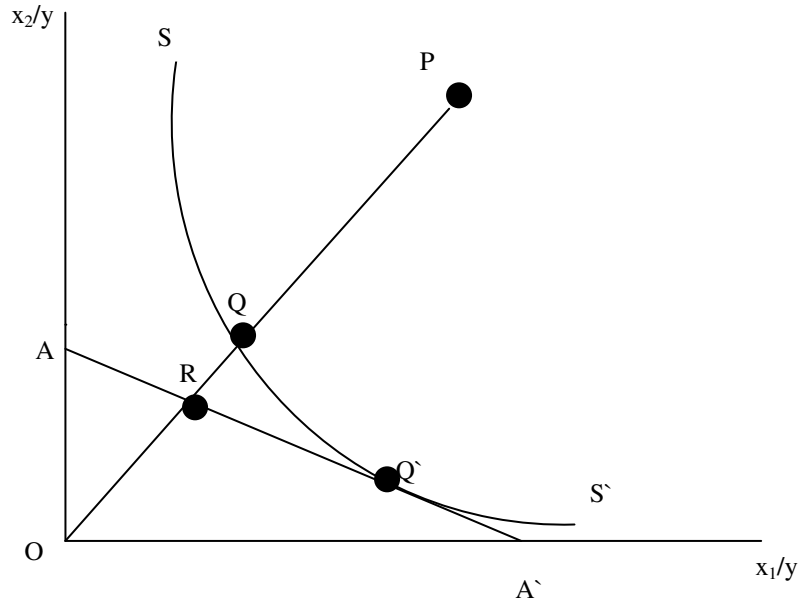
² A more detailed treatment is provided by Fare, Grosskopf and Lovell (1985, 1994) and Lovell (1993).

³ Price efficiency instead of allocative efficiency and the term overall efficiency instead of economic efficiency

because it lies on the efficient isoquant. The AE can be calculated by input price ratio thus the *allocative efficiency* (AE) of the firm operating at P is defined to be the ratio

$$AE_1 = OR/OQ \quad (1.2)$$

Figure 1.1 Technical and Allocative Efficiencies in Input Oriented Measures



Since the distance RQ represents the reduction in production costs that would occur if production were to occur at the allocatively (and technically) efficient point Q', instead of at the technically efficient, but allocatively inefficient, point Q.⁴ The total *economic efficiency* (EE) is defined to be the ratio

$$EE_1 = OR/OP \quad (1.3)$$

Where the distance RP can also be interpreted in terms of a cost reduction. Note that the product of technical and allocative efficiency provides the overall economic efficiency. The results of all three measure are not to be less than zero and greater than one.

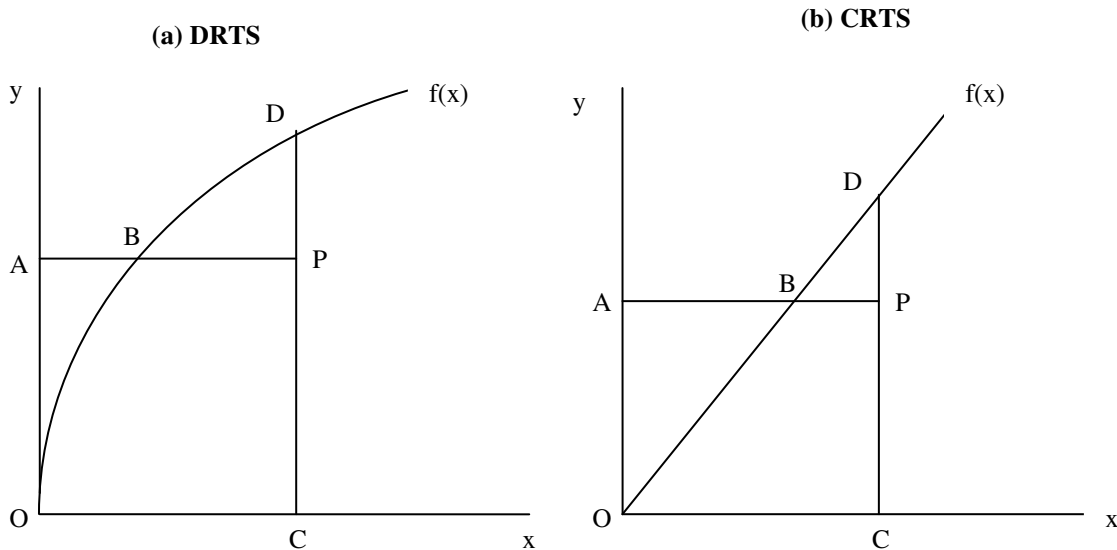
$$TE_1 \times AE_1 = (OQ/O'P) \times (OR/OQ) = (OR/O'P) = EE_1 \quad (1.4)$$

⁴ One could illustrate this by drawing two isocost lines through Q and Q'. Irrespective of the slope of these two parallel lines (which is determined by the input price ratio) the ratio RQ/OQ would represent the percentage reduction in costs associated with movement from Q to Q'.

B: Output-Oriented Measures

The output-orientated technical efficiency measure explains that how much output quantities can be proportionally expanded without altering the input quantities used. The output-orientated measure opposed to the input-oriented measure. The difference between the output- and input-oriented measures can be illustrated using a simple example involving one input and one output. This is shown in Figure 1.2(a) where we have decreasing returns to scale technology represented by $f(x)$, and an inefficient firm operating at the point P. The input-orientated measure of TE is equal to the ratio AB/AP , while the output-orientated measure of TE is CP/CD . The output- and input-orientated measures provide equivalent measures of technical efficiency if constant returns to scale exist and it is unequal when either increasing or decreasing returns to scale are present (Fare and Lovell 1978). The constant returns to scale case is depicted in Figure 1.2(b) where we observe that $AB/AP = CP/CD$, for any inefficient point P we care to choose.

Figure 1.2 (a,b) Input and Output Oriented Technical Efficiency Measures and Returns to Scale



An output-oriented model implies that the efficiency is estimated by the output of the firm relative to the best practice level_for a given level of inputs. In order to specify the mathematical formulation of the output oriented, let us assume that we have K decision-making units (DMU)⁵ using N inputs to produce M outputs. Inputs are denoted by x_{jk} ($j = 1, \dots, n$) and the outputs are represented by y_{ik} ($i=1, \dots, m$) for each bank k ($k=1, \dots, K$). The efficiency of DMU can be measured as (Coelli, 1998; Worthington, 1999; Shiu, 2002).

$$TE_K = \frac{\sum_{i=1}^m u_i y_{is}}{\sum_{j=1}^n v_j x_{jk}} \quad (1.5)$$

Where y_{ik} is the quantity of the i^{th} output (i.e. Loan & Advances and Investment) produced by the k^{th} DMU banks, x_{js} is the quantity of j^{th} input (i.e. Deposits, Labor and Capital) used by the s^{th} firm, and u_i and v_j are the output and input weights respectively. The DMU maximizes the efficiency ratio, TE_k , subject to

$$\frac{\sum_{i=1}^m u_i y_{is}}{\sum_{j=1}^n v_j x_{jk}} \leq 1 \quad \text{Where } v_j \geq 1 \quad (1.6)$$

The above equation indicates that efficiency measures of a firm cannot exceed one and the input and output weights are positive. The weights are selected in such a way that the firm maximizes its own efficiency. To select optimal weights the following mathematical programming (output-oriented) is specified (Coelli, 1998; Wrothington, 1999; Shiu, 2002)

Max TE_k

$$\text{Subject to } \sum_{i=1}^m u_i y_{ir} - x_{jr} + w \leq 0 \quad r=1, \dots, K \quad (1.7)$$

$$v_j x_{jr} - \sum_{j=1}^n u_j x_{jk} \quad u_i \text{ and } v_j \geq 0$$

⁵ Banks will be represented as DMU.

Input oriented linear programming methods are used in order to obtain the minimized inputs. Therefore the following mathematical programming model is specified (Banker and Thrall, 1992; Coelli, 1998; Worthington, 1999; Shiu, 2002; Topuz *et al*, 2005).

Min TE_k

$$\text{Subject to } \sum_{i=1}^m u_i y_{ir} - y_{iF} + w \geq 0 \quad r=1 \dots K \quad (1.8)$$

$$x_{jr} - \sum_{j=1}^n u_j x_{jk} \geq 0 \quad u_i \text{ and } v_j \geq 0$$

The above model shows constant return to scale (CRS) if $w=0$ and it changed into variable return to scale (VRS) if w is used unconstrained (Qayyum and Ahmed, 2006). In the first case it leads to technical efficiency (TE) and in the second case we estimate pure technical efficiency (PTE). The TE scores obtained from a CRS DEA into two components, one due to scale inefficiency and one due to pure technical inefficiency. This may be done by conducting both a CRS and a VRS DEA upon the same data. If there is a difference in the two TE scores for a particular DMU, then this indicates that the DMU has scale inefficiency, and that the scale inefficiency can be calculated from the difference between the VRS TE scores and the CRS TE score. The CRS assumption is only appropriate when all DMUs are operating at an optimal scale. Imperfect competition, constraints on finance, etc. may cause a DMU to be not operating at an optimal scale. Banker, Charens and Cooper (1984) suggested an extension of the CRS DEA model to account for VRS situations. The use of the VRS specification will permit the calculation of TE devoid of these SE effects.

In the present study, the use of DEA to compute various efficiency scores has been preferred over other competing techniques, especially stochastic frontier analysis (SFA) for measuring relative efficiency of banks for several reasons. First, it allows the estimation of overall technical efficiency (OTE) and decomposes it into two mutually exclusive and non-additive components, namely, pure technical efficiency (PTE) and scale efficiency (SE). Further, it identifies the banks that are operating under decreasing or increasing returns-to-scale. Second, in DEA, there is no need to select a priori functional form relating to inputs and outputs like Cobb-Douglas and Translog production/cost functions (Banker, 1984). Third, DEA easily

accommodates multiple-inputs and multiple-outputs of the banks. Fourth, it provides a scalar measure of relative efficiency, and the areas for potential addition in outputs and reduction in inputs. Fifth, in DEA, it is not necessary to provide values for weights associated with input and output factors, although the user may exert influence in the selection of weight values. Sixth, DEA works particularly well with small samples (Evanroff and Israilevich, 1991). On the other hand, DEA's major shortcoming is that it assumes data to be free of measurement error, and could therefore; give unreliable results if the integrity of data is not assured (Avkiran, 1999a).

Input and output variables' specification is critical to banking efficiency studies (Berg, *et al.* 1992). The efficiency of banks can be measured by selecting appropriate inputs and outputs. Input output specification itself depends on how one defines banking activity. Economists look at a bank from five different angles [see for more details Favero and Papi (1995) and Colwell and Davis (1992)]. These approaches are the Production Approach (PA), Intermediation Approach (IA), Asset Approach (AA), User Cost Approach (UCA) and Value Added Approach (VAA). The former two approaches are commonly used by researchers.

The study used Intermediation Approach (IA) in defining bank inputs and outputs. The (IA) considers financial institutions as primarily intermediaries, channeling funds between borrowers and savers as intermediators of financial resources. The most fundamental role of the financial system remains that of intermediating between savers and investors. Efficient resource allocation of the available resources of the economy is undertaken (Haque, 1997). Intermediation approach deposits treated as inputs (Miller and Noulas, 1996). Along with Deposits, Labor and Capital as Inputs and Loans and Advances and Investment as Outputs.

The annual data used covers the period 1991-2008 for the 19 domestic commercial of Pakistan. The study period was divided into three periods, pre- reform period (1991-1997), First Phase of Reforms (1998-2001) and Second Phase of Reforms (2002-2005). The annual data are collected from various issues of the *Banking Statistics of Pakistan* by SBP and different annual reports of scheduled banks.

5. Empirical Findings

Financial Sector Development and Economic Development are inter-related. No economy can grow and improve the living standards of its population in the absence of a well

functioning and efficient financial sector. Banks in Pakistan account for 95 percent of the financial sector and hence a sound and healthy banking system is directly related to economic growth and development of Pakistan. The modern growth theory identifies two main channels through which the financial sector might affect long-run growth in a country: first, through catalyzing the capital accumulation (including both human and physical capital) and second by increasing the rate of technological progress.

Efficiency score of Pakistan banking industry working as intermediates are calculated by using DEA approach. We also assume VRS by using both input oriented (IO) and output oriented (OO). The results are presented in the table. As can be seen from the table the average input oriented technical efficiency (TE), pure technical efficiency (PTE) and scale efficiency (SE) leveled at 64.9%, 88% and 74.2% during 1991. The average output oriented TE, PTE and SE are 64.9%, 88.7% and 73.6% respectively during the same year. Scale inefficiency is greater than pure technical inefficiency in both measures. The performance of commercial banks as a group in 1991 is not noteworthy because the state owned banks were large in size.

Efficiencies of the domestic banks are presented in Table 2. Efficiency analysis for the pre reform period (i.e.1991-97) reveals that, the efficiency score of banking improves from 65% in 1991 85% in 1997. The efficiency score jumped at least 20 percentage points. This may be due to the privatization of main nationalized banks and the induction of new private banks that may have induced healthy competition in the banking industry.

Comparing the results of pre reform and 1st phase of reforms it can be concluded in input-oriented the Pure Technical Inefficiency (PTI) in pre-reform period was 8.9 percent and in first phase it is 5.8 percent. It means that there is a 3.1 percent increase in PTE. But Scale Inefficiency (SI) in pre-reform period was 14.2 percent and in first phase it is 16.7 percent. It means that the scale inefficiency increased by 2.5 percent in the 1st phase of reforms. On the other hand, in output-oriented the Pure Technical Inefficiency (PTI) in pre-reform period was 8.4 percent and in first phase it is 6.4 percent. It means PTE increased 2 percent. In pre-reform period SE was 14.7 percent and in first phase of reforms it is 15.8 percent, its means that the SE increased 1.1 percent. Scale Inefficiency is increased in this period it may be due to over employment in banks, unprofitable branches, burden of non-performing loans (NPLs) etc.

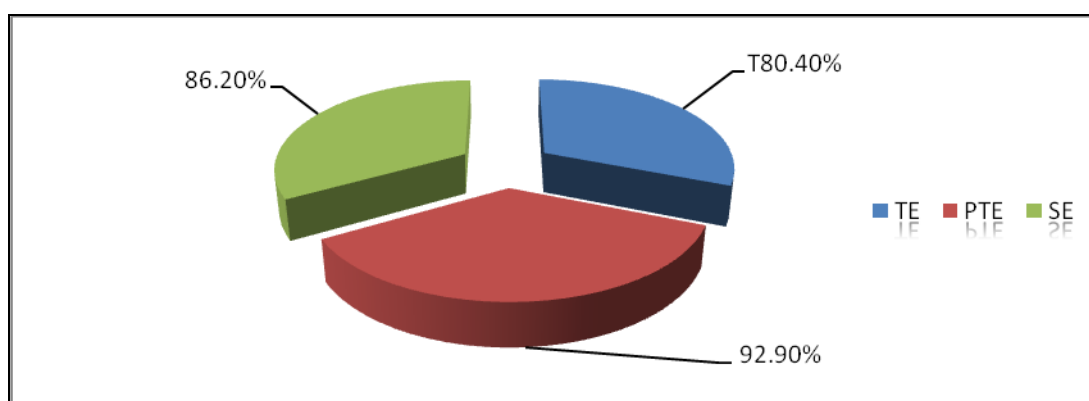
Table 2: Summary of Input and Output Oriented Efficiency Measures of Banking Industry

Banks	Years	Input Oriented			Output Oriented		
		TE	PTE	SE	TE	PTE	SE
Pre-Reforms	1991	0.649	0.880	0.742	0.649	0.887	0.736
	1992	0.718	0.886	0.818	0.718	0.888	0.817
	1993	0.727	0.901	0.807	0.727	0.921	0.787
	1994	0.879	0.951	0.924	0.879	0.961	0.914
	1995	0.802	0.899	0.883	0.802	0.902	0.882
	1996	0.875	0.930	0.939	0.875	0.926	0.944
	1997	0.854	0.935	0.912	0.854	0.928	0.909
MEAN	1991-97	0.786	0.912	0.861	0.786	0.916	0.856
Phase-1	1998	0.812	0.929	0.868	0.812	0.923	0.875
	1999	0.797	0.946	0.845	0.797	0.950	0.842
	2000	0.802	0.966	0.828	0.802	0.957	0.839
	2001	0.739	0.929	0.794	0.739	0.914	0.815
MEAN	1998-01	0.788	0.943	0.834	0.788	0.936	0.843
Phase-2	2002	0.821	0.932	0.877	0.821	0.924	0.884
	2003	0.825	0.940	0.880	0.825	0.931	0.891
	2004	0.924	0.989	0.934	0.924	0.986	0.937
	2005	0.939	0.979	0.958	0.939	0.980	0.958
	2002-05	0.877	0.960	0.912	0.877	0.955	0.918
	2006	0.854	0.814	0.891	0.874	0.779	0.837
	2007	0.894	0.956	0.936	0.882	0.958	0.923
	2008	0.919	0.965	0.941	0.921	0.967	0.956
MEAN	2006-08	0.889	0.912	0.923	0.892	0.901	0.905
MEAN	1991-08	0.824	0.929	0.877	0.823	0.927	0.875

During the first phase of reforms, during the period 1998-01 average input oriented TE, PTE and SE are 78.8%, 94.3% and 83.4% respectively. Average mean efficiency of output oriented TE, PTE and SE are 78.8%, 93.6% and 84.3% respectively. A possible reason for the increasing PTE during the period may be the strengthening of the prudential regulations and international accounting standards for the banks by the SBP

Comparing the results of the pre reform period and the first phase of reforms, it can be concluded in input-oriented Pure Technical Inefficiency (PTI) in the pre-reform period was 8.9% and in first phase it is 5.8%. This means that there is a 3.1% increase in PTE. But Scale Inefficiency (SI) in the pre-reform period was 14.2% and in the first phase it was 16.7%. Thus scale inefficiency increased 2.5% in the first phase of reforms. On the other hand, in output-oriented Pure Technical Inefficiency (PTI) in the pre-reform period was 8.4% and in the first phase it was 6.4%. Thus PTE increased 2%.

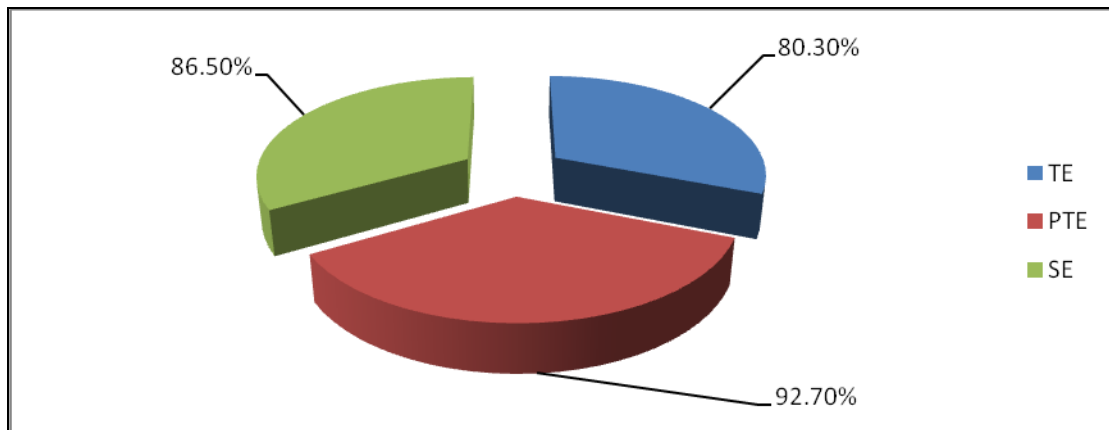
Figure: 1.3 Input Oriented Efficiency Measures of Banking Industry (1991-2008)



In the pre-reform period SE was 14.7% and in first phase of reforms it was 15.8%. SE increased 1.1%. Scale Inefficiency increased in this period. It may have been due to over employment in banks, unprofitable branches, and the burden of non-performing loans (NPLs) etc

Annual average efficiencies of the domestic commercial banks are presented in Table 5.1. Efficiency analysis for the pre reform period (i.e.1991-97) reveals that, .mean of input oriented TE, PTE and SE was 78.6%, 91.2% and 86.1% respectively. The average output oriented TE, PTE and SE are 78.6%, 91.6% and 85.6% respectively. As can be seen from the Table, the efficiency score increased during the period. This may be due to the privatization of public banks and the entrance of new private commercial banks in the industry which increased competition among the banks

Figure: 1.4 Output Oriented Efficiency Measures of Banking Industry (1991-2008)



Last spell of financial sector reforms started in 2002 to 2005 with the revival of earlier reform process by the government of Pakistan with the help of international agencies. Most of the reforms initiated in the 2nd phase are reduce the cost structure of state owned banks and facilitate their scale, complete the privatization of banks, liberalize the bank branch policy, reduce taxes and maintain a more effective role of the central banks, are in the second phase.

Efficiency analysis for the period of the second phase of reforms (i.e.2002-08). For the year 2002 input oriented TE, PTE and SE was 82.1%, 93.2% and 87.7.2% and output oriented TE, PTE and SE are 82.1%, 92.4% and 88.4% respectively. The efficiency scores for the period 2008 presented in the Table revealed that input oriented TE, PTE and SE are 91.9, 96.5 and 94.1 percent, and output oriented TE, PTE and SE are 92.1, 96.7 and 95.6 respectively. Efficiency score increased in 2008 as compare to 2002, the reforms improve the efficiency of banks so the TE, PTE and SE increased. Overall mean efficiency score (1991-2008) shows that the reforms improved the efficiency of banks so the PTE and SE increased regularly.

In the pre reform, first phase second phase of reforms and after the second phase mean efficiencies shows there is a decline in efficiency. From the pre reform period there is a gradual increase in the efficiencies till 2005, after that table shows a decline in efficiency scores. The table shows that scale inefficiency is greater than pure technical inefficiency in both measures. This implies that most of the technical inefficiency of commercial banks is due to scale inefficiency rather than pure technical inefficiency (Managerial Efficiency). Now the banks are able to expand their core business activities, they strengthened their capital base, improved asset

quality and profitability during the year 2004& 2005. These developments clearly reflect the increased competition among banks and improvement in the efficiency of the banking sector. The results show that most of the reforms are related to the management side and banks showed improvements in the management side (i.e. PTE). However, there is a need for proper reforms to reduce scale inefficiency.

6. Conclusion

The paper attempts to explore the efficiency measures of Pakistani banks by using bank-wise annual data from 1991 to 2008. The financial sector reforms initiated in early 1990s has changed the entire banking industry in Pakistan. There was a government monopoly in banking sector during pre-reform era Reforms have increased both the revenues and costs of banks whereas profitability not for consumers.

The technological progress, which mainly comprised computerization and automation of financial transactions, has significantly reduced the cost of banking industry during the sample period. Thus financial sector reforms particularly the second phase of reforms improved the efficiency of commercial, public and private banks. After the reforms, PTE increased as compared to SE. It can be concluded that the overall efficiency of the industry improved because of an increase in pure technical efficiency.

For each year, efficiency frontier is estimated under each specification to measure the relative performance of commercial banks. The analysis found that commercial banks could improve their efficiency by increasing profits, assets, markup interest earnings and non-markup interest earning and decreasing liabilities, markup interest expenditures and non-markup interest expenditures among the bank specific variables.

There is an overall improvement in the efficiency of commercial banks. Financial sector reforms changed the ownership structure of the banking sector during the two decade. Earlier banking sector was dominated by the state owned banks. Now share of public sector banks has declined. Improve the efficiency of the banks and after the reform the PTE is increased as compared to SE (2004-05). It is further concluded that the overall efficiency of the industry improved because of increase in the pure technical efficiency (PTE).

Overall conclusion of the study is that the reforms are successfully improving the efficiency of domestic commercial banks in Pakistan which can be achieved through adopting

corrective measures in administrative management, optimal diversification of asset portfolio, technological progress and reducing the amount of nonperforming loans under the guidance of international agencies.

This study however concentrated on only one aspect of commercial bank that is role as an intermediary. There are number of other dimensions and aspects needs to be explored, including efficiency of bank as production unit, economic and allocative efficiency of banks etc.

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