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## **Profitability Determinants of Energy & Power sector of Pakistan**

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### **Abstract**

This paper attempts to explore the direct effects of Determinant's of profitability of energy & power sector of Pakistan. The financial sector plays a vital role in the expansion and growth of an economy of the country. As profitability is a comparative measure that describes the associations of total amount of profit with different factors. The objectives of this research paper is to find out the relationship between profitability and stock market 100 index, imports, exports, growth rate and debt. Our research data contains from 2006 to 2020. In this research dependent variable is profitability and independent variables are imports, exports, growth rate, and debt. Different international and Pakistani writers used different research tools and techniques to study the relationship and interdependency of different dependent and independent variables. We used regression and co relation as a statistical tools. We work on secondary data. Analysis has been applied on linear time series data of selected variables. Correlation results shows that results are positively significant between profitably and all independent variables except debt; Correlations results were significant at significance level, but insignificant correlation has been observed between debt and PAT at significance level, same relationship was significance at level of significance due to significance values between dependent and independent variables.

**Key Words:** Profitability, imports, exports, debt, growth rate.

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## **Chapter: 1**

### **1. Introduction**

Exports play an important role in the economic development of developing or less-developed countries. It is also one of the major sources of foreign exchange currency in a country, which ultimately covers the Balance of Payment deficit and as well as utilizes in the formation of domestic capital, which is subsequently used in the process of the export production. Trade deficit of the Pakistan has increased quite a lot in the last few years, whereas export revenue has shown notable progress but import bills surpassed the exports revenue, which leads to a large upswing in the Balance of Payment deficit. The exports of Pakistan have increased sharply from 7.5 billion US dollar in 1999 to 18 billion US dollar in 2008 and 22 billion dollar in 2010(Almaqari, Al- Homaidi et al. 2019).

Various factors are responsible for this performance of the exports; one of the factors is Foreign Direct Investment, which has been growing constantly in Pakistan since nineties. However, despite of mounting FDI inflows, there has not been any major attempt to verify its positive roles in the export growth of Pakistan(Alsharari and Alhmoud 2019).

Jumono and Mala (2019) have carried out a study to investigate the performance of the exports by taking into consideration the external factors and the internal factors. He found variance in the performance of the exports in different countries mostly due to the progression of the foreign factors.

### **1.1 Major Theories and Empirical Tests**

Ricardo is famous for first enunciating the theory of comparative advantage. This classical theory implied that economic policies which sought to alter the comparative advantage outcomes would only lead to a pointless reduction of real incomes. Freedom of international trade was a sine qua non for optimization of world economic welfare(Ali and Puah 2019).

According to Ricardo, factors of production were given and immobile. But capital, a produced means of production, as opposed to land, which was a God give~ means of production, could be accumulated over time. Therefore, in capital-short nations there was an argument for government policy to stimulate accumulation(Al-Harbi 2019).

The Reckscher-Ohlin Factor Proportions model, a later development, dealt with the factor proportions combination of capital with labor and showed the possibility of changing these proportions. Leontief's research findings questioned these theories. Further empirical studies resulted in four majors partial explanation theories which are to some extent interlinked, of what leads to comparative advantage(Islam and Khan 2019).

### **1.3 Foreign reserves**

Pakistan's foreign exchange reserves increased \$258 million, or 1.27 percent, during the week ended December 31, the central bank reported on Thursday. The country's forex reserves stood at \$20.512 billion, compared with \$20.254 billion in the previous week. The foreign exchange reserves held by the State Bank of Pakistan (SBP) increased \$261 million to \$13.412 billion. The rise in the SBP's reserves is attributed to the government's official inflows. The foreign exchange reserves of commercial banks stood at \$7.099 billion, compared with \$7.103 billion in the preceding week(Dimitrić, Tomas Žiković et al. 2019).

## **1.4 Pakistan stock exchange 100 index**

There were three stock exchanges in Pakistan: Karachi, Lahore and Islamabad. The three stock exchanges were merged into one which is now called the Pakistan stock exchange or the PSX. The performance of a stock exchange is considered as a yardstick to judge economic growth in a country. To measure the performance of a stock exchange, different indexes are used. The KSE-50 was the first index used for this purpose which was replaced by KSE-100 Index on November 2, 1991, with a base of 1,000 points. Hence, the KSE-100 Index is the main tool to measure the performance of PSX. Over the 26-year period, the KSE-100 Index witnessed a growth of 4,656% reaching 46,565 points on June 30, 2017 (Al-Harbi 2019).

## **1.5 Exports of Pakistan**

Exports are believed to be the engine of economic growth. A nation can win friends through trade relations and ensure an optimal allocation of the available resources. Following the comparative advantage principle, each country is likely to export those goods which can be produced at relatively low costs. The returns from trade depend on enhancing domestic production, ensuring international standards and exploring new markets for exports. The export performance of a country is determined by many factors, which can be categorized in terms of demand and supply side determinants (Huang and Hou 2019).

The demand side factors include capacity of the trading partners, the prices of exportable goods, the prices of competing/substitute goods in the world market and the exchange rate etc. However the political and social factors also play a very crucial role in this regards. The supply side factors include domestic productive capacity, exchange rate, relative prices (prices of exports relative to prices of competing goods), wage rate and import of inputs (Bolarinwa, Obembe et al. 2019).

## **1.6 Problemstatement of the study**

Taking into account the fact that Pakistan economy is going down due to the severe problem of the energy shortage since last six to seven years. There are lot of studies have been conducted on bank profitability but now there is need to check the profitability (Performance) of non-financial firms like Power and Energy Sector of Pakistan with the same internal variables which have been highlighted in the literature available both for developed and developing economy (Hussanie and Joo 2019).

In this research we see that what effect on export when increase GDP. GDP main role play in exports and imports so we will focus on GDP cause of how export increase.

Does profitability increase with increase bellow mentioned independent variables?

- 1) Is there significant relationship between profitability and growth rate?
- 2) Is there significant relationship between profitability and exports?
- 3) Is there significant relationship between profitability and imports?
- 4) Is there significant relationship between profitability and debt?

## **1.7 Objectives of research**

- 1) To find out the relationship between profitability and stock market 100 index.
- 2) To find out the relationship between profitability and exports.
- 3) To find out the relationship between profitability and imports.

4) To find out the relationship between profitability and exchange rate.

## 2. Literature

Found that prices of exports and exchange rates in different countries played a vital role in the determination of the export performance of any country. They used two different periods (Flexible exchange rate period and fixed exchange rate period) to determine the performance of the same model in two different exchange rate regimes. He had applied the OLS technique to analyze the behavior of exports. He stated that prices of exports and exchange rates in different countries played a vital role in the determination of the export performance of any country(Bongini, Cucinelli et al. 2019).

Research Determinants of Pakistan's Export Performance applied the simultaneous equation model by using factors affecting the export demand side and export supply side by taking the sample from eight different countries. They found the negative link between export demand and export price variable further, they had found significant link between world income and export demand(Al- Homaidi, Tabash et al. 2019).

Dang, Vu et al. (2019)using OLS methodology carried out a research study to explain the export performance of solitary countries by using the annual data and employing the model for demand of exports through foreign factors, which comprised the quantum of exports as dependent variable and World inflation and income of world were taken as independent variable. He found that the prices of exported items played a crucial part in the export growth in the developing country.

Liuspita and Purwanto (2019)carried out a research study on the supply of exports to Bangladesh by employing different technique of Co integration along with Error correction Model and found positive link between price variable of exports for Bangladesh. He also reported the significant relationship between exchange rate and exports supply, local production capacity and export supply of Bangladesh.

Stamolampros, Korfiatis et al. (2019)had conducted a study on the same issue and presented results for cumulative export demand model for 7 under developed countries. He had taken a quantity of a country's export as dependent variable in relation with world income and relative export price variable were taken as an independent variable. He had applied Almon approach to determine the impact of foreign trade factors on a country's export performance. Findings of this study supports the result of studies in which, it was revealed that export performance of a country is affected by the relative prices of exports and exchange rates.

Haris, Yao et al. (2019)had carried out a research study on the export growth in India. He also explained the performance of Indian export growth by denominating the factors affecting the export growth in the form of export demand factors or factors affecting the demand of exports in India and in the form of export supply factors or factors that affect the supply of exports in India.

Chandra, Junaedi et al. (2019) had applied 2-stage least square method and found negative and significant relationship between export demand and real effective exchange rate and export price variable. Here it is important to note that, he found insignificant coefficient for Determinants of Pakistan's Export Performance Research World income, which is in contrast with several studies discussed in this review and many studies conducted in different countries.

Mohamad, Sulaiman et al. (2019)have carried out a research study in Pakistan on the same issue by taking external factors affecting the demand of exports and interior factors affecting the supply of exports by using 3- stage least square method. He found positive relationship between exports

demand in Pakistan and found negative link with export price variable. On the other side, he had also found positively significant relationship between nominal exchange rate and exports demands in both cases.

Atique and Ahmad (2013) had conducted a study to explain the export growth of Pakistan by dividing the exogenous and endogenous factors in the form of export demand functions and export supply functions. Using OLS methodology he found with respect to export demand function, that exports of Pakistan increased, when real effective exchange rate of Pakistan decreased. Increase in World Economic Activity would raise the exports of Pakistan. They further reported with respect to export supply equation that relative prices of exports were estimated as insignificant variable, whereas potential output and impact of wage rate had found significant variable in relation with supply of exports in Pakistan.

Naser (2019) had carried out a study on the same topic in Pakistan in the same manner as previously export supply factors and export demand factors. He had applied the Two Stage Least Square method to estimate the model for export demand and export supply of Pakistan. He came up with the results regarding export demand function, that export price variable and world income were found significant in the said study. On the other side, factors included for supply function of exports in Pakistan were found insignificant export price variable but coefficient of variable was found positive, production capability of Pakistani exports is inelastic in relation to relative prices of exports but on the other side it is highly elastic in relation to local production capability (Petria, Capraru et al. 2015).

### **Hypothesis**

H0: There is no significant relationship between profitability and growth rate.

H1: There is significant relationship between profitability and growth rate.

H0: There is no significant relationship between profitability and exports.

H2: There is significant relationship between profitability and exports.

H0: There is no significant relationship between profitability and imports.

H3: There is significant relationship between profitability and imports.

H0: There is no significant relationship between profitability and debt.

H4: There is significant relationship between profitability and debt.

## **3. Research Methodology**

### **3.1 Introduction**

In this chapter, on the basis of previous discussion, all obtained knowledge and practical implication has been applied to this chapter. To provide the prospective results, different writers have discussed the impact of profitability on performance of the firm. Different international and Pakistani writers used different research tools and techniques to study the relationship and interdependency of different dependent and independent variables (Pervan, Pelivan et al. 2015).

Specifications regarding the environment of Pakistan, different methods were taken up to the mind. There were lot of assumptions regarding different techniques, but Aryan and Aryan (2015); Nunda and Hammoudeh (2017); CongLa (2016); analysis techniques it is founded that correlation and regression are the best techniques to find out the results in the scenario of South Asia region.

Many researchers used different analysis techniques to find out the answers of their research, specifications regarding the environment of Pakistan. Different methods were taken up to the mind,

there were lot of assumptions regarding different techniques, but last stated method was found best to apply on analysis process. On the basis of above discussion, this paper will use regression and correlation analysis to find out the answers of research questions and objective(Noman, Chowdhury et al. 2015).

### **3.2 Research Design**

This research work is designed in such a way that it helps to understand the relationship of profitability and performance of the firm. It will be a quantitative research based on secondary data. We will use statistical tools for research results. Statistical Tools will be correlation analysis and linear regression analysis on different variables. The study area of this research work is Pakistan where companies listed under stock exchange will be studied(Fareed, Ali et al. 2016).

### **3.3 Secondary Source of Data**

This paper uses the secondary source of data from annual reports of PSX. Secondary source of data means that the data which is already used for any other purpose(Fareed, Ali et al. 2016).

On the other hand, there is nothing regarding the data collection that has been collected from survey technique or questionnaire. The whole research based on the secondary source of data. Used secondary source of data to analyses(Gerritsen 2016).

### **3.4 Sample Selection Criteria**

studied the non-financial sector listed in stock exchange are direct contributors towards the economy of the country, due to this reason these companies will give the clear picture of insurance sector's efficiency. Louganis (2016); Gasser and Goodwin (2014) determined the macroeconomic variables and developed the model with annually data.

### **3.5 Sample and period of the study**

The period of study is 6 years (From 2006 to 2017) including ten companies registered from Pakistan Stock exchange on both dependent and independent variables?Papapetrou (2001) used for the period 1974-2000, He used the firm performance measures in US stock market return data. Sandusky (2012) used data from annual report of 25 years and used annually data on stock market returns. (Yüksel, Mukhtarov et al. 2018)used oil prices for the period 1973-1998 and used annually data on S&P 500 index upon capital structure determinants.

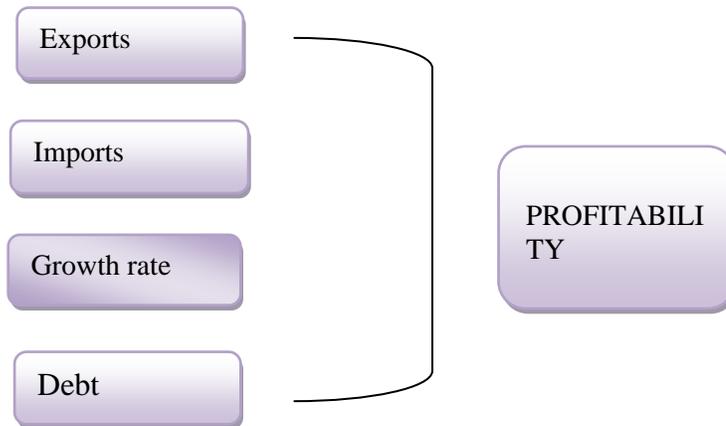
#### **3.5.1 Variables of research**

##### ***Dependent variables***

- Profitability (P)

##### ***Independent variables***

- Import (I)
- Export (E)
- Growth rate (GR)
- Debt



### 3.6 Research tools

Statistical Tools will be correlation analysis, linear regression analysis. Many researchers used different analysis techniques to find out the answers of their research, specifications regarding the environment of south Asia, different methods were taken up to the mind, there were lot of assumptions regarding different techniques(Firth, Li et al. 2016).

#### 3.6.1 Correlation Analysis

Correlation is a term that refers to the strength of a relationship between two variables. A strong or high correlation means that two or more variables have a strong relationship with each other while a weak or low correlation means that the variables are hardly related. Correlation coefficients can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while a value of +1.00 represents a perfect positive correlation, a value of 0.00 means that there is no relationship between the variables being tested. The most widely used type of correlation coefficient is the Pearson r, which is also referred to as linear or product-moment correlation. This analysis assumes that the two variables being analyzed are measured on at least interval scales. The coefficient is calculated by taking the covariance of the two variables and dividing it by the product of their standard deviations(Menicucci and Paolucci 2016).

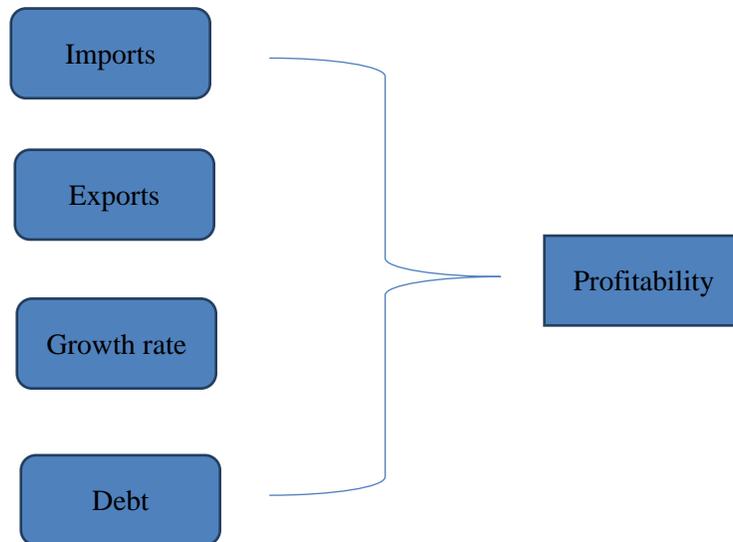
#### 3.6.2 Regression

A statistical measure that attempts to determine the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other changing variables (known as independent variables).

The two basic types of regression are linear regression and multiple regressions. Linear regression uses one independent variable to explain and/or predict the outcome of Y, while multiple regressions use two or more independent variables to predict the outcome. The general form of each type of regression is:

Linear Regression:  $Y = a + bX + u$

$P = a + b_1 (I) + b_2 (E) + b_3 (D) + b_4 (GR) + u$



In multiple regressions, the separate variables are differentiated by using subscripted numbers. Regression takes a group of random variables, thought to be predicting Y, and tries to find a mathematical relationship between them. This relationship is typically in the form of a straight line (linear regression) that best approximates all the individual data points. Regression is often used to determine how many specific factors such as the price of a commodity, interest rates, particular industries or sectors influence the price movement of an asset(Yin and Matthews 2016).

The standard for analysis will depend on 95% level of significance. In results of regression if a P values is less than  $\alpha$ . It means, if the correlation among the variables will be more than 95 than relationship will be accepted otherwise rejected.

On the other hand, correlation analysis is also helpful to find out the results of the studies. Correlation analysis will clearly show the positivity or negativity of the relationship between the variable. Therefore, analyzing this situation there will be ease of understanding the result of analysis(Nguyen and Nguyen 2020).

### 3.7 Conclusion

Many researchers used different analysis techniques to find out the answers of their research, specifications regarding the environment of South Asia. Different methods were taken up to the mind. There were lot of assumptions regarding different techniques but Aryan and Aryan (2010); Park and Ratty (2018); Mari and Hammoudeh (2017);Keeley and Matsumoto (2018); Ayadi, Chattered and Obi (2015); Cong et al (2008); Sandusky (2008) and Papapetrou (2011) analysis techniques it is founded that correlation and regression are the best techniques to find out the results in the scenario of south Asia region. On the basis of above discussion, this paper will use regression and correlation analysis to find out the answers of research questions and objective.

All tools of analysis have same results, first regression analysis should have showed that there is positive relationship among the variables; correlation analysis should have showed that there is positive correlation among the variables and these variables move towards the same direction, there direction may be positive or negative.

**4. Data analysis**

This part consists of analysis of research data, the main part of this research. Analysis used methods to find out relationship of variables, ultimately to reach research objectives(Aissa and Goaid 2016). Data analysis is the process of applying statistics or systematic logical techniques to describe and illustrate, summarize, communicate and evaluate statistical results of the research. According to Hailegebreal (2016), different analytical processes provide a way to "draw statistical impulses, and to distinguish relationship and impact of variables.

While qualitative research can involve statistical processes in statistical analysis, sometimes the analysis becomes an ongoing iterative process where data is collected and analyzed almost simultaneously. In fact, researchers usually analyze patterns of observation through all phases of data collection (Savane, Robinson, 2004). This research used quantitative approach of data analysis.

An important part of ensuring statistical consistency is an accurate and accurate analysis of research findings. Incorrect data analysis distorts scientific research, misleads ordinary readersWarrad and Al Omari (2015), and can have a negative impact on people's perceptions about research. The problem of consistency is very relevant for the analysis of non-statistical data.

**4.2 Data Analysis for results of study**

**4.2.1 Descriptive analysis**

Fourteen years data on four variable with total observation of 14, shows below regression results of linear data as this types of analysis was applied by (Hsiao 2014) in his research work.

**Descriptive statistics**

|                     | <b>PAT</b> | <b>EXPORTS</b> | <b>GROWTH</b> | <b>IMPORTS</b> | <b>DEBT</b> |
|---------------------|------------|----------------|---------------|----------------|-------------|
| <b>Mean</b>         | 86790.48   | 25.81080       | 2.132857      | 42.81606       | 58.54286    |
| <b>Median</b>       | 91254.92   | 26.65054       | 2.130000      | 41.05946       | 56.70000    |
| <b>Maximum</b>      | 104638.4   | 30.69924       | 2.440000      | 63.13797       | 82.19000    |
| <b>Minimum</b>      | 55028.51   | 19.40085       | 1.900000      | 29.57734       | 38.80000    |
| <b>Std. Dev.</b>    | 16708.92   | 3.815049       | 0.148915      | 10.23532       | 15.34432    |
| <b>Skewness</b>     | (1.05)     | (0.40)         | 0.136593      | 0.523089       | 0.376536    |
| <b>Kurtosis</b>     | 2.609665   | 1.794568       | 2.709057      | 2.239128       | 2.027495    |
| <b>Jarque-Bera</b>  | 2.655679   | 1.215939       | 0.092912      | 0.976158       | 0.882516    |
| <b>Probability</b>  | 0.265049   | 0.544455       | 0.954606      | 0.613804       | 0.643227    |
| <b>Sum</b>          | 1215067.   | 361.3512       | 29.86000      | 599.4248       | 819.6000    |
| <b>Sum Sq. Dev.</b> | 3.63E+09   | 189.2098       | 0.288286      | 1361.903       | 3060.826    |
| <b>Observations</b> | 14         | 14             | 14            | 14             | 14          |

Figure above shows about data description of four variables upon mean, median, maximum value minimum value etc. conclusively descriptive statistics have data characteristics.

**4.2.2 Regression analysis**

Results are perfectly significant at 0.05 level of significance; constant values are significant that shows that model of regression is acceptable at all levels. P values of both intendent variables (exports, growth, imports) are also significant with dependent variable (profit after tax) of selected sample of data from 2006 to 2020. Coefficients shows that results of significance are positive that means increase in value of Profit after tax (PAT) will ultimately increase the value of exports. Values of r square and adjusted R square are at acceptance level(Almaqari, Al- Homaidi et al. 2019).

**4.2.2.1 R-squared & Adjusted R Square**

In case of Pakistan If the adjusted R Square value is much lower than the R Square value, it is an indication that our regression equation may be over-fitted to the sample, and of limited generalizing. The value of R Square and Adjusted R Square are 69% and 64%, it means explained variations are more than 69%, it is not good to have the values of R square less than 60% This also tells that how much output variable’s variance is explained by the input variable’s variance. The adjusted R square explains the accuracy of regression equation.

Results are insignificant due to inclusion of debt values, now results below have been extracted without debt values in model.

Dependent Variable: PAT

Method: Least Squares

Date: 02/23/21 Time: 10:56

Sample: 2006 2020

Included observations: 14

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.  |
|--------------------|-------------|-----------------------|-------------|--------|
| C                  | 9.88        | 8.31                  | 1.1889      | 0.0174 |
| EXPORTS            | 1.194       | 4.2301                | 0.2822      | 0.0248 |
| GROWTH             | 3.05        | 5.93                  | 0.5143      | 0.0172 |
| IMPORTS            | 1.0028      | 9.7068                | 0.1033      | 0.0016 |
| R-squared          | 0.691462    | Mean dependent var    | 86790.48    |        |
| Adjusted R-squared | 0.658901    | S.D. dependent var    | 16708.92    |        |
| S.E. of regression | 6276.402    | Akaike info criterion | 20.56194    |        |
| Sum squared resid  | 3.94E+08    | Schwarz criterion     | 20.74453    |        |
| Log likelihood     | -139.9336   | Hannan-Quinn criter.  | 20.54504    |        |
| F-statistic        | 27.37791    | Durbin-Watson stat    | 2.309805    |        |
| Prob(F-statistic)  | 0.000039    |                       |             |        |

Regression results shows that results are significance 0.05, that means variable have positive relationship on the basis of positive coefficients of the regression output.

**4.2.3 Correlation analysis**

Correlation analysis shows that results of exports and all independent variable are significant, as strong strength of relationship exist between PAT and exports with positive correlational value of 0.80, another strong positive relationship exist between PAT and imports. Relationship between growth and PAT is also perfectly significant with value of 0.50 as per results of correlation analysis with moderate strength.

|         | PAT   | EXPORTS | GROWTH | IMPORTS | DEBT  |
|---------|-------|---------|--------|---------|-------|
| PAT     | 1.000 | 0.808   | 0.504  | 0.768   | 0.090 |
| EXPORTS | 0.808 | 1.000   | 0.403  | 0.550   | 0.576 |
| GROWTH  | 0.504 | 0.403   | 1.000  | 0.038   | 0.133 |
| IMPORTS | 0.768 | 0.550   | 0.038  | 1.000   | 0.948 |
| DEBT    | 0.090 | 0.576   | 0.133  | 0.948   | 1.000 |

Correlation analysis shows significant results at level of significance 0.05 for all three relationships of results of the study.

### Conclusion and Recommendations

#### 5.1 Conclusion

Research has been conducted on the topic of determinants of profitability of energy and power sector of Pakistan. Objectives of the research were settled on the basis of gap analysis conducted after studying detailed literature of the topic, objective targeted to find out the significance relationship between profitability and its determinant (all independent variable like debt, imports, exports and growth). Analysis has been applied on linear time series data of selected variables. Correlation results shows that results are positively significant between profitably and all independent variables except debt; Correlation results were significant at significance level of 0.05, but insignificant correlation has been observed between debt and PAT at significance level of 0.01, same relationship was significance at level of 0.05 due to significance values of 0.00 between dependent and independent variables.

#### 5.2 Hypothesis evaluations

|                 |  |          |
|-----------------|--|----------|
| H <sub>01</sub> | There is no significance relationship between PAT and imports. | Rejected |
| H <sub>1</sub>  | There is significance relationship between PAT and imports.    | Accepted |
| H <sub>02</sub> | There is no significance relationship between PAT & exports.   | Rejected |
| H <sub>2</sub>  | There is significance relationship between PAT & exports.      | Accepted |
| H <sub>03</sub> | There is no significance relationship between PAT and growth.  | Rejected |
| H <sub>3</sub>  | There is significance relationship between PAT and growth.     | Accepted |
| H <sub>04</sub> | There is no significance relationship between debt and PAT.    | Accepted |
| H <sub>4</sub>  | There is significance relationship between debt and PAT.       | Rejected |

#### 5.3 Future recommendations

- Future research could be conducted on debt structure with other profitability measures like ROA, ROE or simply net profit.

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