

## Economic Exposure of Stock Returns in an Emerging Stock Market

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**Abstract:** The objective of the study is to examine the stock returns variation to specific economic variables by applying multi-factor model developed under Arbitrage Pricing Theory. The variables in the model are descriptive of the market and economic conditions of the country. The study attempts to determine which, if any, of the variables are of use in explaining the variability of stock returns of Pakistani Industries. These industries were selected on the basis of data availability, profitability and performance on the Karachi Stock Exchange 100 index. The data for the selected industries and economic variables obtained for the period of 10 years. GARCH technique used to analyze the risk and return relationship and to ascertain the usefulness of multifactor model over single factor model in explaining the variation in stock returns of Pakistani Industries. The results reveal that market return is largely responsible for the stock returns variation; however the inclusion of other macroeconomic variables has added additional explanatory power in describing the stock returns variation. Results also indicate that stock returns of different industries respond differently in similar economic conditions that acquaint investors about the risk diversification opportunity in the stock market.

**Key words:** Economic factors • Stock returns • Multifactor model • Stock exchange

### INTRODUCTION

There is a long history about the determinants of stock returns in the empirical capital market literature which suggests that different variables are potentially important in explaining the variations in stock returns beyond a single market factor. Two theories are very important and common in explaining the stock returns, one is called Capital Asset Pricing Model (CAPM) and the other is known as Arbitrage Pricing Theory (APT). Now it is quite evident from the literature that CAPM cannot fully explain the returns of investment opportunities and we need certain other factors to describe the variation in returns. A well known alternative to a single risk based model is the multifactor approach. Multifactor models have increased the understanding of variation in returns by considering diverse industry and market related factors [1]. These models attempt to answer the questions whether the market return is the only factor that explains stock return variations and the question then is: what extra-market factors should be considered as likely candidates when investigating stock returns volatility? According to multi factor model the stock returns are based upon numerous factors. These factors include market return as well as other different factors,

which are grouped into industry-wide factors and economic factors. The industry-wide factors may be different for different industries. These models are based on the assumption that the stock returns are generated by a limited number of economic variables or factors [2].

There exist some narrower investigations in literature which focus on specific economic conditions. One such case is that of the mining sector by Ball and Brown [3] who find that mining stocks in the Australian equity market exhibited anomalous stock return behavior. Specifically, they uncover that mining companies are considerably riskier than industrial companies without earning a corresponding risk premium. One way of further investigating this phenomenon is to take an industry-based perspective, that is, to examine separately key industries within the economic sector. Faff and Chan [4] apply a multifactor model consisted of the market factor, gold prices, interest rates and exchange rates on stock returns of Australian gold industry over the period of 1979 to 1992. They find that market factor and gold prices are the factors that describe significant variations in stock returns. Recently there is also a realization about the worth of using conditional means and variance in financial data in econometric analysis of financial markets as Merton [5] argues that researchers should consider

heteroskedasticity when forecasting expected returns. Since risk-averse investors need to forecast asset returns and their volatility over the period of investment. Literature reveals that the class of generalized auto regressive conditional heteroskedasticity (GARCH) models [6, 7] successfully captures asset returns and volatility by allowing the means of asset returns to based on their time-varying variance and other contributory factors.

The capital market literature on developed economies has provoked to analyze the recent economic and stock market developments in Pakistan. As Stock Market in Pakistan has been undergoing a profound transformation and has become a productive place for domestic and foreign investors. The steps taken by the policymakers have helped in building up the faith of investors and stock market has shown impressive performance and large trading activities in recent years. The Karachi Stock Exchange (KSE 100 Index) is one of the most liquid exchanges of the world in mid years of this decade. The KSE 100 Index which was hovering around mere 1,000 points in late 90s now has jumped over 12,000 points in year 2008 [8]. Moreover, the market capitalization has gone up to manifold along with a number of listed companies and listed capital in recent years. All these facts emphasize on the importance of Pakistani capital market and thus it becomes a very lucrative investment opportunity for investors. Pakistan Economy has also shown positive growth as economic indicators have grown up during the period under review because of some earnest steps taken by the government. The policies on privatization, liberalization and deregulation have encouraged private investments which also has a profound effect on the economic activities in the country. Corporate earnings and growth opportunities, particularly in the telecommunication, banking and financial sectors, have been excellent, prompting foreign investors to expand their activities in these sectors [9].

The economy has shown great resilience in front of adverse internal factors like political tensions, law and order situation, water shortage and earthquake and external developments like food and energy crisis, international financial crisis and 9/11 attacks. These unwelcome shocks of high intensity have threatened the economic stability of the country on one side; but on the other side they have provided growth opportunities as well. Since Pakistan has received a lot of financial aid after 9/11 attacks along with foreign direct investment (FDI) especially in Banking, Oil & Gas, Telecommunication, Automobile and Education sectors. Enhanced FDI and

financial aid have relaxed many constraints to the economy and have contributed in the improvement of various economic indicators for the last several years. Communication, Food & Beverage, Oil & Gas and Financial sectors are some of the major recipient of foreign direct investment in Pakistan. These sectors have performed exceptionally and achieved extraordinary growth during last 8-10 years. The increasing FDI is an indication of growing confidence of foreign investors in the long term prospects of Pakistan economy. However, rising political tension, deteriorating law and order situation, increasing power shortage, monetary tightening and growing operating costs of business are critical issues of the average manufacturing performance in the later part of this decade as compared to initial years where the growth was extraordinary. Therefore, manufacturing growth exhibits a moderating trend in recent years. Pharmaceutical, Engineering Products, Sugar, Cement, Automobiles and Fertilizers industries are among the growing industries of the manufacturing sector. Whereas Textile, Tobacco and Electronics industries have shown consistent growth initially and then afterwards there is a downturn in growth for these industries. The Textile Industry is confronted with problems both at local and international level, especially the ramifications of increasing cost of input. Despite of all those reasons manufacturing sector has performed satisfactory over the last decade [8].

Until recently, Pakistan has enjoyed the rapid economic growth accompanied by the historical performance by the stock market. But the international financial crisis that has emerged during the later part of year 2007 is now knocking the door of our economy which has already started tumbling. Macroeconomic indicators are already exhibiting signs of deterioration as Rupee is depreciating against dollar, inflation is mounting, interest rates are increasing and industrial production is started to decline. The economic indicators and stock market which were growing side by side for last 8-10 years now both had started declining. This is an implicated situation for the researchers and academicians inviting them to investigate the inference of economic growth in the stock market development. More specifically the interrelationship of economic variables and stock market performance of different industries should be analyzed to devise an economic policy to sustain the economic growth in the country. This study contributes to the existing literature by analyzing the effect of economic variables on stock returns in an emerging Asian market which has a distinct structure and institutional

characteristics from developed stock markets. Moreover, this study provides a sectoral measurement of stock returns variation caused by various economic factors at the industry level.

**Literature Review:** It is evident from the literature that the relationship between stock returns and economic variables have received great attention over recent years in specific countries and economic conditions. The amount of return achieved or expected from an investment is contingent on a variety of factors. Capital Asset Pricing Model, the single index model developed by Sharpe [10], was a primary method used to ascertain risk and return related to a certain security. This was the principal feature as well as the basic shortcoming of this model that it was using just the market return as a single factor to determine security return. This problem had led to an alternate model to describe the stock returns variation called the Arbitrage Pricing Theory. Multi-factor asset pricing models were usually based on the premise that stock returns were influenced directly or indirectly by a number of different economic factors. Financial information and macroeconomic variables could predict a notable portion of stock returns as Gertler and Grinols [11] investigated the relationship between unemployment, inflation and common stock returns. The sample period of the study was Jan 1970 to Jan 1980 related to monthly returns of 712 companies listed on the New York Stock Exchange. The results of the study showed that there was a statistical relationship between expected security returns and the macroeconomic factors. The addition of two variables i.e., unemployment and inflation to the standard two factor model of security returns improved the explanatory power of the regression significantly.

Bower *et al.* [13] used APT to describe variation in utility stock returns, the study presented some additional evidence that APT might lead to different and better estimates of expected returns than the CAPM. On the basis of monthly portfolio stock returns from 1971 to 1979, they concluded that policymakers should not bank on the single factor risk approach of the CAPM as principle measure of the risk, but should give greater importance to APT, whose multiple factors provided a stronger indication of asset risk and estimate of expected return. Similarly Chen *et al.* [13] applied an APT model to assess the significance of different factors in explaining security returns. They used the monthly data for the period of 1953-1983; the results specified that the following factors were crucial in explaining the variability of a security return: spread between long and short

interest rates, expected and unexpected inflation, industrial production and the spread between returns on high- and low-grade bonds. Chen [14] improved the framework for analyzing stock returns and macroeconomic factors like lagged production growth rate, the default risk premium, the term premium, the short-term interest rates and the market dividend-price ratio by using the data for the period 1954-1986. He argued that these variables were key indicators of current economic growth, which was in turn negatively correlated with the market excess return. Flannery and James [15] investigated the effect of interest rate changes for a sample of 67 banks in the United States and they found empirical evidence that there existed a significant relationship between the sensitivity of the stock returns to interest rate changes and the asset-liability (maturity) structure of the bank. Pari and Chen [16] conducted a study on 2090 firms for the period 1975 to 1980 using APT model and their findings suggested that price volatility of energy, interest rate risk and market index had an influence over stock returns. A study investigated the relationship of stock returns, inflation and real activity. The results suggested that there was an inverse relation between real stock returns and inflation in Canada [17]. Luehrman [18] evaluated the influence of exchange rate changes in the values of two industries i.e., automobile and steel industries. He found that the depreciation of home currency causing adverse impact on the value of both industries. Bodnar and Gentry [19] also studied the relationship between exchange rate and industry portfolio returns over the period of 1979 and 1988 for Canada, Japan and US. They found that the exchange rate was important for explaining industry returns for each country and also detailed exchange rate exposure as a function of industry characteristics. Understanding the linkage between macroeconomic variables and financial markets had long been a goal of financial economics. One of the reasons for the interest in this linkage was the expected excess returns on common stocks appeared to vary with the business cycle. The question of whether expected returns varied at cyclic frequencies and with macroeconomic variables was pertinent to the debate. However it was expected that key macroeconomic variables should play an imperative role in describing excess stock returns. Many studies found a significant relationship between U.S. Stock returns and economic variables like industrial production, gross national product, inflation, money supply and interest rates [20, 21, 13]. Sill [24] recognized that U.S. stock market excess returns were significantly explained by the factors like industrial production, Treasury bill rates and inflation.

Similarly Madura and Zarruk [23] examined the sensitivity of banks stock returns to interest rate movements. Their sample was consisted of 29 banks of British, Canada, Japan, German and U.S. and data period was from Jan 1988 to Apr 1993. They found that interest rate risk varied among countries, which they partly attributed to the difference in country specific bank regulations and managerial traditions. Several other studies also confirmed that factors other than the market do explain the variability of stock returns that was multi-factor model and it was a superior tool in explaining the variability of stock returns. Capital market researchers were always keen about stock returns volatility as Errunza and Hogan [24] documented the macroeconomic determinants of European stock market volatility. They found that the time variation in the stock market volatility was significantly affected by the past variability of either monetary or real macroeconomic factors. Furthermore, increased factor variance led to an increase in market return volatility with the effect on market volatility being transitory in all cases lasting for 6 to 8 months. Similarly, Mei and Hu [25] developed a multifactor model to analyze the time variation of real estate stock returns of some Asian countries like Hong Kong, Singapore, Indonesia, Philippines, Malaysia, Japan and Thailand and the USA. Short term interest rates, spread between long and short run interest rates, changes in the exchange rates with the dollar and the dividend yield on the market portfolio were the macroeconomic variables included in the study. The study concluded that the risk premium of Asian property stocks varied considerably and significantly affected by macroeconomic risk factors. Oermann *et al.* [26] investigated the effect of domestic and international interest rates on European financial corporations' equity returns. For the period from Jan 1982 to Mar 1995 they developed multifactor models to explore the susceptibility of equity returns to market index returns and interest rate movements. They concluded that in all countries, the stock returns of financial corporations were negatively affected by unexpected changes in interest rates. The idea of a higher interest sensitivity of bank stock returns compared to industrial firms was also empirically supported by Bessler and Booth [27] who compared U.S. and German banks and by Bessler and Murtagh [28] who analyzed banks and non-banks for different countries.

On the other hand, Spyrou [29] studied the relationship between stock returns and inflation for the emerging economy of Greece during the 1990s. The results of the study suggested a significant negative relationship between stock returns and inflation for the

period up to 1995, where as the relationship was insignificant for the remaining period. Fang and Miller [30] applied a bivariate GARCH-M model to examine empirically the effects of daily currency depreciation on the stock market returns during the Asian financial crisis for five newly emerging East Asian stock markets. The results showed that the conditional variances of stock market returns and depreciation rates exhibited time-varying characteristics for all countries. Domestic currency depreciation and its uncertainty adversely affected the stock market returns across all countries. To study the impact of exchange rate and interest rate changes on stock returns was an important contribution towards capital market research as Joseph [31] studied the effect of foreign exchange rate and interest rate changes on UK firms in the chemical, electrical, engineering and pharmaceutical industries for the period of 1988 to 2000. The results revealed that industry returns were more negatively affected by interest rate changes than by foreign exchange rate changes. The adverse effects of interest rate changes and foreign exchange rate changes appeared more pronounced for the electrical and engineering sectors whereas these effects were positive for the pharmaceutical industry. Additionally, the results at the portfolio-level were generally similar with those based on the firm-level analysis, except that the short term foreign exchange rate effect was very thin at the portfolio level. Overall, the results at the individual firm level implied that the impact of foreign exchange rate and interest rate changes had negative effects on stock returns.

Liow [32] examined the time variation of Singapore real estate excess stock returns by using five macroeconomic factors. He found that the expected risk premium on real estate stock were both time varying and related to time varying conditional volatilities of these macroeconomic variables. El-Masry [33] extended research on the foreign exchange rate exposure of UK non-financial companies at the industry level over the period of 1981 to 2001. The study differed from earlier studies in a way that it considered the effect of the changes (actual and unexpected) in exchange rates on firms' or industries' stock returns. The findings indicated that a higher percentage of UK industries were exposed to exchange rate changes than those documented in earlier studies. The results of the study had interesting implications for public policy makers who wished to understand links between policies that influence exchange rates and relative wealth affects. Joseph and Vezos [34] investigated the impact of interest rates and foreign

exchange rates changes on US bank's stock returns. The study employed an EGARCH model to consider the ARCH effects in daily returns. The results suggested that the market return accounted for most of the variation in stock returns at both the individual bank and portfolio levels; and the degree of the sensitivity of the stock returns to interest rate and exchange rate changes was not very pronounced despite the use of high frequency data. The study contributed to existing knowledge in the area by showing that ARCH effects had an impact on measures of sensitivity. Whereas Liow *et al.* [35] employed a three step estimation strategy including GARCH (1,1) estimates to analyze the relationship between property stock market returns and some major macroeconomic risk factors such as GDP Growth, unexpected inflation, industrial production growth, money supply, exchange rate and interest rate for some major markets namely Singapore, Japan, Hong Kong and UK. Macroeconomic risk was measured by the conditional volatility of macroeconomic variables. They found that the expected risk premium and the conditional volatilities of the risk premium on property stocks were time varying and dynamically linked to the conditional volatilities of the macroeconomic risk factors. However, the significance of the impact of macroeconomic risk factors was different across the property stock marts.

Gunsel and Cukur [36] used monthly data for the period of 1980-1993 to investigate the performance of the APT in London Stock Exchange. They selected seven macroeconomic variables, five among those were similar to the factors derived by Chen, Roll and Ross; term structure of interest rate, the risk premium, the exchange rate, the money supply and unanticipated inflation and added two industry specific variables, such as sectoral dividend yield and sectoral unexpected production. The results indicated that macroeconomic variables had a significant effect on the UK stock exchange market. However, each factor might affect different industry in different manner i.e., a macroeconomic factor might affect one industry positively and the other industry negatively. Hyde [37] conducted a study at the industry level to explore the responsiveness of stock returns to market, interest rate and exchange rate shocks in the four major European economies: France, Germany, Italy and the UK. While the market exposure was the most significant factor; the study found that significant levels of exposure to exchange rate risk in industries in all four markets. Interest rate risk was significant only in Germany and France. Likewise, Samimi *et al.* [38] reviewed macroeconomic sources of market risk in Iran using

multivariate GARCH model. The results showed that macroeconomic variables had significant effects on equity market risk premium in Iran. However, the review of literature reveals that there has been no well-known study of the intensity and orientation of interaction between stock returns and key economic variables in Pakistan at the industry level. This study contributes to the existing literature by analyzing the cross sectoral impact of economic variables on stock returns in an emerging Asian market. The outcomes of this study can be valuable to understand the interaction of economic variables and returns so that an effective economic and financial policy can be devised to improve both economic and stock market condition in the country that is started to decline after an impressive performance during the previous decade.

## MATERIALS AND METHODS

**Data:** The 09 industries selected for this study are the top performers at KSE 100 index. These are Banking, Pharmaceutical, Cement, Fertilizer, Automobile, Textile, Tobacco, Ghee & Oil and Petroleum industries. This study measures the variability of stock returns to economic variables like Market Index (KSE 100 Index), Consumer Price Index (CPI), Risk Free Rate (RFR), Exchange Rate (Ex Rate), Industrial Production (IP), Money Supply (M2) and individual industrial production. KSE 100 Index is the measure of market return; CPI is a measure of inflation, RFR represent the yield on 6 month Treasury bills and a measure of interest rate and the Rupees/dollar exchange rate as a measure of the foreign exchange rate. Industrial Production Index and individual industrial production are the measures of real output. Money supply to the economy is measured by M2. The data for closing monthly stock prices and the KSE 100 index was obtained from the websites of Karachi Stock Exchange and Business Recorder's website. The data for economic variables was obtained from Federal Bureau of Statistics, State Bank of Pakistan and various editions of Economic Survey of Pakistan. The data for all the variables was monthly; the choice of monthly data was constrained by the fact that the most of the economic variables under study were available at monthly intervals. Moreover, Pakistani Industry consisted of private firms and privatized firms (formerly nationalized). The data for most of the firms was not available before 1998 because most of the firms either established or privatized and subsequently enlisted at Karachi Stock Exchange after

that date. So including data before Jul 1998 would not been feasible and therefore, the whole research was reduced to a maximum of 120 months i.e., from Jul 1998 to Jun 2008.

**Procedure:** After getting monthly closing prices, returns were calculated for all variables in order to find out the relationship between growth in economic variables and stock returns. This also helped in eliminating the problems related to non stationary variables. The industry returns were calculated as an equally weighted average of the returns of the all firms of each industry. The model, which was used, consisted of monthly observations of seven independent variables, starting from Jul 1998 to Jun 2008. The independent variables selected were descriptive of the market and economic conditions of the country. The independent variables were described in some details below along with the Multi Index Model to be tested.

$$K_{it} = b_0 + b_1 KSE_t + b_2 CPI_t + b_3 RFR_t + b_4 IP_t + b_5 ExR_t + b_6 M2_t + b_7 IIP_t + \epsilon_{it} \quad (1)$$

The dependent variable  $K_{it}$  represents the monthly stock returns of the industry  $i$ , for month  $t$ . The  $b_i$  measures the sensitivity of industry stock returns to each independent variable. There were seven independent variables, which were to be tested. Six of them were macro economic variables, Market Return (KSE), change in Consumer Price Index (CPI), Risk Free Rate of Return (RFR), growth in Industrial Production (IP), change in Exchange Rate (ExR) and growth in Money Supply (M2) and the IIP was industry specific variable that measured growth in industrial production of an individual industry.

**Statistical Tests:** The analytical framework in this study, to examine the relationship between stock returns and economic variables is the Arbitrage Pricing Theory. The analytical framework was directed theoretically by a multifactor model implied under APT. The selection of variables for multifactor model in this study was based on the evidence available in the empirical literature. The analytical framework of the study suggested three steps in the analysis. As a first step descriptive analysis were performed to find out the temporal properties of the data in terms of mean, standard deviation, skewness and kurtosis of each variable. In the second stage variables were tested for unit root to establish the order of integration by employing Augmented Dickey Fuller Statistics developed by Dickey and Fuller [39]. ADF test was applied on all variables at their first difference.

Once the order of integration was established for each variable, the next step was to evaluate the impact of economic variables on stock returns. The descriptive statistics of the variables under study displayed different degree of skewness and kurtosis being time series as conveyed by the financial literature. The combination of skewness and kurtosis for the variables would then contribute to different volatilities across all industries. Consequently the hypothesis that the stock returns and macroeconomic returns were normally distributed may not be validated. These characteristics implied that the stock returns and economic time series exhibited conditional heteroskedasticity and that a GARCH specification was appropriate for capturing the presence of time-varying volatility. GARCH technique was used to determine which of the independent variables had a significant impact on dependent variable i.e., stock return. Analyses were carried out separately by using stock returns of each of the industry' returns as the dependent variable.

## RESULTS

The objective of the study is to analyze the impact of economic factors on the stock returns at industry level. This section delineates the results of the analytical process applied in this study and also demarcates the discussion on results/findings of the study in the light of previous researches where practical implications are drawn on the basis of risk and return relationship ascertained.

The results of ADF Test applied on all variables under study describe that all data series are stationary at their first difference, hence rejecting the null hypothesis of unit root. The values of descriptive test indicate that variables are both positively and negatively skewed but are leptokurtic with higher than normal kurtosis. The results reveal that the values of skewness for all series are not significantly different from zero hence data series are not seriously departing from normality. Moreover the descriptive statistics of the variables display different degrees of skewness and kurtosis and contribute to different volatilities across all industries. Consequently the hypothesis that the stock returns and macroeconomic returns were normally distributed may not be validated. These characteristics implied that the stock returns and economic time series exhibit conditional heteroskedasticity and that a GARCH specification is appropriate for capturing the presence of time-varying volatility.

Table 1: Results of GARCH Model

Dependent Variable	Constant	KSE	CPI	RFR	IPI	Exrate	M2	IPI-Ind	Constant	ARCH	GARCH	R2	F-Stat	p-value
ΔPetroleum Industry	0.0036	0.7906*	0.2675	0.0725	0.0198	-0.6390	-0.2982	0.0247	0.0003	-0.0838*	1.0242*	0.5919	15.8071	0.0000
ΔPharma Industry	0.0148	0.3068*	-0.3598	-0.0438	-0.0405	-0.3833	-0.0934	0.1659*	0.0055	-0.1555*	0.0986	0.2502	3.6365	0.0003
ΔGhee & Oil Industry	-0.0024	0.1009	0.5848	-0.0799	-0.0490	-0.8565*	1.0232*	0.0019	0.0000	0.3075*	0.7655*	0.1088	1.3308	0.2232
ΔAutomobile Industry	0.0104	0.5701*	0.4296	-0.1223*	-0.0513	-0.9187	-0.6550	0.0145	0.0011	-0.0850	0.7910*	0.4653	9.4865	0.0000
ΔCement Industry	-0.0135	0.8707*	0.6659	-0.0231	-0.0212	0.1888	0.2028	0.0463	0.0004	-0.0851*	1.0380*	0.4969	10.7659	0.0000
ΔTobacco Industry	0.0050	0.1263	0.3579	0.1624**	-0.1655*	-1.1699	0.4956	0.0999*	0.0073	1.1572*	0.0518*	0.0370	0.2865	0.9598
ΔFertilizer Fertilizer	-0.0133	0.6751*	1.6769*	-0.0364	0.1373*	-0.0305	0.2512	-0.0287	0.0025	-0.0972	0.2217	0.5739	14.6813	0.0000
ΔTextile Industry	0.0001	0.4447*	-0.7724	-0.0320	-0.0482	1.1656*	0.2720	0.0287	0.0018	0.6255*	0.0362	0.2987	4.6420	0.0000
ΔBanking Industry	0.0178	0.8479*	-2.7864*	0.0646	-0.0690	-0.2161	-0.4874	0.0695	0.0001	-0.0724*	1.0513*	0.6278	18.3862	0.0000

\*\* Significant at the 0.1 level, \* Significant at the 0.05 level

Table 1 reveals the results of GARCH Model with industry returns as dependent variables. The results demonstrate that ARCH (1) term is statistically significant ( $p<.05$ ) and negative for most of the industries except for Ghee & Oil, Tobacco and Textile industries where it is statistically significant and positive whereas GARCH (1) term is positively significant ( $p<.05$ ) for most of the industries. This describes that industry stock returns volatility is a function of both lag of the squared residuals and lag variances. From the table it is also evident that the multifactor models are significant ( $p<.05$ ) for almost all industries other than Ghee & Oil and Tobacco Industries where the models are insignificant ( $p>.05$ ). The models fit the data well and there is a strong relationship between dependent variables and predictors as evident from the values of F-statistics and R2. The independent variables of the model explain substantial variations in the dependent variables except for Ghee & Oil and Tobacco industries. The independent variables when investigated on an individual basis, Market return has significant ( $p<.05$ ) positive relationship with stock returns of almost all industries with exception of Ghee & Oil and Tobacco Industries where the impact is insignificant ( $p>.05$ ). Consumer Price Index variable is insignificant ( $p>.05$ ) and positive for most of the industries however the regression coefficient of CPI is negative for Pharmaceutical, Textile and Banking Industries. Risk Free Rate and Industrial Production Index are insignificant ( $p>.05$ ) and negatively related to stock returns of most of the industries. Exchange Rate is also insignificant ( $p>.05$ ) and negatively related to stock returns of majority of the industries however the relationship is positive for Cement and Textile Industries. Money Supply variable has shown mixed behavior but the relationship is almost insignificant ( $p>.05$ ). Although individual industrial production variable is insignificant ( $p>.05$ ) but it is positively related to stock returns.

## DISCUSSION AND CONCLUSIONS

The effect of economic variables on stock returns of selected industries is empirically analyzed at the industry level. The results of GARCH model demonstrate some diverse behavior of stock returns at industry level. Almost all models have produced significant results except for Ghee & Oil and Tobacco Industries. It is evident from the values of R2 and F-statistics that stock returns of the Banking Industry are more responsive to changes in economic conditions than manufacturing industries like Textile, Ghee & Oil, Pharmaceutical and Tobacco Industries. Similarly macro level or multiuse industries like Petroleum, Automobile, Cement, Fertilizer and Banking Industries have relatively greater values of R2 and F-statistics than micro level or consumer industries like Ghee & Oil and Tobacco Industries since their stock returns are less receptive to changes in economic variables. The idea of a higher sensitivity of bank stock returns compared to industrial firms was empirically supported by Bessler and Booth [27], Oertmann *et al.* [26] and Bessler and Murtagh [28] who analyzed banks and non-banks stock returns for different countries.

ARCH and GARCH terms are statistically significant for most of the industries; this demonstrates the time varying characteristics of stock returns volatility of different industries. Therefore conditional volatility of stock returns is a function of both the estimates of lagged square residuals and lag variances. The time varying characteristics of conditional volatilities of stock returns was early documented by Liow [32] and Liow *et al.* [35]. Market Return is the only variable significant and positively related to stock returns in almost all of the models. This suggests that the market return accounts for most of the variation in stock returns. The results also demonstrate that growth in market return positively influence the stock returns of all the industries.

However the relationship is insignificant for Tobacco and Ghee & Oil Industries. Joseph and Vezos [34], Butt *et al.* [40] and Hyde [37] also identified market exposure as the most significant factor to stock returns. Consumer Price Index is insignificant to stock returns of most of the industries. The regression coefficient of Consumer Price Index is positive for Petroleum, Ghee & Oil, Automobile, Tobacco and Fertilizer Industries whereas it is negative for Pharmaceutical, Textile and Banking Industries. This suggests that rising inflation in the country is adversely affecting the stock returns of some of the major industries. However, stock returns of some industries are less sensitive or positively influenced by increasing prices in the country due to their inelastic nature. The findings of the studies conducted by Cozier and Rahman [17] and Spyrou [29] found an inverse relation between inflation and stock returns. Risk Free Rate is used in this study as a measure of interest rate. The results describe that RFR is negatively related to stock returns of most of the industries though the impact is insignificant whereas regression coefficient of RFR is positive for the stock returns of Petroleum and Banking Industries. Madura and Zarruk [23] and Joseph [31] studied the interest rate sensitivity of stock returns and the results described that stock returns were negatively affected by interest rate changes.

Individual Industrial Production is insignificant but positively related to stock returns of most of the industries except for the Fertilizer Industry where it is negatively related to stock returns. This discloses that growth in the production of a particular industry contributes positively to the stock returns. The Industrial Production Index is positive for the Petroleum and Fertilizer Industries whereas it is negatively related to stock returns of Pharmaceutical, Ghee & Oil, Automobile, Cement, Tobacco, Textile and Banking Industries. The negative relationship between stock returns and real output depicts that investment diverts from the stock market to real activity as a result of its expansion in the economy. Ibrahim and Aziz [41] specified that industrial production had an impact on stock returns. Similarly Sill [22] recognized that the stock market returns were significantly explained by the factors like industrial production, T bill rates and inflation. Exchange Rate is insignificant but negatively related to stock returns of most of the industries except for the Cement and Textile Industries where it is positively related. The continuous depreciation of Pak Rupees against the US\$ is causing a negative effect on stock returns of almost all industries.

The relationship between stock returns and exchange rate was early examined by Luehrman [18], Bodnar and Gentry [19] and Fang and Miller [30] who found that depreciation of home currency caused an adverse effect on stock returns.

Money Supply variable has shown relationship with stock returns in both positive and negative directions; however the relationship is insignificant largely. The stock returns of Ghee & Oil, Cement, Fertilizer and Textile Industries respond positively to Money Expansion in the economy whereas stock returns of Petroleum, Automobile, Pharmaceutical and Banking Industries exhibit negative response to money expansion. Ibrahim and Aziz [41] and Liow *et al.* [35] studied and found a relationship between money supply and stock returns. Although market return accounts for most of the variation in stock returns which is evident from the results of this study, however, inclusion of other macroeconomic and industry related variables has added additional explanatory power in explaining the stock returns variation of different industries. Most of the models produced significant results which is an indication of the fitness of the models. The response of stock returns to changes in economic variables other than the market return is different across the industries and is significant in many models. The usefulness of the multifactor model over single index model was early reported by the studies of Gertler and Grinols [11], Bower *et al.* [12], Pari and Chen [16], Chen *et al.* [13], Cozier and Rahman [17], Chen [14], Faff and Chan [4] and Butt *et al.* [40].

## CONCLUSION

The results of the study provide some insight about the relationship pattern of economic factors and stock returns variation. On the basis of the above results and discussion following conclusion can be drawn:

It is concluded that stock returns behave differently across the industries as stock returns of the financial/service sector (Banking Industry) are more sensitive to changes in economic variables than manufacturing industries (Textile, Ghee & Oil, Automobile and Tobacco Industries). Similarly macro level or multiuse industries stock returns (Petroleum, Automobile, Cement, Fertilizer and Banking Industries) display greater exposure to changes in economic factors than micro level or consumer industries (Pharmaceutical, Ghee & Oil and Tobacco Industries). This might be due to inelastic nature of consumer product industries. The stock returns

volatility depicts time varying characteristics across the industries. Therefore conditional volatility of stock returns is a function of both the estimates of lagged square residuals and lag variances.

It is also concluded that Market Return is the most significant and positively related variable to stock returns and accounts for most of the variation in stock returns. However, consumer product industries like Tobacco, Ghee & Oil and Pharmaceutical Industries are less sensitive to changes in Market Return than macro level or multiuse industries. Rising inflation in the country is adversely affecting the stock returns of the industries. However, stock returns of some industries like Petroleum, Ghee & Oil, Tobacco, Cement and Fertilizer are positively related to Consumer Price Index. It is due to inelastic nature of these industries and is an indication of less sensitivity or positive influence of increasing prices in the country on their stock returns. Risk Free Rate is negatively related to stock returns, so, increase in interest rates in the country is negatively influencing the stock returns. The results also conclude that the growth in the production of a particular industry contributes positively to the stock returns. The negative relationship between stock returns and real output depicts that investment diverts from the stock market to real activity as a result of its expansion in the economy. The depreciation of Pak Rupees against the US\$ cause adverse effect on stock returns except for the Cement and Textile Industries where it influences positively (Rising internal and external demand in recent years for cement and valuable contribution of Textile Industry in country's exports might be the reasons of this exception). Money Supply variable is insignificant to stock returns however stock returns respond both positively and negatively money expansion in the economy.

The results also confirm that although market return accounts for most of the variation in stock returns, the inclusion of other macroeconomic and industry related variables has added additional explanatory power in describing the stock returns variation of different industries. The significant result of the study is an indication of the fitness of the models and provides justification of the inclusion of independent variables in the study. The nature and intensity of the relationship between stock returns and economic variables other than the market return is different across the industries and is significant in many cases. This also documents the usefulness of the multifactor model as compared to a single index model.

**Recommendations and Future Implications:** On the basis of the results of the study and subsequent conclusions, following are some of the recommendations for the stakeholders of the capital market in Pakistan and some suggestions for the further research in this area.

Although stock returns are predominantly influenced by market return at KSE, however other economic factors have also shown some significance so investors must consider these economic indicators while investing at KSE. The positive relationship of industrial production of an individual industry with stock returns is an indication both for the investors and policymakers. So efforts must be made to enhance the industrial production in the country which in turn will contribute towards the stock market growth. It will work as a signal for the investor to make decisions about investment in a particular industry. The value of Pak Rs. against US Dollar is consistently declining over the period which is adversely affecting the stock returns at KSE. Therefore Govt. authorities should take remedial measures to stabilize the currency of the country. It will be a confidence building measure for the investors and will help them to make better decisions based on some accurate forecasting of financial assertions. The expansion in money supply in the economy is affecting the stock returns. So, State Bank of Pakistan should carefully monitor the money supply situation in order to get optimal benefit of this monetary instrument. The rising interest rates in the country depress stock returns and can result in higher cost of debt. This can limit the investment expansion; therefore, Govt should maintain an appropriate rate of interest in the country that will help and motivate investors to grab investment opportunities. Escalating inflation in the country is not only adversely affecting the stock returns; it also results in higher consumption and lower savings among the individuals. The mounting prices of essentials in the country deter availability of resources for investment purposes. The stability of prices is required to encourage investors and to provide them a conducive environment for the investment.

Sectoral analysis of stock market provides better insight about the performance of the market to both investors and the regulators. The results provide an opportunity for risk diversification in Pakistani stock market. Since the stock returns of different industries behave differently in similar economic conditions so investors should analyze the nature of industry before making an investment decision. The results can help investors and portfolio managers in extending their

understanding of the risk return relationship as well as pricing of macroeconomic risk. Moreover, macroeconomic policy can be used as a tool to influence expected risk premium and volatility of stock market returns. The inclusion of individual industrial production in multifactor model has produced some significant results. In the future some other industry related factors like measures of profitability, measures of liquidity and cost of raw material etc. can be considered. The study tests multifactor model for 9 different sectors of the economy and imparts a new avenue for the researchers. This work can be extended by considering other sectors; especially inclusion of more service sectors can provide enhanced comparative results.

In all now Pakistani financial markets are facing competitive pressures and it is extensively required to consolidate and build up the inspiring triumph of the past years. The passage towards a progressive expansion of domestic capital markets is appealing and rewarding. There is a need of strong commitment by the government in improving the financial system of the country. Regulatory authorities should act like a commissioner to oversee the performance of the market and to take appropriate measures for the smooth functioning of the system where it is required. This conduct should be persistent in order to make Pakistan's capital market the best performing market of the region. Moreover, to improve the effectiveness of monetary policy implementation is inevitable for better corporate governance. In this regard clear responsibilities should be allocated to enhance coordination among various regulatory agencies including Ministry of Finance, Securities and Exchange Commission of Pakistan and State Bank of Pakistan.

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