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Pakistani Firms' Efficiency: An Empirical Study of Pakistani Listed Firms through Data Envelopment Analysis

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Abstract *This paper investigates listed firm efficiency on Pakistan Stock Exchange by using Data Envelopment Analysis (DEA). The reason for application and calculation of the DEA score is to know how much the firms are efficient in utilizing their resources to be converted into output (sales/Net Income). An optimization technique (DEA) that helps calculate efficiencies of firm's decision making Units (DMU's) by taking different inputs and outputs variables. This paper uses DEA in measuring efficiency of 136 Pakistani firms listed on Pakistan Stock Exchange (PSX). Using secondary data set of 136 firms for the period 2008-2017, efficiency measurements are calculated by using financial ratios and financial indicators as input and output variables. Results show that some of the firms are efficient in utilizing their available resources in an efficient way to convert it into output, while some are inconsistent in efficiently utilizing their resources (inputs) to get the desired outputs.*

Key Words:

Data Envelopment Analysis, Overall Technical Efficiency, Non-Financial Sectors, Pakistan Stock Exchange (PSX)

Introduction

High investment opportunities in the emerging capital markets have gained high attention of investors all around the globe. Developing countries' financial markets have shown institutional and regulatory changes and reforms of microstructure leading to high liquidity and an increased traded volume (Bekaert & Harvey, 2013). These emerging markets have shown profitable and healthy behavior and resilience in the global financial crisis (Jawad & Samir, 2013). The attraction of lenders and investors of these emerging markets has focused on tools to measure the efficiency of firms listed on the respective markets.

Prior literature has neglected such an important issue which is the key for good investment decisions. Due to very little research available for these developing markets, and even in some case in developed markets about the efficiency of firms; the source of information for lenders and creditors are restricted to financial

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statement published each year, the statement of financial analysis are normally depends on ratio analysis that only allow comparison across time and a cross industry benchmarking. Relying only on ratio as measure of performance of the firm is a complex/multifaceted concept, which cannot be precisely measured (for example ROA or ROE). While the ratios analysis interpretation can be often subjective and problematic (Malhotra & Malhotra, 2008). An in-depth analysis needs multi-factors models that takes different financial measures (Zhu, 2000). For example, a recent technique which is used is the DEA. Hence, the purpose of this study is to measure and investigate whether firms listed on a developing market like Pakistan are efficient or not by using the new method DEA. DEA is better since other measures of firm performance only take financial measures as proxies (ROA, ROE) while DEA is different from all other proxies in the sense that it can take both financial (sales, Net Income etc.) and non-financial measures (number of employees, education of the employees etc.) as input and output variables to measure firm efficiency.

The primary contribution of the research work is to draw an initial map of DEA score of listed firms in PSX. Financial sector firms are excluded from the sample due to the reason that analyzing the performance of these firms and their accounting methods are expressively different from non-financial firms. In short considering debts, cash and other financial assets as inputs or outputs, such as in this study we have taken liabilities as input variable but in financial firms it will be used as output variable.

This study uses CGS, Selling and general & administrative expenses, total liabilities and total assets as inputs variables while sales, income before tax, net income and return on assets as output variables to calculate firm overall technical efficiency through DEA. This study primarily answers the following research question, which firms (non-financial) listed in PSX will be considered as efficient firms by using available resources and to convert it into output (sale/income). Answer of this question will benefit the stakeholders in so many ways. This study will provide an insight on the efficiency (relative) of firms, which can be used as decision criterion in investment. The efficiency of firms also helps the lenders in granting loan along other important factors such as credit ratings etc. Moreover, findings of the study can also benefit financial institutions (banks, insurance companies etc.) in their investment decisions. As there is strong relationship between financial institution and financial markets, most of the time financial institution invest their savings in capital market by investing in equity shares of different firms.

Literature Review

Firms need to know their competitive advantage over their competitors in the global world. Specifically speaking it is important for firms to know their

effectiveness and efficiency levels as compared to its competitors. For example, firms in non-financial sector may compare their results with each other in their respective sectors. What does this word 'efficient' mean? It means working well, without waste and quickly while the word 'effective' means to produce what is actually desired. The concept of efficiency will be discussed in more details.

Efficiency is important for the purpose that organizational performance. Organizations such as financial and non-financial, small or big must get the optimal performance to compete in the market. Mohamad and Said (2010) report that one of the key purposes of the organization is to improve performance. Performance is defined in different ways. For example, one aspect of firm's performance is efficiency measurement. It can be in terms of increasing outputs, decreasing cost or maximizing the profits. A firm is considered as technically efficient if from the given level of inputs, it produces maximum level of outputs or at the lowest level of input produce given level of output. Earlier literature study efficiency in different contexts and research settings with different modifications. Recent researches use DEA to evaluate the performance of hospitals, universities, libraries, courts, businesses, governments and police forces (Lewin and Morey, 1981; Ruggiero, 1996; Thanassoulis *et al.*, 2016),

For instance, Farell, (1957) for the first time empirically calculated the firm efficiency. Charnes, Cooper and Rhodes (1978) extended the research work of Farell's on technical efficiency measurement from a single input and single output to many inputs and many outputs. That is why it is also called CCR model, which was then extended in 1984 by Banker, Charnes and Cooper, and that model was renamed as BCC model.

This method combines different input and output variables of a set of decision-making units (DMUs) to produce efficiency. Thore et al., (1994) study US computer manufacturers firms for efficiency and reports that results recommend that less number of companies retain their performance at productivity efficiency. DEA is a systematic/analytical tool that evaluate the performance of a combination of units called decision making unit (DMUs) (Charnes et al., 1978; Banker et al., 1984; Cooper et al., 2011; Khan et al., 2017). DEA is categorized as multi-criteria decision making technique to evaluate the performance and effectiveness of the DMUs. DMUs have a flexible definition, which is defined as an entity that convert a set of inputs into several outputs. Studies suggest that DEA model the operational procedures of performance estimation and valuation of entities to practical method across different fields and countries (Skokan & Stanickova, 2012). DEA does not fall back on any assumptions, this is why it is used very frequently, and is considered an easy and a more practical analysis tool. Use of multiple input and output variables at a time without any functional form makes DEA very popular. In addition to these multiple use of inputs and outputs, it may be in different units (Trick, 1998).

Literature reports multiple benefits of DEA techniques. For example, it can compare efficiency measures of DMUs among firms operating the same industry or sector (Mantri, 2008). For example, Philips et al, (1994) compare firms in Computing Industry in US market by measuring productive efficiency using the inputs and outputs from their financial statements. Similarly, Reynolds and Thompson (2007) measure the efficiency of restaurants for comparison using restaurant seats, hourly server wage as input variables and a standing alone facility restaurant as a coding variable, and total daily sales and percentage of tip as output variables. Abbott and Doucouliagos (2003) measure the efficiency of 36 Australian public sectors universities in teaching and research. DEA is also used to analyze the time series data of DMUs operating in the same sector/country. For example, Flegg et al. (2004) applied DEA to 45 British universities to measure efficiency in the period of 1980/81 to 1992/93. Barros and Santos (2006) used Portuguese hotel industry from the period of 1998 to 2002 to measure efficiency. DEA also allows firms from same sector across countries for comparison, as Mantri (2008) compared efficiency of German and Swiss hospitals. Even financial institutions can be compared using DEA techniques such as reported by Touhami and Solhi (2008) studied Moroccan banks efficiency during the period from 1993 to 2006.

Batra and Tan (2003) use data of six countries SME's Indonesia, Malaysia, Maxico, Colombia, Guatemala and Taiwan to measure technical efficiency. Their results show that technical efficiency (TE) increases with the firm size and a considerable overlap occurs in the distribution of efficiency with firm sizes, while some small firms are producing higher efficiency than the larger firms are. They argue that the reasons for such a differentiation could be education and training of employees, use of latest technology and automation, and quality control of these countries.

Wu (2005) studies Taiwanese firms from steel industry during the period of 1970-1996 to compare and examine their performance. Their results show that technical efficiency (TE) and industry evolution is highly affected by the companies involved in liberalization and adopting new technology. Similarly, Wu et al. (2006) use DEA to examine the retailing industry performance in Taiwan, the results showed that half of the firms were inefficient/unproductive.

Hong and Park (2007) investigate IT venture firm for efficiency using DEA based approach through Support Vector Machine (SVM). They argue that the most important variables to provide financial information are capital turnover, employees' productivity and sales/employees for efficiency evaluation of IT business venture. Din et al. (2007) use output oriented DEA approach under (CRS) Constant return to scale and (VRS) variable return to scale model assumption to evaluate the technical efficiency (TE) of big manufacturing sector in Pakistan. Using a data from 101 firms for the two different periods 1995-1996 and then 2000-2001, with capital, industrial and non-industrial cost and labor as inputs variables and contribution of GDP as output variable. The result of CRS model

showed improvement in mean efficiency from 0.23 in 1995-96 to 0.42 in 2000-01. Furthermore, a rise in efficiency score was recorded from 0.31 to 0.49 during these two periods under variable return to scale model.

Singh (2006) studies Indian sugar mills in Uttar Pradesh to measure their efficiency. The results show 93 percent of overall technical efficiency (OTE) during the period of 1996-97 to 2002-03. Based on his results, he suggests that the mill may reduce 7 percent of inputs to become more efficient than others. Meenakumari and Kumaraj (2008) evaluate the efficiency of 29 public electric utilities (SOEU's) in India and employed CRS and VRS model assumption of DEA to calculate efficiency. Their analysis shows a positive correlation between inputs and outputs. The DEA results recommend that under CRS and VRS model, 24% of SOEU's were efficient CRS model is used for overall technical efficiency (OTE) and VRS model is used for pure technical efficiency (PTE) measurements. Joshi and Singh (2009) use CCR and BCC models of DEA to evaluate the efficiency of readymade garment in India in terms of productivity. Their results recommend that under CRS model firms are 75 percent efficient and could increase by 25 percent while using VRS model, firms are 83 percent efficient. They argue that the difference in efficiency between the two models, CCR model measure overall technical efficiency and BCC model measures PTE, the main difference among OTE and PTE is OTE includes Scale efficiency (SE) while PTE do not consider the effect of scale on which the firm is performing.

Barita et al., (2011) use CRS model of DEA to investigate the TE and to find out the benchmarking units for Indian safety performance industries. The output taken was the number of accidents and annual budget percentage taken as an input variable. Under CRS model, out of thirty units only seven were found efficient and for inefficient units benchmarking was done to become efficient.

Mahadevan (2002) analyzes the data of Malaysian manufacturing firms during the period of 1981-1996 to measure the growth of productivity. Using DEA approach, and taking capital and labor as inputs variables while value added as output variable, his results report a higher TFP growth by non-ferrous metal industry, which was 3.7 percent. On the hand, lowest TFP growth was obtained by petroleum refineries, which was -0.3 percent. He reports 0.8 percent weighted average TFP growth; 0.3 percent technical change; 0.5 percent technical efficiency, 0.4 percent PTE and 0.1 percent SE changes. He argues that one of the reasons for such variation in his results is that since there is a minimal gain in technical change and technical efficiency, thus a low TFP growth was recorded while other industries operating at optimal scale.

Duzakin and Duzakin (2007) studied performance of 480 manufacturing firms taken from 12 industries in Turkey for the year of 2003. CRS model of DEA output oriented based model was applied. Average number of employees and net assets were used as inputs variables and gross value added, profit before tax and export revenue were used as output variables. They find that deviation from the standard

was average scored from 0.178 to 0.989 and suggested that 278 firms results remained below average, and 65 firms were recognized efficient firms. The main reason of inefficiency in Turkish firms was the minimum level of inefficient exports.

Watanabe and Tanaka (2007) examined the Chinese industry at province level to examine efficiency over the period of 1994 to 2002. The two efficiency measures were estimated through directional output distance function, the one, which consider only required output, and the other, which consider both required and unwanted outputs. Inputs were material, capital and labor and industrial products was taken as desirable output and sulfur dioxide was taken as undesirable output. They find that the result with only required output, the efficiency level was biased. The results showed that ignoring the unwanted output may tend to overestimate efficiency of industries in Sichuan, Shandong and Hubei. They also report that industrial structure of province significantly affects the efficiency levels.

On the basis of the studied literature, we will test that weather non-financial sectors listed in Pakistan stock exchange are efficient in utilizing their resources (inputs) to transform it into sales/Net income (outputs). Different techniques have been applied in the literature to analyze the performance of firms such as ROA, ROE and Tobin's Q etc. to find out the performance of the firms, this study is an attempt to use efficiency of firms as proxy for performance and to test that which firms are most efficient in using their resources. The current study is an attempt to add to the existing body of knowledge by testing data envelopment analysis (DEA) on listed non-financial firms in Pakistan Stock Exchange (PSX).

Research Methodology

This study uses Data Envelopment Analysis (DEA) to calculate efficiency of the firms listed on Pakistan Stock Exchange for the period 2008-2017. DEA was initially developed by Charnes et al. (1978) is a performance/efficiency evaluation technique that measures overall technical efficiency (OTE) with the assumption of (CRS) model. It was further refined and extended by Bankers et al. (1984) to measure (PTE) with VRS model. The only difference between both models is the free variable denoted by Uo. Technical efficiency can be defined as the capability of the firm production by using given level of input to produce a higher level of output. The main benefit of DEA is that it takes several input and output variables to measure the efficiency of firms. It can take financial and non-financial (number of employees, education level etc.) indicators as input and output variables to calculate the efficiency score of Decision Making Units (DMUs).

Initially DEA model was applied on yearly data to avoid noise created by short-term behavior of the data. The main assumption of DEA is that it does not

take the negative values. Thus, all the values must be converted to positive values, means the data for inputs and outputs variables must be positive.
Following are the different models proposed by Chrnes, Cooper & Rhodes (1978) under DEA approach.

Constant-Return to Scale Model

The Charnes et al., first mathematical equation is as follow;

$$\max ho = \frac{\sum_{i=1}^{s} UrYrO}{\sum_{i=1}^{m} ViXiO}$$

Subject to

$$\max ho = \frac{\sum_{i=1}^{s} UrYrj}{\sum_{i=1}^{m} ViXij} \leq 1\,;\ \ j = 1,,,,n.$$

$$Ur, Vi > 0\,; \quad r = 1,,,,,s,; \quad i = 1,,,,,m$$

h_o = DMU 0 efficiency score
J = Decision Making Unit
Yr = the values of output r
Xi= the inputs I values
Ur = output of r weights
Vi= input I weights.
s & r = outputs
m = inputs
n = DMUs
h0 = under assessment DMU.

The critical task in DEA process is the selection of suitable input and output variables. Prior literature uses different inputs and outputs variables according to their research objectives and data availability (see appendix). In this research study I have selected the financial indicators and ratios on the basis of:

(1) Mostly used input and output variables in the literature (see Appendix)
(2) Availability of the data of Pakistani firms

Following are the input and output variables selected for DEA process in this study

Table 1. Input and Output Variables

Inputs variables	Output Variables
Cost of goods sold (CGS)	Sales
Selling and General Administrative Expenses	Income Before Taxes
Total Assets	Net Income
Total Liabilities	Return on Assets

The return on assets (ROA) is measured from financial statements for the period of 2008-2017. The rest of variables were collected from their website.

DEA Models

DEA are used based on the above inputs and outputs variables for firms registered on Pakistan Stock Exchange (PSX) for the period 2008-2017. We use DEAP software for analysis to measure Overall Technical Efficiency (OTE). The efficiency scores are given in the tables in appendix.

The results show that Agriautos Industries Limited, Atlas Battery Limited, Exide Pakistan Limited, General Tyre and Rubber Company of Pakistan Limited, Atlas Honda Limited, Pak Elektron Limited, Pakistan Cables Limited, Biafo Industries Limited, Ittehad Chemical Limited, Nimir Industrial Chemicals Limited, K.S.B. Pumps Co. Limited, are most efficient and effective in utilizing their resources according to their OTE results during the selected time-period, this means that these companies are efficiently using their available resources to convert it into sale/income. The results are consistent with the study of Jawad & Samir (2013) study.The results also show that while some are efficient firms, others are not consistently efficient. These companies are Bestway Cement Limited, Dandot Cement Company Limited, Pakcem Limited as their score in most of the selected years fall under the acceptance level of firm efficiency.

Thore, Kozmetsky and Philips (1994) argue that a firm having high efficiency score does not mean that it will have a high stock market price, high growth rate or can be declared as a successful company. Some profitable firms have low efficiency scores.

Conclusion

This study analyses the relative efficiency of non-financial firms' listed on Pakistan Stock Exchange (PSX) for the period 2008-2017 using DEA technique. The firms are classified into two categories; first category is composed of those firms that are most efficient or successful in converting their inputs into maximum outputs over the selected period of time. These categories comprise of Agriautos Industries Ltd, Atlas Battery Ltd, Exide Pakistan Ltd, General Tyre and Rubber Company of Pakistan Ltd, Atlas Honda Ltd, Pak Elektron Ltd, Pakistan Cables Ltd, Biafo Industries Ltd, Ittehad Chemical Ltd, Nimir Industrial Chemicals Ltd, K.S.B. Pumps Co. Limited.

The second category was comprising of those companies which were inefficient consistently during the selected period of study. These firms were Bestway Cement Ltd, Dandot Cement Company Ltd, Pakcem Ltd.

The inconsistency in efficiency of firms may be due to changes in internal or external factors such like prices of raw materials or final products, investment in a

specific year etc. therefore to ensure positive stable and sustainable performance during such volatile environment, efficient and reactive management is very necessary. Thore, Kozmetsky and Phillips (1994) states that the high efficiency score is due to effective and creative management who can control the expenses and cost of the business related to outputs.

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Table 1. Representing the Overall Technical Efficiency of Auto Parts

Company Name	Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Agri Autos Industries Limited	Automobile Parts & Accessories	0.96	1.00	1.00	1.00	1.00	0.98	0.98	1.00	1.00	1.00
Atlas Battery Limited	Automobile Parts & Accessories	1.00	1.00	0.99	0.94	0.97	1.00	1.00	0.98	1.00	1.00
Baluchistan Wheels Limited	Automobile Parts & Accessories	1.00	0.95	0.98	1.00	1.00	1.00	1.00	1.00	0.93	1.00
Exide Pakistan Limited	Automobile Parts & Accessories	1.00	1.00	0.97	0.98	1.00	1.00	0.95	0.97	0.98	1.00
General Tyre and Rubber Co. of Pakistan Limited	Automobile Parts & Accessories	1.00	1.00	0.98	1.00	0.97	1.00	1.00	0.96	1.00	0.97
Thal Limited	Automobile Parts & Accessories	0.98	1.00	1.00	0.92	0.85	0.99	1.00	0.99	1.00	0.03

Table 2. Representing the Overall Technical Efficiency of Automobiles

Company Name	Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Al-Ghazi Tractors Limited	Automobile Assembler	0.95	1.00	0.99	0.97	1.00	1.00	0.95	0.91	1.00	1.00
Atlas Honda Limited	Automobile Assembler	0.92	1.00	1.00	1.00	0.95	0.95	1.00	0.90	1.00	1.00
Ghandara Nissan Limited	Automobile Assembler	1.00	0.94	1.00	1.00	0.93	0.99	0.89	0.92	1.00	0.92
Ghandhara Industries Limited	Automobile Assembler	1.00	0.88	1.00	0.95	1.00	1.00	0.92	0.95	1.00	0.92
HinoPak Motors Limited	Automobile Assembler	1.00	0.97	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.93
Honda Atlas Cars (Pakistan) Limited	Automobile Assembler	0.94	0.98	0.88	1.00	1.00	0.86	1.00	0.98	0.98	0.94
Indus Motor Company Limited	Automobile Assembler	1.00	0.99	0.92	1.00	1.00	0.88	0.97	1.00	1.00	0.94
Millat Tractors Limited	Automobile Assembler	1.00	1.00	0.94	0.91	1.00	0.90	1.00	1.00	0.99	1.00
Pak Suzuki Motor Company Limited	Automobile Assembler	1.00	0.99	0.95	0.90	1.00	1.00	0.91	1.00	1.00	1.00

Table 3. Representing the Overall Technical Efficiency of Cables

Company Name	Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Pak Elektron Limited	Cable & Electrical goods	1.00	1.00	1.00	1.00	0.92	1.00	1.00	1.00	1.00	1.00
Pakistan Cables Limited	Cable & Electrical Goods	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.98	1.00
Singer Pakistan Limited	Cable & Electrical Goods	1.00	1.00	0.93	1.00	0.98	1.00	1.00	1.00	1.00	1.00

Table 4. Representing the Overall Technical Efficiency of Cement

Company Name	Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Attock Cement (Pakistan) Limited	Cement	0.421	1.000	1.000	0.589	1.000	1.000	1.000	0.349	0.718	0.680
Bestway Cement Limited	Cement	0.416	0.769	0.718	1.000	1.000	0.752	1.000	0.562	0.609	1.000
Cherat Cement Company Limited	Cement	0.759	1.000	0.652	1.000	1.000	0.837	1.000	0.756	0.650	0.520
D.G. Khan Cement Company Limited	Cement	0.867	0.354	0.747	1.000	0.776	0.802	1.000	1.000	0.744	0.414
Dandot Cement Company Limited	Cement	0.920	0.470	0.709	1.000	0.583	1.000	0.492	1.000	1.000	0.371
Dadabhoy Cement Industries Limited	Cement	0.839	0.423	0.620	0.797	1.000	1.000	0.570	0.803	0.672	0.361
Dewan Cement Limited	Cement	0.790	0.532	0.530	0.781	0.751	0.779	0.542	0.696	1.000	0.253

Flying Cement Company Limite	Cement	0.936	1.000	0.735	0.963	0.482	1.000	0.353	0.687	1.000	1.000
Fauji Cement Company Limited	Cement	1.000	0.333	1.000	0.228	1.000	1.000	1.000	0.611	1.000	1.000
Fecto Cement Limited	Cement	0.999	0.480	1.000	0.810	1.000	1.000	1.000	1.000	0.745	1.000
Gharibwal Cement Limited	Cement	1.000	0.488	0.977	0.387	0.577	0.896	1.000	1.000	0.921	0.927
Kohat Cement Limited	Cement	0.895	0.495	1.000	1.000	1.000	0.718	0.703	1.000	0.956	1.000
Lucky Cement Limited	Cement	1.000	0.486	1.000	1.000	0.546	0.989	0.603	0.762	0.947	0.592
Maple Leaf Cement Factory Limited	Cement	1.000	1.000	1.000	0.855	1.000	1.000	0.230	1.000	0.989	0.629
Pakcem Limited	Cement	0.746	1.000	0.642	0.913	1.000	1.000	0.212	1.000	0.892	0.891
Pioneer Cement Limited	Cement	0.721	1.000	0.510	0.853	1.000	1.000	0.411	1.000	0.737	0.480
Power Cement Limited	Cement	0.705	0.995	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.469

Table 5. Representing the Overall Technical Efficiency of Chemical

Company Name	Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Biafo Industries Limited	Chemical	1.000	1.000	1.000	1.000	1.000	0.950	1.000	0.983	1.000	1.000
Colgate Palmolive (Pakistan) Limited	Chemical	1.000	0.798	1.000	0.963	0.912	1.000	0.926	1.000	1.000	0.943
Dynea Pakistan Limited	Chemical	1.000	1.000	1.000	0.941	0.982	0.953	1.000	1.000	1.000	1.000
I.C.I. Pakistan Limited	Chemical	1.000	1.000	0.689	1.000	1.000	0.985	1.000	0.952	1.000	1.000
Ittehad Chemical Limited	Chemical	0.967	1.000	1.000	1.000	1.000	1.000	0.983	1.000	1.000	0.979
Nimir Industrial Chemicals Limited	Chemical	1.000	0.934	1.000	0.957	0.993	0.962	1.000	1.000	0.996	0.987
Sitara Chemical Industries Limited	Chemical	1.000	1.000	0.936	1.000	0.955	0.960	0.957	1.000	1.000	0.756
Wah Noble Chemicals Limited	Chemical	1.000	0.993	1.000	0.968	0.808	0.988	0.960	1.000	0.856	1.000

Table 6. Representing the Overall Technical Efficiency of Engineering

Company Name	Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bolan Casting Limited	Engineering	0.861	1.000	1.000	1.000	1.000	0.991	0.534	1.000	1.000	0.665
Crescent Steel & Allied Products Limited	Engineering	1.000	1.000	0.612	0.958	1.00	1.000	1.000	0.889	1.000	1.000
Dadex Eternit Limited	Engineering	0.887	1.000	1.000	1.000	0.756	1.000	1.000	0.822	0.886	1.000
Dost Steels Limited	Engineering	1.000	1.000	0.706	0.865	0.789	1.000	1.000	0.872	0.733	1.000
Huffaz Seamless Pipe Industries Limited	Engineering	1.000	0.816	1.000	1.000	1.000	1.000	0.804	1.000	1.000	1.000
K.S.B. Pumps Co. Limited	Engineering	0.949	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Pakistan Engineering Company Limited	Engineering	1.000	1.000	1.000	1.000	0.956	1.000	1.000	0.766	1.000	1.000