

## **IMPACT OF MACROECONOMIC VARIABLES ON FINANCIAL PERFORMANCE: EVIDENCE OF AUTOMOBILE ASSEMBLING SECTOR OF PAKISTAN STOCK EXCHANGE**

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***Abstract.** The study examines the macroeconomic variables impact on financial performance, using the financial statement of listed companies in Automobile sector of Pakistan stock exchange. The study covered the period from 2007 to 2016. Before applying the GMM model the preliminary test was done. Firm performance is measured with three ratios i.e., return on assets (ROA), return on equity (ROE) and gross profit margin ratio (GPM). The results revealed that the selected macroeconomics variables have the negative relationship with return on equity, return on assets and gross profit margin and the inflation has positive relation with return on equity and negative relation with return on assets (ROA) and gross profit margin (GPM).*

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**Keywords:** Macroeconomic variables; ROA; ROE; GPM; GMM

### **Introduction**

Firm is an organization that combines and organize resources for producing goods and services to sell in the market to its customer to earn profit. The ultimate objective of firm is to maximize its value and increase their profit. Better financial performance is the way of satisfying its investors. This indicates the company's trend that is either improving or declining. The financial performance is judged by profitability, firm size, and maximization of market value, employee satisfaction, customer's satisfaction, environmental performance and social performance. There are different ratios that measure the financial health of firms some are common for all and some depends on nature of industry, these ratios are return on assets, return on equity, profit margin, revenue, sale growth, liquidity ratio, stock prices, dividend payout ratio, inventory turnover ratio and cash flow ratio (Van Horne, 2008). Macroeconomic is the study of behavior of whole economy not individuals. There are some macroeconomics variables that have an impact on all those companies which exist in a specific economy. There are more than 30 macroeconomics variables that influence firm performance, some of them directly impacts firms and some indirectly influence the performance.

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Researchers (McNamara & Duncan, 1995) investigated the study of firm performance and macroeconomic variables, the author used the 33 macroeconomic variables in this study and find out the significant relation of these variables with firm performance that measure with return on assets. In this study author concluded that firm performance is a function of the prior year return on assets (ROA), and macroeconomic variables. To investigate this relation the study used four major macroeconomic variables that make a high influence on financial performance these variables are “interest rate, inflation rate, exchange rate and GDP growth rate and firm performance” are measured through three ratios “return on equity, return on assets and gross profit margin.”

The main objective of this study is to investigate the relationship of above major macroeconomic variables with the performance of automobile assembling sector of Pakistan stock exchange that these variables influence the performance of this sector and what relationship is present in these variables.

## **2. Literature review**

McNamara and Duncan (1995) investigated the firm performance and macroeconomics variables in Australia. Used 14 years data of macroeconomic variables (1978 to 1991) and financial statements of 41 companies from the top sixty companies on market capitalization basis. The author reveals that firm performance is the function of the previous year return on assets (ROA), and macroeconomic variables. The lead lag model of this study suggests that earnings forecasts may be made based on the presented model of this study.(Boyd, Levine, & Smith, 2001) investigated the impact of inflation on financial sectors performance by using GMM method for finding the result. The results indicate that inflation has negative and significant relationship with both banking sectors and equity market, the inflation rate rise the performance will diminishing rapidly. The authors pin points the exchange rate volatility and its relationship with performance of Nigerian firm. Author used cross sectional data collected from the 20 most active listed companies on Nigerian stock exchange from 2004 to 2013. The study reveals that the “exchange rate volatility” makes negative significant impacts on rate of return on assets, its portfolio activities & asset turn ratio. It is also reveals that there is negative relation with firm performance, higher exchange rate volatility less the firm efficiency (Kelilume, 2016).

Khan (2012) studied the capital structure decisions and performance of engineering sector of Pakistan stock exchange. The author gathers the data from State bank of Pakistan official website. The data covered the period from 2003 to 2009. The author used firm size as control variable in this study. For the analysis Pooled Ordinary Least Square regression was applied. The author

found that the short-term debt to total assets and total debt to total assets has negatively significant impact on ROA, GPM and Tobin's Q. Firm performance and leverage shows negative but insignificant relationship measured by ROE. The scholars investigate the impact of macroeconomic variable on Karachi stock market returns. Collected monthly data from Karachi stock exchange from January 2007 to May 2017. Authors used regression analysis for result. The result reveals that there is significant impact on stock return and result matched with previous finding in other researcher that the inflation have negative relation with return (Pervaiz, Masih, & Jian-Zhou, 2018).

Pacine (2017) empirically investigated macroeconomic factors on firm performance in the United Kingdom using data from Top 100 firm in UK during 2000 to 2014. Results show that there is positive impact of gross domestic product (GDP), the rate of domestic debt interest payments to total income tax and inflation rate with firm performance.

Özlen and Ergun (2012) investigated the impact of macroeconomic factors on stock returns. The researcher used five macroeconomic factors consist on exchange rate, inflation rate, interest rate, unemployment rate and current account deficit and 45 companies selected from 11 different sectors of Irish Stock Exchange (ISE). By using ARDL approach for drawing conclusion. Authors contend that exchange rate and interest rate have significant impact on stock price fluctuation and stock prices are very sensitive for exchange rate and interest rate.

Hasan, Ahsan, Rahaman, and Alam (2014) investigated the influence of capital structure on firm performance in Bangladesh by collecting data from 36 listed companies in Dhaka Stock Exchange in 2007 to 2012. Results reveal that earning per share (EPS) is significantly positively related with short term debt and significantly negatively related with long term debt, return on assets and capital structure have significantly negative relation and capital structure and firm performance has no relation that is measured with return on equity (ROE) and Tobin'Q. In this study it is conclude that capital structure has negative impact on firm's performance. The scholars conduct a study on effect of financial leverage on firm performance. For this purpose, he selects a sample of 284 listed non-financial companies in Karachi stock exchange and collected data from State Bank of Pakistan selected samples from 2004 to 2009. For analysis Pool regression model and regression analysis to be used for accurate result. It is concluded that there is negative relation between performance and leverage and no significance between leverage and profitability. It is also concluded that profitability is also consistent with picking order theory and capital structure theory also contributes in process of decision making (Raza, 2013).

Rajendran and Nimalthasan (2013) investigated the relationship between capital structure and financial performance. For the evidence selected 25 listed manufacturing companies in Sri Lanka. For the analysis collected secondary data from Colombo Stock Exchange publication and annual reports of companies from 2008 to 2012. It is found that the gross profit (GP), net profit (NP), return on equity (ROE), return on assets (ROA) are not significantly correlated with debt equity ratio and Gross profit margin and Return on equity are significantly correlated with debt assets ratio. It also finds that capital structure has significant impact on gross profit and return on equity. The result indicates that increase in leverage has negative effect on return on equity (ROE). The author defines that the exchange rate and interest rate have significant impact on stock price fluctuation and stock prices are very sensitive for exchange rate and interest rate. The authors investigate the impact of financial ratios on the financial performance. The case of Lyondell Basell chemical Industries. The data is collected from the year 2004 to 2011. Multiple regression analysis is used for analyzing of data. The result shows that Current ratio (CR), Quick ratio (QR), Debt ratio (DR) and Net profit margin (NPM) have positive relation with financial performance and the Debt Equity Ratio (DTER) and Operating profit Ratio (OPM) have negative impact on companies' financial performance (Borhan, Naina Mohamed, & Azmi, 2014).

Researchers (Khan, Ullah, Ali, & Khan, 2018) have empirically investigated the relationship between the interest rate, inflation rate, exchange rate, GDP growth rate and the unemployment rate with the dividend payout ratio. The authors collected the macroeconomic variables data from the State Bank of Pakistan and the dividend payout ratio data from the official website of the companies. For the analysis of the data the authors used OLS model. From the analysis of the data the authors concluded from his result that there is a positive relationship between the exchange rate and the unemployment rate and negative relationship with the interest rate, inflation rate and GDP growth rate with the dividend payout ratio. The scholars investigated the impact of macroeconomic variables on the dividend payout ratio: evidence from the textile sector listed on the Pakistan Stock Market. The authors collected data from the State Bank of Pakistan and the official website of the companies. For the analysis of the data the OLS model was used. The authors concluded from his result that the inflation rate has a negative impact on the dividend payout ratios and the interest rate and the exchange rate has a positive relationship with the dividend payout ratios.

### 3. Data and Methodology

The main purpose of this study is to investigate the impact of macroeconomic variables on the financial performance. The data set consist of 10 years from 2007 to 2016. The descriptive results show the full summary of data. Macroeconomics variables such as the interest rate, the inflation rate, the GDP growth rate and the exchange rate data is collected from the State Bank of Pakistan economic data and Pakistan statistics bureau, the dependent variables financial performance i.e. “the return on equity, the return on assets and the gross profit margin” data is collected from the financial statement of companies and these annual financial statements collected from State Bank of Pakistan publication, Karachi Stock Exchange website and Official web sites of companies.

#### Regression equation

The descriptive statistic and the generalized method of moment is applied for the analysis of data and the reason of applying this model is to exclude the unit root problem and multicollinearity. There are three equation are formulated due to three dependent variables that measure the firm performance.

1.  $ROE = \alpha + \beta_1 Ir + \beta_2 Inr + \beta_3 GDP + \beta_4 Er + \epsilon$
2.  $ROA = \alpha + \beta_1 Ir + \beta_2 Inr + \beta_3 GDP + \beta_4 Er + \epsilon$
3.  $GPM = \alpha + \beta_1 Ir + \beta_2 Inr + \beta_3 GDP + \beta_4 Er + \epsilon$

ROE = represent the return on equity.

ROA = represent the return on assets.

GPM = represent the gross profit margin.

$\alpha$  = represent the Constant/ Intercept.

$\beta_1 Ir$  = represent the slope of interest rate.

$\beta_2 Inr$  = represent the slope of inflation rate.

$\beta_3 GDP$  = represent the gross domestic product rate.

$\beta_4 Er$  = represent the slope of exchange rate.

$\epsilon$  = represent the error term.

### 4. Empirical Evidence

Before applying the OLS model, there is preliminary test which should be applied before performing the OLS.

## Descriptive statistic result

Table 1 *Descriptive Statistic*

	ROA	ROE	GPM	IR	INR	ER	GDP
Mean	0.22	0.08	0.10	10.74	9.82	88.80	3.67
Median	0.20	0.07	0.09	10.65	8.70	89.87	3.95
Maximum	0.36	0.16	0.15	13.64	20.30	104.77	5.74
Minimum	0.10	0.03	0.069	6.39	2.50	60.74	1.61
Std. Dev.	0.07	0.04	0.02	2.64	5.28	14.84	1.41
Skewness	0.61	0.81	0.74	-0.33	0.50	-0.64	-0.21
Kurtosis	2.48	2.54	2.25	1.87	2.66	2.27	1.77
Jarque-Bera	0.74	1.19	1.15	0.71	0.46	0.90	0.70
Observation	10	10	10	10	10	10	10

The mean values shows the average values of all variables the dependent variables, the return on assets average value is 0.22 and it is greater than its median value and the standard deviation shows the 7.8% variation in return on assets, The mean value of the return on equity is 0.084 that is also greater than its median value and the standard deviation 4.3% shows that 4.3% variation in the data of the return on equity and the mean value of gross profit margin 0.102 that is also greater than its median value which is 0.09 and the variation in the gross profit margin is 2.89 percent that represented by standard deviation. The result of independent variables shows that the mean value of interest rate (IR) is 10.74 which is greater than its median and its standard deviation is 2.64. The mean value of inflation rate (INR) is 9.82 which is 1.12 more than its median and standard deviation is 5.28, same as the exchange rate (ER) has mean value 88.8 and the highest value of exchange rate is 104.77 and variation in exchange rate is 14.84 and the GDP growth rate shows that its mean value is 3.67 and the highest GDP growth is 5.74 and the lowest value is 1.61 and total variation in this data is 1.4.

## GMM Table 1 Result

Table 2 of General Method of Movement (GMM) is representing the relationship between mean value of dependent variable return on assets (ROA) and the independent variables i.e. “the interest rate, the inflation rate, the gross domestic product growth rate and the exchange rate”.

Table 2 *Generalized Method of Moments (ROA)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.538771	0.112933	13.62551	0.0000
INR	-0.004076	0.003546	-1.149355	0.3024
IR	-0.065690	0.003788	-17.34178	0.0000
GDP	-0.077603	0.010769	-7.205952	0.0008
ER	-0.003193	0.000641	-4.978896	0.0042
R-squared	0.901723			
Adjusted R-squared	0.823101			
Durbin-Watson stat	2.995273			

The Co-efficient of inflation rate (INR) shows that inflation rate (INR) has negative relationship with return on assets (ROA). When 1% change is comes in inflation rate the return on assets change -0.004 it is statistically insignificant. The Co-efficient of interest rate (IR) shows that interest rate (IR) has negative relationship with return on assets (ROA). When interest rate change 1% the return on assets (ROA) will also change -0.065 it is statistically strongly significant. The Co-efficient of gross domestic product (GDP) growth rate shows that GDP growth rate is negatively correlated with return on assets (ROA). When GDP rate change 1% then the return on assets is decrease up to -0.077, it is statistically strongly significant. The co-efficient of exchange rate (ER) shows the negative relationship between exchange rate and return on assets (ROA). When the exchange rate change 1% then the return on assets will change -0.003 units this is statistically strongly significant. The value of R-square shows the total variation in the dependent variable such as gross profit margin is caused by the selected macroeconomics variables as macroeconomic variables such as “the interest rate, the inflation rate, the exchange rate and the GDP growth rate”. The value of R-squared 0.90 shows that the 90 percent variation in the dependent variable such as the return on assets (ROA) is caused by the independent variables such as the interest rate, the inflation rate, the GDP growth rate and the exchange rate. The adjusted R-square shows the overall explanatory power of the variables. It shows that the impact of independent macroeconomic variables on the dependent variables such as the return on assets (ROA). The value of adjusted R squared shows that the dependent variables changes 82 percent due to changes in independent variables.

### GMM Table 3 Results

The table 3 of General Method of Movement (GMM) is representing the relationship between mean value of dependent variable return on equity (ROE)

and independent variables i.e. interest rate, inflation rate, gross profit margin and exchange rate.

Table 3 *Generalized Method of Moments (ROE)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.600265	0.092444	6.493299	0.0013
INR	0.002777	0.001762	1.576327	0.1758
IR	-0.033179	0.005079	-6.532942	0.0013
GDP	-0.019098	0.005920	-3.225944	0.0233
ER	-0.001305	0.000441	-2.957221	0.0316
R-squared	0.885323			
Adjusted R-squared	0.793582			
Durbin-Watson stat	1.826862			

The Co-efficient of the inflation rate (INR) shows that the inflation rate (INR) has positive relationship with the return on equity (ROE). When 1% change is comes in the inflation rate the return on equity change 0.002, it is statistically insignificant. The Co-efficient of the interest rate (IR) shows that there is inverse relationship between the interest rate (IR) and the return on equity (ROE). When the interest rate changes up to 1% then the return on equity will change inversely -0.033, it is statistically strongly significant. The Co-efficient of the gross domestic product (GDP) growth rate shows negative relationship with the return on equity (ROE), when the GDP rate change 1% then the return on equity is decrease up to -0.019, it is also statistically strongly significant. The co-efficient of the exchange rate (ER) shows that there is inverse relationship between the exchange rate and the return on equity (ROE). When the exchange rate change 1% then the return on equity (ROE) will change -0.001 units this is statistically strongly significant. The value of R-square shows the total variation in the dependent variable such as return on equity (ROE) is caused by the selected macroeconomic independent variables such as “the interest rate, the inflation rate, the exchange rate and the GDP growth rate”. The value of R-squared 0.88 shows that the 88 percent variation in the dependent variable such as the return on equity (ROE) is caused by the macroeconomic variables such as “the interest rate, the inflation rate, the GDP growth rate and the exchange rate”. The adjusted R-square shows the overall explanatory power of the variables. It shows that the impact of independent macroeconomic variables on the dependent variables such as return on equity (ROE). The value of adjusted R squared shows that the dependent variables changes 79 percent due to variation in selected independent macroeconomic variables.



### GMM Table 4 Results

The table 3 of General Method of Movement (GMM) is representing the relationship between mean value of dependent variable gross profit margin (GPM) and independent variables i.e. interest rate, inflation rate, gross profit margin and exchange rate.

Table 4 *Generalized Method of Moments (GPM)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.387268	0.028338	13.66603	0.0000
INR	-0.000313	0.000520	-0.601441	0.5738
IR	-0.017378	0.001813	-9.584129	0.0002
GDP	-0.010601	0.001638	-6.471453	0.0013
ER	-0.000635	0.000124	-5.131825	0.0037
R-squared	0.978592			
Adjusted R-squared	0.961466			
Durbin-Watson stat	1.009829			

The Co-efficient of the inflation rate (INR) shows that the inflation rate (INR) has negative relationship with the gross profit margin (GPM). That shows on every 1% change in the interest rate change the gross profit margin (GPM) -0.0003 it is statistically insignificant. The Co-efficient of the interest rate (IR) shows that the interest rate (IR) has negative relationship with the gross profit margin (GPM). That shows on every 1% change in the interest rate change the gross profit margin (GPM) -0.003, it is statistically strongly significant. The Co-efficient of the gross domestic product (GDP) growth rate shows negative relationship with the gross profit margin (GPM) that shows on every 1% change in GDP growth rate change the gross profit margin (GPM) -0.010 it is statistically strongly significant. The co-efficient of the exchange rate (ER) shows that the exchange rate is negatively related with the gross profit margin (GPM). That shows on every 1% change in the exchange rate (ER) the gross profit margin (GPM) changes up to -0.0006 it is statistically strongly significant. The value of R-square shows the total variation in the dependent variable such as gross profit margin is caused by the independent variables i.e. “the interest rate, the inflation rate, the exchange rate and the GDP growth rate”. The value of R-squared 0.97 shows that the 97 percent variation in the dependent variable such as the gross profit margin (GPM) is caused by the macroeconomic variables i.e. “the interest rate, the inflation rate, the GDP growth rate and the exchange rate”. The adjusted R-square shows the overall explanatory power of the variables. It shows that the impact of independent macroeconomics variables on the dependent variables such as

gross profit margin. The value of adjusted R squared shows that the gross profit margin has changed 96 percent due to changes in the independent variables.

## **5. Conclusion and Recommendation**

The result derived by the analysis of return on assets and selected macroeconomics variables shows that, the inflation rate has negative & insignificant relationship with the return on assets and the interest rate, the exchange rate and the GDP growth rate have negative and significant relationship with the return on assets. Its overall explanatory power is 82% it means the return on assets is changed 82 percent due to change in selected macroeconomics variable. The result also reveals that the financial performance that measured with the return on equity is also affected with the changes in the macroeconomics variables, in this analysis again inflation having insignificant but positive relationship with the return on equity and other variables such as the interest rate, the GDP growth rate and the exchange rate has negative and significant relationship. The interest rate, the exchange rate and the GDP growth rate increase the firm performance is decrease and vice versa. The adjusted R-square value is 79 percent it states that the selected macroeconomics variables change the overall return on equity up to 79 percent. The result from third test when the financial performance is measured with the gross profit margin the relationship between macroeconomics variables shows that the inflation, the interest rate, the GDP growth rate and the exchange rate have negative relationship with the gross profit margin. It states that the positive changes in the macroeconomic variables diminishing the gross profit margin of firm. Further the result reveals that the inflation has insignificant relation with gross profit margin and the other variables have insignificant relationship with gross profit margin. The adjusted R-square of gross profit margin shows that the 96 percent changes are caused by macroeconomic variables in the gross profit margin. Finally, it is concluded that the inflation rate sometime has positively insignificant and sometime negatively insignificant relationship with financial performance, interest rate always has significant and negative relationship with financial performance, GDP growth result also demonstrate that there is negative significant relation with financial performance and the exchange rate is negatively significant with financial performance. All the above discussion reveals that these variables affect financial performance and make some influence on financial performance that is positive or negative that is based on situation.

This study is limited to the financial performance and measured through the return on assets, the return on equity and the gross profit margin. This study covers the short-run period of ten years and limited number of firms. Future

research may cover the long period analysis and other macroeconomic determinants and financial performance is measured with consideration of another ratio.

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