

**ENERGY CRISIS AND PERFORMANCE OF
MANUFACTURING SECTOR OF PAKISTAN**



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Dedicated
to
Buzurg,
Safeera Baji,
and
My Parents

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ABSTRACT

This study aims to explore the effect of energy crisis on the performance of listed manufacturing sector of Pakistan by using the panel data of 300 firms for the period of 1999-2012. For this purpose profitability and working capital management are used to investigate the influence of energy crisis on overall industry. Generalize Method of Moments (GMM) technique is applied to analyze the aftermath of energy crisis. The results reveal that energy crisis leads to upsurge in profitability and working capital (WC) of the firms. The control variables: size, capital structure, asset turnover, and GDP have positive significant effect on return on assets. However, working capital, lagged dependent variable and inflation shows negative influence. For Working capital management energy crisis and all control variables have shown positive and significant effect. The study concludes that energy crisis influence producers to invest more in working capital (adopt conservative approach). For profitability, the result reveals that rise in energy crisis leads to upsurge in profitability. Price escalation or shifting the burden on consumers can be the possible reason for the surge.

Keywords: Energy crisis, Return on assets, Return on equity, Working capital

CHAPTER 01

INTRODUCTION

1.1 Background of the Study

Energy is considered to be the lifeline for every economy around the globe, and it is considered the most important component in the course of development (Sahir and Qurashi, 2007) whether it is agriculture or industry, energy is an essential component to move forward. Socially it represents the class of life of citizens and community and economically it is important for every industry. Traditional theories of economics consider just capital and labor as the most important factors of production (Stern Cleveland, 2004). But it is no more the case in current scenario, recent studies have suggested that energy is the most important component in the production and consumption function of every economy in the world (IEA, 2005). Lot of work has done in the recent years and it has been proved that energy is the essential component in the growth of economy because of its complementary part in production (for example, Asafu-Adjaye, 2000; Lee, 2005). The relationship of energy consumption and economic growth has been investigating from last few decades. Various studies has conducted in this regard, findings of these studies are much contradictory in few of the cases. This difference in the findings may be because of the difference in the structure of the economies and dependency of the economy on energy (Sari et al., 2008). Akarca and Long (1980) found no relationship between energy consumption and economic development in US. Similar results were reported by (Lee, 2006). However some of the studies found the significant impact of energy on the economic development (Soytas and Sari, 2003). In Pakistan this area has not adequately explores there are just few studies that attempted to find the relationship of energy consumption and economy development. Aqeel and Butt (2001) found a positive

relationship between economic development and energy demand and consumption. In Pakistan demand for different sources of energy is increasing rapidly. For example if we just look at the electricity, in Pakistan number of consumers increased to 15 million in 2005-06 which were just 8.2 million in 1992-93 (ESP 2005–2006). So it is 83% growth in consumer which is observed in these 15 years. And per capita usage of electricity is also increasing with a sharp rate which was 425 kWh in 2004-05 (IEA, 2006). The main reason of this sharp increase in per capita consumption is industrialization, growth and technological advancement in agriculture, urbanization and electrification of rural areas in the country (NBP, 2008). During the same period, world average per capita consumption of electricity was 2516 kWh which shows that still in Pakistan per capita consumption of electricity is not too much high (IEA, 2006). According to Economic survey of Pakistan in the year of 2007 electricity is available to 86.6% of the total population of Pakistan (ESP 2007– 2008). It shows that still there is lot of room in the demand of electricity. If government takes some action to provide electricity to remaining population of Pakistan, there would be a significant increase in the demand of electricity. Same is the case in utilization of natural gas which is the second major source of energy. During 2007 natural gas was available to just 30% of the total population of Pakistan (ESP 2007–2008). This suggests that demand is expected to increase in this sector. According to the different researches conducted all over the world, it has been proved that electricity is the most important and richest source of production and economic growth followed by gas (Erbaykal, 2008). Statistics has been proved that gas and electricity are main energy sources in Pakistan, for domestic usage and International Journal of African and Asian Studies - An Open Access International Journal Vol.2 2013 51 commercial usage as well (ESP 2007–2008). Since 2006 Pakistan is facing a decline in the production and distribution

of the gas and electricity (ESP 2006–2007). During the year of 2006 and 2007, production and distribution of electricity and gas has decreased approximately 40% (ESP 2007–2008). In Pakistan both of the two main energy recourses are not enough to meet the demand of domestic and commercial users. In this scenario growth of economy is not possible, even it is very difficult to maintain the GDP at current level. At the same time tariffs of electricity and gas is increasing rapidly, which is the major source of inflation in Pakistan (ESP 2008–2009). In this study we have investigated the impact of these energy crises on the performance of different industries in Pakistan.

According to the Ministry of Finance, the energy crisis is the major single drain on Pakistan’s economy, cutting away up to 2 percentage points from annual GDP growth in the country (see EAW, 2013: “Overview”). The demand for energy has been increased by a very faster growth rate since early 2000’s. That demand and supply gap was not managed well and resulted in creating severe energy crisis.

There are so many structural factors that contribute to the severe energy crisis. Though the main cause was the boom in global commodity price in 2007 that causes an increase in oil prices from averaged \$50 per barrel to \$ 147 per barrel over an 18-month period time. As mentioned in the energy section of Pakistan economic survey (2012-13) the consumption depends as high as more than 80% on oil and gas. For the fiscal year 2008 that increase in fuel prices caused increase of 36% in Pakistan’s import bill (see EAW, 2013: “Statistical appendix”, Table 8.3).

Energy crisis has created a lot of problems for manufacturing sector of Pakistan. It does increase the cost of doing business, which leads to not achieving economies of scale so reducing the profitability for a major part of manufacturing

industries. According to SMEDA (2011) energy crisis was one of the main factors that increases cost of production in Pakistan. That's why some of the firms are either going to closure or moving out (Dawn, 2011). As in this era, capital mobility is not much difficult so the firms find it better to get low costs and maximum profit. For a country like Pakistan it is an alarming situation, as we already face a lot of challenges like unemployment, budget deficit, trade deficit and many more. Industries are now substituting energy(due to crisis) with expensive means- like using generators to generate electricity to run plant, but most of the time, the burden of using expensive means to cope with the crisis have been shifted to the final consumers. Thus prices for commodities have been increased which did reduce the purchasing power of the final consumers. The recent increase in the prices of basic necessities (food) and energy has raised alarms among policy makers for the decline in economic welfare of the middle and lower class as they spend large segment of their income on purchasing food and energy sources(for fuel and lighting activities)¹.

The firm increase the prices of any product whose demand is inelastic whenever there cost of production increases, shifting all the burden on consumers. However (for the firms with elastic demands) inflation in an economy can decrease the profitability as it may increase the cost of production.

The effect of energy prices on manufacturing sector profitability has not yet been explained in literature, specifically for Pakistan. This study efforts to explore the effect of increase in energy prices on manufacturing sector profitability of the

¹ Household Integrated Economic Survey (2011-12).

listed manufacturers in Pakistan and concludes some policy implications on the basis of the findings of the study.

Along with energy crisis, the study tries to explore the impact of firm-specific variables, inflation rate, and economic growth on profitability to get the better insight on the overall economic conditions. The firm specific variables included for statistical analysis are size, efficiency, Working Capital Management (WCM), financial leverage, and the lagged dependent variable (Hussain and Junaid, 2012).

For any business the role of corporate finance is relatively more important as the decisions of financial managers can disturb the profitability of the firm. As, working capital has an impact on liquidity and profitability of the firm so, the managers pay a lot of attention on the ratio. Profitability can be enhanced by efficient and effective management of working capital (Chhapra and Naqvi, 2010).

Most of the times companies are involved in financial leverage to expand their business or to meet day to day expenses. Though, it comes with greater financial risk and it can lower the profitability and sometimes it obliterate shareholders right on assets when the company goes bank corrupt.

The study also focuses on the sub sectors (Industries) to get better understanding about the factors contributing to their profitability. That explains that which industries are involved in price escalation and shifting the whole burden on consumers. It also help us realize that which sectors should be provided subsidize so that overall economic condition can be improved.

1.2 Objectives

As it has been figured out that energy crisis effects the overall economy. This study will focus on the impact of energy crisis on profitability and working capital management. More specifically the objectives of the study are:

To examine the possible effects of energy crisis on profitability.

Whether firm-specific and macroeconomic/industry-specific factors contribute to the profitability of listed producers?

To examine the relationship between energy crisis and working capital for the manufacturing sector of Pakistan.

1.3. Significance of the Study:

Energy crisis is one of the main reasons for decrease in output for the industries (Hussain and Junaid, 2012). It does increase the cost of production. This study contributes to existing literature by explaining the impact of energy crisis on profitability of the firms. This helps the producers to analyze that how can they reduce their costs, so that they can increase their production and profitability. This study has also significance for the policy makers, so they can develop efficient policies to eradicate power shortages. The study is also significant for the government and provides them insights on the seriousness of the energy crisis in concern of trade deficit. Muhammad (2010) states that imports in this country are almost always greater than the exports.

1.4. Organization of the Study

Our study consists of six chapters after giving the introduction in first chapter the chapter 2 is based on Review of literature. Chapter 3 gives theoretical and empirical background of determinants of profitability and working capital, chapter 4 explains

data, methodology and description of variables, Chapter 5 Contains Results and Discussions, and chapter 6 consists of Conclusion and Policy Recommendations.

CHAPTER 02

LITERATURE REVIEW

This chapter explains the review of previous studies that explains the relationships between the variables.

Hussain and Junaid (2012) while focusing on the impact of energy crisis on profitability of food producers in Pakistan concludes that the producers gain at the cost of final consumers suffering as one percent increase in energy prices causes 2.25 percent increase in food producer profitability. The study uses GMM EGLS method for the panel of 15 food producers for the time period of years 2001 to 2010. The study further concludes that lagged profitability, working capital (WC), and change in firm size have positive impact whereas corporate gearing has a negative impact on the profitability of food sector. The study suggests that price regulation authorities must take actions and make efficient policies to decrease consumer sufferings.

Hussain (2012) uses the panel data technique for the period of year 2000 to 2009 to analyze the impact of firm specific and macroeconomic variables on profitability of textile sector of Pakistan. The study concludes that corporate gearing has a negative impact on profitability of the textile sector. The study further concludes that WC management and asset turnover have a positive impact on profitability. The study suggests that managing WC with efficiency and improving asset turnover can increase profitability.

Chhapra and Naqvi (2010) analyzes the impact of working capital management on profitability for the textile sector of Pakistan. The study uses ANOVA test on the secondary data for the time period of 2003-08 and concludes that

working capital management has a positive impact on the profitability of textile sector of Pakistan.

Ahmed (2011) while focusing on the cost of production of textile Industry in Pakistan concludes that the energy crisis has a positive and significant impact on cost of production. The study further concludes that the growth of textile industry is highly negatively associated with the energy crisis. The study suggests that rapid urbanization is the main driving force behind the escalating demand of energy sources.

Chowdhury and Amin (2007) examines the impact of working capital policies on the profitability. The study uses the data of pharmaceutical companies for the time period of 2000 to 2004. The study concludes that the performance of firms is highly affected by the current assets management. The survey (questionnaire) was conducted & the results indicate that the pharmaceutical firms have been managing their current assets efficiently. The study further reveals that the industry holds inventories in large volumes but it didn't reflect inefficiency for the pharmaceutical industry.

Wang (2002) investigates the relationship between liquidity management and operating performance for firms in Japan & Taiwan. The study reveals that cash conversion cycle has a negative impact on return on assets and return on equity. The study suggests that the operating performance can be enhanced through aggressive liquidity management that can also increase the corporate value for the firms.

Shin and Soenen (1998) examines the impact of WCM on profitability. The study focuses on the impact of net trading cycle (NTC) on the profitability and stock returns. The study reveals that there is strong negative association between

profitability & the firm's NTC. Moreover, the results indicate that the shorter NTC are linked with greater risk adjusted stock returns.

Soenen (1993) examines the impact of WCM on profitability. The study uses ROA as a proxy of financial profitability. The study uses the financial data of 20 different industries, for the time period of 1970 to 1989, and applies different statistical techniques to analyze the relationship. The results indicate that shorter NTC have been linked with higher profits and the long NTC has been associated with low profitability. The study shows that level of impact and association between variables for different industries was different. The study suggests that efficient management of cash cycle can enhance the profitability.

Raheman and Nasr (2007) also focuses on the impact of WCM on profitability. The study uses ordinary least square method on the data of 94 firms, for the time period of 1999 to 2004. The study reveals that WCM has a negative impact on profitability. Moreover, it shows that size has a positive impact on profitability, whereas leverage and liquidity have a negative impact on profitability for these firms.

Raheman, etal (2011) focuses on the impact of different WCM measures on the profitability. The study uses the data of 204 manufacturing firms for the time period of 1998 to 2007. The study tries to explore the sector wise performance and uses ratio analysis to determine the relationship among variables. The study reveals that inventory turnover in days is mostly responsible for any sectors' dominant or laggard behavior in terms of WCM. The study further reveals that inventory turnover also effects cash conversion cycle and net trade cycle.

Akhtar etal (2012) focuses on the impact of financial leverage on financial performance for the fuel and energy sector of Pakistan. The study concludes that

financial leverage has a positive impact on financial performance. The study uses the data of 20 listed oil and gas companies and reveals that by improving optimal capital structure the oil and gas sector can improve their profitability and that can enhance the growth rate for our country.

Ojo (2012) has studied the impact of financial leverage on corporate performance for the listed companies in Nigeria. The study reveals that financial leverage has a significant impact on corporate performance.

Rehman (2013) studies the impact of financial leverage on profitability of sugar industry of Pakistan. The study concludes that financial leverage affects return on assets positively. The study suggests that profitability can be improved through proper management of capital structure.

Aliu (2010) focuses on the impact of capital structure on the profitability of manufacturing sector for Nigeria. The sample size for the study was 108 listed companies for the time period of 2000- 2009. The statistical analysis shows that through proper utilization of debt, performance for manufacturing sector can be enhanced.

Nimalathan (2010) while focusing on the impact of capital structure on profitability for the manufacturing sector in Sri Lanka reveals that the gearing ratio has a positive relationship with profitability. The study uses the data of the listed manufacturing companies for 5 years from 2003 to 2007. The study suggests that the stakeholders should formulate better policies that can provide them better control over mix of debt and equity and can help reducing bankruptcy costs.

Choudhury (1993) while focusing on capital structure and profitability reveals that there is a sound relationship between both variables. The study suggests that not using

enough debt with leads to decline in profitability because without enough finances one cannot avail all profitable opportunities. The study concludes that availability of funds and their efficient usage can increase profitability and vice versa.

Banu (1990) also focuses on the relationship between capital structure and profitability. The study indicates that the capital structure of an industry has a positive relationship with profitability. The study recommends that the concerned stakeholders should give weight to various aspects of capital structure and study different possibilities that can help them increase their profitability. The study states that inefficient use of debt can lead to adverse impact on profitability of the firms.

Treacy (1980) while focusing on the impact of firm size on profitability concludes that the firms have negative correlation between variance in returns on equity and firm size. The study further reveals that there is a moderate correlation between average returns on equity and firms size.

Whittington (1980) focuses on the relationship between firm size and profitability. The study reveals that there is positive relationship between size and profitability. The study suggests that the greater the firm size, the higher the profitability will be. The firms with the higher degree of concentration have the monopoly power and they can reduce the costs through producing at economies of scales.

Kanwal and Nadeem (2013) focuses on the listed banking sector of Pakistan and analyzes the effect of macroeconomic variables on profitability for the time period of 2001-2011. Pooled Ordinary Least Square (POLS) has been used as a statistical technique to inspect the effect of inflation rate and GDP on return on assets

(ROA), equity multiplier (EM), and return on equity (ROE). The study reveals that inflation rate has a negative link with all three independent profitability variables.

Ali et al (2011) focuses on the impact of economic growth on profitability. The study used the data for listed commercial banks for the time period of 2006- 2009. The study concludes that economic growth has a positive impact on profitability.

Pandey (2000) explains the net working capital as the difference between current assets and current liabilities. Because impact of energy crisis on overall working capital provides us a better insight. Previous year value of WCM ($WC(-1)$) captures the inertia in working capital. Kwenda & Holden (2014) use this variable to understand the impact of previous year investment on working capital on current year WCM. The study uses GMM and shows the positive relationship among the variables.

“A firm’s sales expectations have an influence on the investment in working capital management” (Nunn, 1981), increase in inventory or supply is based on the sales so, that can affect the working capital management in a positive way. Kwenda & Holden (2014) also uses sales as a measure of investment in working capital management and assert that for some firms the data shows positive relationship between sales and working capital management.

According to Benito and Vlieghe (2000, p. 90) the firms with higher gearing have chances of liquidity constraints in a bad economic time, which hinders their valuable investment activities and have an adverse impact on profitability.

CHAPTER 03

THEORETICAL FRAMEWORK

This chapter explains theoretical framework that explains the impact of energy crisis on profitability and working capital.

3.1. For Energy Crisis and Profitability:

Firm's objective is to maximize profit.

$$\text{Profit} = P \cdot Q - C(Q)$$

Where $Q = F(L, K, E)$

L = labor,

K = capital → it can be divided into debt and equity

E = energy

$$\text{Cost function} = C = wL + rK + pE + c$$

Where C = total cost, w is labor cost, r is interest on capital, pE is price of energy*energy consumption, and c is the fixed cost.

Assuming the Cobb Douglas Technology,

$$Q = A L^\alpha K^\beta E^\gamma$$

Where A = Technology

α, β, γ are the shares of the factors of cost of production.

$$\text{Profit} = P A L^\alpha K^\beta E^\gamma - pL - rK - pE - c$$

Where $0 < \alpha, \beta, \gamma < 1$

$$\text{For } \frac{\partial \pi}{\partial L} = \alpha P A L^{\alpha-1} K^\beta E^\gamma - PL = 0 \text{ (e1)}$$

$$\frac{\partial \pi}{\partial k} = \beta P A L^{\alpha} K^{\beta-1} E^{\gamma} - P K = 0 \text{ (e2)}$$

$$\frac{\partial \pi}{\partial E} = Y P A L^{\alpha} K^{\beta} E^{\gamma-1} - P E = 0 \text{ (e3)}$$

For e1 and e2 we get:

$$\alpha K / \beta L = P L / P K \rightarrow \alpha P K K = \beta P L L$$

For e1 and e3 we get:

$$\alpha E / \gamma L = P L / P E \rightarrow \alpha P E E = \beta P L L$$

For e2 and e3 we get:

$$\beta E / \gamma K = P K / P E \rightarrow \beta P E E = \gamma P K K$$

Assuming Labor as a constant we get:

$$E = \gamma P K K / \beta P E, \text{ and } K = \beta P E E / \gamma P K$$

$$C = P K K + P E E$$

$$C = \beta / \gamma P E E + P E E$$

$$C = \beta P E E + \gamma P E E / \gamma \rightarrow (\gamma + \beta) P E E / \gamma$$

$$E = \gamma C / (\gamma + \beta) P E$$

$$\text{Profit} = P A (\beta P E E / \gamma P K)^{\beta} (\gamma P K K / \beta P E)^{\gamma} - P K (\gamma P K K / \beta P E) - P E (\beta P E E / \gamma P K)$$

$$\text{Where, Total Capital} = (\beta P E E / \gamma P K), \text{ Total Energy} = (\gamma P K K / \beta P E)^{\gamma}$$

$$\text{Price of Capital} = P K (\gamma P K K / \beta P E), \text{ Price of Energy} = P E (\beta P E E / \gamma P K)$$

Therefore, if the price of energy will increase the profitability will decrease if the market prices of the products remain constant. However if the prices of output increases with more intensity in comparison to the prices of energy. Profit will increase and the price burden will be on final consumers.

The insertion of the total assets (Log), permits for a possible link between profitability and firm size. There is a high possibility that if firms take benefits from scale economies when they grow, size and profit could have positive relationship. On the other hand if growth inclines to diseconomies of scope, the relationship between size and returns may have a negative expectations. As stated by the Managerial theory of the firm, if managers are inspired by earnings, supremacy, benefits, status and prestige (they all are the signs of size rather than profit) and have preference to follow their own objectives, size along with profit may move into firm's objective function (Baumol, 1959).

For capital structure, long term liabilities divided by total assets, denotes gearing of a firm. Fazzari et al (1988) and Stulz (1990) explains that firms with high gearing are facing high risk of being incapable to repay interest and debt obligations. On the other hand, firms with high gearing provides benefits to shareholders if the profit earned surpasses borrowing cost (interest payment). Models of strategic behavior put emphasis on the significance of long term liabilities for strategy. Firms with low gearing ratio has can increase their output to a level that can apply a downward pressure on price of that product. This will have an adverse impact on the profitability of the highly geared competitors. After some time due to price war strategy the high geared competitor may not be able to payback their debts and will dissolve (Telser, 1966). According to Benito and Vlieghe (2000, p. 90) the firms with higher gearing have chances of liquidity constraints in a bad economic time, which hinders their valuable investment activities and have an adverse impact on profitability.

There are four main theories that tries to explain the impact of working capital on value of the firm. As per the net income approach an increase in degree of

leverage, the cost of capital will decrease and it will increase the total valuation of the firm (Durand 1952). According to the net operating income approach capital structure does not affect the valuation of the firm. Modigliani and Miller (1958) provides behavioral support and reveals that valuation of the firm and cost of capital does not get affected by the capital structure. The last approach is the traditional approach that assumes that sensible use of leverage can increase the total value of the firm.

The Structure–Conduct–Performance paradigm, in industrial economics, anticipates a relationship between profitability and market share of the firm. It states that the firms with high market share and power incline to work on anti-competitive approaches that allows them to get abnormal profits. Then again, companies that have attained a huge market share may have achieved this by focusing on innovation or efficiency to avail better opportunities in the past (Ross, 1986; Eckard, 1995). That shows that positive link between firm’s market share and profitability show positive relationship between productive efficiency and size of the firm. The most efficient firms in terms of innovation, availing opportunities and minimizing costs, make the maximum rates of profit, and their accomplishment of achieving maximum profits allows them to grow and attain a relatively huge market share. Goddard et al (2005) states that larger the firm share the higher will be the profitability in comparison to the firms having smaller market share because the firms can create monopolistic scenarios. Slade (2004) reveals that the market share shows the efficiency of the firm.

Working capital is being measured in current study by current assets ratio (current assets divided by current liabilities). Liquidity shows the promptness at which a firm is able to respond to sudden changes or any opportunity in the market. Nickell and Nicolitsas (1999) states that if a firm will hold high proportion of current assets than it would be protected to abrupt changes in the market scenarios. High liquidity

of a firm shows that the firm is facing little risk of not being able to pay short term commitments (current liabilities.). Deloof (2003) states that for Belgian firms working capital management was a significant indicator to enhance profitability, Though, if a firm have a high proportion of liquid assets than it will restrain the firm to avail opportunities for long-term investment.

3.2. For Energy Crisis and Working Capital Management:

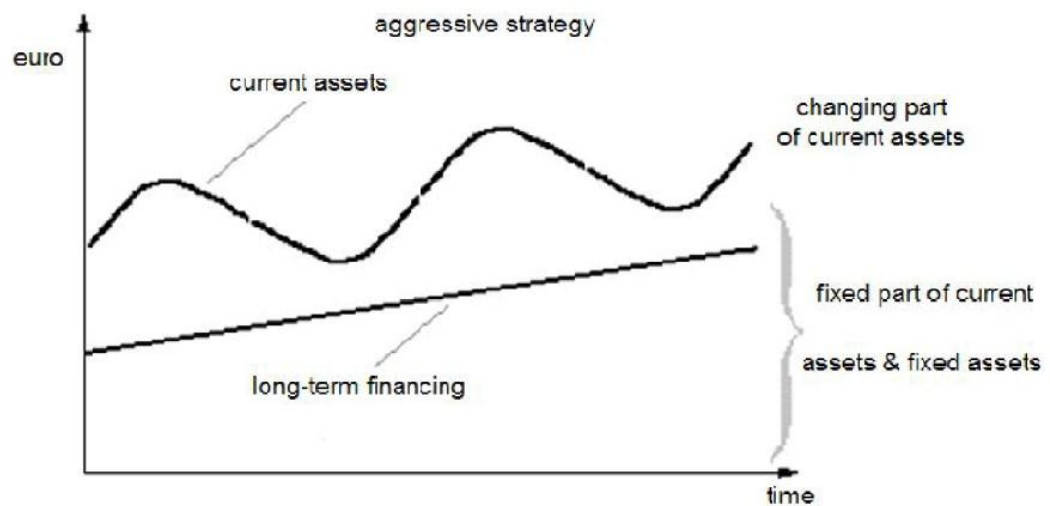
Pandey (2000) explains the net working capital as the difference between current assets and current liabilities. As stated by Michalski (2008) “it is a consequence of dichotomy between the formal origination of sales revenue and the actual inflow of funds from recovery of receivables and different times when the costs are originated and when the funds covering liabilities are actually paid out.”

The financing policy focuses on the suitable mix of short-term and long-term financing selections to support the investments in working capital (Firer et al., 2012). Working capital financing include a trade-off among profitability of a firm and risk (Gitman et al., 2010). In simple words, working capital deals with the liquid assets require to pay the debt as they mature. However, excess of working capital can lead the current assets to be inefficient restrain the firm to avail opportunities for long-term investment. So bringing working capital at an optimal level is the most important stuff on which finance managers dedicate more than 60% of their time (Van Horne & Wachowicz, 2004). There are three approaches to deal with investment in working capital management: aggressive, conservative, and the moderate strategy.

Aggressive approach leads towards higher profitability as the firm upholds relatively small ratio of current assets-to-sales ratio. Though, adopting this approach may lead to incur shortages as the firm is holding insufficient current assets and it may face problems in sustaining smooth processes (Van Horne & Wachowicz, 2004).

So a higher risk is also attached with this approach. Aggressive approach also leads to the problem of over trading as only financing for fixed assets and partial permanent current assets is done through long term financing. Financing for the requirements of partial permanent current assets and temporary current assets is done through short term financing. There are different solutions for this problem of over trading. The firm can issue share, can arrange long term financing, can retain the profit, reinvest in current assets.

Figure 1: Aggressive Policy

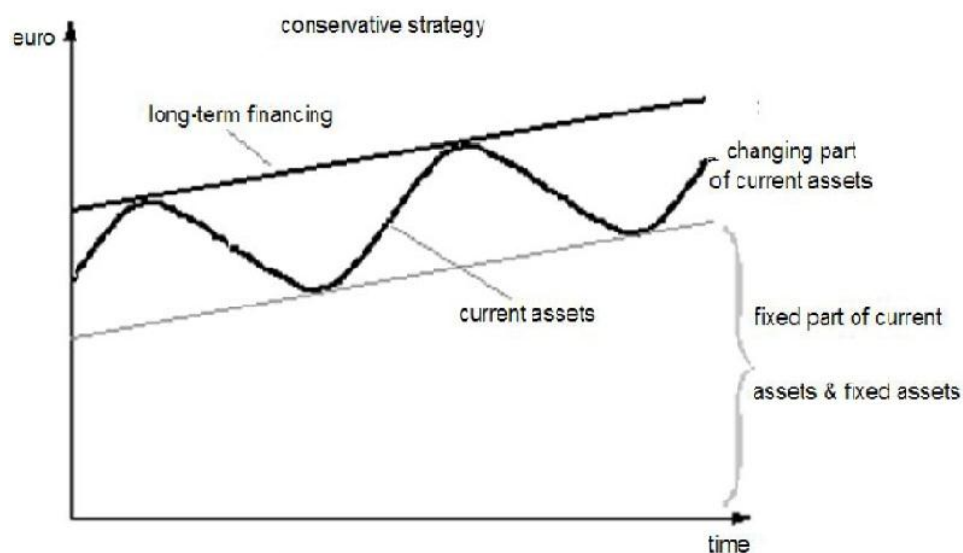


Source: Michalski, G. (2008). *Corporate inventory management with value maximization in view. ZEMEDELKA EKONOMIKA PRAHA*, 54(5), 187.

The moderate approach states that taking moderate risk to manage the working capital efficiently and earns judicious profitability, than the firm will be having optimum balance of the working capital management. It basically provides the solution and lies in between the aggressive and conservative approaches (Firer et al., 2012). For financing the working capital moderate approach uses short term financing to finance temporary current assets and use long term financing to finance fixed assets and permanent current assets. That leads the firm to face moderate risk and earn moderate profitability.

Conservative approach is opposite to aggressive approach as the firm upholds relatively high ratio of current assets-to-sales ratio. Though, adopting this risk averse approach the firm holds more than sufficient current assets and it may face problems of earning low returns or no returns on holding idle money (Brealey, Myers & Allen, 2008). Conservative approach leads to the problem of over capitalization, as only financing for the requirements of partial temporary current assets is done through short term financing. There are different solutions for this problem of over capitalization. The firm can use the money to return the debts, pay dividend or expand the business (through investment in fixed assets).

Figure 2: Conservative Policy



Source: Michalski, G. (2008). *Corporate inventory management with value maximization in view.* ZEMEDELKA EKONOMIKA PRAHA , 54(5), 187.

To find out the factors affecting WCM helps the stakeholders to understand what policies should they opt and what finance source should they use for investing or financing in working capital management.

At the time of crisis people tend to liquidity preference. For firm or producer any crisis can change the adaptation of working capital strategy. In the last few years, there is a significant chance that the producer can shift from aggressive strategy to conservative strategy due to energy crisis. Producers have to hold more cash to deal with power shortages. Generating electricity need holding more cash. It is also in alliance with the Keynesian demand for money for precautionary measures.

Pandey (2000) explains the net working capital as the difference between current assets and current liabilities. Because impact of energy crisis on overall working capital provides us a better insight. Previous year value of WCM ($WC(-1)$) captures the inertia in working capital. Kwenda & Holden (2014) use this variable to understand the impact of previous year investment on working capital on current year WCM. The study used GMM and showed the positive relationship among the variables.

“A firm’s sales expectations have an influence on the investment in working capital management” (Nunn, 1981), increase in inventory or supply is based on the sales so, that can affect the working capital management in a positive way. Kwenda & Holden (2014) also uses sales as a measure of investment in working capital management and assert that for some firms the data shows positive relationship between sales and working capital management.

According to Benito and Vlieghe (2000, p. 90) the firms with higher gearing have chances of liquidity constraints in a bad economic time, which hinders their valuable investment activities and have an adverse impact on profitability.

CHAPTER: 04

RESEARCH METHODOLOGY AND DATA

This chapter explains Research Methodology and econometric techniques used to achieve the objectives and the data used in the study.

4.1. Methodology and Description of Variable

4.1.1 Energy Crisis and Profitability

The explanatory variables involve some firm specific and some macroeconomic variables.

Profitability

The dependent variable is return on assets (ROA) and return on equity (ROE) for which the study uses net profit as a percentage of total assets and net profit as a percentage of equity respectively. Petersen & Schoeman (2008), Treacy (1980), and Wang (2002) use these variables as the dependent variable and the proxies of profitability.

The first independent variable is the previous year value of profitability ratios (lagged dependent variable) and is denoted by (ROA(-1)) and (ROE(-1)) and capture the inertia in profitability. Mueller (1977), Stierwald (2009) and Hussain and Junaid (2012) use this variable to understand the impact of previous year profitability on current year profitability. Hussain and Junaid (2012) and Stierwald (2009) shows the positive relationship between the variables.

Firm Size

The second explanatory firm specific variable is the size of the firm for which the study uses log of total assets, indicated by (SZ). Stierwald (2009) explains the

relationship between firm size and profitability and stated that the larger firms in size can get benefit from economies of scope or can get capital at lower costs than the firms small in size. Whittington (1980) focuses on the relationship between firm size and profitability. The study reveals that there is positive relationship between size and profitability. The study suggests that the greater the firm size, the higher the profitability will be for firms. Stierwald (2009) also shows the positive relationship between firm size (No. of employees) and profitability. Whittington (1980), and Hussain and Junaid(2012) have taken log of total assets as the proxy for size and shows the positive relationship. Current study also takes log of total assets as a measure to explain size as data on No. of employees is not available for all firms.

Asset turnover Ratio:

The third firm specific explanatory variable is efficiency which can be measured through asset turnover ratio (ATO), that is, sales divided by total assets. Fairfield, & Yohn (2001) uses ATO as a measure to forecast return on assets. Hussain and Junaid (2012) uses the ATO to measure return on assets and reveals the positive relationship between the variables.

Capital structure:

The fourth firm specific explanatory variable is financial leverage (GR) for which the study use gearing ratio, that is, long term liabilities divided by total assets. Choudhury (1993) and Nimalathan (2010) and Banu (1990) while focusing on capital structure and profitability reveal that there is a sound relationship between both variables. The studies suggest that not using enough debt with leads to decline in profitability because without enough finances one cannot avail all profitable opportunities. Amjed (2007) shows negative relationship between capital structure

and profitability, however Nimalathan (2010) and Banu (1990) show positive relationship between the variables.

Efficiency:

The fifth firm specific explanatory variable is the market share for which the study takes gross sales of a manufacturing firm as a percentage of gross sales of the industry. Hussain and Junaid (2012), Slade (2004) and Goddard et al (2006), chose market share as a determinant of profitability. Goddard et al (2006) states that larger the firm share the higher will be the profitability in comparison to the firms having smaller market share because the firms can create monopolistic scenarios. Slade (2004) reveals that the market share shows the efficiency of the firm. Goddard et al (2006) and Husain and Junaid (2012) both show positive relationship between firm market share and profitability.

Working Capital:

The last firm specific variable is working capital for which the study uses current ratio (CR) as a proxy. (Deloof, 2003) states that the more the company will hold cash or other liquid assets the more it will lose the ability to invest. The study reveals that investing optimally in working capital management enhance profitability of the firm as it create more opportunities for investment. Chowdhury and Amin (2007) and Chhapra and Naqvi (2010) examines the impact of working capital policies on the profitability. The studies conclude that the performance of firms is highly affected by the current assets management. Hussain (2012) concludes that WC management and asset turnover have a positive impact on profitability. The current study uses current ratio as a proxy of working capital as suggested by (Hussain and Junaid, 2012).

--The three macroeconomic explanatory variables are as follows:

Gross Domestic Product:

Economic Growth (GDP) for which the study uses growth rate of Gross Domestic Product (GDP). The annual data has been collected from the statistics available on World Bank website. Kanwal and Nadeem (2013) uses Pooled Ordinary Least Square (POLS) as a statistical technique to inspect the effect of inflation rate and GDP on return on assets (ROA), equity multiplier (EM), and return on equity (ROE). Ali et al (2011) focuses on the impact of economic growth on profitability and concludes that GDP has a positive impact on profitability. It shows that higher the output of a country, higher the profits of firms will be.

Inflation:

Inflation (INF) is the second macroeconomic variable for which study uses the rate of inflation. The data has been collected on inflation rate (consumer prices) from the statistics available on World Bank website. Kanwal and Nadeem (2013) reveals that inflation rate has a negative link with return on assets and return on equity. Hussain and Junaid (2012) also uses inflation as a measure to examine profitability. If prices of factors of production increases more, in comparison to the prices of output produced than, inflation will have a negative impact on profitability. However inflation can have a positive relationship if the firm is having inelastic demand for its product. The firm can get higher profitability through price escalation.

Energy Crisis:

The last macroeconomic variable for study is energy index (PEC) for which the study uses the composite energy price index for electricity and gas. For energy prices, the study uses the data collected from NTDC Power Statistics, 36th edition.

Annual data for the industrial prices and consumption of electricity and gas for the years 1999-2012 has been focuses for statistical analysis. The study creates a composite price index (industrial energy prices* industrial energy consumption) while taking year 2007 as a base year. The price available are in KWH and the consumption is in GWH, so to create harmony the study multiplies prices with 1million. Hussain and Junaid (2012) also uses the composite price index for their study on listed food sector. The result reveal price escalation as a result of energy crisis by the food producers. That states the positive impact of energy crisis on profitability.

4.1.2. Working Capital Management and Energy Crisis:

A firm can implement 3 different strategies to deal with working capital. It can use aggressive, moderate or conservative strategies while making decisions regarding investment in working capital. Michalski (2008) explains the aggressive policy as a situation where current assets are held at low level. No liquid asset remains idle and so, it creates opportunities to invest. However it has a risk as the aggressive approach might not allow the producer to hold liquid asset for precautionary measures. Michalski (2008) explains moderate policy and states that it is a situation where current assets mainly cash and stocks are held at a moderate level. And conservative policy is opposite to aggressive policy, where producers hold current assets in high levels. It's a financing policy where long term financing is used to finance volatile and fixed levels of current assets.

At the time of crisis people tend to liquidity preference. For firm or producer any crisis can change the adaptation of working capital strategy. In the last few years, there is a significant chance that the producer can shift from aggressive strategy to conservative strategy due to energy crisis. Producers have to hold more cash to deal

with power shortages. Generating electricity need holding more cash. It is also in alliance with the Keynesian demand for money for precautionary measures.

Working Capital Management:

The study uses working capital (Current assets- Current Liabilities) as a dependent variable. Pandey (2000) explains the net working capital as the difference between current assets and current liabilities. Because impact of energy crisis on overall working capital gives us a better insight. As it has a direct impact on holding liquid assets more.

The first independent variable is the previous year value of working capital (lagged dependent variable) and is denoted by (WC(-1)), it captures the inertia in working capital. Kwenda & Holden (2014) use this variable to understand the impact of previous year investment on working capital on current year WCM. The study used GMM and shows the positive relationship among the variables.

Size:

Akinlo (2012) uses size as a determinant of working capital. The study shows positive relationship among the variables. Hill et al. (2010) and Jose, Lancaster, and Stevens (1996) provides reason for the positive relationship between firm size and working capital management and states that the firms bigger in size invests more in working capital to put up with processes at a higher level. The firm size is an essential variable when it comes to founding a working capital management strategy. According to Palombini and Nakamura (2012) the firms that are large in size maintain lower amounts of working capital. The strong trust level and good relationship with suppliers can be the reason for that.

Sales:

“A firm’s sales expectations have an influence on the investment in working capital management” (Nunn, 1981), increase in inventory or supply is based on the sales so, that can affect the working capital management in a positive way. Kwenda & Holden (2014) also uses sales as a measure of investment in working capital management and assert that for some firms the data showed positive relationship between sales and working capital management. The study uses sales to total asset ratio (STA) as a proxy of sales.

Gross Domestic Products (GDP):

Investment in inventories and trade credit can be affected by Gross domestic product of a country (Atseye, Ugwu, & Takon, 2015). Smith (1987) and Walker (1991) states that economic conditions of a country have a significant impact on the level of account receivables of the firms. The state of the economy influences the level of accounts receivable. Lamberson (1995) have revealed that the economic slowdown of a country enhance the investment in working capital. So the study also uses GDP as a measure to find out its impact on working capital.

4.2. Data Set and Estimation Technique

The emphasis of this study is on the manufacturing sector of Pakistan. The study uses the data of 300 out of 340 manufacturing firms listed on Karachi Stock Exchange for the time period of 1999-2012. Forty excluded firms are either involved in services or directly in energy production. The required data is extracted from balance sheets of firms, handbook statistics of Pakistan economy and sbp.org.pk. For energy prices, the study uses the data collected from NTDC Power Statistics, 36th edition.

The literature suggests that the equation containing lagged dependent variable are endogeneity biased (Blundell and Bond, 1998). As the above mentioned regression equations contain a lagged dependent variable, so there is a significant probability of presence of endogeneity in the model, so for this, the study uses Generalized Method of Moments (GMM) as a statistical tool. Hussain and Junaid (2012), Arellano and Bond (1991) have explained GMM as an instrumental variable method with the instruments. The GMM model suggested by Arellono and Bond (1991) and modified by Blundell and Bond (1998) is used to answer the problem of endogeneity. Arellano and Bond (1991) have suggested Sargan J test to validate the instrumental variables by examining the sample analogue of the moment's conditions.

4.3. Empirical Model Specifications:

4.3.1 Model Specification for Energy Crisis and Profitability:

The study uses the regression model suggested by Hussain and Junaid (2012) in this study. The model that is used to estimate the impact of firm specific and macroeconomic variables on profitability is as follows:

$$ROA = B_0 + B_1X_{it} + B_2Z_t + B_3PEC_t + E_{it} \text{ ----- model (1)}$$

$$ROE = B_0 + B_1X_{it} + B_2Z_t + B_3PEC_t + E_{it} \text{ ----- model (2)}$$

For model (1) and model (2) ROA and ROE indicates return on Asset and returns on equity respectively. *i* is used as measure of profitability explains the cross sectional and *t* describes the time dimension. B_0 , B_1 and B_2 are the parameters to be estimated and X_{it} denotes firm specific variables which includes a lagged dependent variable. Z_t contains macroeconomic variables which are also explanatory variables for profitability. PEC denotes Energy crisis as an independent variable. E_{it} denotes the error term for the models.

Explanatory variables as expected determinants of profitability are: Lagged dependent variable (ROA/ROE (-1)), log of Assets (SZ), working capital (CR), Capita Structure (GR), Market Share (MKTSHR), Asset Turnover (ATO), Inflation (INF), Gross domestic product(GDP), and Energy crisis(PEC).

By incorporating the variables the specified form of the model becomes:

For ROA:

$$ROA_{i,t} = \alpha + \beta_1 ROA_{i,t(-1)} + \beta_2 SZ_{i,t} + \beta_3 CR_{i,t} + \beta_4 GR_{i,t} + \beta_5 MKTSHR_{i,t} + \beta_6 ATO_{i,t} + \beta_7 INF_t + \beta_8 GDP_t + \beta_9 PEC_t + E_{it}$$

For ROE:

$$ROE_{i,t} = \alpha + \beta_1 ROE_{i,t(-1)} + \beta_2 SZ_{i,t} + \beta_3 CR_{i,t} + \beta_4 GR_{i,t} + \beta_5 MKTSHR_{i,t} + \beta_6 ATO_{i,t} + \beta_7 INF_t + \beta_8 GDP_t + \beta_9 PEC_t + E_{it}$$

Literature on profitability shows that different statistical tools can be used to examine the factors determining the returns on assets. The most common measures used to estimate the performance of the firms contains of financial ratios such as ROA, ROE, Tobins Q etc. (Madajewicz, 2008). This study uses the ratios ROA and ROE to measure profitability and applies GMM as a statistical tool to analyze the significance of relationship between variables.

4.3.2. Model Specification for Energy Crisis and Working Capital Management:

There is no previous research study that determines the relationship between energy crisis and working capital management. The current study focuses on determining the impact of energy crisis firm specific, and macro-economic variables on investment in working capital management.

This study uses GMM model as used by (Kwenda & Holden, 2014). The general form of the model is as follows:

$$WC_{it} = \beta_0 + \sum_j^n \beta_j X_{jit} + \varepsilon_{it} \text{ ---- Model (3)}$$

For model (3) WC indicates working capital for the firms. *i* is used as measure of working capital that explains the cross sectional and *t* describes the time dimension. β_0 , β_j are the parameters to be estimated and X_{it} denotes firm specific variables which includes a lagged dependent variable. Z_t contains macroeconomic variables which are also explanatory variables for profitability. Explanatory variables as expected determinants of working capital are: Lagged dependent variable (WC(-1)), sales to assets (STA), Size (size), Gross domestic product(GDP), and Energy crisis(PEC). ε_{it} denotes the error term for the model.

When we convert the generalized model to the requirement of our specific model, we get:

$$WC_{i,t} = \beta_0 + \beta_1 WC(-1)_{i,t} + \beta_2 STA_{i,t} + \beta_3 SZ_{i,t} + \beta_4 GDP_t + \beta_5 PEC_t + E_{i,t}$$

In this study the analysis is done for 300 firms over period of 1999-2012, and applied GMM to analyze the impact of energy crisis on profitability as used by Hussain and Junaid (2012) and also on working capital management (Kwenda & Holden, 2014). The reason for considering the data for 14 years till 2012 is that, it completes the 5 years performance of political party. As 2013 was the elections year, and a new democratic party was chosen. There is a high probability that the parameters may change, so the study does not chose the year 2013 and 2014 for analysis.

CHAPTER: 05

RESULTS AND DISCUSSIONS

In this study, the impact of energy crisis on profitability ratio has been analyzed for the whole manufacturing sector. For food sector, the impact of energy crisis has been analyzed by Hussain and Junaid (2012). The present study estimates the impact of energy crisis on profitability and working capital of manufacturing sector.

5.1 Summary Statistics of Data

Table: 01

	Mean	Median	Maximum	Minimum	Std. Dev.
ROA	-293.25	3.011	81813.41	-803898	13990.71
ATO	4379.470	106.1100	5800746.	0.00	138978.1
CR	202.5985	99.37461	87503.72	0.00	1986.304
SZ	2.976899	2.975397	5.014102	-1.09152	0.720953
INF	8.514286	7.750000	20.30000	2.900	4.884064
GDP	4.028571	3.600000	7.700000	1.600	1.901516
PEC	102.6486	90.22789	221.9143	51.132	46.18586

Table: 1 shows the descriptive or summary statistics of the whole data for manufacturing sector of Pakistan. The results for return on assets show that the variable is showing negative mean. This infers that on average the firms are facing losses. That can be due to so many factors like, Energy crisis, economic instability, higher inflation rate, war on terrorism and other firm related variables. These all factors may have contributed to the overall negative value in terms of net profit of the firm. The size of the firm could also have shadowed the overall results. As for as asset turnover ratio the data is showing that on average sales to asset ratio is 4379. This shows that on average for firms investment of Rs.100 in assets bring Rs.4379 as sales.

For current ratio the descriptive stats show that on average firms hold more current assets than current liabilities. This can be to meet day to day expenses or it can be due to the precautionary demand of money for a time when country is facing energy shortages and economic instability. For size the data shows the average value as 2.98. It is basically the log firm of total assets to harmonize the standard deviation. Inflation shows the mean of 8.51 that means on average inflation rate tends towards 8.51 for the country. The observations for inflation rate according to time series data are only 14. So we cannot generalize these stats. For GDP the summary stat table shows that on average the growth rate for gross domestic country for a year is 4.02. This means that from 1999 to 2012 the country grows on 4.02 on average in terms of total domestic output produced. The data on energy crisis showed that on average the energy consumption*prices was 102. We have taken year 2007 as base year and we have created an index where the industrial consumption for that year 2007 is 100.

5.2. Results of Impact of Energy Crisis on Profitability

5.2.1. Model 01: Impact of Explanatory Variables on ROA for Manufacturing Sector

Table: 03

Variable	Coefficient	Prob.
ROA(-1)	-0.190	0.000
GR	1.511	0.000
SZ	2.746	0.000
CR	-1.062	0.000
ATO	0.110	0.000
PEC	0.441	0.068
INF	-0.763	0.015
GDP	1.095	0.023
MKTSHR	-5.317	0.116
Prob(J-statistic)	0.613	

Probability (J-statistic shows the significance of the statistical analysis).

The Model 1 includes the firm specific and macroeconomic variables for the whole manufacturing sector. The study uses GMM as a statistical tool to analyze the impact of variables on profitability of the firms. The study tries to explore the impact of each variable on return on assets individually. The probability (J- statistic) is higher than 0.05 that states that the variables used as an instruments are valid and results can be generalized.

The result states that the relationship between the last year profitability (roa(-1)) and ROA is significant and negative. The coefficient value states that 1 % change in the lagged dependent variable causes 0.19% change in ROA. This negative relationship between lagged dependent variable and dependent variable shows the uncertainty or fluctuations in the data. This uncertainty creates negative expectations among the investors. Economic instability, Energy crisis, inflation, unemployment etc. could have been the reasons for these fluctuations. These results are consistent with Kok et al (2015) and is inconsistent with the findings of (Hussain and Junaid, 2012). Gearing ratio has been used to identify the impact of capital structure. The results shows a significant positive relationship between Gearing ratio and return on assets. The findings state that the firms are using optimal level of debt. The coefficient value demonstrates that for every 1% increase in gearing ratio, there will be an increase of 1.5% in return on assets. The study is focusing on long term debts, which are available as the sources to expand business. The results state that the firms are utilizing these resources in a proper way to generate profitability. However, higher the gearing ratio the higher the risk will be- because it is not optional to pay interest as it is to pay dividends (Telser, 1966). These results confirms the findings of Amjed (2007) and are inconsistent with the findings of (Hussain, 2012; Hussain and Junaid, 2012).

The results illustrates that the size of the firms has a positive significant relationship with return on assets. The data states that increase in the firm size plays a vital role on increasing profitability. The result shows that 1% increase in size brings 2.88% increase in return on assets. This demonstrates that the big firms in manufacturing sector generate reasonable profits. The results also confirm the theory of economies of scale in manufacturing sector. These results confirms the findings of Raza et al. (2011), Hussain and Junaid (2012) but are inconsistent with the findings of Ammar et al. (2003). The study has used current ratio as the proxy of working capital. The results reveal that working capital has a significant but negative relation with profitability. This states that upsurge in the current ratio will decrease the profitability of the firm. This also states that the average firms are on a level where the stock, cash or receivables are not held efficiently. The investment in current assets is more than required thus applying conservative strategy. The results state that 1% increase in current ratio causes 1.07% decrease in profitability. These results confirms the findings of Raheman and Nasr (2007) and are inconsistent with the findings of (Hussain and Junaid, 2012). Asset turnover is measured through sales divided by total assets. The results reveals the significant positive relationship between ATO and ROA. The data states that 1% change in ATO brings 0.12% positive change in profitability. This result reveals that the firms which generate better sales (in comparison to assets) do work efficiently to trickle down this positive effect to the bottom of income statement. The results shows that on average ATO is impacting positively on ROA for the manufacturing sector of Pakistan. These results are in consistent with the findings of (Fairfield, & Yohn, 2001; Hussain and Junaid, 2012).

The composite price index of energy sources consumption has been used to analyze the impact of energy crisis on profitability. The result reveals that there is a

positive relationship between energy crisis and ROA. The result is significant at 10% and the data shows that 1% increase in total expenditure on energy sources brings 0.44% increase in ROA. This shows that the producers cannot recover the whole cost incurred by them. Though it states that some of the cost is being recuperated. There can be different scenarios for this positive relationship. One is that, the demand for the products has been increased that causes increase in supply so returns move upwards. The second scenario is that the producers are shifting some burden on the final consumers through increasing prices. There is a possibility that some of the products have near to inelastic demand, so increase in prices will not change the buying behavior (Hussain and Junaid, 2012). That creates an opportunity for the producer to survive and shift the burden on final consumers. These results confirm the findings of Hussain and Junaid (2012) and are inconsistent with the findings of (Ahmed, 2011). The result states that the relationship between inflation and return on assets is significant. The coefficient value states that 1 % change in inflation causes 0.76% change in ROA. The results state that the sign with the coefficient and t stat values is negative- which indicates the negative relationship among variables. This can be due to increase in cost of production as inflation does increase the prices of raw material and labor. These results confirm the findings of (Kanwal and Nadeem, 2013). The results illustrate that the growth in gross domestic product has a positive significant relationship with return on assets. The data states that increase in economic growth level plays a vital role on increasing profitability. The result shows that 1% increase in GDP brings 1.06% increase in return on assets. This demonstrates that the higher the output/economic growth, higher will be the profitability. These results confirm the findings of Ali et al (2011).

5.2.2. Model 02: Impact of Energy Crisis on ROE:

Table: 03

Variable	Coefficient
ROE(-1)	0.31*** (2.44)
GR	-0.65 -(0.86)
SZ	1.69*** (2.77)
CR	0.41 (0.86)
ATO	0.04 (0.86)
PEC	0.23** (1.97)
INF	-0.41** -(1.96)
GDP	2.62** (1.95)
Probability (J-Statistic)	0.13

Notes: The *** indicates the significance at 1%. ** indicates the significance at 05%, * indicates the significance at 10% level. The values written below coefficient values (x.xx) are the t-stat values. Probability (J-statistic shows the significance of the statistical analysis).

Model 2 includes the firm specific and macroeconomic variables for the whole manufacturing sector. The study uses GMM as a statistical tool to analyze the impact of variables on profitability of the firms. The study tries to explore the impact of each variable on return on equity. The probability (J- statistic) is higher than 0.05 that states that the variables used as an instruments are valid and results can be generalized.

The result states that the relationship is significant between Return on Equity and the previous year profitability. The coefficient value states that 1 % change in the previous year's profitability causes 0.31% change in ROE. This positive relationship between lagged dependent variable and dependent variable shows the smoothness in

the data which shows that profitability is predictable. This power to predict creates positive expectations among the investors. These results are consistent with the findings of (Hussain and Junaid, 2012).

The relationship between long-term liability and returns on equity are not significant. The results shows a non-significant negative relationship between Gearing ratio and return on assets. The coefficient value demonstrates that for every 1% increase in gearing ratio, there will be a decrease of 0.65% in return on equity. The results state that the firms are not utilizing the resources in a proper way to generate profitability and they should focus on getting funds through equity. These results are inconsistent with the findings of (Amjed, 2007).

The results illustrates that the size of the firms has a positive significant relationship with return on equity. The data states that increase in the firm size plays a vital role on increasing profitability. The result shows that 1% increase in size brings 1.69% increase in return on equity. This demonstrates that the big firms in manufacturing sector generate reasonable profits. The results also confirm the theory of economies of scale in manufacturing sector. These results confirms the findings of Raza et al. (2011), Hussain and Junaid (2012) but are inconsistent with the findings of Ammar et al. (2003).

The results reveal that working capital has a non-significant and positive relation with profitability. The sign states that upsurge in the current ratio will increase the profitability of the firm. The coefficient explains that 1% increase in current ratio can cause 0.42% increase in profitability.

The result reveals that there is a positive relationship between energy crisis and ROE for the manufacturing sector. The data shows that 1% increase in total

expenditure on energy sources brings 0.23 % increase in ROE. This shows that the producers cannot recover the whole cost incurred by them. This shows that energy crisis has a direct impact on the profitability of the firm. Though it states that some of the cost is being recuperated. There can be different scenarios for this positive relationship. One is that, the demand for the products has been increased that causes increase in supply so returns move upwards. The second scenario is that the producers are shifting some burden on the final consumers through increasing prices. There is a possibility that some of the products have near to inelastic demand, so increase in prices will not change the buying behavior (Hussain and Junaid, 2012). That creates an opportunity for the producer to survive and shift the burden on final consumers. These results confirm the findings of Hussain and Junaid (2012) and are inconsistent with the findings of (Ahmed, 2011). The result states that the relationship between inflation and return on assets is significant. The coefficient value states that 1 % change in inflation causes 0.42% change in ROA. The results state that the sign with the coefficient and t-stat values is negative- which indicates the negative relationship among variables. This can be due to increase in cost of production as inflation does increase the prices of raw material and labor. These results confirm the findings of (Kanwal and Nadeem, 2013). The results illustrate that the growth in gross domestic product has a positive significant relationship with return on assets. The data states that increase in economic growth level plays a vital role on increasing profitability. The result shows that 1% increase in GDP brings 2.63% increase in return on assets. This demonstrates that the higher the output/economic growth, higher will be the profitability. These results confirm the findings of Ali et al (2011).

5.3 Results of Impact of Energy Crisis on Working Capital

Table : 05

Coefficient	
WC(-1)	0.89 *** (25.16)
SZ	2.57*** (3.91)
PEC	3.00*** (6.36)
STA	1.47*** (2.70)
GDP	1.70* (1.81)
Probability (J-Statistic)	0.40

Notes: The *** indicates the significance at 1%. ** indicates the significance at 05%, * indicates the significance at 10% level. The values written below coefficient values (x.xx) are the t-stat values. Probability (J-statistic shows the significance of the statistical analysis).

Model 3 includes the firm specific and macroeconomic variables for the whole manufacturing sector. The study uses GMM as a statistical tool to analyze the impact of variables on working capital management of the firms. The probability (J- statistic) is higher than 0.05 that states that the variables used as an instruments are valid and results can be generalized.

The result states that the relationship is significant between WCM and the previous year previous year WCM. The coefficient value states that 1 % change in the previous year's WC causes 0.89% change in WCM. This positive relationship between lagged dependent variable and dependent variable shows the smoothness in the data. It also states that the policy makers doesn't change use almost similar policies for working capital management. The results confirm the finding of Kwenda & Holden (2014).

As for as the impact of size on the investment of working capital management is concerned the results reveal positive and significant sign among the variables. It states that the large size firms do increase investments in working capital management

in Pakistan. Hill et al. (2010) provides reason for the positive relationship between firm size and working capital management and states that the firms bigger in size invests more in working capital to put up with processes at a higher level. The results are consistent with the findings of and Jose, Lancaster, and Stevens (1996) and are inconsistent with the results of (Palombini and Nakamura, 2012).

The result reveals that there is a positive relationship between energy crisis and working capital management. The coefficient value states that 1% increase in energy crisis causes 3% increase in working capital. This shows that firms hold much more cash due to energy crisis. This can be used to cope with the problematic situations or to generate electricity. It is also in alliance with the Keynesian demand for money for precautionary measures. The results also shows that due to crisis the firms have opt risk averse behavior and using conservative approach for working capital management to deal with energy crisis.

The results shows that sales have a significant positive relationship with working capital. The data revealed that 1% increase in sales causes 1.47% increase in working capital management. This shows that a firm's sales expectations have an impact on the investment in working capital management (Nunn, 1981) Sales determine the level of inventory: higher sales means higher demand and higher demand leads to higher supply, it also increases the cash of the firm and account receivables of the firms. The study confirms the results of (Kwenda & Holden, 2014).

The results reveal that there is a positive relationship between GDP and working capital management. Investment in inventories and trade credit can be affected by Gross domestic product of a country (Atseye, Ugwu, & Takon, 2015). Smith (1987) and Walker (1991) stated that economic conditions of a country have a

significant impact on the level of account receivables of the firms. The state of the economy influences the level of accounts receivable. That can be the reasons for the positive relationship between the variables.

Other than the relationship between energy crisis and the performance of overall manufacturing sector of Pakistan. This study also focusing on different industries of manufacturing sector to get a clear picture of the scenario. So, for that, the study is analyzing different sub sectors. Model 4-9 will each represent a subsector.

**5.4. Results of Impact of Explanatory Variables on ROA for Sub Sectors:
Table: 05**

	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
ROA(-1)	-0.18*** (-3.51)	0.53*** (5.1)	-0.07*** (-12.35)	-0.36*** (-2.8)	0.13** (2.4)	0.16*** (2.4)
GR	1.56*** (7.98)	-0.08* (-1.95)	-0.40*** (-15.33)	0.36*** (4.96)	-0.58*** (-2.76)	-0.03 (-0.46)
CR	-1.09*** (-8.62)	0.06 (1.62)	-0.19 (-0.71)	3.67** (2.08)	0.10*** (5.03)	0.18*** (3.04)
ATO	0.11*** (7.66)	0.03** (2.36)	0.10*** (9.55)	0.28* (1.87)	0.056*** (4.29)	0.06*** (8.96)
INF	-1.17* (-1.68)	-0.37** (-2.26)	-1.15*** (-7.9)	-2.23 (-1.16)	0.001 (0.69)	0.01*** (3.26)
GDP	1.78* (1.9)	0.002 (0.65)	0.59*** (5.72)	0.49*** (3.02)	0.236*** (2.61)	0.002 (0.33)
SZ	2.01* (1.82)	0.03*** (3.87)	2.79*** (8.43)	-6.37 (-0.31)	0.028*** (3.12)	-0.01 (-0.24)
PEC	0.08** (1.99)	5.06 (0.39)	-0.13*** (-3.89)	0.19* (1.87)	0.001 (0.60)	-0.11*** (-2.95)
Prob(J-statistic)	0.427928	0.536677	0.314725	0.396909	0.076525	0.002461

Notes: The *** indicates the significance at 1%. ** indicates the significance at 05%, * indicates the significance at 10% level. The values written below coefficient values (x.xx) are the t-stat values. Probability (J-statistic shows the significance of the statistical analysis).

5.4.1 Model 4: For Textile Sector

The Sector consists of almost half of the manufacturing sector. So it have a greater impact on overall results for the whole manufacturing sector. It has shadowed the results and have created biasness.

The Model 4 includes the firm specific and macroeconomic variables for the Textile sector. The study tries to explore the impact of each variable on return on

assets individually. Total firms under observation for textile sector are 144. The probability (J- statistic) is higher than 0.05 that states that the variables used as an instruments are valid and results can be generalized.

The result states that the relationship between lagged dependent variable and return on assets is significant and negative. The coefficient value states that 1 % change in the lagged dependent variable causes 0.19% change in ROA. This negative relationship between lagged dependent variable and dependent variable shows the uncertainty or fluctuations in the data. These results are inconsistent with the findings of (Hussain and Junaid, 2012). The results shows a significant positive relationship between Gearing ratio and return on assets. The coefficient value demonstrates that for every 1% increase in gearing ratio, there will be an increase of 1.57% in return on assets. The results state that the firms are utilizing these resources in a proper way to generate profitability. These results confirms the findings of Amjed (2007) and are inconsistent with the findings of (Hussain and Junaid, 2012).

The results illustrates that the size of the firms has a positive significant relationship with return on assets. The result is significant on 10% range and the data states that increase in the firm size plays a vital role on increasing profitability. The result shows that 1% increase in size brings 2.01% increase in return on assets. This demonstrates that the big firms in manufacturing sector generate reasonable profits. The results also confirm the theory of economies of scale in manufacturing sector. These results confirms the findings of Raza et al. (2011), Hussain and Junaid (2012) but are inconsistent with the findings of Ammar et al. (2003). The results reveal that working capital has a significant but negative relation with profitability. This states that upsurge in the current ratio will decrease the profitability of the firm. The results state that 1% increase in current ratio causes 1.1% decrease in profitability. These

results confirms the findings of Raheman and Nasr (2007) and are inconsistent with the findings of (Hussain and Junaid, 2012). Asset turnover is measured through sales divided by total assets. The results reveals the significant positive relationship between ATO and ROA. The data states that 1% change in ATO brings 0.12% positive change in profitability. This result reveals that the firms which generate better sales (in comparison to assets) do work efficiently to trickle down this positive effect to the bottom of income statement. These results are in consistency with the findings of (Hussain and Junaid, 2012).

The result reveals that there is a positive relationship between energy crisis and ROA. The data shows that 1% increase in total expenditure on energy sources brings 0.09 % increase in ROA. This shows that the producers cannot recover the whole cost incurred by them. These results confirms the findings of Hussain and Junaid (2012) and are inconsistent with the findings of (Ahmed, 2011). The coefficient value for the relationship between inflation and return on assets states that 1 % change inflation causes 1.17% change in ROA. The result is significant on 10% range and the results state that the sign with the coefficient and t stat values is negative- which indicates the negative relationship among variables. This can be due to increase in cost of production as inflation does increase the prices of raw material and labor. These results confirms the findings of (Kanwal and Nadeem, 2013). The results illustrates that the growth in gross domestic product has a positive significant relationship with return on assets. The result is significant at 10% range and the data states that increase in economic growth level plays a vital role on increasing profitability. The result shows that 1% increase in GDP brings 1.78% increase in return on assets. This demonstrates that the higher the output/economic growth, higher will be the profitability. These results confirms the findings of Ali etal (2011).

5.4.2. Model 5: for Pharmaceutical and Chemicals:

The model 5 includes the firm specific and macroeconomic variables for the Chemical sector. The study tries to explore the impact of each variable on return on assets individually. Total firms under observation for Chemicals sector are 25. Discussion and results for model 5 are as follows: The probability (J- statistic) is higher than 0.05 that states that the variables used as an instruments are valid and results can be generalized.

The result states that the relationship between Lagged dependent variable and ROA is positive and significant. The coefficient value states that 1 % change in the lagged dependent variable causes 0.53% change in ROA. This positive relationship between lagged dependent variable and dependent variable shows the smoothness in the data which shows that profitability is predictable. This power to predict creates positive expectations among the investors. These results are consistent with the findings of (Hussain and Junaid, 2012). Gearing ratio has been used to identify the impact of capital structure. The results shows a significant negative relationship between Gearing ratio and return on assets. The coefficient value demonstrates that for every 1% increase in gearing ratio, there will be a decrease of 0.09% in return on assets. The results state that the firms are not utilizing the resources in a proper way to generate profitability and they should focus on getting funds through equity. These results confirms the findings of Hussain (2012) and Hussain and Junaid (2012) and are inconsistent with the findings of (Amjed, 2007). The results illustrates that the size of the firms has a positive significant relationship with return on assets. The result shows that 1% increase in size brings 0.03% increase in return on assets. This demonstrates that the big firms in manufacturing sector generate a little bit higher profits- but not as much profits as they are investing. These results confirms the

findings of Raza et al. (2011), Hussain and Junaid (2012) but are inconsistent with the findings of Ammar et al. (2003). The results reveal that the relationship between working capital and profitability is not significant. Asset turnover is measured through sales divided by total assets. The results reveals the significant relationship between ATO and ROA. Average turnover impacts positively on return on assets. The data states that 1% change in ATO brings 0.03% positive change in profitability. These results are in consistency with the findings of (Hussain and Junaid, 2012).

The results reveal that the relationship between energy crisis and profitability is not significant. The coefficient value states that 1 % change in inflation causes decrease of 0.37% in ROA. This can be due to increase in cost of production as inflation does increase the prices of raw material and labor. These results confirms the findings of (Kanwal and Nadeem, 2013). The results reveal that the relationship between GDP and profitability is not significant.

5.4.3. Model 6: For Food Sector and General Industries:

The model 6 includes the firm specific and macroeconomic variables for the Food sector. The study tries to explore the impact of each variable on return on assets individually. Total firms under observation for food sector are 42. Discussion and results for model 6 are as follows: The probability (J- statistic) is higher than 0.05 that states that the variables used as an instruments are valid and results can be generalized.

The result states that the relationship between Lagged dependent variable and ROA is significant. The coefficient value states that 1 % change in the lagged dependent variable causes 0.078% change in ROA. This negative relationship between lagged dependent variable and dependent variable shows the uncertainty or

fluctuations in the data. These results are inconsistent with the findings of (Hussain and Junaid, 2012). The results shows a significant negative relationship between Gearing ratio and return on assets. The coefficient value demonstrates that for every 1% increase in gearing ratio, there will be a decrease of 0.4% in return on assets. The results state that the firms are not utilizing the resources in a proper way to generate profitability and they should focus on getting funds through equity. These results confirms the findings of Hussain (2012) and Hussain and Junaid (2012) and are inconsistent with the findings of (Amjed, 2007). The results illustrates that the size of the firms has a positive significant relationship with return on assets. The data states that increase in the firm size plays a vital role on increasing profitability. The result shows that 1% increase in size brings 2.8% increase in return on assets. This demonstrates that the big firms in manufacturing sector generate reasonable profits. The results also confirm the theory of economies of scale in manufacturing sector. These results confirms the findings of Raza et al. (2011), Hussain and Junaid (2012) but are inconsistent with the findings of Ammar et al. (2003). The result reveals that the relationship between working capital and return on assets is not significant. The results reveals the significant relationship between ATO and ROA. Asset turnover impacts positively on return on assets. The data states that 1% change in ATO brings 0.11% positive change in profitability. This result reveals that the firms which generate better sales (in comparison to assets) do work efficiently to trickle down this positive effect to the bottom of income statement. These results are in consistency with the findings of (Hussain and Junaid, 2012). The result reveals that there is a negative relationship between energy crisis and ROA. The data shows that 1% increase in total expenditure on energy sources brings 0.14 % decrease in ROA. This shows that the producers cannot recover the whole cost incurred by them and are even

facing losses. It can be due to the inclusion of general industries in food sector for this analysis. These results confirm the findings of Ahmed (2011) and are inconsistent with the findings of (Hussain and Junaid, 2012). The coefficient value states that 1 % change in inflation causes 1.15% decrease in ROA. This can be due to increase in cost of production as inflation does increase the prices of raw material and labor. These results confirm the findings of (Kanwal and Nadeem, 2013). The results illustrate that the growth in gross domestic product has a positive significant relationship with return on assets. The data states that increase in economic growth level plays a vital role on increasing profitability. The result shows that 1% increase in GDP brings 0.6% increase in return on assets. This demonstrates that the higher the output/economic growth, higher will be the profitability. These results confirm the findings of Ali et al (2011).

5.4.4. Model 7: For Auto Mobile Sector:

The model 7 includes the firm specific and macroeconomic variables for the Auto Mobile sector. The study tries to explore the impact of each variable on return on assets individually. Total firms under observation for Auto Mobile sector are 29. Discussion and results for model 7 are as follows:

The probability (J- statistic) is higher than 0.05 that states that the variables used as instruments are valid and results can be generalized.

The result states that the relationship is significant and negative. The coefficient value states that 1 % change in the lagged dependent variable causes 0.36% change in ROA. The negative relationship between lagged dependent variable and dependent variable shows the uncertainty or fluctuations in the data. This uncertainty creates negative expectations among the investors. These results are

inconsistent with the findings of (Hussain and Junaid, 2012). The results shows a significant positive relationship between Gearing ratio and return on assets. The findings state that the firms are using optimal level of debt. The coefficient value demonstrates that for every 1% increase in gearing ratio, there will be an increase of 0.36% in return on assets. The study is focusing on long term debts, which are available as the sources to expand business. The results state that the firms are utilizing these resources in a proper way to generate profitability. These results confirms the findings of Amjed (2007) and are inconsistent with the findings of Hussain (2012) and (Hussain and Junaid, 2012). The results reveal that working capital has a significant and positive relation with profitability. This states that upsurge in the current ratio will increase the profitability of the firm. The results state that 1% increase in current ratio causes 3.7% increase in profitability. These results confirms the findings of Hussain and Junaid, (2012) and are inconsistent with the findings of (Raheman and Nasr, 2007). Asset turnover is measured through sales divided by total assets. The results reveals the significant relationship between ATO and ROA. Asset turnover impacts positively (at 10% significant level) on return on assets. The data states that 1% change in ATO brings 0.29% positive change in profitability. This result reveals that the firms which generate better sales and do work efficiently to trickle down this positive effect to the bottom of income statement. These results are in consistency with the findings of (Hussain and Junaid, 2012).

The result reveals that there is a positive relationship (at 10% significant level) between energy crisis and ROA. The data shows that 1% increase in total expenditure on energy sources brings 0.19 % increase in ROA. This shows that the producers cannot recover the whole cost incurred by them. These results confirms the findings of Hussain and Junaid (2012). The results illustrates that the growth in gross domestic

product has a positive significant relationship with return on assets. The data states that increase in economic growth level plays a vital role on increasing profitability. The result shows that 1% increase in GDP brings 0.5% increase in return on assets. This demonstrates that the higher the output/economic growth, higher will be the profitability. These results confirms the findings of Ali et al (2011).

5.4.5. Model 8: Construction Sector

The model 8 includes the firm specific and macroeconomic variables for the Construction sector. The study tries to explore the impact of each variable on return on assets individually. Total firms under observation for construction sector are 30. Discussion and results for model 8 are as follows

The probability (J- statistic) is higher than 0.05 that states that the variables used as an instruments are valid and results can be generalized.

The result states that the relationship between lagged dependent variable and ROA is positive and significant. The coefficient value states that 1 % change in the lagged dependent variable causes 0.13% change in ROA. This positive relationship between lagged dependent variable and dependent variable shows the smoothness in the data which shows that profitability is predictable. This power to predict creates positive expectations among the investors. These results are consistent with the findings of (Hussain and Junaid, 2012). The results shows a significant negative relationship between Gearing ratio and return on assets. The coefficient value demonstrates that for every 1% increase in gearing ratio, there will be a decrease of 0.59% in return on assets. The results state that the firms are not utilizing the resources in a proper way to generate profitability and they should focus on getting funds through equity. These results confirms the findings of Hussain (2012) and

Hussain and Junaid (2012) and are inconsistent with the findings of (Amjed, 2007). The results illustrates that the size of the firms has a positive significant relationship with return on assets. The result shows that 1% increase in size brings 0.03% increase in return on assets. These results confirms the findings of Raza et al. (2011), Hussain and Junaid (2012) but are inconsistent with the findings of Ammar et al. (2003). The results reveal that working capital has a significant and positive relation with profitability. This states that upsurge in the current ratio will increase the profitability of the firm. The results state that 1% increase in current ratio causes 0.11% increase in profitability. These results confirms the findings of Hussain and Junaid (2012), and are inconsistent with the findings of (Raheman and Nasr, 2007). Average turnover is measured through sales divided by total assets. The results reveal the significant relationship between ATO and ROA. Average turnover impacts positively on return on assets. The data states that 1% change in ATO brings 0.06% positive change in profitability. This result reveals that the firms efficiently trickle down this positive effect to the bottom of income statement. These results are in consistency with the findings of (Hussain and Junaid, 2012).

The result reveals that the relationship between working capital and return on assets is not significant. The results illustrates that the growth in gross domestic product has a positive significant relationship with return on assets. The data states that increase in economic growth level plays a vital role on increasing profitability. The result shows that 1% increase in GDP brings 0.23% increase in return on assets. This demonstrates that the higher the output/economic growth, higher will be the profitability. These results confirms the findings of Ali et al (2011).

5.4.6. Model 9: For Sugar Industry

The results for this industry are not significant as the J-stat probability for the relationship is less than 0.05.

CHAPTER 06

CONCLUSION AND POLICY IMPLICATIONS:

6.1. Conclusion:

This study tries to find the effect of energy crisis on profitability and working capital by using data for a panel of 300 out of 328 listed manufacturing companies in Pakistan for the period 1999-2012. The study also investigates different industries in manufacturing sector, and tries to find out that which sub sector has been affected with higher intensity.

The study has examines the impact of energy crisis on profitability and working capital model .Profitability model is estimated for all manufacturing sectors and sub-sectors. Three models were estimated for the main manufacturing sector (ROA, ROE, and working capital were dependent variables for each model) and six for sub sectors (ROA was the dependent variable). It also tries to explore the impact of capital structure, size, working capital, turnover, inflation and gdp growth on profitability of manufacturing sector and the sub sectors.

The results reveal that for manufacturing sector, energy crisis showed positive impact on profitability. The reason can be the price escalation by the producers which shifted some burden on the final consumers. For all other independent variables except Market share the results showed significant relationships with return on assets. Size, Capital structure, asset turnover, GDP, and energy crisis (electricity and gas prices*consumption) showed positive impact on return on assets. However, working capital, lagged dependent variable and inflation showed negative influence on the dependent variable. The negative value of lagged dependent variable shows fluctuations, uncertainty and negative expectations of the producers. Energy crisis

also have a positive impact on return on equity. For return on equity size and lagged dependent variable shows significant relationship among firm specific variables. This shows that profitability of manufacturing sector is being explained by the variables used in this study. For manufacturing sector results for ROE shows significant relationships for all macro-economic variables. GDP and energy crisis show positive relationship and inflation rate shows negative relationship with ROE. Size and lagged dependent variable also show positive relationship. However other variables shows insignificant relationship with the variables.

For Working capital management all the variables shows positive and significant relationship. The study revealed that energy crisis influence producers to invest more in working capital for precautionary measures. GDP and sales also increase the working capital as suggested by the theories.

As for as the individual analysis of subsectors for profitability is concerned, the data state that, textile sector contains almost half of the firms of the whole manufacturing sector. That's the reason for its influence on overall results of the manufacturing sector. The study reveals that the signs for all explanatory variables for textile sector are same like manufacturing sector. The impact of energy crisis on profitability of textile sector is positive but the coefficient value is very low. It shows that 1 % increase in energy prices brings 0.09% increase in profitability. Again size and GDP Growth and capital structure are the key variables affecting profitability for the textile sector. The results reveals that firms are not increasing their prices in accordance with the increase in cost (due to energy crisis).

For Chemical Industries, lagged dependent value, asset turnover and Size showed positive relationship with reference to return on assets. However, inflation

and Capital structure showed negative relationship. The data reveals that working capital, GDP Growth and energy crisis didn't have the significant relationship with profitability.

For Food and General Industries, Energy crisis has a negative impact on profitability of the firms. Negative value for energy crisis shows that energy prices are reducing profitability of the food and general industries. Lagged dependent value, Capital structure, inflation and energy crisis has showed negative impact on return on assets. However, GDP asset Turnover and Size shows negative relationship. The data reveals that working capital didn't have the significant relationship with profitability for food sector.

For Construction Industries, lagged dependent value, working capital, asset Turnover and Size showed positive relationship with reference to return on assets. However, Capital structure showed negative relationship. The data reveals that inflation, and energy crisis didn't have the significant relationship with profitability.

For Auto Mobile Industries, energy crisis has a positive impact on returns on assets. The results again reveal that firms are not increasing their prices in accordance with the increase in cost (due to energy crisis). Only lagged dependent value showed the negative sign. Capital structure, working capital, asset Turnover, and GDP all show positive relationship with reference to return on assets. The data reveals that inflation, and size didn't have the significant relationship with profitability for the auto mobile sector. For Sugar Industry, the data reveals that explanatory variables are not enlightening the relationship between them and dependent variable.

6.2. Policy Implications:

The study reveals that for general industries the impact of energy crisis on profitability is negative. Government should provide the optimal level of subsidy in providing energy sources, so that this sector should overcome the losses.

The positive impact of energy crisis on profitability states the price escalation by the producers that leads to final consumers sufferings. Government should take strict measures to control prices so that unnecessary burden should not be shifted on final consumers.

Government should overcome energy crisis through production of electricity by different means, for example, through coal, wind, solar panels, hydal etc.. Or it can buy electricity and gas from friendly neighboring countries. This will help us reduce energy shortages and will lead to a decrease in inflation rate.

Textile sector is playing a major part in total manufacturing sector. So government should focus on providing them energy means to overcome energy crisis or provide them electricity and gas on optimal subsidize rate. This will reduce their production cost so will it cause decrease in the prices of final product. This study also proposes government to allow the manufacturers to produce electricity by different means and sell the surplus electricity to government.

Firms are shifting their plants to other countries due to higher production cost, uncertainty, law and order condition in the country etc.. So, state should make effective policies to facilitate them so to reduce this closure and capital mobility of the firms from our country.

Mergers and acquisitions can help the firms grow as size plays a major role in determining profitability. So, those firms which are facing losses should try and

merge with big firms. It will make them produce on the basis of economies of scale. So, they can reduce the higher costs and increase the margin (profitability). However it can also leads to monopoly, so for that government should make some policies or set price limits (ceiling and floor).

Capital structure also plays a vital role in firms' profitability. Firms should focus on industry averages and should use optimal level of debt.

GDP has a positive impact on the firms. That means higher the output in the country, higher the profits will be. That's the sign of prosperity. It's the responsibility of all stake holders (Government, Producers, and people) to ensure the higher GDP.

6.3. Limitations and Suggestions for Further Studies:

- The lagged dependent variable showed the negative relationship with ROA which shows uncertainty and fluctuations. There can be a lot of reasons for these fluctuations like economic conditions, poor law and order, and so many other reasons. These conditions should be explored in future research studies.
- The study has only focused on manufacturing sector. Other sectors should be taken under consideration to confirm the results.
- Secondary data was used to explore the effect of energy crisis on profitability of the firms. To do a cross check an interview base research can be conducted. Manufacturers can be interviewed to know the sufferings other than financial losses.
- Effect of energy crisis on employment rate should also be measured, so that an exact economic situation can be examined with the insight on labor force.
- In future Oil prices and consumption should also be extracted, so that a combined effect of all energy sources on profitability ratios can be examined.

- For future research it is suggested that all measures for profitability of a firm should be focused as the dependent variable.
- For future studies it is suggested that relationships between energy crisis and components of working capital should be measured to get better insight of the determinants.

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