# IS PAKISTAN STOCK EXCHANGE A TRUE REFLECTOR OF ECONOMIC REQUISITE?

**Mahpara Naeem***

Lecturer, Visiting faculty
Nazeer Hussain University, Karachi, Pakistan


**Sadaf Mustafa****
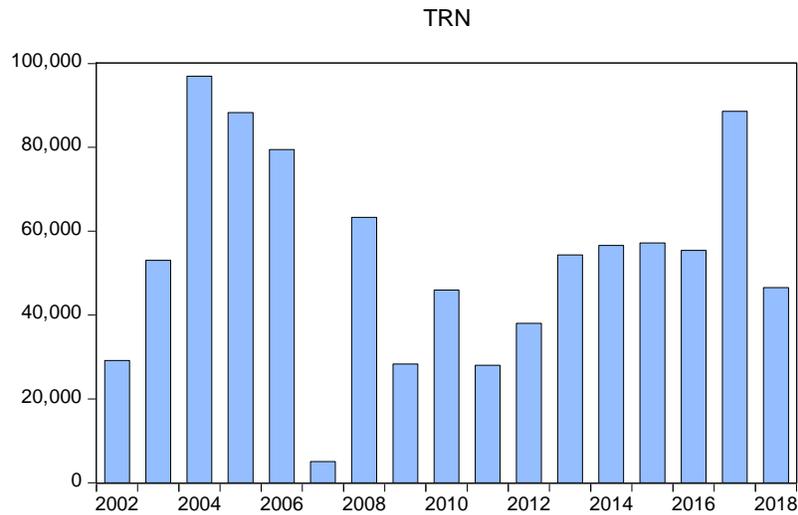
Assistant Professor
Karachi, Pakistan

## Abstract

Stock market returns, another indicator of financial health of stock market and investors as well. Deviations in returns may vary country to country, investor to investor and market to market. There are many causes behind deviations in returns such as micro and macro variables. This study is aimed to identify causes behind stock market deviation theoretically and practically. Time span of 2002-2018 is examined as a sample year for practical analysis while literature on implementation of economic theories is considered for theoretical analysis. Statistical software EVIEWS is employed on the driven equation to conclude practical inferences by drawing critical region and sign of coefficient. Results indicates that EMH and APT theories exist in Pakistan while CAMP approach is invalid for Pakistan Stock Exchange. Furthermore, practically stock returns of Pakistan are not true reflector of economic requisite of Pakistan.

**Keywords:** Stock Market, Returns, EMH, APT, Financial health

## Introduction

Pakistan stock market previously known as Karachi stock exchange initiated its maneuver on March 10, 1949 with paid up capital of 37 million rupees.KSE-100, KSE-30 AND KMI-30 index are the indices of PSX. Market capitalization of PSX is as on December 2018 is 8321418.37 PKR million. Stock market turnover directs how often the shares are traded, simply its spectacles volume of trading shares by market capitalization of a specific stock market all around the period. High the turnover, high liquidity of stock market. In Pakistan following is the trend of turnover of KSE-100 index:

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Is Pakistan stock exchange a true reflector
of economic requisite?

TRN



Stock market returns, another indicator of financial health of stock market and investors as well. Deviations in returns may vary country to country, investor to investor and market to market. There are many causes behind deviations in returns such as micro and macro variables. Deviation in performance and returns on any investment is counted as risk. In other words, difference between expected and actual returns is called risk. There are many factors which affect returns and price of a security and called as component of risk. On the basis of classification of Risk, there are two components of total risk:

**Unsystematic Risk**

Risk which is associated with a specific industry firm or security is referred to as unsystematic risk. These risks can be eliminated by diversifying towards substitutes. Managerial skills, change in demands and other internal factors. These factors are uncorrelated with macro-economic factors.

**Systematic Risk**

The risk which every security holds due to economic, political and social factors. These factors are called macro factors. Such as interest rate, exchange rate, inflation, change in political authorities etc. These risks are undiversified due to prevail equally in the whole economy of a state.

**Flow Diagram**



\* **Note:** In context of types of risk in finance, purchasing power risk and inflationary risk are same.

Risk which is arises due to change in interest rate on debt security is known as Interest rate risk. The volatility of equity indices or interest rate may change due to market events, significant investor uncertainty, and political instability or structure changes in the economy. (Kaplan, 2012). In case of inadequate capital structure firm becomes unable to bear interest rate risk as compared to low debt profile firms because of carrying fixed rate of interest facing by individual firm of an economy.

Other type of risk facing stock prices of firms, is associated with the fluctuation of market demand and supply such as oil prices, stock indices, and exchange rate volatility, termed as market risk. Due to inefficiency of market investors become misguided about investment in different securities and shares which lead them toward unexpected losses later. Exchange rate risk is one of the main types of market risk. Exchange rate volatility generate transaction and translation exposures in repatriation of returns for foreign investors. Determining the discount rate risk premium that is required by investors is important. The changes in risk premium affect the value of an asset through changes in the discount rate. The change which results from risk premium represent (measures) the Changes in the degree of aggregate risk for the economy. Stock return will be influenced by changes in risk premium (Husam Rjoub, Turgut Tu¨rsoy and Nil Gu¨nsel).

Inflationary risk gives direct impact on firm's revenues and cash flows. In an inflationary, period cost of production becomes higher and disrupt demand-supply equilibrium of the firm. In inflationary period investments becomes more risky than deflationary period in terms of cost-benefit analysis for stock returns.

**Purpose of Study**

This study is aimed to check validity of the following points:

- Does Pakistan stock market show implementation of theories in the right way?
- Are Macro economic variables correlated and significant causes behind deviations in returns of Pakistan Stock Exchange, practically?

**Theoretical framework**

**Arbitrage Pricing Theory**

This theory is presented by Stephen Ross in 1976.He introduced a multi combination of risks and returns with macroeconomic variables. He concluded that returns on investment is linear regression function of macro-economic variables. In 1986, Chen and Ross identified some macroeconomic factors to explain returns such as GDP, Inflation, interest rate, oil Prices, exchange rate etc. To test APT theory for predicting stock's returns (Mauri Paavola, 2006) conducted a study on Russian equity market by applying multi linear factor model and found insignificant relation between macroeconomic variables and stock return, (Tursoy et al, 2008) found same trend in Istanbul stock market. Iqbal, Khattak, Khattak and Ullah, (2012) found systematic influence of macroeconomic variables on stock returns in Karachi stock market.

**Efficient Market Hypothesis:**

EMH hypothesis declares that Market is efficient by information point of view, stock prices reflect internal and external, past as well as future information. Philip Ifeakachukwu and   Isiaq Olasunkanmi, (2011) presented EMH in their study and concluded that only public information can not deviate stock prices, news related to firm's own assets in public perception can predict stock prices. [Stock Prices                Market Information]

Contrary to this, Gordon and Rittenberg (1995) tested EMH in Warsaw Stock exchange market and quoted that "Prices do not reflect information at a given point of time, so while those investors take advantage in sufficient time "while (Dima and Milos, 2009) explored that limited informational efficiency prolonged to financial instability of Bucharest Stock market.

**Capital Asset Pricing Model:**

CAPM model divided risk into systematic and unsystematic kind. It maintained a model for measurement of risk for investors to demand relevant returns on investors. It indicates that the firm's value is adjusted by all types of risk premiums such as market risk premium, exchange rate exposures and risk-free rate of return etc. So, in case of Mne's, the value of a company should be adjusted to any exchange rate which would affect the estimated returns. In other words, if the financial marketplace is perfect, the value of a firm reacts to the fluctuation of the exchange rate in order to reflect the estimated returns offset the estimated overall risk, as the case for all international assets.

$$E(R_i) = R_f + \beta_i(E(R_m) - R_f)$$

Welch, Capital Asset Pricing Model, (2014) assumed that every country has risk free assets which can avail by every investor in every quantity and shall be included as a factor of determinant for expected returns on every single investment. Dai, Hu and Lan, (2014) tested CAPM model to calculate expected returns in stock market of China and

found insignificant presence of CAPM model on expected returns of stocks due to small number of individual stocks.

## Literature Review

### Efficient market hypothesis (EMH) and Pakistan Stock Exchange

Eugene Fama in 1965 presented efficient market hypothesis. According to this theory "In an efficient market, intrinsic value of stocks instantaneously exhibits any new information that comes into the market". Three different forms of EMH can be existed in any stock market such as weak, semi strong and strong as discussed in theoretical framework.

According to EMH, Stock's prices and returns are moved by the prevailing information in the market and stock prices reflect past internal and external information as well as future information. Privatization of SOE'S is counted as an event for privatized firms and may have direct effect on share prices during pre-post privatization period. Pakistani stock markets are efficient, they reflect economic condition of country. To check presence of any form of EMH. Asif, Khawaja and Wali, (2015) tested EMH by taking 10 years monthly data from (2000-2010) of KSE index 100 and concluded in results that Pakistani market, KSE is not weak form efficient and past prices can be used to predict future prices and make abnormal profits as well. (Saqib Nisar and Muhammad Hanif, 2012) tested weak form of EMH in South Asia stock markets. For this purpose, historical data from 1997-2011 was considered from Pakistani representative stock market (KSE) to run statistical tests [Durbin test, unit root, variance ratio and run test]. Results revealed that KSE-100 index is efficient market but not the weak form efficient market because future prices are predictable here. Supporting this, (Muhammad Arshad Haroon, 2012) highlighted in a study that technical analysis is applicable to KSE and past prices can help to take decision of investment that's why weak form efficient hypothesis does not exist in Pakistan. Akbar and Baig, (2010) tested strong form of EMH and examined pre-post stock prices after dividend announcement of 79 companies listed in KSE-100 during the period 2004-2007 and found positive effect of dividend announcement on stock prices. In addition, Arshad and Sarwar, (2012) analyzed data during period of 1997-2012 of KSE indices by covering stock market crashes events and found significant value of monthly, daily, weekly stock indices showed overvaluation of stock's returns during stock market crashes globally. They further concluded that investors with superior information and technical analysis can outperform in KSE because of having inefficient information regarding stocks. Hameed and Ashraf, (2006) asserted same results in a research paper.

### Validity of Arbitrage Pricing Theory (APT) in Pakistan's Stock Market:

Arbitrage Price theory highlighted macro-economic factors which are the fundamental factors behind returns of individual investment such as interest rate, exchange rate, inflation rate, risk premium etc. According to APT, there is a set of macro-economic factors that influence stock market performance and these economic factors are counted as a risk factor which cannot be diversified. Stock return is a linear function of a number (K) of macroeconomic factors. APT indicates that risk premium on individual

asset's sensitivity is directly proportionate to economic risk factors (Iqbal and Haider, 2005). Macroeconomic variables as proxies for the systematic risk and there is a co-movement between return of stocks and these factors. In Pakistan, these macroeconomic factors carry risk for equity markets because APT Theory is empirically valid in Pakistan Stock market (Attaullah, 2001). Gul and Khan, (2013) to test validity of APT in Pakistani stock market, selected 37 companies as a sample, stock prices of the sample companies were compared with four macro-economic factors such as money supply, industrial production, interest rate and exchange rate. Statistical packages EViews and SPSS were used to run data from period 2000-2005 and results exposed that there is insignificant relation between stock returns and selected macro-economic variables. Researcher added that APT have no limitation in selection of sample factors, other macroeconomic factors may have significant impact on sock's returns.

Butt and Rehman, (2009) examined factors affecting stock returns bases on APT. They further added that, Stock's performance is affected by Internal and external factors. Internal factors include management control, structure of capital while interest rate exchange rate and price mechanism are external factors. GAARCH & ARCH MODEL were applied on firm and industry of Pakistan. Results showed that inflation, increasing interest rate and depreciation of exchange rate adversely affected stock returns of firms and industry. Attari, 2013 and Nishat & Rozina (2004) adopted the same technique to measure volatility and Ganger causality test to check causal relationship among macro-economic variables ad stock returns and concluded by results that inflation rate has causal effect on stock returns while unidirectional relation as found between stock returns and interest rate of firms registered in KSE and recommended that to predict fluctuation of a stock market it is necessary to take counts of macro-economic factors. Contrary to this Khalid & Majid, (2006) quoted negative relation between return and expected inflation by literature but in research their results showed insignificant relation between macroeconomic variables and returns in the long run in Pakistan.

Oil prices as a global economic factor, have a strong impact on stock market globally. Current policy of privatization can be called "Privatization of Energy Sector". That why oil prices would give linear impact on stock's return. Mashkoor, (2014) considered domestic and global indicator as a determinant factor to calculate fluctuation of price of stock and categorized them into diversified and non-diversified risks. In results it was revealed that oil prices do not have any impact on stock returns. On the other hand, Asghar and Ansar, (2013) found positive relation between Oil prices and Stock market return in KSE-100. Iqbal and Khattak, (2012) conducted study to reveal those macroeconomic factors which can be the driving factors behind variation in stock returns. Four macroeconomic factors inflation, exchange rate, money supply and oil prices Selected sample of 26 companies capitalized in KSE-100 over a period from 2004-2008 and variances were measure through calculated regression and beta. Results indicates that oil price is one of the significant factors, having effect on stock returns. In the last researcher concluded that APT is valid in Pakistani stock market.

**Application of CAPM approach at Stock market:**

CAPM approach assumes that difference between return on risky security and return on risk free security is equal to risk premium, if market is efficient. Therefore, increase in risk would lead to increase in return. This model is applicable on financial market to calculate expected returns by investors in presence of market efficiency (Ahmed & Zaman, 2000). To test validity of CAPM approach, Sheikh (2013) applied Sharpe model and concluded that CAPM is not applicable at KSE-100 because of inefficient market and negative tradeoff among market risk and market return.

In addition, Qamar, Rehman and Shah, (2013) tested the validity of CAPM in Karachi Stock Exchange by taking 10 companies as a sample for time duration (2006-2010).MS-Excel was used to calculate expected returns. Variation in actual and calculated returns indicated that CAPM is not applicable in Pakistani Equity Market. (Bhatti,2010) found same results and concluded that CAPM is not applicable on low-risk securities while Iqbal and Brooke, (2007) conducted cross sectioned study on stock returns of KSE during 1992-2006.Study covered daily, weekly and monthly data of individual stock and industry portfolios as well. Results found that non-linear relationship exists between risk and return of portfolios.

**Methodology**

This research is conduct to check validity of implementation of different economic theories on Pakistan stock exchange theoretically and practically. To check theoretical implementation, previous studies on economic theories are reviewed to draw conclusion of theories while to check practical implementation secondary data is used.

**Data Collection Technique:**

As there are two methods of collecting data Primary and Secondary, but this study is based on Secondary data.

**Sources of Secondary Data:**

- Debt policy Statements
- Articles, Journals and Publications
- State bank of Pakistan's annual records of trade and payments
- Financial market data from State Bank of Pakistan
- Fiscal policy Statements

**Sample Size:**

**Theoretical Analysis**

For theoretical analysis, all studies from 2001-present are reviewed so that different aspects can be highlighted.

**Practical Analysis**

Time span of 2002-2018 is considered as sample year to check validity of economic theories by taking different variables.

**Modeling Frame work for Practical Analysis:**

**Econometric Model**

$Y = \beta_0 + \beta_1(\chi_1) + \beta_2(\chi_2) + \dots\dots\dots\dots\dots + \mu$

**Model Driven:**

$STCKRTRN = \beta_0 + \beta_1 \, XRATE + \beta_2 \, INTRSTRT + \beta_3 \, FDIMIL + \beta_4 \, CPIRT + \beta_5 \, CRDOIL + \beta_6 \, M2GRWTH + \beta_7 \, PRVTZNTRNS + \mu$

Where,

**Dependent variable**

STCKRTRN=Stock return of Pakistan Stock Exchange

**Independent variables**

XRATE=Exchange rate
INTRSTRT=Interest Rate
FDIMIL=Foreign Direct Investment
CPIRT=Consumer Price Index
CRDOIL=Crude Oil Prices
M2GRWTH=Money Supply Growth rate
PRVTZNTRNS=Privatization Transactions

**Expected signs**

- $\beta_0 = ?$
- $\beta_1 < 0$
- $\beta_2 < 0$
- $\beta_3 > 0$
- $\beta_4 < 0$
- $\beta_5 < 0$
- $\beta_6 > 0$
- $\beta_7 > 1$

**Hypothesis**

Macro-Economic Variables are significantly correlated with macroeconomic variables.

## Data Handling

Data is handled through EVIEWS software by analyzing statistical tests:

## Statistical Tests:

- level of significance=95%
- Probability≤0.05
- Correlation
- T-test value>2

## Analysis & results

## Descriptive Statistics

| Descriptive Statistics (Table 1) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CPIRT | CRDOIL | FDIMIL | INTRSTRT | M2GRWTH | PRVTZNTRNS | STCKRTRN | XRATE |
| Mean | 6.811 | 56.558 | 2264.333 | 8.556 | 16.462 | 65411.59 | 3088.243 | 69.176 |
| Median | 7.800 | 50.590 | 1524.000 | 9.000 | 15.430 | 53971.30 | 1770.400 | 60.073 |
| Std. Dev. | 3.030 | 26.259 | 1925.208 | 1.488 | 2.7562 | 63566.87 | 2896.652 | 18.708 |
| Observations | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |

The above table shows the mean, median, standard deviation of each variable, the highest the mean and standard deviation show highest deviation in data.

## Correlation Matrix

| Correlation Matrix (Table 2) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CPIRT | CRDOIL | FDIMIL | INTRSTRT | M2GRWTH | PRVTZNTRNS | STCKRTRN | XRATE |
| CPIRT | 1.000 | 0.852 | 0.754 | 0.859 | -0.080 | 0.178 | 0.285 | 0.011 |
| CRDOIL | 0.851 | 1.000 | 0.686 | 0.747 | -0.413 | -0.046 | 0.617 | 0.411 |
| FDIMIL | 0.754 | 0.686 | 1.000 | 0.829 | 0.067 | -0.232 | -0.032 | -0.232 |
| INTRSTRT | 0.859 | 0.748 | 0.829 | 1.000 | 0.085 | -0.065 | -0.009 | -0.248 |
| M2GRWTH | -0.080 | -0.414 | 0.067 | 0.085 | 1.000 | 0.117 | -0.773 | -0.763 |
| PRVTZNTRNS | 0.178 | -0.046 | -0.232 | -0.065 | 0.117 | 1.000 | 0.105 | 0.173 |
| STCKRTRN | 0.285 | 0.618 | -0.032 | -0.009 | -0.773 | 0.105 | 1.000 | 0.898 |
| XRATE | 0.011 | 0.411 | -0.232 | -0.248 | -0.763 | 0.173 | 0.898 | 1.000 |

The data has analyzed through EViews software by using correlation and regression. The correlation test indicates the relationship between the variables. According to above table there is a positive correlation between dependent and independent variables. In the above table it is shown that crude oil prices, consumer price index and privatization

transactions are positively correlated while exchange rate is very strongly positively correlated with stock returns. On the other hand, money growth rate is strongly and negatively correlated with stock returns while other are negligible in correlation.

## Estimated Equation

| Coefficient of Determination (Table 3) | | | | |
|---|---|---|---|---|
| Dependent Variable | STCKRTRN | | | |
| Method | Least Squares | | | |
| Date: | 02/24/19 | | | |
| Time | 01:15 | | | |
| Sample (adjusted) | 2002 2015 | | | |
| Included observations | 9 after adjustments | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 63193.16 | 21201.11 | 2.988 | 0.206 |
| XRATE | -443.5192 | 175.791 | -2.523 | 0.240 |
| INTRSTRT | -4824.804 | 1455.672 | -3.314 | 0.186 |
| FDIMIL | -1.007816 | 0.344 | -2.931 | 0.209 |
| CPIRT | -2092.521 | 856.834 | -2.442 | 0.247 |
| CRDOIL | 636.1425 | 197.396 | 3.222 | 0.191 |
| M2GRWTH | -645.020 | 230.178 | -2.802 | 0.218 |
| PRVTZNTRNS | 0.046 | 0.018 | 2.605 | 0.233 |
| R-squared | 0.992 | Mean dependent var | 3088.243 | |
| Adjusted R-squared | 0.941 | S.D. dependent var | 2896.652 | |
| S.E. of regression | 700.555 | Akaike info criterion | 15.522 | |
| Sum squared resid | 490778.5 | Schwarz criterion | 15.697 | |
| Log likelihood | -61.849 | Hannan-Quinn criter. | 15.143 | |
| F-statistic | 19.395 | Durbin-Watson stat | 2.9054 | |
| Prob(F-statistic) | 0.173 | | | |

In the above equation: R Square show Coefficient of Determination defines the square of Coefficient of Correlation. The R Square value (0. 992689) means 99.2689% reliable to be used for estimation of population. The Std. Error is important because they reflect how much sampling Fluctuation a statistic will show.  The R change shows the differences between R-value & Adjusted R square.
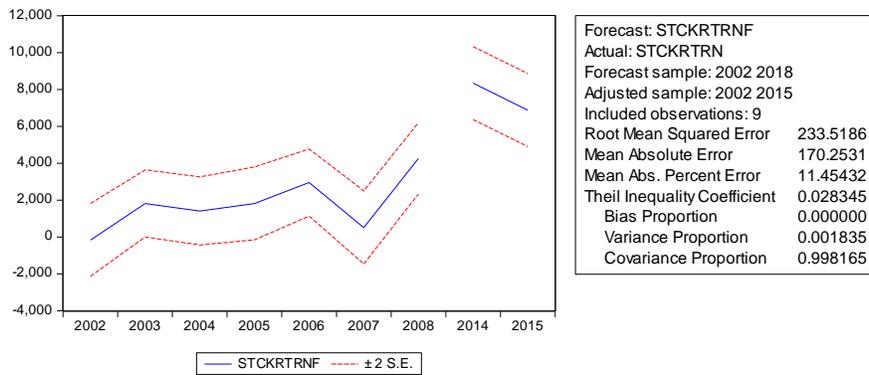
Durbin Watson test value lies in significant as less than equal to 4 region which indicates that there is no autocorrelation in the samples.

**Actual/Fitted/Residual Graph:**
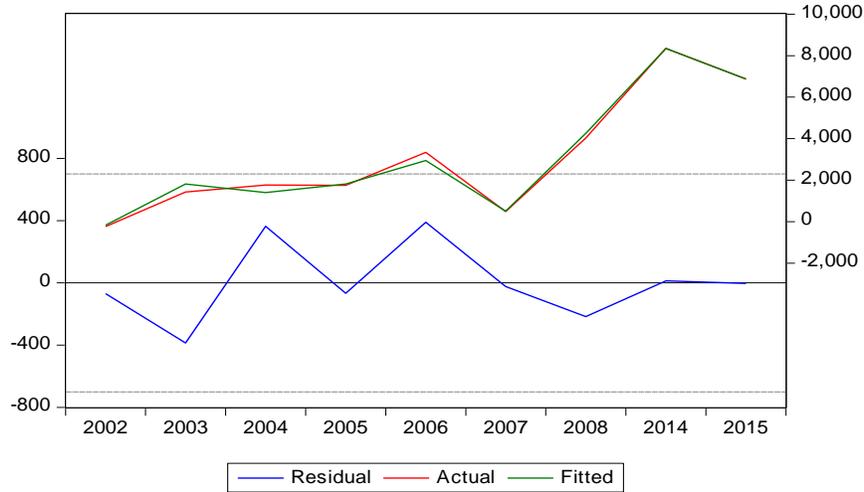


The above graph shows the tracing of model, the tracing of the model indicates minor error in a model as adjusted R-Squared indicated as well.

**Forecast with standard deviations:**



| Forecast: STCKRTRNF | |
| --- | --- |
| Actual: STCKRTRN | |
| Forecast sample: 2002 2018 | |
| Adjusted sample: 2002 2015 | |
| Included observations: 9 | |
| Root Mean Squared Error | 233.5186 |
| Mean Absolute Error | 170.2531 |
| Mean Abs. Percent Error | 11.45432 |
| Theil Inequality Coefficient | 0.028345 |
| Bias Proportion | 0.000000 |
| Variance Proportion | 0.001835 |
| Covariance Proportion | 0.998165 |

**Inferences**

| Inference (Table 4) | | | | | |
|---|---|---|---|---|---|
| Independent Variable | Coefficient | t-value | Probability | Correlation | Label |
| **XRATE** | -443.519 | -2.522 | 0.240 | 0.898 | Insignificant |
| **INTRSTRT** | -4824.804 | -3.314 | 0.186 | -0.009 | Insignificant |
| **FDIMIL** | -1.007 | -2.931 | 0.209 | -0.032 | Insignificant |
| **CPIRT** | -2092.521 | -2.442 | 0.247 | 0.285 | Insignificant |
| **CRDOIL** | 636.142 | 3.222 | 0.191 | 0.617 | Insignificant |
| **M2GRWTH** | -645.019 | -2.802 | 0.218 | -0.773 | Insignificant |
| **PRVTZNTRNS** | 0.046 | 2.605 | 0.233 | 0.105 | Insignificant |

**Conclusion**

Stock market as a core indicator of investment climate of an economy and affected by internal and external factors. Basically, deviation in risks and returns are associated with macro and micro economic factors both. Different economic theories are proposed to describe factors behind performance of stock market and APT, CAPM and EMH are some of them. To check the validity of these theories practically and theoretically the above study is conducted. Results indicated that there is a correlation among macroeconomic variables and stock returns of Pakistan Stock Exchange but insignificantly by probability. On the other hand, theoretical aspects are analyzed and researcher found that EMH and APT theories exist in Pakistan while CAMP approach is invalid for Pakistan Stock Exchange. In a nut shell, practically stock returns of Pakistan are not true reflector of economic requisite of Pakistan.

**Limitations**

From the above analysis, researcher is able to draw the following points:

- Difference in time period may occur different results as found by other researchers.
- There is a need of further research on reporting of facts and figures. Discrepancies in manipulation of data may occur unexpected results.

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