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Impact of Mergers & Acquisitions upon Banking Efficiency in Pakistan: A Data Envelopment Analysis Approach

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Abstract
        This study is aimed at investigating the effect of Mergers &Acquisitions (M&As) upon banking sector efficiency in Pakistan. The widely used Data Envelopment Analysis method with its input oriented measure under CRS assumption is applied to explore the efficiency impact of M&As. The technical efficiency (TE), pure technical efficiency (PTE) and scale efficiency (SE) scores for the individual banks are calculated by using three different input-output models. The findings of study show a decline in average efficiency scores for majority of the sample banks during post-merger/acquisition period.

Key words: Mergers & Acquisitions, Banking Sector, Date Envelopment Analysis, TE, PTE, SE.

Introduction

        The efficient, established and well functioning financial system is necessary for the economic development of any country. It facilitates the economic transactions, mobilize the domestic savings, and create an investor friendly environment and helps in identification as well as funding of good business opportunities (Arshad & Sajawal, 2007; Khalid, 2006). The efficient financial system makes it possible to exchange the funds from saving surplus units to saving deficit units and thereby increase well being of both the parties. It enables the surplus units to transfer/secure their purchasing power over future and provide funds to deficit units for their

current needs (Viney, 2002). It ensures the effective and efficient utilization of national resources.

The commercial banking sector is considered as an important sector in Pakistan and is playing a crucial role in economic development of the country. At the time of partition in 1947, Pakistan got a weak banking sector and services of banking were severely affected. Pakistan got only few banks with 81 branches in total having limited capital, however, after the establishment of central bank in 1948; this sector was much emphasized and showed significant improvement (Khalid & Hanif, 2005). The number of scheduled banks in 1973 was about 14 and the branch network crossed the figure of 3000 domestically plus some branches in foreign countries as well. However, the government at that time decided to nationalize the banking sector along-with other sectors and banks were restructured into a group of five banks (Siddiqi, 2002). This was reversed in early 1990s and liberalization process started in the country. The new local and foreign banks were allowed to enter in the banking business. The government, during different phases in 1990's and afterwards, introduced different financial liberalization policies in the country and it has significantly changed the structure and composition of banking sector (Husain, 2003). Following the liberalization policies, M&As process groomed in Pakistan during 1990's and particularly after 2000; number of M&A transactions took place in Pakistan (Husain, 2006).

The M&A is generally referred as a process of combination of two or more entities with the object of improving performance, maximizing shareholder value and strengthening market position. The main difference between merger and acquisition is that the merger usually represents mutual agreement of two or more equal companies for combination into a single entity. The acquisition, on the other hand, is usually a result of large company's purchase of small company (DePamphilis, 2002). The primary reason of M&As, according to Pilloff (1996), is the performance improvement through sharing of management skills, consolidation of resources and technology, fragmented market share, etc. Generally, the concept of M&A is based on synergy approach and the companies expect to gain more market share, enjoy the benefits from economies of scale, diversification, sharing of knowledge/technology, know-how, etc. (Damodaran, 2005).

The motive of firms behind M&A has been broadly explained by the efficiency theory and monopoly theory. The former suggests that firms get benefit from M&As through economies of scale while latter proposes that firms engage themselves in M&As activity to increase their market power (Chatterjee, 1986; Klein, 2001; Mishra & Chandra, 2010; Porter, 1985). The efficiency enhancement may not be necessarily a sole objective in all the cases and firm(s) may engage in M&As just to gain large market share & control, tax consideration & credit or for signalling purposes. It may also be possible that the managers may engage in activity of mergers to get private benefits instead of the shareholder's benefit (Amihud & Lev, 1981; Jensen, 2005; Shleifer & Vishny, 1989). Alternatively, the managers may have good intentions and commitment but due to over-confidence they over-estimate their abilities and resultantly failure instead of success may happen (Rau & Vermaelen, 1998; Roll, 1986; Malmendier & Tate, 2005). The existing literature on efficiency effect of M&As is yet inconclusive from both the theoretical and empirical perspectives.

The objective here in this study is to find out the impact of M&As upon banking sector efficiency in Pakistan. The widely used DEA approach is used to examine the efficiency of merged/acquired banks in both periods; i.e. before and after merger/acquisitions. The DEA is applied with its input orientation for both CRS and VRS assumptions and by using three different input-output models namely income-based model, loan-based model and intermediation approach. The data is extracted from banking statistics of Pakistan and the annual reports of

sample banks while analysis is made for -3 (pre-merger) and +3 (post-merger) years with the year of merger/acquisition is considered as the zero period and is referred as "during the merger/acquisition". The list of bank mergers, selected as sample of the study, is presented in Table I. There are nine cases of bank mergers included in the study where 17 banks are involved in the merging/acquisition process. The results of study with different input-output models show a decline in average efficiency for majority of sample banks during post-merger/acquisition period. The inefficiency in almost all the cases is because of scale inefficiency while pure technical efficiency remains at almost maximum level throughout the period. The findings of study are of practical relevance to the researchers, practitioners, policy-makers and firms interested in future M&As program. The study contributes to the existing literature by showing that the efficiency improvement is not a necessary outcome of the M&As program. Therefore, a careful and comprehensive analysis is to be done before advocating or engaging in merger activity.

Literature Review

The modern theory of corporate control presented by Bradley (1980) opened a room of discussion regarding the effect of M&As. Prior to it; there was a general consensus that bidding firm(s) either intends to loot the assets of target or to reap the profit from share appreciation in response of takeover announcement. This new model rejected the existing phenomenon on motive behind mergers and acquisition. It was argued that the bidding firm actually identifies a target that is currently being run in a sub-optimal manner. After taking the control, the bidding firm would put a high valued operating strategy and convert losses into profits. The efficient teams would be employed that can help to wipe out the inefficiencies. The M&As are considered beneficial for overall economy because is ensures the control and flow of resources towards their efficient utilizers. Since 1980 number of studies has been conducted in this area to explore the impact of M&As upon efficiency of enterprises including banking sector. This area got significant importance following Asian financial crisis of 1997 (Dost, Ahmad & Warraich; Ismail & Rahim, 2009; 2011; Ong, Teo & The, 2011).

The upshot of M&As has been discussed in existing literature from either stock return or efficiency perspective. The different studies used different variables, employed different techniques including event study, ratio analysis, DEA, SFA, DFA, etc. and found varying results. Turvey, Sparling and Duren (1999) found a positive effect of bank mergers in Canada upon farm and rural communities for majority of cases and for other its impact is at least non-negative while Worthington (2001) documented an increase in scale efficiency as well as pure technical efficiency in post-merger period for credit union industry in Australia. Similarly, Athanasoglou and Brissimis (2004) found a positive effect on cost and profit efficiency of M&As for banks in Greece. Fadzlan (2004) reported an increase in overall efficiency for merged banks in Malaysia during post-merger period with having major role of pure technical efficiency. He further documented that small & medium sized units got benefit from merger program, however, large banks are not much successful due to scale inefficiency.

Knapp, Gart and Becher (2005) found a significant negative reaction of market to merger announcement of bank holding companies. The profitability of bank holding companies remained below than the industry average for post-merger period. Campa and Hernando (2006), however, reported a significant improvement in the performance of target banks after two years of merger transaction completion and an increase in return on equity following the mergers for EU banks. Similarly, Sufian (2006) documented an increase in overall efficiency of banks in

Singapore in period after mergers when compared to the period before merger and the improvement trend started in the year during which merger process completed. In another study, Kithinji and Waweru (2007) reported an increase in capital adequacy and solvency but decline in profitability ratios for majority of banks after mergers than before mergers in Kenya. Altunbas and Marques (2008) documented an improvement in performance of European banks after the M&As, particularly for cross-boarder M&As.

Rezitis (2008) reported an increase in technical inefficiency of Greek banks after mergers, however, during the same period the technical efficiency of non-merged banks increased. Both TFP growth & technical efficiency were not found to be negatively affected by M&As. On the other side, Said, Nor, Low and Rahman (2008) documented no significant variation in productive efficiency of banking institutions in Malaysia after mergers in comparison to the period before merger. The consolidation program in Malaysia was started after the financial crisis of 1997. Badreldin and Kalhoefer (2009) found some mixed and unclear effect on profitability with no significant improvement upon return on equity (ROE) of merged banks in Egypt when compared to pre-merger period while a little positive effect was observed on credit risk position. Ismail and Rahim (2009) documented an increase in efficiency scores of Malaysian commercial banks after mergers while the local banks were comparatively less efficient in comparison to the foreign banks. They further found an improvement in productivity of banks and this improvement is comparatively greater in local banks, being merged. A positive effect of M&As upon technical efficiency for majority of sample banks in GCC countries was noted by Gattoufi, Al-Muharrami and Al-Kiyumi (2009).

Sufian and Habibullah (2009) observed the high technical efficiency in after-merger period than the period before merger for banking sector in Malaysia. Similarly, Kaur and Kaur (2010) documented an increase in cost efficiency of banks following mergers in India. They concluded that the technical efficiency contributes more to overall cost efficiency as compared to allocative efficiency. Obaid-ullah, Sabeeh-ullah and Usman (2010) reported some mixed results with improvement in some ratios while decline in others during post-merger period; for Faysal Bank Ltd. and Atlas Investment Bank Ltd. in Pakistan. Another study by Ravichandran and Alkhathlan (2010) used the ratio-based CAMELS framework to conclude that although some variables of merged banks improved after the mergers, however, the overall productive efficiency is not significantly different from pre-merger period in Indian and Saudi Arabian banks. Joshua (2011) documented a financial efficiency in period after merger as compared to the period before merger for banks in Nigeria. They used three parameters of financial efficiency namely net assets, profit after tax and gross earnings.

Kousar and Saba (2011) documented a decline in operating financial performance for after-merger period as compared to before-merger period in banking sector of Pakistan. They used six key ratios to conclude that it is not necessary to have an increase in performance after M&As. Dost, et al (2011) found a decline in technical efficiency as well as scale efficiency while increase in pure technical efficiency in post-merger period for two cases of bank mergers in Pakistan. Similarly, Khan, Kayani and Javid (2011) documented a rising trend in industry concentration following mergers while a decline in profitability and net interest spread was found for two banks after merger. Kemal (2011) studied the financial performance of RBS by using ratio analysis and documented non-improvement of financial performance for sample bank in post-merger period. Ong, et al (2011) also found no significant, though little improvement, upon the financial performance of banks in Malaysia after mergers. The improvement in some indicators was observed. Similarly, Ebimobowei and Sophia (2011) observed no significant difference in pre-merger and post-merger's return on equity for banks in Nigeria. For analysis,

they selected randomly a sample of ten M&As of banks. Liargovas and Repousis (2011) neither observed any impact of M&As upon return nor any improvement in operating performance of Greek banking sector for post-merger/ acquisition period.

The recent studies have also documented positive effect of mergers on banking performance. For example, Abdul-Rehman and Ayorinde (2013) found out that mergers and acquisition positively affects the bank performance of 15 Nigerian Banks. Rozzani and Abdul Rehman (2013) used stochastic frontier analysis and observed that the efficiency of Islamic and conventional banks is quite similar. They evidenced that increase in bank size and decrease in operational costs affect the efficiency of conventional banks; in case of Islamic banks operational costs have inverse relation with bank efficiency. However, Haider, Shoaib and Kanwal (2015) found insignificant effect of mergers on banking performance. Aik, Hassan and Mohamed (2015) identified that managers made mergers to achieve market control rather than to create synergies. Moreover, they reported productivity improvements in non-merging competitive firms than bidder firms.

It is evident from the survey of literature that different studies aimed at investigating the upshot of M&As upon banking sector efficiency. The variations in results have been observed in different countries and even within the countries for different samples. After the liberalization policies of the government, number of M&As occurred in Pakistan. These M&As were in different sectors including banking sector. Different studies have already been conducted to investigate the effect of M&As upon performance/efficiency of banking sector in Pakistan; however, these are either in case study form for individual bank context or through ratio analysis. Both approaches are limited in scope and lacking a comprehensive study to uncover the effect of M&As upon banking sector efficiency in Pakistan. This study attempted to fill the vacuum.

Methodology

It is attempted in the study to examine the effect of mergers & acquisitons upon effeiciency of banking sector in Pakistan. The banks that have been merged or been acquired by another group from 2000 to 2009 are selected for study. The banks are evaluated in both pre- and post-merger period (-3 & +3 years) and the mean efficiency score for both the periods is calculted. The data is extracted from Banking Statistics published by SBP and annual published reports of the banks under study. All the variables are measured in thousand of Pak ruprees except labour which is taken as the number of employees.

The widely used DEA method is used in this study to determine the technical efficiency, pure technical efficiency and scale efficiency of banks in both pre- and post-merger/acquisition periods. This methodology is used for evaluating the comparative efficiency of a DMU, i.e. decision making unit, to similar other DMUs. The DEA uses the value of inputs and outputs to find that which firm(s) determine the envelopment surface and the firms lying on the surface are considered efficienct and receive the value of unity while firms lying below the surface are inefficienct with value of less than unity. The efficiency scores in DEA are defined as the ratio of weighted sum of outputs to inputs. The objective of DEA is to measure comparative efficiency of similar units, that uses similar resources as inputs, share similar technology and have similar goals (outputs). The efficiency scores usually lie between 0 and 1with fully efficient at 1 and fully inefficienct at 0. This methodology is preferable because of multi reasons such as handling of multiple inputs and outputs, direct comparison of DMU with peers, possibility of handling inputs and outputs having different units and suggest the optimal inputs-output mix that can improve the productivity as well as performance and thereby enabling the firm to be efficienct.

The foundation of measuring efficiency & productivity at micro level was provided by Farrell (1957) by proposing that the efficiency has two components namely technical efficiency

and allocative efficiency. The work of Farrell was extended by Charnes, Cooper and Rhodes (1978) for multiple input-output context. Their model is called CCR model and it assumes constant return to scale. This model is suitable when every included DMU is operating at best possible level but it may not be possible in all the cases. In order to overcome this issue; Banker, Charnes and Cooper (1984) introduced an extended model that may fit for variable return to scale situation and is referred as the BCC model. The extended model further decomposes TE to the pure technical efficiency (PTE) and scale efficiency (SE).

The Data Envelopment Analysis can be illustrated mathematically by considering the original model of Charnes, et al. (1978) called CCR model. To understand it, consider N units that transform K inputs to M outputs, where K may be greater, smaller or to equal to M. Each unit in the analysis is called a DMU, i.e. Decision Making Unit. For measuring the efficiency of a DMU through this conversion process, Charnes, Cooper and Rhodes proposed the use of ratios in following way, in such that the similar ratios for other DMUs are equal to or less than one. i.e.

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

Subject to;

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

Where; $n=1,2,\ldots\ldots.,N$; $v_k^0, u_m^0 \geq 0$; $k=1,2,\ldots\ldots,K$; $m=1,2,\ldots\ldots.,M$.

The DMU being analyzed is represented by index 0, taken as the base DMU. The function "Max e^0" given by the equation "C" is the efficiency score assigned by DEA to DMU^0. The DMU^0 is said to be technically efficient at score $e^0=1$, otherwise it is inefficient.

Charnes, et al. (1978) further converted the above given non-linear function into linear one as:

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

Subject to:

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

Where; $n=1, 2, \ldots\ldots., N$; $v_k^0 \geq \mathrm{C}$; $u_m^0 \geq \mathrm{C}$; $k=1,2,\ldots\ldots\ldots,K$; $m=1,2,\ldots\ldots\ldots,M$

The variables defined in equation "R" are similar to those defined in equation "C", however, C is introduced additionally in equation "R". The purpose of C is to ensure the positive weight values of all inputs and outputs. The condition $h^0=1$ensures that the base decision making unit is DEA efficient with respect to other included DMUs. A comprehensive DEA model requires the solution of N such problems, each for DMU^0, yielding N (v_k^n, u_m^n), weight sets.

The 1st step in application of Data Envelopment Analysis is to identify the input-output combination of DMU's under study. The nature and function of banking company's business is different from that of a manufacturing concern. There is no defined rule for specifying the inputs and outputs in banking sector and different researchers used varied input-output models depending upon the requirements of study and nature of banking business. The most commonly used approaches includes production approach, intermediation approach, value added approach, income base model and loan based model (Ataullah, Cockerill & Le, 2004; Avkiran, 1999; Burki & Shabbir, 2003; Leightner & Lovell, 1998). The production and intermediation approaches are

usually used jointly for inputs and outputs of banking sector. By taking into consideration, the nature and functions of commercial banks in Pakistan and to examine the efficiency from different angles; three different but closely related input-output models/approaches namely Income-Based model, Loan-based Model and Intermediation Approach are used in the study.

The income based model chooses the inputs and outputs based on expense and income relationship. It proposes that the banks incur interest expenses and operating expenses to generate interest and non-interest income while loan based Model proposes the loans & advances and investments as the outputs generated with same set of inputs used in the previous model. The intermediation approach, on the other side, chooses the input-output combination from another angle. It focusess on banks as intermediaries that facilitates the transfer of financial resources from saving surpuls to saving deficit units and thereby ensuring the efficient utilization of resources. Therefore labour, physical capital and financial capital are taken as the inputs to generate loans & advances and investments. The above-discussed three input-output approaches are used to analyze the Technical Efficiency, Pure Technical Efficiency and Scale Efficiency of sample banks in both the periods of before and after mergers/acquisitions.

Data Analysis and Results

This study is aimed at investigating the effect of M&As upon banking sector efficiency in Pakistan. The sample selected for study includes the banks that have been merged or being acquired during the period of 2000 to 2009. The analysis is made on the bank level data by applying Date Envelopment Analysis approach and is conducted in both pre- merger/acquisition and post- merger/acquisition scenarios. The selection of inputs and outputs is made by using three different models/approaches namely income-based model, loan-based model and intermediation approach. The different input-output models are used to examine the efficiency from different angles. All the statistics are recorded in Pak Rupees (000) excluding number of employees that is counted in numbers. The Technical Efficiency, Pure Technical Efficiency and Scale Efficiency scores are computed by using the DEA methodology with its input-orientation and different input-output models. The detailed results from three models are given in Table 2.

As discussed in earlier section, the income based model focuses on the relationship between expense and income. It describes that how efficiently the bank is converting its deposits for interest generation and running its operations cost-effectively in order to maximize the wealth of its shareholders. It is evident from the results that the average efficiency scores of sample banks in post-merger period are found to be less than the pre period in majority of the banks. The only slight improvement in efficiency is observed after having the merger of Standard Chartered Bank and Union Bank while the efficiency after the merger of Habib Bank AG Zurich and Metropolitan Bank as well as after the merger of Al-Faysal Investment Bank to Faysal Bank Ltd. remain unchanged. The average technical efficiency declined during post merger period for all other banks. The technical inefficiency represents the excessive use of banking resources than are technically viable for the production of targeted outputs. The inefficiency in almost all the cases is due to SIE while PTE remains at maximum during both the periods. The scale inefficiency represents the inappropriate scale of production and the reasons of SIE include, but not limited to the over-employment, unprofitable branches, large volume of NPLs, etc. After the merger of PICIC with NIB, the inefficiency of NIB increased insignificantly from 30.2% to 42.9% while of RBS, after having the merger of ABN Amro into it increased from 7.8% to 12.8%. Similar is the case of Crescent Commercial Bank, NDLC-IFIC and ABL where inefficiency increased to 75.6%, 28.1% and 24.9% respectively in post-merger/acquisition

period. The merger of Atlas Investment Bank with and into Atlas Bank Ltd. resulted an increase in inefficiency from 18.4% to 58.1%.

The loan-based model describes the efficiency of banks in conversion of same inputs used in income based model to the loans & advances and investments. The results of loan based model show, by and large, the similar trend as in case of income based model. The technical efficiency of almost all the units declined in the post-merger period and again it is due to scale inefficiency. The merger of Standard Chartered Bank & Union Bank Ltd. caused an insignificant increase in technical inefficiency form 12.3% to 25.1%. Similarly, the inefficiency of NIB, after having a merger of PICIC with it, increased insignificantly from 5.3% to 43.8% in the post-merger period. No effect of mergers upon efficiency is found after the merger of Al-Faysal Investment Bank Ltd. with Faysal Bank and of Habib Bank AG Zurich & Metropolitan Bank. The banks remained fully efficient in both the periods. The inefficiency increased insignificantly from 21.1% to 50.6% after the merger of ABN Amro with RBS while the same is happened after the merger of Trust Commercial Bank and Crescent Commercial Bank with an increase in technical inefficiency from 2% to 68.5%. The merger of Credit-Agricole with NDLC-IFIC resulted an insignificant increase to 5.3% in technical inefficiency while after the merger of Atlas Investment Bank with Atlas Bank Ltd. it rises from 8.9% to 59.2%. The inefficiency of ABL also increased insignificantly to 15.1% in the post-acquisition period.

The intermediation approach considers the inputs from a different angle and it proposes that the banks uses labour, physical capital and financial capital to generate loan & advances and investments. The results from this approach show a mixed trend with efficiency decline in majority of cases, improvement in some cases while no effect on rest of the cases. The inefficiency increased insignificantly after having the merger of Standard Chartered and Union Bank, PICIC with NIB, ABN Amro with RBS, Trust Commercial Bank with Crescent Commercial Bank and Credit Agriclo with NDLC-IFIC. The average inefficiency scores increased to 0.7%, 3.6%, 4%, 17.6% and 1.5% respectively. No effect of mergers upon efficiency is found after the merger of Habib Bank AG Zurich and Metropolitan Bank as well as for mergers of Al-Faysal Investment Bank Ltd. with and into Faysal Bank Ltd. The inefficiency declines insignificantly from 32.9% to 7.2% after the merger of Atlas Investment Bank with Atlas Bank Ltd. Similarly, the inefficiency of ABL declines after its acquisition. The results of above three models, by and large, show a decline in efficiency of banks for after-merger/acquisition period when compared to the before-merger/acquisition period. The identification of reasons for efficiency decline in post-merger/acquisition period is beyond the scope of this study. A separate study is required for this purpose.

Summary and Conclusions

The financial sector reforms started during early 1990s in Pakistan brings structural changes in banking sector. The entry of local and foreign investors in this sector resulted in stiff competition among different units. The different banking units, in order to meet local and global competitive challenges, entered into M&As. The M&A is basically a process of consolidation of two or more separate entities into a single one. The motive behind mergers usually is to enjoy the economies of scale, sharing of resources, managerial skills, technological know-how, etc. The history of M&As is very old; however, it groomed at large scale in Asian continent following the Financial Crisis of 1997 (Ismail & Rahim, 2009; Dost, et al., 2011).

This study examined the upshot of M&As upon banking sector efficiency in Pakistan by taking the sample of bank M&As over the period of 2000 to 2009. The efficiency of sample

banks in both the pre-merger/acquisition and post-merger/acquisition period is examined by using the Data Envelopment Analysis method. The DEA is used for efficiency measurement widely and is preferred because of its ability to handle multiple outputs and inputs. The input-output combination is selected by using three different models namely income-based model, loan-based model and intermediation approach. The DEA is applied with its input-orientation for both CRS and VRS approaches. The mean efficiency scores for pre-merger, during the merger and post-merger periods are calculated. The results show an insignificant decline in average technical efficiency for majority of sample banks in the post-merger/acquisition period, thereby leading to the rejection of null hypothesis. This decline in technical efficiency is due to scale inefficiency while pure technical efficiency remains at maximum in all the periods. The results of study are in-line with the existing studies conducted in Pakistan for different bank cases and documented either decline, no-improvement or mixed results for post-merger efficiency {see for instance; Obaid-ullah, et al., 2010; Dost, et al., 2011; Kousar & Saba, 2011; Kemal, 2011). The study can be extended in future by including the enterprises other than banking sector to see more comprehensive results.

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Table 1: List of Bank Mergers & Acquisitions Proposed for Study

S. No.	Banks involved in Merger/Acquisition Process	Post Merger/Acquisition Name	S. No.	Banks involved in Merger/Acquisition Process	Post Merger/Acquisition Name
1.	Habib Bank AG Zurich	Habib Metropolitan Bank Ltd.	2.	Standard Chartered Bank	Standard Chartered Bank (Pakistan) Ltd.
	Metropolitan Bank Ltd.			Union Bank Ltd.	
3.	Faysal Bank Ltd.	Faysal Bank Ltd.	4.	NIB Bank Ltd.	NIB Bank Ltd.
	Al-Faysal Investment Bank Ltd.			PICIC Commercial Bank Ltd.	
5.	Atlas Bank Ltd.	Atlas Bank Ltd.	6.	Crescent Commercial Bank Ltd.	Crescent Commercial Bank Ltd.
	Atlas Investment Bank Ltd.			Trust Commercial Bank Ltd.	
7.	RBS	RBS (Pakistan) Ltd.	8.	NDLC-IFIC	NDLC-IFIC/NIB
	ABN Amro N.V.			Credit Agricole Indosuez	
9.	Allied Bank Ltd.[1]	Allied Bank Ltd.			

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[1] Acquisition of the majority shares of ABL by Ibrahim Leasing Ltd. & Ibrahim Group.

Table 2: Results of Income Based Model, Loan Based Model and Intermediation Approach

Merger/Acquisition Title	Model/ Approach	Input Oriented CRS & VRS								
		Pre-Merger			During-Merger			Post-Merger		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
Standard Chartered Bank (Pakistan) Ltd. (Merger of Standard Chartered Bank & Union Bank Ltd.)	Income-Based	.921	1.000	.921	.886	1.000	.886	1.000	1.000	1.000
	Loan-Based	.877	1.000	.877	.837	1.000	.837	.749	1.000	.749
	Intermediation	1.000	1.000	1.000	1.000	1.000	1.000	.993	1.000	.993
Merger of PICIC with NIB	Income-Based	.698	1.000	.698	.615	1.000	.615	.571	1.000	.571
	Loan-Based	.947	1.000	.947	1.000	1.000	1.000	.562	1.000	.562
	Intermediation	1.000	1.000	1.000	.954	1.000	.954	.964	1.000	.964
Habib Metropolitan Bank (Merger of Habib Bank AG Zurich & Metropolitan Bank)	Income-Based	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Loan-Based	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Intermediation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Merger of ABN Amro Bank with RBS	Income-Based	.922	1.000	.922	.538	1.000	.538	.872	1.000	.872
	Loan-Based	.789	1.000	.789	.435	1.000	.435	.494	1.000	.494
	Intermediation	.968	1.000	.968	.871	1.000	.871	.960	1.000	.960
Merger of Trust Commercial Bank with Crescent Commercial Bank	Income-Based	1.000	1.000	1.000	.603	1.000	.603	.244	1.000	.244
	Loan-Based	.980	1.000	.980	.778	1.000	.778	.315	1.000	.315
	Intermediation	.950	1.000	.950	1.000	1.000	1.000	.824	1.000	.824
Merger of Credit Agricole with NDLC-IFIC	Income-Based	1.000	1.000	1.000	.860	1.000	.860	.719	1.000	.719
	Loan-Based	1.000	1.000	1.000	1.000	1.000	1.000	.947	1.000	.947
	Intermediation	1.000	1.000	1.000	1.000	1.000	1.000	.985	1.000	.985
Merger of Atlas Investment Bank with Atlas Bank Ltd.	Income-Based	.816	1.000	.816	.736	1.000	.736	.419	1.000	.419
	Loan-Based	.911	1.000	.911	1.000	1.000	1.000	.408	1.000	.408
	Intermediation	.671	1.000	.671	1.000	1.000	1.000	.928	1.000	.928
Merger of Al-Faysal Investment Bank Ltd. with Faysal Bank Ltd.	Income-Based	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Loan-Based	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Intermediation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Acquisition of ABL shares by Ibrahim Group (Transfer of Ownership)	Income-Based	.857	1.000	.857	1.000	1.000	1.000	.751	.981	.763
	Loan-Based	.865	1.000	.865	1.000	1.000	1.000	.849	.981	.864
	Intermediation	.809	1.000	.809	.993	1.000	.993	.937	1.000	.937