



## Impact of Privatization upon Efficiency of Enterprises: Evidence from the Banking Sector of Pakistan

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### ABSTRACT

*This research aims at examining the impact of privatization upon efficiency of banking sector in Pakistan. It covers commercial banks of the country that were nationalized in 1970s and later on privatized between 1991 and 2007. By using banking data of 1981 to 2007, from the annual reports of sample banks, this study aims to analyze the impact of privatization upon banking efficiency. Furthermore, nationalized banks for that period are also evaluated to analyze the relative efficiency and impact of privatization on competitive banks in group. The non-parametric Data Envelopment Analysis method is used to calculate the relative efficiency scores for individual banks in both pre- and post- privatization scenarios as well as in different phases for comparative purpose. The results indicate that the overall efficiency of banks in post-privatization period as well as in each phase remained significantly lower than the phase beneath it.*

**Keywords:** Privatization, Efficiency, Banking Sector, DEA, CRS

### Introduction

The well functioning financial system is a key factor in economic development of any country. It facilitates economic transactions and establishes an investor-friendly environment (Arshad & Khan, 2007). It is also necessary for enhancing efficiency of intermediation through mobilization of savings and funding the profitable business opportunities (Khalid, 2006). The financial stability in a country can be promoted through the presence of established financial system. An unstable banking system, on the other side, may distort link between inflation, interest rates and economic activity and thereby complicate monetary policy decision making. Resilience, internal stability and flexibility are the fundamental characteristics of a robust financial system (Ngalande, 2003).

The concept of financial institutions exists since man came to realize importance of money as medium of exchange. It is widely accepted that Bank of Venice founded in 1157 was 1<sup>st</sup> public banking institution. Besides to classic origins, the banking in its modern form and structure started in Britain in 14<sup>th</sup> Century (Viney, 2002; Siddiqi, 2003). The significance of financial system in economic development has been accepted widely. Considering the importance of financial institutions and markets in economic growth, some Governments in less developed countries tried to enlarge the state ownership of banks and other such institutions; so that it can be able to extend credit to priority sectors. However, many research findings showed that state ownership has a negative effect on economic development of many developing countries. A balanced financial system can contribute to economic stability, growth and competition whereas unbalanced financial system usually led to under-developed and uncompetitive markets. It also imposes constraints on economic growth of the country (Perotti & Oijen, 2001; William & Ngyuen, 2005).

Pakistan, like most of other developing countries, also promoted public sector in 1970s to operate in almost all financial services, infrastructure and many industrial units. The domestic banks in Pakistan had been nationalized during above-mentioned period and were transformed to five national commercial banks. Additionally, some household saving schemes and specialized credit institutions were also established. Its objective was to boost specific and priority sectors through provision of bank credit on reasonable terms. The government was major controller of financial sector in Pakistan during pre-reform period. In beginning of nineties, the public sector was dominant with about 92% share of total assets and 93% of total deposits. The remaining portion was held by foreign banks while no domestic private bank operating in country.

The restructuring of financial system has been started by many developing countries, since early 1990s, through broader Structural Adjustment Programs (SAP) under the directions of IMF. In Structural Adjustment Programs, the policies of fiscal consolidation, liberalization and deregulation of financial sector, reforms of trade and exchange rate system, etc. were adopted (Zaidi, 2005; Arshad & Khan, 2007). The program of denationalization was firstly introduced by government of Konrad Adenauer in the Federal Republic of Germany, in 1961, through public share offering in stake of Volkswagen to small investors. However, it is widely accepted that modern privatization programs has started/introduced by conservative government of Margaret Thatcher in U.K. in early 1980s. The achievements of privatization program in U.K. induced many other countries for public share offerings of SOEs (Megginson & Netter, 2001).

About 16 years after Nationalization, the authorities decided to introduce liberalization policies in financial sector by licensing private banks to operate in Pakistan. The policy makers reached at the conclusion that long-term objectives of employment and economic growth can only be achieved in the presence of a dynamic and strong private sector. Government, in different phases in 1990s, introduced remarkable changes in banking sector through deregulation and liberalization of financial sector. As a part of this financial liberalization strategy, private sector was allowed to open commercial banks in the country. The majority of state-owned commercial banks have also been de-nationalized/privatized. Additionally, the intervention of government in business of its own banks has also been minimized to ensure competitive industry environment. The Government, from 1991 to 2007, completed 07 transactions of bank privatization for Rs. 41,023.20 million. Shares of different banks were also sold through capital market transactions (PC, Year Book, 2006-07). Privatization of banks put a massive impact on overall banking sector. By end of 2007, the share of state-owned banks reduced to around 20% in both assets and deposits. The five domestic commercial banks namely NBP, MCB, UBL, ABL and HBL are still playing a critical role in the domestic financial system.

The literature on privatization has mainly focused on overall impact of financial sector reforms upon banking sector in Pakistan. There is lesser emphasis on examining the impact of privatization upon efficiency; particularly in pre- and post-privatization scenarios. The objective of this research is to analyze the impact of privatization upon efficiency of banks in Pakistan and for this purpose banks are evaluated in both pre- and post- privatization scenarios. DEA methodology is used for examining individual banks' efficiency in both pre-privatization and post-privatization scenarios as well as for different phases. The results of DEA show a variation in banking efficiency over study period. The overall efficiency scores of banks in post-privatization period as well as in each phase remained, by and large, significantly lower than the phase beneath it. The results, therefore, supports the hypothesis that privatization of a bank/enterprise may not necessarily enhance its efficiency. The findings of study are expected to be relevant and helpful for government policymakers and others in the civil societies who are supporting privatization program.

## **Literature Review**

Privatization is usually referred as partial or total sale of SOE's shares to private investors. The term Privatization has variety of meanings; e.g. Savas (1987) described privatization as a mean of increasing the assets' ownership by private sector while reducing the role of government. Hanke (1987) defined it as a mechanism of transferring service functions and assets to private hands from public sector. Self (1993) referred the privatization as a mean to enhance competitive pressure of market forces by slimming the state. In simple and broader words, privatization means the transfer of any government function to private sector. There are different views about privatization. Both proponents and opponents have their views. According to proponents, presence of free market competition makes the private sector more efficient than government in delivering goods and services to customers. This will also lead to improved quality, quicker delivery, more choices, lower prices, and less corruption.

The underlying assumption behind privatization policies is the potential of markets in satisfying human needs effectively as compared to state. The public sector has been criticized for having a number of distortions and imperfections. The dominance of political considerations in public sector over economic efficiencies usually leads to under-investment and lower growth (Self, 1993; Smith, 1998). Contrary to proponents; the opponents of privatization claimed that a government elected in a democratic setup is held accountable to people and therefore it exerts more efforts to safeguard assets of the nation. The social objectives dominate the profit motive in such a setup. These are lacking in private enterprises because their prime objective is to earn profit without considering social costs and benefits (Hartely & Parker, 1991; Bhaskar & Khan, 1995). The views of proponents and opponents can be broadly classified into two categories namely political view and development view. The political view holds that state ownership of financial institutions can politicize the allocation of resource for public votes and results in inferior economic efficiency. Contrary to this, the development view claims that governments can mediate through financial institutions to put the savings of people in developmental sectors and to direct credit towards priority sectors. It advocates the state ownership of enterprises in strategic sectors of economy (Gerschenkron, 1962; La Porta, Lopez-de-Silanes, & Shliefer, 2002).

Hanke (1987) argued that privatization is a most revolutionary innovation in recent economic policy's history. Hartley and Parker (1991) pointed out that the prevalence of perfect competition matters more for efficiency gains than the ownership status. Under similar market signals and competitive pressures, both public and private sector firms are expected to generate

similar results in terms of allocative efficiency. Shleifer and Vishny (1996) argued that managers in public sector enterprises need to pursue multiple objectives unlike their counterparts in private sector. Tanyi (1997) argued that in Africa, most governments attempt to generate revenue in short term while spinning off loss-making enterprises, through privatization of state-owned enterprises. Due to this reason, profitable enterprises and sectors are usually excluded from the list of privatization candidates in most African countries. Smith (1998) argued that deregulation enabled the banks to achieve scale economies by using new technologies more efficiently, on one hand; and increased competition due to the entry of new players from private sector, on the other hand. The association of privatization to economic growth most directly links to microeconomic theories that are used to justify privatization. The theoretical perspectives on ownership issues are basically drawn from public choice theory, principal agent analysis and theory of property rights (Alchian, 1965; Jensen & Meckling, 1976). In the presence of well protected property rights, it is less likely that buyer will fail to fulfill the promises. Aharoni (1982) referred the state-owned enterprises as an agent without having a principal.

The number of researchers attempted to empirically investigate the effect of privatization and liberalization policies across different countries. Tatje and Lovell (1996) noted a decline in productivity of Spanish saving banks after deregulation program. Leightner and Lovell (1998), on the other hand, found that productivity of Thai banks improved in the post-liberalization period. Denizer, Dinc and Tarimcilar (2000) found that efficiency of banks declined in reality during post-liberalization period for Turkish banking sector. In a similar study, Barth, Caprio and Levine (2001) used banking sector data of over 60 countries and documented negative association of state ownership to performance of banks and for overall development of financial sector. Kumbhakar, Lozano-Vivas, Lovell and Hasan (2001) documented an increase in productivity growth rate of Spanish savings banks during post-liberalization period. Hao and Hunter (2001), however, concluded that there is no or minor positive association of banking sector reforms and efficiency in Korea. Isik and Hassan (2003) found an improvement in performance of Turkish banks after financial liberalization. Similarly, Nakane and Weintraub (2005) concluded that private banks are significantly more productive than the state-owned banks. They noted a significant increase in productivity of Brazilian banks because of privatization. Beck, Cull and Jerome (2005) also found a significant positive impact of privatization on Nigerian banks, even in times of unfriendly regulatory and macroeconomic environment to financial intermediation. In a similar study, Williams and Nguyen (2005) found that privatization policies lead to improvement in both bank efficiency and productivity. Otchere (2005), on the other side, did not find any significant performance improvement of banks in low and middle-income countries following privatization.

It has been attempted by some researchers to examine the effect of liberalization and privatization policies on banking performance in Pakistan; however, results are yet inconclusive. Rizvi (2001) documented a better performance of major state-owned banks in Pakistan as compared to private and foreign banks. Atallah, Cockerill and Le (2004) compared the commercial banks' technical efficiency in Pakistan and India; after liberalization of financial policies in both the countries. They noted a positive effect of liberalization policies on efficiency of banks in both countries. Patti and Hardy (2005) examined profit and cost efficiency of banks in Pakistan in post-liberalization period. They found that financial liberalization lead to increase bank profits in 1<sup>st</sup> round of financial reforms; however, in subsequent years the reforms do not have a positive impact on banking performance. The profitability declined after 1997 that may be due to deteriorating business conditions. Khalid (2006) employed ratio-based CAMELS framework to examine the effect of liberalization and privatization on performance of banking

sector in Pakistan. He concluded that benefits of privatization are likely to emerge over a longer period of time only whereas it has negative impact for shorter period. In a similar study, Ali and Ahmed (2007) analyzed the effect of financial sector reforms on soundness of banks in Pakistan over last two decades. They applied CAMELS framework of financial ratios and found that financial sector reforms, introduced in late 1980s, made significant impact on soundness of banks. Burki and Niazi (2010) studied the effect of privatization, regulation and competition on efficiency of banks in Pakistan. The state-owned banks found to be least cost efficient while foreign banks were at highest level of efficiency in the group. Nazir and Alam (2010) examined the relative efficiency of commercial banks in Pakistan, over the period of 2003-07. They employed two different techniques and found public sector banks more efficient than the private banks.

Kouser, Azid and Ali (2011) argued that the government can develop a competitive environment in the country through the private sector and this will result in overall economic development of the country. The privatization results in significant increase of enterprises' performance, according to them. Similarly, Ilyas, Sabeeh Ullah, Obaid Ullah and Fayaz (2012) studied the effect of privatization on financial performance of two banks in Pakistan. They documented some mixed results with increasing trend in majority of performance indicators. On the other hand, Ijaz, Atta-ul-Haq, Naseem and Iqbal (2012) found a significant decline in the value of non-performing loans after privatization. Mehmood and Faridi (2013) documented an insignificant positive effect of privatization on economic growth of Pakistan. In a similar study; Mujahid, Hashmi and Abbas (2014) examined the effect of privatization on profitability of banks in Pakistan. By comparing the profitability ratios of pre- and post-privatization period, they found a significant positive effect of privatization on profitability of sample banks and the overall banking sector. Shafiq (2014) analyzed the comparative effect of privatization on performance of banking sector in Pakistan. By employing ratio, vertical and common size analysis, he documented a superior performance of HBL after privatization, in comparison to other banks. Another study by Rizwan, Pasha, Asrar and Siddiqui (2015) examined the impact of privatization on financial performance of MCB and ABL that were privatized in initial stages of privatization program. They noted a significant improvement in the performance of banks after privatization. The existing studies focused much on the overall impact of liberalization and deregulation policies. The study to compare pre- and post-privatization efficiency of privatized commercial banks in Pakistan is especially needed. This study is an attempt to fill gap in existing literature and will help to determine impact of privatization upon efficiency of banks in Pakistan following privatization.

## **Methodology**

The analysis is made by employing Data Envelopment Analysis (DEA) technique and it is employed in pre- and post-privatization scenarios. DEA is used broadly in performance evaluation of Decision Making Units. It uses observed values of inputs and outputs and attempts to find which of firm(s) in sample determine an envelopment surface. Firms lying on surface are considered efficient and receive value of unity whereas firms not lying on surface are considered to be inefficient and receive value of less than unity. In presence of multiple output and input factors, the efficiency score can be defined as ratio of weighted sum of outputs to inputs. The original model of Charnes, Cooper and Rhodes (1978) called CCR model can express DEA mathematically. To understand it, consider N units converting K inputs to M outputs. Each unit in the analysis is called a DMU. To determine efficiency of a DMU through this process,

Charnes, Cooper and Rhodes proposed the use of maximum ratio of weighted outputs to inputs for that unit, subject to condition that similar ratios for other DMUs be less than or equal to one. That is,

$$\text{Max } e^0 = \frac{\sum_{m=1}^M u_m^0 y_m^0}{\sum_{k=1}^K v_k^0 x_k^0} \text{-----} \text{©}$$

Subject to:

$$\frac{\sum_{m=1}^M u_m^0 y_m^n}{\sum_{k=1}^K v_k^0 x_k^n} \leq 1$$

Charnes, et al. (1978) further transformed this non-linear programming function to a linear one as:

$$\text{Max } h^0 = \sum_{m=1}^M u_m^0 y_m^0 \text{-----} \text{®}$$

Subject to:

$$\sum_{k=1}^K v_k^0 x_k^0 = 1$$

$$\sum_{m=1}^M u_m^0 y_m^n - \sum_{k=1}^K v_k^0 x_k^n \leq 0$$

The variables defined in equation “®” are similar to those defined in equation “©”. However, in addition to variables of equation “©”,  $\epsilon$  is introduced in equation “®”. The purpose of  $\epsilon$  is to ensure positive weight values of all of known outputs and inputs. The condition  $h^0=1$  ensures that base DMU<sup>0</sup> is DEA efficient.

The 1<sup>st</sup> and crucial step in DEA is the selection of input-output combination. Considering the nature of functions performed by commercial banks in Pakistan; the Income-based model, Loan-based model and Intermediation approach are used in this study for selection of inputs and outputs. Income-Based Model proposes that banks generate non-interest and interest income by incurring interest and operating expenses whereas Loan-Based Model proposes use of similar inputs to produce loans & advances and investments. Intermediation Approach as the mix of production and intermediation approaches is also used for the selection of variables. The intermediation alongwith production approach considers the inputs of labour, physical capital and financial capital to generate outputs represented by loans & advances and investments (Leightner & Lovell, 1998; Ataullah, Cockerill, & Le, 2004).

## Data Analysis and Empirical Results

The study is aimed at investigating effect of privatization upon efficiency of banking sector in Pakistan. The sample selected for this study includes banks that were nationalized in 1970s and then privatized in different phases from 1991-2007. The banks remained state-owned in same period are also included to investigate the comparative position and impact of privatization on competitive banks of group during this period. The banks included in study are NBP, MCB, UBL, ABL and HBL. The analysis is made on bank level data of 1981-2007 and is conducted in both pre- and post-privatization scenarios. The data is extracted from annual audited financial statements of sample banks. The efficiency scores for each bank are calculated in pre- and post-privatization scenarios as well as in different phases. In pre- and post-scenario,

the average efficiency score for each bank are calculated whereas for comparative purposes, the whole period is divided into three phases. The Phase I (1981-1990) covers the pre-privatization period and all the banks included in the sample remained state-owned during this period. Phase II (1991-2001) covers the period after privatization of MCB and ABL. However, NBP, UBL and HBL remained state-owned in this period. Phase III (2002-2007) covers the period after privatization of UBL and HBL with NBP still remained state-owned; whereas the privatization of MCB and ABL already completed in the 2<sup>nd</sup> Phase. The efficiency score showing pre-privatization vs post-privatization Comparison is summarized in Annexure I.

The results of DEA, calculated through different input-output combinations, indicate that efficiency of banks varied over the study period. The mean efficiency, by using MS-Excel technique, is calculated for comparative purposes and is calculated for pre-privatization period, post-privatization period as well as for three phases. The comparison of mean values for pre and post privatization period indicates that the efficiency of banks, in majority of cases, declined in post-privatization period. The banks actually failed to convert their inputs to outputs efficiently, in post-privatization period. The TE, PTE and SE for all four banks, by and large, declined in post-privatization period. Moreover, the mean efficiency scores for three different phases also show a declining trend in each phase as compared to its previous phase. The comparative efficiency analyses of different phases are summarized in Annexure II. The slight increase of mean efficiency in 2<sup>nd</sup> phase, in some cases, is only because of an increase in the efficiency of NBP; that remained state-owned throughout the period.

The results indicate that privatization of ABL and MCB in the 2<sup>nd</sup> phase and that of UBL and HBL in the 3<sup>rd</sup> phase put a negative effect on performance of these banks as well on competitive banks in group. On the other side, NBP that remained state-owned throughout the period, remained fully efficient in both 2<sup>nd</sup> and 3<sup>rd</sup> phases. While investigating the source of inefficiency, it is concluded that in overall Cost Inefficiency (CIE), Allocative Inefficiency (AIE) contributes more than Technical Inefficiency (TIE) whereas in overall TIE, the contribution of Scale Inefficiency (SIE), by and large, is more than that of Pure Technical Inefficiency (PTIE). The reasons of this inefficiency may include, but not limited to, the extra usage of inputs than technically desired for the production of outputs, improper scale of production/transformation of inputs to outputs, failure of management to utilize the resources properly, unprofitable branches, huge portfolio of NPLs, unfavorable macroeconomic environment, political instability, etc.

## **Summary and Conclusions**

This study examines the impact of privatization upon efficiency of banks in Pakistan that were nationalized in 1970s and later on privatized between the periods of 1991 to 2007. The banks remained state-owned during this period are also evaluated to determine the impact of privatization on competitive banks of group. Generally, it is believed that liberalization and deregulation is pre-requisite for enhancing the efficiency within banking sector as well as for overall economic growth in country. However, the advocates of nationalization do not accept this phenomenon and viewed that state ownership of enterprises is economically and socially beneficial. They consider the state control of major enterprises as an important tool for national integration and nation building because through SOEs the government can make investment decisions by itself, can provide jobs to young educated people and can make wide coverage for the benefit of general public. This may lack in private enterprises that exist with profit-motives only and concentrate only on profit-oriented areas.

In Pakistan, comprehensive banking-sector reforms with privatization of SOEs started in early 1990s. Financial sector reforms changed ownership structure of banking sector during the last two decades. Prior to the start of financial sector reforms in early 1990s, banking sector was dominated/controlled by SOEs with about 92% of total assets, 93% of total deposits and 86% of total equity of banking industry. The continuous banking sector reforms changed structure of this sector and percentage for Assets, Deposits and Equity of SOEs remained 20%, 21% and 24% respectively in 2007. During this period (1991-2007), four major nationalized banks namely MCB, UBL, ABL and HBL were privatized. The purpose of this study is to compare efficiency of these banks in both scenarios of pre-privatization and post-privatization for which input-oriented non-parametric DEA model is used. For comparative purposes, total study period (1981-2007) is divided into three phases.

The results of DEA indicate a variation in banking efficiency over study period. For comparative purposes, the mean efficiency of each bank in pre- vs post-privatization periods as well as in phases is calculated. The results indicate that the overall efficiency scores of banks in period after privatization as well as in each phase remained, by and large, significantly lower than the phase beneath it. The results, therefore, supports the hypothesis that privatization of a bank/enterprise doesn't necessarily enhance its efficiency. The efficiency is actually declined in post-privatization period for sample banks. The allocative inefficiency is found to be contributing more in cost inefficiency than technical inefficiency. The results, therefore, suggests that inefficiency sources are mostly allocative and implies that banks do not use the proper input mix. In addition to this, the contribution of SIE to overall TIE is, by and large, greater than that of PTIE. This implies the improper scale of production/transformation by the banks. The results further indicate that banks failed to transform their inputs to outputs efficiently in the period following privatization. The reason of this failure includes, but not limited to, the excessive deployment of resources than technically desired to produce required outputs.

The privatization of public sector enterprises in Pakistan, contrary to general perception, actually failed to meet the expectations and it causes slowdown of social development. The results of this study are in line with results of some previous studies conducted in different economies of the world; including Pakistan, Korea, Spanish, Russia, India, Turkey and some other low & middle income countries. These studies concluded that the privatization program, if not properly designed and implemented, can lead to inefficiency of privatized enterprises as well as impose negative consequences on overall economic growth of the country (Naqvi & Kemal, 1991; Tatje & Lovell, 1996; Villalonga, 2000; Hao & Hunter, 2001; Otchere, 2005). The experience of some other countries also does not show much impressive outcomes from privatization and many countries have stepped forward to nationalize their privatized/private enterprises particularly major banks. Despite the facts mentioned above, the findings of this study does not support the idea that all the private ownership is suboptimal and nationalization of private property is a viable and efficient outcome but it suggests the extensive evaluation of enterprises before supporting the privatization program.

The results of this study suggests that only change of ownership, from public to private hands, is not enough to enhance the efficiency of enterprises. Instead of privatizing state-owned enterprises; the measures should be taken to attract the public-private partnership. The private and foreign investors should be encouraged in this context. Furthermore, the privatization of state-owned enterprises, wherever necessary, should be done through gradual sale of shares to the public; as it is the most preferred form of privatization and proved successful in some earlier cases as well. This study concentrated only on banking sector, however, there are number of other sectors included in the privatization program. A deep investigation of other sectors, where

the privatization of SOEs took place, can find more interesting facts related to impact of privatization upon efficiency. Moreover, besides to using quantitative data from annual reports, the qualitative data on variables including customer's satisfaction, improvement in services, geographic coverage and analysis of macro-economic factors during the study can also be utilized to see the actual status and for more comprehensive results covering all aspects.

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**Annexure I: Pre-Privatization vs Post- Privatization Comparison**

<b>Analysis Period</b>	<b>TE</b>		<b>PTE</b>		<b>SE</b>
<b>Income Based Model</b>					
<b>MCB</b>					
Before Privatization	1.000		1.000		1.000
After Privatization	0.982		0.987		0.995
<b>UBL</b>					
Before Privatization	0.983		0.995		0.988
After Privatization	0.880		0.902		0.972
<b>ABL</b>					
Before Privatization	0.996		1.000		0.996
After Privatization	0.912		0.997		0.914
<b>HBL</b>					
Before Privatization	0.970		1.000		0.970
After Privatization	0.823		0.976		0.840
<b>Loan Based Model</b>					
<b>MCB</b>					
Before Privatization	0.994		1.000		0.994
After Privatization	0.975		0.986		0.989
<b>UBL</b>					
Before Privatization	0.998		1.000		0.998
After Privatization	0.870		0.931		0.927
<b>ABL</b>					
Before Privatization	0.998		1.000		0.998
After Privatization	0.935		0.997		0.938
<b>HBL</b>					
Before Privatization	0.992		1.000		0.992
After Privatization	0.811		1.000		0.811
<b>Intermediation Approach</b>					
	<b>TE</b>	<b>CE</b>	<b>PTE</b>	<b>SE</b>	<b>AE</b>
<b>MCB</b>					
Before Privatization	1.000	0.964	1.000	1.000	0.964
After Privatization	0.999	0.968	1.000	0.999	0.969
<b>UBL</b>					
Before Privatization	0.995	0.961	0.998	0.997	0.966
After Privatization	1.000	1.000	1.000	1.000	1.000
<b>ABL</b>					
Before Privatization	0.996	0.963	1.000	0.996	0.967
After Privatization	0.951	0.911	1.000	0.951	0.955
<b>HBL</b>					
Before Privatization	1.000	1.000	1.000	1.000	1.000
After Privatization	1.000	0.966	1.000	1.000	0.966

**Annexure II: Comparative Efficiency of Banks (Phase-wise Result)**

Phases	NBP	MCB	UBL	ABL	HBL	NBP	MCB	UBL	ABL	HBL	NBP	MCB	UBL	ABL	HBL
	<b>TE</b>					<b>PTE</b>					<b>SE</b>				
<b>Income Based Model</b>															
I	0.976	1.000	0.987	0.996	1.000	0.980	1.000	0.994	1.000	1.000	0.995	1.000	0.993	0.996	1.000
II	1.000	0.991	0.979	0.953	0.944	1.000	0.996	0.996	1.000	1.000	1.000	0.994	0.983	0.953	0.944
III	1.000	0.966	0.880	0.837	0.843	1.000	0.971	0.902	0.991	0.980	1.000	0.995	0.972	0.844	0.858
<b>Loan Based Model</b>															
I	0.860	0.994	0.997	0.998	1.000	0.869	1.000	1.000	1.000	1.000	0.990	0.994	0.997	0.998	1.000
II	0.975	0.963	1.000	0.965	0.984	1.000	0.979	1.000	1.000	1.000	0.975	0.984	1.000	0.965	0.984
III	0.978	0.996	0.870	0.881	0.842	1.000	0.998	0.931	0.991	1.000	0.978	0.998	0.927	0.889	0.842
<b>Intermediation Approach</b>															
I	0.903	1.000	0.997	0.996	1.000	0.909	1.000	0.999	1.000	1.000	0.993	1.000	0.998	0.996	1.000
II	1.000	0.999	0.994	0.973	1.000	1.000	1.000	0.998	1.000	1.000	1.000	0.999	0.996	0.973	1.000
III	1.000	0.999	1.000	0.911	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	1.000	0.911	1.000
	<b>CE</b>					<b>AE</b>									
I	0.887	0.964	0.979	0.963	1.000	0.983	0.964	0.982	0.967	1.000					
II	0.991	0.979	0.945	0.942	0.999	0.991	0.981	0.950	0.968	0.999					
III	1.000	0.947	1.000	0.853	0.972	1.000	0.948	1.000	0.933	0.972					