ASSESSING THE ROLE OF MACROECONOMIC VARIABLES ON STOCK PRICE VOLATILITY: A CASE OF PAKISTAN STOCK EXCHANGE

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Abstract

The purpose of executing this research study was to assess the role of macroeconomic variables on stock price volatility. Specifically 10 companies were chosen that are listed on the Pakistan Stock Exchange. The following are the objectives which were devised for this study, to understand the basic concepts and features of stock exchange with respect to investments and economic development; to identify important and appropriate macroeconomic factors having influence on stock prices and to evaluate the impact of macroeconomic variables on stock price volatility in the context of companies listed on the Pakistan Stock Exchange. We adopted secondary method for data collection and the results extracted through correlation and regression analysis displayed that macroeconomic variables including interest rate, inflation rate and the corporate tax rate affect share prices of companies operating in Pakistan.

Keywords: Stock Market Prices, Variable Affecting Stock Prices, Stock Price Volatility, Pakistan Stock Exchange

JEL Classification: E 300

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Introduction

Nowadays, people want to live in a well-developed economy due to having a belief that gradual and continuous increase in the economic growth has an important association with the increasing industrial growth, opportunities of investment, establishment of a good financial system, reduced unemployment, reduce inflation, favourable balance of payment and trade, balanced relationship between macroeconomic variables, better earnings, growth per capita revenue, and finally, improved living standard (Lewis, 2013). All these factors may get affected by several macroeconomic variables including growth rate, required rate of revenue, sales, cash flow, interest rate, inflation rate, risk premium, and exchange rate. All of these macroeconomic variables are perceived to be associated with the future investment revenues and earnings and are heavily influenced by the economic view.

In a developing economy like Pakistan, it is considered that stock market under overall equilibrium and stability plays a vital role in collecting and apportioning funds and the optimal productive and proficient use of those funds in an effective way. As stated by Lamey, et al. (2012), fluctuation and variation in the stock prices impact the economic growth of a country. When stock prices decline then the economic activities of a country also declines, while on the other side, when the prices of stock market increases then economic growth of a country also increases. This statement indicates that macroeconomic variables and activities strongly influence the incline and decline of the stock prices and their volatility.

Problem Statement

The fact that the indices of stock market have become an indication of the economic growth of a country also indicates that stock market plays an essential role in the industrial development of a country. However, there is an inconsistency existing between the results of existing studies as few studies indicated that macroeconomic variables have no impact on stock market or stock prices volatility. In contrast, Agrawal, et al. (2010) stated that macroeconomic variables have positive impact on stock prices volatility. In last, as stated by Ali, et al. (2010), there is a negative relationship between interest rate which
is one of the major economic variables, and stock prices volatility in Pakistan Stock Exchange. Thus, the researcher intended to assess the impact of macroeconomic variables on stock prices volatility in order to achieve the accurate and consistent research findings and outcomes.

Background of the Study

According to Rahman & Salahuddin (2010), macroeconomic variables such as, corporate tax, interest rate, inflation rate are the significant areas of economic market as they provide access to the capital for the companies and investors. Having knowledge of certain variables and their possible effect on share prices and stock prices volatility is highly significant for both investors and firms as this could help them enhance their firms’ value within the market.

Aim and Objectives of the Study

The aim of the study is to assess the role of macroeconomic variables in the volatility of stock prices in the context of the listed companies of Pakistan. In order to achieve the main aim, a number of secondary objectives have been developed as listed below:

· To understand the basic concepts and features of stock exchange with respect to investments and economic development.
· To identify important and appropriate macroeconomic factors having influence on the stock prices.
· To evaluate the impact of macroeconomic variables on stock price volatility in the context of listed companies of Pakistan Stock Exchange.

Significance of the Study

This study would be essential for the institutional and general investors at Pakistan Stock Exchange (PSX) that they would certainly get a broad focus in order to analyse their holdings and capitals of individual securities along with their funds collection. Moreover, the findings of the study would be essential for organisation and implementation of policies associated with the stock pricing as well
as significant for the regulation of stock exchange trading. In addition, this study would also be essential for the Pakistan government in order to make rules, policies, and regulations related to the trading rules in order to increase the economic growth of a country.

Outline of the Study

This research is based on the following sections:

Section 1 includes the introductory part of the study and comprises of overview of the study, problem statement, background of the study, aim and objectives of the study, significance of the study, and outline of the study.

Section 2 includes the relevant literature of the research that is being reviewed by the research, and also includes the research hypotheses in order to clarify financial theory about relationship between stock returns and macroeconomic variables.

Section 3 involves the research methods and techniques in order to gather significant data and information for the research to be concluded.

Section 4 includes the result section and research findings of the study.

Section 5 involves the discussion of the results that have been obtained from the empirical research.

Definition of Key Terms

Stock Prices: Stock prices are the cost of purchasing a security on an exchange (Gul, et al., 2011).

Corporate Tax: According to Zucman (2014), corporate tax is a tax placed on the revenues and profit of a company in order to increase taxes.
Inflation Rate: Inflation rate is the rate at which prices and expenses increase over time period, causing a fall in the buying value of money (Gul, et al., 2011).

Interest Rate: Interest rate is the share of a loan that is charged as an interest to the borrower, usually classified as an annual proportion of the loan remaining.

**Literature Review**

This section includes the relevant research studies and work that has formerly been done by different researchers at different period of time. In this section, both empirical and theoretical framework are mentioned for providing the causes and reasons of variations in stock returns and revenues. It has been examined that the macroeconomic variables such as, inflation rate, exchange rate, and interest rate have an impact on the stock prices of PSX 100 index (Shahzadi & Chohan, 2012). This study used data from 2012 to 2016 and used multiple linear regression research models for the analysis of the collected data.

Aloui, et al. (2012) stated that inflation rate and interest rate have significant impact on the stock prices volatility, while on the other hand, exchange rate, and corporate tax have significant impact on the stock prices of Pakistan Stock Exchange. Moreover, Akbar, et al. (2012) found the relationship between interest rate and stock returns and concluded that fluctuations in the policy of decreasing and increasing the supply of money in the market strongly affect on stock prices of enlisted companies of Pakistan Stock Exchange. In addition, they also found the basic relationship between stock prices of Pakistan Stock Exchange and interest rate, consumer price index, export and import, and exchange rate. In order to understand the association among these variables and stock market, 21 year data from 1992 to 2012 have been used.

Nawaz, et al. (2014) acquired the data from 2005 to 2012 in their research and used inflation rate, exchange rate, current accountant deficient rate, unemployment rate, and interest rate, as independent variables and stock prices volatility as dependent variable for analysing the relationship between independent and dependent variables and they concluded that interest rate and exchange rate are the most important macroeconomic variables that
play an important role in the stock price fluctuation and have substantial impact on stock market revenues and incomes.

Nishat (2011) examined that industrial production, money supply, exchange rate have positive impact on stock return, while inflation rate has a negative effect on the stock exchange returns. Furthermore, it has been examined by the technique of Vector auto regression that there is a relationship between macroeconomic variables and stock price volatility and found that interest rate, and inflation rate have little impact on Pakistan stock exchange. For the research they used monthly data from the time period of 10 years , (1995 to 2005).

Rahman & Salahuddin (2010) conducted a study on examining the impact of corporate tax on stock exchange prices. The research applied on Pakistan stock exchange for the time period of 2006 to 2010. They used Unit Root test of Augmented Dickey Fuller, Perron, Johansen’s Co Integration test, Unit Root test of Phillip, and Granger Causality test (GCT) statistical techniques in order to find the relationship between corporate tax and stock prices volatility of the Pakistan Stock Exchange and they concluded that corporate tax have positive impact on stock prices and stock exchange within the Pakistan Stock Exchange.

Mohanty, et al. (2011) found the relationship between macroeconomic variables and stock market returns in Pakistan. For the study they took data of Pakistan stock exchange from March 1991 to March 2003 and it has been concluded that stock exchange and inflation rate have negative association with each other. In addition to it, it has also been examined that the oil prices have an influence on Pakistan stock exchange (PSX) 100 indexes. In this study they used the secondary data from 2005 to 2011 and simple linear regression has been used for the analysis of the research findings, where oil prices used as an independent variable and Pakistan Stock Exchange used as a dependent variable. They found no relationship between independent and dependent variables.

Attari, et al. (2013) investigated the result of several variables such as, corporate tax, interest rate, and inflation rate on stock prices volatility. The study used the data for the time period of 1 year,
(January 2008 to January 2009) and found the interest rates impact and identified that macroeconomic variables impact on stock returns and prices volatility. The study observed the impact of macroeconomic variables such as, inflation rate, interest rate, and corporate tax on stock returns and prices volatility of 11 sectors and 45 companies. The result revealed that the interest rate, and inflation rated have transformed the economic position of all sectors and companies and these are the main macroeconomic variables in stock price which fluctuate the position of companies in the stock market.

Research Hypotheses

- \( H_01 \): Rate of interest does not have any significant influence on stock prices.
- \( H_02 \): Rate of inflation does not have any significant influence on stock prices.
- \( H_03 \): Corporate tax does not have any significant influence on stock prices.

Research Method

Data Collection Method

Data collection can be done through several ways i.e. primary and secondary. This study has chosen to collect the data via secondary sources of data to study the factors over a period of time. Moreover data are collected from authorized secondary source to guarantee the real time research and study.

Sampling Technique

The methods of sampling provide the guidance to the researcher in order to collect the data in accordance with how data can be gathered (Csikszentmihalyi & Larson, 2014). Sampling methods help the researcher in the collection of respondents that will be incorporated in the study. In this study the sampling method that will be used by the researcher is non-probability sampling. Among non-probability sampling techniques, convenience sampling technique will be used by the researcher as this technique will help researcher...
acquire the relevant information and data on the basis of availability and convenience of the sample size.

**Sample Size**

The five year financial information and data of 10 companies that are enrolled on the Pakistan Stock Exchange will be used to achieve the aim and objectives of the study.

**Data Collection Instrument**

The data regarding the relationship between macroeconomic variables and stock prices would be collected from the annual reports of Pakistan Stock Exchange while the data for macroeconomic variables would be extracted from the website of Pakistan Bureau of Statistics. The collected data would be for a period of 5 years from (2012 to 2016).

**Data Analysis Technique**

For the analysis of collected information and data, SPSS software will be used by the researcher. In order to determine the relationship between macroeconomic variables and stock prices volatility, the correlation test will be carried out. In addition to this, regression analysis would also be used by the researcher in order to find out whether macroeconomic variables have an influence on stock price volatility or not.

**Research Model**

Research model is the most essential part of the study as it identifies the tools that are essential for the analysis of collected data. This research model helps the researcher build the relationship between the independent and dependent variables and how the research hypothesis can be generated and tested. For the current research, the SPSS software will be used in order to analyse the calculated data through the annual reports and informational websites

\[ y = \hat{\alpha} + \hat{\alpha}_1 X_1 + \hat{\delta} \]

Here, \( X_1 \) is independent variable, \( Y \) represents the dependent variable; \( \hat{\alpha} \) is a constant and \( \hat{\delta} \) is the error term.
Finding and Results

In order to present the findings and outcomes regarding the phenomenon that is being studied, section of results is incorporated for this purpose. The results presented in this section were extracted from secondary sources because financial data regarding the share prices and macroeconomic variables are published on official websites of companies and stock exchange. 10 companies were chosen for this study which are listed in Pakistan Stock Exchange and the data were analysed using the test of correlation analysis and regression analysis. The software SPSS was used to analyse the numerical data in order to determine the impact of macroeconomic variables on stock prices.

Correlation Analysis

Correlation is one of the most common tools for analysis used in statistics which shows the relationship between different variables chosen for research study. The value nearest to one shows that the relationship among the variables is strong and correlation is perfect and that the variables can be used for executing the research study. The table given below is generated by using the software of SPSS and by applying the test of correlation. The relationship between each variable is given in their respective boxes such as the Pearson Correlation value of share prices with inflation rate is 0.771, 0.723 with interest rate and 0.705 with corporate tax rate. All the values of Pearson correlation shows that the relationship among these variables is moderate and the value of significance is also below 0.05. Similarly, the relationship among all in the independent variables is strong such as the value of inflation rate with interest rate is 0.910 which according to the statistical standards depicts a strong relationship.

Table 1:
Correlation

<table>
<thead>
<tr>
<th></th>
<th>Share prices</th>
<th>Inflation rate</th>
<th>Interest rate</th>
<th>Corporate tax rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share prices</td>
<td>1.000</td>
<td>0.771</td>
<td>0.723</td>
<td>0.705</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>0.771</td>
<td>1.000</td>
<td>0.910</td>
<td>0.849</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Interest rate</td>
<td>0.723</td>
<td>0.910</td>
<td>1.000</td>
<td>0.804</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Corporate tax rate</td>
<td>0.705</td>
<td>0.849</td>
<td>0.804</td>
<td>1.000</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Regression Analysis

Provided below is the table of model summary representing different values including the value of R, R Square and Adjusted R Square. The table is generated by applying the test of regression analysis through SPSS in order to analyse the impact of microeconomic variables on the share prices of firm. The microeconomic variables in this research study comprises inflation rate, interest rate and corporate tax rate. The value of R represents the collective relationship between independent and dependent variables which is similar to the values provided in the table of Pearson correlation. The value 0.814 shows that the relationship among all the variables is 81.4% strong. The next value given in the table is the value of R Square which displays that how much the independent variables including inflation rate, interest rate and corporate tax rate explains the dependent variable of research study which is share prices. The value 0.512 shows that microeconomic variables explain 51.2% of share prices. Similarly, the adjusted R Square value is the modified value of R square adjusted according to the independent variables chosen for research study.

Table 2:
Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.814</td>
<td>.512</td>
<td>.494</td>
<td>156.86709</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), corporate tax rate, interest rate, inflation rate

The Second table generated is the table of ANOVA which is utilised by the research to accept or reject the hypotheses that are designed for accomplishing the goal of study. The key value in the table of ANOVA is the sig value which determines that whether the hypotheses are accepted or rejected. The significance value below 0.05 determines that the hypotheses designed for research study are accepted whereas a value above 0.05 determines that the hypotheses of research study are rejected. The significance value given in the table of ANOVA below shows that hypotheses designed for the study are accepted and that macroeconomics variable including interest rate,
inflation rate and corporate tax rate affects the share prices of companies.

Table 3:
ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>142.681</td>
<td>3</td>
<td>47461.561</td>
<td>1.929</td>
<td>.038</td>
</tr>
<tr>
<td>Residual</td>
<td>1131.255</td>
<td>46</td>
<td>24665.586</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1274.736</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4:
Coefficient

The last table generated by applying the test of regression is the table of coefficients which shows different values that are necessary to interpret in order to gain a clear understanding regarding the variables of the study. The values given under the head of the unstandardized coefficients show that if one unit change is observed in dependent variable how much change will occur in independent variables. The value of inflation rate given in the table is 0.766 showing that one unit change in the dependent variable will bring a change of 76.6% in the independent variable. Similarly, the other two values including interest rate and corporate tax rate depicts the same thing. Moreover, the value of sig of all the variables is below 0.05 representing that the findings of this research are significant.
Hypotheses Assessment Summary

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Hypothesis Statement</th>
<th>Sig Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rate of interest does not have any significant influence of stock prices</td>
<td>0.027</td>
<td>Accepted</td>
</tr>
<tr>
<td>2.</td>
<td>Rate of inflation does not have any significant influence of stock prices</td>
<td>0.039</td>
<td>Accepted</td>
</tr>
<tr>
<td>3.</td>
<td>Corporate tax does not have any significant influence of stock prices</td>
<td>0.015</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

The hypotheses assessment summary table represents the sig value of all the hypothesis designed for research study and shows the acceptance and rejection. In above table the sig value is provided with respect to each hypothesis designed for this study showing that all the hypotheses are accepted.

Conclusion and Discussion

The main aim for which this research was conducted was to assess the role of macroeconomic variables including interest rate, inflation rate and corporate tax rate on stock price volatility. 10 companies were selected that are listed in Pakistan Stock Exchange and the data related to the effects of macroeconomic variables were gathered from different secondary sources. According to a study conducted by Rahman & Salahuddin (2010), stock market is among the most important economic indicators through which the stability of countries are determined since it enables and ensures long-term returns to the economy. However, it has been observed that whenever the stock market is faced by a substantial decline, there are various reasons that contribute towards the slowing trend. According to the findings of research study conducted by Shahzadi & Chohan (2012), it is observed that one of the key macroeconomic variable is the interest rate which is involved directly towards the growth of an economy and the increase in interest rates significantly affects the share prices of companies since companies have to return more in the amount they borrow which affects the operations of a business and ultimately
increases the share price of the company in order to compensate higher rates.

On the other hand, similar to the findings of research conducted by Mohanty et al. (2011), it has also been observed that the rate of inflation also affects the share price of the companies and due to inflation the prices of everyday commodities increased and the purchasing power of individuals is decreased. Therefore they spend less towards products and services they consume. The inflation rise has insidious effects through which the prices become higher, consumers start purchasing fewer goods, a decline is observed in the profit margins and revenues of the companies and lastly the economy also appears to progress at a slow pace. Similarly, study conducted by Lamay et al. (2012), shows that when the profit margins of different corporations start declining, their share price increases and businesses issue more stock in the market to cover their losses and regain their position with respect to capital. However, there are various studies conducted for analysing the impact of inflation rate on stock prices in the past years have shown contradictory results by concluding that expected inflation rate can negatively as well as positively affect the stock prices which depends on the ability of hedging and the monetary policies of government. Though, there are no conclusive findings with respect to unexpected inflation which signify a positive and strong correlation regarding the stock prices in times of economic contractions.

With respect to the effects of corporate tax rate on share prices, as study conducted by Rahman & Salahuddin (2010), applied the Unit Root test of Augmented Dickey Fuller, Perron, Johansen’s Co Integration test, Unit Root test of Phillip, and Granger Causality test (GCT) statistical techniques for the purpose of finding the relationship between corporate tax and stock prices volatility of the Pakistan Stock Exchange and the outcomes of their research concluded that corporate tax rate has a positive impact on stock prices of companies operating in Pakistan and listed in Pakistan Stock Exchange. Furthermore, according to Agrawal, et al. (2010), the increase in corporate tax rate significantly affects the stock prices of companies since the company starts paying more tax against its operations and retains less to invest again in the business. Moreover, a research study conducted by Attari, et al. (2013) assessed the
findings of different variables including corporate tax, interest rate, and inflation rate on the volatility of stock prices. Data was collected during the time period of one year from (January 2008 to January 2009) and found that stock prices were significantly affected by the rate of interest and the study further identified that macroeconomic variables impact on stock returns and prices volatility. A study conducted by Akbar, et al. (2012), evaluated the impact of macroeconomic variables including inflation rate, interest rate, and corporate tax on stock returns and prices volatility of 45 different companies belonging to 11 different sectors. The result revealed that the interest rate, and inflation rate have transformed the economic position of all sectors and companies and these are the main macroeconomic variables which affect the stock price and fluctuate the position of companies in the stock market.

The research study was conducted to assess the role of macroeconomic variables on stock price volatility of 10 companies listed in Pakistan Stock Exchange. Through the secondary data collected, the research study concluded that there is a significant relationship among the variables and those macroeconomic variables including interest rates, inflation rates and corporate tax rate affect the share prices of companies operating in the economic boundaries of Pakistan. However, the literature that has been published displayed contradicting results and showed no effects between the chosen variables. The difference in findings may have occurred due to the rules and regulations and polices that have been implemented by different governments within their specific regions.
Assessing the Role of Macroeconomic

References


