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Capital asset pricing model in unconditional and conditional framework: empirical evidence from emerging economy of Pakistan

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ABSTRACT

The present study empirically investigates the risk and return relationship by loading the macroeconomic information in standard CAPM in addition to market information. One hundred financial and non financial companies listed on Karachi Stock Exchange are investigated over a period of January 2005 to August 2011. Monthly data is used for the company asset prices, market portfolio and macroeconomic variables in this study. The macroeconomic variables are used as additional risk forces in the model. The study makes use of CAPM with unconditional and conditional specification for the prediction of future asset prices. The time varying conditional information and lagged macroeconomic variables are added in the model. The GARCH (1, 1) – M technique is applied to capture the conditional volatility clustering of asset returns. The findings of the current study reveals that conditional multifactor CAPM have better results than unconditional multifactor CAPM model. The residuals and conditional variances have significantly positive impact and are helpful in explaining time varying behaviour of asset returns. The macroeconomic variables such as oil prices, foreign exchange rate, foreign exchange reserves, inflation rate, interest rate, and money supply play significant role while industrial production index, unemployment rate, and market returns have inconclusive role in this study. The study concludes that macroeconomic risk factors play a prominent role in explaining stock returns.

Introduction

A significant amount of work has been related to asset pricing models targeting the investor spirit and motivation to access the expected value of cash flows at different risk levels. The most prominent studies in terms of explanation of risk return relationship are CAPM developed by Sharpe (1964) and Lintner (1965). Both CAPM studies use the market portfolio of all economy assets measured through beta of cash flows and develop a linear relationship between asset returns and market returns. The various studies investigate the cross sectional risk return relationship on traditional version of CAPM over last four decades (Jagannathan & Wang, 1996). The major empirical drawback of the standard CAPM studies is taking only one risk factor, which is uncertainty (market returns) about future prices. The most of the literature proves that standard CAPM has failed to predict the cross sectional expected returns.

The CAPM might still be surviving because no other asset pricing model is supportive; CAPM has intuitive call while other models lack it, or perhaps lack of empirical economic importance against CAPM (Hansen & Singleton, 1982, Connor & Korajczyk, 1988a, Connor & Korajczyk, 1988b, Lehmann & Modest, 1988, Hansen & Jagannathan, 1991, Hansen & Jagannathan, 1994).

However Fama & French (1992) posit that the failure of static CAPM in predicting expected returns is economically more important. Fama & French (1992) examine the static CAPM by using intense collection of assets data and find insignificant results between market returns and stock returns. The CAPM hypothesis is fully dependent on single risk factor, which consideres valid for all economic portfolio investments. The common assumption of the CAPM is that beta remains constant over time but literature suggests that constant beta is not practically and empirically accepted. The time varying risk is more important and empirically investigates the average returns in business information cycle.

As stated earlier, that static version of CAPM wholly depends upon single risk factor; however there are several other risk factors which may affect the future returns. These factors suggest the researchers to develop multifactor models such as Inter-temporal Capital Asset Pricing Model (ICAPM) by Merton (1973) and Arbitrage Pricing Theory (APT) by Ross (1976). However Opfer & Bessler (2004) state that these models are limited to a specific number of variables. This statement raises another important question: do macroeconomic factors help in explaining portfolio return? The economic factors differ from industry to industry; consequently it is not possible to predict defined number of variables or factors. The conditional variances are considered very important for the financial markets and the heteroscedasticity should be more considered by researchers to predict the expected returns (Merton, 1980). The Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) model is more likely to explain the stock variation by providing the time varying base to equity returns with other participating variables (Bollerslev, T 1986, 1990). So the present study focuses to explain the stock returns by means of macroeconomic risk factors in Pakistani business sector.

The stock market returns and asset prices depend upon various economic forces which require modern techniques and

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phenomena for their interpretation and execution (Cochran 2005). The macro forces exhibit the volatility and change the asset prices. Chen, Richard, & Stephen (1986), provide the first study, where macroeconomic variables such as industrial production, difference between low and high grade bonds and unexpected inflation are used as risk proxies in explaining asset returns.

Ferson & Campbell (1991, 1993, 1999) have used macroeconomic variables as risk sources in predicting future prices. The multifactor model with conditional information is used to determine investor's expectations. The conditional CAPM phenomena explains the change in the stock returns by varying economic situation, where every situation exhibits risk premium and market price per unit of beta. They conclude that multifactor model should be designed in such a way that time varying beta may explain the expected stock returns more comprehensively.

The use of macroeconomic forces as risk proxies to predict future returns has been explored extensively in developed countries; however it is a quite new and emerging idea when it comes down to developing countries. Literature suggests that macroeconomic variables affect the stock returns but this empirical analysis (approach) has not be extended to emerging economies like Pakistan yet. Therefore, main aim of our study is to empirically analyse the macroeconomic forces that impact the asset prices in Pakistan. The current study selects the variables that are aligned with the business environment in the Pakistan.

Pakistan economy holds an importunate economic position in developing economies. The Pakistan equity market plays a vital role and has an impressive growth rate since last decade. Existing literature indicates that equity market has a key role to determine the growth of any economy. However many economic factors can be held responsible for fluctuating equity prices in Pakistan. These forces could be increased interest rates, rescheduling of heavy loans, exchange rate variations, cause of deficit financing, increased tax rates, inflation rates, energy crisis, political instability, corruption trends, unproductive projects, tight monetary policy and downward industrial production, etc. Moreover, Pakistan has also been facing trade shocks, global financial crisis, war against terrorism, earth quakes and flood rehabilitation etc. The security issues in Pakistan has shacked the internal and external investor's confidence towards equity markets which, in return, has made market prices highly volatile. These factors discourage the availability of Pakistani products in the international markets. The above given factors also pressurize the capital markets. The literature suggests that capital markets are a tool to judge the economy and financial growth of any country. These markets efficiently transform the savings into productive investments and also provide a financial ground to local and foreign investor (Dwyer & Hafer, 1990).

The growth rate of the economy has been highly distressed during last three years and the average growth rate has declined to 2.6 over the last eight years. Now, there arises the need to explore and examine the factors which are more affluent and active in deteriorating the stock prices in Pakistan. Identification and investigation of the risk return relationship of the individual stock traded in the equity market is using multifactor model is also to be explored.

The capital markets are the barometers to judge the health of financial position in any country. These institutes provide short and long term financial resources to investors from lenders to borrowers. The stock markets do not provide only financial funds but also give confidence to available investors and capital growth. The stock markets offer various channels to investors in order to access the stakeholders. The capital markets absorb efficient information through excellent effective institutional management. Pakistan realized this fact in its earlier stage and as a result Karachi Stock Exchange is established in 1949. There are three stock exchanges in Pakistan, Karachi Stock Exchange (KSE 100), Lahore Stock Exchange (LSE 25) and Islamabad Stock Exchange (ISE 10) Index. These stock exchanges are now regulated by Security Exchange Commission of Pakistan (SECP) which is established in 1999.

Karachi Stock Exchange (KSE 100) index is introduced in 1991, which is the premier stock exchange of the Pakistan. The KSE 100 Index was 11070.58 points at 31 Aug 2011 with market capitalization 2934.2 Billion Rupees[1]. The Government has introduced good policies for the equity markets liberalization and regulation. It gives great confidence to local and foreign investors, but current financial crisis has made the investment process sluggish.

Pakistan Economic Survey (2010-11) discloses the performances of various important sectors of the economy. The Oil & Gas producer is the most growing sector of the economy due to its high demand and rising global prices; its market capitalization has increased from Rs. 1042.3 million to 1051.7 million. During the current fiscal year its total profit after tax has been Rs. 104.2 billion. This sector is highly volatile due to rising global prices. The chemical sector is also very important sector of the economy. The total listed chemical companies are 36. This sector earns high profits due to high demand. The market capitalization of this sector has increased by Rs. 113.6 billion over last year and reached as high as Rs. 392.9 billion.

There are 19 Automobile & Parts companies listed at KSE. Personal goods sector consists of 211 listed companies; most of the companies are textiles. The market capitalization, in this sector, has increased and reached as high as Rs. 132 billion during 2010-2011. The increased capitalization of the sector is due to demand and high prices of yarn and cotton products. Construction & Material sector is another main player in the economy comprising of 37 listed companies but its share has decreased to 8.1 % with market capitalization of 63.3 billion Rupees. There are 27 banks listed with KSE. This sector has also gone slow and decelerated due to high interest rates, defaults loan and global financial crisis. Fixed Line Communication comprises of 5 listed companies and it has been widely affected by the mobile networks in the economy. Food Producers is a key sector having 61 sugar companies listed at KSE. The high sugar cane prices have raised market capitalization at Rs. 282.9 billion during 2010-2011. Pharmacy & Biotech sector comprises of 9 companies and its share and market capitalization has also increased due to rising demand of medicines.

The investor always looks at the better performance of his/her portfolio and strives to get maximum financial benefit. However it does not appear to be an easy task because the risk factors always chase the return, so risk and return relationship has a historical background in literature. A significant amount of work has been done for developed and developing countries; however a little has been contributed in Pakistan to predict stock returns with risk factors and other economic forces. Consequently there is a dire need to conduct the enriched

[1] Business recorder website

research to the Pakistan by analysing the risk return relationships.

The present study aims at investigating the risk return relationship involving the conditional and unconditional beta, market beta, economic variables and stock returns in Pakistan. This study is a contribution to literature by using macroeconomic forces as risk proxies in predicting stock returns. The macroeconomic variables under consideration are oil prices, interest rate, risk free rate, foreign exchange rate, foreign exchange reserves, inflation rate, industrial production index, money supply, unemployment rate and market returns,. For this purpose, the multifactor model has been developed in such a way that CAPM with unconditional and conditional information uses the economic factors to predict the stock returns in Pakistan. One hundred companies, both financial and non financial listed with Karachi Stock Exchange are observed in this study.

2. Relevant Literature Review

The basis for portfolio model is built up by Markowitz (1952, 1959). He states that portfolio risk is measured through variation of rate of return as given by some of Markowitz assumptions where investor perceives higher return at minimum risk level. The investor is considered as Markowitz efficient investor in the model. Then the Markowitz assumptions are extended by Sharpe (1964) and Lintner (1965). The resulting standard CAPM explains the risk return relationship. This model takes only one risk factor, which is uncertainty into account to predict the future prices. The theoretical base for variation in cross section expected returns are guided by Merton (1973) through Inter temporal Capital Asset Pricing Model and Ross (1976) through Arbitrage Pricing Theory (APT) and use additional risk factors, which explain stock variations with market returns. The literature suggests statistical and theoretical approaches to be used for Arbitrage Pricing Theory. The factor analysis is used in statistical approach by selecting some common factors, which explain stock variations. The factors are not specified, meant only to determine, whether these factors might explain the stock variations and sources for risk factors other than used in standard CAPM. However no one knows exactly about other factors. These statistical studies are practically valuable, because other economic factors influence the stock returns and these economic forces are loaded with business and prices behaviour information.

The first approach provides by Chen et al., (1986) and use macroeconomic and financial forces like inflation rate, consumption, t bill rate, industrial production, oil prices, long term Govt. bonds, low grade bonds and equity returns to explore the extra risk market. The study has found that industrial production, term structure and yield spread play a substantial role as risk sources to explain the stock returns. Considerable work has been done regarding macroeconomic forces, as additional sources of risk, in explaining stock returns. Lettau & Ludvigon (2001) have also contributed in this domain while working on consumption wealth and capital ratio. There are also many other variables affecting the stock returns like, t bills rate, inflation rate, money supply, investment spending, exchange rates, real estate returns, default spread, difference between long and short term bonds, growth rate, unemployment rate, interest rate, etc. The previous study has used the inflation rate as a source of risk influencing the stock returns offered by Jaffee & Mandelker (1976), Nelson (1976), Fama & Schwert (1977), Schwert (1981) and Gulltekin (1983).

The foreign exchange rate is a very important currency risk factor impacting the asset prices. The currency risk is affected by the fluctuation of foreign exchange rate. The positive and negative rate of foreign exchange increases or decreases the investor's profit. So foreign exchange rate is also used as a risk factor in many studies. Joulion (1991) explores that exchange rate is not influencing the US market. The exchange rate has significant impact on the international equity market as studied by Gerard & Desanta (1998). There is another study which explores consistent relationship of exchange rate exposure through Inter temporal Capital Asset Pricing Model (Adler & Domas, 1983 and Solnik, 1994). The study explores the exchange rate exposure follows by currency risk.

Luehrman (1991) has selected two industries which are automobile and steel and observe exchange rate have significant impact on both of industry asset prices. The results show the adverse affects of depreciation of local currency on asset prices of both industries. Bondar & Gentry (1993) study the impact of exchanges rate on stock returns in USA, Canada and Japan for the period (1979- 1988). They document that exchange rate has good significant explanatory power of asset returns in all countries.

Joseph (2002) uses monthly data of exchange rate and interest rate over the period (1988- 2000) for pharmaceutical, chemical, engineering and electrical industries of United Kingdom and reveals that changes in interest rate have more negatively affected the stock returns than changes in foreign exchange rate. Panetta (2002) examines the relationship of economic forces with stock returns and studies foreign exchange rate, manufacturing production, term structure, inflation rate and oil prices for the equity market of Italy. The study finds insignificant relationship between macroeconomic variables and asset prices and this instability also observe for sub data periods. The exchange rate variations are found having a significant impact on stock returns in emerging markets of European countries of Hungry, Czech Republic and Greece (Grambovas, 2003).

Gertler & Grinols (1982) determines the correlation among unemployment, inflation rate and common stock returns. The monthly data is used for 712 listed companies at New York Stock Exchange (NYSE) is used for given purpose. The relationship of macroeconomic variables with stock returns is found quite significant with mix signs. Bower & Logue (1984) use multifactor model and state that multifactor model results are significant and better explanation of stock returns. Flannery & James (1984) observe the impact of change in interest rate on stock prices of 67 United State banks. The study concludes that change in interest rate have significant impact on the variation of stock returns. Pari & Chen (1984) use 2070 firms' data for the period 1975- 1980 and find significant correlation among interest rate, energy volatility and market returns.

Beenstock & Chan (1988) observe that inflation rate, interest rate and money supply significantly interpret the variation in asset prices. Cozier & Rahman (1988) examines the asset prices of Canadian firms taking inflation rate as risk variable. The study finds inverse relationship among inflation and stock returns. Bennett & Kelleher (1988) use 30 years data for four countries; United States, United Kingdom, Japan and Germany. The study examines industrial production, inflation rate, interest rate, unemployment rate and markets returns and finds significant relationship of interest rate and industrial production with asset prices for USA, Germany and UK countries. Dwyer & Hafer (1990) examines the impact of industrial production, interest rate and exchange rate on asset prices for five manufacturing countries using the monthly data for the period of 1973- 1987. The findings of the study are only in favour of the interest rate while interpreting asset returns for all five countries.

Ferson & Harvey (1991) use multifactor model for US market. The study finds that risk premium beta is more significant than economic beta. That all is because of market scenario and business information caused the fluctuation of the market risk premiums. The systematic risk factors vary over time period leading the market fluctuation and convey the different risk premiums (Schwert, 1989). Jagannathan & Wang (1996) observe the cross section expected returns in USA by conditional Capital Asset Pricing Model (CAPM) and concludes that conditional beta is more important than static beta over time. The study also concludes that if human capital in proxy of changing growth rate of per capital income of labour as a risk factor is used, then model play more efficient and significant role in explaining expected stock returns.

Baillie & DeGennaro (1990) apply GARCH-M model to investigate the relationship between mean expected returns and conditional variance. The study finds marginal relationship among them and conclusion suggests that investor should have perceived an alternative risk evaluation than variance for asset returns.

McCue & Kling (1994) find that economic stability, investment output and nominal rates have significant impact on the real estate returns. Sill (1995) also finds the remarkable impact of manufacturing output, inflation and t bill rate on United State market returns. Madura & Zarruk (1995) study the impact of variation in interest rate on asset returns of 29 Banks of five countries included United State, United Kingdom, Japan Canada and German for the period of (1988- 1993). The study results indicate that the rules and regulations and traditions of the banks fluctuated interest rates in all five countries.

Bae & Duvall (1996) use Multifactor Capital Asset Pricing Model (CAPM) with the specification of industry and economic variables on aerospace stock returns for the United State. The results show that aerospace industry stock returns are better explained by multifactor model than single factor model.

West & Worthington (2003) apply GARCH-M model in order to investigate the impact of economic forces on commercial estate returns of Australia. Ibrahim & Aziz (2003) have also used macroeconomic variables like money supply, industrial production, exchange rate and inflation rate to investigate the stock prices. The results show that CPI and industrial production have significant positive mutual relationship and exchange rate and money supply have a negative relationship with asset prices. Liow, Ibrahim, & Huang (2006) use three step multifactor model with GARCH (1, 1) approach for the estimation of macroeconomic conditional volatility for the countries like Japan, Hong Kong, United Kingdom and Singapore. The macroeconomic risk forces are GDP growth rate, inflation, money supply, exchange rate, industrial production growth and interest rate. The study concludes that risk premium and expected risk premium conditional volatility for property stocks are time variant and depends upon the conditional variation of economic variables.

Fang & Miller (2002) apply GARCH M to examine the impact of daily devaluation of currency on stock returns for Asian equity markets. The results examine that conditional variance and devaluation of domestic currency both of time varying nature for all countries. The domestic daily devaluation of currency adversely affects the asset prices of all countries.

In second approach, most of the work has been done by Fama & French (1992,1993, 1995, 1996, 1998 and 2004) to explore the industry and fundamental variables as risk sources like, book to market ratio, earning price ratio, leverage, size, etc. to determine the asset prices.

"Fama French three factor analysis" is found very useful in order to explain the relationship between risk and return. The study finds no relationship between cross sectional beta and stock returns. Fama & French (1993) by using the market beta find that the higher expected returns are due to high book/market ratios. The study also observes the systematic risk of macroeconomic factors, HML (high minus low book or market value of stocks) and SMB (small minus big book or market value of stocks) returns. That study is further explained and concluded that HML and SMB stock returns are explained through price multiplier by using five year data of sale growth and tendency to repeated five years returns. The study show that the variation in returns by using CAPM is most likely observed through three factor model. Fama & French (2004) recommend three factor model rather than single CAPM for practitioners. Faff (2001) uses the three factor model for Australian data used for the variation in expected returns. He finds that "Fama French three factor model" is less effective for the expected returns and having a negative size effect.

Breeden (1978) develops consumption CAPM; in this model investor presume consumption functions with lifetime benefit. The consumption CAPM explores the linear relationship between the expected returns and consumption betas. But Gregory & Shapiro (1988) empirically considers the consumption CAPM less important for developed markets. Breeden, Gibbons, & Litzenberger (1989) observe the U.S market data and find the consumption CAPM having a significant role in U.S market. Banz (1981) observes the returns and total market value of common stocks traded at NYSE for the period of (1926-1975) and find smaller firms having more risk adjustments than larger firms. Reinganum (1981) also came across similar results as found earlier by Banz (1981). Bhandari & Chand (1988) reveal a positive relationship between leverage and stock returns.

Engle (1982) develops Auto Regressive Conditional Heteroscedasticity (ARCH) series to capture the time varying volatility clustering. The financial time series generally exhibits the volatility clustering. The volatility clustering includes data prices in which high swing periods follow the data prices with calm periods (Franses, 1998). The time varying volatility clusters occur due to the ups and downs of exogenous financial economic events and information given by different news sources. The volatility, a very crucial term in financial history, addresses that any macroeconomic event is not itself bad but volatility of event is worse because it disrupts the financial planning. The high volatility demonstrates high losses or high profits and exhibits more uncertainty. Then the question arises: how to measure this volatility. The financial time series are mostly at their level form or in non stationary form or reveal random walks. The financial time series generally become stationary at their first difference. So it is required to model these time series at first difference instead of level form. But these time series often exhibit volatility after first difference, so how to model this kind of activity because variance of time series varies over time. This kind of data prices activity or volatility has been captured through the modern technique called Auto Regressive Conditional Heteroscedasticity (ARCH) developed by Engle (1982). This model motivates others to test the ARCH series in their studies (Bollerslev, Engle & Wooldridge, 1988, Bollerslev, Engle & Nelson, 1994 and Morgan & Morgan, 1987), comment that empirical based ARCH models are found stronger in explaining risk return relationship than previous models.

The other popular type of such a technique is "Generalized Autoregressive Conditional Heteroscedasticity model" (GARCH), developed by Bollerslev, T (1986). Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model observes not only the square of the residual error term but also the square of the conditional variance. But a very diminutive work has been carried out regarding multifactor model in GARCH settings (Soufian, 2004).

Many Pakistani researchers also find the relationship of macroeconomic forces with stock returns. Hussain & Mahmood (2001) study the macroeconomic risk variables have a long run causal relationship on stock prices. Rehman & Saeedullah (2005) examine the cement industry sector and concludes that market return have a significant impact in explaining equity returns. Butt, Rehman & Ahmad (2007) study the banking industry prices in scenario of macroeconomic factors and find that only market return is a good risk proxy in interpreting and predicting banking asset returns. Ihsan, Ahmad, Ihsan & Sadia (2007) also find that financial economic variables significantly affect the stock prices in Pakistan. Ahmed & Farooq (2008) find the impact of 9/11 shocks on the Pakistani equity returns and develop an informational relationship of 9/11 shocks on variation of stock returns.

Still, a few works has been analysed in explaining the risk return relationship of involvement of Capital Asset Pricing Model (CAPM) with macroeconomic forces such as risk factor sources in Pakistan. Ahmad & Zaman (1999) use the GARCH-M model for the investigation of risk and return relationship in Pakistani market and explore that the variation in stock returns is due to time varying repeated trends in the market. While Ahmad & Qasim (2004) investigate in the same domain and finds positive shocks having a prominent impact on expected stock variations rather than negative shocks in Pakistani market. Mirza & Shahid (2008) employ "Fama French three factor model" to explore the risk and return relationship involving market return, size and value premium in Pakistan. The study use daily data from January 2003 to December 2007 of market returns, size and value premium representing selected companies from every sector listed at Karachi stock exchange. The study use multivariate regression model and concludes at the robust results among stock returns and Fama French three factor model. The results find that "Fama French three factor model" have a significant role in predicting stock returns in Pakistan. Iqbal & Brooks, (2007) explore the Pakistani Stock Markets and find no linear risk return relationship and concludes that unconditional CAPM is not applicable in the Pakistani stock markets. Iqbal, Brooks & Galagedera (2008) also state that unconditional "Fama French model", by using cubic market factor, is better in explaining the market returns rather than other compatible models. Javed A. Y., (2008) explain the risk return relationship of the individual listed companies of the Karachi stock exchange (KSE) in Pakistan. The daily and monthly data of the 49 listed companies is observed for the period of (1993-2004). The objective of the study is to explore the multifactor CAPM in the Pakistani markets. The results explain contradiction of standard CAPM developed by Sharpe (1964) and Lintner (1965) in the Pakistani stock markets. The CAPM is used with conditional and unconditional settings with multifactor model through GARCH (1, 1) and GARCH-M Process. The results concludes that the risk premium is supportive to very few stocks and conditional multifactor CAPM is found more valid, provided that the macroeconomic variables taken as their lagged values. The consumption growth, call money rate, inflation rate and term structure are found effective and valid in explaining stock returns in Pakistani market while the foreign exchange, market returns and oil prices are found having a limited impact on asset prices. Javed & Ahmad (2009) observe the risk and return relationship for the period (1993-2004) and find that the conditional CAPM is better in explaining the risk return relationship than standard CAPM in Pakistan.

The considerable amount of work has been done in developed countries with the purpose to find out the risk return time varying relationship among macroeconomic, financial, instrumental and fundamental variables and asset prices. However a little works in the scenario of modern techniques has been carried out in emerging and developing countries like Pakistan. So there is a dire need to develop such kind of work in order to explore and capture time varying volatility for Pakistani equity market. It would be an important contribution to literature for future researchers and investors. Therefore CAPM in unconditional and conditional framework with multifactor model is developed in order to surge the pervasive risk sources in macroeconomic scenario and for determining the asset prices for both financial and non financial industries in Pakistan.

3. Research Methodology

The study determines the risk return relationship by applying unconditional and conditional multifactor CAPM. The individual company stock returns traded on Karachi stock exchange are used as dependent variable and macroeconomic forces and market returns are used as independent variable.

3.1. Data

In the present study, secondary data regarding all of the mentioned variables are used. The monthly data of stock prices, market prices and all economic variables are used in present research. The data is taken from the period January 2005 to August 2011. According to general view, data frequency does not deteriorate or improve the results (Davis, 1994). The various data sources are provided in table 1.

3.2. Sample Selection

The unconditional and conditional multifactor CAPM model is applied on monthly observations of one hundred (100) financial and non financial companies listed on KSE from the period January 2005 to August 2011[2].

Table 1: List of Macroeconomic Variables

[2] One hundred financial and non financial companies are listed in table A 1 in appendix A. The companies are selected with the availability of data and high market capitalization.

Macroeconomic Variables	Symbols	Data Derived Sources
Oil Prices Index	OP	OPEC Website
Foreign Exchange Rate (Nominal)	NEER	International Monetary Fund Website
Foreign Exchange Reserves	FEXR	International Monetary Fund Website
Inflation Rate (Whole Sale Price Index)	WPI	International Monetary Fund Website
Interest Rate (Call Money Rate)	CMR	State Bank of Pakistan Website
Money Supply	M 2	International Monetary Fund Website
Manufacturing Production Index	IPI	International Monetary Fund Website
Unemployment Rate	UNEMPR	State Bank of Pakistan Website
Market Returns as KSE 100 Index	MR	Karachi Stock Exchange Website
T Bill Rate	R_{fr}	State Bank of Pakistan Website

The companies are selected with the availability of data and high market capitalization. All of the companies are representative companies of their selected 18 sectors. The industry selection is made on the basis of high market capitalization and continuing listing on KSE over the whole period. The one fourth of the companies is the top companies during the whole data period (Jan 2005 to Aug 2011).

The eighty months data is taken from the period of Jan 2005 to Aug 2011. The monthly data of closing prices of the one hundred (100) individual companies, listed at Karachi stock exchange is obtained from the business recorder website. The monthly stock and market returns are calculated with the help of natural logarithm of current price divided by previous price. The three months t bill rate is used as risk free rate in the study and data is taken from the State Bank of Pakistan website. The KSE 100 index is used as market portfolio while the monthly data about economic variables like, oil prices, foreign exchange rate, foreign exchange reserves, inflation rate, interest rate, industrial production index, money supply and unemployment rate is obtained from the international monetary fund and OPEC websites.

3.3. Dependent and Independent Variables:

3.3.1 Dependent Variable

The individual company stock prices are taken as dependent variable for multifactor model in the present research. The stock prices are transformed into individual stock returns by taking natural logarithm of current price divided by previous price, indicated by R_{it}, which is stock returns for stock, i, for the time, t. The stock returns are calculated by:

$$R_{it} = \text{Ln}\left[\frac{P_t}{P_{t-1}}\right] \quad (1)$$

Where 'Ln' is a natural logarithm, P_t is the current price and P_{t-1} is the closing price of an asset at time t and at time t-1. The expected excess returns or individual security premiums are estimated through $ER_{it} = E(R_{it} - R_{fr})$. The risk free rate R_{fr} is the rate, which the investor certainly earns.

3.3.2 Independent Variables

Macroeconomic Risk Forces

The macroeconomic variables are used as risk proxies for the measurement of systematic risk. This insightful idea is used in order to capture the behaviour of co-movements among macroeconomic forces and stock returns. The idea behind the macroeconomic forces as risk proxies is derived mainly from the study of Chen et al., (1986) besides various numerous empirical studies. The market portfolio for aggregate wealth is suggested by standard CAPM. The KSE 100 index is used as proxy for the market return, which is in excess of the average t bill returns. The justification of macroeconomic forces used in multifactor model in predicting asset returns is described below.

A. Oil Prices

The oil prices are a pervasive source of risk that affects the asset returns. The oil prices as a risk proxy have been used in different studies like, Chen et al., (1986) and Panetta (2002). The monthly changes in oil prices are calculated with the help of given formula:

$$OP_t = \text{LN}\,(OP_t / OP_{t-1})$$

B. Exchange Rate

The exchange rate is the price of domestic currency in terms of foreign currency of United State dollars which affects the asset returns. The currency fluctuations deteriorate the investor expectations and disperse the cash flows. The exchange rate risk violates the purchasing power parity and affects the decision making of investor who takes interest in maximizing his wealth or minimizing his risk. The exchange rate has been used as risk factor in several studies like, Chen et al., (1986), Joulion (1991), Gerard & Desanta (1998), and Solnik (1994). The nominal effective exchange rate is used as proxy of foreign exchange rate in this study. The change in monthly exchange rate is formulated by:

$$NEER_t = \text{LN}\,(NEER_t / NEER_{t-1})$$

C. Foreign Exchange Reserves

The foreign exchange reserves also affect the stock returns. The increase in foreign exchange reserves have positive influence on asset returns and give more confidence to investor. The change in foreign exchange reserves can be estimated by:

$$FEXR_t = \text{LN}\,(FEXR_t / FEXR_{t-1})$$

D. Inflation Rate

The phenomenon exhibiting the inclination of upward movement in general price level of goods, services and fall in purchasing power is termed as inflation. The inflation rate risk causes the decrease in the value of asset. It roots the diminishing value of investments. It is also a source of risk affects the stock prices. It could be a source of risk to raise the production, manufacturing and commercial cost of assets and price swings. So change in inflation may be a risk premium in a multifactor model (Gertler & Grinols 1982, Gulltekin 1983, Nelson 1976, Chen et al., 1986). The inflation itself is not a bad thing but variation in inflation is bad because it deteriorates the investor decision making. The whole sale price index as a proxy of inflation is used in this study. The monthly changes in inflation rate are estimated with the help of formula given below:

$$WPI_t = \text{LN}\,(WPI_t / WPI_{t-1})$$

E. Interest Rate

The interest rate is an amount charged by lender to borrower by using his assets or money for some period and it is the annual percentage of principal amount. The interest rate risk is the fluctuation that changes the investment value inversely and this risk is minimized through diversification or hedging. The interest rate is frequently used as a risk factor in predicting stock returns in literature like, Merton (1973), Chen et al., (1986), Beenstock & Chan (1988), Dwyer & Hafer (1990), Ferson & Campbell (1991). The call money rate as risk proxy for short term interest rate is used in present study. The stock returns are also affected by short term interest rates. The monthly change in interest rate is calculated by given formula:

CMR_t = LN (CMR_t /CMR_{t-1})

F. Industrial Production

The industrial production index is also used in present study as a risk factor. The industrial production is a real sector indicator that also affects the investor expectations. The industrial production has also been frequently used as risk factor in literature (Chen et al., 1986, Sill 1995, Panetta 2002, West & Worthington 2003). Monthly change in industrial production is measured by given formula:

IPI_t = LN (IPI_t/IPI_{t-1})

G. Money Supply

The expansion and contraction of money supply also affects the stock returns. There are different policies and tools used by Government for the regulation of monetary policy. The literature suggests that money supply also affects the asset prices like, Beenstock & Chan, (1988), Ibrahim & Aziz (2003), Liow, Ibrahim, & Huang (2006) etc. M 2 is used as proxy for money supply in this study. The monthly money supply growth rate is estimated through:

$M2_t$ = LN ($M2_t$/$M2_{t-1}$)

H. Unemployment Rate

The unemployment rate also affects the stock returns. The more uncertainty about the employment forwards the more doubt in terms of lack of savings that disperses the investment results in asset prices fluctuations. The unemployment has also been used as a risk factor in several studies like, Gertler & Grinols (1982), Bennett & Kelleher (1988). The monthly growth rate changes in unemployment rate are calculated by:

$UNEMPR_t$ = LN ($UNEMPR_t$/$UNEMPR_{t-1}$)

I. Market Returns

The KSE 100 index prices are used for the purpose of measuring the market risk in a multifactor model. The market returns are used as an essential part to measure CAPM and to explain the market portfolio risk affecting the stock returns. The market prices as a compulsory factor have been used in all capital asset pricing theories. It is the base variable used to detect risk return relationship. The change in market returns are estimated through:

$KSE100_t$ = LN ($KSE100_t$/$KSE100_{t-1}$)

A diversity of macroeconomic variables influencing the asset returns have been used in literature. The present study uses those macroeconomic variables which are found influencing the stock returns significantly according to the business or information cycle in Pakistan. These variables are market return, interest rate (call money rate), foreign exchange rate (Nominal), treasury bill rate, growth of industrial production index, unemployment rate, money supply (M 2), foreign exchange reserves, inflation rate (whole sale price index) and oil prices.

3.4. Model Specification

The model is constructed following the multifactor capital asset pricing model (CAPM) in the specification of unconditional and conditional. Those macroeconomic variables are incorporated in model specification as risk proxies which are found affecting the stock prices outside of the market. The linkage of macroeconomic risk variables have been primarily developed by Chen et al. (1986). The modern techniques such as family of ARCH developed by Engle (1982) and GARCH –M by Engle, Lilien & Robins (1987) are used in order to capture the volatility clustering by loading the conditional information. The Autoregressive Conditional Heteroscedasticity (ARCH) allows the current conditional volatility which depends on the lagged or past squared residual error terms while the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) allows the current conditional variance that depends not only on the lagged or past squared residual error terms but also on the lagged or past conditional variance. The GARCH in Mean model is used for developing the relationship between stock returns and its own conditional variance.

3.4.1. The Unconditional Multifactor CAPM

The analysis is initiated with unconditional multifactor CAPM. The multifactor model comprised of expected stock returns having linear relationship with macro betas. The analysis have been applied on macroeconomic risk forces and investigated whether these economic variables could explain the stock returns in the equity market. The macroeconomic risk variables are included in the CAPM in order to estimate their significance in the Pakistani market perspective. The first step of analysis develops the relationship between changes in economic variables and the changes in stock returns. The estimation of unconditional multifactor CAPM is included on two step procedures of Fama & MacBeth (1973). First step is the time series regression of excess returns on all macroeconomic variable and market returns is executed in order to estimate macroeconomic betas. The Generalized Method of Moments (GMM) is applied for time series regression. Then slope coefficients or betas are used as independent variables and average excess stock returns are used as dependent variable in a cross sectional regression. The next step is the cross sectional regression of excess returns on economic and market coefficients. The Generalized Least Squares (GLS) method is applied for cross sectional regression. The monthly estimated coefficients of cross sectional regression give the average risk premiums related to those economic risk variables. Then the null hypothesis is developed that risk premium means of these estimated time series are equal to zero while‘t’ ratio is used for the significance of hypothesis. Then the study assumes that asset returns of stock ‘i’ is linear with ‘j’ economic variables and econometric model could possibly be written as:

$$E\,(r_{\downarrow}it) = E\,(\Sigma_{\downarrow}(j=1)^{\uparrow}j \equiv b_{\downarrow}jt\ \ f_{\downarrow}j) \qquad (3)$$

Or

$$r_{it} = b_{0t} + \sum_{j=1}^{j} b_{jt} f_j + \mu_{it} \qquad (4)$$

Where, b_{0t} are constants and b_{jt} are the factor coefficients of j economic variables and μ_{it} is the disturbance term. The market and macroeconomic coefficients (betas) are estimated and then Generalized Least Squares (GLS) regression model is applied in order to estimate the risk premiums on monthly basis. GLS model captured the volatility according to weight of the observations. Consequently, the study comes up with the equation as given below:

$$r_{it} = \gamma_0 + \sum_{j=1}^{j} \gamma_j b_{ijt} + \mu_{it} \qquad (5)$$

Where, γ_0 is the intercept and γ_j is the estimated slope coefficients of average risk premiums and b_{ijt} as estimated time series factor sensitivities measured by equation 4.

3.4.2. The Conditional Multifactor CAPM

After measuring unconditional CAPM, the model is extended for the purpose of capturing conditional multifactor CAPM. The conditional multifactor CAPM is also included on two step procedures. The first step is time series regression of excess returns on macro risk variables for estimation of risk coefficients. Then the second step is cross sectional regression (GLS) of excess returns on macro risk coefficients for the estimation of average risk premiums. The GARCH (1, 1) - M model is applied in order to analyse the conditional information regarding time varying variance. The final multifactor regression model appeared as:

$$r_{it} = b_{0t} + \sum_{j=1}^{j} b_{ijt} f_j + \sum_{i=1}^{p} \alpha_i r_{t-1} + \sum_{s=0}^{q} b_j \varepsilon_{t-1} + \theta_i f\left(\frac{1}{\sigma_t^2}\right) + \mu_{it} \qquad (6)$$

where

$$\varepsilon_t = \vartheta_t \sqrt{\sigma_t} \qquad (7)$$

and

$$\sigma_t = \emptyset_0 + \sum_{k=1}^{l} \emptyset_k \mu_{t-k}^2 + \sum_{m=1}^{s} \gamma_m \sigma_{t-m} \qquad (8)$$

The equation (6) indicates that b_{0t} is constant, b_{jt} is the slope coefficients of economic variables and μ_{it} is the error term. In equation (7), the unequal variance is decayed into ϑ_t that is homoscedastic with $\sigma_t^2 = 1$ and σ_t is the hetroskedastic by ARMA process. The out liars are wiped out using Histogram and Correlogram procedure for normal data distribution. Then the autoregressive and moving average process to make t value significant is done for applying ARCH affect. In equation (8), $\emptyset_k$ is the ARCH coefficient with order k and γ_m the GARCH coefficient with order m.

$$r_{it} = \gamma_0 + \sum_{j=1}^{j} \gamma_j b_{ijt} + \mu_{it} \qquad (9)$$

In equation (9), γ_0 is the intercept and γ_j is the estimated slope coefficient determining the average risk premiums regarding each economic factor and *t* test is used to test the significance of slope coefficients. The time varying conditional variance and covariance regarding each economic variable estimated through betas obtained by time series multifactor regression model. The time varying betas determined the nature of time varying risk premiums related to each economic variable. The multifactor regression model is:

$$r_{it} = E_{t-1}(r_1 it \mid I_{\downarrow}(t-1)) + \mu_{it} \qquad (10)$$

$$E_{t-1}(r_1 it \mid I_{\downarrow}(t-1)) = E_{t-1}\left[\sum_{j=1}^{j} b_{jt} f_j \mid I_{t-1}\right] \qquad (11)$$

$$r_{it} = b_{0t} + \left[\sum_{j=1}^{j} b_{jt} f_j \mid I_{t-1}\right] + \mu_{it} \qquad (12)$$

The conditional expectation is denoted by E_{t-1}, for given information I_{t-1} at time t-1 and b_{jt}, are the regression coefficients with j economic variables. The, μ_{it} is the disturbance term.

4. Empirical Results

The study employs macroeconomic variables as risk proxies additional to market returns in CAPM for asset pricing significance. The change in macroeconomic variables has been used to explain a change in asset returns and using multifactor CAPM in unconditional and conditional settings is used in order to develop risk return relationship among individual excess asset returns, macroeconomic variables and excess market returns. The multifactor CAPM model is applied to observe whether these economic risk proxies explain the asset returns more than what is suggested by single risk factor, the traditional CAPM. The study starts by using estimation of multifactor unconditional CAPM. The appendix table A 3 shows the results of economic risk coefficients estimated through GMM procedure. The results indicate that oil prices coefficients b_{OP} having mix signs but most of signs are negative, it means the rise in oil prices has adverse effect on stock returns. The rise in oil prices increases the compensation cost which negatively affects the asset returns. The exchange rate beta b_{NEER} of most of the asset returns is negative that shows exchange rate risk having negative effect on stock returns. The foreign exchange reserves coefficients b_{FEXR} are mostly positive that means increase in foreign exchange reserves gives more confidence to investor and leads to rise in asset returns in equity market. The foreign exchange reserves have a covariance risk. The parameters of inflation rate risk b_{WPI} are negative that means rise in inflation rate will decrease the asset returns thus making the investment less attractive. The coefficients of interest rate indicated by b_{CMR}, are mostly positive but are statistically insignificant. The money supply coefficients b_{M_2} are mixed in signs and have inconclusive results. The coefficients of industrial production b_{IPI} also have mix signs but mostly are insignificant that exhibits insecurity of real sector in country. There are some mixed and mostly insignificant signs of unemployment rate coefficients in this study as well, indicated by b_{UNEMPR}. That means unemployment rate exerts no effect in rise or decrease in asset returns. The signs of market returns coefficients b_{MR} are mostly positive and significant that means marker returns have a covariance risk with individual asset returns. The rise or fall in market returns will increase or decrease the asset returns in the equity market.

The results about the average risk premiums with unconditional multifactor CAPM are given in table 3 and the t values are given in * form indicating the significant difference from null hypothesis that manifesting average premiums as equal to zero.

Table 3: Average Risk Premiums with Unconditional Multifactor CAPM

Name of Factors	2005-06	2007-08	2009-11	2005-11
γ_0 (Constant)	0.0099	0.0011*	0.0003*	0.0002***
γ_{OP}	0.0009	0.0111***	0.0047	0.0035
γ_{NEER}	0.0002	-0.0007	0.0005	0.0004
γ_{FEXR}	0.0042	-0.0082***	0.0023	0.0030
γ_{WPI}	-0.0013	0.0029*	0.0020*	0.0010
γ_{CMR}	-0.2334***	-0.4199*	-0.1756***	-0.1899*
γ_{M2}	0.0040	0.0027	0.0008	0.0006
γ_{IPI}	0.0032	0.0146*	0.0052	0.0045
γ_{UNEMPR}	0.0138*	0.0059	-0.0012	0.0032
γ_{MR}	-0.0041	-0.0031	0.0038	0.0015
R^2	0.31	0.42	0.30	0.34

*significant at 1 % level, ** significant at 5 % level and *** significant at 10 % level.

The results show that the intercept terms are different from zero and significant for all sub periods except period 2005-06. The average risk premiums of oil prices are positive for all sub-periods and entire period but are significant only for the period of 2007-08. The average risk premiums about foreign exchange rate are positive for sub periods 2005-06, 2009-11 and entire period 2005-11 and negative for the period 2007-08 but having insignificant pricing behaviour for entire sample periods. The average premiums about foreign exchange reserves are positive but insignificant for the sub periods of 2005-06, 2009-11 and entire period 2005-11 and negative but significant for the period 2007-08. The results of the average risk premiums of inflation rate are negative but insignificant for the sub period 2005-06 and entire period 2005-11 and positive and significant for the sub periods 2007-08 and 2009-11. The call money rate risk negatively compensates in the market and risk premiums for all the sub periods and entire period are significantly negative. The rise in interest rate gives negative risk premiums in the market. The risk premiums related to money supply are insignificant for all sample periods. The industrial production index risk premiums are positive for all sample periods but significant only for the period 2007-08. The average premiums related to unemployment rate are only significant for the period 2005-06 that have positive effect in the market and inconclusive for all the periods. The average risk premiums of market return are negative for the sub periods 2005-06, 2007-08 and positive for the sub period 2009-11 and entire period 2005-11 but have rather vague and inconclusive results. The overall results show that the only call money rate significantly compensates in the market for all the periods but all other economic variables have limited and inconclusive results. The results of unconditional multifactor CAPM indicate that if market is inefficient that means all other economic variables have no significant price in the market. The present study results with unconditional multifactor CAPM are consistent with Chen et al. (1986) and Javed & Ahmad (2009) and against with Ferson & Harvey (1991).

The results of economic coefficients of multifactor conditional CAPM with GARCH (1, 1) – M settings are shown in appendix table A 4. The results are included on constants, sensitivity coefficients and conditional variance coefficients. The results report that the oil prices coefficients b_{OP} have mix signs but mostly are negative and most of the signs are insignificant. The oil prices have adverse affect on the excess returns but inconsistent with GARCH M specification. The exchange rates coefficients b_{NEER} are mostly negative and significant that means rise in exchange rate adversely affects the excess returns in the market. The coefficients of foreign exchange reserves b_{FEXR} are mostly positive that means foreign exchange reserves have positive impact on excess returns. The inflation rate coefficients are mostly negative that means the inflation rate adversely affects the stock returns. The call money rate coefficients b_{CMR} are mostly positive but insignificant. The money supply coefficients b_{M_2} are mostly negative and insignificant. The industrial production index coefficients b_{IPI} are mostly negative that shows instability of real sector in the country. The unemployment rate coefficients b_{UNEMPR} have mix signs but insignificant results. The market returns coefficients b_{MR} are mostly positive and significant that means market return have a positive impact on excess returns.

The results of average premiums of conditional multifactor CAPM with GARCH (1, 1) – M settings are shown in table 4. The t values are given in * form with null hypothesis thus showing risk premiums as equal to zero.

The all intercepts are different from zero and significant for the periods 2007-08 and 2005-11. The average risk premiums connected to oil prices are significant for all the periods. The oil prices risk premiums are negative for the sub period 2005-06 and positive for the sub period 2007-08, 2009-11 and entire period 2005-11. The results of oil prices risk premiums in conditional multifactor CAPM are more significant than those in unconditional multifactor CAPM in present study. The exchange rate risk premiums are negative for all periods but significant for the sub period 2009-11 and entire period for 2005-11.

Table 4: Average Risk Premiums with Conditional Multifactor CAPM in GARCH (1, 1)-M Specification:

Name of Factors	2005-06	2007-08	2009-11	2005-11
γ_0	0.0002	0.0008*	0.0002	0.0002***
γ_{OP}	-0.0210*	0.0371*	0.0365*	0.0193*
γ_{NEER}	-0.0002	-0.0022	-0.0029*	-0.0021*
γ_{FEXR}	0.0071	0.0128***	0.0108*	0.0097*
γ_{WPI}	0.0005	0.0079*	0.0084*	0.0059*
γ_{CMR}	-0.1296	-0.0503	0.0762	0.0161
γ_{M2}	0.0035	0.0132*	0.0082*	0.0067*
γ_{IPI}	0.0052	0.0023	-0.0005	0.0012
γ_{UNEMPR}	-0.0036	-0.0040	-0.0028	-0.0030
γ_{MR}	-0.0006	-0.0178*	-0.0016	-0.0011
R^2	0.37	0.55	0.41	0.39

*significant at 1 % level, ** significant at 5 % level and *** significant at 10 % level

The average risk premiums of foreign exchange reserves are positive for all the periods but significant for the sub periods 2007-08, 2009-11 and entire period 2005-11 that means increase in foreign exchange reserves give more average premiums to investors. The inflation rate average premiums are positive for all periods and significant for sub periods 2007-08, 2009-11 and entire period 2005-11. The average premiums connected with interest rate, industrial production and unemployment rate are insignificant for all the periods. The money supply average premiums are positive and significant for the sub period 2007-08, 2009-11 and entire period 2005-11. The increase in money supply will increase the excess returns in the market. The average premiums of market returns are negative for all the periods and only significant for sub period 2007-08. The average market premiums are inconclusive in this study. The conditional time varying variance have been added in the model and results show that the ARCH and GARCH coefficients are mostly positive and significant that means the residuals and time varying variance have positive impact on asset returns.

The results of conditional multifactor CAPM are more consistent, varied and significant than unconditional multifactor CAPM in this study. The results show that conditional information and time varying variance contribute to better future ends. The results are consistent with the study by Jagannathan & Wang (1996), Ahmad & Zaman (1999), Iqbal & Brooks (2007, 2008), Javed A. Y. (2008, 2009).

The theory of standard CAPM states that there is a positive relationship among market risk and returns and market risk is sufficient as single risk proxy for all portfolios of assets. But the results have shown that standard CAPM theory is inconsistent with present study because other macroeconomic risk variables have also compensated the asset price significance. The study has shown that other economic risk events are more prominent than market risk. The study also indicates that conditional information and time varying conditional variance predict better future prices than unconditional information and static variance.

5. Conclusions

The objective of the study is to investigate the risk return relationship by developing multifactor CAPM model in explaining the future stock returns in Pakistan. The macroeconomic variables are loaded as additional risk forces in the multifactor model. The capital asset pricing model is specified in unconditional and conditional information. The Generalized Method of Moments (GMM) model is used to calculate the unconditional betas and GARCH (1 -1) M model is used to calculate the conditional betas in multifactor model. Then these estimated betas are used as independent variables in multifactor CAPM to determine the average risk premiums. The Generalized Least Square (GLS) model is applied to capture the average risk premiums.

The study develops the risk return relationship by incorporating macroeconomic risk variables as pervasive and systematic source of risk in addition to market risk in traditional CAPM. The study results are contradicted with the basic positive trade off theory developed by Sharpe (1964) and Lintner (1965). The study concludes that market risk premiums have negative and insignificant signs in most of the sample periods in Pakistani market perspective. The macroeconomic risk variables have been found helpful in explaining average risk premiums in this study. The monthly data of asset returns of one hundred (100) financial and non financial companies listed on KSE and also monthly data of market returns and macro events are observed for the period of January 2005 up till August 2011. The multifactor unconditional CAPM plays a limited role in this study. Then conditional information is added as lagged macroeconomic variables in multifactor CAPM. The conditional multifactor CAPM is found exhibiting better and convincing role in explaining time varying future asset returns while economic variables, found having a significant role in this study, are oil prices, foreign exchange rate, foreign exchange reserves, inflation rate, interest rate, and money supply. The industrial production index, unemployment rate and market returns are found having inconclusive results in Pakistani market perspective for this study. The residuals and conditional variance have also played a positive and significant role in explaining expected stock returns. So the study results conclude that macroeconomic variables as systematic source of risk have better results in explaining stock returns than single market risk proxy.

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Appendix A Table A 1: Name of sectors and listed companies included in a sample

Sectors	S. No.	Name of Company	Symbols
A. Oil & Gas	1	Mari Gas Company	MARI
	2	Pakistan State Oil	PSO
	3	Shell Pakistan	SHEL
	4	Attock Petroleum	APL
	5	Pak Petroleum Ltd.	PPL
B. Pharma and Bio Tech	6	Abbot Laboratories	ABOT
	7	Feroze Sons	FEROZ
	8	Wyeth Pakistan Ltd.	WYETH
C. Food Producers	9	Nestle Pakistan	NESTLE PAK
	10	Unilever Pakistan	ULEVER
	11	AL-Noor Suger Mills	ANRS
	12	Rafhan Maize XD	RMPL
	13	JDW Sugar Mills Ltd.	JDWSR
	14	Al Abbas Sugar Mills Ltd.	AABS
	15	Habib Sugar Mills	HABSM
	16	Shakarganj Sugar Mills Ltd	SGML
	17	Faran Sugar Mills Ltd	FRNM
	18	Noon Sugar Mills Ltd	NONS
D. Industrial Engineering	19	Alghazi Tractors	AGTL
	20	Hino Pak Motors	HINO
	21	Millat Tractors	MTL
	22	K.S.B.Pumps	KSBP
	23	Pak Engineering	PECO
E. Automobile & Parts	24	Atlas Hondas	ATHL
	25	Honda Atlas	HOND
	26	Generel Tyre & Rubber Co. Ltd.	GTYR
	27	Pak Suzuki Motors	PSMC
	28	Atlas Batteries	ATBA
	29	Exide Batteries	EXIDE
	30	Dewan Motors	DFML
F. Construction & Materials	31	Attock Cement	ACPL
	32	Best Way Cement	BWCL
	33	Cherat Cement	CHCC
	34	DG Khan Cement	DGKC
	35	Dandot Cement	DNCC
	36	Fauji Cement Co Ltd.	FCCL
	37	Javedan Cement	JVDC
	38	Kohat Cement	KOHC
	39	Lucky Cement	LUCK
	40	Maple Leaf Cement	MLCF
	41	Pioneer Cement Co Ltd.	PIOC
	42	Fecto Cement Co Ltd.	FECTC
	43	Dadabhoy Cement Co Ltd.	DBCI
G. Tobacco	44	Philips Morris Pakistan	PMPK
	45	Pakistan Tobacco	PAKT
H. Chemicals & Fertilizers	46	Dawood Hercules Chemicals	DAWH
	47	Engro Chemicals	ENGRO
	48	Fauji Fertilizer Company	FFCL
	49	ICI Pakistan	ICI
	50	Sitara Chemical Ltd	SITC
	51	Lotte Pak PTA Ltd	LOTPTA
	52	Clariant Pakistan	CLPA
I. Textile	53	Suraj Cotton Mills Ltd	SURC
	54	Kohinoor Mills	KML
	55	Shahtaj Textiles Ltd	STJT
	56	Artistic Demin Mills Ltd	ADMM
	57	Dawood Lawrencpur Textile	DLL
	58	Masood Textile	MSOT
	59	Nishat (Chunian) Ltd	NCLR
	60	Quetta Textile Mills	QUETR
	61	Sapphire Fibers Ltd	SFL
J. Gas Water and Multiutilities	62	Sui North Gas	SNGP
	63	Sui South Gas	SSGP
K. Banks	64	Askari Bank	ACBL

	65	Bank of Punjab	BOP
	66	Bank Al Habib	BAHL
	67	Faysal Bank Limited	FABL
	68	MCB Bank	MCB
	69	Bank Al-Falah	BAFL
	70	Soneri Bank	SNBL
	71	NIB Bank Limited	NIB
	72	Habib Metropolitan Bank	HMB
	73	Meezan Bank	MBL
	74	SAMBA BANK	SBL
	75	National Bank	NBP
L. Non Life Insurance	76	Adamjee Ins	AICL
	77	IGI insurance	IGIIL
	78	New Jubilee Insurance	NJICL
M. General Industries	79	Tri Pack Films Ltd.	TRIPF
	80	Packages Limited	PACK
	81	Siemens Pak	SIEM
N. Electronic and Electrical Equipment	82	Pakistan Cables Ltd.	PCAL
O. Food & Personal Care Products	83	Murree Brewery Co.	MURE
	84	Clover Pakistan Ltd.	CLOV
	85	Mithchells Fruit	MFFL
	86	National Foods Ltd.	NATF
P. Personal Goods	87	BATA Company Ltd.	BATA
	88	Service Industries Ltd.	SRVI
	89	Colgate Palmolive	COLG
	90	Crescent Textile Mills Ltd.	CRTM
	91	Gillette Pakistan Co Ltd.	GLPL
	92	Gul Ahmed Textile Mills Ltd.	GULT
	93	Ibrahim Fibres Ltd.	IBFL
	94	Indus Dyeing & Manufacturing Co Ltd.	IDYM
	95	Nishat Mills Ltd	NML
	96	Treet Corporation	TREET
Q. Forestry & Paper	97	Security Paper	SEPL
	98	Pak Paper Prod	PPP
R. Fixed Line Telecommunication	99	Pakistan Telecommunication Ltd.	PTC
	100	Telecard Ltd.	TELE

Table A2: Descriptive Statistics of Daily Stock Returns

Company	No. of Obs.	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
AABS	1635	-0.00083	0.11	-4.43	350.05	8210401
ABOT	1635	-0.00035	0.02	-1.82	21.36	23868
ACBL	1635	-0.00145	0.03	-3.31	38.52	88924
ACPL	1635	-0.00021	0.03	-0.68	11.01	4496
ADMMP	1635	-0.00143	0.05	-22.24	735.34	36672140
AGTL	1635	0.00013	0.02	-0.72	11.42	4979
AICL	1635	-0.00022	0.03	-0.13	3.13	6
ANSR	1635	0.00082	0.03	-0.09	4.42	139
APL	1635	0.00043	0.03	-0.46	114.06	840364
ATBA	1635	0.00043	0.03	-1.97	21.08	23327
ATHL	1635	-0.00041	0.03	-2.29	28.12	44421
BAFL	1635	-0.00089	0.03	-0.83	13.15	7207
BAHL	1635	-0.00040	0.04	-1.93	44.19	116574
BATA	1635	0.00136	0.02	0.08	5.03	283
BOP	1635	-0.00155	0.03	-0.99	12.98	7045
BWCL	1635	-0.00083	0.03	-0.13	5.24	346
CHCC	1635	-0.00135	0.03	-0.15	5.14	317
CLOVER	1635	-0.00025	0.03	-1.42	14.94	10264
CLPA	1635	-0.00028	0.02	-4.10	59.42	221409
COLG	1635	0.00058	0.03	-2.43	37.16	81076
CRTM	1635	-0.00091	0.03	-0.04	2.59	12
DAWH	1635	-0.00099	0.04	-20.46	656.92	29245518
DBCI	1635	-0.00113	0.05	0.43	12.69	6453
DFML	1635	-0.00153	0.06	1.11	90.65	523703
DGKC	1635	-0.00063	0.03	-0.23	3.98	80
DLL	1635	-0.00078	0.03	-0.15	3.77	47
DNCC	1635	-0.00116	0.07	-0.04	12.02	5546
ENGRO	1635	-0.00004	0.02	-0.39	6.02	663
EXCIDE	1635	0.00055	0.02	-0.84	12.37	6172
FBL	1635	-0.00096	0.03	-0.53	7.80	1647

FCCL	1635	-0.00101	0.11	-5.30	698.64	32974678
FECTC	1635	-0.00101	0.03	-0.13	8.38	1976
FEROZ	1635	-0.00050	0.02	-2.81	29.37	49513
FFCL	1635	0.00007	0.02	-2.87	34.96	71819
FRNM	1635	0.00009	0.03	-0.18	6.90	1047
GLPL	1635	-0.00009	0.03	-0.11	3.54	23
GTYR	1635	-0.00036	0.03	0.02	5.34	372
GULT	1635	-0.00030	0.02	-0.25	5.80	553
HABSM	1635	-0.00039	0.03	-4.52	52.04	169399
HINO	1635	-0.00033	0.02	-0.24	4.15	106
HMB	1635	-0.00083	0.03	-4.97	65.18	270144
HOND	1635	-0.00132	0.03	-3.92	62.76	247460
IBFL	1635	-0.00021	0.02	-0.04	3.64	28
ICI	1635	0.00021	0.02	-0.03	3.77	41
IDYM	1635	0.00096	0.03	-0.23	3.85	63
IGIIL	1635	-0.00078	0.03	-4.69	59.98	227158
JDWSR	1635	0.00017	0.03	-1.40	15.68	11485
JVDC	1635	0.00081	0.03	-5.85	128.94	1089871
KML	1635	-0.00192	0.04	0.14	8.54	2099
KOHC	1635	-0.00147	0.03	-0.67	15.06	10024
KSBP	1635	-0.00027	0.02	-0.22	3.69	46
LOTPTA	1635	0.00000	0.04	0.26	23.28	28047
LUCK	1635	0.00035	0.03	-0.09	3.27	7
MARI	1635	-0.00009	0.03	-5.73	124.73	1018399
MBL	1635	0.00005	0.03	-0.76	10.93	4443
MCB	1635	0.00062	0.03	-0.27	4.23	123
MFFL	1635	-0.00007	0.02	-0.06	3.82	47
MLCF	1635	-0.00112	0.08	2.86	191.82	2431048
MR	1635	0.00035	0.02	-0.35	5.00	306
MSOT	1635	-0.00026	0.03	-1.00	19.05	17825
MTL	1635	0.00036	0.02	-4.78	60.75	233447
MURE	1635	0.00011	0.03	-1.10	11.72	5509
NATF	1635	-0.00047	0.05	-24.80	845.87	48565335
NBP	1635	-0.00048	0.03	-1.63	16.94	13970
NCLR	1635	-0.00107	0.03	-0.72	12.82	6705
NESTLE	1635	0.00123	0.03	4.62	66.33	279060
NIB	1635	-0.00178	0.04	-7.08	172.77	1977075
NJICL	1635	-0.00016	0.03	5.04	153.14	1542614
NML	1635	-0.00035	0.03	-0.19	3.61	36
NONS	1635	-0.00130	0.03	-0.73	8.63	2304
PACK	1635	-0.00039	0.02	-0.04	4.38	131
PAKT	1635	0.00013	0.02	0.11	3.25	7
PCAL	1635	-0.00092	0.03	-3.51	48.59	144980
PECO	1635	-0.00030	0.08	0.73	679.57	31183939
PIOC	1635	-0.00097	0.03	-0.05	4.95	261
PMPK	1635	-0.00047	0.02	-0.19	5.60	470
PPL	1635	0.00021	0.02	-0.79	9.12	2719
PPP	1635	-0.00015	0.03	-4.01	123.41	992100
PSMC	1635	-0.00048	0.02	-1.75	29.34	48083
PSO	1635	-0.00014	0.02	-0.03	4.10	83
PTC	1635	-0.00084	0.02	-0.24	5.10	317
QUETR	1635	-0.00031	0.02	-0.01	5.34	374
RMPL	1635	0.00092	0.02	-0.12	5.34	376
SBL	1635	-0.00129	0.04	-0.02	6.42	796
SEPL	1635	-0.00100	0.02	-3.33	41.30	102946
SFL	1635	0.00017	0.02	0.23	6.34	773
SGML	1635	-0.00148	0.04	0.02	6.18	689
SHEL	1635	-0.00057	0.02	-2.99	40.83	99930
SIEM	1635	0.00020	0.02	-0.13	3.96	68
SITC	1635	-0.00014	0.02	-0.04	4.01	70
SNBL	1635	-0.00135	0.03	-2.16	26.90	40179
SNGP	1635	-0.00074	0.02	-0.04	4.21	100
SRVI	1635	0.00114	0.03	0.00	2.77	4
SSGP	1635	-0.00016	0.04	1.80	29.09	47246
STJT	1635	-0.00025	0.02	-0.83	12.66	6547
SURC	1635	-0.00030	0.03	-0.32	5.43	431
TELE	1635	-0.00144	0.05	0.24	19.72	19060
TREET	1635	-0.00114	0.06	-31.39	1167.39	92633073
TRIPF	1635	0.00057	0.02	-0.03	3.74	38
ULEVER	1635	0.00080	0.02	0.02	6.02	621
WYETH	1635	-0.00016	0.03	0.11	13.32	7266

Table A3: The Coefficient of Unconditional Multifactor CAPM with GMM Specification

Company	b_o	b_{op}	b_{NFER}	b_{FEXR}	b_{WPI}	R^2
MARI	-0.0006*	0.0850*	0.1330	0.0546***	-0.2608***	0.69
PSO	0.0006	0.0672*	0.0990*	0.0180	-0.1785*	0.58
SHEL	0.0000	-0.0451*	-0.0625*	0.0275*	-0.1204***	0.57
APL	0.0015	-0.0422*	-0.0754*	0.0447*	-0.2386*	0.34
PPL	0.0010	0.0695*	0.0976*	0.0110	-0.2131***	0.56
ABOT	-0.0005	-0.0649*	-0.1232*	0.0212	-0.2561*	0.12
FEROZ	0.0009	0.0525*	-0.1120*	-0.0416*	-0.0176*	0.15
WYETH	-0.0018	-0.0142	-0.0329*	0.0025	0.1401*	0.13
NES PAK	0.0027***	0.0098	-0.0883*	-0.0027	-0.0507	0.35
ULEVER	0.0011*	-0.0131	0.0077	0.0089	0.0416	0.49
ANRS	-0.0003	0.0926*	0.1909*	0.0418	-0.2904	0.76
RMPL	0.0044*	-0.0216*	0.0541*	-0.0030	-0.1331*	0.11
JDWSR	-0.0004	-0.0565*	-0.0830*	0.0512*	-0.1090	0.49
AABS	0.0049	0.0176	0.6840*	-0.0511*	0.1250	0.74
HABSM	-0.0021	0.0723*	-0.1387*	0.0375	-0.3083*	0.16
SGML	-0.0026	-0.0919*	-0.3508*	0.0534	-0.1116	0.54
FRNM	-0.0015	-0.0131	0.1322*	0.0107	0.2191*	0.49
NONS	-0.0010*	0.0836*	0.2698*	0.0409	-0.1735	0.55
AGTL	0.0028*	0.0259*	-0.0690*	0.0067	-0.1105*	0.44
HINO	0.0072*	0.0495*	-0.0596	-0.0204	-0.2728*	0.30
MTL	-0.0004	-0.0674*	-0.0842*	0.0587*	-0.1761	0.34
KSBP	0.0059*	0.0350*	0.0644*	-0.0155	-0.2309*	0.32
PECO	0.0043*	-0.0463	-0.0724	0.0420	-0.0828	0.17
ATHL	0.0028*	0.0230	-0.0561*	0.0020	-0.0650	0.25
HOND	-0.0002	-0.0872*	-0.1075*	0.0570***	-0.2064	0.44
GTYR	0.0030**	0.0258***	0.0913*	0.0081	-0.0943	0.32
PSMC	0.0007	0.0596*	0.0895***	0.0518***	-0.2481*	0.26
ATBA	0.0000	-0.0902*	-0.1048*	0.0674	-0.2100***	0.33
EXIDE	-0.0011	-0.0956*	-0.1281*	0.0718*	-0.1599	0.35
DFML	-0.0016	0.0758*	-0.2462*	0.0432	-0.1499	0.55
ACPL	0.0012	-0.0624*	0.1256*	0.0278	-0.2582*	0.29
BWCL	-0.0080***	-0.0166	-1.3427*	0.0576***	-0.4419***	0.23
CHCC	0.0003	0.0615*	-0.1509*	0.0168	-0.1926*	0.15
DGKC	0.0003	-0.0963*	0.1886*	0.0352	-0.3214*	0.18
DNCC	-0.0089*	-0.0211*	-1.5208**	0.0604	-0.4684	0.32
FCCL	0.0012	0.0649*	0.1413*	0.0175	-0.2485*	0.56
JVDC	0.0003	0.0040	0.0294**	0.0072	0.0198	0.54
KOHC	-0.0015	-0.0224	-0.0941*	0.0026	0.0481	0.29
LUCK	0.0006	-0.0946*	-0.1650*	0.0371	-0.2526*	0.31
MLCF	0.0008	-0.0089	0.0945*	-0.0318	0.0640	0.48
PIOC	0.0022	0.0015	-0.1252*	-0.0058	-0.0598	0.36
FECTC	-0.0034*	-0.0108	-0.1007*	0.0138	0.1694**	0.20
DBCI	-0.0011	0.0866*	0.2815*	0.0280	-0.1535	0.12
PMPK	0.0007	0.0047	-0.0683*	-0.0051	-0.0128	0.30
PAKT	0.0044*	-0.0256	-0.0564*	0.0253	-0.1692**	0.46
DAWH	-0.0015	-0.0322	0.0481**	-0.0010	0.2709**	0.23
ENGRO	0.0005	0.0702*	-0.1040*	0.0308***	-0.1726***	0.69
FFCL	0.0011	-0.0482*	-0.0133	0.0245***	0.0814	0.64
ICI	0.0034	-0.0885*	-0.0365	0.0757*	0.0235	0.32
SITC	0.0000	0.0487*	0.0823*	0.0362	-0.1417*	0.38
LOTPTA	-0.0013	0.0786*	-0.1337*	0.0570*	-0.0085	0.46
CLPA	-0.0007	-0.0425*	-0.0734*	0.0474***	-0.1233	0.18
SURC	0.0023	0.0083	0.1254*	-0.0132	0.0449	0.36
KML	-0.0035***	-0.0573*	0.1649*	0.0527**	-0.0164	0.14
STJT	0.0033*	0.0169	-0.1405*	-0.0113	-0.0236	0.24
ADMM	0.0006	-0.0077	0.0600*	-0.0055	-0.0203	0.58
DLL	0.0015	0.0377***	0.1263*	-0.0009	-0.0674	0.51
MSOT	0.0005	0.0093	-0.0740*	-0.0073	0.0327	0.21
NCLR	-0.0020	-0.0653*	-0.1229*	0.0474**	-0.1303	0.11
QUETR	-0.0010	-0.0025	0.0737*	-0.0019	0.0784	0.34
SFL	0.0000	0.0559*	0.0897***	0.0367	-0.1886	0.24
SNGP	0.0014	-0.0664*	-0.1288*	0.0334*	-0.3050	0.14
SSGP	0.0031	-0.0838*	-0.0077	0.0553*	0.0497	0.27
ACBL	0.0058***	-0.1369*	-0.0813	0.1205*	-0.1489	0.12

BOP	0.0004	-0.1203*	0.1853*	0.0463	-0.5699*	0.19
BAHL	0.0014	0.0598*	-0.1197	0.0180*	-0.2954	0.36
FABL	0.0037	-0.1018*	-0.0230	0.0701*	-0.0543	0.48
MCB	0.0014	0.0663*	0.1228*	0.0419***	-0.2371*	0.32
BAFL	-0.0006	-0.1029*	0.1638*	0.0464	-0.3277*	0.65
SBL	0.0045	-0.1110*	0.0037	0.0482	-0.0438	0.49
NIB	-0.0004	0.0884*	-0.1632*	0.0363	-0.3307*	0.52
HMB	-0.0005	0.0864*	-0.2358*	0.0391	-0.3285*	0.59
MBL	0.0000	-0.0543*	-0.1420*	0.0237	-0.1468	0.39
SNBL	-0.0002	0.1000*	0.1880*	0.0333	-0.3497*	0.47
NBP	0.0025	-0.1001*	0.1700*	0.0298	-0.4408*	0.34
AICL	0.0043	-0.0447**	-0.0793**	0.0441	-0.3217***	0.67
IGIIL	0.0001	0.0712*	0.1234*	0.0558*	-0.3175*	0.51
NJICL	-0.0009	-0.0194*	-0.1091	0.0223	-0.0457	0.25
TRIPF	0.0002	0.0658*	-0.0967*	0.0422***	-0.1908*	0.39
PACK	0.0007	-0.0708*	0.1085*	0.0220	-0.2657*	0.64
SIEM	-0.0038	-0.0275*	0.1124*	-0.0125	0.1474*	0.68
PCAL	-0.0002	0.0680*	0.1466*	0.0594*	-0.1753***	0.41
MURE	-0.0006	0.0165	-0.0638*	0.0236**	-0.0226	0.31
CLOV	-0.0005	-0.0615*	0.1342*	0.0388	-0.1445	0.54
MFFL	-0.0002	-0.0047	-0.0569*	-0.0066	-0.0237	0.48
NATF	0.0042*	-0.0081	-0.0796*	-0.0470*	-0.1127	0.45
BATA	-0.0014	-0.0732*	0.1755***	0.0600**	0.7145*	0.56
SRVI	0.0008	0.0866*	0.0982*	0.0738*	-0.2056	0.34
COLG	0.0054*	0.0422*	0.0710*	-0.0195	-0.1824***	0.38
CRTM	0.0020	-0.0228*	-0.1185*	-0.0185	-0.1294	0.42
GLPL	0.0009	-0.0061	0.0317*	-0.0004	0.0023	0.31
GULT	0.0029*	-0.0326*	-0.1061*	-0.0386*	-0.1644*	0.38
IBFL	-0.0020	-0.0392*	0.0865*	0.0512*	-0.0229	0.46
IDYM	0.0015	0.0001	0.0907*	-0.0056	0.0624	0.51
NML	0.0001	-0.0976*	0.1621*	0.0273	-0.2911*	0.39
TREET	-0.0006	-0.0032	-0.0900*	0.0083	0.1097	0.32
SEPL	-0.0008	0.0516*	0.1162*	0.0308*	-0.1666***	0.34
PPP	0.0034*	-0.0392*	-0.0948*	-0.0248	-0.1110	0.36
PTC	-0.0011	-0.0726*	0.1375*	0.0365***	-0.1484	0.29
TELE	-0.0007	-0.0809*	0.1701*	0.0373	-0.2141	0.41

***significant at 1 % level, ** significant at 5 % level and *** significant at 10 % level

Table A3: The Coefficient of Unconditional Multifactor CAPM with GMM Specification (Continued)

Company	b_0	b_{CMR}	b_{M2}	b_{IPI}	b_{UNEMPR}	b_{MR}	R^2
MARI	-0.00062*	0.00189	0.07135	0.00642	0.01717	0.04491***	0.54
PSO	0.00060*	0.00120	0.00767	0.00496	0.01090	0.04553*	0.45
SHEL	-0.00004	0.00091	-0.01799	0.00599	0.01215	0.01435	0.31
APL	0.00147*	0.00051	-0.00347	0.00192***	-0.01754*	-0.03624	0.27
PPL	0.00096	0.00099	0.00196	0.02125	0.00090	0.06361*	0.56
ABOT	-0.00048*	0.00152*	0.13719*	0.00465	0.00562	0.04720*	0.47
FEROZ	0.00091*	0.00009	-0.05207	0.00113	0.01907**	0.04560**	0.33
WYETH	-0.00178	0.00108	-0.0992*	-0.01546	0.00791	-0.02863*	0.39
NES PAK	0.00269*	0.00095*	-0.01830	0.00955	0.00501*	0.00016	0.24
ULEVER	0.00110*	0.00006	-0.0362*	0.00533	0.00130	0.00642	0.65
ANRS	-0.00030	0.00245**	0.11026**	0.00571	-0.00368	0.04606*	0.57
RMPL	0.00440*	0.00028	-0.09738*	0.01513	-0.01846	0.00210	0.26
JDWSR	-0.00044	0.00023	-0.00991	0.00692	0.01270	0.01710	0.29
AABS	0.00485	0.00008	-0.08929	-0.01397	-0.00854	0.03450	0.75
HABSM	-0.00205	0.00085	0.24970*	-0.02187	-0.01202	0.06734*	0.34
SGML	-0.00259	0.00249*	0.07030	-0.00701	-0.02535	0.05365*	0.45
FRNM	-0.00146	-0.00030	-0.12584*	-0.04247*	0.01597*	0.00454	0.43
NONS	-0.00099	0.00153*	0.02534	-0.00208	-0.00955	0.06914*	0.47
AGTL	0.00276*	0.00000	-0.04669	-0.00535	-0.00553	0.02345*	0.71
HINO	0.00716*	-0.00081	-0.1014**	-0.02218	-0.0257**	0.07563*	0.24
MTL	-0.00044	0.00171	-0.02270	0.01038	-0.03651	0.01882	0.30
KSBP	0.00591*	-0.00215*	-0.08533	-0.02995*	0.00608	0.06212*	0.45
Company	b_0	b_{CMR}	b_{M2}	b_{IPI}	b_{UNEMPR}	b_{MR}	R^2
PECO	0.00427*	-0.00085	-0.00765	-0.00106	0.01428	-0.03635	0.53
ATHL	0.00282*	0.00034	-0.06086	-0.02174	-0.03723*	0.04019	0.43
HOND	-0.00016	0.00129	-0.09002	-0.0218***	0.01192	0.04704*	0.25

GTYR	0.00297*	0.00095	-0.10502*	0.00629	0.01154	0.01992***	0.35
PSMC	0.00069	0.00026	0.00991	-0.00390	-0.02522	0.04742*	0.41
ATBA	-0.00003	0.00131	0.02361	0.01903	0.02602**	0.05957*	0.31
EXIDE	-0.00106	0.00187*	0.03923	0.00923	0.00615	0.03974***	0.38
DFML	-0.00163	0.0019***	-0.00650	0.02433	-0.00480	0.04544	0.27
ACPL	0.00121	0.0015***	-0.00868	0.00294	0.00070	0.01933	0.48
BWCL	-0.00800	0.00022	0.28732	-0.04028	0.01816	-0.02087	0.56
CHCC	0.00031*	0.00212	-0.0603**	-0.00106	-0.01261	0.01406	0.47
DGKC	0.00031	0.00292**	0.02606*	0.02401	-0.00004	0.04443	0.52
DNCC	-0.00890*	-0.0034**	0.28947*	-0.04880	-0.02828	-0.01362	0.16
FCCL	0.00122	0.001***	-0.073***	0.00090	-0.00697	0.03419*	0.30
JVDC	0.00027	0.00032	-0.02667	-0.01082	0.06523	0.00023	0.34
KOHC	-0.00152	0.00107	0.02779	0.00978	-0.01907	-0.04548**	0.25
LUCK	0.00058	0.00234*	0.03727	0.01492	0.00473	0.05372*	0.47
MLCF	0.00075	0.00315	-0.13514	-0.06595**	0.00494	0.04047	0.19
PIOC	0.00223	0.00035	-0.09046	0.04150*	-0.01256	-0.034***	0.35
FECTC	-0.00342*	-0.00036	-0.03732	-0.00067	0.01452	-0.00355	0.43
DBCI	-0.00111	0.00152	0.03112	0.00542	-0.00468	0.06352	0.29
PMPK	0.00066	-0.00192*	0.00699	-0.03510*	-0.00922	0.03282	0.55
PAKT	0.00435*	0.00089	-0.11392*	-0.00523	0.00445	0.02220*	0.36
DAWH	-0.00149	0.00018	0.03161	0.00544	-0.01689	0.01709	0.44
ENGRO	0.00050	0.00144	-0.02446	0.01549	0.00473	0.03708*	0.69
FFCL	0.00109	-0.00049	-0.05030	0.00451	0.00101	-0.029***	0.50
ICI	0.00343	-0.00053	-0.05781	0.00127	-0.00179	-0.06662*	0.55
SITC	-0.00001	0.00191*	0.00455	0.00948	-0.00170	0.00475	0.61
LOTPTA	-0.00131	0.00122	-0.05205	0.03239	-0.00177*	0.07140*	0.46
CLPA	-0.00067	0.00181	0.01744	-0.02666	0.01278	0.02855*	0.26
SURC	0.00229	-0.00128*	-0.00235	-0.02029	-0.0070**	0.05723*	0.36
KML	-0.003***	0.00327*	0.04882	-0.01891	0.00702	0.05173*	0.62
STJT	0.00333*	-0.001***	-0.062***	-0.00646	0.00146	0.08166*	0.67
ADMM	0.00060	-0.00033	0.07067	-0.01692	-0.01548	0.02540	0.29
DLL	0.00149	0.00088	-0.07023	0.02792***	0.01145	0.02029	0.37
MSOT	0.00048	-0.00012	0.03969	0.00426	0.01572	0.02247	0.56
NCLR	-0.00198	0.00137	0.01391	-0.00644	0.00275	0.02249	0.48
QUETR	-0.00101	-0.00028	-0.01557	0.00180	-0.01591	0.02750	0.33
SFL	0.00005	-0.00026	0.10351	0.03605	0.00080	0.05563	0.45
SNGP	0.00141	0.00082	-0.0580**	0.03085*	0.01390	0.02788*	0.63
SSGP	0.00312	-0.00108	-0.06748	0.01742	-0.01550	-0.067***	0.38
ACBL	0.005***	0.00045	-0.06979	-0.01537	0.01267	-0.07***	0.31
BOP	0.00035	0.002***	0.07869	-0.00696	-0.02033	0.049***	0.26
Company	b_0	b_{CMR}	b_{M2}	b_{IPI}	b_{UNEMPR}	b_{MR}	R^2
BAHL	0.00139	0.00064	0.02668	0.03170*	-0.00167	0.03924*	0.38
FABL	0.00375	0.00004	-0.05258	-0.00209	0.01945	-0.076***	0.56
MCB	0.00139	0.00069	0.03136	-0.00153	0.00395	0.043***	0.46
BAFL	-0.00060	0.002***	0.04156	0.00278	0.01820	0.044**	0.43
SBL	0.00448	-0.00035	-0.07490	-0.01394	0.00575	-0.05***	0.25
NIB	-0.00041	0.00027	0.01395	0.00818	-0.00200	0.05793*	0.28

HMB	-0.00050	0.00184	0.10168	0.01544	-0.00462	0.04610	0.34
MBL	-0.00003	0.00080	0.04398	0.00413	0.01093	0.033***	0.73
SNBL	-0.00015	0.00101	0.00458	0.03011	0.01726	0.03553	0.58
NBP	0.00250	0.001***	-0.04324	0.01387	0.00331	0.044***	0.64
AICL	0.004***	0.00002	-0.08615	0.021***	-0.02831	-0.00831	0.28
IGIIL	0.00008	0.002**	0.07402	0.01682	-0.03744*	0.039***	0.46
NJICL	-0.00094	0.00244*	0.05205	0.01646	-0.00385	0.02926*	0.31
TRIPF	0.00025	0.00082	0.05928	0.01684	0.00971	0.03740*	0.39
PACK	0.00072	0.00097	0.03361	0.02548	-0.0019*	0.041**	0.27
SIEM	-0.00385*	-0.00059	0.00729	0.00748	-0.01836*	-0.01397	0.54
PCAL	-0.00021	0.00280*	-0.00894	-0.00982	0.01811	0.024**	0.55
MURE	-0.00061	0.00157*	0.02208	-0.00115	-0.01911*	-0.00009	0.41
CLOV	-0.00045	0.00031	0.07672	-0.00361	-0.00951	0.02418	0.44
MFFL	-0.00018	-0.00085	0.03595	-0.00504	-0.028***	0.023***	0.38
NATF	0.00423*	0.00021	-0.01375	-0.01119	0.02635	0.02890*	0.33
BATA	-0.00143	0.00030	0.08244	0.04913*	0.07830*	0.05944*	0.29
SRVI	0.00084	-0.00076	0.04136	-0.00092	-0.00403	0.10439*	0.24
COLG	0.00540*	-0.00012	-0.03760	-0.027***	0.0135**	0.06879*	0.52
CRTM	0.00202	0.00081	-0.01018	0.01468	0.04301*	-0.031**	0.37
GLPL	0.00092	-0.00046	-0.12650*	-0.02964*	0.02001	0.02243	0.34
GULT	0.00295*	-0.00172*	-0.04237	-0.00225	-0.01665	0.05052*	0.65
IBFL	-0.00198	0.00109	0.06124	0.00962	0.00531	0.02481*	0.45
IDYM	0.00148	-0.00087	0.01126	-0.01401	-0.01609	0.10054*	0.35
NML	0.00009	0.00190*	0.04432	0.00690	-0.00858	0.0499**	0.42
TREET	-0.00061	0.001***	-0.00375	0.00476	0.00194	-0.02795	0.71
SEPL	-0.00076	0.00085	0.02820	0.00775	0.00212	0.02488	0.41
PPP	0.00340*	-0.00047	-0.02875	-0.01715	-0.01308	0.06974*	0.39
PTC	-0.00111	0.00250*	-0.00457	0.01756	0.01481	0.04463*	0.53
TELE	-0.00075	0.00355*	-0.00269	0.00475	0.00970	0.052***	0.45

*****significant at 1 % level, ** significant at 5 % level and *** significant at 10 % level

Table A4: The Coefficient of Conditional Multifactor CAPM with GARCH- M Specification

	MARI	PSO	SHEL	APL	PPL	ABOT	FEROZ
b_0	0.00006*	0.00001*	0.00000	0.00000	0.00000	0.00001	0.00000
b_{OP}	-0.01363	0.00500	-0.00979	-0.00977*	-0.00404	-0.00775	0.02480*
b_{NEER}	0.03906	-0.00952	-0.00288	0.02171*	-0.03357	-0.0503***	-0.08840*
b_{FEXR}	-0.00599	-0.02148*	0.01153	0.01542	0.028***	0.01843	0.02303*
b_{WPI}	0.09308	-0.08568*	-0.09058*	-0.03555	-0.084***	0.00580	0.03586
b_{CMR}	0.00041	0.00050	0.00048	-0.00053	-0.00012	0.00089	0.00035
b_{M2}	0.02122	-0.00719	-0.02566	0.00627	-0.02473	0.0909***	-0.01805
b_{IPI}	-0.01518	-0.01080	0.00441	-0.01308	0.00790	-0.00997	-0.00562
b_{UNEMPR}	0.01578	0.00887	-0.00727	-0.02021	-0.00471	0.00335	0.02166
b_{MR}	-0.00782	0.03001*	0.01162	-0.03765*	0.063***	0.0273***	0.03072*
$\emptyset_k$	0.35987*	0.68258*	0.56297*	0.18594	0.31459*	0.07788	0.21385*
γ_m	-0.10644	0.24764	0.50948*	0.63822*	0.64118*	0.49309	0.61013*
R^2	0.21	0.42	0.45	0.32	0.56	0.49	0.38
	WYETH	NES PAK	ULEVER	ANRS	RMPL	JDWSR	AABS
b_0	0.00000	0.00000*	0.00002	0.00001*	0.00001	0.00008	0.00001*

b_{OP}	-0.00291	-0.00341	0.00380	0.00006	-0.00876	0.00580	-0.00073
b_{NEER}	0.04280*	-0.02803*	-0.04426	-0.054***	0.019***	-0.78290	0.04723*
b_{FEXR}	-0.00197	0.00076	-0.01818	0.003***	0.01085	0.065***	0.00918*
b_{WPI}	0.03865	0.09463*	0.14368*	0.0489***	0.14655	0.31653	-0.00885*
b_{CMR}	0.00128	0.00045	0.00118	0.00063	-0.00075	0.00060	0.00085
b_{M2}	-0.05553	-0.02151*	0.00214	0.04521	-0.05058	0.00856	0.13371
b_{IPI}	0.01393	0.00184	-0.01130	-0.00025	-0.00349	-0.00673	-0.02789
b_{UNEMPR}	0.00787	0.00155	0.02043	-0.02151	0.01068	-0.08291	-0.00437*
b_{MR}	-0.04681*	0.01731*	0.03031*	0.00574	0.00630	0.07426	0.05557*
ϕ_k	-0.01928	0.16046*	-0.10162	-0.03598*	0.22572*	1.06576	-0.06123*
γ_m	0.97710*	0.59332*	0.71081*	0.63787*	0.61251	-0.00988*	0.82031
R^2	0.30	0.36	0.43	0.39	0.65	0.49	0.29
	HABSM	SGML	FRNM	NONS	AGTL	HINO	MTL
b_0	0.00004	0.00002*	0.00001*	0.00000	0.00005	0.00001	0.00002
b_{OP}	-0.00714	0.00634	0.01055	0.00565	-0.00459	-0.01797	-0.00479
b_{NEER}	0.16438	-0.14539*	-0.12236*	0.06958*	-0.08733*	0.004***	-0.01270
b_{FEXR}	-0.01968	0.00461*	-0.00514	-0.01400	0.007***	0.01091	0.02831
b_{WPI}	0.18842	0.11053*	0.18669*	0.08358*	0.03200*	0.07888	0.05627
b_{CMR}	0.00232	-0.00031*	0.00019	-0.00028	0.00147	0.00044	-0.00070
b_{M2}	-0.01925*	-0.04175	-0.08289	0.00432*	-0.03692	-0.03242	0.14363
b_{IPI}	-0.03121	-0.02468*	-0.01326*	-0.01242	0.00934	-0.00807	-0.00072
b_{UNEMPR}	0.00660	0.03606	-0.01007*	-0.00623	0.00051	-0.05006	-0.00130*
b_{MR}	0.04212*	0.01885*	0.06376	0.02580*	-0.03345*	-0.0046***	0.05233
ϕ_k	0.73316	0.50216*	0.51969*	0.67253	0.09892*	0.15491	-0.06201
γ_m	-0.04625*	-0.20646	0.52678*	0.52711*	0.07466*	0.61056	0.59642*
R^2		0.31	0.31	0.27	0.45	0.42	0.24

	KSBP	PECO	ATHL	HOND	GTYR	PSMC	ATBA
b_0	0.00002*	0.00001	0.00004**	0.00002*	0.00000	0.00000	0.00001
b_{OP}	-0.03324*	-0.00479	0.00894	0.01797	0.00118	-0.01489	0.01382
b_{NEER}	0.05769	0.01270	-0.04961	-0.01070	-0.076***	-0.02884	-0.01697
b_{FEXR}	0.029***	0.02831*	0.00447	0.00975	-0.01433	0.00892	0.00645
b_{WPI}	0.1160**	0.05627	0.03375	0.01628	0.12072**	0.0777**	0.08270
b_{CMR}	0.00097	-0.00070	0.00084	-0.002***	0.00150	-0.00016	-0.00004
b_{M2}	-0.05562	0.14363**	-0.02037	-0.08781	-0.05826	-0.0571**	0.01758
b_{IPI}	-0.01088	-0.00072	-0.00169	-0.01934	-0.00386	-0.00513	0.00164
b_{UNEMPR}	0.00742	-0.00130	-0.02763	-0.026***	0.01109	-0.02262*	0.02433
b_{MR}	-0.00856	0.05233**	-0.03025	0.02985	0.0240**	0.03255	0.04749*
ϕ_k	-0.06201	0.44487*	0.20760	0.77052*	0.42697*	0.47651*	0.20911
γ_m	0.59642*	0.44994*	0.02677	0.19027	0.66240*	0.64168*	0.65543*
R^2	0.33	0.37	0.47	0.26	0.37	0.32	0.45
	EXIDE	DFML	ACPL	BWCL	CHCC	DGKC	DNCC
b_0	0.00000	0.00000	0.00000	0.00000	0.00002	0.00001	0.00007*
b_{OP}	0.01282	0.00483	-0.00673	0.00855	0.00699	-0.01158	0.01971*
b_{NEER}	0.05096	-0.12917*	-0.06636	0.14538*	-0.08893*	-0.09327	0.19709
b_{FEXR}	0.00468	-0.02468	0.02046	0.00935	0.01493	0.02832	-0.01562
b_{WPI}	0.12447	0.17090**	0.02531	-0.00052	0.05273	0.12143*	0.02784
b_{CMR}	0.00033	0.00028	0.00104	0.00171*	0.00083	0.00161	-0.00134

b_{M2}	-0.01307	-0.07320	-0.04730	0.04536	-0.07775	-0.02491	-0.02140
b_{IPI}	-0.00060	-0.00639	-0.00003	-0.02135	-0.01455	-0.00179	-0.02890
b_{UNEMPR}	0.00332	-0.025***	-0.013***	0.01593	-0.02462	-0.00075	-0.04070
b_{MR}	0.01810	0.030***	-0.021***	0.00880	0.00772	0.01391	0.01955
$\emptyset_k$	0.11247	0.56081*	0.50153	0.01991	0.57661*	0.24679	0.34128*
γ_m	0.81330*	0.56528*	0.58638*	0.90356*	-0.00923	0.57938	-0.16533*
R^2	0.28	0.63	0.68	0.58	0.51	0.43	0.56
	FCCL	JVDC	KOHC	LUCK	MLCF	PIOC	FECTC
b_0	0.00000	0.00001	0.00001	0.00001	0.00012*	0.00001	0.00004*
b_{OP}	-0.00868	-0.01038	-0.00588	-0.00733	0.03317	0.00864	-0.00244
b_{NEER}	0.01894	-0.02530	0.08749	-0.07165	0.00719	-0.147***	0.14321*
b_{FEXR}	-0.0154**	0.00346	0.03815*	0.01778	0.02119	0.05725*	0.00334
b_{WPI}	-0.09634*	-0.06235	-0.00237	0.1292***	-0.05276	-0.01996	-0.05372
b_{CMR}	0.00000	-0.00126	-0.00040	0.00104	0.00135	-0.00080	-0.00005
b_{M2}	-0.05301*	-0.03962	0.04803	-0.01173	-0.25277*	0.02259	-0.02951
b_{IPI}	-0.00089	-0.01048	-0.01121	-0.00478	-0.06318*	0.02334	-0.00467
b_{UNEMPR}	0.00969	-0.06012*	-0.02364	0.00802	-0.01382	-0.0284*	-0.01514
b_{MR}	0.00563	-0.02446	0.00521	0.02587	0.00831	0.00474	0.00607
$\emptyset_k$	0.32882*	-0.06694	0.28632	0.32765	1.25684*	0.22029*	0.45258*
γ_m	0.53594*	0.58373	0.61456*	0.51877	-0.00515	0.69070*	-0.21894*
R^2	0.48	0.54	0.58	0.34	0.44	0.34	0.42

	DBCI	PMPK	PAKT	DAWH	ENGRO	FFCL	ICI
b_0	0.00000	0.00001	0.00002	0.00000	0.00000	0.00000	0.00001
b_{OP}	-0.02825*	-0.02939*	-0.00410	-0.02149	0.00241	-0.00868	-0.00723
b_{NEER}	-0.19498*	-0.05078	0.04271	-0.05977	0.04765	-0.01894	-0.05658
b_{FEXR}	-0.02353*	0.01895	0.00252	0.034***	0.00726	0.01543*	0.01332
b_{WPI}	-0.24875*	-0.09834*	-0.06691	0.07400	-0.11324*	-0.09634*	-0.1558*
b_{CMR}	0.00039	0.00029	0.00089	-0.00001	0.00057	0.00000	-0.00005
b_{M2}	-0.07814*	-0.01926	0.03188	0.0668***	-0.02500	-0.05301*	-0.02700
b_{IPI}	-0.00805	-0.02276	-0.02185	-0.0334**	0.00716	-0.00089	0.00096
b_{UNEMPR}	-0.00775	-0.01900	0.02015	-0.01068	-0.00430	0.00969	0.00376
b_{MR}	0.02609	-0.01528	0.02693	0.00432	0.02044	0.00563	0.02913
$\emptyset_k$	1.35653*	-0.08127*	-0.05465*	1.37833*	0.42869*	0.32882*	0.14408
γ_m	0.28212*	0.87846*	0.61833	0.33003*	0.64493*	0.53594*	0.73518*
R^2	0.48	0.25	0.37	0.55	0.31	0.29	0.63
	SITC	LOTPTA	CLPA	SURC	KML	STJT	ADMM
b_0	0.00001	0.00000	0.00000	0.00001	0.00002	0.00001	0.00002*
b_{OP}	-0.00317	0.00575	0.00575	-0.00597*	-0.02917	-0.01493	0.01546
b_{NEER}	0.03632	-0.06309	-0.06309	-0.02161*	-0.11512	-0.13867*	0.0681**
b_{FEXR}	0.019***	0.01625	0.01625	0.01284	0.01241	0.00702	0.017**
b_{WPI}	0.04884	-0.22844*	-0.22844*	-0.08938*	0.16839	-0.14202*	-0.01957
b_{CMR}	0.00064	-0.00002	-0.00002	0.00084	0.00054	0.00014	0.00018
b_{M2}	0.02438	-0.079***	-0.07997	-0.00693	-0.01734	-0.04957	0.02254
b_{IPI}	-0.01536	0.01682	0.01682*	-0.03303	-0.00677	0.01412	-0.01694
b_{UNEMPR}	-0.00250	0.00327	0.00327	0.00878	-0.00390	0.00724	-0.02015
b_{MR}	0.01376	0.0642***	0.06427	0.02890	-0.01230	0.01581	0.04772*
$\emptyset_k$	0.15926	0.30728*	0.30728	0.31392	-0.04568*	0.15091	2.15374*

γ_m	0.61965*	0.68751*	0.68751*	0.58203	0.55495*	0.60663	0.00506
R^2	0.29	0.37	0.44	0.48	0.41	0.53	0.39
	DLL	MSOT	NCLR	QUETR	SFL	SNGP	SSGP
b_0	0.00001	0.00001	0.00002	0.00000	0.00003*	0.00001	0.00000
b_{OP}	0.01723	-0.03421*	-0.00473	0.00643	-0.01419	-0.029***	-0.0187*
b_{NEER}	-0.10586*	0.04837	-0.03098	-0.14070*	-0.03204	0.04910	-0.0784*
b_{FEXR}	-0.04784*	0.00701*	0.01591	0.00723	0.00022	0.00158	0.0197*
b_{WPI}	-0.06843	-0.11865*	-0.07448	-0.065***	-0.07152	-0.08791	0.22205*
b_{CMR}	-0.00014	0.00199	0.00087	0.00001	-0.00037	-0.00025	0.00064
b_{M2}	-0.02019	-0.00468	-0.06485	-0.01131	0.0580***	-0.05970	-0.0448*
b_{IPI}	0.01350	0.00285	-0.01949	0.00408	0.02791*	0.01585	0.00408
b_{UNEMPR}	0.00361	0.02976	0.00757	-0.00493	0.00122	0.01281	-0.0230*
b_{MR}	0.028***	-0.03730*	-0.02271	-0.03454*	0.02903	0.00750	0.02374*
$\varnothing_k$	0.51139	0.07327*	0.55443*	0.71497*	0.45244*	0.02944	0.75595*
γ_m	0.39034	0.76472	0.37752*	0.37155*	-0.06155*	0.66855	0.50734*
R^2	0.28	0.54	0.65	0.27	0.30	0.33	0.36

	ACBL	BOP	BAHL	FABL	MCB	BAFL	SBL
b_0	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001*
b_{OP}	-0.03023*	-0.01688	-0.00571	-0.02148	-0.023***	-0.01259	-0.0241*
b_{NEER}	0.05107	-0.04738	-0.05403	0.07451	-0.03087	-0.02993	0.07267*
b_{FEXR}	-0.00739	0.02250	0.02243	0.01885	0.00698	0.02517*	0.0417*
b_{WPI}	0.06682	-0.02872	-0.03188	-0.06438	-0.18072*	-0.10691*	0.09945*
b_{CMR}	0.00040	0.00125	0.00044	0.00049	0.00033	-0.00053	-0.00010
b_{M2}	-0.01099	0.03586	0.01626	-0.02399	0.00977	-0.01757	-0.03267
b_{IPI}	-0.01493	-0.03451	0.01131	0.01668	-0.01767	-0.01625	-0.02230
b_{UNEMPR}	0.00435	-0.01685	0.00339	0.01409	0.01635	0.01440	0.00969
b_{MR}	0.02359	0.01352	0.02638*	0.02699	0.0258***	0.01595	0.01028
$\varnothing_k$	0.05852	0.07683	0.08558	0.17546	0.40812*	0.33963	0.42368
γ_m	0.85886*	0.80210*	0.70789	0.71152*	0.49821*	0.49635	0.38361
R^2	0.47	0.51	0.54	0.35	0.59	0.47	0.32
	NIB	HMB	MBL	SNBL	NBP	AICL	IGIIL
b_0	0.00002*	0.00003*	0.00001	0.00002*	0.00001	0.00001	0.00001
b_{OP}	-0.01874	-0.02055*	-0.00812	-0.00843	-0.02751	-0.00714	-0.00448
b_{NEER}	-0.01972	-0.12288	-0.090***	-0.09648	0.04587	-0.04812	0.03198
b_{FEXR}	-0.02472*	0.00555	0.02472*	0.01162	0.01880	0.02928	0.01817
b_{WPI}	-0.06681	0.06893	-0.12379*	-0.05383	-0.10553	-0.07631	0.03013
b_{CMR}	-0.00152	0.00144	0.00035	0.00018	0.00118	-0.00121	0.00179
b_{M2}	-0.01989	0.04028	0.05388	-0.05076	-0.05275	-0.02042	0.02889
b_{IPI}	-0.01681	-0.00971	-0.01112	0.01776	-0.00950	0.01388	0.01030
b_{UNEMPR}	0.00389	-0.00320	0.01879	0.01097	0.00670	-0.03246	-0.03850
b_{MR}	0.03778*	0.02818	0.02205	0.02743	0.01400	-0.00107	0.02660
$\varnothing_k$	0.41030	-0.07470	0.14559	-0.06683*	0.29271	0.24652	0.13715
γ_m	0.29271	0.41129	0.68924*	0.62287*	0.56850*	0.62087*	0.74925*
R^2	0.41	0.47	0.36	0.34	0.33	0.27	0.34
	NJICL	TRIPF	PACK	SIEM	PCAL	MURE	CLOV
b_0	0.00002*	0.00000	0.00000	0.00001	0.00000	0.00001	0.00001
b_{OP}	-0.03439*	0.00928	0.00539	-0.00543	-0.00347	-0.01305	-0.0311*

b_{NEER}	-0.06858*	-0.03473	0.02865	-0.05449*	0.11100*	-0.02266	0.07560
b_{FEXR}	0.00260	0.00870	0.02629*	-0.00246	0.00107	0.00744	0.01063
b_{WPI}	-0.15599*	0.08781	0.05108	-0.05205	-0.09123*	-0.079***	0.12565*
b_{CMR}	0.00218*	-0.00038	-0.00054	0.00120*	0.00308*	0.00066	0.00074
b_{M2}	-0.00920	0.04460	0.02434	0.02225	-0.06119	0.01455	0.03583
b_{IPI}	0.01166	0.00534	0.00683	-0.00374	-0.00518	-0.01420	-0.00323
b_{UNEMPR}	-0.00127	0.00595	-0.01210	0.00561	0.03002*	-0.00923	0.00271
b_{MR}	0.02515*	0.0308***	0.02552	-0.00218	-0.00174	-0.00514	-0.01986
$\emptyset_k$	0.83797*	0.15310	0.75241*	-0.18748*	0.58029*	0.08654	-0.11320
γ_m	-0.03010	0.79872*	0.38540*	0.95445*	0.55314*	0.57427	0.83403*
R^2	0.29	0.54	0.26	0.38	0.18	0.32	0.19

	MFFL	NATF	BATA	SRVI	COLG	CRTM	GLPL
b_0	0.00002*	0.00001	0.00003*	0.00000	0.00002	0.00002	0.00004*
b_{OP}	0.00574	0.01571*	-0.00021	0.00080	-0.01926	0.01985	-0.00970
b_{NEER}	0.00697	-0.02479	-0.05696*	-0.02195	-0.05184	0.15533*	-0.04631
b_{FEXR}	0.00297	0.00268	0.00250	0.01490	0.02223	0.07258*	0.00018
b_{WPI}	0.05882	-0.04296	-0.03370	-0.08936	-0.134***	-0.04504	0.03368
b_{CMR}	0.00116	0.00024	-0.00038	-0.00127	0.0021***	-0.00045	0.00183
b_{M2}	0.00495	0.04149	0.10519*	0.06888	-0.02200	0.12140*	-0.02745
b_{IPI}	-0.03713*	-0.00984	-0.00554	-0.01944	-0.00363	-0.00060	0.00863
b_{UNEMPR}	0.01506	0.04740*	0.03698*	-0.00233	0.00994	0.03209	0.02514
b_{MR}	0.020***	0.04322*	0.05727*	0.05735*	-0.01754	0.01514	-0.00967
$\emptyset_k$	0.88212*	1.66556*	-0.20951*	-0.05182*	-0.03887	0.27338	0.26792*
γ_m	-0.04811	0.00949	0.61810*	1.01709*	0.64238	0.59975*	0.25335
R^2	0.44	0.49	0.42	0.24	0.36	0.33	0.62
	GULT	IBFL	IDYM	NML	TREET	SEPL	PPP
b_0	0.00000	0.00000	0.00001	0.00000	0.00002*	0.00001	0.00002*
b_{OP}	-0.00525	-0.00592	-0.00293	0.00248	-0.06203*	-0.00525	-0.00396
b_{NEER}	-0.07553*	0.01376	-0.11479	0.08727	-0.09322*	-0.040***	0.05524
b_{FEXR}	-0.00345	0.00874	-0.00390	0.03150	0.01344	0.02548*	0.02220*
b_{WPI}	-0.06493	-0.09261*	-0.09808	-0.03355	-0.17532*	-0.06764	0.09696*
b_{CMR}	0.00033	0.00067	0.00031	-0.00006	0.00375*	0.00070	0.00140*
b_{M2}	-0.04627	0.00946	0.03162	0.00235	-0.08043*	-0.03244	-0.01904
b_{IPI}	0.01222	-0.00812	0.00011	0.00882	0.00042	-0.00491	-0.01165
b_{UNEMPR}	-0.03791*	0.00321	-0.00582	-0.00710	-0.00257	0.00320	-0.01581
b_{MR}	-0.00820	0.01569	0.00687	0.01531	-0.06082*	0.00576	0.02740*
$\emptyset_k$	-0.07634	0.46482*	0.13750	0.20329	1.62616*	0.18946	0.73667*
γ_m	0.97710*	0.67194*	0.58613*	0.76193*	0.00647	0.63935*	-0.01844
R^2	0.48	0.31	0.37	0.52	0.42	0.25	0.31
	PTC	TELE					
b_0	0.00001	0.00002*					
b_{OP}	-0.00893	-0.00153					
b_{NEER}	0.04951	0.07619*					
b_{FEXR}	-0.01738*	-0.00861					
b_{WPI}	0.10606*	0.12994*					
b_{CMR}	0.00077	0.00137					

b_{M2}	-0.07018*	-0.06995					
b_{IPI}	-0.00048	-0.00861					
b_{UNEMPR}	0.00862	0.00709					
b_{MR}	0.04743*	0.05883*					
ϕ_k	0.47127	1.40268*					
γ_m	0.39297	0.05769					
R^2	0.54	0.28					

*****significant at 1 % level, ** significant at 5 % level and *** significant at 10 % level