



Macroeconomics Indicators & Financial Performance of Firms: A Study of the Sugar Industry in Pakistan

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Abstract

This research assesses the impacts of major macroeconomic including interest rate, GDP growth, inflation rate, exchange rate, foreign direct investment on the financial performance of sugar mills of Pakistan. This study's conceptual framework includes the dependent variable of ROA of the sugar industry and the five variables including the GDP, rate of inflation, interest rate, exchange rate, and foreign direct investment as an independent variable. Ten-year panel data is compared across all 29 sugar mills listed at Pakistan Stock Exchange (PSX) for 2010-2019 via a multiple regression model. This study concluded varying degrees of impact of macroeconomic variables on the profitability of sugar mills of Pakistan. GDP growth showed a higher relationship with ROA (a proxy of profitability) but the relationship was negative. Interest rate, Exchange rate, and Inflation rate were found to have a negative association with ROA. However, FDI had no significant relationship. Certain macroeconomic indicators have a significant impact on the profitability of the sugar industry of Pakistan. Based on the results, mills must constantly monitor the interest rate, exchange rate, and inflation rate because these variables are negatively affecting the sugar Mills' performance.

Disciplinary: Macroeconomics and Financial Markets.

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1 Introduction

Financial performance is a term used to refer to how well a firm employs its resources to give returns to its investors. Management uses profit as a performance measure. Various indicators can

be utilized to measure performance but the frequently used indicators are return on assets (ROA) or the return on capital employed (ROE) (Heikal et al., 2014). An economy's performance is judged through macroeconomic variables. Macroeconomic variables are classified as leading indicators and lagging indicators. This study is focused on lagging indicators. Lagging indicators indicates how the economy changes over time and can help identify long-term trends. These lagging variables include Gross Domestic Product (GDP), inflation rate, interest rate, exchange rate, foreign direct investment, etc. These factors are important as they determine the health of the economy. All these macroeconomic factors are beyond the control of any organization, thus posing a systematic risk to a firm. Macroeconomic is the aggregate level so those variables like GDP, FDI, tax rate, unemployment rate, and inflation rate. Most businesses and industries need to forecast the future effect of all these listed variables on corporate performance (Broadstock et al., 2011). Several studies also have tried to find the relationship between macro-economic variables and financial performance. (Ali et al., 1992; Barakat et al., 2016; Issah and Antwi, 2017; Ibrahim & Aziz, 2003; McNamara & Duncan, 1995; Kanwal and Nadeem, 2013; Zulfiqar and Din, 2015; Ismael et al, 2018).

1.1 Pakistan Sugar Industry

Although sugar production and use were recorded in 520 BC and earlier, the growth of the modern form of the sugar industry in the Indian subcontinent dates back to the early 1930s. Since time immemorial, sugarcane has been grown in Pakistan due to the Indus River and its offshoots. Pakistan land is full of agriculture and sugar cane is one of the most famous cash crops, this crop is very important to create sugar production and sugar-related products. This is also the biggest source to generate revenue for the country by exporting the sugar to foreign countries and also generate the good profit for farmers and those people who are working in fields it also creates the good employment opportunities for farming society among all provinces of Pakistan.

Pakistan's sugar industry is an important contributor to the GDP of Pakistan and it is the second-largest agricultural industry after Textile products, ranked fifth in the world's sugar cane acreage, ranked 15th in sugar production. The sugar industry accounts for 4.2% of the manufacturing industry. The sugar industry has more than 1.5 million people, including management experts, technicians, engineers, and financial experts, skilled, semi-skilled, and unskilled workers. In 1967, the first sugar mill was set up in Sindh province at Tando Muhammad Khan District, nowadays eighty-seven sugar industries are running in Pakistan.

Pakistan's economy has been passing through the depression stage for the last two decades; several factors have led to this plight including change in the political environment, depreciation of Pakistani rupee, rise in inflation, and erosion in foreign exchange reserves, etc. Therefore, the main interest of stakeholders is to look for factors affecting the financial performance of manufacturing companies. To date, no research literature has been found that is related to Pakistan's sugar industry. This study is intended to concentrate on sugar mills that are listed on Pakistan Stock Exchange.

The purpose of this study is to establish the effect of macroeconomic variables (i.e. GDP, the rate of inflation, interest rate, exchange rate, and FDI) on the financial performance/profitability of the sugar industry of Pakistan.

2 Literature Review

Many researchers have researched in various sectors to find the effect of macroeconomic indicators on the profitability of firms (Gekone, 2011; Illo, 2012; Irungu & Muturi, 2015). Their results are quite similar to one another. The majority of the research findings conclude that there is a positive direct relationship between major macroeconomic factors such as GDP, interest rate, and rate of inflation, and profitability of firms. Most of the researchers used regression and Pearson's correlation analysis to study the impact. Ismael et al (2018) investigated the effect of macroeconomic factors on the performance of insurance companies of Malaysia using panel data of 6 listed insurance companies from 1996-2015. They used Multiple Regression Analysis to examine the relationship of GDP, Consumer Price Index, and interest rate with return on asset of firms. They concluded that GDP and interest rate affect a company's performance while CPI has less impact.

Zulfiqar and Din (2015) studied the link between macroeconomic pointers and performance of firms among 5 cement companies listed at the Pakistan Stock Exchange (PSX), their findings recommend a positive unimportant relationship between inflation rate and firm performance. They took regression analyses for studying the relationship.

Koina (2016) studied the impact of macroeconomic factors on the performance of all firms listed in the energy & petroleum sector at the Nairobi Securities Exchange and indicated that exchange rate has a positive relationship with ROA with a strong relationship between ROA and real interest rate, while GDP growth rate has negative insignificant impact on financial performance.

Kibet (2016) conducted the same study by taking six agribusiness firms listed at the Nairobi Security Exchange in Kenya using 2009-2013 data. Kibet (2016) applied the two most common statistical tests (i.e. correlation and regression analysis) to conclude the relationship of the exchange rate, inflation rate, interest rate, and GDP with ROA. The findings concluded a significant negative relationship between ROA and independent variables.

Kanwal and Nadeem (2013) studied the impact of macroeconomic variables on the performance of commercial banks of Pakistan, using panel data from 18 listed commercial banks working in Pakistan for 2001-2011. They adopted the set least squares method (POLS) to test the influence of three main variables which were "Inflation", "real GDP" and "real interest rates" with banks Return on assets and earnings. Besides, the finding also indicated a strong positive association of real interest rate with ROA and ROE.

Rao (2016) studied the energy and oil sectors of the Nairobi Stock Exchange for 2014-2015 by taking the earning per share (EPS) as a proxy of financial performance while he used the percentage of inflation, interest rate, exchange rate, GDP growth, and oil prices as macroeconomic indicators. The Arbitrage Pricing Theory was used to analyze the panel data obtained after which statistical

techniques like Polled OLS regression, correlation analysis were used to get the results. Rao (2016) found a significant effect of oil prices and interest rate on financial performance.

Zhu (2012) examined the effects of macroeconomic factors on the stock returns of the Energy and Petroleum sector in the Shanghai Stock Market for 2005-2011. A positive relationship was found between the stock return of the energy and petroleum sector and the foreign reserve. A negative relationship however exists between export and stock return.

Issah and Antwi (2017) explored the effect of variables, like GDP, FDI, interest rate and predict the firm financial performance as measured by Return on Assets one of the major indicators to measure the firm's financial performance. They took 116 listed non-financial companies of the UK comprising of various sectors, for 2002-2014. They took 59 macroeconomic variables. And conclude that firm's performance is strongly affected by macroeconomic factors.

Following an exhaustive review of the related literature, it was learned that there is considerable room for empirical studies regarding the macroeconomic effects (Flannery & Protopapadakis, 2002) on the sugar industry in particular because to date researchers have studied the impact of macroeconomic variables on stock returns of firms rather than their financial profitability. This study is based on recent financial data of the sugar industry covering the period of ten years (2010-2019). Therefore, this study aims to fill that gap by examining the role of macroeconomic variables on the performance of sugar mills of Pakistan listed at the Pakistan Stock Exchange (PSX).

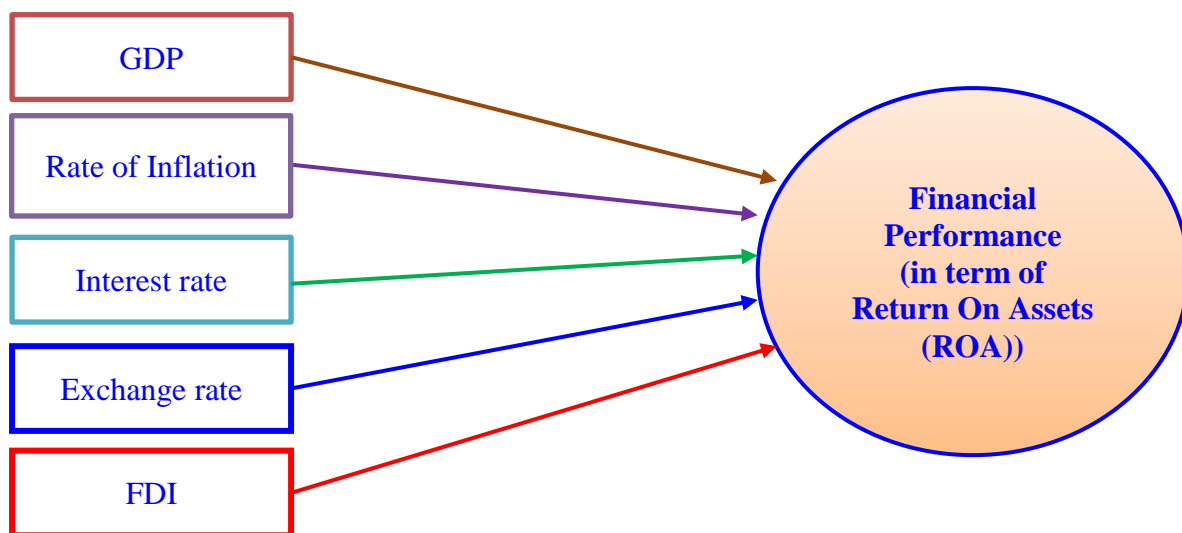


Figure 1: Conceptual research model

2.1 Conceptual Framework

Figure 1 shows the conceptual framework of the relationship between Macroeconomic measures and a firm's financial performance, schematically.

In this study, the research hypotheses are

H1: GDP has a positive effect on the financial performance of Pakistan's sugar mills.

H2: The rate of inflation has a positive effect on the financial performance of Pakistan's sugar mills.

H3: Interest rate has a positive effect on the financial performance of Pakistan's sugar mills.

H4: Exchange rate has a positive effect on the financial performance of Pakistan's sugar mills.

H5: Foreign Direct Investment has a positive effect on the financial performance of Pakistan's sugar mills.

3 Research Methodology

3.1 Method Design

This study entails a quantitative approach by design (Cooper & Schindler, 2003). It is explanatory research, researching the relationship between macroeconomic indicators and the financial performance of the sugar industry. For this purpose, secondary data has been utilized for the macroeconomic variables listed, including interest rate, exchange rate, GDP, inflation, and FDI as well as for performance indicators of sugar mills in the form of ROA.

3.2 Population and Sample

To carry out the study sugar mills listed at Pakistan Stock Exchange have been analyzed. Currently, the population of sugar mills listed at PSX is twenty-nine.

3.3 Data Collection and Analysis

Secondary data was employed for data analysis. The macroeconomic data of the previous ten years was collected from the State Bank of Pakistan and the Ministry of Finance's economic surveys. The ten-year panel data (2010-2019) related to the performance of manufacturing firms in the form of ROA was extracted from the annual firm reports. Multiple regression for data analysis was utilized.

3.4 Models Specification: (Multiple Regression Model)

The conceptual framework listed five independent variables including GDP, inflation rate, interest rate, exchange rate, and FDI measures the Macroeconomic variables, and one dependent variable ROA that measure financial performance. The regression model was formulated as

$$ROA = \beta_0 + \beta_1(GDP) + \beta_2(RI) + \beta_3(ER) + \beta_4(IR) + \beta_5(FDI) + \varepsilon \quad (1),$$

where

ROA = Return on Assets

GDP = Gross Domestic Product

RI = Rate of Inflation

ER = Exchange Rate

IR = Interest Rate

FDI= Foreign Direct Investment

ε = Error Term

The symbols β_1 , β_2 , β_3 , β_4 , β_5 are the regression coefficients and β_0 is the regression constant.

4 Results

4.1 Descriptive Analysis

Table 1 shows the descriptive statistics of dependent and independent variables chosen for this study, ROA shows a mean of 2.04 with an SD of 1.49. Sugar mills have a minimum ROA of 0.46 and 4.64 as maximum. GDP has a mean value of 3.95% growth with an SD of 1.69. The minimum value for GDP during the past decade is 1% while the maximum value remained 5.80%. On the other hand, the exchange rate remained \$105 on average during the past ten years, with a maximum value of \$150.04 and minimum value of \$85.19, if we see the rate of inflation then its minimum value is 2.86%, and maximum value of 13.66% during the past ten years. The interest rate has depicted a deviation of 3.45 and its mean value is 4.17, with a maximum of 8.32% while a minimum of -4.37%.

Table 1: Descriptive Statistics (N = 10).

| Variable | Minimum | Maximum | Mean | SD |
|---------------------------|---------|---------|---------|--------|
| Return On Assets (ROA) | .46 | 4.64 | 2.042 | 1.494 |
| Gross Domestic Product | 1.00 | 5.80 | 3.950 | 1.695 |
| Exchange Rate | 85.19 | 150.04 | 105.252 | 18.909 |
| Inflation (%) | 2.86 | 13.66 | 7.295 | 3.539 |
| Interest Rate (%) | -4.37 | 8.32 | 4.178 | 3.454 |
| Foreign Direct Investment | .86 | 2.58 | 1.814 | 0.545 |

4.2 Trend Analysis

The following charts are showing the time series data of selected variables, including average interest rate trend, average inflation trend, real exchange rate trend, gross domestic product, foreign direct investment, and firm financial performance for 2010-2019.

4.2.1 Return On Assets (ROA)

Figure 2 demonstrates the trend analysis of the sugar industry's financial performance during the past decade, as measured by the average ROA of all the listed sugar mills. It can be seen that time high value of the whole decade in the year 2010 with the value of 4.56%. However, after that, it started to decline and touched the lowest value of 0.46% in 2014. This sudden decline might have occurred due to the political change. The year 2019 has an impressive ratio with 2.69 after 2011.

4.2.2 Gross Domestic Product (GDP)

Figure 3 shows the trend of GDP growth during the past ten years. It illustrates an increasing trend of GDP growth that is quite impressive. In 2010 the GDP just 1.6% but after the year 2010 the rate of increase in the GDP growth was quite impressive but the GDP growth gain momentum and end with the all-time high of this decade with the value of 5.8% in the year 2018. The lowest GDP growth was reported in 2019 when it was just 1%. The sudden downward trend of GDP in that year is due to an increase in the rate of inflation and the impact of increasing foreign debt on the country's economy and is the lowest GDP ratio in the past 10 years.

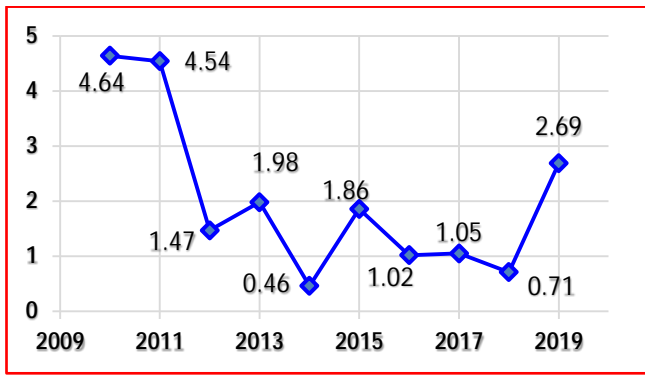


Figure 2: Average ROA of the Sugar Industry.

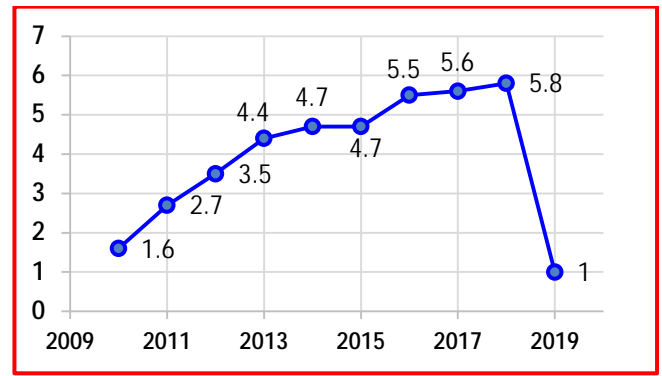


Figure 3: Annual Growth of GDP.

4.2.3 Inflation Rate Figure

Figure 4 illustrates the trend line of the inflation rate of Pakistan, as measured by CPI in percentage. In Pakistan, inflation has always been highly volatile. In the year 2010, the inflation rate was very much high showing a value of 13.66% and the impact of rising inflation can also be observed from the ROA of sugar mills, due to the high inflation rate the ROA was also declining in the reported period. Later on, the inflation rate begins to decline and ended up in the lowest figure of the decade with the value of 2.86% in the year 2016. After that in 2016, inflation again gained momentum and started increasing and in the year, 2019 it was 6.74%. The same increasing trend is expected to happen in 2020 as well due to a huge economic downturn.

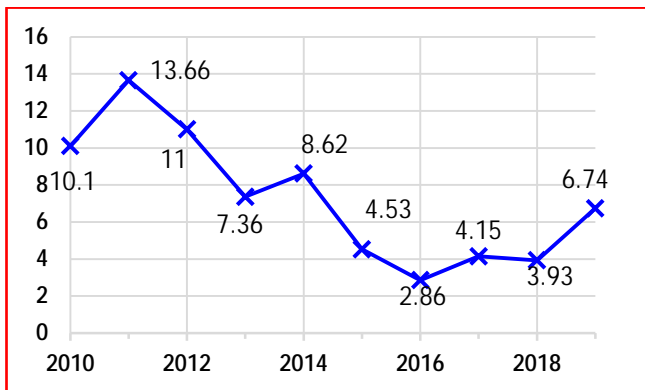


Figure 4: Annual Inflation Rate

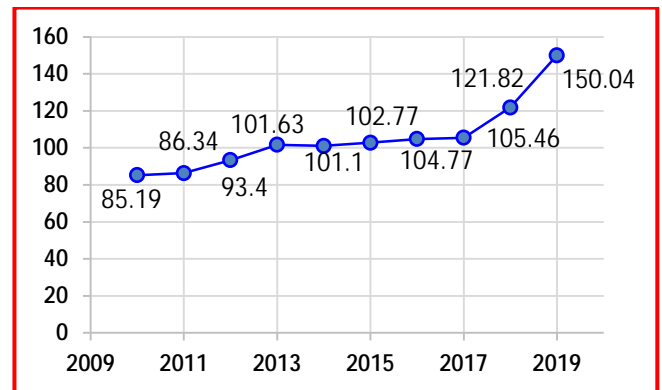


Figure 5: Annual (Average) Exchange Rate

4.2.4 Exchange Rate

Figure 5 shows the increasing trend line of the average exchange rate of Pakistani currency relative to the U.S. dollar. The Pakistani rupee has been weakening against the dollar since 2010, leading to a loss in the value of the Pakistani rupee. The lowest exchange rate was \$85.19 in 2010 when about 85 Pakistani rupees were able to buy 1\$. However, since then the exchange rate has been increasing and in the year 2019, the Pakistani rupee depreciated much higher against the dollar, when 150.04 PKR were able to buy 1\$.

4.2.5 Real Interest Rate

Figure 6 demonstrates the trend line of real lending average interest rate from the year 2010 to 2019. Since 2011 interest rate has been increasing. In 2011 it was -4.37%, whereas in the next

year interest rate rises to its highest i.e. 7.13%, then it declines and again touched its height in 2016 when it was 8.32% after that once again it declines and end up with 3.33% in 2019.

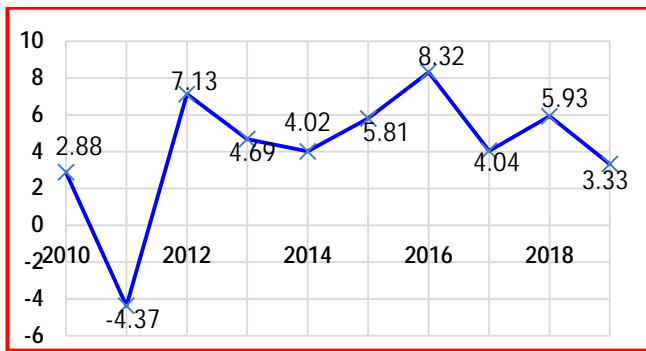


Figure 6: Average Lending Interest Rate

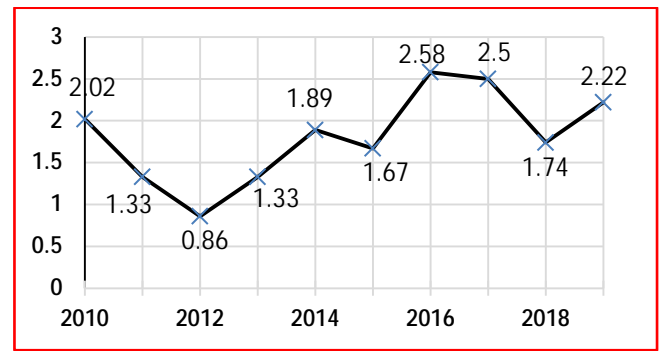


Figure 7: Foreign Direct Investment.

4.2.6 Foreign Direct Investment

Figure 7 demonstrates the trend line of foreign direct investment for 2010-2019.

4.3 Regression Analysis

Multiple regressions have been conducted for testing a different hypothesis to predict whether there is a significant relationship between macroeconomic indicators and the profitability of sugar mills. In Table 2, the R square (coefficient of determination) shows the "goodness of fit" of the model. It can be read as a percentage. In the above column of R square, the value is 0.962 which means that the independent variables can explain the change or variance of about 96.2% in the dependent variable or ROA in our case, while 3.8% cannot be explained by explanatory variables. The R-value just shows the simple correlation and in this case, it is 0.981, which indicates a high degree of correlation.

Table 2: Summary of Model Run.

| R | R ² | Adjusted R ² | Std. Error of the Estimate |
|-------------------|----------------|-------------------------|----------------------------|
| .981 ^a | .962 | .914 | .43920 |

a. Predictors: (Constant), Foreign Direct Investment, GDP Growth, Exchange Rate, Real Interest Rate, Inflation Rate

Table 3: Analysis of Variance (ANOVA)

| Model | Sum of Squares | df | Mean Square | F | Sig. | |
|-------|----------------|--------|-------------|-------|--------|-------------------|
| 1 | Regression | 19.308 | 5 | 3.862 | 20.019 | .004 ^b |
| | Residual | .772 | 4 | .193 | | |
| Total | | 20.079 | 9 | | | |

a. DV: Return on Assets

b. IVs: (Constant), Foreign Direct Investment, GDP Growth, Exchange Rate, Real Interest Rate, Inflation Rate (CPI)

In Table 3, the ANOVA (Analyses of Variance) indicates that the regression model predicts the dependent variable ROA significantly well, as the Sig.-value is 0.04 that is less than the significance level of 0.05. This demonstrates that the model is a good fit for the data.

Table 4, the macroeconomic indicators are significant when the significance value is less than the significance level of 0.05. Four of five independent variables —GDP growth, rate of

inflation, and interest rate have proved statistically significant effects, as it can be seen in the coefficient that reflects the p-value below 0.05, which shows that these variables are imparting to this model by creating and showing the good relationship between ROA and GDP, Rate of inflation and interest rate. FDI had no significant relationship because the p-value was more than 0.05 (see Table 5).

Table 4: Regression coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---------------------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| 1 (Constant) | 17.751 | 3.373 | | 5.263 | .004 |
| GDP Growth | -1.023 | .167 | -1.161 | -6.131 | .004 |
| Inflation Rate (CPI) | -.444 | .138 | -1.052 | -3.223 | .002 |
| Real Interest Rate | -.285 | .068 | -.658 | -4.192 | .014 |
| Exchange Rate | .055 | .012 | -.699 | -4.488 | .001 |
| Foreign Direct Investment | -.787 | .457 | -.287 | -1.723 | .160 |

a. DV: Return on Assets

Table 5: Hypotheses Summary.

| H | Hypothesis | P-Value | Result |
|----|---------------------------------|---------|---------------|
| H1 | GDP \Rightarrow ROA | 0.04 | Supported |
| H2 | Inflation \Rightarrow ROA | 0.001 | Supported |
| H3 | Interest rate \Rightarrow ROA | 0.002 | Supported |
| H4 | Exchange rate \Rightarrow ROA | 0.014 | Supported |
| H5 | FDI \Rightarrow ROA | 0.160 | Not Supported |

5 Discussion

From the result of correlation analysis, it was revealed that GDP has a very strong but negative significant relationship with ROA of sugar mills of Pakistan. It means that an increase in GDP reduces the performance of sugar mills. Issah and Antwi (2017) and Ismael et al (2018) also concluded the same result; they found a negative impact of GDP on a firm's performance. Further inflation and interest rate were also found to have a negative correlation with ROA, which means that with an increase in the value of interest rate and inflation rate the profitability of sugar mills of Pakistan declines significantly. This is because when the interest rate is high sugar mills have to pay more in the form of borrowing cost, and hence the ROA of sugar mills. Similarly, when the inflation rate rises the sugar mills have to pay more to the cane grower and other stakeholders. Moreover, the increasing cost of manufacturing results in low profitability and thus low return on investment. The findings that the interest rate and the inflation rate have a negative association with ROA are similar to findings of Kanwal and Nadeem (2013), Zulfiqar and Din (2013), and Ismael et al (2018). In correlation analysis Exchange rate showed a significant correlation with ROA.

Regression analysis also revealed the almost same result. Out of five macroeconomic indicators, four were found to have a significant association with the ROA of sugar mills of Pakistan. Only FDI was found to have a negative but insignificant relationship with ROA. GDP growth showed a higher relationship with ROA (proxy of profitability) but the relationship was

negative. Interest rate, Exchange rate, and Inflation rate were found to have a negative association with ROA. Whereas, FDI showed a positive but insignificant relationship with ROA. Hypothesis 5 was thus rejected.

Sugar Mills must constantly monitor the interest rate and inflation rate because both these variables are negatively affecting the sugar Mills' performance. When the interest rate is high sugar Mills must have to look for equity funding to maximize their returns. Similarly, when there is high inflation sugar Mills have to reduce their operating expenditures and other costs associated with their operation to cope with inflation. Besides that, the exchange rate is found to have a negative relationship with the firm performance although the result was significant, it is recommended for sugar Mills to pile up foreign exchange particularly the dollar because the exchange rate is continually increasing since the past decade. Government can provide subsidies to the sugar industry in periods of high inflation to increase the earning potential of the sugar industry. The high earning of the sugar industry will ultimately increase the government's tax returns; hence, the economy will be better off.

6 Conclusion

This extant study was aimed to establish the relationship among macroeconomic variables and performance of the sugar industry, measured by ROA. This study took panel data of ten years from 2010-2019 to conclude. Different statistical measures were adopted to analyze the data using SPSS software. Five independent variables were taken including; GDP growth, Rate of inflation, interest rate, exchange rate, and FDI.

Overall, it is concluded that certain macroeconomic indicators have a significant impact on the profitability of the sugar industry of Pakistan. Several studies have concluded the same results, such as McNamara and Duncan (1995); Ibrahim & Aziz, (2003); Broadstock et al. (2011); Kanwal and Nadeem (2013); Zulfiqar and Din (2015); Barakat et al. (2016); Issah and Antwi (2017) and Ismael et al (2018) recommended that GDP, rate of inflation, interest rate, exchange rate, and FDI has a strong effect on company's financial performance.

7 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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