

Macroeconomic Indicators and Stock Market Development

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Abstract

The stock markets play a key role in both developing and advanced countries because it channelize idle money into productive investment and generate capital for businesses which boosts the economy up. Pakistan's stock market is an emerging stock market. The main objective of the study is to check the contribution of macroeconomic indicator to the stock market development. In this study, an attempt is made to capture the macroeconomic determinants that effect more or less in stock market development. Karachi Stock Exchange (KSE) is taken as a representative stock exchange of Pakistan. This study considered Gross Domestic Saving (GDS), Money Supply (MS) and Foreign Remittances (FR) as explanatory variables and stock market development (SMD) takes as dependent variable. The study employed Phillips and Perron (PP) test for Stationarity. Finally the study utilized the ARDL to co-integration approach because it is more dominant and robust procedure to examine the short run and long run dynamic relationship. Autoregressive distributed lag (ARDL) and Error Correction Model used to find the relationship between the variables of selected econometric model. The ARDL to Co-integration results showed that Gross domestic savings, money supply positively contribute to the development of stock market in Pakistan in both short run and long run that are consistent with theoretical and conceptual framework and literature (See also; Raza et al., 2012; Adam and Tweneboah, 2009). Foreign remittances have insignificant effect in both short run and long run on stock market because most of the foreign remittances are used in consumption. CUSUM lines remained inside the critical bound at 5 percent significance level that guaranteed the stability of model.

Keywords: Stock Market development, Money Supply, Gross Domestic Saving, Foreign Remittances

Introduction

We cannot reject the role of stock market in an economy. It plays a central role in an economy because it is a source of long term funding to the firms which means more investment, more employment opportunities and more output and economic growth and development of the economy. It encourages savings which generate more capital through the use of idle money. So it is not be wrong to say that development of stock market is actually a development of an economy. In this respect it is very important to give the confidence to the investors of stock market. Investor's confidence can be built by many firm related variables as well as many external variables like inflation etc. In this research paper, an attempt is made to capture some major macroeconomic factors that may affect to the stock market.

The main objective of the study is to measure the effect of macroeconomic indicators on the development of stock market in Pakistan. Selected macroeconomic indicators are money supply, exchange rate, gross domestic savings, and foreign remittance. There is no any doubt that economic activity has substantial role in the improvement of stock market. So here we focused on some macroeconomic indicators as gross domestic savings, money supply, and foreign remittances.

Now the question is why we choose these variables? Because money supply is associated with the money in circulation and it is also one of the tools of monetary policy. Gross domestic savings promotes capital formation in an economy that leads to aggregate capitalization so called stock market development. Foreign remittances¹ play crucial role in developing countries like Pakistan. It improves economy's foreign exchange reserve that is one of the causes of investment in Pakistan. Due to these reasons we tried to check the existence

¹ After 9/11 attack on World Trade Center, Pakistan's stock market moves towards the growth because of the inflow of capital from developed countries in the form of remittances. The reason behind this is the uncertainty of survival among Muslims especially among Pakistanis in all over the world. Due to the uncertainty and instability factors, they shifted their assets in bulks forms to their domestic countries.

of the relationship between macroeconomic variable and stock market development in Pakistan.

Financial sector reforms and stock market openness in Pakistan started in 1991. But since 1991 after the period of liberalization of stock market, the stock market has developed very fast with remarkable notion. During 1991 the stock market of Pakistan witnessed a boom. Large number of developments has being done in this era. The firstly, the process of financial liberalization results in an inflow of foreign investment which increases the trading volume of stock market. Secondly, the process of privatization and offering of new shares that leads to high growth in stock market, thirdly, political stability which increases the investors' confidence. A rapid development has been shown in last few years in which KSE-100 index goes up to its highest psychological height which shows the attraction of investors and well functioning of stock market in Pakistan.

Suleman et al. (2009) found a significant impact of exchange rate and exchange reserves on stock market after financial reforms in 1991. Consecutively, Pakistan stock market is said the best performing stock market in emerging stock exchanges of the world in 2002. All this shows that Pakistan's stock market is now a prominent stock market in the world. But there are some issues and problems facing Pakistan economy such as energy crisis, terrorism and political instability that affect investor's decision making and can affect the stock market performance in adverse manners. This study is conducted to check this question that is there any co-integration relation exist between economic activity i-e money expansion, domestic saving and foreign remittances on stock market development.

Literature Review

Grossman and Shiller (1980) worked on the determinants that cause the volatility in stock prices. They did not go beyond the discount factor analysis. The study also documented the positive functional relation among stock returns and real variables like capital investment and output growth. Finally, the results confirmed the negative statistically significant relationship between inflation and stock return. Fama (1981) resulted negative significant relationship between consumer prices and real economic activity which induced inverse relation between inflation and stock returns by taking monthly, quarterly and annually data and applied capital regression on each data set separately.

Abdullah and Hyworth (1993) identified a group of macroeconomic indicators which has granger causal to the share prices in USA. The study employed Granger Causality and Vector Autoregressive model for analysis. Money growth, budget deficit and long run interest rate had granger cause to the stock prices. The study also established a direct link between money growth, inflation and stock prices.

Mukherjee et al. (1995) found negative relationship between inflation, government bond and stock prices in Japan. Interest rates on the Tokyo Stock Exchange were found to move in opposite directions. Humpe and Macmillan (2007) analyzed the response of many macro variable on stock index in United States and Japan. The study compared the American and Japan stock exchanges for the period of 1965 until 2005. They found that industrial production had positive impact on stock price. Long run interest rate and money growth were found a negative effect with stock market.

Adam and Tweneboah (2008) analyzed relationships between the stock prices and some economic indicators by selecting the period from 1991 to 2006 and used Johansen's Multivariate cointegration approach for Ghana. The findings of Impulse Response Function (IRF) demonstrated that FDI and interest rate were the major estimators of the stock index in Ghana.

Mohammad et al. (2009) found that foreign exchange reserve was positively associated with stock price index in Pakistan. Wisniewski (2009) tried to explain the political factor that explains the behavior of stock price variability. Pilinkus (2009) attempted to explain the behavior of stock prices in Lithuania. He found that stock prices are directly affected by GDP and money supply. Asaolu et al. (2010) analyzed the impact of macroeconomic variables on stock market in Nigeria. Results explained that only exchange rate had Granger caused to share prices. Gross domestic product growth rate and monetary expansion affect stock market prices. Singh et al (2011) empirically found that GDP has positive but inflation, exchange rate, and money supply were negatively related with stock returns.

Micro and macro level study of stock market had been done by Ali (2011) in Bangladesh. Inflation, foreign remittance used as macro level and market price earnings, growth in market capitalization micro level variables. Multivariate Regression Model was employed and found that inflation and foreign remittance negatively related to stock prices. Industrial production index, market earning per share and growth in market capitalization had positive impact on stock market. Rukh et al.(2011) found that changes in discount rate had involvement in the trading volume at KSE, while the CPI and Treasury bill had inconsequential effect on the trading volume of KSE- 100 index.

Azam (2011) attempted to explain the behavior of stock price variability by analyzing both internal and external variables in Pakistan. He focused on variables that are known good estimator from investor's point of view. Empirical findings showed that the stock prices had positive effect on GDP growth. But interest rate was found to be negative.

Raza et al. (2012) made an attempt to investigate the behavior of foreign direct investment towards stock market growth in Pakistan by taking annual data from 1988 to 2009. Domestic savings also positively related but exchange rate and inflation had a negative effect. The study suggested that foreign direct investment can boost up by providing adequate facility of infrastructure. Raimony et al. (2012) found macroeconomic variable had unfavorable effect on stock returns except GDP that had positive impact on return.

Theoretical and Conceptual Framework

The study is based on "*Efficient Market Hypothesis*" presented by Fama in 1965. It explains that no one can achieve benefit from stock market constantly if it does not use the current information. Now we will give theoretical explanation of econometric model with respect to stock market.

Money Supply and Stock Market Development

In current study, we use M1 as proxy for money supply. It is narrow money which is equal to currency in market plus demand deposits. In literature most researchers used M2 as a measure of money supply? Now the question is: Why we choose M1 instead of M2? Because M1 is money that is most associated to money as men in streets because it covers most frequently used means of payments of cash and cheques drawn on banks current accounts. So that's why, we are concerned to the information of current circulation and demand deposits. Monetary policy of the economy plays a significant role through its tools to control the situation like interest rate, bank rate and open market operation. Easy or expansionary and tight monetary policy has two sided effects.

By adopting easy monetary policy, there is a possibility of excess liquidity through open market operation. People will sale bonds for high return which results in a rise in money supply. It will rise bond prices and interest rate goes down which leads high stock prices. Money supply may affect stock prices in two ways: First, money supply behaves negatively with stock market development as an expansion in money growth in market will increase unanticipated inflation. Consequently in this way uncertainty among the investor rise which will lead to decrease to the stock price.

Second, money supply shows positive influence on stock price. A rise in money supply may stimulate the economic growth and economic activity that will increase the corporate earnings of the firms as a result future cash flow will increase and consequently stock prices goes up. Akbar et al (2012), Suleman et al (2009), Pilinkus (2009), Humpe and Macmillan (2007) and Mukherjee and Naka (1995) empirically established direct relationship between money expansion and stock prices. Negative effect of money supply has been found by Raza et al. (2012), Singh et al. (2011), Gan et al (2006).

Stock Market Development and Consumer Price Index (CPI)

Inflation can be described as the persistence and consistence raise in general price level. Inflation is measured in term of consumer price index (CPI) and GDP deflator. But most common measure of inflation is consumer price index. In literature most researchers use consumer price index to measure inflation rate. CPI measures changes in the prices of basket of consumer goods in a given time period. When there is a rise in the consumer price index it means the general price level goes up so inflation at consumer end. CPI is calculated for given set of goods and services in turn to find out the changes in the index on monthly or annually basis. Here we try to find the relationship between inflation and stock price variability. Inflation may affect stock prices in negative manners.

As inflation increases stock prices will decrease because of purchasing power reduced than before. High inflation leads to tight monetary and fiscal policies. On contrary it may affect stock market index in a positive way also. As inflation is there it can stimulate the economy so in this way stock prices move in upward because it increases the profits of firms so future cash flow generated as a result stock prices increases. In literature Rashid et al (2011), Hosseini et al (2011) and Akmal (2007) found positive relation of CPI with stock price indices. But Akbar et al (2012), Raza et al.(2012), Singh et al.(2011), Ali (2011), Butt et al.(2010), Humpe and Macmillan (2007).

Stock Market Development and Gross Domestic Savings (GDS)

Gross domestic savings is equal to the difference between GDP and total final consumption expenditures. Stock market provides us a platform to channelize the domestic saving into productive investment. Household savings generates investment and capital formation which leads to stimulate economic growth. Household savings also become cause of inflow of capital throughout the stock markets in the economy. Raza et al (2012) found positive relationship between gross domestic savings and stock price index in Pakistan. Expected functional relationship is positive between Domestic Savings on stock market.

Foreign Remittances and Stock Market Development

Foreign remittances are the income which is transferred by immigrants who are employed in foreign country. Money sent to home by migrants constitutes one of the largest financial inflows to Pakistan. The share of

Foreign remittances increases than international aid to Pakistan. Foreign remittances are one of the major sources of inflow of capital from developed to developing countries. This inflow boosts up the economy. In this respect, the theory established positive link between stock prices and workers' remittances because a rise in foreign remittances generates income level which leads to increase saving and do investment in stock market.

In this way, shares demand increases and the stock prices moves upward. Theory suggests positive association between stock market and remittances. Ali et al.(2011) found negative relation between them for Bangladesh. In Pakistan no any study found which tried to check the dynamic relationship between worker's remittances and stock market development.

Data and Methodology

The data is collected from State Bank of Pakistan (SBP), Pakistan economic survey and World Bank official website. The study use annual data from 1973 to 2012. The study employed Philips and Perron Test for stationary measures. After that ARDL to co-integration technique is employed to measure relationship in short run and in long run in our analysis.

Econometric model is as under:

$$SMD = \beta_0 + \beta_1 DGS + \beta_2 MS + \beta_3 FR + \mu_i \quad \text{----- (1)}$$

Where,

SMD = Stock Market Development

GDS = Gross Domestic Savings

MS = Money Supply

FR = Foreign Remittances

Measurement of the variables

Stock Market Development

Development of Stock market is measured by using a proxy aggregate market capitalization growth at KSE. Aggregate market capitalization is the overall value of all ordinary shares in Karachi stock exchange (Pakistan Economic Survey). Data is taken from state bank of Pakistan. This study use market capitalization as a proxy to measure stock market development.

Gross Domestic Saving

Gross domestic saving is obtained after deducting final consumption expenditure from Gross domestic expenditure. Data is taken from World Bank.

Money Supply

M_1 is taken as proxy for money supply which is considered as narrow money which consists of currency plus demand deposits. M_1 is money that is most associated to money as men in streets because it covers most frequently used means of payments of cash and cheques drawn on banks current accounts. Data source is world development indicator (World Bank).

Foreign Remittances

Foreign remittances are the income which is transferred by immigrants who are employed in foreign country. Money sent to home by migrants constitutes one of the largest financial inflows to Pakistan. Data source is world development indicator (World Bank).

Brief Description of Estimation Techniques:

Phillips and Perron Test of Unit Root (PP test)

For unit root test PP test is employed because it is non parametric in nature and corrects problem of serial correlation and problem of heteroscedasticity in error term. The mathematically PP test has approximately same as augmented dickey fuller (ADF) that is constant and trend which is represented as in:

$$\Delta X_t = \beta_1 + \beta_2 t + \gamma M_{t-1} + \epsilon_t$$

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In above equations, β_1 is constant and $\beta_2 t$ trend and second equation consist of only constant term (β_1). Here the null hypothesis (H_0) is $\gamma = 0$ (the variable has a unit root) which is less restricted as ADF. Normally ADF and PP tests provide the same results concerning to the order of integration. If the H_0 is rejected, then the variable is said stationary or independent of time. If the H_0 not to be rejected then the variable is said non-stationary or have time effect.

ARDL to Co integration

The present study employs Auto Regressive Distributed Lag (ARDL) model to co-integration that was projected by Pearson et al. (2001). Lagged independent variables through auto time alteration process is taken by ARDL approach which is one of the main features of this approach. This approach estimates the conditional ARDL model for dependent variable and explanatory variables. The model can have the following form.

$$Z_t = \alpha_0 P_t + \alpha_1 P_{t-1} + \alpha_2 P_{t-2} + \dots + \alpha_k P_{t-k} + \mu_t \dots \dots \dots (I)$$

In above model, independent variable P_t changes in t- period and it occurs α_i change in Y_t by $(\alpha_0, \alpha_1 \dots \alpha_k)$ is the effect on Y after one period.

Another effect on Y is α_k and this changes after k periods. So we can say, it takes k periods for the full effects of the impulse to be recognized. The coefficients $\alpha_0, \alpha_1 \dots \alpha_k$ made the impulse response function of plotting from P_t to Z_t .

Another way to confine the dynamic elements of this behavior is to add lagged values of the responded variable and on the explanatory side of the regression model with the independent variable. In time series analysis we usually include lag on both sides of explained and explanatory variables.

$$Z_t = \delta_0 + \delta_1 Z_{t-1} + \delta_2 Z_{t-2} + \dots + \delta_n Z_{t-n} + \alpha_0 P_t + \alpha_1 P_{t-1} + \alpha_2 P_{t-2} + \dots + \alpha_k P_{t-k} + \mu_t \dots \dots \dots (II)$$

The equation (II) describes the Autoregressive Distributed Lag Model (ARDL) (n, k). Here n and k means the quantity of lags of Z and P can be used. Length of lags is selected on the ground of the statistical significance of lagged variables. Finally, resulting model is soundly precised which shows that the model is free from the problem of serial correlation.

Operations in ARDL Model

To check the dynamics relationship, it is constructive to employ lag operator (L) which is also identified as the toward the back shift of (II) operator. It can be written in the form of algebra as

$$\begin{aligned} LZ_t &= Z_{t-1}, L^2 Z_t = Z_{t-2} \dots L^k Z_t = Z_{t-k} \\ Z_t - Z_{t-1} &= (1-L) Z_t \\ Z_t - Z_{t-1} - Z_{t-2} &= (1-L-L^2) Z_t \\ Z_t + \delta Z_{t-1} + \delta^2 Z_{t-2} + \dots + \delta^k Z_{t-k} &= (1 + \delta L + \delta^2 L^2 \dots + \delta^k L^k) Z_t \\ 1 + \delta L + \delta^2 L^2 + \delta^3 L^3 + \dots &= 1/1 - \delta L \quad \text{if } |\delta| < 1 \end{aligned}$$

First Order ARDL Model (1, 1)

The first order ARDL linear regression model form,

$$Z_t = \delta_0 + \delta_1 Z_{t-1} + \alpha_0 P_t + \alpha_1 P_{t-1} + \mu_t \quad t=1, 2, 3 \dots n \dots \dots \dots (III)$$

Here a notable thing is that Z_t is stable which means it converges to its equilibrium level if $-1 < \delta < 1$.

When Z_t becomes stable then long run equilibrium equation (III) becomes as

$$\begin{aligned} Z_t &= (\delta^0 / 1 - \delta_1) + (\alpha_0 + \alpha_1 / 1 - \delta_1) P_t + \mu_t / 1 - \delta_1 \\ &= W_0 + W_1 P_t + \mu_t / 1 - \delta_1 \dots \dots \dots (IV) \end{aligned}$$

Where $W_0 = (\delta^0 / 1 - \delta_1)$ and $W_1 = (\alpha_0 + \alpha_1 / 1 - \delta_1)$

Equation (IV) is equipped with the supposition of $Z_t = Z_{t-1}$ and $P_t = P_{t-1}$

So objective value is

$$Z_t^* = W_0 + W_1 P_t$$

General form of ARDL equation is as under:

$$\Delta Z_t = \alpha_0 + \sum_{k=i}^n \alpha_k \Delta Z_{(t-i)} + \sum_{k=i}^n \beta_k \Delta P_{(t-i)} + \delta_1 Z_{(t)} \dots \dots \dots (V)$$

There are two major steps of ARDL approach. First one is to test the long run relationship among the dependent and independent variables. For this purpose F-test is used. Pesaran et al. (2001) found two set of critical values: first set assumes that all variables are co-integrated at order I (1). The second set assumes the variables are integrated at I (0) at given level of significance. These two sets are said upper critical bound (UCB) and lower critical bound (LCB). If F-statistic is greater than upper critical bounds than co-integration relationship exists. And if F statistics is lower than lower critical bound than there is no co integration. And if F-static is between upper and lower critical bound then the results are inconclusive.

The second step occupies long run and short run estimation. For short run analysis following model of ECM is taken into consideration.

ECM equation is given below:

$$\Delta Z_t = \alpha_0 + \sum_{k=i}^n \alpha_k \Delta Z_{(t-i)} + \sum_{k=i}^n \beta_k \Delta P_{(t-i)} + \delta ECM_{t-1} + \mu_t$$

By taking lag of our dependent variable and take it as an independent variable, we measure the short run relationship as

$$\Delta SMD_t = \alpha_0 + \sum_{k=1}^n \alpha_k \Delta SMD_{(t-k)} + \sum_{k=1}^n \beta_k \Delta MS_{(t-k)} + \sum_{k=1}^n \gamma_k \Delta GDS_{(t-k)} + \dots + \delta ECM + \mu_t$$

To determine the goodness of fit of the ARDL model, diagnostic tests are constructed. Problems of regression are checked by using diagnostic test. This test used CUSUM and CUSUMSQ to measure whether model is stable or not. If the estimated line of CUSUM and CUSUM square remain inside the critical bounds (upper bound and lower bound) of 5 %, then the model is called statistically stable otherwise instable.

Results and Discussions

Table 1: Results of Phillips Perron Test of unit root

Variables		Intercept			Trend and Intercept			Conclusion
		Null Hypothesis: The variable has a unit root or non-stationary						
		Coefficient	Standard Error	Test statistics (t-value)	Coefficient	Standard Errors	Test - statistics (t-value)	
WR	Level	0.134	0.044	3.048	0.099	0.061	1.621	I(1)
	1st Difference	-0.532	0.155	-3.421	-0.635	0.163	-3.893	
MS	Level	0.050	0.0390	1.293	-0.047	0.073	-0.635	I(1)
	1st Difference	-0.771	0.1719	-4.483	-0.842	0.174	-4.826	
GDS	Level	0.070	0.030	2.303	-0.034	0.067	-0.512	I(1)
	1st Difference	-1.285	0.1682	-7.644	-1.562	0.144	-10.78	
SMD	Level	-0.013	0.0613	-0.212	0.160502	0.092699	-	I(1)
	1st Difference	-0.739	0.164	-4.505	0.758	0.166	-4.569	

ARDL to Co-integration Results

ARDL model is as under:

$$SMD_t = \alpha_0 + \sum_{k=1}^n \alpha_k SMD_{(t-k)} + \beta \sum_{k=1}^n GDS_{(t-k)} + \gamma \sum_{k=1}^n FR_{(t-k)} + \epsilon_t$$

The estimates of ARDL are obtained on the basis of Schwarz Bayesian Criterion (SBC). Regression estimates of above econometric model are given in the following tables.

Table 2: Results of ARDL (1 0 0 0) Model conducted on SBC: Stock Market Development [dependent variable]

Variables	Coefficients	t-statistics	p-values
SMD(-1)	0.61801	5.7675	0.000
MS	0.19599	3.6621	0.001
GDS	0.01222	3.9262	0.000
FR	-1.2297	-1.7298	.092
R-Squared (LM) = 0.921		R-BAR-Squared (LM) = 0.915	
DW-Statistic (LM) = 1.9842		F-statistics (LM) = 137.50	
Probability (LM) = 0.000			

* indicates significance level at 1%

** indicates significance level at 5 %

The above table results illustrate that there exist a strong co-integration between money supply (MS), gross domestic savings (GDS) and stock market development. The result shows that there exist a significant positive or direct relationship between gross domestic savings and money supply which means that GDS and MS play significant role in the development of stock market. Further we can interpret it as one unit increase in GDS and MS will lead to increase the market capitalization by 0.01222 and 0.19599 respectively. Foreign remittance is rejected at 5 percent level of significant yet it becomes significant at 10 percent level. It is negatively related to the stock market development. R-square value is 0.92 which shows that 92 percent variation in the stock prices is determined by independent variables of the model. F-statistic value is highly significant at 1 percent level of

significance which shows the overall goodness of fit of the model.

Table 3: Diagnostic Tests

LM Version	Coefficient	Probability
Serial Correlation	0.059567	0.807
Functional Form	3.3285	0.068
Normality	24.6404	0.000
Heteroscedasticity	11.0267	0.001

Diagnostic tests for serial correlation, normality, heteroskedasticity and functional form are explained in above table 5.4.6. Diagnostic tests clearly show that there is no any problem of serial correlation and functional form. Yet problem of heteroskedasticity exists in this model but it does not affect the ARDL results¹. So we can conclude that the model has no any major disease which overstate or underestimate the issue.

Table 4: Long Run Estimation of ARDL (1 1 0 0) Model based on S.B.C

Variables	Coefficients	t- statistics	p- values
MS	0.51308	3.0849*	0.004
GDS	0.031998	4.1893*	0.000
FR	-3.2193	1.4802	0.148

* specifies significant level at 1%

The result explained that money supply (MS), gross domestic savings (GDS) has substantial long run relationship to the stock market development. FR has no significant relationship between stock market developments which means that foreign remittances have no role in the development of stock market in long run. A unit change in MS and GDS will positively change the SMD. So we conclude that in long run an increase in gross savings and money growth will lead to increase the aggregate capitalization in stock market that is a sign of stock market development in Pakistan.

Table 5: Short Run Estimation of ARDL (1, 1, 0, 0, 0) based on SBC

Variables	Coefficients	t- statistics	p- values
dMS	0.19599	3.6621*	0.001
dGDS	0.012223	3.9262*	0.000
dFR	-1.2297	-1.7298***	0.092
ecm(-1)	-0.38199	-3.5648*	0.001

F statistics = 31.706 Probability = 0.000

R-Squared = 0.845 R-Bar-Squared = 0.813

DW-statistic = 1.8867

Error Correction Equation:

$$ecm = SMD - 0.51308*MS - 0.031998*GDS + 3.2193*FR$$

* specifies significant level at 5%

** specifies significant level at 10%

Where

$$dVSP = VSP - VSP(-1) \quad dMS = MS - MS(-1) \quad dGDS = GDS - GDS(-1)$$

Error correction model (ECM) results explained that the elasticity of MS and GDS. ECM model is describing the development in stock market in short run is engaged with the expansion in money supply and gross domestic savings. Both are high significant with probability of 0.000 and 0.001. FR is negatively related to the stock market development but statistically insignificant. Error Correction Term (ECM-1) which is obtained from long run that explains that in the short run how much disequilibrium will be move away in long run. The error correction term is found negative and highly significant. The value of ECM (-1) coefficient is -0.38 which means that the adjustment to equilibrium procedure is fast from previous year to the current year.

Stability of Model

The stability of the model is tested by Cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. The null hypothesis for stability check of the coefficients cannot be discarded if CUSUM and CUSUM square statistics lies within the critical bounds at 5% significance level.

¹ See for example: Shrestha (2005), Hassan and Nisar (2008)

Figure 1: Graph of Cumulative Sum of Recursive Residual

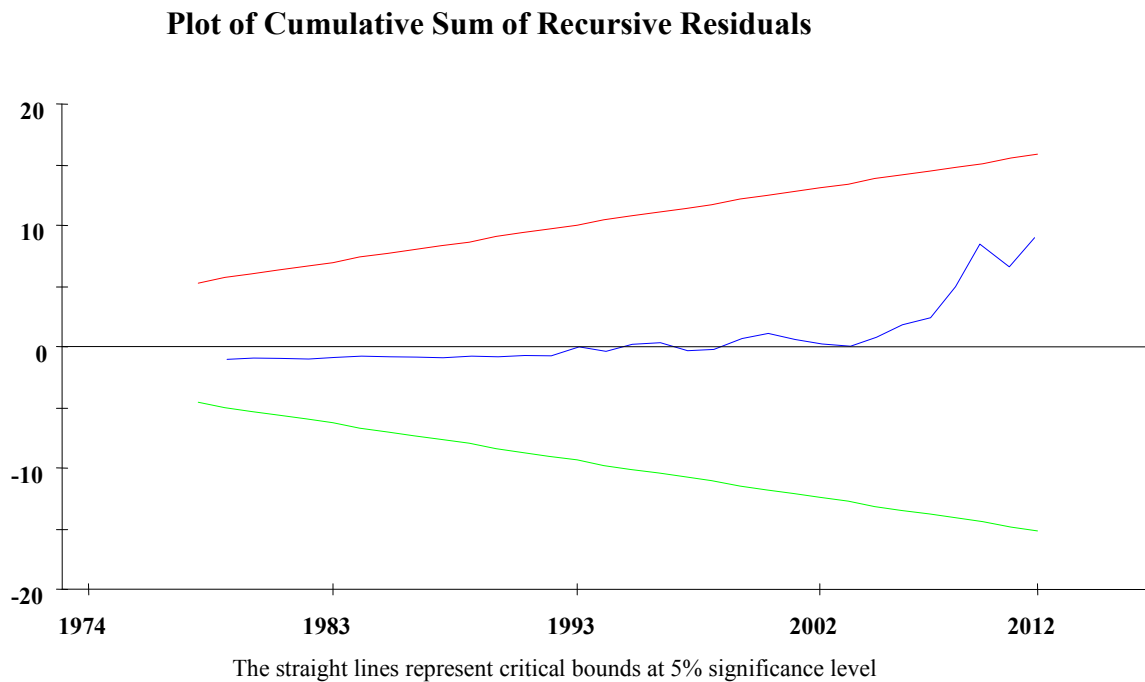


Figure 2: Graph of Cumulative Sum of Square Recursive Residual

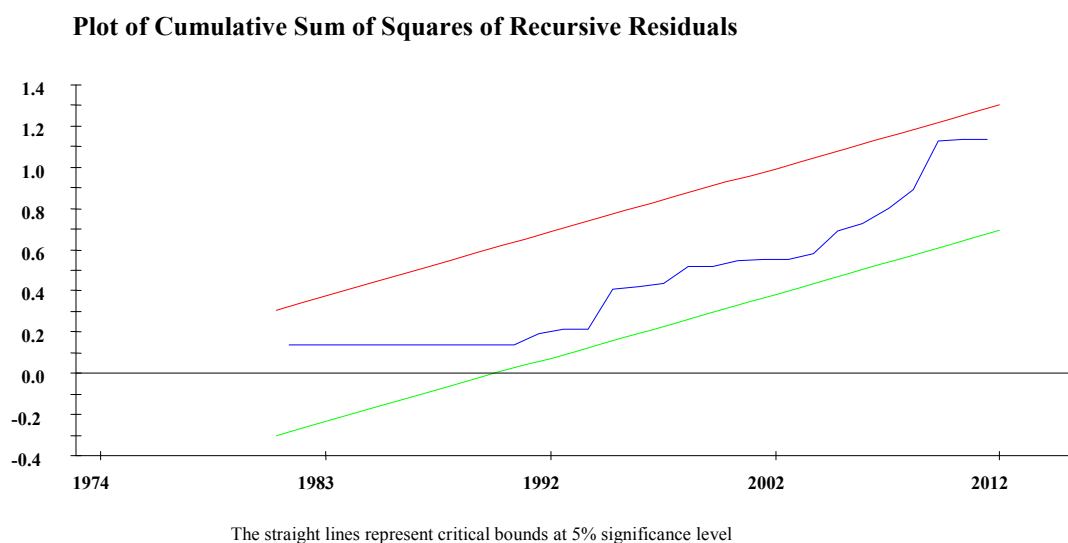


Figure 2 represents CUSUM square of residuals which shows that the estimated line remained within the upper and lower critical bounds at 5 percent significance level. The results cleared that required lines move insides of upper and lower bounds which evidently show that the concerned model is stable within constraints.

Conclusion

The stock markets play a key role in Pakistan because it channelize idle money into productive investment and generate capital for businesses which boosts the economy up. Pakistan’s stock market is one of emerging stock markets in the world. The ARDL to Co-integration results proved that Gross domestic savings ,money supply have positive impact on stock market development in Pakistan in both short run and long run that are consistent with theoretical and conceptual framework and literature [See also: Raza et al.(2012) and Adam and Tweneboah (2009)].

Foreign remittances have an insignificant effect on stock market development in short run. But the

study found no any affect on stock market in long run. F-static is greater than upper bound in both models that confirms the co-integration relationship between dependent and independent variables. CUSUM line remain between the upper and lower critical bound at 5 percent level of significance that guaranteed the stability of the model.

The study proposed that macroeconomic information like inflation; money supply etc can be used to forecast the stock market prices by rational investors. Monetary authorities should use their tools by keeping in view the response effect of them within the context of stock market development and variability of stock prices. The higher the rate of savings, higher will be the capital stock and then higher will be the economic growth. By keeping in view that Savings behavior must be encouraged in the country through appropriate savings schemes by the government.

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