

# STOCK MARKET RESPONSE TO MONETARY POLICY

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**ABSTRACT:** *This paper finds nexus between monetary policy movements and stock market performance. Quantile regression is applied on monthly data of monetary policy instruments and stock market index (KSE100) from 2008-2014. It has been estimated that contractionary monetary policy suppresses stock market investment or activities while expansionary monetary policy boosts stock market activities. OMOs have positive relation while interest rate has negative relation with stock market. At higher level of index value, the nature of monetary policy impact more in comparison to lower level or moderate level of index value. Expansion monetary policy, on the other hand, increases economic growth, enhances stock market activities, creates job opportunities but increases inflation in economy by increasing money supply and money velocity.*

**Keywords:** *Contractionary monetary policy, expansionary monetary policy, stock market, inflation, Reserve require market, OMOs*

## 1. INTRODUCTION

No doubt, secondary markets are influenced by various economic, social and psychological dimensions irrespective of economic setups but monetary policy is an active player in this realm [1]. Instability of monetary policy (MP) may distress economic gains in developing countries as well as in developed countries, therefore, this issue is getting significance with the passage of time [2] Monetary policy actually governs and regulates money supply by using various mechanisms and tools; interest rate is focal or prime tool of it which causes variation of prices and return of securities by controlling money supply [3].

Monetary authority, State bank of Pakistan (SBP), manipulates the moneysupply or money velocity to ensure the equilibrium nominal rate of interest in Pakistan but got limited success in this regard owing to different reasons. These reasons are classified into economic, social and infrastructural but officials of SBP agree that the stock market response fluctuates with news of any type of monetary policy. SBP, the central bank of Pakistan, established in 1948. At time of independent banking system was in worse condition and SBP took responsibility to rehabilitate and expand banking infrastructure in economy. Firstly, SBP devised a policy to stop foreign banks branches in interior of economy for dominance of local financial sector. In this context, National bank of Pakistan established in 1949 to outreach for public, Agricultural Development Finance Corporation (ADFC) in 1952 for agricultural support, House Building Finance Corporation (HBFC) in 1952 for public home construction and later Pakistan Industrial Finance Corporation in 1957 for industrial growth. SBP prime objective to control credit was achieved by lowering interest rate from 1948-1970. This policy made many beneficial tasks for economy; it encouraged debt which was major reason for large expansion. SBP also encouraged banking sector for lending to neglectable part of economy and minimum margin requirement in 1965. Before this Quota System was announced in 1963, regarding its advances to the scheduled banks against government securities. In 1972, many comprehensive reforms were introduced for banking system in economy

and new governor of SBP. During this time, credit supply was channelized for priority sectors i.e. agriculture, industry and small businesses. But ineffective and inefficient reforms it was nationalized in 1974 in Bhutto regime. In this way, monetary and credit policies were focused towards providing suitable credit to productive sectors in general and priority sectors in particular. A compulsory zakat deduction of 2.5 percent was levied on saving accounts and other financial assets during this period and later profit and loss account were opened along with elimination of interest rate during Zia regime. Profit and loss sharing (modarba) and mark-up (murahaba) term got the popularity during this period also [4]. In 90s SBP gained autonomy while in 1992 the Prudential Regulations were introduced in Pakistan which was second phase of banking reforms to tackle challenges<sup>1</sup>. These reforms introduced public debt auction, ending of credit ceiling and deposit rate [4]. The OMO, which SBP started on ad hoc basis in October 1991, supplemented by the changes in the discount rates and cash reserve requirements and issuance of T bills of different maturity in June 1998, facilitated in the management of the monetary and credit expansion. In 1999 the multiple exchange rate system was replaced by unified exchange rate by the SBP. From July 1, 2000, the integration of the exchange rate and the monetary policies took place.

“During the 1989–2000 period, monetary and credit policies mainly operated within the Annual Credit Plan (ACP). In December 2000, the Federal Investment Bonds were complemented with Pakistan Investment Bondm [4].”

In 2000, monetary policy was tightened and increased discount rate by one percent twice in a year that ultimately reached 13% first time in history and increased reserve ratio to control the depreciation of currency. Focus of monetary policy changed in 2005, it was shifted from growth perspective to inflation control. SBP has also increased discount rate first time after 2001 and higher level of

<sup>1</sup>Major challenges were inflation and unemployment simultaneously, slower economic growth, depreciating currency, limited reserves, high debt burden etc.

OMOs. The auction of OMOs, more statutory liquidity requirement and high discount rate decreased the money quantity in economy.

Data of other indicators show Contractionary monetary policy reduces inflation [5] impact stock market negatively [1], reduces aggregate demand and creates unemployment stems from low investment activity in economic setup by receding money supply in market [6].

The financial analysts, strategy planners and market participants want guaranteed returns but dependability of stock market performance and its return definitely is subjected to monetary policy. This situation has got manifold prominence owing to other factors i.e. terrorism, political stability, economic condition and interest rate volatility in Pakistan [3]. Secondary markets' efficiency and competency are built on sound foundation, which synchronizes by monetary policy at larger extent [7]. Diverse types of macroeconomic variables affect securities and stock prices but interest rate, being a prominent tool of monetary policy, is central point of monetary authorities [8]. Sensible and rational investors try to invest in well-organized efficient markets to avoid higher degree of volatility. This volatility of stock markets along with ineffective adopted policies deprives investors to get handsome gains hence they face losses [9]. This uncertainty or volatility may be controlled by adopting well-thought and robust monetary policy<sup>2</sup>. Stock markets' variations may be by-product of interest rate fluctuations, which reshapes behavior of consumers and business sector alike. Higher interest rate compels business entities to minimize costly debt financing in their capital structure, which ultimate reduces expansion of business and its profitability [10]. This trend not only hinders the companies to get benefit of tax shield but also distresses fundamental earning parameters, which lead to lower securities prices and send negative signal that reduces investment behavior of the masses [10]. In the period of profitability decline, financiers do not feel their investment secure and safe that worsens the situation of business especially in secondary markets. As the interest rate increases, government offers new securities like Treasury bills and trend of the investment in such securities increases, which suppresses equity prices. Consequently, it has been observed that the relationship between interest rates and stock value is negative and tight monetary policy further affects the association [11]. Monetary policy cannot be stagnant because monetary authorities keep on changing it by viewing the economic condition of country. It directly affects money supply, inflation, economic growth, unemployment and currency appreciation or depreciation.

Tight or relaxed monetary policy basically governs quantity and velocity of money in economy to handle<sup>3</sup> four major macro issues. Capitalistic nature of economy puts more

focus on the monetary policy for getting better and desired results by improving financial infrastructure. Monetary base is controlled by manipulating interest rate, reserve requirement by the central bank and, at some extent, by Open Market Operations (OMOs). OMOs are performed by developed countries having better digits of foreign currency reserves in comparison with developing countries [12] Monetary policy may be of two types, expansionary (relaxed) and contractionary (tight). Both policies have some plus and negative points. Expansionary monetary policy increases money supply in the economy by lowering interest rate and required reserve ratio imposed on commercial banks by central bank. It generates more job opportunities, magnifies economic growth and improves living standard but, on the on the other side, it has some negative influence on economy as well i.e. higher inflation, widening gap between poor and richer and devaluation of money. Normally, central banks adopt expansionary monetary policy in recession to uplift economic activities but keep their eyes on targeted inflation as well. Whenever central banks want to control the inflation in economy, it introduces contraction (tight) monetary policy, which decreases money supply in the economic setup by increasing interest rate and required reserve ratio. This policy also possesses some benefits and it is normally used in while boom in the economy. Benefits of the policy are controlled inflation, appreciated exchange rate, increased saving habits and improved balance of payment (BOP) [13].

## 2. LITERATURE BACKGROUND

Stock market is affected by the changes in reserve ratio of commercial banks imposed by central bank [8]. This impact is negative on equity indexes but magnitude varies from economy to economy and entity to entity [1]. Ehrmann, and Fratzscher [14] concluded in his research that low equity-based companies, having weak liquidity and profitability potential were likely to be more affected by the change in monetary policy as compare to established companies. Bomfim [8] inspected pre-announcement and news impacts of monetary policy on the secondary market especially on stock markets in perspective of disclosure of monetary policy decisions in USA. FED reserve was the major variable in the study. Bomfim [8] showed that volatility of equity markets tend to be relatively lower on days before and higher on days after monetary policy decisions. Thorbecke [1] employed this methodology from 1953-90 and found out the response of US stock returns to monetary policy shocks based on federal fund rates. Rigobon and Sack [7] explored that movements in the stock market could have a significant impact on the macro economy and are, therefore, likely to be an important factor in the determination of monetary policy. However, little is known about the magnitude of the Federal Reserve's reaction to the stock markets.

Perez-Quiros and Timmermann [15] used changes in market interest rates or official rates as their measures of monetary policy. Agha et al. [3] observed the monetary transmission mechanism in Pakistan with the help of vector

<sup>2</sup>Robust policy provides following benefits smooth money supply, controlled inflation, higher economic growth, more business activities, more job opportunities and stable currency value

<sup>3</sup>Four macro issue are inflation, unemployment, economic growth and Balance of payment

autoregressive technique. The researchers concluded that contraction policy decreased the demand, which automatically decreased the price in economy. Interest rate was a major channel whereas exchange rate was a minor one and statistically insignificant in the study. Bekaert, Cho and Moreno [16] studied the impact of monetary policy on bond prices in USA. They found that prices of stock and commodities were affected by nature of monetary policy especially with interest rate mechanism. These findings supported the results inferred by Chen [9].

Gertler and Gilchrist [10] documented the quantum of stock return with monetary policy and found that portfolios were affected by monetary policy responses. Cochrane and Piazzesi [17] used Eurodollar rates to check the impact of monetary policy whereas Rigobon and Sack [7] utilized the Eurodollar Futures rate to explore the impact of monetary policy on stock markets.

Interest rate and banking reserve ratio are primary tools of monetary policy around the globe to control the monetary base in economies. Circulation of money creates many problems despite of certain advantages, which may be high inflation, currency depreciation, unemployment, and disturbance of balance of payment. Contractionary monetary policy shrinks economic activities and controls the inflation rate by increasing interest rate by central bank whereas expansionary monetary policy enhances the money supply and increases the employment activities.

Stock market is affected by volatility in monetary policy. It is empirically proven that there exists a significant policy response in context of stock market; with a 5 percent rise in S&P 500 may boost a 25 basis point tightening policy and vice versa [7].

Bernanke and Kuttner [21] empirically tested the notion that monetary policy had an impact on the stock market returns. They concluded that expansionary monetary policy boosted the stock market index and return. 25 points reduction in federal fund might increase 1.25 % return. They also determined that the impact of fund rate variation was based upon the nature of industry. Every type of industry was not equally affected by the 25 points reduction in reserves. They used three type of equity excess return proxies i.e. cash flows, discount rate in real interest rate to nullify or accept the hypothesis. The researchers have found that there exists a relationship in portfolio return (stock return) and magnitude of monetary policy. They further dig deep the topic by preference in tools of monetary policy.

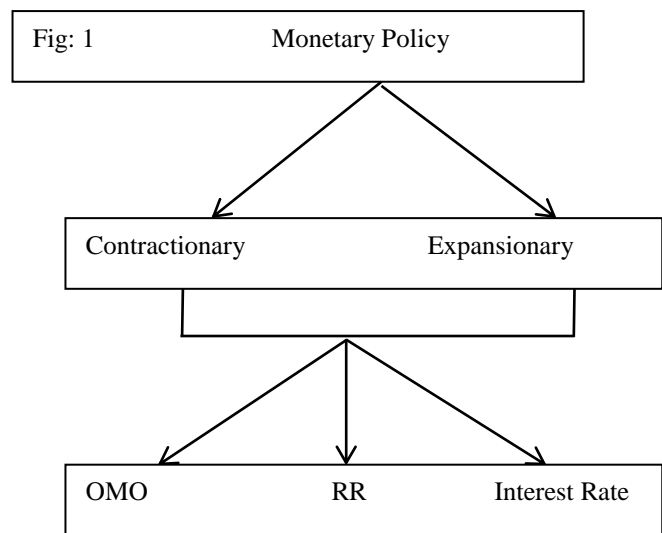
Bernanke and Gertler [2] claimed that an inflation-targeting monetary policy or contractionary monetary policy automatically stabilizes the stock market or stock market returns. Main reason behind it is the adjustment of interest rate; in booms, inflation rises that automatically raises interest rate in economy which moderate or equilibrate the price increase of equity. Expansionary monetary policy provides a signal for economy and participants take it positive, which increases future production causing higher economic growth.

Barro [18] asserted that simple monetary policy affected the employment with wage function and created vulnerability in market. Gertler & Gilchrist [10] criticized this particular

model. Christiano et al.[19] advocated full monetary model and gave suggestions to incorporate proper banking sector assisted by financial institutions thoroughly. Bernanke and Gertler [20] gave suggestion that appropriate monetary policy was compulsory for economy otherwise a burst in economic bubble would create financial instability and further decline in assets' values.

Stock market investors can use available resources and organize them in a best way to get handsome return on their investment but the availability of financial resources somewhat depends upon the monetary policy of specific economy (Risqué et al., 2011). Expansionary monetary policy equips the secondary market investors and enlarges the financial resources by reducing interest rates. The instability in stock price or in the stock market is considered as a threat and may be controlled by MP. Many researchers (Chen et al., [9] ,Bekaert et el., Gertler, & Gilchrist, [10] have conducted research on the relationship of interest rates and stock prices. The variation in firm's value and in its stock is influenced by the interest rate. The fluctuation in interest rate depends on the economic conditions and it is controlled by monetary policy.

**3. THEORETICAL FRAMEWORK**



**Tools of Monetary Policy**

There are three tools usually practiced by monetary policy makers in all over the world for an effective and desired implementation of monetary policy. All these tools have some positive and negative impacts on secondary and real markets as well. Here, we will discuss the impact on secondary markets only.

- Interest<sup>4</sup> rate
- <sup>5</sup>Reserve requirement (RR)
- <sup>6</sup>Open Market Operation (OMO)

<sup>4</sup> Interest rate is primary tool which effect monetary base and money velocity enormously

<sup>5</sup> It is reserve requirement imposed by State Bank of Pakistan in percentage of deposit to commercial banks

#### 4. METHODOLOGY AND ANALYSIS

This empirical study tries to trace impact of monetary policy on stock market. Stock market performance is measured by Karachi Stock Exchange (KSE) 100. It is major stock market of Pakistan and top 100 companies are included in this index. The data of components of monetary policy and stock market index has been taken on monthly bases from reliable sources i.e. stock market official reports and State Bank of Pakistan data corridor. The analysis is consist of model one which consist of monetary policy type and stock market index value while model two consist of all component of monetary policy i.e., OMO, interest rate and KSE 100 index. Monetary policy is used as dummy variable and assigned 01 value shows expansionary monetary policy while 0 assigned contractionary monetary policy. The basis is one in the study based on lower interest rate and mop-up OMOs.

$$\text{Eq 1.1 } KSE100 = \beta_0 + \beta_1 MP + e$$

$$\text{Eq 1.2 } KSE100 = \beta_0 + \beta_1 MP + \beta_2 OMO + \beta_3 Int + \beta_3 RR + e$$

MP= Monetary policy

RR= Reserve requirement

OMO = Open Market Operation

KSE100: Karachi Stock market 100 index

Int = Interest rate fixed by monetary policy authorizes

**Table: 1 OLS and Quantile regression results**

Technique	Independent variable	Coefficient	Stand errors	t-stat
OLS	MP	6170.2357*	1642.224	3.757244 <sup>8</sup>
	OMO	0.015778*	0.005063	3.116032
	RR	-1601.263*	624.7962	-2.562857
	C	29694.5*	8953.091	3.316676
Q-0.2	MP	2797.57*	1433.119	1.952084
Q-0.25	MP	3153.09*	1530.815	2.059746
Q-0.5	MP	4118.279** <sup>9</sup>	1621.869	2.539219
Q-0.6	MP	4422.127**	1762.435	2.509101
Q-0.7	MP	6504.143**	2202.492	2.953083
Q-0.75	MP	9285.854**	2469.505	3.760209
Q-0.9	MP	13663.85**	2207.904	6.188606

The study utilized two research techniques, firstly I applied Ordinary Least Square on model one and find that expansionary monetary policy boost stock market index value, it has positive significant relationship on conventional level of significance normally followed in social sciences research. Its results are consistent<sup>10</sup> because of issue

<sup>6</sup> The is injection and extraction of foreign currency from market to establish a reasonable FORX value of Pakistan rupees . this policy is normally used in developed countries having impel amount of foreign currency reserves

<sup>7</sup> Significant at conventional level i.e. @ 5%

<sup>8</sup> Hypothesis testing is valid owing to skewness and kurtosis value that are approximately zero and 3 respectively

<sup>9</sup> Highly Significant at less than 1%

<sup>10</sup> OLS finding are consistent not efficient because of heteroskedasticity and autocorrelation issue, therefor quantile regression is applied to get better results of estimation

existence of heteroskedasticity and Serial correlation. The model one is also have one limitation that the model is not linear in terms of parameters and these reasons impact the efficiency of estimation. The explanatory power of the model is also little bit arguable which is only 20%. Residual of the model one approximately normally distributed which is better for validation of individual significance of test of monetary policy nature. In model two individual component of monetary policy are also statistically significant. OMO has positive while interest rate has negative relation which increase reliability of model one.

Second technique of the study is quintile regression; we applied this technique because it has not so rigid assumption and heteroskedasticity issue also favor this technique. The result of 07 quantile shows that monetary policy has highly significant relationship with stock market index. The results reveal that the coefficients across quantile are different and the technique is suited for that data set. The estimation gives us sound clue that expansionary monetary policy boosts stock market activities in economic setup. The finding of results also provide us sound justification to claim that at higher level of index value the nature of monetary policy impact more in comparison to lower level or moderate level of index value.

**Table: 2 Correlation Analyses**

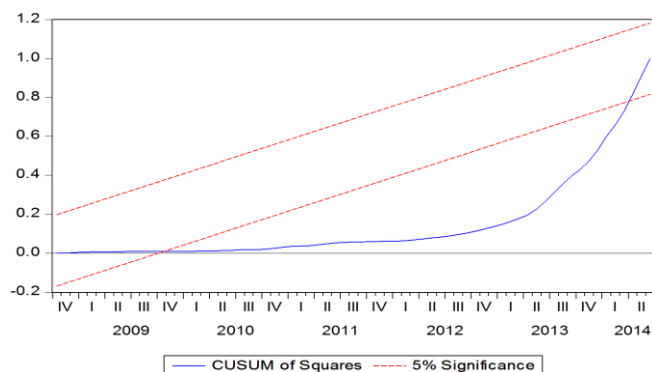
	KSEI	OMO mop-up	OMO injection	RR	MP
KSEI	1.00				
OMO mop up	0.67	1.00			
OMO injection	0.41	-0.26	1.00		
RR	-0.84	-0.28	-0.68	1.00	
MP	0.40	0.08	0.48	-0.62	1.00

The table 2 shows correlation of individual components of monetary policy with performance of stock market index. RR has negative relationship with KSE and has higher level of negative correlation. RR has also negative relationship with nature of monetary policy while OMOs and KSE has moderate level of positive correlation. The level of correlation in independent variables also shows limited chance of multicollinearity in data.

One further test has been performed to check the causal relationship<sup>11</sup> and the output of Granger Causality show that no causal relationship has been found at lag one, two, four and five. Only at lag three test reveals one way causality i.e. stock market causes monetary policy shaping and it is limited prove to claim better causality between two.

Figure: 02 Linearity testing

<sup>11</sup> Granger causality has been checked but could not find reasonable evidence of causal relationship so results are not included in the paper



The figure above shows that parameter is not linear in nature so quantile approach is better to capture the nature of relationship.

## 5. CONCLUSION

The article uses the data of monetary policy and its instruments i.e. OMO, reserve requirement and interest rate on monthly basis from 2008 to 214. Then based on these, dummy variable is generated for tight or relax monetary policy. It has been empirically found that on individual basis OMO has positive significant while interest rate is negative significant relationship. Results of dummy variable shows that relax or expansionary monetary policy boosts stock market activity in contrast to tight or contractionary monetary policy. Two research techniques OLS and quantile regression support the results. It is concluded that monetary policy is a vital synchronizing agent in capitalistic economy and it serves many purposes i.e. controls inflation, harmonizes economic growth, and reduces unemployment. Every country tries to implement a policy, which is better fitted in their capitalistic setup. Contraction monetary policy reduces inflation, affects stock market negatively by reducing money supply in the market. Expansionary monetary enhances stock market activities and creates job opportunities but increases inflation in economy by increasing money supply and money velocity.

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