ASYMMETRIC EFFECT OF MONETARY POLICY THE STOCK MARKET

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CERTIFICATE

This is to certify that this thesis entitled: **"Asymmetric Effect of Monetary Policy on Stock Market".** submitted by **Mr. Rahim Jawahar** is accepted in its present form by the School of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree in Master of Philosophy in Economics and Finance.

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ABSTRACT

This research investigates the asymmetric effect of monetary policy on stock market volatility, it is a panel analysis of high income countries and low middle income countries over the states of stock market which is bull and Bear. This research used the data over the period of 2010M1 to 2021M12. The objectives of the study are to examine the volatility of stock market, identify bull and bear states of stock market, asymmetric effect of monetary policy on stock market. Volatility of stock market is explored by GARCH (1,1). The outcomes showed that, in both High and low middle income countries volatility is persistent. For the identification stock market periods Markov regime switching model had been employed. It is identified that the high persistence showed by bull and bear states. It is also explored that in most of the countries when countries change its regime to bear it is the shorter period. GMM has been used to explore the asymmetric effect of monetary policy on stock market volatility. Upshots showed that there is asymmetric response of monetary policy to the stock market volatility, to bull and bear states of stock market. It is also identified that the greater impact of monetary policy is in bear state as compare to bull state. When the policy makers formulating policies, they have to look at the condition of the economy. When Central bank implement tightening monetary policy to calm down the economic conditions it may have adverse effect of the financial markets, stock market. In case of expansionary monetary policy, it allows the investors to invest in the economy due to circulation of money and the shares of stock market shift from bear state to bull.

Key Words: Stock Market, Volatility, asymmetry,

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Chapter 1

Introduction

1.1 Back ground

Monetary policy is a policy which is used by the central bank to maintain and regulate the available credit with in the economy. The Monetary policy is regulated to achieve several objectives such as price stability, employment level, adjusting in economic variations, economic growth which means to maximize the welfare of the society. Full level of employment is the vital aim because it leads the living standards of the people. If there is unemployment in the economy, that is the reason that output below its potential level. Keeping the output at its potential level is the main concern of the monetary policy. It can be done by keeping the prices, interest rate, and exchange rate stable.

The monetary policy has some targets but these targets of the monetary policy are also employed as instruments, which are money supply, available credit, and interest rate. In measuring the health of the country the interest is the imperative variable. Interest rate is the rate of capital and the user of funds are concern with the return on their investment.

The challenges which is faced by the monetary policy is the adjustment among these variables. In designing the monetary policy, the appropriate selection of these variables is very important and this is the art of monetary policy to keep all the variables at the optimal level.

The monetary policy influences interest rate and money supply to stable the prices, to gain social welfare and to stable the financial markets. The instable prices are creating uncertainty in the financial markets because the prices are directly linked with the business cycle. The monetary policy has to control rate of inflation to achieve the primary objective which is price stability. The financial markets such as stock markets influenced by the changes in the monetary policies and

changes in the economy. The economy can be effected by the political changes as well as environmental changes. The responsibility of the central bank and the government is to provide setting for the economic growth. A social, political and economic setting is needed to grow the economy.

There is always some uncertainty in the monetary policy, when the central banks performing their task or communicates efficiently. Central banks may have plans for future. The policy makers bear difficulties when they execute their plan due to unexpected economic developments. For example, In United states, when the policy makers making decisions. They go through the status of United States, which gives them information about the uncertainty in the financial markets. According to the (Kurov & Stan, 2018) , the uncertainty arises due to the application of policy itself. Particularly for the investors the timing and potential, critically influence while making policy. After financial crisis in the 2008. In 2009, Taylor express that low interest rate rises the real estate market cycle. This is also seen that quantitative easing period when the Fed obtained securities to inspire money supply in the market. After couple of periods Fed increases the interest rate. The researcher would take interest in it due to high fluctuations in the economy which ultimately effect the stock market.

Monetary policy affects the stock market by three ways, central banks uses monetary policy to affect the financial markets and financial institutions. They use the instruments of the monetary policy such as borrowing cost, reserves and available capacity of credit. In the second step, the central banks and the financial institutions uses the monetary policy to encourage the companies, with the actions of monetary policy the commercial banks and the financial institutions regulate themselves to affect the activities of the economy such as investment, savings, consumption. The third step is about the non-financial sector, monetary policy through nonfinancial sector in which

the actors of the economy handle the social economic variables aggregate expenditure, output and employment (Sun & Wang, 2018b).

Financial markets run the price discovery mechanism by discounting the future earnings of the companies (Elgammal et al., 2020). Historically the theories of economics and finance describes that effective financial markets give importance to the stock prices, when the company is great in expected earnings. In other words, the expected earnings of company are more, the value of stock prices are more significant. The information is very sensitive in the financial markets. There is a multifaceted bond within stock market and the monetary policy. The announcements of the central bank regarding monetary policy will positively impact the stock prices. The connection between financial market and the economy impact on long term basis. In financial econometrics, the efficient market hypothesis is a hypothesis in which all the information is reflected by stock prices. Consequently, it captures and forecast the performance of corporate sector. The existing situation of the macro variables is also reflecting by the stock prices (Goh et al., 2003). The association with in the stock market and macro variables can help the policy makers to make economic choices (Yaqoob & Bibi, 2021) .

The stock market plays the role of intermediary between the savers and the user of the funds. It plays a crucial role in the growth of the economy. It makes sure that the perfect allocation of its resources. i.e. the transmission of resources (funds) from surplus units to deficit units. The stock market can also be taken as intermediary role between the listed companies and investors in developed as well as in developing economies. The stock market enables the public companies to increase their capital and make sure the available opportunities for the investors. Through this the companies rise their cash flows by collecting funds from various stakeholders(Moussa & Delhoumi, 2021). The performance of stock market act as a central role in the global economy. It

acts as transmission mechanism, rise savings from advance countries to the emerging countries. Because investors invest in those project which are well planned, properly managed and give profits to the investors. The moment of these variables are key indicators for the public as well as for the stakeholders (Joshi & Giri, 2015).

The performance of stock market can be measured by the stock market indices. It gives the standard target to compare the sock returns. The stock market function in the short run and long run. In the short run the stock market is captured by the power of supply and demand. In the long run the capability of listed companies to deliver the cash flows to drive the stock returns (Moussa & Delhoumi, 2021). The trend and the movement of the stock market and the monetary variables are the vital indicators for the both public and private stakeholders. The economic prosperity brings in the economy only when the investors look towards the well managed capital market. The investor tries to invest in the diversified portfolios. It ultimately sustains the health of the economy.

The performance of stock market is evaluated by the volume of transactions (VOT), it is directed to growth and development of the economy. When the VOT is fluctuated it directly impact on the variables such as investment and consumption by the changes in the stock prices (Ahmad et al., 2012). In the previous studies it is identified that there are three ways that the economy is effected by the Shocks of the stock prices. The first is that the investment is very necessary for the markets but the variations in the investment is due to the shocks in the stock prices and it is hard for the companies to raise the funds. Second, the company's balance sheet is affected by the shocks in the share prices. The third one is that the wealth of the household depend on the stock prices, which ultimately affect the consumption of the household (Joshi & Giri, 2015).

The economy has association amid money supply, stock prices. Following are the interactions of monetary policy, stock market and macro economy. Firstly, when the central banks of the

countries implement tightening monetary policy. The money supply decreases, the interest rate and the cost of company increases. As a result, the investors decreases their stock and chose other financial assets which give them profit, this reduces the stock prices. Secondly, when the monetary policy is formulated the stock market takes some following forms. The expectations or return of the investors increases, when the stock prices increases. When the risk is unchanged the investors increase their investment by demanding the safe assets. Thirdly, stock market gathers funds from the society and finances the companies, which give them an opportunity to increase the production of the comapny. The stock market reach at its peak point, it influences the economy through income and investment. Fourthly, the economy grows when the demand of the product exceeds than supply, it allows the companies to speed up their production. It raises the gross domestic product. The development changes in the macro economy it influences the investor's stock returns, which affect the stock prices. Finally, the policy makers consider the alteration of macro-economic environment while making the monetary policy, which ensure the development in the economy. Generally, the monetary policy should be practical. It increases the total demand and decreases the risk of the assets, which is caused by unnecessary money supply.

1.1.1 Asymmetry of monetary policy

Early in the 1930s the central banks of the various countries imply monetary policy these policies can be easing or tightening. It is believed that the impact of these policies are symmetric. In the 1930s, when the great depression took place in the United States the people realize that the monetary policy may be asymmetric. The U.S government have implemented expansionary monetary policy throughout the great depression to improve the economy but it couldn't show an important role (Zheng et al., 2014).

The asymmetric effect of monetary policy is the eye catching phenomenon for the macroeconomist and financial economist because its outcomes are adverse on stock market. In the monetary policy perspective, asymmetry monetary policy means the given monetary policy have uncertain effects on its purposes (Bui, 2015). The asymmetry is also known as traditional Keynesian asymmetry, which is defined as, the positive monetary shocks impact differently on economy, their impact is small as compare to negative monetary shocks, and the impact of negative shocks is greater on economy. Asymmetries in monetary policy such as (a) negative and positive shocks, (b) Big or small shocks, (c) Low variance, negative shocks. The difference between big and small shocks is built on the variance of unanticipated monetary shocks. Due to inconsistent monetary policy multiple markets experienced uncertain fluctuation in the stock return. This volatile and uncertain information is the cause of asymmetry which influence the stock market. The investors and policymakers are looking for this information to regulate the stock market efficiently.

It is also documented that the major source of the asymmetric effect of monetary policy is the financial constraints on the financial markets(Ehrmann & Fratzscher, 2004) That is the company who is financially constrained then the regulating monetary policy have greater impact on the stock returns, particularly in the bear market situations. Moreover, a research conducted by the (Chen, 2007) in his study he debated that the monetary policy asymmetric effect in the bear market would be describe by the agency cost prominent to the information asymmetry with in the financial institutes and companies.

The association among stock market and monetary policy is dynamic. Stock market is closely tied with two variable of monetary policy which are interest rate and money supply (Abbas & McMillan, 2014). Additionally, the investors are interested in interest rates movement to capitalize their capital, where they anticipate higher yield to return/return. When the investors get higher

interest rate from the bank as compare to the stock market the investors shift their investment and deposit money in the banks.

The monetary policy can influence the stock market through different channels. It affects the stock market in two ways, impact on cash flows and impact on discount rate. Expansionary monetary policy increase money supply in the economy, it rises the demand for the assets or stocks and the rising demand means the increase in the stock prices. It allows companies to invest in profitable projects and thus increase in the cash flows. Tightening monetary policy decrease the money supply and makes the economy volatile (Bui, 2015).

The stock prices can be affected by the changes in the interest rate, it affects the company's cash flows or by altering the expectations of future cash flows. (Lobo, 2000). When the financial markets integrate, it gives benefit to each other as well as they have adverse impact on each other because the crises from one part of the world can shift to the other part of the world. All the markets influenced by the exchange rates, the variations in the exchange rate is the actual economic cost which have impact on the price stability, profit of the company's and growth of economy (Benita & Lauterbach, 2007).

1.1.2 Monetary Policy shocks

The increase or decrease in the monetary shock can affect the economy. The money supply is required for the growth in the economy. The money supply should support in growing the real economy through money, which create development in the economy by promoting the economy to produce at its potential level. When the motion of money is excess in the economy and the economy is successively above at the possible level of output. The central bank use tightening monetary policy to control the situation by decreasing the money supply and the interest rate rises. So the demand of the money rises and the money in the economy is less which create the negative

monetary gap which ultimately keep the economy at its potential level but the decline in the money supply or the negative monetary shocks make the stock market volatile.

Another situation is that when the circulation of money is limited in the economy and the economy is working below its potential level of production. The expansionary monetary policy has been implemented which increases the money supply and resultantly the supply of money is greater as compare to the demand of money. The positive output gap has been produced which promote the economy.

The monetary policy shocks can affect the stock prices. There are huge number of empirical researches conducted on the association between monetary policy shocks and stock prices/equity returns. A sight states that when the money supply rises it rises the stock prices. By using the growth in the monetary aggregates M1 as a measure of monetary shock (Huma & Jaffe, 1971) concluded that monetary policy has significant impact on the stock prices. Another sight of the monetary is that it affects the stock prices through interest rate (Thorbecke, 1997) Investigates the reaction of stock market to the monetary shocks. He used the VAR model and concluded that negative relationship between tightening monetary policy and stock market. According to the study of (Rigobo & Sack, 2004), they said that short term interest rate has negative impact on the stock prices. The uncertainty in the economic policy arises when the economic agents could not take proper decisions. The decisions regarding employment, consumption, saving and investment can affect the performance of stock market.

1.2 Research Question:

This study has following questions.

1. To explore how monetary policy, influence the volatility of stock market?

2. To estimate how does monetary policy respond in the bullish and bear market? Is the effect of monetary policy on stock market are asymmetric?

1.3 Objectives:

The objectives of the study are given below.

- Analyze the volatility of stock markets when the asymmetric monetary policy changes take place.
- Second objective of the study is to identify the states of stock market.
- Explore the response of asymmetric monetary policy to the stock market. Is it symmetric or asymmetric?
- Analyzing the policies of central bank and develop a policy, which is favorable for stock market.

1.4 Problem Statement

For the growth in the economy the money supply is required. The shocks in the economy can affect the financial markets and economic growth. Money supply plays supporting role in the development of economy. The economy can produce at its potential level. When the circulation of money is excess in the economy. The economy is above at its potential level of output. The central uses its policy to control the situation, central bank implement tightening monetary policy. Tightening monetary policy decreases the money supply and increase in the interest rate. It rises the demand of the money but decline of money in the economy create negative monetary gap but the decline in the money supply or the negative monetary shocks make the stock market volatile.

Another case is that when the economy circulates with limited amount of money. The economy is working below its potential output. Central bank implement expansionary monetary policy in which money supply increases and interest rate decreases. Money supply is in greater amount to the demand of the people. Investors invest in the stock markets which ultimately grows the economic growth.

1.5 Significance and gap of Study.

Economies of both Developed and developing economies have the most important feature which is stock market. Somehow it is possible to say that the stock market presents the economies of the countries. Asymmetric effect of monetary policy is accepted in the both developed and developing countries but this effect is commonly scene in developed countries. But this study contributes a panel analysis on asymmetric effect of monetary policy on stock market over bull and bear states in case of developed and developing countries. There is a less literature which gives a clear picture of both developed and developing countries. For measuring the volatility and uncertainty in the stock market, the most appropriate method is GARCH specification. ARCH effect and GARCH specification is used in this study to measure the stock market volatility. Asymmetric effect of monetary policy in the states of stock market can be recognized by the using Markov-Switching model and it also identified that the response of monetary on the states of stock market. The results help the policy makers to policy which enhance the growth of the stock market as well as the economies of the countries.

1.6 Organization of the study

This study consists of six chapters. Chapter number one is about the introduction the monetary policy and stock market. The second chapter include the literature review of the study. The third chapter is based on the data and methodology. The fourth chapter comprises results of empirical analysis. Fifth chapter is about the Policy & Qualitative analysis. The last chapter is the conclusion of the study and policy recommendation.

Chapter 2

Literature Review:

The literature has been well captured on asymmetric effect of monetary policy on stock market. The large number of studies have explored with the purpose to explore the response of monetary policy on the financial markets like stock market. The asymmetric monetary policy has diverse effect in different phases such as contractionary and expansionary, on the indicators of the stock market. The researchers concern with the literature due to volatility in stock market, due to asymmetric effects by the monetary policy. The volatile stock market has opposing effect on the economy.

Economist and researchers of the world try to putt efforts to show how the monetary policy respond on the components of financial markets, like the researchers of India have explored the Asymmetric effect of unanticipated or unexpected monetary shocks on stock prices in India. They took the data over the period of 1994M4-2018M11. By applying MSDR model to Time-Varying unanticipated monetary shocks. Their results show that Indian stock prices depend on two states: The state one with high growth rate which is in bull markets. The other state with low stock growth rate which is in bear markets. The unanticipated monetary shocks seem significantly asymmetric lagged effect on the stock prices: (a) the negative unanticipated shocks have positive effect in bull markets, and (b) Positive unanticipated shocks have negative effect in bear market (Thanh et al., 2020).

Studies have been conducted on the emerging economies. Some of the investigated the effect of monetary shocks on the financial markets of Chinese such as stock market during the phase of 2005 to 2011 by using the MSVAR-EGASRCH model. The outcomes indicate that the Chinese

monetary policies have notable, Asymmetric effect on stock market in various stages of market cycles. Interest rate and the other one which reserve rate shocks differ from one market to the other market. The shocks of exchange rate and money supply not effect. The non-linear model also applied for the empirical results, which shows that change in the monetary policy enhance the volatility in the stock prices. The evidences suggested that while designing the monetary policy consider the condition of the markets (Guo, Hu, & Jiang, 2013).

(Sun & Wang, 2018a)Discussed that the china's monetary policy instruments, direct instruments such as interest rate, credit ceiling and direct lending. Indirect instruments such as open market operations, reserve requirements have asymmetric effect on stock market. They use the Markov switching vector auto regression (MS-VAR) model and putt lights on asymmetric effect of monetary policy of china on stock market in bear market and the bull market. The variables which are used for this study are return rate, growth rate of industrial added value (VA), growth rate of M2 (M2), and interest rate. The another study also added the value in the literature, their outcomes of the study represents that stock return can be significantly affected by the unanticipated monetary shocks. The empirical consequences support the indication for the developed markets that the stock return significantly impacted by the monetary policy in the bear market. But in the bull market the monetary policy impacted insignificantly (Han, Wu, & Young, 2014).

The information in the market plays significant role for the investors. Investors act rationally and expect that the efficient market hypothesis gives all available information (Fama, 1970). The stock market has different market conditions such as bear state, normal state and bull states of market which defines the states of market. The investor behave according to the market conditions he face fear and might be greedy in the bear and bull markets (Baker & Wurgler, 2006). Find the Asymmetric dependence structures for regional stock markets, by putting on unconditional

quantile regression (UQR) approach. By using this approach, they explore the connections among the regions of 6 stock markets. They also examine the impact of global factors of economy on them. The findings explore that dependences structure are asymmetric U=shaped or inverted U-shaped, it indicates that both economically and geographically near to stock market. It is observed that the economic factors are more prominent in the bear or bull market, specifically in the bear market. The UQR approach gives a strong extreme value relationship and significant effect rather than the traditional CQR approach (Dong, Li, & Yoon, 2020).

The stock market plays an important role as an intermediary between the savers and the user of the funds in an economy. It transfer the funds from surplus units to deficit unit where the need of funds (Osahon & Oriakhi, 2013). (Adeleke, 2021) Conducted a study in the Nigeria, they find that the asymmetric effect of fiscal and monetary policy on the performance of stock market. The Auto Regressive Distributive Lag (ARDL) have been used to test the technique of co-integration to examine the equilibrium relationship between the series. The data have been analyzing by the Vector correction model. The findings indicate that the anticipated fiscal policy had an adverse and significant upshot on the performance of stock market in the third and fourth quarter of the year. But the stock market performances of Nigeria are not affected by the anticipated and unanticipated monetary policy as well as unanticipated fiscal policy. The (Ravn, 2014) contributed in the debate of examining the effect of Asymmetric monetary policy in general equilibrium (stock market) by using the DSGE model. The researcher determined that asymmetric monetary policy to the stock market will transform in to asymmetric business cycle. Expansionary monetary policy leads the booms in the output. He shows that the financial accelerator or stock wealth is assumed to be non-linear over the business cycle.

Investor sentiment and monetary policy are the non-fundamental elements influencing the stock prices(J. Li, 2015). Investor sentiments acting an organized and major role in the financial asset pricing (Kumar & Lee, 2006). The(Li & Jinfang, 2015) explores the asymmetric effects of investor sentiment and monetary policy on stock prices. In several market states by applying Markov-switching vector auto regression (MS- VAR) model. The outcomes show that the shocks of sentiments are greater than the shocks of monetary policy. It leads not must greater stock price volatility but also for longer period in the stock market down turn rather the spreading out of stock market. This is the reason the stock market shows asymmetric effect. It also detects that the replies of the stock prices to the sentiment shocks present an instant effect, while the responses the stock prices to the monetary policy shows one period lagged effect. Conducted study on the US stock market to discover the asymmetric effect of monetary policy on the stock prices. The Markov-Switching dynamics factor model is used, it is analyzed by the time varying parameter that when the expansionary monetary policy increase or decline in the Federal funds rate have positive impact on the stock returns.

A study had been directed to observe the interdependence of monetary policy and the stock prices of the Barbados, Jamaica and Trinidad and Tobago. The structural VAR have been used with monthly and annually data of the stock prices. Monthly and annually data is used for the Barbados, Jamaica and Trinidad and Tobago. In case of Barbados by using monthly and annual data, the shocks in the monetary policy increases the Treasury bill rate which increases the stock prices, whereas the shocks in the stock prices rises the stock prices which increases the treasury bill rate. In the case of Jamaica, monetary policy shock falls the stock prices, while the shocks in the stock prices rises the prices of the stocks. For the situation of T&T the monetary policy shocks are the reasons of stock prices to decrease but the shocks lead to rise the real stock prices which increases

the Treasury bill rate. When these three countries examined together the treasure bill rate increases by the positive shocks in the stock prices. The results of annual data which is used in the Caribbean countries are parallel to the result of Bjorn land and Leitemo. The monetary policy shock have greater influence in the US whereas the shocks in the stock prices have smaller effect as compare to the economies of TN the Caribbean countries(Lglesias & Haughton, 2015).

The contractionary monetary policy has significant impact as compare to the contractionary monetary policy. It is examined that the monetary policy direction has different results due to different economic responses. The data over the period of 1959 to 2007 have been used in their model. They find an asymmetric evidence in the unemployment due to alteration in the monetary policy. It is estimated that if the federal fund rate rises then the unemployment rate rises. On the otherhand if the federal fund rate decreases it decreases the unemployment rate (Barnichon et al., 2017). The monetary policy has different directions and different directions impact differently on the economy. The monetary policy impact asymmetrically on the economy. In recovering the economy, the monetary policy plays significant role as compare to decline in the economy (Zheng et al., 2014).

Many scholars have viewed that the interest rate has short term and long term effect on the stock market. It is difficult to determine the impact of interest rate on stock prices in the short term period.(Dabbous & Tarhini, 2021) A study conducted by (Papadamou et al., 2017) in which he investigated that the adjustment in the long run interest rate results in the stable stock returns in the long run. The impact of short term interest rate on the prices of stock is not apparent. When there is adjustment in the rate of interest and the deposit reserve ratio, the low rate of interest rate is the cause of economic downturn. Generally, when the monetary policy is tightening by the central banks, the company's cost increases and decreases the returns of the investors. This is the

reason at the end the stock prices decline. To investigate the effect of interest rate of stock returns in China, novel Bayesian time-varying model is used in this study and control the rest of the macroeconomic variable. The outcomes of this study specify that there is significantly negative correlation between the stock market return and the interest rate. The results of this study clearly indicate that the central bank uses interest rate polices to control the stock market(Gu, Zhu, & Wang, 2021). In the past paper, this is observed that the central banks of the countries such as China and Switzerland consider the conditions of the stock market to make advancement in the monetary policy (Bohl et al., 2007).

(Chatziantoniou, Duffy, & Filis, 2012) Conducted a study to examine the impact of monetary and fiscal policy shocks on the performance of stock market, in the three countries which are Germany, UK and US. The consequences of the study explore that the fiscal policy of the Germany have no direct relationship with stock market performance and noticed that there is direct relationship between money supply and German stock market but they viewed that in the Germany the interest rate has no effect. While in the US interest rate is affected by the money supply.

In the context of Pakistan, a study conducted by the Saba and Qayyum on the monetary policy and the stock market. They explore the linkage between them. Repo rate has been used to measure monetary policy. The VAR-EGARCH model was used to study the linkage between repo rate and stock market. For the long run relationship between repo rate and stock market, they used two steps Engle Granger (1987). The results of the study indicate that there is a significant negative relationship between repo rate and the stock returns. They also indicate that there is positive relationship between monetary policy and the stock market, the monetary policy affects the stock market volatility.

The relationship between monetary policy and stock market was examined by(Qayyum & Anwa, 2010). Repo rate was used to measure the main variable which is monetary policy. VAR-EGARIH and Two steps Engle Granger (1987) are used to study the relationship between repo rate and stock market. Stock market returns get affected by the results of repo rate. Stock market volatility and monetary policy has direct linkage but there is negative relationship between repo rate and stock market. The changes in the monetary policy of Pakistan make the stock market complex. According to **(**Sara and fazel, 2008**)** they investigated the associated between money supply and stock market. The association is investigated by using these variables i.e. Three-month Treasury bill to measure interest rate. S&P index used to measure stock price and MI used to measure money supply. The test used to measure the association between money supply and stock prices are Engle Granger and Causality test. The results indicated that there is no constant association between money supply and stock market. Through Granger Causality Test they concluded that there is no association between them. The linkage between monetary variable and equity market returns was investigated and concluded that there is long run relationship between them. The relationship between these variables helps investors to achieve the future direction of equity price by expecting trends in interest rate, exchange rate and money supply. The macro polices of capital markets use the arrival of new information as concluded by efficient market hypothesis.

There are many situations in the economy that the macro variables reflect the stock prices. Changes in the economy for the development influence the investors for stock returns, which ultimately affect the stock prices. For macroeconomics variable, a study had been conducted in the Nigeria by (Oseni & Nwosa, 2011). They explore the relationship of macroeconomic variables and stock market, during the period of 1986 to 2010. They used GDP, inflation, interest rate and stock returns. They employed E-Garch for the velocity of stock market and to test the relationship

between macroeconomic variable and stock returns they employed lag augmented VAR and Granger Causality test. (Okpara et al., 2016) also investigate the impact of monetary policy and stock returns of Nigeria. He said that the stock return of Nigeria is sensitive to the alteration of monetary policy variables.

Historically it is observed that theories of economics and finance give importance to the stock prices. For the importance of stock market prices, and the demand of money in market, evidence is provided by the(Caporale & Soliman, 2013). They express the association within the stock market and monetary policy of developed countries UK, US and Germany. They used data from the duration of 1992-2009. They said that there is a difference between short term and long term interest rate. They also said that as the interest rate decrease, it decreases the money demand and price of assets in these developed countries.

(Yoshino et. al, 2014) represented the study, impact of monetary policy shock on the stock prices of Asia and the employed VECM. The variable they used, Real GDP, exchange rate, monetary base, CPI and the stock prices of Tehran index. They showed the direct relationship with in the real GDP supply of money, exchange rate and Tehran stock exchange.

Many studied had been proposed to investigate that which factors affect the performance of stock market. One of the study proposed by (Mehvish, 2013) in Pakistan, she utilized time series date 1998 to 2008. Variables used by author are interest rate, FDI as percentage of GDP, value traded, domestic credit and market capitalization. She used E-views software and run regression. She concluded that, there is a positive relationship between in FDI, value traded and stock market. Out the real interest rate has inverse relationship.

The variation of interest rate and the exchange rate effect the performance of market Subhani (2011) analyzed the performance of stock market by employing applications of GARCH. He used the data of eight countries US, UK, Japan, Pakistan, Germany, Spain, India, and Hong Kong. The outcomes of the study express positive relationship.

2.1 Monetary policy Channels

The fluctuations in the interest rate can influence the prices of the assets in the economy in couple of ways such as, the company's are affected by their cash flows, the rate at which. The other way is that changing the potentials of the future cash flows. The participants of the stock market have observed that the actions of the fed are important because the federal funds and discount rate are target Changes. It signals the future interest rate and inflation.

To understand association amid monetary policy and asset prices, the policy transmission plays a vital role. In circumstances of economy the Stock prices are extremely complex. The Keynesian IS-LM observed that expansionary and contractionary monetary policy can describe the monetary transmission mechanism. The stock market is affected by the channels of monetary policy. The monetary policy channels such as interest rate, Credit channel and the asset price channel.

2.1.1 Interest Rate

The traditional interest rate links the economy with the consumption and investment. The increase or decrease in the interest rate matters a lot for the investors because it allows the investors to observe the cost of capital and then go for the investment. The investor can rise its investment when the cost of capital decline and ultimately it rises the output level. It also increases the demand of the people and allow people to enhance their spending's. In the business sectors such as companies, they are directly related to the banks because they get loan from banks to increase their capital. The low cost of borrowing of companies straightly affect the stock prices by growing the

present value of future cash flow. While in the case of rise in the interest rate, the rise in the cost of borrow restrict the investors to decrease their investment. Ultimately it decreases the spending of the people, people consume less. The rise in the interest rate which is contractionary monetary policy is the reason of decrease in the stock price. The riskiness of stocks increases when the interest rate increases. The stock market responds sensitively when there are changes in the monetary policy.

Monetarist had viewed that, when the circulation of money rises, the focus of the entire people is to spend their money. They invest their money in their businesses. The demand of equity equipment's rises as the spending of investors rises in the stock market. The Keynesian also support the argument because they also view the same results and made a conclusion that the ease monetary policy attracts the equity investment and reduce the attractiveness of bonds. It increases the prices of the equity. The both views said that by increasing the equity prices the investors and the producers leads the investment and the output.

2.1.2. Credit channel

Credit channel is another channel which can be distributed into two sub channels. The bank loan channel and the balance sheet channel. The credit channel theory states that the bank lending Channel and balance sheet channel works through equity finance premium that match the differences in the credit market situations. Borrowers and lenders in the market face many problems such as asymmetry information, agreement enforcement and the cost of finance (external and internal finance). The asymmetric information in the credit market can be solved by the banks, banks plays a suitable role solve this problem. According to the credit market theory, the monetary shocks can accelerate the economy in the bad market conditions. The lending channel describes the amount of loans supplied. The small companies whose credit or supply of money depend on

the banks, the small company's ultimately depend on the monetary policy to fulfill their expenditures. In the case of large companies, they get credit through stock market and bond market.

In the monetary policy transmission mechanism, the Bank lending channel can work as when the circulation of money rises then the loans and the bank reserves definitely rises. For the borrower's banks plays a crucial role as a lender, as the increase in the loans people invest their money in the projects and increase their output.

The balance sheet channel states that the interest rate is the major factor which affect income statements. In this channel the investment and the output decreases due to increasing Cost of external finance. This indicates the struggling phase of the economy in which the financial institutions and the banks decrease the money supply. This is the alarming situation for the borrowers because they have no access to the money. The situation is worse for the borrowers and they are affected the macroeconomic shocks.

2.2 Literature review of bear and bull market

Markov-Switching model have been widely used to detect the regime switching performance of economic and financial time series researches. To investigate the behavior of stock market in different regimes various studies used Markov switching model. This model is developed by the Hamilton 1989. MS-AR (Markov-Switching Auto regressive) model is the addition of (Goldfeld & Quandt, 1973) by allowing regime switch. (Turner & Startz, 1989)Started this model (MS-AR) in financial econometrics to identify the regime switching behavior of stock market. By using MS-AR model, it is observed by the (Cheu et al., 1994) that there is asymmetric and non-linear association within volatility and returns.

There is a strong regime switching performance of stock market returns is investigated by the (Turner & Startz, 1989). The study of (Schaller & Norden, 1997) is also similar to the study of (Turner & Startz, 1989). A study is carried by the (Nishiyama, 1998) he examined that how stock returns respond to the shocks and shifts in the regimes of 5 industrialized countries. The upshots showed that volatility indicates regime shifts in all five counties. (McCurdy & Maheu, 2012)Divided the US stock market in two states, stable state which is High returns and volatile state which is low returns.

To examined the rotating points of Bear and bull market. (Gonzalez et al., 2000) The monthly data of stock market index have been used in this study during the period of 1800-2001. Various econometric have been used in this study such as BB method and CC method to estimate that the stock returns are high or low. The outcomes of the BB and CC methods are similar due stock market crashes and bear trend exits. At the nineteen after the crash of stock market there was a bull trend. Markov-Switching (2) model and AR (2) had been used to investigate the Indian stock market. (Wasim & Bandi, 2011) conducted this study and concluded that the behavior of stock market is more complex due to the external shocks. The bear market period is more than one then the period of bull. (Shibata, 2012) used the Tokyo stock market price index and examined the bear and bull period. He also examined the volatility during the period of 1949 to 2008. (Kole, 2012) also explores a study on identification of bull and bear market by using Markov switching Garch model.

During the phase of Bear and Bull market (Nitantamis, 2013) studied the relationship of commodity stocks and commodity prices. The results showed that the duration of bear period is extensive in the commodity prices than the duration of bull. For the indication of association of two markets. The (Yaya & Alama, 2014) test the persistence of bull and bear market and he also

examined the asymmetric volatility of Nigerian stock market, he took daily data of Nigerian all share index, for the persistence and the asymmetries he used Garch model. The outcomes showed that there is four peak consistence with the eight markets.

Chapter 3

Data and Methodology

This study analyzes the Asymmetric effect of monetary policy on the stock market. In this study monthly data during the period of 2010:M1 to 2021:M12 is used. This study is panel analysis, for this the whole sample is divided in to sub samples, which is high income countries and the low middle income countries. The high income countries are Argentina, Australia, Brazil, Canada, China, Chile, Colombia, Denmark, Hungary, Iceland, Israel, Jamaica, Japan, Kuwait, Malaysia**,** Maldives, Mexico, New Zealand, Norway, Poland, Qatar, Romania, Russia, South Arabia, South Africa, South Korea, Sweden, Switzerland, Thailand, Turkey, United Kingdom and United State. Low middle income countries are Bangladesh, India, Indonesia, Kenya, Morocco, Nigeria, Pakistan, Philippines, Sri Lanka, Tanzania, Uganda, and Ukraine, Zambia. To build the stock market volatility and for the bear and bull period, indices of stock market of the countries is used.

The variables which are used in this research are money supply, for interest rate Treasury bill rate is used, inflation, exchange rate and stock returns volatility. Asset price theory states that these variables have solid influence on the size and risk-ness of the cash flows of the companies. The data of these variables have been collected from the International financial statistics (IFS), central banks and stock exchange of the respective countries and economic surveys.

3.1 Dependent Variable

This study employs monthly statistics of closing equity market prices of the high income and low middle income countries which is mentioned as above. The market indices and their countries are given below in the table3(a) and 3(b), Countries and their indices of high and low middle income countries.

Table 3(a) : Countries and their Indices of High Income Countries.

Countries	Stock Indices
Argentina	S&P Merval
Australia	S&PASX 200
Brazil	Bovespa
Canada	S&P Tsx
China	shanghai composite
Chile	S&P CLX IPSA
Colombia	COLCAP
Denmark	OMX Copenhagen all share
Hungary	Budapest SE
Iceland	ICEX Main
Israel	TA 35
Jamaica	JSE All Jamaican Composite
Japan	Nikkei 225
Kuwait	Main Market PR
Malaysia	FTSE Malaysia
Maldives	MASIX
Mexico	S&P/BMV IPC
New Zealand	DJ New Zealand
Norway	Oslo All Share
Poland	WIG20
Qatar	QE All Shares
Romania	BET
Russia	RTSI
Saudi Arabia	Tadawul All Share
South Africa	South Africa Top 40
South Korea	KOSPI
Sweden	OMX Nordic 40
Switzerland	SMI
Thailand	SET
Turkey	BIST 100
United Kingdom	FTSE 100
United States	Dow Jones

Table 3(b) : Countries and their Indices of low middle income countries

Countries	Stock Index
Bangladesh	DSE Broad

India	BSE Sensex
Indonesia	FTSE Indonesia
Kenya	Kenya NSE 20
Morocco	Moroccan All Shares
Nigeria	NSE 30
Pakistan	Karachi 100
Philippines	PSEi composite
Sri Lanka	CSE all share
Tanzania	Tanzania All Share
Uganda	Uganda All Share
Ukraine	PFTS
Zambia	LSE all share

3.2 Independent Variables

For demonstrating the asymmetric effect of monetary policy the variables of monetary policy have been used as an independent variable. For measuring the monetary policy, money supply which is Broad money. According to the monetarist and Keynesian, the money supply can impact the equity prices/stock prices via monetary policy. Monetarist view that central banks uses expansionary monetary policy rises the stock prices. The money supply rises at the optimal level it rises the demand for the assets.

On the other hand, the Keynesian theory viewed that rise in the money supply and decrease in the interest rate create income of the instruments fixed which is a smaller amount of attraction than equity. The rise in the money supply leads to decrease in the interest rate, which grows the savings and saving converted into the investment which ultimately appreciate the stock prices. Most of the literature have proved that the money supply has direct relationship with stock prices. As the money supply increases stock prices also increases.

The second independent variable used in the study is exchange rate. The purpose of this variable is to measure the position of the currency of any country with respect to the set of main currencies.

Real exchange rate also tells about the trading capabilities of the country. For developing countries this variable plays an important role for decision making

The relationship between exchange rate and stock market is explained by two models. The first model is called flow oriented model or traditional approach which is proposed by Dornbusch and Fischer. They stated that the product of the country's output become globally competitive when the changes in the exchange rate have been made. These changes make changes in the stock market. According to this model depreciation in the exchange rate make the exports more attractive globally. Opposite situation is when the exchange rate is appreciated (Yang et al., 2017).

On the other hand, the second model is stock oriented model which is proposed by Branson. According to this model when the foreign investors invests in the domestic market, foreign investment flow in to the domestic stock market which increase in value the domestic currency. (Long et al., 2021)

The interest rate and inflation is considered as third and fourth variable in this study respectively. These variables have been selected because these variables are required for the model which is used in this study. These variables are important as these variables are used in literature, various studies use these variables in their conceptual framework such as (Bui & Thanh, 2015). By following literature these variables have been selected. Like other tools of monetary policy, monetary policy uses interest rate to gain its objectives. The interest rate channel rolling from monetary policy to stock market and it shakes the investment decisions of the investors which ultimately affect the output. The monetary policy will directly or indirectly affect the stock market. For example, the rise in the interest rate create savings of the bank and bonds more attractive than the market investment. The dependent, independent, their frequencies, source and unit are given in the below table. 3(c).

Table 3(c): Dependent and Independent variables and their frequency.

Dependent Variable	Independent Variables	Frequency	Source of data	Unit
Stock market volatility	Money Supply	Monthly	IFS	M
	Interest Rate	Monthly	IFS	Percentage per annum
	Inflation	Monthly	IFS	CPI
	Exchange Rate	Monthly	IFS	CPI
	Stock Returns	Monthly	Sock exchange sites	S.P

3.3. Research strategy:

Research strategy is a strategy which is design to analyze the objectives. This study is based on mixed method which involves both quantitative and qualitative technique. The reason for choosing the both techniques is because to get benefits from both techniques. The quantitative technique depends on numbers, the number or data which is manipulated, store in the computer. The use of quantitative technique also gives the reliability of the study. For the quantitative technique the data of the dependent and independent variable is collected which is described as above. Choosing another technique which is qualitative technique because it is based on the words like interviews, these words gives us the meaning and interpretation of the required information. The qualitative analysis helps to interpretation of the obtained results. As this study is on high and low middle income countries for the qualitative analysis the interviews had been conducted from Islamabad stock exchange, Pakistan. The questionnaire is prepared on the basis of results. The questions were asked to regulatory bodies of the companies, what they actually observe in the market.

3.4 Research Design:

Research strategy is designed to achieve the objective of the study. Research design expresses the techniques to achieve objectives such as volatility of stock market, identification bull

and bear states of stock market, estimating the asymmetric impact of monetary policy on stock market. These objectives can be accomplished in the following ways.

3.4.1 Descriptive statistics:

Descriptive statistics describes the mean, median, standard deviation, Skewness and Kurtosis values of the economic and financial variables. The data of the variables can be divided in to sample periods and for both samples mean, median, standard deviation, skewness and kurtosis value is calculated. It gives us the information about the behavior of data of the given period. The descriptive statistics gives thoughtful information to the researcher about the performance of time data.

3.4.2. Volatility models:

To measure the volatility of the stock market which is first objective of this study. Financial markets are stochastic in nature this is the reason of fluctuations (ups and down) in security prices. Due to fluctuations in the prices the stock returns also fluctuate. The investigation can be initiated by observing the data. Skewness and kurtosis values have been used to check the normal distribution of the data. Generally financial data is leptokurtic rather than the normal distribution. Another test Jarque-Bera is used to measure the distribution of data. The volatility can be estimated on the basis of past value. The financial data of markets show the volatility clustering that is the series show high volatility which is followed by high volatility and low volatility which is followed by low volatility. In other words, when the day shows high volatility the next day will also follow the high volatility and if a day show low volatility then the next day also show low volatility. Linear models are failed to explain such behavior of the series due to the assumption of homosekasdasity. To explain such behavior of financial data, those model have been used whose variance value depend on its pervious value. The volatility can be measured by the standard

deviation and ARCH GARCH model. To examine the volatility in the financial time series data the ARCH, GARCH (1,1) models are the best.

3.4.2.1. Generalized Auto Regressive conditional Hetrosecadacity (GARCH):

The monthly and quarterly data considered as highly frequency data. The extensions of the GARCH are used for the measurement of volatility. Our study is based on monthly data, the ARCH GARCH models will be used. The GARCH (1, 1) is suitable for the estimation and the forecasting of stock returns because it provides a significant information about uncertain variable. The GARCH (1, 1) model can be written as,

Mean equation:

$$r_t = \mu + \varepsilon_t \qquad (3.i)$$

Conditional variance equation:

$$\sigma_t^2 = \gamma + \alpha\mu_{t-1}^2 + \beta\sigma_{t-1}^2 \qquad (3.ii)$$

Where,

r_t= return of the asset at time.

$\mu =$ Average return.

$\epsilon_t =$ Error term.

The GARCH model represents the volatility of return on the basis of its previous value. The summation of the weights i.e.$\alpha + \beta = 0 - 1$, α is the ARCH part and β is the GARCH part. α Is the coefficient of ARCH and β is the coefficient of GARCH. The criteria of Schwarz Bayesian information and Akaike information is used for the order of GARCH (1, 1). The current volatility

of return on asset is estimate by the above GARCH (1, 1) equations. The sum of two coefficients α+β, is the persistence of volatility i.e. how this variance reverts to its mean slowly or quickly.

3.4.2.2. ARCH effect test*:*

To apply the GARCH (1, 1) model it is essential to check the ARCH effect in the residuals. For linear structure model the variance of residuals is constant over time. In the financial time series data, the variance varies with time. Two steps have order for testing the ARCH effect, the first step is AR-1 model.

$$r_t = \alpha_\circ + \alpha_1 r_{t-1} + \mu_t \quad \text{(3.iii)}$$

$$\sigma_t^2 = \gamma o \;\; + \; \gamma_1 \, \mu_{t-1}^2 + \gamma_2 \, \mu_{t-1}^2 + \cdots + \; \gamma_q \mu_{t-q}^2 \quad \text{(3.iv)}$$

The ARCH effect in the residuals series will be find by using the above equations. Following are the null hypothesis and alternative hypothesis to test ARCH effect.

$H_\circ =$ The return series have no ARCH effect.

$H_A =$ The return series have ARCH effect.

3.4.3. Identification of Bull and Bear Markets:

Identification of bear and bull states of stock market in the high and low middle income countries is another objective of the study. Hamilton proposed a mindful thought to test different states of stock markets in different time periods or regimes in 1989. Hamilton established the Markov-switching autoregressive model. MS-AR model is used to check the regime switching performance of economic and financial time series studies.

$$R_t = \; \mu_{st} + \; \varepsilon_t \, \varepsilon_t \sim iidN(0, \sigma_{st}^2) \quad \text{(3.v)}$$

$R_t =$ Stock return.

ε_t = Error term.

μ_{st} = Mean of stock return.

σ_{st} = Variance of stock return.

The dummy variable which is used in this model isS_t, which is equal to 0 or 1. The states of stock market indicates by 0 or 1, the S_t =1 denotes the bull market regime and $S_t = 0$ indicates the bear market regime. The expected return on bull market can be measured by the greater value of$\mu 1$, which indicates a positive log return ofR_t. The expected return on bear market is the value of$\mu 2$, which indicates the movement of the prices is negative. The model have different uncertainties in each state which is symbolized by the different volatilitiesσ_1^2 σ_2^2. The stock return is the dependent variable and the volatility is the bear market is greater as compare to the bull market. It also represents that the prices in the bear period decline faster, which also indicates that the uncertainty is greater in the bear phase of the stock market. The Markov process is used to observe unobserved variable between the states which is not observe directly. For the bull market the $S_t = 1$ and for the bear market the $S_t = 0$. Following is the transition probability for two states Markov process.

$$P_{ij} = p(S_t = j / S_{t-1} = i) \quad \text{(3.vi)}$$

It is supposed that the probability is constant over time but it is also chances that the probability varies with time. The constant transition probability can be written in logit form,

$$P^{00} = \exp(\theta_I) / 1 + \exp(\theta_I) \quad \text{(3.vii)}$$

$$P^{11} = \exp(\delta_I) / 1 + \exp(\delta_I) \quad \text{(3.viii)}$$

The logistic distribution function is used to determine the transition probabilities where the θ_I and ϑ_I are the parameters. When the transition probability is defined, the probability which is greater than 0.5 falls in bullish market and otherwise it falls in bearish market (Zare et al., 2013).

3.4.4. Econometric Model:

Panel data (also known as longitudinal or cross-sectional time-series data) is a data set that tracks the activities of multiple individuals or units across time. States, countries, corporations, individuals. For measuring the asymmetric effect of monetary policy on stock market GMM estimation have been used. It is a generic method for estimating parameters in statistical model. It is statistical method used in this study which is generalized method of moments. It is a method which gathers the economic data. The economic data is information is based on the moment of population to produce estimates of the unknown parameters of the economic model. When it is figure out that the parameters then perform the interference for the basic inquiry. For the information that the study is required GMM is perfect method. The GMM can be used to control the indigeneity, when there is a correlation in the model as well as the error term in the model. It also controls the omitted variable an unobserved panel heterogeneity.

The asymmetric effect of monetary policy (variable) in the states of stock market which is bear and bull market is another objective of this study. The econometric model has been given below which is used to measure the asymmetric effect of monetary policy on stock market volatility in different phases of bear and bull market.

$$\mathrm{VOL_t} = \beta_\circ + \beta_1 \mathrm{Irate_t} * \mathrm{bull_t} + \beta_2\, \mathrm{Irate_t} * (1 - \mathrm{bull})_t + \beta_3 \mathrm{MS_t} * \mathrm{bull_t} + \beta_4\, \mathrm{MS_t} * (1 - \mathrm{bull})_t + \beta_5 \mathrm{INF_t} + \beta_6 (\mathrm{Exrate})_t + \varepsilon$$

Where,

$VOL =$ Volatility of stock market.

$Irate =$ Interest rate

$INF =$ Inflation rate.

$Exrate =$ Exchange rate.

$MS =$ Money supply.

The hypothesis of the model is given below,

H_o = Monetary Policy have symmetric effect on stock market.

H_1 = Monetary Policy have asymmetric effect on stock market.

The Markov Switching Model is used to build the dummy variable. When the stock market is in bull state it is denoted by the value 1 and when it is in bear state it is denoted by the 0. The asymmetric effect of monetary policy in the bull and the bear market is measured by evaluating the coefficients monetary indicators which are $Irate *$bull or$Irate * (1 - bull)$. The indicators of monetary policy is built by following(Zare et al., 2013), the coefficients of the monetary policy indicators is used to represent the asymmetric effect in the bear and the bull market. These coefficients interact between the interest rate variable with the dummy variable, for bull it is equal to 1, for bear it is equal to 1-bull which is 0. The coefficients of monetary indicators are statistically significant and different, that means the stock market react differently in the bull and the bear market by the parallel changes in the policy variables.

3.5. Methods of Data Collection:

The quantitative and qualitative both technique have been used.

3.5.1 Quantitative approach

The quantitative research approach is methodical phenomenon of investigation to collect data. This approach is based collecting numerical data, which is then store in the computer and manipulated. For the quantitative data, the monthly data has been used in this study over the period of 2010M1 to 2021M12. To measure asymmetric effect of monetary policy on stock market volatility, stock returns volatility as a dependent variable and the variables of monetary policy as an independent variable, such as money supply, interest rate, inflation and exchange rate. The volatility of the stock return can be built by using stock indices of high and low middle income countries.

3.5.2 Qualitative approach

The qualitative research can be used to take the insight about the concepts, opinions of Brokers, regulatory bodies of companies in the Stock market companies which they experience in their life. In this type of particular research, the data is in the form of words as compare to collect data in numbers. It is non-numerical facts. The purpose to use the qualitative research is to know how people handle their work. It has many approaches such as grounded theory, ethnography, and narrative research. These approaches can be used to achieve objectives of the research which means to get the interpretation of their work, the fluctuations, events they faced. These approaches have different ways to collect data. The data can be collected through observations the information which you have seen record it, interviews asking question face to face to the people to get the facts, and surveys develop questionnaire with open ended questions.

This study has also use the method of qualitative research to examine the asymmetric effect of monetary policy on stock market. The qualitative approach has been used and accepted in investigating the behavior of investors, brokers and consumers. In this study the qualitative data will be collected in the case of Pakistan through interviews and questionnaire. The interviews will

be conducted from the companies, brokers. The data which is collected, it tells about the behavior of stock market when changes take place in the monetary policy variable, like money supply, interest rate. It will enable us to know about their priorities and their optimal decisions regarding the different effects of monetary policy.

For the data collection semi-structured interviews will be used. Qu and Dumay defined the semi-structured interviews, these are the questions which involve guided and cook questions. In this type of collecting information, the focus of the interviewer is to investigate the issue that is the reason he is directing the whole conservation of the interview towards the issue. On the other hand, the questions in the questionnaire will be open ended and they will be design in such a way that the interviewees definite the problem which will be helpful for the interviewer.

Chapter 4.

Results and Discussion

4.1. Descriptive Statistics.

For the descriptive exploration of the variables, mean, median, maximum, minimum and standard deviation has been used. The data of the variables, duration of 2010M1-2021M12 have been divided into the sub samples. The sub samples are categorized as high income countries and the low middle income countries and for each sub sample the mean, median, maximum, minimum and standard deviation is calculated. It describes the behavior of financial data during these periods. As the sample is divided into two sub samples high income countries and low middle income countries the descriptive statistics of both subsamples is given in the following tables 4(a), 4(b), respectively.

Table 4(a): Descriptive statistics of High Income Countries

Variables	Mean	Median	Minimum	Maximum	Std. Deviation	Skewness	Kurtosis
Exchange Rate	91.86	97.442	0.2759	156.23	27.035	-1.662	6.815
LN- M3	18.029	15.120	9.514	32.896	6.067	1.0018	2.741
TBR	3.711	2.24	-3.65	55.58	5.695	5.205	45.423
INF	0.339	-0.066	0.1	6.329	10.580	-1.864	1585.965
Returns	-0.595	0.731	-12.998	160.521	5.603	4.634	150.652

The table 4(a) indicates the descriptive analysis of high income countries. In the panel of high Income countries. There are 32 countries which have high income. The mean value of the exchange rate is 91.86 with the standard deviation of 27.035. The other variables of my study are money supply, Treasury bill rate, inflation and returns. For money supply, the broad money is used for all

the countries and took log of the money supply M3. The average value of these variables are 18.029, 3.711, 0.0339, and -0.595 respectively. The standard deviation of these variables are 6.067, 5.695, 10.580, and 5.603. For the distribution of the series the values of skewness and kurtosis is used weather the distribution is normal or not. The skewness value may be positive and negative. If the value is positive then the series is positively skewed, if it is negative then the series is negatively skewed. The value of LN-M3 (money supply), Treasury bill rate (TBR) and returns are positive which shows that the distribution is positively skewed. But the values of exchange rate and inflation (INF) are negative which indicates that the series are negatively skewed. The value of Kurtosis is used to measures the flatness or the peak-ness of the distribution of the series The value of Kurtosis of all the variables except LNM3 in the high income countries are greater than 3 which means the shape of the curve is Leptokurtic. The value of LNM3 is less than 3 which means the curve is platykurtic.

As this study is panel analysis that is the reason that some values of descriptive analysis are small and large. For instance, the minimum value of exchange rate is 0.2759. this is the value of Kuwait it is lower because the currency of Kuwait is heavier than dollar. The maximum value is 156.2, it is the value of Korea id due the lower currency of Korea.

Table 4(b): Descriptive Statistics of Low Middle Income Countries

Variables	**Mean**	**Median**	**Minimum**	**Maximum**	**Std. Deviation**	**Skewness**	**Kurtosis**
Exchange Rate	227.520	98.803	45.72	2294.146	474.284	3.515	13.899
LN- M3	17.079	16.148	9.483	32.617	5.056	1.956	6.638
TBR	8.129	7.2	0.03	27.03	5.214	0.854	3.3629
INF	0.0401	0.405	-3.80	13.13	6.112	-13.752	208.227
Returns	0.4299	0.400	-9.93	29.092	5.231	-0.4790	7.945

The table 4(b) represents the descriptive statistics of low middle income countries. The average value of the exchange rate is 227.5 and the value of standard deviation is 474.2 which is greater than the high income countries. The mean value of LN-M3 and TBR is 17.07 and 8.12 respectively with the standard deviation of 5.05 and 5.21. The average value of inflation is 0.04 which is lower than the high income countries, the mean value of the returns is 0.42 and the standard deviation of these variables are 6.11 and 5.23. The standard deviation value of returns of high income countries is greater than the low middle income countries which indicate that the high income countries is with greater return and riskier than the low middle income countries. The skewness value of the exchange rate, LN-M3 and TBR are positive whereas the value of INF and returns are negative which means the series is negatively distribute. The skewness value of returns for high and low middle income countries are positive and negative which specifies that there are large positive returns than the large negative returns of stock markets. The kurtosis value of all variables in the low middle income countries are greater than 3 which means the distribution is leptokurtic. The Jarque-Bera values are less than 0.5 for the variables of both high and low middle income countries which represents that the distribution is not normal and reject the null hypothesis. As this is the panel analysis this is the reason that some values of descriptive statistics are low and high, for example minimum value of exchange rate is 45.2, this is the value of India in 2010. The maximum value of exchange rate is 2294.14, this is the value of Tanzania because its currency is lower as compare to dollar.

To check the stationarity of the data, that the series of the variable are stationary or not. To ensure the stationarity Augmented Dickey (ADF) unit root test has been used. For the high income countries, exchange rate of all the countries except Denmark are accepting the null hypothesis that means they are non-stationary. The exchange rate variable of all high income countries is

stationary at first difference except but Denmark is stationary at its level. The other variable LNM3 is stationary at first difference but china and Colombia are stationary at second difference. The third and the fourth variables which are Inflation and Stock returns. These both variables are stationary at level. For low middle income countries, exchange rate is stationary at first difference. LNM3 is stationary at first difference expect India, Indonesia and Kenya. The other both variables inflation and stock returns are stationary at level.

4.2 Measuring Volatility

Measuring volatility of the stock market is the first objective of the study. It is mentioned in the methodology chapter that there are various methods to measure the stock market volatility.

Table 4(c): Descriptive Statistics of stock indices.

Descriptive Statistics of Stock Returns					
High Income Countries					
Index Name	**Mean**	**Median**	**S.D**	**Kurtosis**	**Skewness**
S&P Merval	2.488	2.083	11.647	6.341	-0.8583
S&PASX 200	0.0029	0.0084	0.0398	11.183	-1.724
Bovespa	0.294	0.381	6.467	8.3383	-0.9986
S&P Tsx	0.4108	0.834	3.405	10.762	-1.438
shanghai composite	0.0072	0.244	5.972	5.665	-0.259
S&P CLX	0.127	0.0488	4.773	3.774	-0.0712
COLCAP	0.0220	0.207	5.004	13.5221	-1.657
OMX	1.1884	1.132	4.124	3.958	-0.3980
Budapest	0.581	0.597	05.523	4.898	-0.2693
ICEX Main	1.161	0.769	3.7083	3.764	-0.1538
TA 35	0.3796	0.987	3.987	5.744	-0.9570

JSE All Jamaican Com	1.2405	0.241	5.474	11.989	0.9707
Nikkei 225	0.697	1.201	5.055	3.154	-0.4321
Main Market PR	1.575	0.5909	13.657	129.208	11.046
FTSE Malaysia	0.0805	0.3132	2.954	3.567	-0.3363
MASIX	-0.122	-0.057	5.135	5.723	0.425
S&P/BMV IPC	0.351	0.575	3.9112	5.893	-0.7221
DJ New Zealand	0.709	0.937	3.025	5.733	-0.8732
Oslo All Share	0.7885	1.0421	4.104	5.047	-0.6166
WIG20	-0.0364	-0.521	5.333	3.740	-0.013
QE All Shares	0.716	1.103	4.619	4.047	-0.575
BET	0.7111	1.0843	5.273	4.663	-0.985
RTSI	0.0911	0.534	7.777	4.217	-0.507
Tadawul All Share	0.447	0.996	5.407	4.339	-0.646
South Africa Top 40	0.685	0.516	4.091	3.1192	0.079
KOSPI	0.3963	0.7421	4.202	4.556	-0.346
OMX Nordic 40	0.752	1.057	4.040	3.181	-0.318
SMI	0.469	0.893	3.297	3.087	-0.352
SET	0.566	0.97	4.75	5.1537	-0.424
BIST 100	0.873	0.737	6.630	2.579	-0.072
FTSE 100	0.309	1.009	3.439	5.748	-0.766
Dow Jones	0.836	1.016	3.960	4.5902	-0.594

Some of the methods to measure the volatility are historical variance, EWMA and GARCH (1, 1), out of theses ways to measure the volatility the most appropriate method is GARCH (1, 1). To

study the distribution or circulation of the financial data. Descriptive statistics of the stock indices have calculated. The results of descriptive statistics are shown in the table 4(c) and 4(d). The table 4(c) is the descriptive statistics of stock indices of high income countries and table 4(d) shows the descriptive statistics of low middle income countries. It shows the mean median, standard deviation, kurtosis and skewness values of the stock markets.

Table 4(d): Descriptive Statistics of stock indices

Descriptive Statistics of Stock Returns					
Low middle Income Countries					
Index Name	**Mean**	**Median**	**S.D**	**Kurtosis**	**Skewness**
Dhaka S.E Broad	0.266	-0.372	4.260	4.541	0.512
BSE Sensex	0.8365	0.7199	5.026	7.818	-0.9541
FTSE INDO	0.5150	1.476	5.080	5.235	-0.9924
Kenya NSE 20	-0.371	0.3600	4.666	3.9961	-0.6658
Moroccan All Shares	0.1709	0.115	3.606	14.146	-1.7372
NSE 30	0.4423	0.824	6.368	4.176	-0.387
Karachi 100	1.085	1.851	5.73	5.8257	-0.7287
PSEi	0.5883	1.242	4.812	7.0316	-1.0573
CSE	0.891	0.482	5.782	6.043	0.4986
Tanzania All Share	0.3223	0.412	3.664	6.4921	-0.6229
Uganda All Share	0.463	0.667	5.633	6.269	-0.9680
PFTS	-0.0636	-0.0206	7.955	7.829	-0.0923
LSE	0.541	-0.0447	3.855	7.040	-0.334

In the high income countries, the skewness values of all the stocks indices are negative except JSE All Jamaican Com, Main Market PR, MASIX, South Africa Top 40, these are the stock markets of Jamaica, Kuwait, Maldives and South Africa respectively. The negative values indicate that the lower tail of the distribution is thicker than the higher tail. This denotes that the probability value

of the stocks returns is to decline quickly as compare to increase in the stock returns. Similarly, in the low middle income countries all the stock indices have negative value of skewness expect Dhaka S.E Broad and CSE which is the stock market of Bangladesh and Sri-Lanka. The negative values of the stock indices show that the distribution of higher tail is thinner as compare to the lower tail which is thicker. This implies that the probability of the stock returns is to decline rapidly as compare to increase in the stock returns. The kurtosis values of the stock indices of the high income countries and the low middle income countries are greater than 3 except BIST 100 which is stock market of Turkey. These values are shown in the above table 4(c) and 4(d). When the value of the kurtosis is greater than 3 then the series of stocks have leptokurtic curve than the normal standard distribution.

Figure 4a: Volatility Clustering of High Income Countries

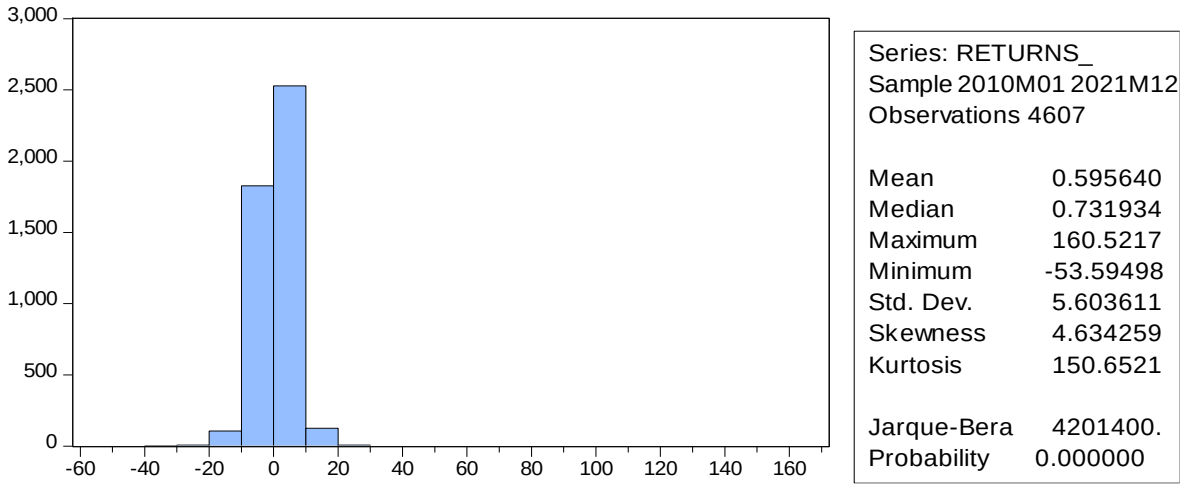
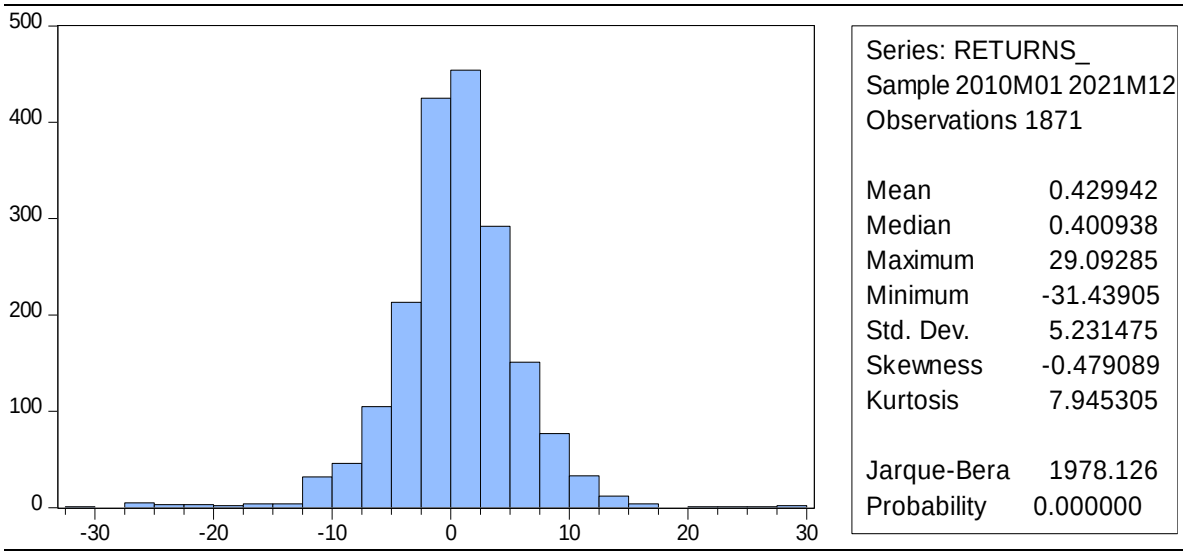


Figure 4b: Volatility Clustering of Low middle Income Countries



The volatility clustering of high income countries and low middle income countries is shown in the above figures. The kurtosis value of both is greater than 3 which indicate the leptokurtic distribution. The high income countries are positively skewed and the low middle income countries are negatively skewed. The Jarque-Bera value reject the null hypothesis which is normal distribution and the stock markets are highly volatile. To measure the volatility through ARCH GARCH it is examined by the presence of ARCH effect. It rejects the null hypothesis and accept the alternative hypothesis which is presence of ARCH effect in the residuals. For capturing cluster volatility mean equation is not sufficient. Based on the mean equation move towards the GARCH model.

4.3 GARCH (1, 1) model

The data which is used in this study, is data of financial market. Their behavior is not standard normal distribution; the behavior is leptokurtic. GARCH models used for the financial time series data because it allows its variance to depend on its past variance. The GARCH (1, 1) is most appropriate model to detect the volatility clustering in financial data. The table 4(e) and 4(f) represents the results of GARCH model of high income and low middle income countries,

constant (ω), ARCH term (α) and GARCH term (β). It also provides the sum of α and β. The coefficients of ARCH and GARCH terms are statistically significant at 1%, 5%, and 10%. The significant terms of ARCH and GARCH indicates that the volatility from the past events had significant impact on the present or future volatility. The sum of α and β (α+β) is less than one. This shows that the process of GARCH is mean reverting. It also indicates that the unconditional change in the error term is stationary. The stock markets of high income and low middle income countries, whose summation value of α and β is nearby one that means when the shock hits their markets it will transferred in to future periods. That means the financial markets are very sensitive to the external shocks.

Table 4(e): Results of GARCH(1, 1) of Return series of High Income countries

Indices	**Ω**	**A**	**B**	**α+β**
S&P Merval	9.41(0.2)	0.246(0.03)	0.712(0.00)	0.958
S&PASX 200	8.48(0.00)	0.483(0.00)		0.483
Bovespa	27.833(0.00)	0.419(0.00)		0.419
S&P Tsx	0.676(0.00)	0.482(0.00)		0.482
shanghai composite	2.88(0.05)	0.215(0.01)	0.71(0.00)	0.925
S&P CLX	3.81((0.1)	0.201(0.02)	0.63(0.00)	0.831
COLCAP	7.20(0.3)	-0.02(0.2)	0.737(0.01)	0.717
OMX	15.1(0.00)	0.122(0.1)	0.63(0.00)	0.752
Budapest	4.56(0.1)	0.08(0.1)	0.75(0.00)	0.83
ICEX Main	1.27(0.1)	0.007(0.8)	0.88(0.00)	0.887
TA 35	9.89(0.02)	0.16(0.1)	0.58(0.03)	0.74
JSE All Jamaican Com	2.10(0.02)	-0.03(0.00)	0.96((0.00)	0.93
Nikkei 225	0.57(0.2)	-0.10(0.00)	1.09(0.00)	0.99
Main Market PR	175(0.00)	-0.006		-0.006
FTSE Malaysia	2.39(0.2)	0.17(0.09)	0.55(0.05)	0.72
MASIX	1.99(0.09)	0.302(0.00)	0.63(0.00)	0.932
S&P BMV IPC	0.68(0.5)	0.32(0.00)	0.57(0.04)	0.89
DJ New Zealand	1.05(0.1)	0.162(0.01)	0.73(0.00)	0.892
Oslo All Share	20.78(0.2)	0.169(0.01)	-0.54(0.02)	-0.371

WIG20(pol)	19.15(0.00)	0.299(0.04)		
QE All Shares	5.25(0.1)	0.246(0.04)	0.508(0.07)	0.754
BET	0.0001(0.08)	-0.007(0.6)	0.944(0.00)	0.937
RTSI	25.41(0.03)	0.315(0.00)	0.429(0.00)	0.744
Tadawul All Share	0.000(0.2)	0.166(0.02)	0.777(0.000)	0.943
South Africa Top 40	9.73(0.01)	0.210(0.08)	0.680(0.01)	0.89
KOSPI	0.652(0.3)	0.0877(0.2)	0.877(0.00)	0.9647
OMX Nordic 40	13.58(0.00)	0.126(0.1)	0.670(0.00)	0.796
SMI	19.49(0.1)	0.197(0.04)	0.127(0.7)	0.324
SET	12.712(0.00)	0.615(0.00)	-0.0941(0.01)	0.5209
BIST 100	2.938(0.7)	0.031(0.5)	0.900(0.00)	0.931
FTSE 100	6.430(0.00)	0.439(0.00)	-0.171(0.04)	0.268
Dow jones	0.001(0.01)	0.239(0.03)	-0.283(0.01)	-0.044

In the high income countries S&P Merval, shanghai composite, S&P CLX, Budapest, ICEX Main, JSE All Jamaican Com, Nikkei 225, MASIX, S&P BMV IPC, DJ New Zealand, BET, Tadawul All Share, South Africa Top 40, KOSPI, BIST the volatility of these stock markets are highly persistent. For these stock markets 95%, 92%, 83%, 83%, 88%, 93%,99%, 93%, 89%, 89%, 93%, 94%, 89%, 96%, 93%. Of their past volatility is transferred in to the present value.

Table 4(f): Results of GARCH(1, 1) of Return series of Low middle Income countries

Indices	**Ω**	**A**	**β**	**α+β**
Dhaka	-1.44(0.9)	0.803(0.00)	0.404(0.00)	2.207
BSE Sensex	43.314(0.005)	0.5708(0.007)	-1.163(000)	-0.5922
Karachi	0.001(0.1)	0.157(0.09)	0.691(0.000)	0.848
PSEi	7.649(0.00)	0.25(0.00)	0.79(0.00)	1.04
FTSE	20.00(0.00)	0.251(0.00)		0.251
Kenya NSE 20	21.22(000)	0.218(0.00)	0.217(0.01)	0.435
Moroccan All Shares	-0.105(0.8)	-0.09(0.00)	1.09(0.00)	1.00
NSE 30	0.644(0.5)	-0.146(0.3)	1.084(0.00)	0.938
CSE	1.159(0.114)	0.132(0.005)	0.842(0.00)	0.974
Tanzania	2.40(0.001)	0.64(0.00)	0.39(0.00)	1.00
PFTS	-2.02(0.00)	-0.001(0.7)	0.977(0.00)	0.976
Uganda	21.15(0.00)	0.437(0.00)		0.432
LSE	5.95(0.2)	-0.042(0.00)	0.608(0.1)	0.566

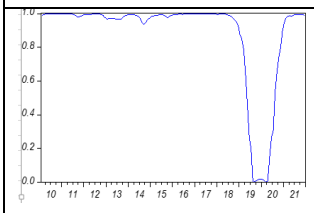
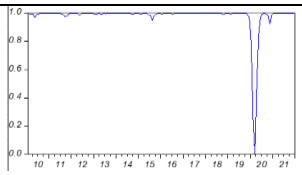
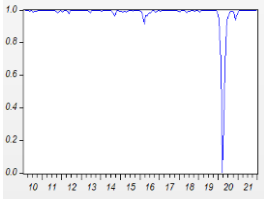
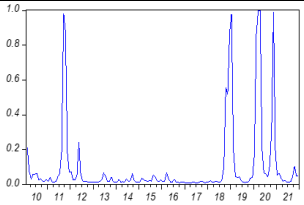
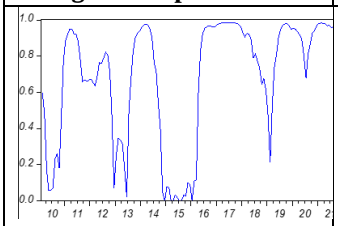
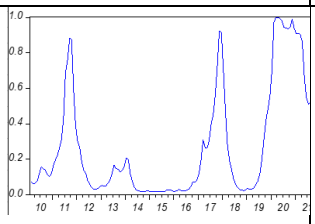
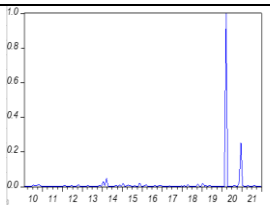
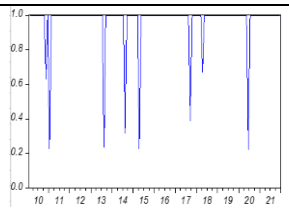
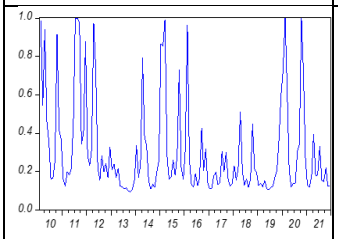
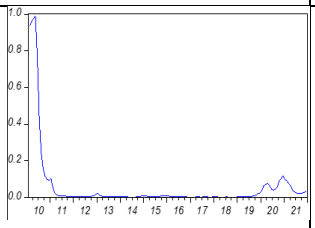
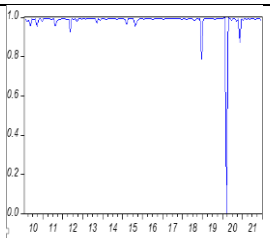
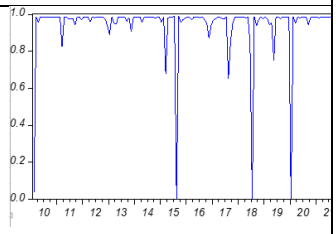
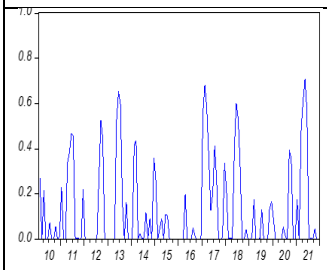
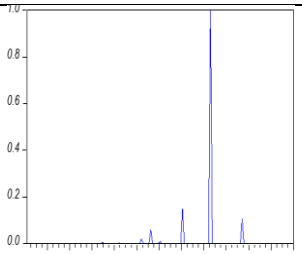
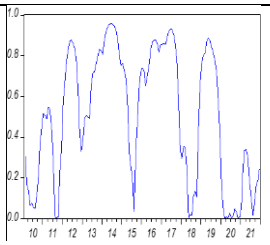
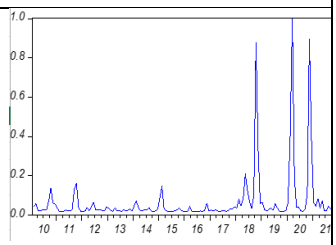
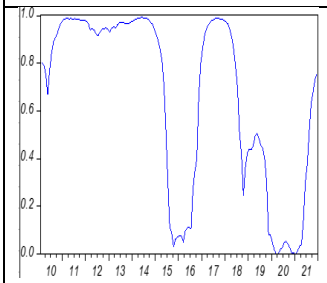
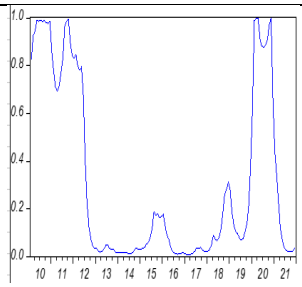
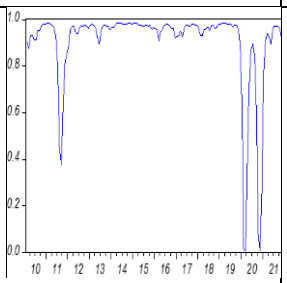
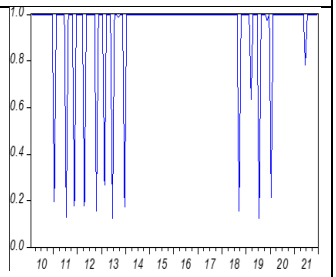
In the low middle income countries Karachi 100, Moroccan All Shares, NSE 30, CSE, PFTS. For these stock markets 84%, 1%, 93%, 97%, 97%. Of their past values of the volatility transmitted in to the current one.(Setiawan , Abdallah, & Farkas, 2021).

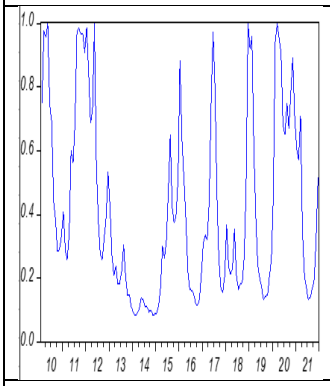
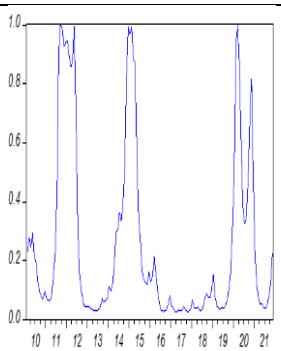
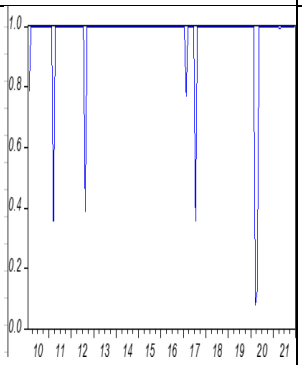
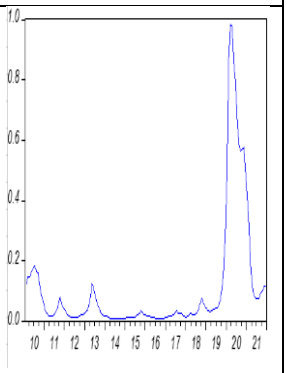
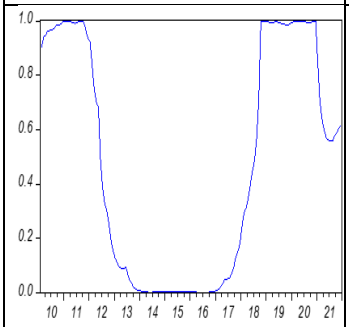
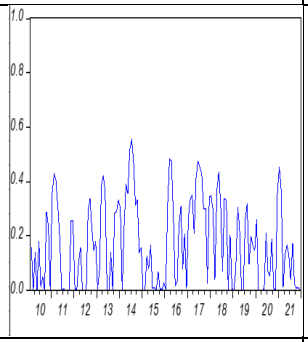
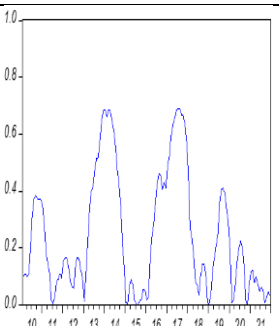
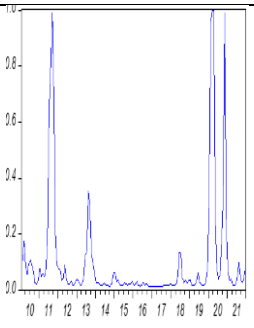
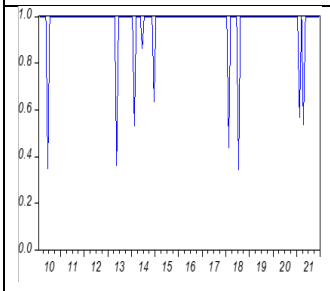
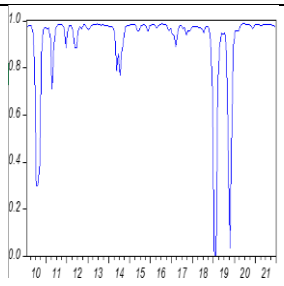
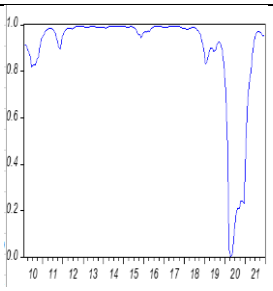
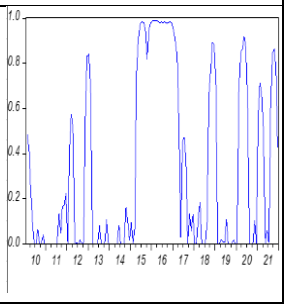
4.4 Identification of Bull and Bear states of stock market

The Markov Switching model have been used to reorganize bull and bear state which is stable high returns and volatile low returns respectively, of the stock market. Markov switching model is put forward by Hamilton (1989). The bull and bear markets of high income and low middle income countries. The Figure 4(c) captures the figures of transition probability of high income countries and The Figure 4(d) captures the figures of transition probability of low middle income countries. These figures are captured by using Markov switching model. The stock market is in the bull period when the transition probability is greater than 0.5. When the transition probability is less than 0.5 then the stock market is in the bear period. In the high income countries, the stock markets such as S&P Merval, S&PASX 200, Bovespa, COLCAP, TA 35, Main Market PR, S&P BMV IPC, and South Africa Top 40 are those who changes their states during the period of 2018 to 2021. These stock markets switch to bear market; this is due to the COVID-19 crises. All other stock markets in the high income countries change their states with the passage of time but it has seen that in most of the countries when stock market switch to the bear period, it is the shorter period as compare to the bull market. The Markov switching model shows that there are many countries who changes its state like shanghai composite, Nikkei 225, DJ New Zealand, BET, MASIX but the Budapest stock market of Hungary quickly changes its state (bull and bear). This states that the spell of bull and bear market is shorter as compare to the other countries. (fig.4c). The transition probability of low middle income countries is shown in fig. 4d, it is observed that the stock markets like BSE Sensex, FTSE Indonesia, Moroccan All Shares, Karachi, CSE SRI, PFTS, LSE, have

shift their regime from bear state to the bull state during the period of 2018 to 2021. These changes in the state have been observed due to the COVID-19. During the period of COVID all around the world the investment decreases but in the case of low middle income countries the governments of these countries provide incentives to the investors. These results have been obtained by following the study of (Zare et al.,2013).

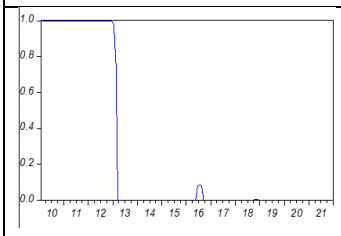
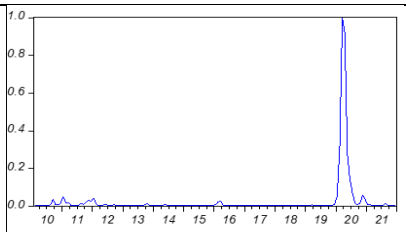
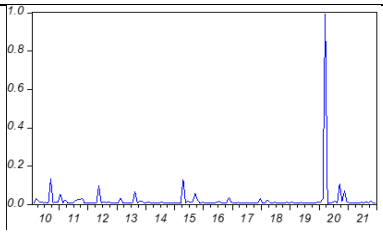
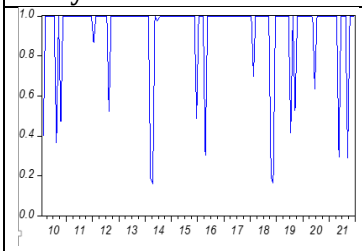
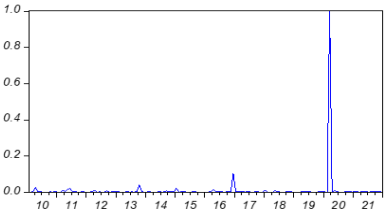
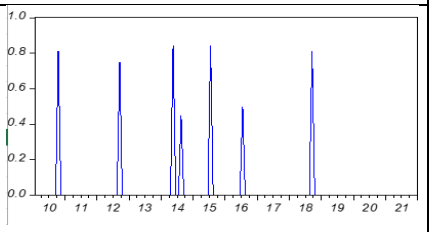
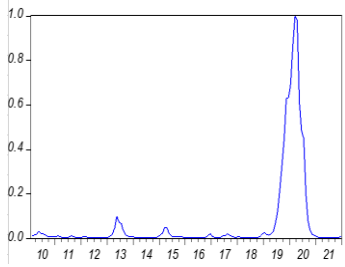
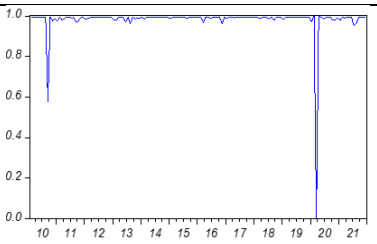
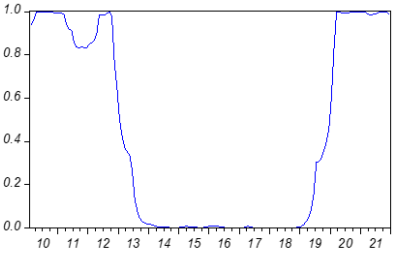
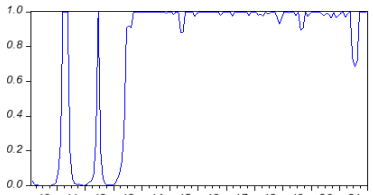
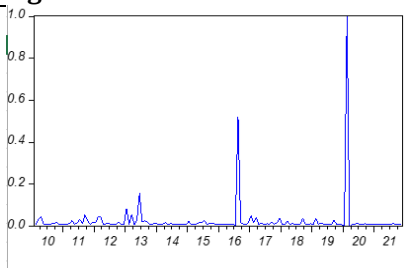
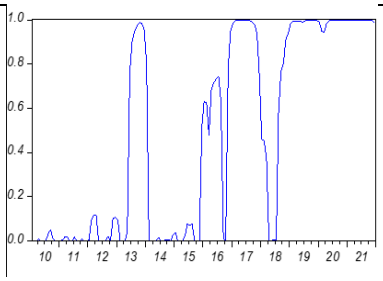
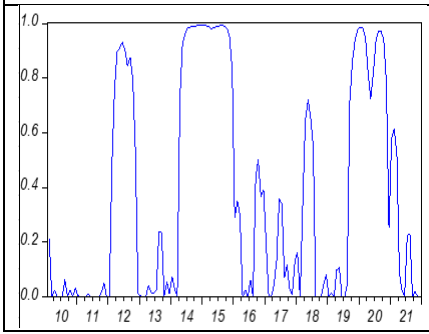
Figure 4c : Transition Probabilities of High Income Countries.

S&P Merval	**S&PASX 200**	**Bovespa**	S&P Tsx
			
shanghai composite	**S&P CLX**	**COLCAP**	**OMX**
			
Budapest	**ICE_Land**	**TA 35**	**JSE All Jamaican Com**
			
Nikkei 225	**Main Market PR**	**FTSE Malaysia**	**S&P BMV IPC**
			
DJ New Zealand	**Oslo All Share**	**WIG20**	**QE All Shares**
			

BET	RTSI	Tadawul All Share	South Africa Top 40
			
KOSPI	**OMX Nordic 40**	**SMI**	**SET**
			
BIST 100	**FTSE 100**	**Dow Jones**	**MASIX**
			

The state of the countries decreases the interest rate and allow investors for investment. To build their production planes, to increase exports of the countries. These changes can shift market from bear state to the bull state. It is also observed that in some countries the bull period is shorter and in some countries bear period is shorter. LSE(Zambia) stock market is the most regime changing stock market have been observed, which means the duration of the bull state and bear state is shorter as compare to the other nations.

Figure 4d : Transition Probabilities of Low Middle Income Countries.

Dhaka S.E Broad	**BSE Sensex**	**FTSE Indonesia**
		
Kenya NSE 20	**Moroccan All Shares**	**NSE 30**
		
Karachi	**PSEi**	**CSE SRI**
		
Tanzania All Share	**Uganda All Share**	**PFTS**
		
LSE		
		

4.5 Estimate the asymmetric effect of monetary policy on stock market

The GMM estimation have been used to investigate the asymmetry monetary effect on stock market. The coefficients of monetary policy indicator of interest rate and money supply, is being compared in the bull and bear period of the stock market. The GMM can be used to control the indigeneity, when there is a correlation in the model as well as the error term in the model. The variables which are used in this study are money supply, interest rate, inflation and exchange rate. Many empirical studies find out that money supply and inflation highly correlate (McCandless & Weber, 1995). According to quantity theory of money if circulation of money is double then the prices or inflation is also double. Monetary policy uses interest rate to control inflation, Fischer states that interest rate and inflation moves in parallel direction. To solve the problem, lags of these variables were used as instrument variables (Nguyen, 2015), (Biom , 2007). The table 4(g) and 4(h) represents results of GMM estimation of monetary policy effect on stock market of low middle income countries and high income countries. The results of low middle income countries indicate that the money supply in the bull and the bear market have significant inverse relationship with the stock returns volatility. Exchange rate and inflation shows direct relationship with the volatility of stock market. The Treasury bill rate in the bull and bear market indicates positive relationship with the volatility of stock returns.

Table 4(g): GMM estimation of monetary policy effect on stock market of low middle income countries.

Independent Variables	TBRBull	TBR(1-Bull)	LNM3Bull	LNM3(1-Bull)	INF	EX
Coefficients	3.329(0.00)	5.659(0.04)	-0.977(0.00)	-0.744(0.00)	1.07(0.1)	0.009(0.05)

The outcomes show that the exchange rate have direct link with the stock market volatility in the low middle countries. When the exchange rate appreciates, it increases the volatility of the stock

market. The coefficient of the exchange rate has positive sign; it shows positive relationship. It means when 1unit increase in the exchange rate in low middle income countries it would lead to 0.01 rises the volatility. These results support the research of (Fama, 1981). In this cases when the currency of the countries depreciates then the imports of the product will be expensive. It affects the cash flows of the companies and the cash flows decreases, decreases the stock returns of the companies. In the low middle income countries most of the companies depend on the imports. This study is consistent with the flow oriented model or traditional approach which is proposed by Dornbusch and Fischer. According to this model depreciation in the exchange rate make the imports cheaper and the exports are more attractive.

The money supply in the periods of stock market which is bull and bear have significant but inverse impact stock market volatility in both high and low middle income countries. The coefficients of money supply in the states of stock markets of both type of countries shows negative sign which means there is inverse relationship with the stock market volatility. When the supply of money decreases it increases the interest rate channel which decreases the stock prices which rises the volatility. It shows that 1-unit decrease in the money supply in the bull and bear duration it significantly increases the volatility by 0.97 units and 0.74 units respectively in the low middle income countries. Same as in the high income countries by decreasing one unit in the money supply it rises the volatility by 0.39 and 0.39 units in bull and bear period respectively and vice versa. These finding supports the finding of (Bailey, 2001).

Table 4(h): GMM estimation of monetary policy effect on stock market of high income countries

Independent Variables	TBRBull	TBR(1-Bull)	LNM3Bull	LNM3(1-Bull)	INF	EX
Coefficients	2.863(0.000)	5.132(0.000)	-0.390(0.00)	-0.395(0.00)	0.001(0.9)	-0.289(0.00)

In the low middle and high income countries the inflation is positive but insignificant. These results of the study are consistent with the results of Pal and Mittal and Akbar. They investigated the negative linkage with the stock prices. As the inflation rises it rises the cost of the products ultimately which reduces the profit and prices of stocks, which increases the volatility. According to the Fama (1981) as increase in the inflation rises the cost of the products which lead to decline in the stock prices and profit of the company.

Fisher states that inflation and interest moves in a parallel direction. When the inflation is raised at high level then the central banks uses interest rate to balance the economic conditions. Central bank rises the interest rate and result of increasing interest rate, the stock prices decreases. In the low and high income countries, this study shows that the Treasury bill rate in the bull and bear periods of stock market have positive relationship with the stock market volatility. The one-unit increase in the Treasury bill rate of both low and high income countries it significantly enhances the stock volatility by 3.3 unit, 5.6 units 2.8 unit, 5.1 unit in the bull and bear states respectively. These outcomes supports the results of (Zare et al., 2013).

The asymmetric effect of monetary policy on stock market is examined by matching the coefficients of the monetary policy variable in the bull and bear market, of low middle and high income countries. The upshots of low middle income countries specify that by using the interest rate as monetary policy variable, the monetary policy have massive impact on bear period of stock market volatility. By using money supply as monetary policy variable then the greater impact of

monetary policy in the bull state of stock market. The results of this study is consistent with the model of finance constrain which means interest rate rises in the tightening monetary policy, which is reason of decline in the investment. People were interested to save money in the banks due to high rate of interest rate. Due to low investment the stock prices decreases and volatility of stock market rises. In this case, the investors think about their investment due to riskier stock market. The investors alter their investment. The finance of companies is constrained due to drop in investment. The stock market shifts their state from bull to bear state in tightening monetary policy.

Chapter 5

Policy & Qualitative Analysis

The qualitative analysis gives us key information about the results which are discussed in the above section. The qualitative information is organized in the response of the respondent. For the collection of data, the questionnaire is obtained, the questions are open-ended type of question which are asked to the participants of concerned organization. The questions which were asked to the participants are well organized that they have knowledge that how central bank uses the monetary policy and how monetary policy impact the stock market by using its instruments. The instruments such as interest rate, money supply, inflation exchange rate, by making changes in these instruments the stock returns fluctuate in the bull and bear state of the stock market.

5.1 Semi- Structure Interviews

The participants of the semi-structure interviews took interest during the interviews and they were feel pleasant to tell about the stock markets, its state and how it behaves during the changes in the monetary policy. The main objective of the semi-structure interview is to get insight from the participants through their opinions, that what is the impact of monetary policy on stock market, or how monetary policy indicators affect stock market of Pakistan. The queries of semi-structure interviews given to the participants and request them to express clearly which variables or factors affect the stock market.

The results of the semi-structure interviews are the response and opinion of the participants. These results are in transcription and categories in the following parts.

Part (a): Shocks of money supply and stock market.

The participants respond about the response of stock market when the shocks of money supply take place. They respond that they supply shocks are positive and negative. In the positive shocks the money supply increases and in the negative shock the money supply decreases. When the money supply increases, it decreases the interest rate. By increasing the money supply it increase the investment of the investors. The purpose of the investors is to earn profit. Investors invest in those project which are fruitful. When the interest from the bank is at low level, the investors get loan from the banks because most of the companies work on loan and they took it to expand their project. The investors invest in the projects or purchases the share from the bear period. Investment increases the stock prices and it increases the stock returns which ultimately increases and stabilize the stock market volatility.

In the case of negative shock, the money supply decreases and the interest rate increases. When the interest rate increases the investors stop getting loan from the banks at higher interest rate. At high level of interest rate, investors stop investing in the projects. The projects of the investors contracted which decreases the prices of the products and make the stock market more volatile.

Part (b): Effect of interest rate on stock market

The increase or decrease in the interest rate have multiple effect on the stock market. The decrease in the interest rate is favorable for the investor through which they invest in the market or project. It increases the liquidity or investment which rises the projection plans which is attract full for the stock market. It raises the stock prices and stock market moves into bullish period of stock market, stabilize condition of the stock market.

When the interest rate increases it affect the investors of the companies. The investors get loan from the bank to regulate their company. But in this case the investment decreases which is

unhealthy for the companies as well as for the market. The only sector which get benefits by increasing the interest rate is the banking sectors otherwise all other sectors are unbeneficial. It rises the volatility of stock market.

Part (c): Stabilize the stock market

The monetary policy can affect the stock market. Depend on the current situation of the country or what is the actual position. What kind changes that the monetary policy need to change. Central needs to make some decisions regarding the growth of the stock market through which economy ultimately grows. To stabilize the stock market, the central bank need to keep the interest at the low level. The low rate of interest allows investors to invest in the market. Tightening monetary policy make the stock market riskier. When the stock market is risky the investors have diversified their investment in different portfolio. Consistency in the high money supply to make investment for the projects. Circulation of money regulate the stock market through which the stocks jumps from bear to bull market.

5.2 Policy Analysis

Central bank uses monetary policy to regulate the credit in the economy. Policies such as expansionary and contractionary monetary policy. Currently Central bank implementing tightening monetary to handle inflation, it rises interest rate and decline in the money supply. Consequently, it volatile the stock market and stock market is in the bear state because Pakistan facing persistently the issue of volatility. Central bank need to implement optimal level of expansionary monetary policy. so that it allows investors to invest in the assets which give them return. It increases the stock prices and make the market stable.

Interviews which is conducted from brokers and companies of stock exchange. They also suggest that the central bank need to keep the interest rate at low level at least at single digit. It allows the investors to invest in the market. High rate of interest is a barrier for the investors to invest and the stock market is affected through it.

Chapter 6

Conclusion and Recommendations

6.1 Conclusion

This study investigates the asymmetric effect of monetary policy on the volatility of stock market over the bull and bear states. It is a panel analysis of high and low middle income countries during the period of 2010M1 to 2021M12. Distribution of facts (data) have been checked by using various normality test. The normality test showed that there is no normal distribution of data and it shows the existing of volatility clustering. For measuring the volatility, different methods have been used but the most appropriate method is GARCH (1, 1). The process of GARCH is mean reverting and the GARCH depend on its variance. It tells us about the series, such as persistence or stickiness of the series. The outcomes of the volatility indicate that there is persistence in the series both in high and low middle income countries. In other words, high volatility is followed by changes in high volatility. Low volatility is followed by the changes in low volatility. Further for the identification of bull and bear states of stock market the Markov regime switching model has been used for both high and low middle income countries. After applying the Markov regime switching model the results showed that the states of stock market bull and bear show high persistence. It is also observed that the bull state of stock market is longer as compare to the bear state of stock market. The bear period of stock market is shorter.

The determination of asymmetric effect of monetary policy on stock market can be defined by comparing the coefficients of the monetary policy variable in the bull and the bear state. The results GMM estimation, showed that monetary policy affects the stock market of both high income countries and low middle income countries and behaving asymmetrically.

In the low middle and high income countries outcomes specifies that by using the interest rate as monetary policy variable then the monetary policy have massive impact on bear period of stock market volatility. The another variable which is used in this study is money supply the money supply have greater impact of monetary policy in the bull state of stock market. The tightening monetary policy, increases the interest rate and decreases the supply of money. Due to this the investment of the investors decreases. There is a greater probability that the stock market changes its state from bull to bear in the tightening monetary policy and it increases the stock market volatility. The exchange rate has direct relationship the volatility of stock market. Exchange rate had a significant effect on the prices of the stocks, when the exchange rate appreciate the home currency depreciate, in this case most of the low middle income countries relay on imports. Inflation have positive but insignificant impact on the volatility of stock market.

6.2 Policy Recommendations

The impact of monetary contraction carries a higher magnitude, approximately twice as much as expansion. State should be more cautious while implementing a contractionary policy as it may excessively slow down the business sector. In the context of formulation of policy. The monetary policy has been aimed to impact the markets of the economy i.e. Stock market. The impact of monetary policy on stock market, it varying with respect to time and the states of the markets. This study provides a deep understanding to stabilize the financial markets. Through literature, interviews which were conducted to the different listed companies of Islamabad stock exchange, Pakistan and results of this empirical study suggest that the central bank of the countries can influence the stock markets through interest rate and money supply. To grow the economy and the financial markets, the government play a vital role by monitoring the regulatory authorities of central that make optimal decisions which support the market as well as the economy. The central

should keep the interest rate at low level, it would not climb at its optimal level through which the investors get affected. Government and the authorities need to provide facilities through which they can feel free to invest in the markets. The hazard and problem related to investment is the interest rate, the low level of interest rate allow investors to invest in the market and ultimately there is growth in the market. In the bull and the bear state the investors must behave rational they do not be greedy as the stock market is cheaper in the bear period they also have to take some optimal decisions. Investors must look to the geographical and economic similarities while investing. These both similarities can reduce the investment risk and increase the investment portfolios.

To make the stock market less volatile the authorities of stock market need some professional experts that they can follow the pattern of instruments of monetary policy then they took decisions. The establishments of the Stock Exchange make some reform, like the authorities need to accelerate the flexibility of the companies. Another factor which affect the stock market is uncontrollable inflation. The rising inflation is the cause of increasing prices of the products. The increasing rate of goods and services create a hazard for the investors, it affects the investors investment in their companies. The central bank need to manage the inflation rate at low level and at a single digit. Low rate of inflation makes the stock market less volatile and no decline in the stock market.

This is the responsibility of the central bank authorities to consider these suggestions and make some suitable strategies to enhance the potential of stock market.

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