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Effect of Energy Crisis on Performance of Export and Non-Export Oriented Textile Companies in Pakistan

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Abstract

Energy plays a pivotal role in industrial and economic progression of any country. Pakistan has been observing a persistent energy shortfall during last few decades. This energy crisis negatively affected the performance of many units and sectors of the economy. The present study aimed at investigating the overall and relative effect of energy crisis on performance of export and non-export oriented non-financial companies in Pakistan. The sample of the study was comprised of 118 listed companies selected from the textile sector. In the study, annual firm level data of 2004-2015 were utilized and empirical analysis was conducted by using panel data technique. Return on assets was the dependent variable and used as a proxy of financial performance for sample companies. Other firm level and macroeconomic variables having certain impact on performance of the companies were used as explanatory and control variables. Effect of the energy crisis on performance of the companies was captured by adding a dummy variable in panel regression model. Relative effect across export and non-export oriented companies was examined with the help of interaction terms. Results of this study revealed that the performance of companies declined significantly during episodes of energy crisis in the country. The comparative analysis, however, didn't report any significant difference for export and non-export oriented companies in terms of bearing the consequences of crisis. The study concluded that energy crisis negatively affected all the companies and sectors of the economy in Pakistan. Remedial measures should be taken to overcome the energy deficiency for stimulating the industrial and economic growth in the country.

Keywords: Energy Crisis, Non-Financial Companies, Panel Data, Textile Sector, Performance

Introduction

The economy of Pakistan has been passing through many problems and challenges during last few decades. Besides terrorism, political instability and currency depreciation, the energy shortage remained problematic and a chronic problem for the economy. It severely affected the industrial production and economic efficiency of the enterprises. The energy issue created economic chaos and unrest, thereby disrupting the socio-economic environment (Subhani, Hasan, Osman, Khan, & Nayaz, 2012). The country has been confronting with severe energy crisis as its generating capacity remained much lower than the demand. To absorb the demand, the country required to import from other countries. This alternative is costly as well as uncertain. The higher costs ultimately impact the production cost. This is a complicated and multifaceted issue that may be attributed to political, economic, governance or technical issues. Despite of its causes, the outcomes always remained harmful and disruptive for overall economic environment of the country. The energy is, therefore considered as a backbone of economic prosperity and always played a pivotal role in socio-economic development of the country.

Energy plays a leading role in every industrialized economy and is considered crucial source in the path of development (Sahir & Qurashi, 2007). It is an essential requirement in production and is equally important to other sources of production, such as labour and investment. Energy stimulate the

domestic productivity, increase exports, raise standard of living and act as a driver of economic development (Shahbaz, 2015). Electricity is secondary form of energy and it is produced through the conversion of primary energy sources such as coal, gas, nuclear energy, oil, etc. Production in most of the cases is subject to the availability of electricity. Shortage, lesser availability and higher price of electricity created energy problems and its persistence for a longer time period caused the emergence of crisis. Energy crisis refers to the enormous shortage of energy supply for the economy or substantial rise in energy prices. It includes the shortage of electricity, oil and other petroleum products (Dar, Azeem, & Ramzan, 2013). During the last two decades, many emerging economies faced sever energy crisis which badly affected the economic activities.

Pakistan is amongst the countries which are severely affected by the energy crisis. The country experienced an amazing time period of surplus energy resources but the situation reversed in early years of the current century (Malik, 2012). The demand and supply gap of energy products widened gradually after 2006 (Abdullah, Wei, Anwar, & Bhutta 2013; Nadeem, 2014). This energy crisis turned out to be the worst crisis since partition and it negatively affected the industrial units of the country (Subhani, et al., 2012). An extensive shortfall and substantial tariff increase had been witnessed during this time period (Amer & Daim, 2011; Lodhi, Siddiqui, & Umie Habiba, 2013). This situation made it difficult to meet the local and global demands and challenges by the industrial sector. Numerous factors including inefficient deployment of energy resources, population growth, outdated technology, growing use of electrical appliances, poor planning, institutional inefficiency, untargeted subsidies and system losses contributed in creation and development of this issue (Ali & Shah, 2012; Chaudhry, 2016; Khan & Ahmed, 2014; Nadeem, 2014; Perwez, Sohail, Hassan, & Zia, 2015; Qasim & Kotani, 2014; Shah & Bhatti, 2009; Siddiqui, Jalil, Nazir, Malik, & Khalid, 2008). The energy shortage and its raising prices increased the manufacturing costs in the country which adversely affected the competitiveness of the companies (Mahmud, 2000; Yasmin & Qamar, 2013). It also negatively affected the quantity and quality of industrial production, stock performance and economic growth of the country (H.U. Khan, Habib-ur-Rehman, Naseem Ullah, Waseem Ullah, & I. Khan, 2021; Riaz, Chaudhry, & Faridi, 2018; Sarwar, Waheed, Amir, & Khalid, 2018). The crisis incapacitated the businesspersons to fulfil the commitments and many moved abroad (Ali & Nawaz, 2013).

The energy crisis in the country severely damaged the textile sector (Abdullah, et al., 2013). This sector remained more vulnerable due to heavy reliance on electricity and gas. Textile sector is a leading contributor in exports, employment and economic growth of the country. Considering the importance of the sector, this study aimed at investigating the effect of energy crisis on performance of the companies in textile sector of Pakistan. The study further examined the relative effect of crisis on performance of export and non-exported oriented companies. For analysis, the study selected a sample of 118 companies from textile sector and collected secondary data of firm level and macroeconomic variables from annual reports, balance sheet analysis of joint stock companies and world development indicators. The study utilized the annual data of 2004-15 and employed panel regression model for empirical analysis. Dummy variable was used for determining the effect of energy crisis while interaction term was added to probe the relative effect across export and non-export oriented companies. The results showed a significant effect of energy crisis on performance of sample companies. Significant differential effect for export and non-export oriented companies was, however not observed. Findings of the study are expected to be helpful for different stakeholders. It will encourage the investment in energy sector and will induce the companies to explore alternative and internal energy sources for avoiding the shortage and controlling production costs. Findings will also induce the regulators to prioritize the textile sector in energy supply for better and vibrant economic outcomes.

Research Objectives

This research is aimed at:

1. Examining the effect of energy crisis on performance of textile companies in Pakistan.
2. Relatively examine the export and non-export oriented companies in terms of the effect of crisis.

Literature Review

The availability of energy always remained crucial to the success of industries and economies all over the world. The supply of uninterrupted and lower cost energy, however remained a challenging task

for almost all the governments. The researchers all over the world also addressed this issue to highlight the importance of the energy in production, trade, investment, companies and economic performance of the countries. Nishimizu and Robinson (1994) reported the constructive role of power sector and consistent energy supply in manufacturing sector. The energy shortage exert serious negative consequences for industrial growth. Pasha, Ghaus, and Malik (1989) observed severe effect of energy shortfall on companies of different sectors including textile sector. Aluko (2003) also noted the effect of energy crisis alongwith some other factors on companies performance in Nigeria. Similarly, Von Ketelhodt and Wocke (2008) documented a negative effect of energy crisis on business of SMEs. Owusu (2010) noticed a negative effect of electricity crisis on operations of small companies in Ghana. The researcher suggested for exploring and availing reliable alternative energy sources to maintain the level of business operations. Khattak, Arsalan, and Umair (2011) observed nearly similar consequences for SMEs. The researchers noted that energy crisis and certain other internal factors raised issues in meeting the orders timely and it also substantially leveraged the cost of production.

Every sector of economy felt the effect of energy crisis. Indeed, electricity crisis influenced the whole economy, as reported by Alter and Syed (2011). It affected the industries, exports, employment and overall economic growth negatively. Many industrial units had stopped their operations during the persistent energy shortage time period. This was observed by Shah, Gul, and Aziz (2011). Moyo 2012 also observed a significant negative effect of power outage on the output of companies in Nigeria. Similarly, Diboma and Tatietse (2013) found a negative effect of power crisis on industrial sector of Cameroon. Furthermore, Cissokho and Seck (2013) noticed an adverse effect of electricity shortage on productivity in Senegal. This issue hindered the business growth. Decrease in productivity of enterprises due to power crisis was also reported by Abdullah, et al. (2013). Ado and Josiah (2015), Frederick and Selase (2014), Ranjbar and Abbasi (2014), Siyal, et al. (2014) noticed the effect of power outage on performance and efficiency of SMEs. The energy shortage and insecurity caused delayed orders, increased cost of production and reduced the labour and factor efficiency. It further influenced the investment and employment decisions of the SMEs. Extending the literature, Islam, Khan, and Islam (2013), K.E. Ugochukwu, Nwosu, and S.E. Ugochukwu (2016), Mohammed (2014), Ugwoke, Dike, and Elekwa (2016), Fisher-Vanden, Mansur, and Wang (2015) reported the effect of power shortfall and interruption on output and performance of the companies and industries in Bangladesh, Anambra State, Nigeria, Africa, and China. This, indeed remained a severe problem for many countries of the world.

Energy crisis also severely damaged the economy of Pakistan. The effect of energy crisis on companies, industries and economy of the country has been reported by many researchers. Amjad, Ghani, Musleh ud Din, and Mahmood (2012) identified energy crisis and certain other factors as barrier in exports of the country. Energy shortage damaged the production, manufacturing, employment and economic activities of the country. Bukhari, Shahid, and Iqbal (2015) documented a similar effect which remained pronounced for smaller companies as such companies cannot avail the alternative sources. Xu, et al. (2022) observed a negative effect of energy prices on productivity and performance of companies. In Pakistan, energy shortage damaged also every sector of the economy. Textile sector remained more vulnerable due to its heavy reliance on electricity and gas. Textile sector is considered as a backbone of economy in the country (Shah, Warraich, & Kabeer, 2012). This is largest manufacturing sector and plays a leading role in investment, employment, revenue and foreign exchange earnings. The sector, however faced the issue of electricity and gas shortage which negatively affected the performance and competitiveness locally and globally (Afzal, 2012; Shah, et al., 2012). Numerous researchers observed the negative consequences of energy crisis for textile sector of Pakistan (A.A. Khan & M. Khan, 2010; A. Kiran & F. Kiran, 2016; Afzal, 2012; Ali & Nawaz, 2013; Allcott**,** Collard-Wexler, & O'Connell, 2016; B. Shah, Essrani, N. Shah, & Rahat, 2013; Jameel, Akhtar, Azeem, & Shabib ul Hassan, 2014; Mughal & Chaudhary, 2014; Yasmeen, Shah, Ivascu, Tao, & Sarfraz, 2022). Due to wider energy crisis, production decreased and unemployment enhanced in the country. It also contributed in raising the production cost, lowering production, decreasing the performance and exports of the textile sector and the country. Many companies closed the operations due to non-availability of energy resources timely and on reasonable prices. Energy crisis thus remained problematic for companies, industries and economies all over the world and owing to its importance numerous contributions have been found in literature. This study

also aimed at contributing in the existing literature by examining the effect of energy crisis on companies of textile sector in Pakistan with special focus on the performance of export and non-export oriented companies in the wake of energy crisis. For analysis purposes, the study hypothesized:

H_1: Financial performance of the companies significantly affected by the energy crisis.

H_2: Export-oriented companies affected more by the energy crisis as compared to non-export oriented companies.

Methodology

For examining the effect of energy crisis on performance, the study selected the companies of textile sector. Newly listed companies or that delisted during period or with missing data over the study period of 2004-15 were excluded from the sample. Final sample of the study was comprises of 118 non-financial companies. The companies were selected on the basis of size. Secondary data of firm level and macroeconomic variables were extracted from annual audited reports, balance sheet analysis of joint stock companies, Pakistan economic survey and world databank. The study used the data of 2004-15 and applied panel regression model for analysis purposes. Return on assets was taken as dependent variable which served as a performance determination proxy for the companies. The study used certain other variables as explanatory and control variables. For examining the effect of energy crisis on companies' performance, dummy of "Ecrisis" was added in the regression model. Dummy variable was assigned the value of "1" for energy crisis period and "0" otherwise. The study selected the time period of 2007-12 as the crisis period. Following panel regression model was applied for analysis purposes.

$$FP_{it} = \alpha_o+\alpha_1 Liq_{it}+\alpha_2 Act_{it}+\alpha_3 Tang_{it}+\alpha_4 Lev_{it}+\alpha_5 LnTA_{it}+\alpha_6 Sg_{it}+\alpha_7 Growth+\alpha_8 Inf+\alpha_9 Ecrisis+\boldsymbol{\varepsilon}_o$$

The dependent variable specify the ability of a company to earn profit in proportion to its assets. It also show the efficiency of management in utilizing its assets to generate earnings. Among control variables, liquidity was determined with the help of quick ratio, activity measured through inventory turnover ratio and tangibility by means of proportion of fixed assets. Similarly, leverage and natural log of total assets were used for debt and size of the companies, respectively. Sales growth was also used as control variable in the regression model. Macroeconomic variables of GDP per capita growth rate and inflation rate were added in the panel regression model as control variables. The purpose of dummy variable was related to the effect of energy crisis on performance of sample companies. After establishing the effect of energy crisis for companies' performance, the study probed the differential pattern of effect for export and non-export oriented companies. Following panel regression model was used for this purpose.

$$FP_{it}=\alpha_o+\alpha_1 Liq_{it}+\alpha_2 Act_{it}+\alpha_3 Tang_{it}+\alpha_4 Lev_{it}+\alpha_5 LnTA_{it}+\alpha_6 Sg_{it}+\alpha_7 Growth+\alpha_8 Inf+\alpha_9 Ecrisis+\alpha_{10} Ecrisis*Exp+\boldsymbol{\varepsilon}_o$$

The interactive dummy of "Ecrisis*Exp" was added to check the differential effect of crisis for export and non-export oriented companies. It again takes the value of "1" for export oriented and "0" for non-export oriented companies.

Data Analysis Results

Prior to application of panel regression model, the basic data characteristics were examined with the help of descriptive statistics. Table 1 is portraying the results of descriptive statistics.

Table 1. Descriptive statistics

	FP	Liq	Act	Tang	Lev	LnTA	Sg	Growth	Inf
Mean	1.914	0.328	6.933	0.546	2.314	14.382	10.322	2.077	9.905
Med.	1.985	0.258	5.345	0.555	1.821	14.285	9.234	2.351	8.492
Max.	16.078	1.071	22.253	0.840	9.785	16.654	66.225	5.499	20.286
Min.	-12.293	0.010	1.540	0.248	-2.781	12.490	-42.821	-0.498	2.540
St.Dev.	7.995	0.280	5.219	0.173	2.637	1.146	28.241	1.898	4.324
Obs.	1416	1416	1416	1416	1416	1416	1416	1416	1416

Table 1 is presenting the summary statistics of all the variables. Financial performance was the dependent variable and measured by return on assets. Firm level indicators of liquidity, activity, tangibility, leverage, size and sales growth were added in the regression model. The macroeconomic variables of GDP per capita growth and inflation rate were also taken as the control variables. The statistics showed highest mean value of size while lowest of liquidity. Size was measured as natural log of total assets while liquidity in terms of quick ratio. The highest dispersion was noted in sales growth while lowest in tangibility, measured as the ratio of tangible to total assets ratio. After examining the descriptive statistics and some basic diagnostic tests, the study selected appropriate

model by applying the likelihood ratio and Hausman tests. The results supported the appropriateness of fixed effect model for the dataset. The panel regression model was initially applied for examining the effect of explanatory and control variables on companies' financial performance. The dummy and interaction term were later added to check the effect of energy crisis on all the sample companies and then separately for export and non-export oriented companies. The results of analysis are presented in table 2.

Table 2. Effect of energy crisis on companies' performance

Variable	(1)	(2)	(3)
C	1.741	5.347	4.390
Liq	3.065***	3.026***	3.038***
Act	0.067	0.065	0.066
Tang	-12.866***	-13.011***	-13.014***
Lev	-0.352***	-0.346***	-0.346***
LnTA	0.398	0.197	0.259
Sg	0.060***	0.060***	0.060***
Growth	0.178	0.006	0.018
Inf	-0.021	0.003	0.006
Ecrisis		-0.958**	-0.833*
Ecrisis*Exp			-0.923
Adj. R. Sq.	0.43		
DW Stat.	1.66		

***, **, * specifies significance at 1%, 5%, 10% levels, respectively.

The results of analysis show a positive and significant effect of liquidity and sales growth on performance of the companies. On the other hand, the effect of tangibility and leverage was negative and significant. No significant effect of inventory turnover and size was observed. Similarly, the effect of macroeconomic variables remained insignificant. Negative and significant dummy variable specified a significant negative effect of energy crisis on performance of companies selected from textile sector of Pakistan. This shows that the crisis negatively affected the performance of the companies. To check the differential effect for export and non-export oriented companies, interaction term was added in regression model. The insignificant value of interaction term supported the absence of significant difference among export and non-export companies in terms of the consequences of energy crisis. It supported the phenomenon of bearing the consequence of energy crisis by all the companies, irrespective of their export activities or only dealing locally. The value of adjusted R-square and Durbin Watson statistics confirmed the model fitness and absence of autocorrelation.

Conclusion

Energy is considered as a lifeline for every world economy. It is essential for almost every sector and it ever played a dynamic role in the growth and prosperity of the countries. The availability of energy not only stimulate the domestic productivity but also sustain living standard through income effect by improving exports. It is an essential input for all the industries. The interrupted and lesser supply of energy create serious issues for industrial output, decrease the companies' performance and foreign exchange earnings, increase unemployment, poverty and crime rate. In Pakistan, electricity and gas supply didn't remain adequate during last few decades, which affected all the sectors of economy including textile sector. Due to the energy crisis, the textile producers found it difficult to secure optimal productivity and fulfil the orders timely. Adoption of alternative sources also increased the production cost. This phenomenon of energy crisis and its effect on performance of textile sector companies was examined in the study.

For empirical analysis, the study selected a sample of 118 listed companies from textile sector of Pakistan and categorized those companies as export and non-export oriented. Secondary data of firm level and macroeconomic variables were extracted from published sources. The study covered the time span of 2004-15. The study applied panel regression methodology and inserted dummy variable and interaction term to examine the effect of energy crisis on companies' performance and then check its differential effect for export and non-export oriented companies. Results of the study revealed that the financial performance of the companies selected from textile sector significantly declined during the energy crisis episode. The results further revealed that both export and non-export oriented companies affected by the crisis and significant differential effect across the two categories was not observed. Based on findings, the study suggested for remedial measures to manage the energy requirements for sustainable development. Different steps in this context are required which may

include improving energy generation capacity, demand and supply forecasting of the electricity, construction of dams, exploring and availing alterative lesser cost energy sources and reducing line losses. Private investment may be attracted in the power sector and investor-friendly policies should be devised accordingly. The study may also be extended by incorporating the elements of political instability, governance issues and macroeconomic environment for broader and more comprehensive results. This may also be extended to examine the impact on other sectors of the economy.

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