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Full Length Research Paper

Do economic factors influence stock returns? A firm and industry level analysis

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The objective of this study is to examine the stock returns variation to specific economic variables by applying a multi-factor model. The firms relating to banking and textile sectors were selected for this study on the basis of data availability, profitability and performance on the Karachi Stock Exchange. The data for the selected firms and economic variables obtained for the period of 10 years. GARCH model used to analyze risk and returns relationship. The tests applied on the stock returns of each firm and on the data set of the entire industry to generalize the results. The results disclose that market return is mainly accounts variation in stock returns, however the inclusion of other macroeconomic and industry related variables has added additional explanatory power in describing the stock returns variation. It is found that economic exposure is higher at industry level than firm level stock returns. Results also indicate that stock returns of different firms behave differently in similar economic conditions that acquaint investors about the risk diversification opportunity in the stock market.

Key words: Stock returns, multifactor model, macroeconomic variables.

INTRODUCTION

The return on stocks is based on a number of factors, the exact number is not yet known. 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 (ATP). The literature suggests that different variables are potentially important in explaining the variations in stock returns beyond a single market factor. In addition to the traditional equilibrium based model Capital Asset Pricing Model, a number of multi-factor asset pricing models have been developed e.g., arbitrage-based model, Arbitrage Pricing Theory. These models are based on the assumption that the stock returns are generated by a limited number of economic variables or factors (Opfer and Bessler, 2004). The CAPM has come under increasing scrutiny in recent years due to its inability to explain fully the pricing of risky assets. A well known alternative to a single risk based models is the multifactor approach. A multifactor model can be either from an arbitrage pricing theory (APT) or from a multi-beta CAPM perspective. Theses models attempt to answer the questions whether the market return is the only factor that explains stock returns variations and the question then is: what extra-market factors should be considered as likely candidates when investigating stock returns volatility? Recently there is also a realization about the importance of using conditional means and variance in financial data in econometric analysis of financial markets. Since risk-averse investors need to forecast asset returns and their volatility over the period of investment. Merton (1980) argues that researchers should consider heteroskedasticity when forecasting expected returns. Literature shows that the class of Generalized Auto Regressive Conditional Heteroskedasticity (GARCH) models (Bollerslev, 1986, 1990) successfully captures asset returns and volatility by allowing the means of asset

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returns to depend on their time-varying variance as well as other contributory factors.

For a little over a decade now, the Pakistani Stock Market has been undergoing a profound transformation. Due to more liberal policies of the government, not only the investment within the country has amplified, the inflow of foreign investment has gone up manifold in recent years. Pakistani industries and stock market have become a rewarding place for domestic and foreign investors and it is flourishing very rapidly in recent times. The Karachi stock exchange (KSE) remains one of the biggest and most liquid exchanges of the world during that period. The KSE 100 Index which was hovering around mere 1,000 points in late 90 s now has jumped over 12,000 points in year 2008. Moreover, the market capitalization has gone up to manifold along with number of listed companies and listed capital in recent years. All these facts emphasize on the importance of Pakistani capital market, and hence it becomes a very profitable investment opportunity for investors. Pakistan Economy has also shown positive growth as economic indicators have grown up during the period under study 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 extend their activities in these sectors (Economic Survey, 2006; 2007).

The economy has shown great buoyancy 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. The service sector remains the driving force behind the economic growth in the country and has provided the much needed support for maintaining a relatively high growth rate for the economy. Manufacturing sector has also shown steady growth for most part of the decade but then later there is a decline in growth for the sector in recent years. The Textile Industry (one of the leading industry of manufacturing sector) is now confronted with problems both at local and international level, especially the impact of increasing cost of input. Despite of all those reasons manufacturing sector has performed satisfactory over the last decade. Pakistan's strong economic growth for the last few years can be gauged at the macroeconomic level and can also be observed by the growth of some industries. Moreover, there is historical turnaround in Pakistani Stock Market during that period which has performed remarkably. 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 should be analyzed (Economic Survey, 2006, 2007).

This study is a step forward in this direction and provides a sectoral measurement of stock returns variation caused by various economic factors. The study contributes to existing literature by analyzing the relationship between economic variables and stock returns in an emerging Asian market which has a different structure and institutional characteristics from developed stock markets. Therefore it is critical to find out whether stock returns in Pakistan respond differently to economic variables or not. This is a sectoral study examining the variability of stock returns to economic variables at the firm and industry level. The study also applies different methodology as compare to existing work on Pakistani stock market to find out the variation caused by economic variables in stock returns. The outcomes of this study can be useful to understand the interplay of economic variables and stock returns variation 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 outstanding performance during the last decade.

LITERATURE REVIEW

Studies have shown that as a result of financial deregulation, the stock market becomes more receptive to domestic and external factors. It is evident from literature that the relationship between stocks returns and economic variables have received great attention over recent years in particular countries and economic conditions. The level of return achieved or expected from an investment is dependent on a variety of factors. The internal factors can be a type of investment vehicle, quality of management, type of financing etc, whereas those of external could include war, price controls, political events, interest rate, exchange rate and inflation among others. Capital asset pricing model (CAPM) was a basic technique used to determine risk and return related to a particular security. The single index model was developed by Sharpe (1963). This was the main characteristic as well as the primary shortcoming of this model that it was using only the market return as a single factor to determine security return. This problem had led to alternative model to explain the stock returns variation called the arbitrage pricing theory (APT). The arbitrage pricing theory was emerged as an alternative to CAPM and based on a much lesser number of assumptions about the stock market character as compared to CAPM.

Multi-factor asset pricing models were generally based on the assumption 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.

Gertler and Grinols (1982) 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 as the dependent variable and the return on the market portfolio, unemployment rate and inflation rate measured by the consumer price index as independent variables. 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 that is, unemployment and inflation to the standard two factor model of security returns improved the explanatory power of the regression significantly. Bower et al. (1984) used APT to explain variation in utility stock returns, the study presented some new evidence that APT might lead to different and better estimates of expected return than the CAPM. On the basis of monthly portfolio stock returns from 1971 to 1979, they concluded that policymakers should not rely on the single factor risk approach of the CAPM as principle measure of the risk, but should give greater weight to APT, whose multiple factors provided a better indication of asset risk and a better estimate of expected return. Pari and Chen (1984) conducted a study on 2090 firms for the period of 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.

Similarly Chen et al. (1986) applied an APT model to test the significance of various factors in explaining security returns. They used the monthly data for the period of 1953-1983; the results specified that the following factors were significant 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 (1991) 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 important indicators of current economic growth, which was in turn negatively correlated with the market excess return. Flannery and James (1984) investigated the impact of interest rate changes for a sample of 67 banks in the United States that were engaged in positive maturity transformation, that is, short-term deposits were transformed into long term loans. They found empirical evidence that there existed a significant relationship between the sensitivity of the stock returns to interest rate changes. Baillie and Degennaro (1990) employed GARCH in mean (GARCH-M) to examine the relationship between mean returns on a stock portfolio and its conditional variance or standard deviation. They concluded that any relationship between mean returns and own variance or standard deviation was weak. The study suggested that investors should consider some other risk measures to be more important than the variance of portfolio returns.

Luehrman (1991) evaluated the impact of exchange rate changes on the values of two industries that is, automobile and steel industries. He found that the depreciation of home currency causing adverse effect on the value of both industries. Bodnar and Gentry (1993) 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 linkages between macroeconomic variables and financial markets had long been a goal of financial economics. Madura and Zarruk (1995) 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 January 1988 to April 1993. They found that interest rate risk varied among countries, which they partly attributed to difference in country specific bank regulations and managerial traditions. Similarly Isimbabi and Tucker (1997) analyzed the market perception of the risk of the banking industry over the 1969-1989 period (by using monthly data for the variables) through analysis of the relative influences of market, economic, industry, and bank-specific factors in Bank holding company stock returns. Their multifactor model was an extension of the Stone (1974) two-factor model which included economy-wide and banking industry-specific default risk variables in addition to the Stone model's market and interest rate factors.

Capital market researchers were always passionate about stock returns volatility as Errunza and Hogan (1998) 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. Mei and Hu (2000) developed a multifactor model to examine 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. Similarly Oertmann et al. (2000) investigated the impact of domestic and international interest rates on European financial corporations' equity returns. For the period from January 1982 to March 1995 they developed multifactor index models to examine the sensitivity 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 (1994) who compared U.S. and German banks.

Spyrou (2001) studied the relationship between stock returns and inflation for the emerging economy of Greece during the 1990s. The results of the study suggested a negative and significant relationship between stock returns and inflation. Fang and Miller (2002) applied a bivariate GARCH-M model to investigate empirically the effects of daily currency depreciation on the stock market returns 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 stock market returns across countries. The significant effects of foreign exchange market events on the stock market returns suggested that international fund managers who invested in the newly emerging East Asian Stock markets should evaluate the value and stability of the domestic currency as a part of their stock market investment decisions. Joseph (2002) studied the impact 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 negative 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 impact was very weak 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 adverse effects on stock returns.

Liow (2004) 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. Joseph and Vezos (2006) investigated the impact of interest rates and foreign exchange rates changes on US bank's stock returns. The study employed an EGARCH model to account for the ARCH effects in daily returns instead of standard OLS estimation methods with the result that the presence of ARCH effects would had affected estimation efficiency. 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. (2006) 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. 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 markets.

All of the above cited studies show that factors other than the market return, which are industrial and economic, are critical in predicting the stock return variability. Among the key factors in predicting the stock returns other than the market factors are company's size, dividend yield, price volatility of energy, interest rate risk, money supply, risk free rate, exchange rates, inflation and industrial production index. A review of the literature reveals that there has been no well-known study of the strength and direction of interaction between stock returns and economic variables in Pakistan at the firm and industry level. Most of the work on Pakistani stock market is either focusing on the relationship between stock prices and macroeconomic variables or measuring the stock return volatility caused by economic and political events. This study is contributing to the existing literature by analyzing the impact of economic variables on stock returns in an emerging Asian market which has a different structure and institutional characteristics from developed stock markets. This is a sectoral study examining the variation of stock returns to economic variables at the firm and industry level. The outcomes of this study can be useful to understand the relationship between economic variables and stock returns.

METHOD

Data

This study is primarily based on secondary data. The 32 firms related to two most important industries of Pakistan economy that is. Banking Industry (Service/Financial Sector) and Textile Industry (Manufacturing Sector) selected for this study are the top performers at KSE 100 index. This study measures the variation of stock returns to economic variables like market index, consumer price index (CPI), risk free rate of return (RFR), exchange rate (Exrate), industrial production index (IPI), money supply (M2) and individual industrial production. Market 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 each of the firms' closing monthly stock prices and the KSE 100 index was obtained from the websites of Karachi Stock Exchange and Business Recorder. The data for the other variables was obtained from Federal Bureau of Statistics, State Bank of Pakistan and various editions of Economic Survey of Pakistan. 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. Therefore, the data was taken for the period of 120 months that is, from Jul 1998 to Jun 2008. Since including data before July 1998 would not been feasible and therefore, the whole research was reduced to a maximum period of 120 months. All the data on stock prices and macroeconomic variables was monthly. Faff et al. (2005), Patra and Poshakwale (2006) and Liow et al. (2006) used monthly returns as the choice of the monthly sampling interval, over a long historical period was intended to capture long-term movements in volatility and to avoid the effects of settlement and clearing delays which were known to significantly affect returns over shorter sampling intervals and to avoid spurious correlation problem Moreover, the choice of monthly data was constrained by the fact that the most of the economic variables under study were available at monthly intervals.

Procedure

After getting monthly closing values for KSE 100 index, selected firms and economic variables, monthly returns were calculated using continuous compounded return formula. Monthly returns were calculated for all variables in order to find out the relationship between growth in economic variables and stock returns instead of stock prices. This also helped in eliminating the problems related to non stationary variables. The industry returns were also 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 economy. The independent variables were described in some details below along with the Multi Index Model to be tested.

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

The dependent variable K_{it} represents the monthly stock returns of the firm 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 of the study consisted of three steps. As a first step descriptive analyses were performed to find out the temporal properties of the data. Mean, standard deviation, skewness and kurtosis of each variable were analyzed. In the second stage variables tested for unit root to establish the order of integration by employing Augmented Dickey Fuller Statistics developed by Dickey and Fuller (1979). ADF test was applied on the returns of all variables. The ADF statistics preferred over PP test (Philips and Perron, 1988) because it was considered superior for time series with autoregressive structure and was more reliable, since it ensured white noise residuals in the regression (Dejong et al., 1992; Patra and Poshakwale, 2006). The appropriate number of lags was selected using Schwarz (1978) information criteria (SIC). As SIC was widely sued in the literature and had almost become a standard tool for selecting lag structure.

Once the data was tested for unit root, the next step was to evaluate the relationship between stock returns and economic variables. The descriptive statistics of the variables under study would likely to display 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 applied on multi index model to determine which of the independent variables had a significant relationship with the dependent variable, that is, stock return. The conditional standard deviation (GARCH-M) used in multifactor equation as an explanatory variable. The specification used to find out the relationship between stock returns and conditional standard deviation (risk). Analyses were carried out separately by using stock returns of each of the firms' returns as the dependent variable. Moreover multi-index model was also tested by taking industry return as a dependent variable.

RESULTS AND DISCUSSION

Results

ADF test is applied on all variables that is,, stock returns and economic factors. In ADF unit root test the null hypothesis is that the series is non-stationary. The results reveal that all data series are stationary at their first difference. Each variable under study is analyzed in terms of its mean, standard deviation, skewness and kurtosis. The combination of skewness and kurtosis for the variables will then help to investigate volatilities across all industries. Consequently the hypothesis regarding the normality of stock returns and economic variables returns can be examined. The values of skewness and kurtosis indicate that ΔCPI, ΔExRate and ΔM2 variables are positively skewed and are leptokurtic with higher than normal kurtosis. Whereas, ΔKSE, ΔRFR and ΔIPI series are negatively skewed but with higher than normal kurtosis. The descriptive statistics of Textile Industry data series show that all variables are positively skewed whereas only ΔAzgardNine Textile series is negatively skewed however all series are leptokurtic with higher than normal kurtosis. The descriptive statistics of Banking Industry data series reveal that ΔBank of Punjab, ΔPrime Bank, ΔUnion Bank, ΔMy Bank, ΔMeezan Bank, ΔKASB Bank, ΔPICIC Bank and ΔSaudiPak Bank variables are positively skewed whereas ΔAskari Bank, ΔBank Al Habib, ΔFaysal Bank, ΔMCB Bank,

∆Metropolitan Bank, ∆Soneri Bank, ∆National Bank, ∆Industry and ∆IPI-BS series are negatively skewed but all series are leptokurtic with higher than normal kurtosis.

The results show that the values of skewness for all series are not significantly different from zero hence data series are not seriously departing from normality. Banking and Textile Industries stock returns are apparently show some response to changes in macroeconomic variables as the standard deviation of most of` the variables is in the same range as of the macroeconomic variables. This suggests that there is a link between stock returns variation and changes in macroeconomic variables. The descriptive statistics of all the variables under study display different degree of skewness and kurtosis. The combination of skewness and kurtosis for the variables contributes to different volatilities across the firms. Consequently the hypothesis that the stock returns and macroeconomic returns are normally distributed may not be validated. These findings suggest that the stock returns and economic factors time series exhibit conditional heteroskedasticity and that a GARCH specification is appropriate for capturing the presence of time-varying volatility (Table 1).

The stock market performance of Textile Industry is analyzed at firm and industry level. The GARCH model applied to stock returns have shown diverse pattern at firm and industry level, as most of the models at firm level produced insignificant (p >.05) results; however industry stock returns have exhibited significant exposure to economic variables. ARCH and GARCH terms are statistically significant generally; this reveals that stock returns volatility of Textile Industry is a function of both the lag of the squared residuals and lag variances. GARCH-M term designates a statistically insignificant (p > .05) positive relationship between risk and stock returns for most of the firms. Market Return is the variable having significant and positive relationship with stock returns of most of the firms. Industrial Production Index has shown mixed relationship with stock returns. Consumer Price Index, Risk Free Rate, and Industrial Production of Textile Industry are negatively related to stock returns though the impact is almost insignificant. Exchange Rate and Money Supply variables are though insignificant in most of the models but maintain a positive relationship with stock returns. Rising inflation and interest rates in the country cause negative variation in stock returns of Textile Industry. Whereas growth in Market returns and decline in the value of Pak Rupee against US$ (Since textile exports constitute more than 50% of the total exports of the country) contribute positively to stock returns (Table 2).

Banking Industry's stock market performance is analyzed by applying GARCH model at the firm and industry level. The results demonstrate similar behavior of stock returns at firm and industry level since almost all models are significant (p<.05); however industry stock returns display greater exposure to economic variables than most of the firm level stock returns. GARCH term is statistically significant for most of the firms; this indicates that stock returns volatility of Banking Industry is a function of lag variances. GARCH-M term denotes a statistically insignificant (p>.05) positive relation between risk and stock returns for most of the firms, therefore there is a small risk premium for the risk associated with the returns of the banking Industry. Market Return is the only variable significant and positively related to stock returns of all the firms which is the clear indication of the influence of market return on firms and industry stock returns. Industrial Production Index, Exchange Rate and Money Supply variables are negatively but insignificantly related to stock returns whereas Risk Free Rate and Banking Spread are positively related to stock returns though the impact is insignificant. Consumer Price Index is negatively related to stock returns of the firms but the impact is statistically significant in some of the models. The results reveal that rising inflation, growing industrial production, declining value of Pak Rupees against US$ and increasing money supply contribute negatively where as growth in Market Return, increase in risk free rate and augmentation in Banking Spread contribute positively to stock returns of Banking Industry.

Discussion

The relationship between stock returns of selected firms of two major industries and economic variables is analyzed at the firm and industry level. The results of GARCH model demonstrate some diverse behavior of stock returns at firm and industry level. Models at the industry level have produced significant results whereas many models are insignificant at firm level. Moreover, industry stock returns (with higher R2 and F-statistics) display greater exposure to economic variables than firm level stock returns. All models applied at stock returns of banking industry have produced significant results whereas most of the models are insignificant for the Textile Industry. It is also evident from the values of R2 and F-statistics that stock returns of the Banking Industry firms are more responsive to changes in economic variables than firms of Textile Industry. The idea of a higher sensitivity of bank stock returns compared to industrial firms was empirically supported by Bessler and Booth (1994), Oertmann et al. (2000), and Bessler and Murtagh (2003) who analyzed banks and non-banks stock returns for different countries.

ARCH and GARCH terms are statistically significant for most of the firms of both industries; this demonstrates the time varying characteristics of stock returns volatility of different firms in the industries. Therefore conditional volatility of stock returns is a function of both the estimates of lagged square residuals and lag variances. The result of GARCH-M term indicates a statistically insignificant relationship between risk and return of most

Table 1. Results of GARCH model: Textile industry.

Dependent variable	Constant	KSE	CPI	RFR	IPI	Exrate	M2	IPI-Ind	GARCH-M	Constant	ARCH	GARCH	R2	F-Stat	p-value
ΔGul Ahmad	0.0174	0.2004	-2.7132	0.1316	-0.0583	0.0078	-0.0363	0.0800	0.4250	0.0025	0.1691*	0.6488*	0.0522	0.6004	0.8106
ΔKohinoor textile	-0.0204	0.8913*	-1.8173	-0.0266	0.0890	1.1982	1.0550	0.1256	2.2084**	0.0030	0.1434	0.7188*	0.2699	4.0297	0.0001
ΔCresent textile	-0.0300	0.9099*	0.1104	-0.0547	0.0685	1.0161	1.5745**	0.0728	0.4449	0.0007	0.0999	0.8684*	0.3223	5.1846	0.0000
ΔSphier textile	-0.0048	0.2787**	0.4503	-0.1651	0.0209	-0.2022	0.6117	-0.0798	-2.9768	0.0049	0.0144	0.6557	0.0829	0.9848	0.4610
ΔDawood Lawrence	-0.0154	0.4216*	2.5002	-0.0463	0.0758	2.4253*	0.3041	-0.1063	3.7053*	0.0087	0.8398*	0.0649	0.0167	0.1854	0.9970
ΔHusein textile	0.0055	0.1895*	-1.8342*	-0.0527	-0.0964*	-0.2257	0.1976	-0.0004	-0.2846*	0.0012	1.9971*	0.0893*	0.0635	0.7385	0.6868
ΔNishat textile	-0.0214	1.6104*	-0.8819	0.1065	-0.0149	1.5604*	0.5823	0.1504*	0.3367	0.0078	0.6845*	0.1644*	0.6065	16.7999	0.0000
ΔQuetta textile	0.0092	0.1224	-0.0977	-0.0715	-0.0255	1.2504	0.1619	-0.0550	0.6601*	0.0041	1.4029*	0.0310*	0.0144	0.1593	0.9984
ΔFateh textile	0.0221	0.0417**	-0.9060*	0.0018	0.1542*	-0.1055	-0.8013*	0.0064	0.2265	0.0003	8.0185*	0.0029	0.0379	0.3513	0.9768
ΔKhyber textile	0.0008	0.0337	0.4911	-0.0511	0.1138*	1.5537*	-0.3441	-0.0941*	0.3158*	0.0026	1.4488*	0.078**	0.0093	0.0840	1.0000
ΔAhmad Hasan textile	0.0207	0.0617	-3.5356*	-0.1156	0.0643	1.2068	0.7523	-0.0297	0.9325	0.0006	-0.0718*	1.0433*	0.0694	0.8127	0.6170
ΔArtistic Denim textile	0.0586	0.2799	-9.2466	0.2486	-0.2544	2.1295	0.3826	0.0576	-0.2687*	0.1654	0.1311	0.5241	0.0487	0.5581	0.8446
ΔBlessed textile	0.0069	0.4516*	-2.0229	-0.0539	0.1040	1.7135	0.7767	-0.1361*	1.5461	0.0074	0.0926	0.4234	0.2416	2.1984	0.0492
ΔMahmood textile	-0.0095	0.3263*	1.1864	0.0677	0.1466**	1.6994	-0.0943	-0.0986	0.2199	0.0011	0.2897*	0.6947*	0.0211	0.1920	0.9985
ΔAzgard Nine textile	-0.0714	1.4641*	2.2994	0.1785	0.0965	2.2443	2.9325*	-0.1435	-0.1149	-0.0003	-0.0393*	1.0611*	0.1165	1.4374	0.1735
ΔSuraj textile	-0.0310	0.3636*	2.0019	-0.1228	-0.2241*	1.4331	1.1311**	-0.0243	0.2497	0.0031	0.6958*	0.2641*	0.0441	0.5033	0.8845
ΔBhanero textile	0.0047	0.1715	-2.8791	-0.1696	0.1913	1.6828	0.7787	0.1281**	0.8032	0.0092	-0.0333*	0.5940	0.3455	2.5561	0.0392
ΔIndustry	0.0001	0.4447*	-0.7724	-0.0320	-0.0482	1.1656*	0.2720	0.0287	0.9173**	0.0018	0.6255*	0.0362	0.2987	4.6420	0.0000

Table 2. Results of GARCH model: Banking industry.

Dependent variable	Constant	KSE	CPI	RFR	IPI	Exrate	M2	IPI-BS	GARCH-M	Constant	ARCH	GARCH	R2	F-Stat	p-value
ΔAskari Bank	0.0124	0.8134*	-1.9732	0.1555	-0.0273	-0.8993	-0.3774	0.1302	0.8740	0.0014	-0.0858*	0.9484*	0.4058	7.4455	0.0000
ΔBank of Punjab	0.0312	1.7404*	-5.7007*	0.2845**	-0.0919	0.6373	-2.1835*	0.1012	0.5861	0.0013	0.1826**	0.7800*	0.4787	10.0084	0.0000
ΔBank Al Habib	0.0231	0.4409*	-3.6068*	0.0616	-0.0494	-1.0076	-0.3991	0.1469	19.4990	0.0071	0.0452	0.1681	0.2373	3.3905	0.0007
ΔFaysal Bank	-0.0004	0.8975*	-2.0008	0.0767	0.0622	-0.5657	0.3336	0.0177	0.3903	0.0016	0.0791	0.6494*	0.5469	13.1565	0.0000
ΔMCB Bank	0.0021	1.2736*	-0.2172	0.1713*	-0.0109	1.1040	-0.4308	0.0878	-2.5630*	0.0046	0.2429	0.1316	0.6389	19.2854	0.0000

Table 2. Contd.

ΔMetropolitan Bank	0.0271	0.4336*	-3.8595*	0.1298	-0.0326	-0.1942	-0.3660	0.0509	13.6981	0.0016	-0.0374	0.8941*	0.1828	2.4382	0.0115
ΔPrime Bank	0.0106	0.9016*	-2.7053**	0.1143	-0.0758	-0.2280	-0.3480	0.1530	2.0281*	0.0012	-0.0305	0.9452*	0.3795	6.6653	0.0000
ΔSoneri Bank	-0.0050	0.7483*	-1.7767	0.0578	-0.0610	-0.4097	0.3172	0.0293	0.6122	0.0016	0.1739**	0.6875*	0.3200	5.1298	0.0000
ΔUnion Bank	0.0045	0.9464*	-3.5863**	0.0578	-0.0840	0.7749	-0.2330	0.0887	-7.8816	0.0013	0.0134	0.9103*	0.2995	4.6601	0.0000
ΔMy Bank	0.0200	0.4593*	-1.5276	-0.0888	0.0308	-0.8193	-0.2065	-0.0713	0.2353	0.0009	-0.1154*	1.0675*	0.1839	1.6445	0.1111
ΔMeezan Bank	0.0118	0.4488*	-1.8180	0.0260	-0.1685	-0.1904	0.2406	-0.0044	0.1257	0.0045	-0.0557*	0.5615	0.2246	2.1140	0.0338
ΔKASB Bank	0.0148	0.4723*	-0.5999	-0.1305	-0.0782	1.5602	-1.2077*	0.0511	0.5241	0.0039	1.0150*	0.0023	0.1625	1.4161	0.1904
ΔNational Bank	0.0292	1.3372*	-2.4726*	0.3083*	-0.0219	-0.8665	-1.6588*	-0.0600	4.0300*	0.0001	-0.0758	1.0824*	0.5754	9.8940	0.0000
ΔPICIC Bank	-0.0215	0.9051*	1.9790	-0.1600	-0.1276	0.6731	0.1726	0.0527	1.2472	0.0003	-0.0784	1.0660*	0.3239	3.4972	0.0008
ΔSaudiPak Bank	0.0196	0.6518*	-1.3899	-0.1689	-0.2479*	-1.9054	-0.3293	0.1247	1.5185*	0.0068	0.2586	0.3800	0.2602	2.5679	0.0102
ΔIndustry	0.0178	0.8479*	-2.7864*	0.0646	-0.0690	-0.2161	-0.4874	0.0695	0.3965	0.0001	-0.0724*	1.0513*	0.6278	18.3862	0.0000

of the firms. Therefore there is a little risk premium for the risk associated with the stock returns of both industries. The time varying characteristics of conditional volatilities of stock returns was early documented by Liow (2004) and Liow et al. (2006). 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 at both the individual firm and industry level. The results demonstrate that growth in market return positively influence the stock returns of most of the firms and industries. Joseph and Vezos (2006) and Butt et al. (2007) also found that market exposure is the most significant factor. Consumer price index is insignificant to stock returns of most of the firms. The regression coefficient of consumer price index is largely negatively related to stock returns. This suggests that rising inflation in the country is adversely affecting the stock returns of most of the firms. However, stock returns of Banking Industry are more sensitive to increasing prices in the country than textile industry. The findings of the studies conducted by Adrangi et al. (1999), and Spyrou (2001) 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 Risk Free Rate is negatively related to stock returns of Textile Industry firms though the impact is insignificant whereas regression coefficient of RFR is positively related to stock returns of Banking Industry (This positive relationship can be attributed to the nature of industry being the financial sector). Madura and Zarruk (1995) and Joseph (2002) studied the interest rate sensitivity of stock returns and the results described that stock returns were negatively affected by interest rate changes.

Industrial production of textile industry is insignificant and has shown mixed behaviour to stock returns. Whereas banking spread is positively related to stock returns of most of the firms. This discloses that increase in the productivity of a firm contributes positively to the stock returns both at the firm and industry level.

Industrial production index (IPI) is negatively related to stock returns at large; however, the relationship is insignificant. The regression coefficient of IPI is positive for many firms of textile industry. 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. Chen et al. (1986) and Sill (1995) recognized that the stock market returns were significantly explained by the factors like industrial production, interest rates and inflation. Exchange rate is insignificant but negatively related to stock returns of most of the firms of Banking industry whereas it is positively related generally for the firms of textile industry (rising internal and external demand in recent years and valuable contribution of textile industry in country's exports may be the reasons of this exception). However, the continuous depreciation of Pak Rupees against the US$ is causing a negative effect on stock returns of most of the firms. The relationship between stock returns and exchange rate was early examined by Luehrman (1991); Bodnar and

Gentry (1993); Fang and Miller (2002) who found

that depreciation of home currency caused an adverse effect on stock returns. Money supply variable has shown insignificant relationship largely. The stock returns of the firms of textile industry respond positively to Money Expansion in the economy whereas stock returns of the firms of Banking Industry exhibit negative response to money expansion. Ghazali and Yakob (1997) and Liow et al. (2006) 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 have added additional explanatory power in explaining the stock returns variation of different firms of selected 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 firms 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 (1982), Bower et al. (1984), Pari and Chen (1984), Chen et al. (1986), Faff and Chan (1998) and Butt et al. (2007).

CONCLUSION AND RECOMMENDATIONS

Conclusion

The stock returns behave differently at the firm and industry level. The impact of changes in economic factors on stock returns is more significant and strong at the industry level than firm level. Therefore, industry stock returns are subject to larger variation against economic variables than firm level stock returns. It is also concluded that stock returns of the financial/service sector (Banking Industry) are more sensitive to changes in economic variables than manufacturing industries (Textile Industry). 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. From the results of conditional standard deviation it is concluded that there is a statistical relationship between risk and return of the firms. Therefore there is some risk premium for the risk associated with the stock returns. It is also concluded that Market Return is the most significant and positively related variable to stock returns and it accounts for most of the variation in stock returns at both the individual firm and industry level.

The rising inflation in the country is adversely affecting the stock returns of the firms. Increase in interest rates is also adversely affecting the stock returns however the response of banking industry stock returns is positive being a financial sector. Growth in industrial production suppresses stock returns which depicts that investment diverts from the stock market to real activity as a result of its expansion in the economy. It is also concluded that depreciation of Pak Rupees against the US$ cause adverse effect on stock returns. Expansion in money supply in the country contributes positively to stock returns of Textile Industry whereas it is negatively affecting the stock returns of Banking Industry. 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

This research aims to identify the effect of changes in economic variables on stock returns of firms listed at Karachi stock exchange. 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.

Though market exposure is the most important factor, other economic factors have shown some significance to stock returns therefore 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 firm or industry. The value of Pak Rs. is consistently declining over the period which is adversely affecting the stock returns. Therefore government authorities should take 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. Money Supply in the country is controlled and regulated by the State Bank of Pakistan (SBP) as constitute of monetary policy framework. The expansion in money supply in the economy is negatively affecting the stock returns of most of the firms. So, SBP should carefully monitor the money supply situation in order to get optimal benefit of this monetary instrument. Interest rate is an essential device available to government to intervene in the financial system of the

country. However, rising interest rates in the country depress stock returns and can result in higher cost of debt. This can limit the investment expansion; therefore, government 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 is also resulting in higher consumption and lower savings among the individuals. The mounting prices of essentials in the country deter availability of resources for investment purposes.

Sectoral analysis of stock market provides better insight about the performance of the market to both the investors and the regulators. A sectoral division can be multiuse or macro level industry and consumer industry or it can be manufacturing industry and service industry. 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 and has contributed a lot to the ability of the model in explaining the variations of stock returns. In the future some other industry related factors can be considered. Similarly GARCH-M term is introduced in the multifactor model as an explanatory variable that has worked and results confirm that there is some risk premium for the risk associated with stock returns. This is an encouraging sign for the researchers and is an invitation to them to apply some other conventions for an improved explanation of risk and return relationship. This study tests multifactor model at the firm and industry level by taking two different sectors of the economy and imparts a new avenue for the researchers. This work can be extended by considering other sectors.

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. It is worth mentioning here that to yield substantial and stable results a mechanism of reforms is a process that requires a strong and sustained commitment. 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. 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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