DOES MONETARY POLICY INFLUENCE STOCK MARKET LIQUIDITY IN PAKISTAN? AN ARDL BOUND TESTING APPROACH

Zain Shamshad

M.Phil Scholar, Department of Economics and Finance, Pakistan Institute of Development Economics, Islamabad

Zeeshan Rasheed

Lecturer, Govt. Associate College Shahpur Sadar

Waleed Khalid

Assistant Professor, Department of Accounting and Finance, Khawaja Fareed University Rahim Yar Khan

Abstract

This current study has examined the relationship between monetary policy and market liquidity for Pakistani equity market from 2000 to 2021 by using monthly data. Broad money (M2) and *interest* rate *(treasury bills rate)* are utilized to capture the effects of monetary policy, value traded is used as a proxy for market liquidity and foreign portfolio investment (FPI), the index of industrial production (IIP), exchange rate *(*EX) are used as independent variables. All variables are taken in log form to make them unit free. The Auto Regressive Distributed lag approach is adopted to assess the short run and long run causal relationship. In the long run, the findings of the study *show* that broad money and exchange rate have insignificant while foreign Portfolio Investment and Ttreasury Bill Rate have negative and significant impacts in the long run. In the short run, stock market liquidity has significant and negative association with Treasury bill rate, foreign portfolio investment and exchange rate. The results indicate that high interest rates discourage the foreign portfolio investment. Monetary policy committee should decrease the interest rate that will increase stock market's liquidity.

Key words: Monetary Policy, Liquidity, Treasury Bill Rate, Industrial Production Index, Foreign Portfolio Investment, Exchange Rate

JEL Code: B26, D53, E44, F38, G17, P34

Introduction

Liquidity in stock market has grasped the attention of researchers, market participants and analysts during the recent financial crisis across the globe. It is the ability of the market to sell the financial asset quickly without discounting. Amihud et al. (2005) defined the stock market's liquidity as, "the ease of trading". Stock market's liquidity and monetary policy considerations are interrelated. A monetary policy affects the stock market's liquidity during the crisis period (Chordia et al., 2005). To overcome the liquidity problem created in a stock market during a

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financial crisis, the Central banks of different countries have directly intervened through monetary policy. In Pakistan, State bank formulates monetary policy to curb inflation and stabilize economy through contraction or expansion of money supply.

The monetary policy is considered as one of the effective policies to overcome a financial crisis in the whole world. In relation to liquidity, contractionary monetary policy reduces the stock market liquidity while expansionary monetary policy enhances the stock market liquidity (Fernández-Amador et al., 2013). Contractionary monetary policy adheres to a recession in a business cycle of the economy. An expansionary monetary policy is auspicious because of low interest rate which increases economic activity and the firm or industry's internal rate of return.

In the long run, monetary policy is not much effective for achieving higher economic growth but it is highly recommended in the short run. When monetary policy changes, it affects the economy through demand and supply side channels. In demand side channel, private consumer spending take place as the result of an expansionary monetary policy on the other hand, investment financing becomes cheaper for firms in supply side channel (Carlin & Soskice, 2006). Tobin (1982) declared insights about the influence of stock prices and monetary policy on real economic growth. As for as stock market is concerned, lower interest rates make bonds less attractive relative to stocks because of hike in bond prices. Since stocks and bonds are considered as substitutes of each other therefore, the stocks demand rises.

Furthermore, Modigliani also claimed that a contractionary monetary policy can lead to lower consumer spending and financial wealth in an economy. An unexpected positive shock of money supply in recession or contraction phase of business cycle would further increase the money supply to avoid inflationary pressures, and this procedure is called liquidity effect. Pakistan is a developing market with increasing opportunities, so the financial investor's interest is being evolved over the time. It is widely evidenced that loose monetary policy results in higher liquidity of stocks while tight monetary policy reduces the liquidity of stocks. Amihud (1986) reported that people hold more liquid stock in the short run because of higher expectations attached with trading activities. In Pakistan, Major work has been done on stock market volatility, stock markets return and stock market prices. Adalat (2018) concluded that it is the monetary policy that determines the stock market's liquidity. Earlier studies also estimated the turnover for liquidity and utilized standard deviation, market returns, inflation rate and market capitalization. In spite of these studies, there is very handy work on stock liquidity and monetary policy. The Pakistani equity market has been very volatile during the last decade. It requires to revisit the link between macroeconomic decisions and market response measured through trading activity. The objectives of this study are to find the short as well as long run effects of Pakistan's monetary policy and macroeconomic indicators on the stock market's liquidity. This study is unique and different from previous studies as it utilizes the trading volume of stocks as a proxy for stock market's liquidity. Beside this, this study also incorporates both the money supply and interest rate to investigate the entire impact of monetary policy on stock market liquidity, as often interest rate increases while money supply stays constant and vice versa. This study helps domestic and foreign investors to make a rational about selling and purchasing of stocks keeping in view the monetary policy of Pakistan.

Literature review

Signaling theory is a prominent theory in the financial market having assumption of asymmetric information in the market. When a new policy takes place, rational expectations help people to utilize best information regarding new formulated policy. Business firms, consumers, government and foreigners have various reactions towards a new monetary policy either it is expansionary or contractionary. Whenever new monetary policy is implemented, the hike or decline in interest rate directly affect sale and purchase of stocks particularly in short run. According to the Efficient Market Hypothesis, the stocks are always sold or purchased keeping in view the fair value on their exchange, resulting in impossible for an investor to purchase the undervalued stocks or to sell stocks on inflated prices and the only way an investor can gain higher yield on his investment is by acquiring a riskier investment. The nexus between monetary policy and stock market's liquidity at macro as well as at micro level is discussed in several studies. Few studies also considered pessimistic and optimistic periods while discussing the link between stock market's and liquidity monetary policy. It is concluded that a monetary policy has stronger influence on market's liquidity in pessimistic period than the optimistic period (Debata et al., 2021). Qing et al. (2019) studied that there is negative association between stock market and interest spread while money supply and exchange rate both influence stock market positively.

Pervaiz et al. (2018) found the effects of three macroeconomic variables i.e. exchange rate, interest rate, and inflation rate on the returns of Karachi stock market. A Hypothesis has been evaluated to assess whether a meaningful relationship between a stock market's market and macroeconomic variables exists or not. The study indicated that interest rate and inflation negatively affect stock market returns whereas exchange rate has positive impact. Epaphra & Salema (2018) examined the association between equity prices and macroeconomic indicators. The Results illustrate that exchange rate and money supply influence stock prices positively. On the other side, the treasury bill rate has negative effects on the stock prices. Investors maximize their returns by purchasing in recession and selling in boom. Khan & Khan (2018) analyzed the causal relationship between stock market prices and macroeconomic factors. It is found that the economic activity, exchange rate and money supply significantly influence stock prices in Karachi Stock Exchange. Jiang (2018) states that the impacts of an expansionary monetary policy on a stock market are asymmetrical between the different phases of a monetary policy. The findings show that there could be either the positive or negative effects of expansionary monetary policy on stock market. Aouadi et al. (2018) tried to elaborate that the market information available to the investors determine the stock liquidity. The findings show that the relationship between the stock liquidity and information is positive.

Jonathan and Oghenebrume (2017) discussed the relationship between monetary policy and the liquidity for stock market in Nigeria. The Results reveal that the Exchange rate, money supply and bank rate have significant effects on stock market liquidity. Herwany et al. (2017) explored the relationship between monetary policy and stock market liquidity. It is concluded that monetary policy significantly influences stock prices. Sensoy (2016) studied the effect of monetary policy decisions on liquidity in the Turkish market. In developed countries, the stock market liquidity

increases with monetary policy announcements. Rehman et al. (2016) concentrated on aggregate or market level liquidity rather than individual stock level liquidity because world portfolio positions take place at the country or market level not at the individual asset level. In a set of macroeconomic variables, the findings indicate that, only the interest rate, foreign equity net inflow and industrial production significantly explain stock market's liquidity in the long-run. While inflation rate, Interest rate, monetary base, and foreign equity net inflows significantly explain stock market's liquidity in the short-run. Ismail et al. (2016) identified the association between stock market returns and macroeconomic factors. The estimates illustrate that there is a negative relationship between stock market returns and gross domestic product. Salamat (2016) discovered the firm-specific determinants of market stock liquidity determinants in Jordan. The Results depict that leverage, gross domestic product, interest rate, earnings per share, and business size are positively related to market stock liquidity while market value ratio per share to book value per share, asset return, and inflation rate are negatively associated. Qamri (2015) examined the relation between Pakistan's inflation rate and stock prices. This study found the negative relationship between stock prices and inflation rate. When stock prices are low, companies avoid to enter in the capital market until the central bank provides a substitute for their capital market investment project. The inflation rate also affects the value of the company. Contractionary monetary policies may reduce inflation and stock prices, as people have less money to purchase commodities or stocks.

 Abouwafia & Chambers (2015) explored the effects of monetary policy and real exchange-rate shocks on the stock market in Oman, Kuwait, Saudi Arabia, Jordan and Egypt. Mainly, monetary policy and real exchange rate shocks have direct short-term impacts on the stock market in the selected countries. Ali (2014) analyzed the relationship between equity market and interest-rate. The estimates show the negative association between stock market and interest rate. It is also claimed that if the interest rate is high, stock market output would be poor. Hussain et al. (2015) studied the connection between stock market returns and macroeconomic factors in Pakistan. The Results show that exchange rate, industrial sector and money supply negatively affect the volatility of stock market. Furthermore, less liquid stock markets rely on contractionary monetary policy, and expansionary monetary policy determines highly liquid stock market. Ahmad et al. (2015) determined that different macroeconomic indicators affect stock prices in emerging markets such as Nigeria. The estimates conclude that inflation rate, gross domestic product and exchange rate have significant influence on equity prices.

Rafique et.al (2013) concluded that gross domestic savings and GDP per capita have significant and positive effect on the Karachi stock exchange index while inflation and interest rates negatively determine stock market index. Fernández-Amador et al. (2013) explored the effects of monetary policy on stock market's liquidity. The results show that when European Central Bank announces the expansionary monetary policy, the aggregate stock market's liquidity increases. It is also claimed that the effect of this monetary policy was considerably greater for the lower worth stocks. Zare et al. (2013) observed the link between monetary policy and stock market's volatility. Stock market volatility shows an asymmetric response to monetary policy over bull and bear

periods in Asian countries. Result shows that contractionary monetary policy has a stronger effect on stock market volatility in case of bearish market than in case of bullish. Naik and Padhi (2012) studied the association between Indian stock market and the macro-economic variables like whole price index, exchange rate, money supply, treasury rate, and industrial production. The findings illustrate that there is industrial production and money supply granger causes stock market prices. Qayyum et al. (2011) tried to find the relationship between Pakistan's stock market returns and monetary policy. The findings show that a marginal shift in monetary policy positions has a major impact on stock market volatility.

Data and Methodology

For this study, the time-series monthly data has been utilized for the 20 years from 2000 to 2021. Stock market liquidity (LIQ) appeared as a dependent variable whereas broad money supply (M2), treasury bill rate (TR), industrial production index (IPI), foreign investors portfolio investment (FPI) and exchange rate (EX) appeared as independent variables. Number of stocks or shares traded in a day or in a specific time period is called trading volume of stock. The index which shows the growth in production sector is called index of industrial production. The trading volume of stocks and industrial production index are the proxies represent stock market liquidity and gross domestic product respectively (Bernann et al., 1998; Sauer, 1994). On the other side, broad money supply and Treasury bill rate are the proxies for monetary policy capturing its effects (Lunde & Timmermann, 2004; Beenstock & Chan, 1988). Foreign portfolio investment is defined as the entry of funds into a country in which foreigners deposit money in a country's bank or make investments on the country's stock and bond markets, often for speculation (Burnmeister & Wall, 1986). The data for treasury bill rate, exchange rate and industrial production index is extracted from Pakistan's monthly economic survey while the dataset for foreign portfolio investment and trading volume is taken from Pakistan's National Clearing Company Limited and Ceicdata respectively.

The econometric model for this study is shown below in equation (1).

$$\ln Liq_t = \theta_1 + \theta_2 \ln FPI_t + \theta_3 \ln MS_t + \theta_4 \ln ER_t + \theta_5 \ln IIP_t + \theta_6 \ln TR_t + \mu_t \qquad (1)$$

In equation (1), θ_i and μ_t are the parameters and error term respectively.

In time series analysis, the data stationary is the question of matter. Mostly macroeconomic indicators are stationary at first difference but series illustrated in growth rate are more likely to be stationary at level. In order to check the stationary of each variable, the study utilizes unit root tests that include Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests which are widely used by the researchers.

As for as empirical methodology is concerned, Auto Regressive Distributed Lag bound testing approach will be employed introduced by Pesaran, Shin and Smith (2001). There are three major reasons to opt this methodology: First, it executes both the short as well as long-term estimates provided that order of integration of all variables is not same but mixture of I(0) and I(1). Secondly, it removes the problem of autocorrelation and variable omission biasness. Thirdly, it is a useful technique when sample size is not too large (Pesaran et al., 2001).

The long run ARDL (p, q) model of this study is shown in equation (2).

$$Liq_t = \theta_0 + \gamma_i \sum_{i=1}^{m} Liq_{t-i} + \alpha_i \sum_{i=0}^{m} FPI_{t-i} + \beta_i \sum_{i=0}^{m} MS_{t-i} + \delta_i \sum_{i=0}^{m} ER_{t-i} +$$
$$\propto_i \sum_{i=0}^{n} IIP_{t-i} + \vartheta_i \sum_{i=0}^{n} TR_{t-i} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots \quad (2)$$

If the cointegration exists then ARDL model could be transformed into Error Correction Model to illustrate short run estimates. Error Correction version of ARDL model of this study is illustrated in equation (3).

$$\Delta Liq_t = \theta_0 + \gamma_i \sum_{i=1}^{m} \Delta Liq_{t-i} + \alpha_i \sum_{i=0}^{m} \Delta FPI_{t-i} + \beta_i \sum_{i=0}^{m} \Delta MS_{t-i} + \delta_i \sum_{i=0}^{m} \Delta ER_{t-i} +$$
$$\propto_i \sum_{i=0}^{n} \Delta IIP_{t-i} + \vartheta_i \sum_{i=0}^{n} \Delta TR_{t-i} + \rho ECT_{t-1} + \varepsilon_t \quad (3)$$

In equation (3), short run parameters are γ, α, β, $\delta, \propto$ and ϑ while ρ is the cointegrating co-efficient which should be negative and significant.

An important test is Granger Causality test which helps to determine whether one time series helps to predict other time series or not. It also helps to determine that kind of causal relationship between regrassand and regressors is one way or two-way. In equation (4), all the parameters of each lagged variable are jointly tested through F-statistics to check Granger causality. If null hypothesis of F-statistics is rejected, it could be concluded that tested lagged variable Granger causes outcome variable.

$$Liq_t = \theta_0 + \gamma_i \sum_{i=1}^{m} Liq_{t-i} + \alpha_i \sum_{i=1}^{m} FPI_{t-i} + \beta_i \sum_{i=1}^{m} MS_{t-i} + \delta_i \sum_{i=1}^{m} ER_{t-i} +$$
$$\propto_i \sum_{i=1}^{n} IIP_{t-i} + \vartheta_i \sum_{i=1}^{n} TR_{t-i} + \varepsilon_t \quad (4)$$

The Granger Causality test also helps to diagnose whether each regressor helps to forecast outcome variable or not.

Results and discussion
Table 1. Descriptive Statistics

Variables	LIQ	TR	M2	IPI	EX	FPI
Average	3.567	0.969	5.819	2.022	1.904	10.28
Median	3.589	0.976	5.649	2.049	1.924	10.85
Maximum	4.315	1.175	7.351	2.243	2.201	11.35
Minimum	0.461	0.757	4.833	1.69	1.714	9.097
Std. Dev.	0.378	0.121	0.796	0.125	0.128	0.937
Kurtosis	27.096	1.973	2.489	3.301	2.019	1.169
Skewness	-3.464	-0.231	0.885	-0.971	0.312	-0.239
Jarque-Bera	6286.04	12.676	33.958	38.634	13.503	35.77
Probability	0.000	0.002	0.000	0.000	0.001	0.000
Sample size	240	240	240	240	240	240

In table 1, descriptive analysis of all variables such as measures of the central tendencies, measures of dispersion and few other moments of dataset are demonstrated. As for as measures of tendency are concerned, mean and median values of all series are almost similar showing that dataset of variables does not contain any outlier. The measures of dispersion also illustrate that there is no unusual dispersion in datasets of all series. The statistics of skewness provide information about the tail of the distribution of a series either it has long right tail or left tail while kurtosis statistics

provide the detail about the peakness of the data distribution of each series. The distribution with kurtosis value equal to 3 is known as mesokurtic, value below than 3 is said platykurtic and finally, the value above than 3 is called leptokurtic distribution. The values of kurtosis are illustrating that Trading Volume (LIQ) and Industrial Production Index (IPI) both have leptokurtic distribution while rest all variables have platykurtic distribution. The skewness statistics are illustrating that Trading Volume (LIQ), Exchange Rate (ER) and Money Supply (MS) are moderately positive skewed while rest of the variables are negatively skewed. The P-values of Jarque-Berra statistics for all series show that the distribution of each series is not normal.

Table 2. Unit Root Tests

Tests	ADF		Phillips-Perron		Order of Integration
Variables	Level	First Difference	Level	First Difference	
ER_t	-1.01	-10.22*	-1.2	-8.99*	I(1)
FPI_t	-0.91	-5.37*	-0.99	-6.23*	I(1)
IPI_t	-1.08	-6.12*	-1.56	-5.65*	I(1)
MS_t	-1.14	-3.30*	-1.2	-2.99*	I(1)
LIQ_t	-4.88*	-5.92*	-3.75*	-4.11*	I(0)
TR_t	-0.95	-4.56*	-1.01	-5.99*	I(1)

Note: * represent 1% level of significance

In table 2, the results of unit root tests are illustrated. The results of Augmented Dickey-Fuller and Phillips-Perron tests depict that all the variables are stationary at first difference except Stock Market Liquidity (LIQ) which has zero order of integration. In such case, the methodology of Auto Regressive Distributed Lag (ARDL) is well suited and robust.[1] Prior to the estimation of an ARDL model, it is mandatory to check the co-integration through ARDL bound testing approach. Akaike Information criteria and Schwartz Criteria are employed to determine optimal lag selection for bound testing approach. It is also stated by few studies that three lags should be the optimal lags (Irhan et al., 2011; Ahsan et al., 2011; Asghar et al., 2012). In table 3, the values of Akaike Information Criteria and Schwartz Criteria are shown up to four lags. Since the values of AIC and SC are smallest at lags three so, it should be considered as optimal lags for bound testing co-integration.

Table 3. Optimal Lag Selection for Bound Testing Approach

Lags	AIC	SC
0	-2.861777	-2.773714
1	-20.90147	-19.28502
2	-21.03260*	-19.88777*

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[1] The advantages of the methodology are discussed in previous section of data and methodology.

3	-20.97203	-19.29883
4	-21.02715	-18.82556

Note: * represents optimal lag with minimum AIC and SC

In table 4, the outcomes of bound testing co-integration are illustrated. The calculated F-Statistics is greater than the critical values of upper and lower bound F-Statistics. Therefore, it can be concluded that co-integration exists among the variables of the econometric model.

Table 4. The Bound Testing of Co-integration

Model	F-Statistics	Lags	Critical Values		Conclusion
			I(0)	I(1)	
$LIQ_t = f(MS_t, TR_t, IPI_t, FPI_t, ER_t)$	14.89*	3	3.74	5.06	Co-integration

Note: * represent 1% level of significance

Prior to the estimation of ARDL model, Granger causality test is employed to check whether there is one-way causal relationship from explanatory variables to outcome variable or two-way causality. For this purpose, the results of Granger Causality test are shown in table 5.

Table 5. Granger Causality Test

Direction of Causality	Observations	F-Statistics	Causality	Lags (AIC)
TR Granger causes LIQ	238	5.155*	Yes	4
LIQ Granger causes TR	238	0.315	No	4
MS Granger causes LIQ	238	0.066	No	4
LIQ Granger causes MS	238	0.056	No	4
FPI Granger causes LIQ	238	1.281	No	4
LIQ Granger causes FPI	238	0.259	No	4
IIP Granger causes LIQ	238	2.831**	Yes	4
LIQ Granger causes IIP	238	0.319	No	4
ER Granger causes LIQ	238	10.875*	Yes	4
LIQ Granger causes ER	238	0.313	No	4

Note: * and ** represent 1% and 10% level of significance respectively.

In table 5, it could be observed that there is no two-way causality at all but one-way causality from explanatory variables to outcome variable. The optimal lag selection for Granger causality test is based on the Akaike Information Criteria. Furthermore, money supply and foreign investors portfolio investment neither Granger cause stock market liquidity nor stock market liquidity Granger causes both of them. After having the outcomes of Granger causality and ARDL bound testing approach, the long run estimates of ARDL models are shown in table 6.

Table 6. Long Run Static Estimates

Variable	Coefficient
	0.553

ER_t	(-0.93)
FPI_t	-0.200*
	(-0.072)
IPI_t	1.544*
	(-0.422)
MS_t	-0.142
	(-0.132)
TR_t	-0.875**
	(-0.356)

Note: Values in parenthesis represent standard errors while * and ** represent 1% and 10% level of significance respectively.

The long run estimates of ARDL model illustrate that there is negative and significant influence of and foreign portfolio investment (FPI) on stock market liquidity (LIQ). The results reveal that if treasury bill rate (TR) increases by 1 percent, stock market liquidity (LIQ) decreases by 0.87 percent. When treasury bill rate falls, people seek higher returns by investing in stock markets so stock market liquidity increases. The lower interest rate tends to increase a business investment and therefore, higher trading of stocks of companies. On the other hand, if foreign portfolio investment (FPI) shows an increase of 1 percent, stock market liquidity (LIQ) decreases by 0.20 percent. In order to have higher return on portfolio investments, people from Pakistan prefer to invest on financial instruments such as shares, stocks and bonds in foreign countries, so the stock market trading or stock market liquidity in Pakistan falls. The results of these estimates are in line with the existing literature (Nishat & Shaheen, 2007; Asperm, 1989). As for as money supply (MS) and exchange rate (ER) are concerned, they have no long run significant impacts on the stock market liquidity (LIQ) as their p-value exceeds 10 percent. Finally, industrial production index (IPI) has significant and positive effect on stock market liquidity (LIQ), if 1 percent increase in the industrial production index (IPI) takes place, stock market liquidity (LIQ) will increase by 1.54 percent. When production in industrial sector increases (decreases), the net worth of enterprises or limited liability companies also increases (decreases) which leads to higher (lower) trading of shares of these companies (Liu, 2008).

Table 7. Short run Estimates of Error Correction Model

Variable	Coefficient
ECT_{t-1}	-0.492*
	(0.048)
ΔTR_t	-2.025**
	(0.931)
ΔFPI_t	-0.171
	(0.154)
ΔFPI_{t-1}	0.145
	(0.154)

ΔFPI_{t-2}	-0.441*
	(0.154)
ΔIPI_t	-0.095
	(0.431)
ΔER_t	2.944
	(3.145)
ΔER_{t-1}	-9.626*
	(3.039)
D.W. Statistics	1.95
R-Squared	0.424
Adjusted R-Squared	0.411

Note: Values in parenthesis represent standard errors while * and ** represent 1% and 5% level of significance respectively.

In Table 7, the short run estimates are illustrated where all variables have short run significant effects on the stock market liquidity except industrial production index. The co-efficient of error correction term is found negative and significant showing that if stock market liquidity deviates from its long run equilibrium due to short run shocks in any explanatory variable, 49 percent of this deviation will be corrected in each month. The value of R-squared demonstrates 42 percent of variation in stock market liquidity is explained by the explanatory variables included in econometric model.

Table 8. Diagnostic Tests for Estimated ARDL Model

Tests	F-Statistics
Breusch-Godfrey Serial Correlation (LM test)	5.75
	(0.000)
Autoregressive Conditional Heteroskedasticity (White test)	0.31
	(0.590)
Normality (Jarque-Bera test)	441.24
	(0.000)
Specification (Ramsey RESET test)	16.64
	(0.000)

Note: Values in parenthesis represent P-values.

The table 8 illustrates the diagnostic tests for the serial correlation, autoregressive conditional heteroskedasticity, normality and model specification. The results of all tests reveal that estimated model fulfils all basic assumptions of classical linear regression model hence, findings of the model could be utilized for policy recommendations.

Conclusion and Policy Recommendation

This study identifies the impact of monetary policy and some macroeconomic indicators on the stock market liquidity in case of Pakistan. The stock market liquidity is measured by the total

traded volume of stocks in Pakistan Stock Exchange while money supply and treasury bill rate are considered as proxies to capture monetary policy effects. By utilizing monthly dataset, ARDL bound testing approach has been employed to estimate the long run as well as short run effects of monetary policy and macroeconomic indicators on stock market liquidity. The findings of the study revealed that foreign portfolio investment and treasury bill rate have negative and significant while industrial production index has a positive and significant influence on stock market liquidity in the long run. Furthermore, money supply and exchange have no significant effects on the stock market liquidity in the long run. This study helps the investors to make decisions about the investment in liquid and riskless assets like stocks. On the basis of empirical findings, the monetary authorities should pursue the expansionary monetary policy through lower interest rate in order to increase stock market liquidity. Lastly, government needs to be much focused about industrial sector and should take needful actions to raise industrial production.

References

Abouwafia, H.E. & Chambers, M.J. (2015). Monetary policy, exchange rates and stock prices in the Middle East region. *International Review of Financial Analysis, 37, 14–28.*

Adalat, Q. (2018). *Does Monetary Policy Determines Liquidity? New Evidence From Pakistan Stock Market* (Doctoral dissertation, CAPITAL UNIVERSITY).

Ahmad, A.U., Abdullah, A., Suong, Z., & Abdullahi, A.T. (2015). Causal Relationship between Stock Market Returns and Macroeconomic Variables in Nigeria. *IOSR Journal Of Humanities And Social Science 20*(5), 74-96.

Ajayi, R. A. & M. Mougoue. (1996). On the Dynamic Relation between Stock Prices and Exchange Rates, *Journal of Financial Research*, 19, 193-207.

Ali, H. (2014). Impact of Interest Rate on Stock Market; Evidence from Pakistani Market. *Journal of Business and Management, 16*(1), 64-69.

Amihud, Y. & Mendelson, H. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics, 17*(2), 223-249.

Amihud, Y., Mendelson, H. & Pedersen, L. H. (2005). Liquidity and Asset Prices. *Foundations and Trends in Finance, 1*(4), 0-96.

Aouadi, A., Arouri, M., & Roubaud, D. (2018). Information demand and stock market liquidity. *International evidence. Economic Modelling, 70, 194-202*.

Asghar, N., Nasreen, S., & Rehman, H. (2012). Relationship between FDI and Economic Growth in Selected Asian Countries : A Panel Data Analysis. *Review of Economics & Finance, 8*, 84–96.

Asprem, M. (1989). "Stock Prices, Asset Portfolios and Macroeconomic Variables in Ten European Countries". *Journal of Banking and Finance, 13*, 589-612.

Jiang, C. (2018).The Asymmetric Effects of Monetary Policy on Stock Market. *Quarterly Journal of Finance, 8*(3)*, 1-27.

Chordia, T., Sarkar, A., & Subrahmanyam, A. (2005). An Empirical Analysis of Stock and Bond Market Liquidity. *The Review of Financial Studies, 18*(1), 85–129.

Carlin, W., & Soskice, D. (2006). Macroeconomics: Imperfections, Institutions and Policies, Oxford, Oxford University Press.

Debata, B., Dash, S.R., & Mahakud, J. (2021). Monetary policy and liquidity: Does investor sentiment matter? *IIMB Management Review, 23*(3), 257-277. https://doi.org/10.1016/j.iimb.2021.07.001

Erdogan, E., & Ozlale, U. (2005). Effects of Macroeconomic Dynamics on Stock Return: The Case of the Turkish Stock Exchange Market. *Journal of Economic Corporation*, 26(2), 69-90. Retrieved 15 October, 2013.

Epaphra, M. & Salema, E. (2018). The impact of macroeconomic variables on stock prices in Tanzania, *Journal of Economics Library, 5*(1), 12-41.

Fernández-Amador, O., Gächter, M., Larch, M. & Peter*, G.* (2013). Does monetary policy determine stock market liquidity? New evidence from the euro zone. *Journal of Empirical Finance, 21, 54–68*.

Herwany, A., Satyakti, Y., 7 Wardhana, W. (2017). The impact of monetary policy on stock market liquidity and the business cycle in Indonesia*.* Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3030518.

Hussain, M., Bedi-uz-Zaman & Ahmad, N. (2015) Relationship between Stock Market Volatility and Macroeconomics Variables: Evidence from Pakistan. *Pakistan Business Review,16*(4), 723-743.

Irhan, H. B., Alacahan, N., & Korap, L. (2011). An empirical model for the Turkish trade balance: new evidence from ARDL bounds testing analyses. *Istanbul University Econometrics and Statistics e-Journal, 14*, 38-61.

Ismail, R., Pervaz, A., Ahmed, A., & Iqbal, R. (2016). Macroeconomic Factors and the Pakistani Equity Market: A Relationship Analysis. *International Journal of Innovation and Applied Studies, 15*(1), 122-129.

Khan M.S. (2014). Macroeconomic Variables and Its Impact on KSE-100 Index. *Universal Journal of Accounting and Finance, 2(2): 33-39.*

Khan, J. & Khan, I**. (**2018). The Impact of Macroeconomic Variables on Stock Prices: A Case Study of Karachi Stock Exchange**.** *Journal of Economics and Sustainable Development, 9*(13), 15-25.

Liu, S. (2015). Investor Sentiment and Stock Market Liquidity. *Journal of Behavioral Finance, 16*(1), 51-67.

Nishat, M., Shaheen, R., & Hijazi, S. T. (2004). Macroeconomic Factors and the Pakistani Equity Market. *The Pakistan Development Review, 43*(4), 619-637

Naik, P.K. & Padhi, P. (2012). The Impact of Macroeconomic Fundamentals on Stock Prices Revisited: Evidence from Indian Data. *Eurasian Journal of Business and Economics, 5* (10), 25-44.

Jonathan, N.O. & Oghenebrume, A. D. (2017). Impact of Monetary Policy on Stock Market Prices Journal *of Economics, Management and Trade, 19*(4), 1-11.

Pervaiz, J., Masih, J. & Jian-Zhou, T. (2018). Impact of Macroeconomic Variables on Karachi Stock Market Returns. *International Journal of Economics and Finance, 10*(2), 28-34.

Pesaran, M.H., Shin, Y. & Smith, R. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics, 16*, 289-326.

Qamri, G.M., Haq, M.A., & Akram, F. (2015). the Impact of Inflation on Stock Prices: Evidence from Pakistan. *Microeconomics and Macroeconomics, 3*(4), 83-88.

Qayyum, A. & Anwar, S. (2011). Impact of Monetary Policy on the Volatility of Stock Market in Pakistan. *International Journal of Business and Social Science, 2*(11), 18-24.

Qing, Y.K., & Kusairi, S. (2019). The Effect of Money Supply, Exchange Rate, and Interest Spread toward the Performance of Stock Market in Malaysia. *Widyakala Journal, 6*(2).142-149.

Rafique, A., Amara, Naseem, M.N. & Elixir, N.S. *(2013).* Impact of Macroeconomic Variables on Stock Market Index (A Case of Pakistan). *The Dialogue, 14*(2), 214-222.

Rehman, I., Mahdzan, N.H. & Zainudin, R. (2016). Is the relationship between macroeconomy and stock market liquidity mutually reinforcing? Evidence from an emerging market. *Int. J. Monetary Economics and Finance, 9(3). 294-316.*

Salamat, W.A.A. (2016). Macroeconomics, Firm-Specific Factors and Stock Liquidity: Empirical Evidence from Jordan. *International Journal of Financial Research, 7*(5), 110-123.

Sensoy, A. (2016). Commonality in liquidity: Effects of monetary policy and macroeconomic announcements. *Finance Research Letters, 16*(C), 125-131.

Tobin, J. (1982). Money and finance in the macroeconomic process. *Journal of money, credit and banking, 14*(2), 171-204.

Zare, R., Azali, M., & Habibullah, M. S. (2013). Monetary policy and stock market volatility in the ASEAN5: Asymmetries over Bull and Bear markets. *Procedia Economics and Finance, 7*, 18-27.