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Impact of Macroeconomic Factors on Stock Returns Volatility of Commercial Banks in Pakistan

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Abstract *This study aims to determine the impact of macroeconomic variables on the stock return volatility of commercial banks in Pakistan. The macroeconomic variables used in this study are Interest rate, Exchange rate, Inflation rate, Balance of payment, and level of unemployment. Convenience sampling is used for this study. Panel data was invited for use in this study for analysis for the time period stated from 2007-to 2017. Data was collected from the data stream. On the basis of some econometric tests, a fixed-effect model was used. It was found that interest rate, exchange rate, and balance of payment have a positive while the inflation rate has a negative impact on stock return volatility of commercial banks in Pakistan. But unemployment has no significant impact thereon. This result is totally significant (P > 0.05). This is a consistent result with the postulations given by the capital asset pricing model and dividend discount model.*

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Microeconomics, Stock Return Volatility, Inflation Rate, Commercial Banks

JEL Classification:

Introduction

Generally, all the stakeholders have a remarkable concern about the economic position of a country. It is important for stakeholders, investors, regulators and analysts to solve the mobilization of resources in the economy (Osinubi, 2010). Sustainable development and growth is the result of the efficient and effective mobilization of resources in the economy. Therefore optimal output will be realized due to effective mobilization and allocation of funds. Capital formation and allocation are efficiency promoted by the stock market (Rajni and Mahendra, 2007). Economic growth is promoted by the stock market as a barometer. Therefore policymakers conclude that market volatility is a barometer of the financial market.

The rising of capital in both private and public entities is one of the fundamental goals of the stock market. Some value increase in terms of stock return is also one of the main objectives of some entities (Solomon, 2013). All the international market become more efficient after rapid globalization; because of this globalization capital market become a major factor in the economy of a country. Economic crises are also

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controlled by this globalization of the market. When the capital market is efficient, it maximizes profit (Chong and koh, 2003).

A country's economic situation can be judged by some important factors. Some investors find out that macroeconomic factors affect stock returns in various countries. Some researchers in the past argued that both interest rate and inflation rate have a negative relationship with stock return (Sohail and Hussain, 2011). This value of currency causes low savings and low savings results in low investment. Due to low investment, investors do not want to invest in the stock market. When the exchange rate increases, people are willing to make more investment and when exchange rate is low, there is low investment (Sing, 2009).

In the stock market, the presence of excessive volatility shows stock price usefulness (Karolyi, 2001). There are some internal and external factors that affect macroeconomic variables. Another study reveals that there is an important relationship between stock return and macroeconomic factors (John k.m.kuwarnu, 2010).

In 2009 GARCH model was used by Chang and Liang to guess the relationship between different macroeconomic factors, and from this study, they found out that stock returns are affected by these factors and variation is not constant(Chang and Liang, 2009).

Foreign exchange rate transactions and international monetary dealing is also effected by exchange rate movement. Scope of financial institutions is also affected by fluctuations in the exchange rate. Some recent studies suggest that some macroeconomic factors are the major factors of multinational companies (Mcguigan, Harris, 2002)

The impact of macroeconomic factors such as interest rate, exchange rate, inflation rate, the balance of payment and level of unemployment on stock return volatility of commercial banks in Pakistan has been extensively studied by many models and theories (Calvo & Rienhar, 2002).

One of these theories is arbitrage pricing theory which states that there is a sensitive relationship between stock return and some macroeconomic factors (Yourougu, 1990).

Research Question

Is there any impact of macroeconomic determinants (interest rate volatility, exchange rate volatility, inflation rate volatility, balance of payment, and level of unemployment) on stock returns volatility?

Research Objective

To establish the influence of macroeconomic factors (interest rate volatility, exchange rate volatility, Inflation rate volatility, Balance of payment, and level of unemployment) on stock return volatility of commercial banks in Pakistan

Literature Review

Introduction

Prior literature is basically concerned with the dynamic interaction between macroeconomics factors and stock returns. Inflation may be cost-push inflation or demand-pull inflation. Balance of payment is the difference between exports and imports. If a country exports is greater than its imports, there is a balance of payment deficit. If a country's exports is less than its imports, there is a surplus balance of payment. The impact of these factors on each other's has been captured by a number of studies. Ross (1976) proposed that stock returns are preliminarily affected by some macroeconomic forces. Fama (1981)

studied the relationship between stock returns and macroeconomic variables and found a negative relationship between inflation and stock returns. Choi *et al.* (1992) tested the data of 48 US banks' stock return against macroeconomic variables, namely market return, interest rate, and exchange rate, using a sample span from 1975 to 1987. Maysami *et al.* (2004) studied the long-run and short-run relationship between a set of macroeconomic variables in Singapore's stock market indices (finance index, property index, and hotel index) for the period span from February 1995 to December 2001. The findings indicate a positive relationship of the inflation rate with stock prices. The exchange rate was found to be positive in the hotel index and negative in both finance and property indexes. Rjoub (2012) observed the impact of the exchange rate on stock return for the period 2001-2009 in turkey. For this analysis, he used the VIA Garch model. The result of this study was that there is a two ways relationship between stock prices and exchange rate. Naran (2014) examined the influence of three economic determinants on Indian banking stock price. For this study, he carried a panel co-integration analysis and panel granger causality test for the period spans from June 1998 to April 2008. The findings indicate the presence of integration between the tested variables and bank stock returns.

Literature Pertaining to Interest Rate

The business of banking is similar to any business because of the particular risk it causes to society. Failure of savers save crisis organized breakdown of one or further credit organization of the whole system of banking inside adding. The system is commonly faced by complexity even if this segment is one of the majorities in time wealth. The nearly all fresh model is the subprime crisis. This disaster guides to bank breakdowns by unfavorable cost lying on the actual wealth across the globe. It is then very important to defend the servers besides these bank breakdowns within situations distinguished through the survival of market defects.

Uddin and Alam (2010) examined that in a country, there are two important determinants that affect a country's stock market. This paper outlines the market efficiency of a country. This study connects linkage between some factors such as interest rate and market index. Data was taken from 1992 to 2004. Dhaka stock exchange efficiency is determined by the help of this study. From this they concluded that Dhaka stock exchange rate will be more efficient if there is no change in the interest rate of the country.

Donald and Nguni (2003) analyzed the association of interest rate with stock return by using the EML approach. In this study, both of conventional Granger causality and ARFIM tests are conducted to determine the relationship between interest rate and stock return. This study suggests that all the investors, stockholders, management and policymakers need to be causal about the long-term property. This study suggests that stock return is a competitor asset. This study reveals that stock market prosperity is the result of a favorable macroeconomic environment. To improve the performance of the capital market government needs to work with the capital market.

Literature Pertaining to Exchange Rate

The elastic exchange rate structure inside 1910 and the rising internationalization of the banking segments has begun an additional universal economic variable. No experiential survey has, until now,

available that clearly observes the combined communication of interest rate and exchange rate lying on bank stock pricing.

Nesrine and Salah (2018) used a multiple regression model to study the association of exchange rate with stock return in turkey. They concluded that the relationship is insignificant in the case of Tunisia. The second result shows data of turkey from 2002 to 2017. In the case of Tunisia, the result shows that all the investors are affected by this change. From this study, they concluded in spite of world rank; there are some factors like political, social, and economical that affect turkey in the Middle East. Terrorism and euro weak growth is also important to factor in this aspect of turkey. It is important for the Turkish government to control the interest rate and exchange rate in the country. The result shows that the exchange rate has a significant impact on stock return.

Mambo and Mirada (2013) analyzed the association of the exchange rate with the stock return of the South African stock exchange. Monthly data for the period 200 to 2010 was used for this analysis. Some observations were selected for this study. The weak relationship between these two factors does not mean that the managers do not monitor the relationship between these two factors. A number of implications was arise from this analysis. For this study, data was taken from the South African stock exchange, and also nominal figures were used for this analysis.

Literature Pertaining to the Inflation Rate

Stephen Babu (2015) used Nairobi stock exchange by taking two important determinants. CPI was used to achieve these objectives. The finding of this study shows that is an important relationship between these two variables. While in the short run it has also a great impact on stock prices. 12.0 version was used for the collection and analysis of data. In this study ARDL model was used. Stable macroeconomic environment creates high economic growth in the country. Stokes (2013) used both the developed and developing countries data to investigate the impact of inflation on stock return at the Nairobi stock exchange. From this study, it was concluded that a change in inflation causes a small change in the stock return. It was found that both interest rate and the inflation rate has a negative impact on stock market return.

Literature Pertaining to the Balance of Payment

Nawaz and Rizwan (2015) examined the connection of balance of payment with stock return. The association of balance of payment with stock return was studied by using monthly data of five years. In this study, it has been adopted that there is an important correlation between stock return and balance of payment. The result of this study shows that a stable exchange rate provides a prosperous environment for the investors.

Oladipupo (2011) examined the connection of exchange rate with the balance of payment. OLS model was used and data have been taken from 1970 to 2010. Depreciation in the exchange rate can be helpful in the improvement of the balance of payment. In order to obtain an actual result, both balance of payment and exchange rate plays an important role in this aspect. In this study, it is concluded that both the macroeconomic variables are closely associated with each other and have a great impact on each other. Boosting supply is an essential measure of the balance of payment.

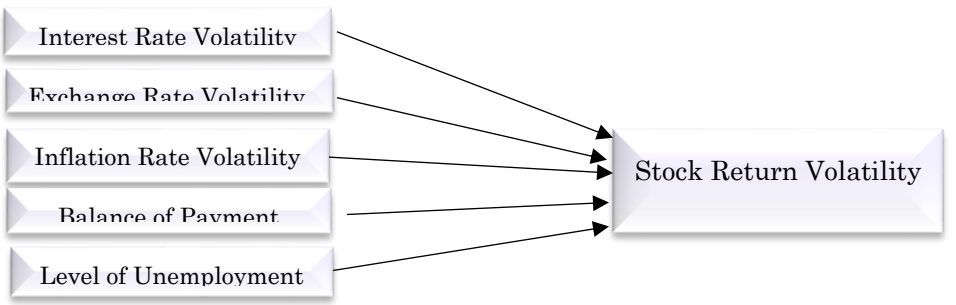
Literature Pertaining to Unemployment

Dirham (2017) examined the effect of unemployment on stock return. This study investigated unemployment reaction to stock return and the association between these variables are also studied. This study find that unemployment that is anticipated has a major effect on stock return. Unemployment and stock return are directly related with each other. When the unemployment rate is high, stock prices are also high. In this study it is concluded that when the unemployment rate increases federal fund rate increase and stock market prices also increases. There are two parts of this study anticipated unemployment and unanticipated unemployment. Data has been taken from 1950 to 2014.

Jessica (2016) investigated the relationship between unemployment rate and stock return in a country. This study shows that unemployment is a critical factor in the economy and it creates a major impact on stock return volatility. In this study DMP model was used to link job opportunities with stock prices. This study shows that high level of low economic development creates high risk, slow growth rate and also discourages investors. When there is a high level of risk evaluation level of markets are slow and also creates unemployment in the country. In this study market labor, productivity of labor and evaluation of stock market are also measured. DMP model was used to study the level of labor in the market that explains an equilibrium between market labor and stock return prices. From this study, it was concluded that time is an important factor in the relationship between these variables. This means that when the unemployment rate changes stock price in time dimension also changes.

Jansen and Zerou, (2017) studied different macroeconomic factors and its relationship with stock returns while, Cooper, (2013); Rjoub and Civcir, (2017) discovered the relationship between bank-specific and macroeconomic determinant and stock prices. These studies suggest further research work needs to be done in this area at different economies and econometric models. During the crises, the bank stock prices decline due to low confidence in the banking sector and, consequently, lead to the price drop.

Conceptual Framework



Hypothesis Development

According to the predictions of the author who find the impact of macroeconomic factors on stock return interest rate.

Interest Rate and Stock Return Volatility

It is determined that the impact of interest rate on stock return is always positive.

(Uddin and Alam, 2010; Donald Nguni, 2009; Tirole, 1994) Thus the first hypothesis of the study is:

H1: There is an impact of interest rate on stock return volatility.

Exchange Rate and Stock Return Volatility

It is evident that the association of exchange rate with stock return is positive (Nesrine and Salah, 2018; Rjoub, 2012). Thus the second hypothesis of the study is:

H2: There is an impact of exchange rate on stock return volatility.

Inflation Rate and Stock Return Volatility

Most of the past researchers suggest that the inflation rate has a negative impact on the stock return volatility of commercial banks in Pakistan (Stephen Babu, 2015(Paul and Malik, 2003). Thus the third hypothesis of the study is:

H3: There is an impact of inflation rate on stock return.

Balance of Payment and Stock Return Volatility

From the literature review of this study it was concluded that the association between balance of payment and stock return volatility is positive (Oligupopu, 1984. Bird G 2013**)**

H4: There is an impact of balance of payment on stock return.

Level of Unemployment and Stock Return Volatility

It was suggested that the association of level of unemployment stock return is insignificant (Arsalan and Rashid, 2010)**.** Thus the last hypothesis of the study is:

H5: There is an impact of level of unemployment on stock return volatility

Research Methodology

Regression analysis was used in this study. In this study pooled OLS, Fixed effects and random effects models were employed and tested econometrically. On the basis of some arguments fixed-effects model was suitable and was selected. Ordinary least square model is a type of linear least square method for estimating the unknown parameters in a linear regression model. A type of model includes variables of fixed parameters is called Fixed effect model. This is in contrast to the random effects model in which all or some of the model parameters are considered as random variables. Another test used to differentiate between Fixed Effect and Random effect model is the Hausman test. An estimator consistency is evaluated by comparing to an alternative or a consistent estimator by using the Hausman test. It helps one evaluate if a statistical model corresponds to the data. The LM test is used to differentiate between Ordinary least Square (OLS) model and random effect model. This test is used to test hypothesis about parameters. We used the F test to differentiate between OLS and Fixed Effect model.

Model Specification

Five variables have been studied in this proposal and the impact of these variables are also considered.

$$SR = \beta^{o} + \beta_1 INR + \beta_2 EXR + \beta_3 INR + \beta_4 BOP + \beta_5 LEM + u$$

In the above equation, Stock return volatility is the dependent variable. Interest rate, Exchange rate, Inflation rate, Balance of payment and unemployment are independent variables.

Correlation Analysis

For the analysis of this thesis fixed effect model is used. Which is recently used by Maysami (2004), Rjoub (2008), Hakim

(2012), Dirham (2017). Multi-collinearity in this respect is one of the main factors that always effect fixed model result. The existence of multi-colleanirity can be determined by calculating the correlation coefficient (r) among the dependent and independent variables. In this study connection amid exchange rate and the level of unemployment is less than the correlation proposed by Darnold (20130, Uddin and Alam (2010), Narayan (2014). The result of fixed effect model is also affected by some other issue. For example serial correlation and heteroscedasticity. A type of error called robust standard was used to solve these problems.

Table 1. Correlation Analysis

Variable	SR	INR	EXR	INR	BOP	LEM
SR	1					
INR	-0.002	1				
EXR	0.505	0.182	1			
INR	-0.535	0.184	-0.648	1		
BOP	-0.247	0.496	-0.399	0.311	1	
LEM	0.395	0.186	0.492	-0.616	-0.253	1

Regression Results

This study is very important to determine various microeconomics determinants relationship with stock return. For the analysis of this study fixed-effect model was used.

From the regression result it was find out that the connection between interest rate and stock return is positive. This result is totally significant (P > 0.05) this is a consistent result with the postulations given by the capital asset pricing model. This means that a rise in stock return also raise interest rate in the country. Similarly, a fall in interest rate also results in falling stock return (Donald 2004, Hamden ali 2014).

According to the literature of this study it was found that the association between exchange rate and stock return relationship is positive. This result is consistent with the line given by the capital asset pricing model. There are also some researchers in the past said that the linkage of exchange rate with stock return may be positive or negative. (Rjoub, 2012). Hypothetically exchange rate and stock return connection can be assumed seeing that any positive (currency falling creates home firms further spirited. Important to an enlarge within send oversees while an outcome stock prices increase and outcome of currency falling minimizing prosperity and an out coming turn down inside stock returns) and no association or a weak association can sell oversees leaning industry, prices increase by currency reduction, because the input rate is too exaggerated through this currency falling then the influence would be revealed toward several degree, as of enlarged rate of manufacturing (Narayan, 2013).

In this study some hypothesis was developed and these hypothesis was totally agree with the influence of inflation rate on stock market return. Fixed effect model was used in this analysis and this model is volatile to the predictions between inflation and market return. From this study it was concluded that when the stock market become public the government of this country become eligible to control inflation rate in the country (Hakim, 2012).

The empirical finding of this study presents that the relationship between

balance of payment and stock return is positive. From this it was concluded that a country having a positive balance of payment is good for all the investors and also for the firms.one researcher in the past said that people who make policy in a country always face problems from deficit balance of payment. Deficit in balance of payment is also called current account deficit. It is an important indicator in a country. Some deficit are permanent it can be recovered with the inflow of cash. Absence of current account does not means that the balance of payment is in equilibrium. This study shows that there are some policies are useful in the balance of payment equilibrium. Government of some developing countries always want to create a balance of payment surplus (Bird, G 1984).

According to this study literature review positive connection of level of unemployment with stock return is expected however the study does not indicates any significant impact. There is insignificant relationship between these two factors.

Table 2. Regression Results

Regressors	Expected sign	Coefficients	pvalue
INR	+	0.304	0.43
EXR	+	0.612	0.001
INF	-	-0.104	0.000
BOP	+	6.13	0.95
LEM	-	-1.170	0.008

Note: INR is the interest rate; EXR is the exchange rate; INF is the inflation rate; BOP is the balance of payment; UEM is the level of unemployment.

This study is very important to determine various microeconomics determinants relationship with stock return. For the analysis of this study fixed-effect model was used. From the regression result, it was discovered that the relationship of interest rate with stock return is positive. This result is totally significant (P > 0.05) this is a consistent result with the postulations given by the capital asset pricing model. This means that a rise in stock return also raise interest rate in the country. Similarly, a fall in interest rate also results in falling stock return (Donald 2004, Hamden ali 2014). According to the literature of this study it was found that there exchange rate and stock return relationship is positive. This result is consistent with the line given by the capital asset pricing model. There are also some researchers in the past said that the linkage of exchange rate with stock return may be positive or negative. (Rjoub, 2012). Hypothetically exchange rate and stock return connection can be assumed seeing that any positive (currency falling creates home firms further spirited. Important to an enlarge within send oversees while an outcome stock prices increase and outcome of currency falling minimizing prosperity and an out coming turn down inside stock returns) and no association or a weak association can sell oversees leaning industry, prices increase by currency reduction, because the input rate is too exaggerated through this currency falling then the influence would be revealed toward several degree, as of enlarged rate of manufacturing (Narayan, 2013). In this study some hypothesis was developed. Fixed effects model was used in this analysis, and this model is volatile to the predictions between inflation and market return. Effects of Asymmetric shocks indicate that there is the positive and negative impact of inflation on stock

return. From this study it was concluded that when the stock market become public the government of this country become eligible to control inflation rate in the country (Hakim, 2012). The empirical finding of this study presents that the relationship between balance of payment and stock return is positive. From this it was concluded that a country having a positive balance of payment is good for all the investors and also for the firms.one researcher in the past said that people who make policy in a country always face problems from deficit balance of payment. Deficit in balance of payment is also called current account deficit. It is an important indicator in a country. Some deficit are permanent it can be recovered with the inflow of cash. Absence of current account does not means that the balance of payment is in equilibrium. This study shows that there are some policies are useful in the balance of payment equilibrium. Government of some developing countries always wants to create a balance of payment surplus (Bird, G 1984). According to this study literature review positive connection of level of unemployment with stock return is expected however the study does not indicates any significant impact. There is insignificant relationship between these two factors.

Discussion and Conclusion

This study aims to determine the effect of macroeconomic determinants on stock return instability of commercial banks in Pakistan. The main macroeconomic variables are Interest rate, Exchange rate, inflation rate, balance of payment and level of unemployment. Convenience sampling is used for this study. In this study simple linear regression model was used. Panel data was inviting for use in this study for analysis. The time period as stated earlier was from 2007-2017. Data was collected from the data stream. In this study fixed effects, Pooled OLS and Random effect models were employed and tested econometrically. From the result of this analysis, it was found that interest rate, exchange rate and balance of payment has a positive impact on stock return volatility of commercial banks in Pakistan. From this study, it was also concluded that the inflation rate has a negative impact on stock return volatility while the level of unemployment has no significant impact on stock return volatility of commercial banks in Pakistan. This result is totally significant ($P > 0.05$). This is a consistent result with the postulations given by the capital asset pricing model and dividend discount model. This study is very helpful to be added to the existing literature on the impact of macroeconomic factors on stock return volatility of commercial banks in Pakistan. Stock return is an important asset of every bank to manage carefully. It is also stated in this study that both the theories of this study is also an important measure of the stock return of commercial banks in Pakistan. Policymakers can take advantages from this study.

Recommendation

From the result of this study it is concluded that for the future study the following recommendations can be made. Only eighteen commercial banks are studied in this study are studied, a number of sample of commercial banks can be extended for the future study. In this study only five independent variables are used, for the future study it is recommended to extend number of variables. In this study only five variables are used. It is recommended to extend the number of variables in future study.

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