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Economic influence vis–a-vis firm performance: an empirical study in Indian context

Subir Chattopadhyay*[1], Niladri Das[2] and J.K. Pattanayak[3]

[1] Research Scholar, Department of Management Studies, Indian Institute of Technology (ISM), Dhanbad, Dhanbad – 826004, Jharkhand – India, Corresponding Author: Email: cmasubir@rediffmail.com,*
[2] Assistant Professor, Department of Management Studies, Indian Institute of Technology (ISM), Dhanbad, Dhanbad – 826004, Jharkhand – India
[3] Professor, Department of Management Studies, Indian Institute of Technology (ISM), Dhanbad, Dhanbad – 826004, Jharkhand – India

Abstract: *Purpose* - In the recent past, the economic scenario in India was antithetical and the performances of many companies were also adversative. While addressing this issue, the Chief Executive Officers of many firms referred to the influence of declining economy on downward trend of their financial performance. In this backdrop, an empirical research has been conducted, the main purpose of which is to corroborate their views, or otherwise, by examining the influence of economy on performance of select Indian companies.

Design/Methodology/approach – Data for twenty one Explanatory Variables were collected for a period 1991-92 to 2012-13 and reduced to two principal components by principal component analysis. Five financial variables were selected from a Sample of forty three Indian companies, representing mainly four major industries, viz. Iron & Steel, Power, Oil & Gas and Infrastructure. Multiple Regression was run to test the hypothesis by comparing the t-stat and F-stat values of the Regression slopes with the critical values of t-distribution & F-distribution and also comparing the p-value with the significance level. Since the Unit Root Test with level data indicated non-stationary time series, it was transformed to first differenced data to make the time series stationary. Information criterion and influence statistics have been computed to get the idea about the overall fitness of the model and influence of any single variable on the results of the analysis.

Findings – Regression Analysis with differenced data indicated significant relationship existing between explanatory variables and financial variables and no single variable had any influence on the results. The residuals are normally distributed and have no serial correlation and heteroskedasticity. As the time series is stationary and stable without any break, the results are considered to be reliable. Thus, it can be inferred that the economy

does influence the performance, but the influence is visible more on sales and income compared to profit before and after tax.

Practical implications - The findings of the study may help the financial analysts for evaluation of financial performance, assessment of the effectiveness of financial restructuring, merger and acquisition etc. by insulating the impact of movement of economy.

Originality/Value - The core sector companies, selected for this study, have significant impact on growth and development of the country. Due to very complex interrelationship between industry and economy, a large number of macroeconomic variables have significant contribution on performance of industry. During extensive literature review, no comprehensive and reliable study on impact of large number of significant macroeconomic variables on the performance of companies from these core sectors could be found in Indian context. This contributes to the originality of the study.

Keywords: Explanatory & Financial Variables, Descriptive Statistics, Principal Component Analysis, Regression analysis, Information Criterion, Influence Statistics, Residual Analysis.

Paper Type - Research Paper

INTRODUCTION

The environment, in which a business operates and aspires to grow, is often capricious. Economic meltdown, bursting of bubbles, peaks and valleys of market demand, technological obsolescence, imposition of new rules and regulations by government, changes in statutes and policies of government and fastidious consumer base can be a serious threat to the sustainability of the business organization. Though many of the factors, responsible for occurrence of the above events, are highly correlated or dependent on each other, researchers have tried to find out, since long, the impact of some key external factors, which have significant impact on the performance of corporates, banks and stock markets.

The performance of an organization remains a central challenge for management research. While 'performance' has been present in the economic and financial literature since 1960, and has been formulated through different criteria, both quantitative and qualitative, there is no concrete definition of the concept of performance (Boldeanu and Pugna, 2014). In many diagnostic analysis, there are direct links to items of financial performance. However, comparative economic data are not always available and they are subjective during a performance assessment. Due to these considerations, a greater attention has been given in last few years to the 'financial performance' which generated a big impact over the performance management system (Boldeanu and Pugna, 2014). Accordingly, an attempt has been made to study the impact of economy on financial performance of companies.

There is paucity of knowledge in the existing empirical literature regarding the effect of exchange rate, interest rate, inflation rate, GDP fluctuations etc. on the performance of the industrial sectors. The nature and extent of the effects of macroeconomic variables are unique from one industry to another (Cliff and Willy, 2014). While macroeconomic indicators affect all industries, the nature and extent of such effects differ from one industry to another. The effect of fluctuation of the macroeconomic variables on the financial performance of industry is not adequately documented. This, therefore, indicates that there exists an empirical gap on the nature and extent of the effect of the macroeconomic variables on the financial performance of firms in industrial sector (Cliff and Willy, 2014).

Different income–influencing events occur at economy, industry and corporate levels, which have differences in potential impact on different groups and witness differences in individual reactions to the events. All companies in the economy are influenced to different degrees by changes in interest rate or monetary policy as they have direct impact on their earnings. An industry may be conceived as narrowly as the individual firm or as widely as economy (Brown and Ball, 1967). Individual firm's earnings variability can be explained by the explanatory power of economy-wide index and industry index (Brealey, 1968) and the correlation existing between profitability and industry performance can be a better indicator of the influence of economy over firm performance (Weiss, 1971). Due to economy wide events, cross sectional correlation among all firms' earnings in a sample can be expected. These commonalities are reflected in security prices as they are significant (Magee, 1974).

Recently, the economy in India took a downward trend (Datt and Mahajan, 2015) and the financial performance of various companies also declined (CMIE Prowess Database, 2014). Chief executive officers (CEO) and Chief financial officers (CFO) of some companies expressed their concern and indicated that the adverse economy affected performance of their companies, which needs to be corroborated, or otherwise, by factual position. With this backdrop, and also realizing that not many reliable studies have been made in Indian context, this empirical research work has been undertaken to conduct a systematic study on the influence of economy on financial performance of a sample of forty three Indian companies, for a period of 1991-92 to 2012-13, selected mainly from iron & steel, power, oil & gas and infrastructure sector, which contribute substantially to GDP growth of the country. This research work is unique with originality, since to the best of our knowledge, gathered during rigorous review of previous works, no such study has been conducted in these industrial sectors, particularly in India. Chapter 2 of this article deals with Literature Review, whereas, chapter 3, 4, 5 and 6 deal with Theoretical Framework, Data & Methodology, Results & Discussion, Conclusion and Implication of the study respectively.

LITERATURE REVIEW

The impact of externalities on financial performance of firms created interest to researchers since long. An extensive review has been made on the previous works of researchers conducted from the year 1967, to assess the impact of economy on financial performance of companies in industrial sectors. In most of the cases, researchers found significant influence of economy on performance of firms.

The findings of previous research works were corroborated by Lev (1980) in his seminal works, where he observed that firms do not operate in vacuum and a multitude of industry-wide factors and economy–wide factors affect the performance of firms. Specifically, the effects of economic factors like changes in the inflation rate, changes in fiscal policy, effects of economic stabilization policies, changes in widely used input prices, like crude oil etc. are reflected in significant commonalities in firms' accounting numbers. Higher capacity utilization, industry growth and market share are found to have strong correlation with profitability in the empirical work of Ravenscraft (1983), but unlike Weiss (1971), his work exhibited insignificant correlation with industry concentration. Industry and economy effect, market share, business effect have been found to have significant relationship with firms' profitability in many research works (Schmalensee, 1985; Foster, 1986; Rumelt, 1991). McNamara and Duncan (1995) also found that performance of a firm is a function of different macroeconomic variables. However, his another finding was that performance of current year is a function of prior year's return on assets.

The effect of the corporate-parent relationship on business specific profitability is found to be influenced by industry in an empirical research conducted by McGahan and Porter (1997). The industry effects are more persistent over time than business specific or corporate parent effects. However, corporate-parent effects on profits of diversified firms having multiple business was observed to be significant (Roquebert et al., 1996).

Broadstock et al. (2011) examined the role of macroeconomic conditions on model-based corporate earnings forecasts. The empirical results based on likelihood ratio tests indicate that macroeconomic variables should be considered when predicting firm's future earnings. The effect of global financial crisis on the economy especially the industrial and manufacturing sectors were examined by Richard and Olayiwola (2011), which revealed that industrial performance is negatively influenced by external shocks.

There is theoretical support that earnings are related to market valuation, which has been corroborated by empirical studies. Therefore, earnings numbers may also reflect approximately similar degree of association with market valuation (Miller and Modigliani, 1966; Brown and Ball, 1967). However, this view has not been supported by Ciora et al. (2011). Though he agreed that the role of indicators in the decision process to measure economic performance and efficiency is undeniable, the importance of these indicators has led to an increase of the methods throughout companies' performance measurement. Using econometric model, little or no correlation between market indicators and measures that use information from financial statements was observed by him.

The information about company performance, especially about its profitability, is useful in substantiating managerial decisions regarding potential changes in the economic resources that the company will be able to control in the future. The objective of the firm is to achieve superior economic results that will increase the company's competitiveness and will satisfy the shareholders' interest (Burja, 2011).

Over the years, manufacturing and industrial sectors have become more capitalized and more dependent on international markets along with domestic market. As a result, changes in the macroeconomic policy have become increasingly significant and the sector is being more vulnerable to variations in interest rate, exchange rate, the size of gross domestic product, foreign direct investment etc., which has been corroborated by an empirical investigation of the impact of macroeconomic factors on manufacturing productivity by Odior (2013).The effect of macroeconomic variables on return on investment (ROI) of public equity firms in Kenya was also found to be significant (Kung'U, 2013).

A summary of some important works conducted by researchers in various countries at different time periods, the purpose of the study and the findings are captured in the following table.

From the literature review, it is observed that most of the studies in the past were conducted in U.S. while from 2007 some research work have been conducted in other countries also. Unfortunately, no significant study regarding the influence of economy on financial performance of firms, selected from major industrial sectors, could be found in Indian context. It will be interesting to study how the Indian companies behave with the movements of the economy and also to understand whether the results obtained in other countries have any relevance in Indian scenario. Therefore, a research gap exists, which needs to be filled up to help policy makers to formulate appropriate policies and the management of firms to adopt the relevant strategy.

Table 1
Literature Review

Year	*Country*	*Authors' Name*	*Study undertaken*	*Findings of Study*
1967	U.S.	Brown and Ball	Association between the earnings of an individual firm, of other firms in its industry and of all firms in the economy. Four basic earning variables, viz. net income, operating income, net income + after tax interest expense and adjusted EPS were used	Strong association between the returns to a firm's stockholder, to stockholders of firms in the same industry and to stockholders of economy.
1968	U.S.	Brealey	Effect of economy and industry on individual firm's earnings variability	Economy-wide index and industry index exhibited significant explanatory power
1971	Holland	Weiss	Effect of imperfect market on the profit ability of firms and industry.	Significant positive correlation between profitability and industry concentration
1974	U.S.	Magee	Effects of industry wide commonalities on a firm's earning relative to the effects of economy-wide commonalities and whether the effects of industry – wide commonalities in earnings, had any impact in security prices	Firm earnings and security returns were significantly affected by the events reflected in industry wide indices which are reflected in security prices.
1980	U.S.	Lev	GNP and Total Corporate profits were selected as explanatory variables and Sales, operating income and net income were selected as dependent variables to find out relationship between industry and economy.	Strong association between the firm variables and those of economy wide indexes were observed, with GNP as the most significant explanatory variables.
1983	U.S.	Ravenscraft	Regression analysis of operating income to sales as the dependent variable with a combination of 23 variables measuring industry structure attributes as independent variables.	Higher capacity utilization, industry growth and market share had significant correlation with profitability but industry concentration had no significant correlation.
1985	U.S.	Schmalensee	Industry effects on accounting profits of American manufacturing firms	Industry effect had significant impact on variation of profit, but firms' effects had no impact.
1986	U.S.	Foster	Importance of industry and economy factors on financial variables of firms with first differenced operator	Industry and economy movements are important variables in explaining firm movements in financial variables.
1991	U.S.	Rumelt	Effect of business units, industry and corporate-parent relation on accounting profits	Business unit effect have more significance compared to industry effect and corporate-parent effect have least significance.
1995	Australia	Mc Namara and Duncan	Influence of prior year return on assets and macroeconomic variables on the performance of a firm	Performance was a function of the prior year return on assets and macroeconomic variables.
1996	U.S.	Roquebert,	Corporate-parent effects on profits of diversified firms having multiple business	Corporate – parent effects were significant.

(*contd....Table 1*)

Year	*Country*	*Authors' Name*	*Study undertaken*	*Findings of Study*
		Andrisani and Phillips		
1997	U.S.	Mc Gahan and Porter	Effect of industry, business-specific and corporate-parent influences on profitability	Industry, corporate parent and business-specific effects were related in complex ways though business-specific and industry effects are more predominant than corporate – parent effect.
2007	Jordan	Zeitun, Tian and Keen	Impact of aggregate economic risk on a company's performance and failure	Unanticipated changes in interest rate negatively and production manufacturing index positively affect a firm's performance.
2011	Romania	Ciora, Munte-anu and Iordache	Correlation between variation of earning per share (EPS) and price earnings ratio (PER) of firms	No direct correlation
2011	Nigeria	Richard and Olayiwola	Effect of global economic crisis on the performance of industry, considering foreign direct investment, bank lending rate, trade balance, inflation rate, exchange rate and oil price as macroeconomic indicators and National Industrial output as proxy to GDP	Foreign direct investment, trade balance and inflation were found to exert significant positive shocks and oil price exerted negative shock on industrial sector performance
2011	U.S.	Broad-stock, Shu and Xu	Influence of macroeconomic conditions on firm-level earnings forecast	Macroeconomic information should be considered when predicting firm's future earnings.
2011	Romania	Burja	How economic performance is achieved by companies	Strong dependent relationship between company performance and the way the available resources are managed
2012	Lithuania	Bekeris	Influence of macroeconomic variables like GDP, FDI, export, import, inflation, unemployment, interest etc. on the profitability of SMEs	The interbank interest rate changes and the unemployment rate have maximum impact on profitability whereas inflation, average wages, monitory base etc. are not statistically significant
2013	Kenya	Kung'U	Effect of selected macroeconomic variables on financial performance of Private Equity (PE) firms	GDP, inflation and banks' lending rate had the greatest positive effect but exchange rate showed a negative relationship on financial performance
2013	Nigeria	Odior	Impact of macroeconomic variables like exchange rate, consumer price index, credit to the manufacturing, interest rate, broad money supply and foreign direct investment on the productivity	Loan, advances and foreign direct investment sharply increase productivity, but broad money has less impact.

(*contd....Table 1*)

Year	*Country*	*Authors' Name*	*Study undertaken*	*Findings of Study*
2013	Paistan	Sherazi, Iqbal, Asif, Rehman and Shah	Problems faced by SMEs	Difficulties in borrowing money from bank and lack of support of Government
2014	Kenya	Cliff and Willy	Effect of macroeconomic environment on the financial performance of manufacturing firms	Foreign exchange, interest rate and inflation have significant effects on profitability
2014	Czech	Buresova and Dvorakova	Influence of economic development on performance measurement and management of enterprises.	Non effectiveness of financial measurement and management are due to insufficient adaptation of economic information to enterprise needs
2014	EU	Boldeanu and Pugna	Factors which influence the financial performance of companies by least square regression technique	Main influence factors over firm's financial performance expressed through return on equity (ROE) are earning per share (EPS) and net profit margin.

THEORETICAL FRAMEWORK

Economy of a country has been substantially sensitive to the movements of macroeconomic indicators. Declining commodity prices, slower domestic demand, increasing fuel prices, change in interest rate and money supply, fluctuation of foreign exchange rate etc. lead to instability of economic sector. These consequences and circumstances would be more challenging to the industrial sectors and the companies. A firm's performance or failure can be significantly influenced by the performance of the macro economy. Many studies, (Brealey, 1968; Magee, 1974; Lev, 1980; Foster, 1986; McNamara and Duncan, 1995; Zitun et al., 2007; Richard and Olayiwola, 2011; Broadstock et al., 2011; and Kung'U, 2013) have proved the strong impact of macroeconomic factor, such as inflation, interest rate, exchange rate, money supply, GDP etc. on performance of firms. Based on empirical evidence, researchers and economists postulated that the performance of economy often exert significant impacts on the financial performance of the companies. However, a statistical relationship cannot establish causal connection and the idea of causation emerges from theoretical framework (Kendall and Stuart, 1961). Therefore, a causal relationship between economy and performance of industry and companies needs to be explored also, to justify the empirical evidence.

Macroeconomic policies for stabilization and economic growth include (1) Monetary policies, which affect money supply, interest rates and credit conditions and (2) Fiscal policy, which affects taxes and spending programs. Using these two fundamental tools, government can influence the level of total spending, rate of growth, output level, price level, inflation and unemployment of the economy (Samuelson and Nordhaus, 2010), which affect the performance of industry and company in a complex way. Monetary policies affect all sectors of the economy through cost of debt and the availability of money and credit which affect a firm's ability to access external sources of fund. Fiscal policies affect a firm's after tax net cash flow, its cost of capital and potentially the demand for its product and survival (Zeitun et al., 2007).

In declining economy, GDP and exports are expected to decline, leading to currency depreciation. The currency depreciation would raise commodity prices, increase interest rate and decrease credit availability. Lower interest rate may facilitate in higher income and lower production costs without necessarily compensating with a decrease in prices of outputs. Tight monetary policy increases rates of interest, inducing capital inflows which cause the exchange rate to depreciate and thereby exports to decline. An expansionary monetary policy cause falling in real interest rates, depreciation of exchange rates and increasing commodity prices in short run. Short run effects on changes of money aggregates and the increased interest rates in supplying money by the central bank tend to reduce the value of local currency which leads to an increase in total export.

Strong economic growth, leading to higher inflation, have mainly negative impact on financial markets of fixed income, as they imply higher interest and therefore lower market rates. Opposite situation occurs when there is decline in economic growth. But, the scenario is not same for other financial markets. High economic growth frequently produces high inflation, which in turn prompts the central bank to tighten monetary policy more, by raising interest. This, however makes company lending more expensive, thereby narrowing the profit margin. At the same time, the higher economic growth also means that companies can sell more because demand rises. Due to the increase in demand, they also probably have greater scope to increase prices. In this respect, higher economic growth positively influences company profits. The question therefore remains as to the overall effect on a company.

The situation in the currency markets is different again. High interest rates tend to suppress economic growth. Falling growth rates adversely affect the exchange rate of a currency. High interest rates make foreign investment attractive, boosting capital inflows, thereby in principle positively affecting the exchange rate.

Inflationary trends often occur in waves through all levels of the production process. As a result, price increases for input material, then for intermediate products and finally for finished product. Only then does a price change affect consumer prices for goods, thereby finally also affecting prices for services. To what extent price changes affect the individual stages depends on the scope within the company for passing on price increases. In a sector with marked competition between companies, there is far less potential than, for example, in a sector with only a few highly specialized companies. Price trends are also affected by cost factors, occurring within the production stages, such as wages, individual taxes and profit margins. An interest rate rise increases the cost of borrowings and then negatively affects a firms' profit, whereas production manufacturing index significantly and positively affect a firm's performance. There exists a positive relationship between inflation and macroeconomic variables like money supply, interest, export, GDP etc. The interest rate has negative impact on export and credit availability but a positive impact on change in GDP). Inflation and interest rate have a positive and significant impact on firm's performance. The overall performance of macroeconomic variables, therefore, affect the domestic and global demand of the products of the firm, its selling prices and input cost, the financing cost and ultimately the profit of the firm.

DATA AND METHODOLOGY

Selection of Sample

For this empirical study, total forty-three companies have been selected, out of which thirty-six companies have been selected from four major industrial sectors viz. iron & steel, power, oil & natural gas and

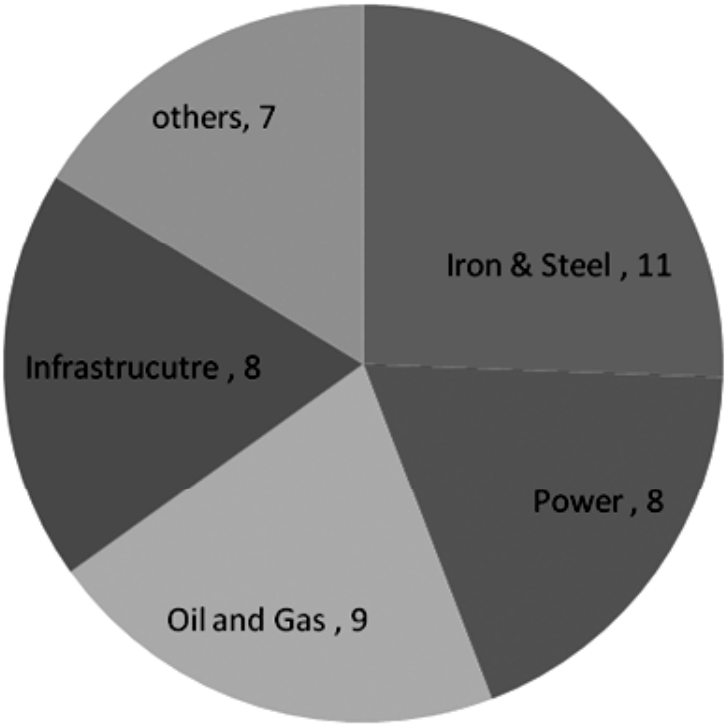

Figure 1: Composition of Sample

infrastructure and seven companies from other sectors. All these sectors have significant contribution towards the industrial development and economy of India. The companies selected in our sample collectively capture more than 75% market share of respective industrial sectors, listed in stock exchange and they are both from public & private sectors.

Based on the previous research work and theoretical frame work, it is observed that the significant explanatory variables can be broadly classified into nine categories: (1) macroeconomic (2) inflation (3) foreign exchange (4) money aggregate (5) export and import (6) external investment (7) interest rate (8) gold price and (9) crude oil price. To capture these, all together twenty-one explanatory variables have been considered for the study.

Data for these variables have been collected from RBI Bulletin, CSO and other published information.

Five significant and most widely used financial variables from profit and loss statement of the companies have been considered in our studies as dependent variables.

Data for these variables have been collected from Prowess data base managed by Centre for Monitoring Indian Economy (CMIE).

Economic liberalization in India started from the year 1991 with major economic reforms. Subsequently, the East Asian Crisis in 1997, Subprime mortgage crisis in 2008 and Eurozone Crisis in 2009 severely affected Indian economy and industry. To capture growth and decline of economy and their impact on the performance of companies, we have selected 1991-92 thru 2012-13 as time horizon in our study.

Table 2
List of Explanatory Variables

Sl. No.	*Variables selected*	*Description of variables*
1	Gross Domestic Product(GDP)	Market value of all final goods and services produced within an economy in a given period of time
2	Gross Fixed Capital Formation (GFCF)	Measures the value of acquisitions of new or existing fixed assets less disposals of fixed assets.
3	Index of Industrial Production (IIP)	An index, which details out the growth of various sectors in an economy.
4	Wholesale Price Index (WPI)	Measures the cost of a fixed basket of wholesale goods in which the weight assigned to each commodity is the share of expenditures on that commodity in a base year.
5	Consumer Price Index (CPI)	Measures the cost of a fixed basket of consumer goods in which the weight assigned to each commodity is the share of expenditures on that commodity in a base year
6	Special Drawing Rights (SDR)	Supplementary foreign exchange reserve assets defined and maintained by the International Monetary Fund (IMF)
7	Foreign Exchange Dollar (FED)	How many units of rupee can buy per unit of dollar
8	Foreign Exchange Euro (FEE)	How many units of rupee can buy per unit of euro
9	MO	Sum of currency in circulation (notes and coins) plus banks' reserves with the central bank.
10	M3	Currency in circulation plus current accounts plus deposit accounts transferable by cheques plus all private-sector deposits and certificates of deposit
11	M2	Currency in circulation plus savings accounts and non-interest bearing bank deposits.
12	M4	Currency in circulation plus current accounts plus deposit accounts transferable by checks plus private-sector bank deposits and money market investments.
13	Export (EXP)	Refers to selling goods and services produced in the home country to other markets.
14	Import (IMP)	Refers to buying a good and bringing into a jurisdiction, especially across a national border, from an external source.
15	Balance of Payment (BOP)	A statement that summarizes an economy's transactions with the rest of the world for a specified time period.
16	Foreign Investment (FI)	Investment made by foreign countries in domestic country
17	Call Money Rate (CMR)	The interest rate paid on the money, which banks lend to each other to be able to maintain the cash reserve ratio.
18	Lending Rate (LR)	Interest rate at which banks lend loan
19	Foreign Institutional investment (FII)	Investment in domestic country in securities by institution established or incorporated outside
20	Gold Price (GP)	The price at which gold is traded
21	Crude Oil Price (OP)	Price of crude petroleum oil

Table 3
List of Financial Variables

Sl. No.	*Variable*	*Description*
1	Sales (FV01)	Monetary value of goods sold and services provided
2	Total Income (FV02)	Miscellaneous income from other sources like interest, rent etc., in addition to income from sales.
3	Total Expenditure (FV03)	All components of Expenditure i.e., Fixed, Variable and Semi-fixed.
4	Profit Before Tax (FV04)	Resultant of income and expenditure.
5	Profit After Tax (FV05)	Residual profit after paying tax

Research Methodology

As a part of descriptive statistics, we have used skewness, kurtosis and Jarque Bera statistic for testing whether the series is normally distributed. The coefficient of variation, has been used to measure relative dispersion. Pearson correlation coefficients has been used to measure linear association between the explanatory variables.

In order to reduce data set to a more manageable size while retaining as much of original information as possible and also to avoid the possible multicollinearity problem, we have used principal component analysis technique. The regression method has been used for calculating component scores and all components with eigen values greater than 1 have been retained. The graphical approach, viz. Scree Plot, has also been used for optimum extraction of components and varimax orthogonal rotation of components have been selected.

The most robust methodology for measuring sampling adequacy i.e., Kaiser-Meyer- Olkin (KMO) method, which recommends accepting values greater than 0.5, has been used by us. Values between 0.7 and 0.8 are considered good in this method.

The t-statistic, achieved by multiple regression, is used to test the hypothesis that a coefficient is equal to zero. The coefficient of determination, R^2 may be interpreted as the fraction of the variance of the dependent variable explained by the independent variables. The F-Statistic reported in the regression output is from a test of the hypothesis that all of the slope coefficients, excluding the constant or intercept, in a regression are zero.

Akaike's Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan Quinn Criterion (HQC) have been used to measure the goodness-of-fit. Three methods, viz. Cook's distance (CD), Central Leverage Value (CLV) and Mahalanobis Distances (MD), have been used as Influence Statistics for discovering influential observations, or outliers.

Two tests, viz. Durbin-Watson statistic (DW) and Breusch-Godfrey Lagrange Multiplier test (BGLM), have been considered here, to examine the evidence of serial correlation. The normality test of the residuals have been done along with the test of skewness and kurtosis of the residuals to understand their distribution pattern.

Five heteroskedasticity tests viz. Breusch-Pagan-Godfrey Test (BPGT), Hervey Test (HT), Glejser Test (GT), ARCH LM Test (AT) and White's Test (WT), have been used to test the heteroskedasticity of

the residuals. Two stability tests, viz., Chow's Breakpoint Test (CBPT) and Chow's Forecast Test (CFT) have been conducted. To test the stationarity of the series Unit Root Test by Augmented Dickey Fuller Test (ADFT) has been adopted.

Augmented Dickey Fuller Test (ADFT) indicated that the time series with level data is not stationary. To avoid the spurious regression problem, that may arise from regressing a non stationary time series on one or more non stationary time series, the non stationary time series have to be transformed to first difference to make them stationary.

RESULTS AND DISCUSSION

Descriptive Statistics of Variables

Out of twenty-one explanatory variables, eighteen variables are positively skewed having long right tail and only three variables i.e. SDR, FED and FEE are negatively skewed having long left tail. This is in conformity with other studies that most of the economic variables are positively skewed (Woolridge, 2013; Gujarati and Porter, 2009) due to the fact that few observations' values are much more compared

Table 4
Descriptive Statistics of Explanatory Variables

Variables	*Skewness*	*Kurtosis*	*J-B Statistic*	*Coefficient of Variation (%)*
GDP	0.652	2.181	2.172	44.35
GFCF	0.738	2.138	2.680	60.69
IIP	0.524	1.862	2.194	45.22
WPI	0.542	2.385	1.424	36.74
CPI	0.449	2.495	0.972	48.07
SDR	-0.372	2.581	0.668	21.03
FED	-0.641	2.573	1.675	18.01
FEE	-0.176	1.481	2.229	44.07
MO	0.933	2.451	3.467	82.75
M3	1.071	2.904	4.213	94.29
M2	0.821	2.266	2.966	81.85
M4	1.068	2.899	4.193	93.25
EXP	0.468	1.901	1.909	27.46
IMP	0.632	2.029	2.331	37.08
BOP	0.162	1.879	1.247	55.15
FI	0.702	3.171	1.833	62.62
CMR	1.611	5.002	13.190	47.80
LR	0.559	2.857	1.163	19.22
FII	1.144	2.646	4.914	108.90
GP	1.758	4.972	14.897	82.82
OP	0.784	2.135	2.943	58.93

to the rest of observations and the variables have higher concentration of values below the average value, but longer tail towards the right indicating extreme data are the ones with large values. Again, eighteen variables have platykurtic distribution and only three variables i.e. FI, CMR and GP have leptokurtic distribution. This implies that most of the variables indicate a type of statistical distribution where the points along the X-axis are highly dispersed or spread-out from the mean, resulting in a lower peak than the curvature found in a normal distribution i.e., the distribution is less clustered around the mean than in a mesokurtic or leptokurtic distribution due to low peak, with resultant thin tails. Nineteen variables indicated that distribution are normal, whereas only for CMR and GP distribution are not normal. The coefficient of variation indicated that eleven variables had less than 50% relative dispersion. Monetary aggregates (M0, M3, M2 and M4), BOP, foreign investment (FI & FII), GP and OP indicated more than 50% relative dispersion.

All financial variables are positively skewed, platykurtic (except total expenditure), normally distributed and not widely dispersed (coefficient of variation being 90% approximately).

Table 5
Descriptive Statistics of Financial Variables

Variables	*Skewness*	*Kurtosis*	*J-B Statistic*	*Coefficient of Variation (%)*
FV01	1.053	2.989	4.063	90.36
FV02	1.042	2.959	3.980	90.03
FV03	1.089	3.079	4.356	90.69
FV04	0.455	1.630	2.480	86.34
FV05	0.459	1.637	2.478	84.82

The finding of our studies support theoretical framework as well as the finding of other research scholars. Zeitun et al. (2007) observed that most of the macroeconomic variables of economy of Jordan are positively skewed, except interest rate and banks' credit, which are negatively skewed. In his empirical works, Cliff and Willy (2014) observed that the distribution of macroeconomic variables of Kenya are normal. The coefficient of variation (CV) indicated that there is significant variation among the macroeconomic variables. Inflation had the highest CV (31.50) whereas money supply (M2) had lowest CV (0.462). CV of GDP was also moderate viz. 0.560 (Zeitun et al., 2007). This indicates that, though the distribution pattern of macroeconomic variables of Jordan and Kenya are similar to the distribution pattern of macroeconomic variables of India, sample data considered in this study are more homogenous, since relative dispersion of variables are much less.

Correlation among Explanatory Variables

Out of total twenty one variables, all variables, except CMR and LR have positive correlations among themselves. CMR & LR, which have been taken as proxy to interest rate, show negative correlation, though correlation is not very strong. This can be theoretically justified, since the increase of interest rate has adverse effect on economy and vice versa. Out of remaining nineteen variables, all variables except SDR, FED, BOP, FI and FII, have very strong correlation among themselves.

Table 6
Person's Correlation Coefficients of Explanatory Variables

	GDP	*GFCF*	*IIP*	*WPI*	*SDR*	*FED*	*EV07*	*FEE*	*MO*	*M3*	*M2*
GDP	1.000	0.995	0.995	0.994	0.981	0.898	0.757	0.913	0.990	0.986	0.995
GFCF	0.995	1.000	0.994	0.982	0.963	0.861	0.700	0.888	0.993	0.987	0.997
IIP	0.995	0.994	1.000	0.985	0.969	0.890	0.738	0.917	0.983	0.972	0.990
WPI	0.994	0.982	0.985	1.000	0.991	0.933	0.809	0.923	0.974	0.975	0.980
CPI	0.981	0.963	0.969	0.991	1.000	0.940	0.845	0.915	0.957	0.960	0.962
SDR	0.898	0.861	0.890	0.933	0.940	1.000	0.942	0.942	0.839	0.842	0.857
FED	0.756	0.700	0.738	0.809	0.845	0.942	1.000	0.863	0.676	0.688	0.695
FEE	0.913	0.888	0.917	0.923	0.915	0.942	0.863	1.000	0.856	0.850	0.880
MO	0.990	0.993	0.983	0.974	0.957	0.839	0.676	0.856	1.000	0.995	0.997
M3	0.986	0.987	0.972	0.975	0.960	0.842	0.688	0.850	0.995	1.000	0.994
M2	0.995	0.997	0.990	0.980	0.962	0.857	0.695	0.880	0.997	0.994	1.000
M4	0.986	0.987	0.972	0.975	0.960	0.842	0.689	0.851	0.995	1.000	0.994
EXP.	0.971	0.970	0.973	0.971	0.937	0.887	0.731	0.913	0.951	0.947	0.962
IMP	0.968	0.976	0.973	0.961	0.929	0.859	0.681	0.877	0.958	0.953	0.967
BOP	0.883	0.875	0.906	0.886	0.864	0.882	0.748	0.929	0.832	0.815	0.859
FI	0.773	0.773	0.808	0.753	0.722	0.703	0.535	0.768	0.756	0.713	0.773
CMR	-0.502	-0.456	-0.514	-0.532	-0.561	-0.677	-0.692	-0.627	-0.430	-0.408	-0.454
LR	-0.621	-0.561	-0.592	-0.677	-0.719	-0.791	-0.858	-0.690	-0.556	-0.562	-0.559
FII	0.883	0.890	0.883	0.857	0.843	0.712	0.539	0.743	0.906	0.890	0.903
GP	0.909	0.916	0.876	0.898	0.882	0.730	0.572	0.706	0.941	0.963	0.929
OP	0.948	0.967	0.950	0.927	0.889	0.763	0.580	0.835	0.951	0.949	0.957

	M4	*EXP*	*IMP*	*BOP*	*FI*	*CMR*	*LR*	*FII*	*GP*	*OP*
GDP	0.986	0.971	0.968	0.883	0.773	-0.502	-0.621	0.883	0.909	0.948
GFCF	0.987	0.970	0.976	0.875	0.773	-0.456	-0.561	0.890	0.916	0.967
IIP	0.972	0.973	0.973	0.906	0.808	-0.514	-0.592	0.883	0.876	0.950
WPI	0.975	0.971	0.961	0.886	0.753	-0.532	-0.677	0.857	0.898	0.927
CPI	0.960	0.937	0.929	0.864	0.722	-0.561	-0.719	0.843	0.882	0.889
SDR	0.842	0.887	0.859	0.882	0.703	-0.677	-0.791	0.712	0.730	0.635
FED	0.689	0.731	0.681	0.748	0.535	-0.692	-0.858	0.539	0.572	0.580
FEE	0.851	0.913	0.877	0.929	0.768	-0.627	-0.690	0.743	0.706	0.835
MO	0.995	0.951	0.958	0.832	0.756	-0.430	-0.556	0.906	0.941	0.951
M3	1.000	0.947	0.953	0.815	0.713	-0.408	-0.562	0.890	0.963	0.949
M2	0.994	0.962	0.967	0.859	0.773	-0.454	-0.559	0.903	0.929	0.957
M4	1.000	0.947	0.954	0.816	0.714	-0.409	-0.562	0.890	0.962	0.949
EXP	0.947	1.000	0.981	0.915	0.758	-0.496	-0.587	0.802	0.859	0.962
IMP	0.954	0.981	1.000	0.911	0.752	-0.450	-0.503	0.818	0.879	0.967
BOP	0.816	0.915	0.911	1.000	0.803	-0.629	-0.528	0.704	0.662	0.852
FI	0.714	0.758	0.752	0.803	1.000	-0.632	-0.428	0.866	0.565	0.712
CMR	-0.409	-0.496	-0.450	-0.629	-0.632	1.000	0.745	-0.438	-0.245	-0.333
LR	-0.562	-0.587	-0.503	-0.528	-0.428	0.745	1.000	-0.465	-0.475	-0.433
FII	0.890	0.802	0.818	0.704	0.866	-0.438	-0.465	1.000	0.838	0.816
GP	0.962	0.859	0.879	0.662	0.565	-0.245	-0.475	0.838	1.000	0.891
OP	0.949	0.962	0.967	0.852	0.712	-0.333	-0.433	0.816	0.891	1.000

Principal Component Analysis.

Principal component analysis has been done with twenty one numbers of explanatory variables. The communalities of fourteen variables after extraction are more than 0.9, for six variables they are more than 0.8 and less than 0.9 and only one variable is more than 0.6 but less than 0.7.

Two components have eigen values more than 1, which jointly explain around 92% of the total variance.

Based on Kaiser's criterion and values of communalities after extraction for the variables, the number of components are not over estimated. Only two components could be extracted based on the point of inflexion of Scree Plot also.

After the components have been extracted, loading of the variable on each component were calculated. It is observed that most of the variables have high loadings on the most important component and small loadings on all other components. Component loadings were less than 0.9 for GP, FII, FI, FED, LR and CMR.

Table 7
Communalities

Variables	*Initial*	*Extraction*
GDP	1.000	0.997
GFCF	1.000	0.995
IIP	1.000	0.990
WPI	1.000	0.992
CPI	1.000	0.972
SDR	1.000	0.952
FED	1.000	0.887
FEE	1.000	0.914
M0	1.000	0.988
M3	1.000	0.982
M2	1.000	0.995
M4	1.000	0.983
EXP	1.000	0.952
IMP	1.000	0.954
BOP	1.000	0.833
FI	1.000	0.639
CMR	1.000	0.818
LR	1.000	0.815
FII	1.000	0.806
GP	1.000	0.891
OP	1.000	0.949

Extraction Method: Principal, Component Analysis.

Table 8
Total Variance Explained

Component	*Initial Eigenvalues*			*Extraction Sums of Squared*	
	Total	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*
1	17.591	83.768	83.768	17.591	83.768
2	1.715	8.165	91.933	1.715	8.165
3	0.756	3.600	95.534		
4	0.471	2.242	97.776		
5	0.195	0.929	98.705		
6	0.108	0.513	99.218		
7	0.054	0.256	99.474		
8	0.038	0.181	99.655		
9	0.023	0.111	99.766		
10	0.019	0.092	99.858		
11	0.013	0.063	99.921		
12	0.006	0.030	99.951		
13	0.004	0.021	99.972		
14	0.003	0.014	99.986		
15	0.001	0.006	99.992		
16	0.001	0.005	99.998		
17	0.000	0.002	99.999		
18	0.000	0.000	100.000		

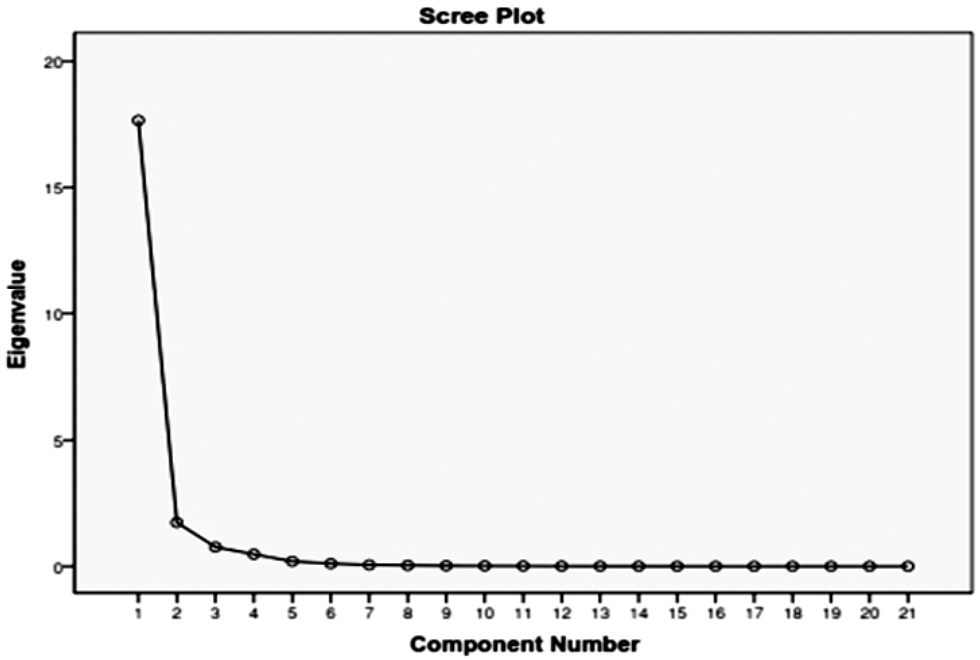

Figure 2: Scree Plot of Variables

In this study, all eighteen loadings of component 1 are more than 0.6 and five loadings out of eight for component 2 are more than 0.6. However, based on maximum loadings, when loadings of twenty one variables are selected from component 1 and 2 combined, all loadings are more than 0.6.

Component loadings of more than 0.5 have been considered in this study. It is observed that eight variables in component 1 have loadings more than 0.9. They are OP, M0, M3, M4, GP, M2, GFCF and IMP. Six variables, viz. GDP, IIP, EXP, WPI, FII and CPI have loading more than 0.8 but less than 0.9. BOP, FEE, FI and SDR have loadings more than 0.6 but less than 0.8. For Component 2, no variable has loading more than 0.9. Three variables viz. CMR, LR and FED have loadings more than 0.8. SDR & FEE have loadings more than 0.6 but less than 0.8. Remaining three variables, viz. BOP, CPI and WPI have loadings more than 0.5 but less than 0.6. Finally, variables in principal components have to be allocated based on their loadings. So four variables viz. CMR, LR, FED and SDR are grouped into component 2 and all other seventeen variables are grouped into component 1. KMO value is calculated as 0.743 which is quite encouraging. Chi-Square value of Bartlett Test is 1355.764 and significance is 0.000 which indicates that Bartlett's test is significant.

Table 9
Component Matrix (Before Rotation)

Variables	*Component*	
	1	*2*
GDP	0.996	
WPI	0.996	
IIP	0.992	
GFCF	0.987	
M2	0.985	
CPI	0.984	
M0	0.977	
EXP	0.974	
M4	0.973	
M3	0.973	
IMP	0.966	
OP	0.934	
FEE	0.933	
SDR	0.925	
BOP	0.905	
GP	0.885	
FII	0.877	
FI	0.797	
FED	0.791	-0.512
LR	-0.658	0.618
CMR	-0.564	0.707

Extraction Method: Principal Component Analysis

2 components extracted

Table 10
Rotated Component Matrix

Variables	*Component*	
	1	*2*
OP	0.946	
M0	0.935	
M3	0.934	
M4	0.934	
GP	0.929	
M2	0.929	
GFCF	0.926	
IMP	0.907	
GDP	0.895	
INIP	0.892	
EXP	0.871	
WPI	0.859	0.504
FII	0.853	
CPI	0.818	0.550
BOP	0.717	0.565
FEE	0.699	0.653
FI	0.657	
CMR		-0.896
LR		-0.866
FED		0.842
SDR	0.640	0.736

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 3 iterations

Table 11
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.743
Bartlett's Test of	Approx. Chi-Square	1355.764
Sphericity	df	210.000
	Sig.	0.000

Therefore, the sample is adequate and the components extracted by PCA are meaningful. Further, there are only twenty seven non redundant residuals with absolute values greater than 0.05, which is only 12% of the total residuals and therefore it is quite good. In Anti-Image Matrix correlation, all diagonal elements are greater than 0.5.

Table 12
Anti - Image Matrix

Sl. No.	*Variables*	*Anti-Image Correlation (Measures of Sampling Adequacy)*
1	GDP	0.702
2	GFCF	0.697
3	IIP	0.755
4	WPI	0.789
5	CPI	0.674
6	SDR	0.864
7	FED	0.685
8	FEE	0.687
9	M0	0.780
10	M3	0.771
11	M2	0.813
12	M4	0.773
13	EXP	0.735
14	IMP	0.948
15	BOP	0.698
16	FI	0.646
17	CMR	0.719
18	LR	0.640
19	FII	0.685
20	GP	0.698
21	OP	0.841

The off-diagonal elements are small. Therefore, the sample is adequate and model is robust. The components scores of the two principal components, are used as data for explanatory variables in subsequent econometric analysis.

The results obtained by researchers in their previous works are similar to our findings. Total thirty three macroeconomic variables from Australian economy were considered by McNamara and Duncan (1995). A varimax principal component analysis was applied to the macroeconomic variables. Three factors were extracted based on eigen values and scree plot. Very high loadings were observed on GDP and Treasury note rate. Broadstock et al. (2011) selected twenty three main macro-variables from U.S. economy, from which three principal components were extracted by PCA to absorb 90% of the macroeconomic information, using an eigen-value based assessment of factor loadings. In the empirical work of Sherazi et al. (2013), total six components were extracted from thirty three macroeconomic variables of economy of Pakistan, whose eigen values were greater than 1 and approximately 65% of the variance could be captured by these six components. The value of KMO measure of sampling adequacy was 0.727 (Sherazi et al., 2013).

Table 13
Component Score Coefficient Matrix

Variables	*Component*	
	1	*2*
GDP	0.070	-0.008
GFCF	0.092	-0.046
INIP	0.070	-0.008
WPI	0.049	0.028
CPI	0.031	0.058
SDR	-0.046	0.183
FED	-0.113	0.280
FEE	-0.016	0.132
M0	0.102	-0.064
M3	0.103	-0.067
M2	0.095	-0.050
M4	0.103	-0.066
EXP	0.066	-0.003
IMP	0.091	-0.046
BOP	0.008	0.088
FI	0.022	0.053
CMR	0.181	-0.372
LR	0.150	-0.330
FII	0.099	-0.071
GP	0.140	-0.139
OP	0.128	-0.113

Extraction Method: Principal
Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Component Scores

Regression Output &Residual Analysis with Level Data

Based on t-stat values and p-values, the null hypothesis that, financial variables have no significant relationship with explanatory variables PC1& PC2, cannot be accepted for level data. Similarly, F-stat and p-values reject the null hypothesis and it is inferred that financial variables have significant relationship jointly with explanatory variables PC1 and PC2. The coefficient of determination, R^2 values are greater than 0.96 indicating very strong relationship.

The standard information criteria, AIC, SIC and HQC values indicate good fitness and extremely low values of MD, CD and CLV indicate that the sample is unbiased and no single variable or observation has any influence on the regression analysis.

However, the low D-W values indicate positive autocorrelation among the residuals. Therefore, the coefficient of determination R^2 do not reflect true picture and indicate only spurious relationship.

The serial correlation test result of residuals reject the null hypothesis of no serial correlation and indicate the presence of serial correlation in the residuals of regression analysis for PBT and PAT.

Residuals of all variables, except PAT indicate negative skewness, of all variables except PBT and PAT indicate leptokurtic and residuals of all variables indicate normal distribution. The BPGT and GT indicate that the null hypothesis of 'no heteroskedasticity' among the residuals cannot be accepted for sales, total income and total expenditure i.e. residuals have heteroskedasticity for these variables and for

Table 14
Regression Output With Level Data-I

	Model Summary			*ANOVA*	*Standardized Coefficients*		
FV	R^2	*D-W*	*F*	*Beta 1*	*t*	*Beta 2*	*Sig*
FV01	0.983	0.975	556.735	0.932	31.352	0.339	11.424
FV02	0.984	0.992	598.689	0.932	32.504	0.340	11.868
FV03	0.980	0.905	475.968	0.932	29.056	0.333	10.378
FV04	0.968	0.654	291.796	0.884	21.706	0.432	10.604
FV05	0.969	0.611	292.272	0.885	21.739	0.431	10.582

Table 15
Regression Output With Level Data– II

FV	*Mahal. Distance*				*Cook's Distance*				*Centered Leverage Value*			
	Min	Max	Mean	S.D	Min	Max	Mean	S.D	Min	Max	Mean	S.D
FV01	0.283	7.801	1.909	1.739	0.000	0.793	0.074	0.175	0.013	0.371	0.091	0.083
FV02	0.283	7.801	1.909	1.739	0.000	0.800	0.074	0.176	0.013	0.371	0.091	0.083
FV03	0.283	7.801	1.909	1.739	0.000	0.833	0.074	0.181	0.013	0.371	0.091	0.083
FV04	0.283	7.801	1.909	1.739	0.000	0.662	0.068	0.144	0.013	0.371	0.091	0.083
FV05	0.283	7.801	1.909	1.739	0.000	0.531	0.061	0.115	0.013	0.371	0.091	0.083

Table 16
Residual Analysis with Level Data-I
(Normality, Serial Correlation and Stability test)

	Normality Test		*Serial Correlation LM Test*			*Chow Break Point Test*			*Chow Forecast Test*	
	Skewness	*Kurtosis*	*Jarqie-Bera*	*F-Stat*	*Obs. R Sor*	*F-Stat*	*LL Ratio*	*Wald Stat.*	*F-Stat*	*Likelihood Ratio*
FV01	-0.245	3.775	0.770	3.035	5.788	2.432	8.265	7.295	11.313	61.748
FV02	-0.233	3.799	0.784	2.743	5.367	2.361	8.063	7.083	10.920	61.018
FV03	-0.178	3.788	0.686	3.766	6.754	2.984	9.777	8.953	13.047	64.708
FV04	-0.037	2.287	0.471	7.410	10.246	14.524	28.922	43.573	45.235	91.218
FV05	0.088	2.191	0.628	8.520	11.013	13.610	27.884	40.829	81.854	104.109

other variables, residuals have homoskedasticity. But HT, AT & WT indicate 'no heteroskedasticity' for the residuals of all variables.

F-stat of CBPT indicate 'no break' at specified point for variables sales, total income and total expenditure and WS of CBPT indicate 'no break' for sales and total income. All other variables indicate break. However, LLR of CBPT and all tests of CFT indicate break. With the results of ADF test, the null hypothesis cannot be rejected i.e. both the explanatory variables PC1 and PC2 and all financial variables represent non-stationary time series.

The findings of non stationarity of time series with level data of explanatory and financial variables are in conformity with the findings of previous research work (Lev, 1980; Odior, 2013)

Table 17
Residual Analysis With Level Data-II
(Heteroskedasticity Test)

	Breusch - Pagan - Godfrey Test			*Harvey Test*			*Glejser Test*			*ARCH Test*		*WHITE Test*		
	F-Stat	*Obs. R Sor*	*S.E.SS*	*F-Stat*	*Obs. R Sor*	*S.E.SS*	*F-Stat*	*Obs. R Sor*	*S.E.SS*	*F-Stat*	*Obs. R Sor*	*F-Stat*	*Obs. R Sor*	*S.E.SS*
FV01	8.079	10.111	10.463	1.706	3.348	2.567	6.342	8.807	9.705	0.002	0.002	2.948	10.549	10.916
FV02	8.064	10.101	10.542	2.585	4.706	3.430	6.588	9.009	9.966	0.002	0.002	2.969	10.588	11.051
FV03	7.725	9.866	10.259	1.635	3.231	3.248	6.284	8.758	9.485	0.010	0.011	2.886	10.432	10.847
FV04	2.319	4.316	2.072	1.912	3.686	1.828	2.009	3.841	2.549	1.341	1.385	0.857	4.648	2.231
FV05	2.218	4.164	1.850	2.219	4.166	3.444	2.277	4.254	3.156	4.321	3.891	0.864	4.675	2.077

Regression Output & Residual Analysis with Differenced Data

The t-stat values and p-values of regression output with first differenced data indicate that PC1 has significant relationship with sales, total income and total expenditure at 1% significance level and with PBT & PAT at 10% significance level. However, the coefficients of PC2 are significant for sales, total income and total expenditure at 10% level and for PBT & PAT at 18% and 15% levels respectively. The coefficients of F-stat, which capture the entire model, indicate significant relationship with sales, income and expenditure at 1% significance level, and with PBT and PAT at 10% significance level. Therefore, our studies indicate significant relationship of financial variables with explanatory macroeconomic variables.

The findings of our studies are in agreement with most of the previous research, notably with the works of Brealey (1968), Magee (1974), Lev (1980), Foster (1986), McNamara and Duncan (1995), Zitun et al. (2007), Richard and Olayiwola (2011), Broadstock et al. (2011), and Kung'U (2013). These studies indicated significant relationship of performance of firms with economy and industry.

However, while studying the impact of macroeconomic variables on the performance of manufacturing sector in Nigeria, Odior (2013) observed that, though loan, advances and foreign direct investment have significant influence, supply of broad money has insignificant impact. Cliff and Willy (2014) observed that foreign exchange, interest rate and inflation have significant effect in manufacturing sector of Kenya, but

Table 18
Augmented Dickey Fuller Test With Level Data

FV	*Test Critical Values*			
	1% level	*5% level*	*10% level*	*t-Statistic*
FV01	-4.468	-3.645	-3.261	-2.659
FV02	-4.468	-3.645	-3.261	-2.623
FV03	-4.468	-3.645	-3.261	-2.858
FV04	-4.468	-3.645	-3.261	-0.652
FV05	-4.468	-3.645	-3.261	-0.647

Table 19
Regression Output with Differenced Data - I

FV	*Model Summary*		*ANOVA*		*Standardized Coefficients*		
	R^2	*D-W*	*F*	*Beta 1*	*t*	*Beta 2*	*T*
FV01	0.411	2.368	6.284	1.551	2.674	1.053	1.815
FV02	0.429	2.364	6.761	1.595	2.791	1.089	1.906
FV03	0.401	2.308	6.014	1.549	2.646	1.063	1.815
FV04	0.242	2.222	2.879	1.288	1.957	0.939	1.426
FV05	0.248	2.096	2.964	1.331	2.029	0.989	1.508

change in GDP has not much significant impact. This insignificance of GDP may be due to sharp decline in Kenyan economy in 2008 due to severe post-election violence and erratic movement of GDP growth due to changed political scenario. The research on the influence of macroeconomic variables on performance of SMEs of Lithuania by Bekeris (2012) and of SMEs of Pakistan by Sherazi et al. (2013) did not support our findings. Except interbank interest changes and unemployment, no other macroeconomic variable had any influence on performance of SMEs. This may be due to the fact that by definition SMEs are small in size, i.e., small capital base, small volume of production, labour intensive with low technology, where specific localized government support may be more relevant than monetary policy and fiscal policy of the country as a whole.

It is further observed that coefficient of determination R^2 values are 0.41, 0.43 and 0.40 for sales, income and expenditure respectively, whereas for PBT and PAT, R^2 values are 0.24 and 0.25 respectively. This implies that 41% of variability of sales, 43% of income, 40% of expenditure, 24% of PBT and 25% of PAT can be explained by the variability of explanatory variables PC1 and PC2. The findings of other previous studies indicate similar results (Brown and Ball, 1967; Brealey, 1968; Lev, 1980; Foster, 1986), though exact coefficient of determinations depended on the selection of specific explanatory and dependent variables by the researchers. About 21% of individual firm's earning variability can be explained by variability of economic factors, whereas industrial factors add 21% variability of earnings more (Brealey, 1968). Brown and Ball (1967) observed that approximately 35 to 40% of the variability of a firms' annual earning in U.S. can be explained by the variability of average earning of the firms and 10 to 15% can be explained by industry average.

In his seminal work, Lev (1980) observed that economy and industry-wide factors explain about 45 to 55% of individual firms' earning variability in U.S. GNP explains about 65% of sales variability and 50% of net operating income variability with level data. The low D-W statistics indicate significant positive autocorrelation of the regression residuals overstating the estimated R^2. Models based on first difference were attempted to remove autocorrelation of residuals, which substantially reduced the R^2 values, viz. 20% to net income (Lev, 1980). In another classic work, Foster (1986) found that an economy-wide index explained for about 27% of individuals firms' earning variability while an industry index explained an additional 18% variability in U.S. Our research findings of explanation of 43% income variability and 25% profit variability by economy in India are very close to the findings of outstanding research works of Lev (1980) and Foster (1986) in U.S.

Long back, a thorough study was conducted by King (1966) in stock market, which revealed that for the period 1952-60 stock market index explained 31% of individual stock variability and industry factors accounted for additional 12% of return variability. Schmalensee (1985) observed that around 20% of the variance in business unit profitability is related to industry or share effects in U.S. manufacturing sector. Market share and industry effects have negative correlation. Between 65% to 70% of variability of return of assets, can be explained by variability of macro-economic variables in Australia (McNamara and Duncan, 1995). Industry directly accounts for 19% of aggregate variation in business-specific profits and 36% of explained variation in U.S. public corporation (McGahan and Porter, 1997). Boldeanu and Pugna (2014) observed that approximately 50% of the variability of dependent variable ROE can be explained by variability of macroeconomic variables in EU. Six out of Nine variables are significant.

Some research work indicated very high coefficient of determination (R^2), which may be spurious due to serial correlation of the residuals. In his empirical work, Odior (2013) found that 99% of variations in manufacturing productivity are accounted for by the changes in exchange rate, consumer price index, interest rate, credit, board money supply and foreign direct investment. However, this result cannot be accepted since both DW and BG test indicated serial autocorrelation of the error terms. In another study Kung'U (2013) found that his model yields R^2 measure of 0.728 which indicates that around 73% of the variability of ROI can be explained by variability of macroeconomic variables in private equity firms in Kenya. The coefficient may be on higher side, since DW Test indicated presence of autocorrelation among the residuals. While examining profitability in manufacturing sector Cliff and Willy (2014) observed that his overall model is significant. The R^2 value implies that 83% of change in profitability in manufacturing sector can be explained by variability of macroeconomic factors in Kenya. This R^2 value is greater than what we found out in our study or in the study by Lev (1980) and Foster (1986) in their works. This deviation can be explained by the fact that our sample contained companies from four separate industries having their own characteristics and complexities, leading to less homogenous data base compared to that of Cliff and Willy (2014), whose research focused on manufacturing sector only.

In banking sector, Clair (2004) observed that around 67% of the changes in the banks' aggregate financial performance can be explained by changes in macroeconomic environment in Singapore. Again this figure is high, compared to our findings, due to the fact that data from banking sector are more uniform and homogeneous compared to our sample.

In his seminal work, Pilinkus (2010), found that selected macroeconomic variables explain 36% to 40% fluctuation in stock market index in Lithuania, Latvia and Estonia of Baltic States. This data is

comparable with explanation of around 40% fluctuations of income of companies by macroeconomic variables observed in our studies.

The AIC, SIC and HQC values indicate good fitness and, the extremely low values of MD, CD and CLV indicate that the sample is unbiased and no single case has any influence on the regression analysis.

The D-W values for the variables indicate 'no autocorrelation' among the residuals of regression. Therefore, the coefficient of determination R^2, obtained are not spurious, and non-autocorrelation in the residuals indicate correct estimates of standard errors and valid statistical inference for the coefficient of the equation. The serial correlation test result cannot reject the null hypothesis of no serial correlation and indicates that there is no serial correlation among the residuals.

The residuals of sales, total income and total expenditure have right skewed distribution i.e. distribution of residuals are positively skewed and all other are negatively skewed. Residuals of all variables are leptokurtic and have normal distribution. Results of BPT, HT, GT & WT indicate that null hypothesis of 'no heteroskedasticity' cannot be rejected i.e., residuals of all variables have homoskedasticity. However, AT indicates that residuals of variables sales, total income and total expenditure have heteroskedasticity.

Results of CBPT cannot reject the null hypothesis of 'no break' at specified break point for all variables. However, CFT rejects the null hypothesis of 'no break' at specified breakpoint. Therefore, Chow Breakpoint Test and Chow Forecast Test give contradictory results for testing of stability, which is not

Table 20
Regression Output With Differenced Data - II

FV	*Mahal. Distance*				*Cook's Distance*				*Centered Leverage Value*			
	Min	*Max*	*Mean*	*S.D*	*Min*	*Max*	*Mean*	*S.D*	*Min*	*Max*	*Mean*	*S.D*
FV01	0.024	5.028	1.905	1.563	0.000	0.453	0.063	0.114	0.001	0.251	0.095	0.078
FV02	0.024	5.028	1.905	1.563	0.000	0.491	0.066	0.122	0.001	0.251	0.095	0.078
FV03	0.024	5.028	1.905	1.563	0.000	0.434	0.061	0.108	0.001	0.251	0.095	0.078
FV04	0.024	5.028	1.905	1.563	0.000	0.208	0.038	0.057	0.001	0.251	0.095	0.078
FV05	0.024	5.028	1.905	1.563	0.000	0.199	0.037	0.055	0.001	0.251	0.095	0.078

Table 21
Residual Analysis of With Differenced Data - I
(Normality, Serial Correlation & Stability Test)

	Normality Test		*Serial Correlation LM Test*			*Chow Break Point Test*		*Chow Forecast Test*		
	Skewness	*Kurtosis*	*Jarque-Bera*	*F-Stat*	*Obs. R Sor*	*F-Stat*	*LL Ratio*	*Wald Stat.*	*F-Stat*	*Likelihood Ratio*
FV01	0.545	3.053	1.041	1.278	2.892	1.392	5.156	4.175	18.518	71.495
FV02	0.522	3.058	0.956	1.011	2.357	1.393	5.160	4.178	17.524	70.376
FV03	0.601	3.005	1.263	1.147	2.634	1.230	4.620	3.691	20.032	73.093
FV04	-0.205	4.142	1.289	0.302	0.763	0.183	0.756	0.550	21.974	74.978
FV05	-0.019	4.074	1.010	0.147	0.379	0.390	1.576	1.169	20.089	73.151

uncommon due to difference in computational methodologies for the tests. However, Chow Breakpoint Test is more robust and in the event of contradiction the results of Chow Breakpoint Test are accepted (Chow, 1983; Maddala and Lahiri, 2009). Therefore, it is concluded that no break exists at specified break point, i.e., in the year 2003.The ADF Test results with differenced data reject the null hypothesis for explanatory variables PC1 and PC2 and all financial variables, i.e., all variables represent stationary time series after transformation of level data to first differenced data.

The limited information available from previous work support the findings of our study. The F statistic of BG serial correlation test indicates no serial correlation (Cliff and Willy, 2014). The F statistic indicates no heteroskedasticity (Cliff and Willy, 2014). BPGT and WT for heteroskedasticity indicated heterogeneous disturbance with level data (McNamara and Duncan, 1995). Chow break point test employed to ascertain the significant structural changes in industrial sector in Nigeria revealed mixed result based on two validating criteria. The first criteria, F-statistic results revealed that there exist no significant structural changes in the industrial sector performance as a result of the macroeconomic shocks before and during the crisis, while the Log likelihood ratio result revealed the presence of structural break (Richard and Olayiwola, 2011). From the ADF test statistics it is observed that all variables were statistically significant at 1%, 5% and 10% critical values in first difference i.e., all variables were non-stationary at level but became stationary at first difference (Odior, 2013). Therefore, most of our findings are supported by the observations of previous research works.

Table 22
Residual Analysis With Differenced Data - II
(Heteroskedasticity test)

	Breusch - Pagan - Godfrey Test			*Harvey Test*			*Glejser Test*			*ARCH Test*		*WHITE Test*		
	F-Stat	*Obs. R Sor*	*S.E.SS*	*F-Stat*	*Obs. R Sor*	*S.E.SS*	*F-Stat*	*Obs. R Sor*	*S.E.SS*	*F-Stat*	*Obs. R Sor*	*F-Stat*	*Obs. R Sor*	*S.E.SS*
FV01	2.622	4.738	3.574	1.382	2.795	4.546	3.560	5.952	6.643	23.541	11.334	1.197	5.991	4.519
FV02	2.622	5.033	3.805	2.067	3.923	6.096	3.635	6.042	6.823	21.313	10.843	1.293	6.324	4.781
FV03	2.622	4.524	3.332	2.202	4.128	7.085	3.482	5.859	6.578	19.799	10.476	1.171	5.894	4.341
FV04	2.622	0.117	0.135	1.093	2.275	2.163	0.284	0.643	0.788	0.194	0.213	0.771	4.295	4.958
FV05	2.622	0.046	0.052	0.296	0.668	0.797	0.124	0.285	0.352	0.167	0.183	0.739	4.152	4.687

Table 23
Augmented Dickey Fuller Test with Differenced Data

FV	*Test Critical Values*			
	1% level	*5% level*	*10% level*	*t-Statistic*
FV01	-4.572	-3.691	-3.287	-4.917
FV02	-4.498	-3.658	-3.269	-4.336
FV03	-4.498	-3.658	-3.269	-4.283
FV04	-4.498	-3.658	-3.269	-6.057
FV05	-4.498	-3.658	-3.269	-5.558

CONCLUSION & IMPLICATION

Five financial variables viz., sales, total income, total expenditure, PBT & PAT indicate significant relationship with explanatory variables with differenced data and thereby reject the null hypothesis of "Zero Regression Slope". The residuals have normal distribution and no autocorrelation or serial correlation among themselves. There is generally no heteroskedasticity and "No break" in the series and the series are stable. The time series are also stationary. Therefore, the results of multiple regression are acceptable. The coefficient of determination indicate that 40% to 43% variation of sales, total income & total expenditure and 24% to 25% variation of PBT and PAT can be explained by variation of explanatory variables. Remaining portion of the variability may be explained by external factors not considered here and /or internal factors of the companies.

The findings of this research work are unambiguous and in conformity with limited similar studies conducted in the past and theoretical framework. Economy do influence the performance of companies, and impact is more on the sales and income, compared to PBT and PAT. Therefore, the concern for the CEOs and CFOs of the companies regarding the impact on performance of their companies by the externalities are well appreciated. However, they must realize that only a portion of their sales, income and profit are affected due to economy and they cannot put blame for the poor performance of their companies, if any, entirely on economy.

Another important observation is that the results obtained in our studies are supported by most of the previous works conducted at different corners of the world, which includes empirical research at U.S., EU, Australia, Singapore, Baltic States, Romania, Holland, Czech Republic, Jordan, Kenya, Nigeria and Pakistan. From the universal congruence of results, it can be inferred that, the theoretical framework of influence of economy on financial performance of firms, is corroborated empirically.

The outcome of the study has many important implications. Policy makers shall form the fiscal policy, monetary policy etc. in such a way that there is economic growth, which will generate demand and improve the performance of the companies. Based on previous trend and Government policy, the macroeconomic variables can be projected for future period and based on the regression equation found out by this studies, sales and profit of the companies can be projected to get a broad idea and accordingly corporate plan & strategy of the companies can be formulated.

While doing financial restructuring, business acquisition, merger etc. financial analysts normally study sales, profits etc. of the concerned companies over the years before and after the merger, acquisition etc. to find out effectiveness of merger, restructuring etc., without considering much, the movement of economy during that contemporary period. Due to growth of economy, there may be growth of companies, which have undergone merger, restructuring etc., which cannot be attributed purely to the achievement of synergy through merger. Based on the findings of the studies, analysts can try to insulate the economy to the extent possible, while making the financial analysis. The outcome of the studies, if applied properly, can help to resolve and refine many such financial econometric issues. However, one limitation of our study is that we have not considered service sector in our empirical research. This sector being fast growing in Indian context, it will be interesting to know whether service sector also corroborates the results achieved in our studies. Therefore, good scope for research relics ahead.

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