Macroeconomic Determinants of Stock Market Capitalization in Pakistan:Fresh Evidence from Cointegration with unknown Structural breaks

Shahbaz, Muhammad and Ur Rehman, Ijaz and Zainudin, Rozaimah

COMSATS Institute of Information Technology, Lahore Campus, University of Malaya, Kuala Lumpur, Malaysia, University of Malaya, Kuala Lumpur, Malaysia

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Muhammad Shahbaz
Department of Management Sciences,
COMSATS Institute of Information Technology,
Defense Road, Off Raiwind Road, Lahore, Pakistan
Email: shahbazmohd@live.com
Phone: +92-334-3664-657

Ijaz Ur Rehman
Department of Finance and Banking
Faculty of Business and Accountancy
University of Malaya, Kuala Lumpur, Malaysia
Email: ejaaz.1983@gmail.com
Phone: +603 (0) 146179742

Rozaimah Zainudin
Department of Finance and Banking,
Faculty of Business and Accountancy Building,
University of Malaya, 50603
Kuala Lumpur, MALAYSIA

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Abstract: This paper explores the macroeconomic determinants of stock market development in case of Pakistan over the period of 1974-2010. We have applied Zivot-Andrews unit root test for integrating properties of the variables and the ARDL bounds testing for cointegration. The direction of causality between the variables is investigated by applying the VECM Granger causality approach. Our results revealed that variables are cointegrated for long run relationship. Economic growth, inflation, financial development and investment increase stock market development but trade openness decline it. The causality analysis confirms that stock market development is a Granger cause of economic growth, inflation, financial development, investment and trade openness. This paper indicates the importance of trade openness while formulating a comprehensive financial policy.

Keywords: Stock market development, determinants

I. Introduction

A sound and developed stock market plays a vital role to stimulate economic activity and hence contributes to economic growth as well as to economic development. The development of stock market is considered as medium to mobilize savings into potential and productive projects as well as to check the efficiency and productivity of investment ventures (Oshikoya and Ogbu, 2002). An efficient stock market not only increases the capital formation but also enhances the existing stock of capital in an economy. The availability of financial resources via capital markets also helps to improve the performance of sectoral growth such as agriculture, industry and services etc. Capital market provides funds for long run investment projects as well as attracts the investors by providing investment avenues to earn suitable investment returns. Capital markets also increase research and development expenditures to enhance production and sectoral productivity by providing employment opportunities and infrastructure development. Sound and developed capital market attracts foreign direct investment in domestic industry and contributes to economic growth. This implies that stock markets plays a vital role to enhance economic development. Previous studies in Pakistan examined the relationship between financial development and economic growth and completely ignored the role of macroeconomic factors influencing stock market development. Although, relationship between stock market development and economic growth has also been investigated in case of Pakistan (Rahaman and Salahuddin, 2010) and stock market development has a positive impact on economic growth in the presence of financial development. Shahbaz et al. (2008) found the feedback effect between economic growth and stock market development in short run as well as in the long run.

Our interest is to examine the impact of contributing factors to stock market development in case of Pakistan. Pakistan has three stock markets i.e. Islamabad stock market, Lahore stock market and Karachi stock market. The Karachi stock market has the largest capitalization share as compared to Lahore and Islamabad stock markets and is considered the biggest stock market in Pakistan. The market capitalization was US $ 41 in May, 2012 and average daily turnover of 254 million shares in Karachi stock exchange. The government initiated financial reforms in financial sector including capital markets and provided an incentive to attract foreign investment in 1990s. The establishment of policy for foreigners and privatization further boosted the confidence of foreign and local investors for investment decisions in stock exchanges of Pakistan generally and especially in Karachi stock exchange. The number of listed companies was 591, 460 and 254 in Karachi, Lahore and Islamabad stock market respectively which raised stock market capitalization from $70.26 billion in 2011 to $75 billion in 2012. This is the basic motivation for authors to investigate the determining factors of stock market capitalization in case of Pakistan.

Our results confirmed cointegration amongst the variables. It is found from our analysis that economic growth improves the performance of stock markets. Inflation and financial development have positive effect on stock market capitalization and, investment is a major contributor to increase in stock market capitalization. Trade openness is inversely linked with stock market development. The VECM Granger causality analysis confirmed the validation of feedback hypothesis between financial development and stock market capitalization, inflation and stock market development, stock market capitalization and investment, trade openness and stock market capitalization, investment and financial development, inflation and investment, inflation and trade openness while unidirectional causality is also found from economic growth to stock market development, financial development, inflation, investment and trade openness.

The rest part of the paper is organized as follows: section-II reports review of literature; data, empirical modeling and estimation strategy are detailed in section-III; results are reported in section-IV and, conclusion and policy implications are drawn in section-V.

II. Literature Review

It is stated in the efficient market hypothesis (EMH) that the stock prices will always go up if stock market is well-organized providing all pertinent information to make the market more sound and efficient. Following economic theory, stock market shows the expectations of future corporate performance via a rise in stock prices. According to the EMH, stock prices are considered as an indicator of future economic activity by assuming that stock prices precisely reveal the underlying fundamentals. Therefore, Sieng and Leng (2005) claimed that investigation of the dynamic relationship between macroeconomic and stock market development is very important to design macroeconomic policy to sustain economic growth in long run. Various studies investigated the stock market capitalization and its contributing factors. For example, Chen et al. (1986) collected the data on stock prices and macroeconomic variables and found a long run equilibrium relationship among the series. Further, they reported that asset prices are sensitive to unanticipated economic news. Long and short term interest rate, inflation, industrial production and spread between high and low grade bonds also affect stock market prices. Yohannes, (1994) examined the causal relationship between stock market prices and macroeconomic variables such as economic activity, exchange rate, money supply, interest rate, inflation and oil prices. The empirical evidence showed that stock returns are Granger cause of money supply and exchange rate and stock returns Granger cause interest rate while the feedback effect exists between inflation and stock prices and, the same is true for economic activity and stock returns. Similarly, Mukerjee and Naka (1995) investigated the dynamic relationship between Japanese stock market and macroeconomic variables using VAR model. Their results indicated the variables are cointegrated for a long run relationship. They noted that inflation, money supply, exchange rate, industrial production, call money rate and long-term government bond impact stock market prices.

Using the panel, Garcia and Liu (1999) investigated the contributing macroeconomic factors to stock market development over the period of 1980-1995. They used income, savings, stock market liquidity, investment, financial development and inflation as indicators of macroeconomy. Their results reported that inflation is negatively linked with stock market development but it is insignificant. Income, savings, investment and financial development have a positive impact on stock market capitation (development). In case of Malaysia, Ibrahim (1999) examined the relationship between macroeconomic variables and KLSE composite index. Although, he exposed that industrial production index, money supply M1 and M2, consumer price index, foreign reserves, credit aggregates and exchange rate are determinants but the Malaysian stock market is less efficient. On the contrary, Islam (2003) investigated the impact of interest rate, inflation, exchange rate, and industrial productivity on Kuala Lumpur stock exchange index. He noted the existence of the long run relationship between the series. Furthermore, these variables contribute to improve the performance of stock market development in case of Malaysia.

Maysami et al. (2004) applied cointegration to examine the impact of macroeconomic variable on stock market performance in case of Singapore. Their empirical exercise found cointegration among the series. Further, they noted that short-and-long term interest rate, inflation, industrial production index, exchange rate and money supply play a crucial role to improve performance of the stock market of Singapore economy. Al-Sharkas, (2004) collected the Amman Stock Exchange share price data to examine its relationship with the treasury bill rate, money supply, inflation and industrial production. The Johansen, (1991) cointegration was applied by using quarter frequency data. The empirical results reported that variables are cointegrated for long run relationship. Further, industrial production and inflation boost stock market prices while interest rate and inflation decline it. Quartey and Gaddah, (2007) examined the impact of financial development, saving rate, income, inflation, exchange rate and treasury bills on stock market development measured by stock market capitalization by applying Johansen and Juselius, (1990) cointegration and error correction modeling in case of Ghana. Their results validated cointegration among the variables and financial development, economic growth, saving rate and exchange rate add in stock market development but inflation and treasure bills decline it. Padhan, (2007) applied TYDL and bounds testing to examine the causality stock prices and economic activity in case of India. The empirical analysis revealed that stock prices and economic activity Granger cause each other after financial liberalization.

Yartey, (2010) focused on institutional and macroeconomic determinants of stock market development using the data of emerging economies. The results indicated that economic growth, financial development, investment, foreign direct investment and stock market liquidity play important role to improve the efficiency of stock markets. Political risk, law & order and bureaucratic quality increase stock market development by enhancing the viability of external finance. In case of Kenya, Olweny and Kimani (2011) investigated the relation between economic growth and stock market development in case of Kenya. They found long run relationship between the variables and found that economic growth has positive impact on stock market development. Their empirical evidence also reported unidirectional causality from economic growth to stock market development. Kemboi and Tarus, (2012) probed the impact of macroeconomic variables on stock market development by applying Johansen cointegration and error-correction model. Their results showed cointegration among the variables. They noted that economic growth, financial development and stock market liquidity add to stock market development but the impact of inflation is positive and it is statistically insignificant. Hsing and Hsieh, (2012) investigated the impact of macroeconomic variables on stock market index of Polish economy. They applied ARCH and GARCH models for their empirical analysis. Their results indicated that growth in real GDP (government borrowing) has positive (negative) impact on stock market prices of Polish economy. Furthermore, impact of real interest rate, nominal effective exchange rate and government bond yield in Euro era have desirable effect on stock market prices. Arjoon et al. (2012) investigated the relationship between consumer prices and stock market prices using the data of South Africa. They found that inflation has permanent impact on stock market prices.

In case of Turkey, Ozcan (2012) investigated the impact of macroeconomic variables on stock market development measured by the ISE industry index over the period of 2003-2010. The results indicated that long run exists among interest rate, consumer price index, money supply, exchange rate, gold prices, oil prices, current account deficit, export volume and ISE industry index. Latter on; Basci and Karaca, (2013) examined the impact of gold prices, exchange rate, imports and exports on stock market development such as gold prices applying variance decomposition approach in the case of Turkey. Their results revealed that imports and exchange rate have significant impact on stock market index. Eita, (2012) invetsiagted the impact of macroecnomic determinats od stock market performace in case Nambia. An increase in economic activity and money supply add in stock market prices but inflation and interest lower it. Nisa and Nishat, (2011) reported that economic growth, real interest rate and fiannacial development are contributor factors in stock prices in Pakistan.

Recently, Shahbaz et al. (2013) investigated the impact of forign direct investment on stock market capitalization in Pakistan by applying bounds testing approach to cointegration. Their results indicated that foreign direct investment and domestic savings have positive impact on stock market capitalization. Jiranyakul, (2013) exmianed the natur of causal relationship between stock market development and industrial development using Thai economy. The empirical results found that stock market development is preditor of industrial development. Zafer et al. (2013) reinvestigated the impct of foreign direct invemsnet, real interest, domestic credit to private sector and trade on stck market perfomrace using Pakistani data. They found that foreign direct invemsnet and tarde openness have positive effect on stock market performance. Alajekwu et al. (2013) probed the impact of economic growth and trade openness on stock market development in case of Nigeria. Their analysis reported that tarde openness and ecnommic growth do not contribute in stock market development and neutral effect is found between stock market development and economic growth and same is true for trade openness and stock market development. Evrim-Mandaci et al. (2013) also reported that foreign direct investment, foreign remittances and financial development contribute to stock market development in emergy markets.

III Data, Empirical Model and Estimation Strategy

III.1 Data and Empirical Model

This study uses annual data for the period of 1974-2010 to test the effect of economic growth, financial development, inflation, investment and trade openness on stock market development. The data on domestic credit to the private sector as a share of GDP, inflation, investment and trade openness as a share of GDP has combed from GoP (2011). International financial statistics (IFS, CD-ROM, 2011) is used to collect data on industrial production index and stock market capitalization[1]. We have transformed all the series into natural log-form to reduce sharpness in data. The log-linear modeling directly provides elasticities and reliable results which will help policy making authorities to understand the impact of macroeconomic variables on stock market development which lead to formulate a comprehensive economic policy to improve the performance of stock market capitalization. The discussion in above literature leads to construct a model for empirical investigation as follows:

$$\ln MC_t = \alpha_1 + \alpha_2 \ln IPI_t + \alpha_3 \ln FD_t + \alpha_4 INF_t + \alpha_5 \ln INV_t + \alpha_6 \ln TR_t + \mu_i \qquad (1)$$

Where MC_t is real stock market capitalization per capita proxy for stock market development, economic growth is proxied by IPI_t i.e. Industrial production index[2], FD_t is financial development measured by real domestic credit to private sector per capita, inflation is indicated by INF_t which is proxied by consumer price index, INV_t is for real investment per capita and openness of economy is

[1] Data is converted into stock market capitalization as share of GDP.

[2] Tang (2009) indicated that industrial production index is good proxy for economic growth that covers actual economic activity in an economy.

measured by per capita real exports plus real imports shown by TR_t . α_1 and μ_i are intercept component and residual term which is supposed to normally distributed.

We hypothesize that economic activity expands during economic prosperity and falls during economic recession or depression. We expect positive relationship between industrial production and future cash flows, and vice versa (Geske and Roll, 1983; Fama, 1990). The impact of financial development on stock market capitalization is either complement or substitute. Financial development and stock market both direct funds to productive investment projects. Following the theory of "Demand for funds" Modigliani and Miller (1958), we argue that sources of finance cannot influence the market value of securities issued by all firms and hence firms can go either to stock market or banking sector to finance their capital with symmetric information in a perfect market. The "Supply of funds" hypothesis reveals a negative relationship between the real interest rate and stock market returns in short run but investors diversify their assets and spread their savings between banking and stock markets in medium and long run. In the real world, dominance of asymmetric and imperfect market is existed. Taxes, subsidies and regulations, debt or equity are used in some countries to distort financing choices. The issue of the relationship between financial development and stock market capitalization is complementary or substitutes investigated by various researches. For example; Boyd and Smith, (1997) argued that banking sector and stock markets play like complements rather than substitutes. Demirguc-Kunt and Levine, (1996) also confirmed that relationship between the banking sector and stock markets is complementary because both growth simultaneously and move in the same direction.

Macroeconomic stability plays a vital role to develop stock market development. We argue that during the higher volatility, economic situation is weakened and people invest less in the stock market due to less incentive both for firms and people. Stock markets become more opaque during high instability as happened in the seventies and eighties in developing countries. It is difficult to judge about stock prices with high standard deviations whether prices change temporary or permanently. In such situation, investors have less incentive to invest in stock markets. This implies that macroeconomic stability boosts stock market capitalization and hence economic activity. It is argued by Bencivenga et al. (1996) that sound stock market has the ability to guarantee adequate liquidity. So, investment in productive projects is encouraged with liquid stock markets. The reason is that savers also want surely to get back their resources when they are needed. Therefore, high liquid stock markets are suitable for portfolio investment and enable firms to obtain funds for long run investment projects. This increases the confidence of investors and they are encouraged to make investment in stock markets because they are accessed to their funds during the whole period of investment. It indicates that liquid stock markets enhance investment which impact economic activity and in resulting, investment enhances stock market capitalization (Demirguc-Kunt and Levine, 1996). Integrated stock markets strengthen the trade-growth nexus via foreign capital inflows, transfer of technology and ideas which impacts stock market development. We may argue that trade openness enhances the foreign capital inflows and diversifies the risk which affects the long term industrial projects and hence stock market capitalization (Udegbunam, 2002). We expect a positive impact of trade openness on stock market capitalization.

III.2 Zivot-Andrews Unit Root Test

Numerous unit root tests are available on applied economics to test the stationarity properties of the variables. These unit tests are ADF by Dickey and Fuller (1979), P-P by Philips and Perron (1988), KPSS by Kwiatkowski et al. (1992), DF-GLS by Elliott et al. (1996) and Ng-Perron by Ng-Perron (2001). These tests provide biased and spurious results due to not having information about structural break points occurred in the series. In doing so, Zivot-Andrews (1992) developed three models to test the stationarity properties of the variables in the presence of a structural break point in the series: (i) this model allows a one-time change in variables at level form, (ii) this model permits a one-time change in the slope of the trend component i.e. function and (iii) model has one-time change both in intercept and trend functions of the variables to be used for empirical propose. Zivot-Andrews (1992) followed three models to check the hypothesis of one-time structural break in the series as follows:

$$\Delta x_t = a + ax_{t-1} + bt + cDU_t + \sum_{j=1}^{k} d_j \Delta x_{t-j} + \mu_t \qquad (2)$$

$$\Delta x_t = b + bx_{t-1} + ct + bDT_t + \sum_{j=1}^{k} d_j \Delta x_{t-j} + \mu_t \qquad (3)$$

$$\Delta x_t = c + cx_{t-1} + ct + dDU_t + dDT_t + \sum_{j=1}^{k} d_j \Delta x_{t-j} + \mu_t \qquad (4)$$

Where the dummy variable is indicated by DU_t showing mean shift occurred at each point with time break while trend shift variables is show by DT_t[3]. So,

$$DU_t = \begin{cases} 1 \ldots if \quad t > TB \\ 0 \ldots if \quad t < TB \end{cases} \text{ and } DU_t = \begin{cases} t - TB \ldots if \quad t > TB \\ 0 \ldots if \quad t < TB \end{cases}$$

[3] We used model-4 for empirical estimations following Sen (2003)

The null hypothesis of unit roots break date is $c = 0$ which indicates that the series is not stationary with a drift not having information about structural break point while $c < 0$ hypothesis implies that the variable is found to be trend-stationary with one unknown time break. Zivot-Andrews unit root test fixes all points as potential for possible time break and does estimation through regression for all possible break points successively. Then, this unit root test selects that time break which decreases one-sided t-statistic to test $\hat{c}(= c - 1) = 1$. Zivot-Andrews intimates that in the presence of end points, asymptotic distribution of the statistics is diverged to infinity point. It is necessary to choose a region where the end points of sample period are excluded. Further, Zivot-Andrews suggested the trimming regions i.e. (0.15T, 0.85T) are followed.

III.3 The Cointegration

The ARDL bounds testing approach to cointegration is used to test a long run relation between the variables developed by Pesaran et al. (2001). This approach has numerous advantages over traditional techniques such Engle and Granger (1987), Johansen and Juselius (1990) and Philips and Hansen, (1990) etc. Traditional approaches to cointegration require that the variables must be integrated at a unique level of integration. The bounds testing approach is flexible in examining order of integration. This approach is applicable if variables have different order of integration i.e. variables integrated at I(1) or I(0) or I(1) / I(0) (Pesaran and Pesaran, 1997). It is pointed by Haug (2002) that the ARDL is useful for small sample data sets by providing better results as compared to traditional cointegration techniques i.e. Engle and Granger (1987), Johansen and Juselies (1990) and Philips and Hansen, (1990).

The bounds testing approach uses linear specification for dynamic error correction model without losing information about the long run relationship (Banerrjee and Newman, 1993). The unrestricted error correction method (UECM) of the ARDL version is used to calculate the F - statistic and empirical equations are as follows:

$$\begin{aligned}\Delta \ln MC_t = {} & \beta_1 + \beta_T T + \beta_{MC} \ln MC_{t-1} + \beta_{IPI} \ln IPI_{t-1} + \beta_{FD} \ln FD_{t-1} + \beta_{INF} INF_{t-1} + \beta_{INV} \ln INV_{t-1} \\ & + \beta_{TR} \ln TR_{t-1} + \sum_{i=1}^{M} \beta_i \Delta \ln MC_{t-i} + \sum_{j=0}^{N} \beta_j \Delta \ln IPI_{t-j} + \sum_{k=0}^{O} \beta_k \Delta \ln FD_{t-l} + \sum_{l=0}^{P} \beta_l \Delta INF_{t-l} \\ & + \sum_{m=0}^{Q} \beta_m \Delta \ln INV_{t-m} + \sum_{n=0}^{R} \beta_n \Delta \ln TR_{t-n} + \mu_i\end{aligned} \quad (5)$$

$$\begin{aligned}\Delta \ln IPI_t = {} & \delta_1 + \delta_T T + \delta_{MC} \ln MC_{t-1} + \delta_{IPI} \ln IPI_{t-1} + \delta_{FD} \ln FD_{t-1} + \delta_{INF} INF_{t-1} + \delta_{INV} \ln INV_{t-1} \\ & + \delta_{TR} \ln TR_{t-1} + \sum_{i=1}^{M} \delta_i \Delta \ln IPI_{t-i} + \sum_{j=0}^{N} \delta_j \Delta \ln MC_{t-j} + \sum_{k=0}^{O} \delta_k \Delta \ln FD_{t-l} + \sum_{l=0}^{P} \delta_l \Delta INF_{t-l} \\ & + \sum_{m=0}^{Q} \delta_m \Delta \ln INV_{t-m} + \sum_{n=0}^{R} \delta_n \Delta \ln TR_{t-n} + \mu_i\end{aligned} \quad (6)$$

$$\begin{aligned}\Delta \ln FD_t = {} & \phi_1 + \phi_T T + \phi_{MC} \ln MC_{t-1} + \phi_{IPI} \ln IPI_{t-1} + \phi_{FD} \ln FD_{t-1} + \phi_{INF} INF_{t-1} + \phi_{INV} \ln INV_{t-1} \\ & + \phi_{TR} \ln TR_{t-1} + \sum_{i=1}^{M} \phi_i \Delta \ln FD_{t-i} + \sum_{j=0}^{N} \phi_j \Delta \ln MC_{t-j} + \sum_{k=0}^{O} \phi_k \Delta \ln IPI_{t-l} + \sum_{l=0}^{P} \phi_l \Delta INF_{t-l} \\ & + \sum_{m=0}^{Q} \phi_m \Delta \ln INV_{t-m} + \sum_{n=0}^{R} \phi_n \Delta \ln TR_{t-n} + \mu_i\end{aligned} \quad (7)$$

$$\begin{aligned}\Delta INF_t = {} & \varphi_1 + \varphi_T T + \varphi_{MC} \ln MC_{t-1} + \varphi_{IPI} \ln IPI_{t-1} + \varphi_{FD} \ln FD_{t-1} + \varphi_{INF} INF_{t-1} + \varphi_{INV} \ln INV_{t-1} \\ & + \varphi_{TR} \ln TR_{t-1} + \sum_{i=1}^{M} \varphi_i \Delta INF_{t-i} + \sum_{j=0}^{N} \varphi_j \Delta \ln MC_{t-j} + \sum_{k=0}^{O} \varphi_k \Delta \ln IPI_{t-l} + \sum_{l=0}^{P} \varphi_l \Delta \ln FD_{t-l} \\ & + \sum_{m=0}^{Q} \varphi_m \Delta \ln INV_{t-m} + \sum_{n=0}^{R} \varphi_n \Delta \ln TR_{t-n} + \mu_i\end{aligned} \quad (8)$$

$$\begin{aligned}\Delta \ln INV_t &= \gamma_1 + \gamma_T T + \gamma_{MC} \ln MC_{t-1} + \gamma_{IPI} \ln IPI_{t-1} + \gamma_{FD} \ln FD_{t-1} + \gamma_{INF} INF_{t-1} + \gamma_{INV} \ln INV_{t-1} \\ &+ \gamma_{TR} \ln TR_{t-1} + \sum_{i=1}^{M} \gamma_i \Delta \ln INV_{t-i} + \sum_{j=0}^{N} \gamma_j \Delta \ln MC_{t-j} + \sum_{k=0}^{O} \gamma_k \Delta \ln IPI_{t-l} + \sum_{l=0}^{P} \gamma_l \Delta \ln FD_{t-l} \\ &+ \sum_{m=0}^{Q} \gamma_m \Delta INF_{t-m} + \sum_{n=0}^{R} \gamma_n \Delta \ln TR_{t-n} + \mu_i\end{aligned} \tag{9}$$

$$\begin{aligned}\Delta \ln TR_t &= \lambda_1 + \lambda_T T + \lambda_{MC} \ln MC_{t-1} + \lambda_{IPI} \ln IPI_{t-1} + \lambda_{FD} \ln FD_{t-1} + \lambda_{INF} INF_{t-1} + \lambda_{INV} \ln INV_{t-1} \\ &+ \lambda_{TR} \ln TR_{t-1} + \sum_{i=1}^{M} \lambda_i \Delta \ln TR_{t-i} + \sum_{j=0}^{N} \lambda_j \Delta \ln MC_{t-j} + \sum_{k=0}^{O} \lambda_k \Delta \ln IPI_{t-l} + \sum_{l=0}^{P} \lambda_l \Delta \ln FD_{t-l} \\ &+ \sum_{m=0}^{Q} \lambda_m \Delta INF_{t-m} + \sum_{n=0}^{R} \lambda_n \Delta \ln INV_{t-n} + \mu_i\end{aligned} \tag{10}$$

Next step is to compare our calculated F-statistic with critical bounds tabulated by Pesaran et al. (2001) to test either cointegration between the variables exists or not. In doing so, hypothesis of no cointegration is $\beta_{MC} = \beta_{IPI} = \beta_{FD} = \beta_{INF} = \beta_{INV} = \beta_{TR} = 0$ inequation-5 against the hypothesis of cointegration is $\beta_{MC} \neq \beta_{IPI} \neq \beta_{FD} \neq \beta_{INF} \neq \beta_{INV} \neq \beta_{TR} \neq 0$. Cointegration is to be found if calculated F-statistic is more than upper critical bound otherwise decision is in favor of no cointegration if lower critical bound is more than calculated F-statistic. The decision about cointegration is questionable if calculated F-statistic lies between upper and lower critical bounds. The stability of ARDL model estimates is tested by applying CUSUM and CUSUMsq tests.

III. 4: VECM Granger Causality

The confirmation of cointegration between the variables leads us to investigate the direction of Granger-causality between the variables. The Granger representation theorem suggests that there will be Granger causality in at least from one direction if there exists a cointegration relationship among the variables provided that the variables are integrated of order one or I(1). Engle and Granger, (1987) cautioned that if the Granger causality test is conducted at first difference through vector auto regression (VAR) method then it will be misleading in the presence of cointegration. Therefore, the inclusion of an additional variable to the VAR method such as the error correction term would help us to capture the long run relationship. To this end, error correction term is involved in the augmented version of Granger causality test and it is formulated in a bi-variate *p*th order vector error-correction model (VECM) which is as follows:

$$\begin{bmatrix} \Delta \ln MC_t \\ \Delta \ln IPI_t \\ \Delta \ln FD_t \\ \Delta INF_t \\ \Delta \ln INV_t \\ \Delta \ln TR_t \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 \\ b_6 \end{bmatrix} + \begin{bmatrix} B_{11,1} B_{12,1} B_{13,1} B_{14,1} B_{15,1} B_{16,1} \\ B_{21,1} B_{22,1} B_{23,1} B_{24,1} B_{25,1} B_{26,1} \\ B_{31,1} B_{32,1} B_{33,1} B_{34,1} B_{35,1} B_{36,1} \\ B_{41,1} B_{42,1} B_{43,1} B_{44,1} B_{45,1} B_{46,1} \\ B_{51,1} B_{52,1} B_{53,1} B_{54,1} B_{55,1} B_{56,1} \\ B_{61,1} B_{62,1} B_{63,1} B_{64,1} B_{65,1} B_{66,1} \end{bmatrix} \times \begin{bmatrix} \Delta \ln MC_{t-1} \\ \Delta \ln IPI_{t-1} \\ \Delta \ln FD_{t-1} \\ \Delta INF_{t-1} \\ \Delta \ln INV_{t-1} \\ \Delta \ln TR_{t-1} \end{bmatrix} + \ldots + \begin{bmatrix} B_{11,m} B_{12,m} B_{13,m} B_{14,m} B_{15,m} B_{16,m} \\ B_{21,m} B_{22,m} B_{23,m} B_{24,m} B_{25,m} B_{26,m} \\ B_{31,m} B_{32,m} B_{33,m} B_{34,m} B_{35,m} B_{36,m} \\ B_{41,m} B_{42,m} B_{43,m} B_{44,m} B_{45,m} B_{46,m} \\ B_{51,m} B_{52,m} B_{53,m} B_{54,m} B_{55,m} B_{56,m} \\ B_{61,m} B_{62,m} B_{63,m} B_{64,m} B_{65,m} B_{66,m} \end{bmatrix} \quad (11)$$

$$\times \begin{bmatrix} \Delta \ln MC_{t-1} \\ \Delta \ln IPI_{t-1} \\ \Delta \ln FD_{t-1} \\ \Delta INF_{t-1} \\ \Delta \ln INV_{t-1} \\ \Delta \ln TR_{t-1} \end{bmatrix} + \begin{bmatrix} \zeta_1 \\ \zeta_2 \\ \zeta_3 \\ \zeta_4 \\ \zeta_5 \\ \zeta_6 \end{bmatrix} \times (ECM_{t-1}) + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \\ \mu_{5t} \\ \mu_{6t} \end{bmatrix}$$

In this framework, difference operator is Δ while m indicates appropriate and optimal lag length following Akaike information criteria (AIC). ECM_{t-1} is lagged residual term obtained from long run cointegration empirical equation[4]. The residual terms are μ_{1t}, μ_{2t} and μ_{3t} normally distributed having zero mean and predetermined covariance matrix. The VECM analysis provides three sources of causation if variables are found to be cointegrated such as (a) short run Granger-causality, (b) long run Granger-causality and joint long-and-short runs (overall) Granger-Causality. This is the main advantage of using a VECM multivariate framework. The joint χ^2-statistic is used

[4] If variables are not cointegrated then ECM_{t-1} is not included in the model to be estimated for Granger causality.

on the 1st difference lagged independent variables to test the direction of short run Granger causality between the variables. For example, $B_{12,m} \neq 0$ and $B_{13,m} \neq 0$, $B_{14,m} \neq 0$, $B_{15,m} \neq 0$ and $B_{16,m} \neq 0$ and $B_{32,m} \neq 0$ indicate that Granger causality is running from economic growth, financial development, inflation, investment and trade openness to stock market capitalization for short run respectively. The long run Granger causality is tested by the t - statistic of ECM_{t-1} with a negative sign. The short-and-long runs Granger causality is investigated by the significance of joint χ^2-statistic on lagged residual term and 1st difference lagged concerned independent variables. For instance, $\zeta_2 \neq 0, \beta_{12,m} \neq 0$ shows that long-and-short runs Granger causality is running from economic growth to stock market capitalization and vice versa. Same inferences can be drawn from other outcomes.

IV. Empirical Results and Discussion

Table-1 reports descriptive statistics and pairwise correlations. The results show that all series are found to be normally distributed. There is a positive association of economic activity, financial development, investment and inflation with stock market development. Trade openness is inversely correlated with stock market development but it is negligible. Economic activity is positively associated with financial development, investment, trade openness and inflation. There is also a positive correlation of trade openness with financial development and investment. A positive correlation is found of inflation with investment and trade openness. Finally, financial development is negatively correlated with investment and inflation.

Table-1: Descriptive Statistics and Correlation Matrix

Variable	$\ln MC_t$	$\ln IPI_t$	$\ln FD_t$	$\ln INV_t$	$\ln TR_t$	INF_t
Mean	11.4898	4.2770	3.2123	12.0154	3.5307	2.0297
Median	11.7047	4.4048	3.2036	12.4209	3.5476	2.0438
Maximum	15.4941	5.5016	3.3944	14.7723	3.6612	3.2832
Minimum	8.2065	3.1864	2.9526	9.0415	3.3221	1.0695
Std. Dev.	2.2604	0.6789	0.1098	1.6807	0.0936	0.4918
Skewness	0.1453	-0.0564	-0.0266	-0.1117	-0.6104	0.1054
Kurtosis	1.8069	2.1126	2.5483	1.7352	2.6308	3.2185
Jarque-Bera	2.2617	1.2001	0.3101	2.4744	2.4403	0.1384
Probability	0.3227	0.5487	0.8563	0.2901	0.2951	0.9331
$\ln MC_t$	1.0000					
$\ln IPI_t$	0.0593	1.0000				
$\ln FD_t$	0.1994	0.0328	1.0000			
$\ln INV_t$	0.1675	0.0826	-0.2417	1.0000		
$\ln TR_t$	-0.0002	0.1854	0.1466	0.0493	1.0000	
INF_t	0.2151	0.2247	-0.0981	0.1872	0.1915	1.0000

Next step is to find out order of integration of the variables before proceeding to the ARDL bound testing approach to cointegration for a long run relationship. In doing so, we used Ng-Perron, (2001) is much suitable for small sample data set and provides efficient results than traditional unit root tests such ADF, DF-GLS and P-P etc. The results are pasted in Table-2 which reveal that investment is integrated at order of I (0) while rest variables have a unit root problem at the level.

At 1[st] stock market development, economic activity, financial development, inflation and trade openness are found to be stationary. This indicates that the variables selected for the empirical estimation in the model are integrated in mixed order of integration. The main problem with Ng-Perron unit root test is that this does not have information about the structural break occurred in the series and may provide spurious results through OLS regression.

Table-2: Ng-Perron Unit Root Test

Variable	MZa	MZt	MSB	MPT
$\ln MC_t$	-9.1117(1)	-2.0931	0.2297	10.1578
$\Delta \ln MC_t$	-23.0968(3)**	-3.3887	0.1467	4.0022
$\ln IPI_t$	-8.5991(2)	-2.0198	0.2348	10.7758
$\Delta \ln IPI_t$	-17.0132(4)***	-2.9136	0.1712	5.3737
INF_t	-9.1913 (1)	-2.1152	0.2301	10.0247
ΔINF_t	-16.6588(0)***	-2.8773	0.1727	5.5222
$\ln FD_t$	-10.9920(2)	-2.3228	0.2113	8.3961
$\Delta \ln FD_t$	-50.9082(3)*	-5.0447	0.0991	1.7921
$\ln INV_t$	-23.6490(3)**	-3.4374	0.1453	3.8604
$\Delta \ln INV_t$	-20.1591(3)**	-3.1734	0.1574	4.5287
$\ln TR_t$	-13.0623(1)	-2.5246	0.1932	7.1477
$\Delta \ln TR_t$	-21.6051(1)**	-3.2853	0.1520	4.2260
Note: *, ** and *** represent significant at 1%, 5% and				

10% level of significance. lag order is shown in parenthesis.

In doing so, we used Zivot-Andrews unit root test to avoid the problem of spuriousness of results due to structural break in the data. The results are reported in Table-3. Results indicate that all the variables are integrated at I(1). These findings are not consistent with the results provided by Ng-Perron (2001). We rely on Zivot-Andrews unit root finds for further analysis. This shows that all the variables have the same order of integration.

Table-3: Zivot-Andrews Structural Break Unit Root Test

Variable	**At Level**		**At 1st Difference**	
	T-statistic	Time Break	T-statistic	Time Break
$\ln MC_t$	-4.219 (0)	1998	-7.027(0)*	1995
$\ln IPI_t$	-4.466(1)	1996	-4.503 (2)***	2000
$\ln FD_t$	-3.240 (0)	2000	-7.502(0)*	2003
INF_t	-4.101(0)	1998	-6.923 (0)*	1981
$\ln INV_t$	-2.868(1)	1991	-4.693(0)***	1993
$\ln TR_t$	-4.517 (0)	1999	-7.740 (0)*	1981
Note: *, ** and *** represent significant at 1%, 5% and 10% level of significance. Lag order is shown in parenthesis.				

This similarity of order of integration of the variables lends support to apply the ARDL bounds testing approach to investigate the long run relationship between the variables. Appropriate lag length of variables is needed to precede the ARDL bound testing approach to cointegration in the presence of structural breaks in the series. The selection of optimal lag length is based on the minimum values of both AIC and SBC criterion. The optimal lag length is reported in row-3 of Table-4 and it is 1 if we follow FPE, SBC and HQ and otherwise 2 following AIC.

Table-4: Lag Length Criteria

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SBC	HQ
0	30.03332	NA	9.80e-09	-1.413724	-1.144367	-1.321866
1	211.6160	288.3960*	1.94e-12*	-9.977412	-8.091908*	-9.334401*
2	249.9283	47.32694	2.09e-12	-10.11343*	-6.611778	-8.919265

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table-5: The Results of ARDL Cointegration Test

Bounds Testing to Cointegration						
Dependent Variable	$\Delta \ln MC_t$	$\Delta \ln IPI_t$	$\Delta \ln FD_t$	ΔINF_t	$\Delta \ln INV_t$	$\Delta \ln TR_t$
Optimal Lag Length	1, 1, 1, 1, 0, 1	1, 1, 0, 1, 1, 1	1, 1, 0, 1, 1, 1	1, 1, 1, 1, 0,1	0, 1, 1, 1, 1, 1	1, 1, 1, 1, 0, 0
F-statistics	9.9977**	2.9276	8.9986**	10.0410**	3.1233	8.4537**

Structural Break	1998	1996	2000	1998	1991	1999
	Critical values (T = 36)					
	Lower bounds $I(0)$	Upper bounds $I(1)$				
1 per cent level	10.150	11.230				
5 per cent level	7.135	7.980				
10 percent level	5.915	6.630				
R^2	0.8274	0.7414	0.8609	0.8920	0.7003	0.8858
Adjusted-R^2	0.6056	0.4090	0.6820	0.7531	0.3818	0.7564
AIC	-0.1961	-3.5678	-3.4530	-0.4397	-1.7225	-3.3632
F-statistic	3.7308	2.2305	4.8140	6.4239	2.1990	6.8475
Prob(F-statistic)	0.0080	0.0665	0.0023	0.0005	0.0611	0.0003

The long run relationship between stock market development, economic growth, financial development, investment, trade openness and inflation is investigated by testing a joint significance F-test for the null hypothesis of no cointegrating i.e. $H_0: \alpha_{MC} = \alpha_{IPI} = \alpha_{FD} = \alpha_{INV} = \alpha_{TR} = \alpha_{INF} = 0$, $H_0: \beta_{MC} = \beta_{IPI} = \beta_{FD} = \beta_{INV} = \beta_{TR} = \beta_{INF} = 0$, $H_0: \delta_{MC} = \delta_{IPI} = \delta_{FD} = \delta_{INV} = \delta_{TR} = \delta_{INF} = 0$, $H_0: \phi_{MC} = \phi_{IPI} = \phi_{FD} = \phi_{INV} = \phi_{TR} = \phi_{INF} = 0$, $H_0: \varphi_{MC} = \varphi_{IPI} = \varphi_{FD} = \varphi_{INV} = \varphi_{TR} = \varphi_{INF} = 0$ and $H_0: \vartheta_{MC} = \vartheta_{IPI} = \vartheta_{FD} = \vartheta_{INV} = \vartheta_{TR} = \vartheta_{INF} = 0$. The calculated PSS (2001) F-statistics for long run relationship between the variables cointegration i.e. $F_{MC}(MC/IPI, FD, INV, TR, INF)$ = 9.9977, $F_{FD}(FD/IPI, MC, INV, TR, INF)$ = 8.9986, and $F_{INF}(INF/MC, IPI, INV, TR, FD)$ = 10.0410 and $F_{TR}(TR/MC, IPI, INV, FD, INF)$ = 8.4537 are higher than upper critical bound (7.980) at 5% level of significance generated by Narayan, (2005). These findings validate the existence of long run association between the running variables in the presence of structural breaks stemming in the series for the period 1974-2010 in case of Pakistan.

The existence of long run relationship between the variables leads us to interpret the marginal effects of independent variables on stock market development. The results are reported in Table-6. The empirical analysis indicates that there is positive relationship between economic growth and stock market development and it is statistically significant at 5% level of significance. This shows that a 1% increase in economic growth propels the stock market development by 0.1043%, all else is same. These findings are consistent with the view by Garcia and Liu, (1999) who reported that stock market development is propelled by economic growth via savings-enhancing effect. The effect of inflation is positive and statistically significant on stock markets development. The results report that 1% increase in inflation will lead stock market development by 0.5801%, by keeping other things constant. This finding is same with the view reported by Shahbaz, (2007) that stocks act as good hedge against inflation in Pakistan and findings should help to formulate appropriate policy to encourage investment in financial markets which in resulting stimulate economic growth.

The positive association is found from financial development to stock market development and it is statistically significant at the 5% level of significance. It is reported on the basis of our results that market capitalization is increased by 0.1358% due to a 1% increase in domestic credit to the private sector as a share of GDP (financial development). This implies that financial development propels stock market development directly through monitoring of managers and exertion of corporate control (Romano, 2002), the provision of liquidity to absorb shocks by firms (Kiyotaki and Moore,

1997) indirectly through controlling macroeconomic volatility (Aghion et al. 1999) and restructuring the production process and trade prototype (Helpman and Razin, 1978). The positive impact of financial development on stock market development validated the view by Garcia and Liu, (1999) and Harris and Martin, (2002).

Table-6: Long Run Elasticities

Dependent Variable = $\ln MC_t$				
Variable	Coefficient	Std. Error	T-Statistic	Probability
Constant	-3.3347	2.6422	-1.2620	0.2166
$\ln IPI_t$	0.1043	0.4621	2.2573	0.0314
INF_t	0.5801	0.1350	4.2953	0.0002
$\ln FD_t$	0.1358	0.6546	2.0750	0.0467
$\ln INV_t$	0.9571	0.1724	5.5499	0.0000
$\ln TR_t$	-0.1891	0.7346	-2.5748	0.0152
R-Squared = 0.9863 Adjusted R-Squared = 0.9841 S.E. of Regression = 0.2847 Akaike info Criterion = 0.4769 Schwarz Criterion = 0.7408 F-Statistic = 434.9750 Prob(F-statistic) = 0.0000 Durbin-Watson = 1.6343				

Robustness Checks		
Diagnostic Tests	Test-Statistics	Prob-Value
χ^2 *NORMAL*	3.2637	0.1955
χ^2 *SERIAL*	0.5325	0.5929
χ^2 *ARCH*	0.1208	0.7304
χ^2 *WHITE*	0.9408	0.4690
χ^2 *REMSAY*	4.4472	0.0049

The impact of investment is found to be positive on stock market capitalization which implies that investment stimulates development of stock markets in Pakistan. Our analysis indicates that investment has dominated effect and a good predictor of stock market development. It is found that a 1% increase in investment activities will raise stock markets i.e. stock market development by 0.957% and it is statically significant at 1% level of significance. Surprisingly, effect of trade openness on stock market development is negative and significant at 5% level of significance. A 1% rise in trade openness declines development of stock market by 0.189% if other things are considered being equal. This implies that trade openness affects stock market development via portfolio investment. The portfolio investment directly affects stock market development. The portfolio investment in Pakistan is negligible and is insufficient to promote the performance of stock market development in the country. Indirectly, foreign direct investment also promotes stock market development through economic growth-enhancing effect (Shahbaz et al. 2013). The situation of capital outflow is deteriorating in case of Pakistan day-by-day due to adverse situation of governance, law and order, improper implementation of economic policies, political instability and terrorism in the country. This situation has not only increased capital outflow in the country by distorting trust of both local and foreign investors but also nullified positive effects of trade openness on stock market capitalization. It is empirically reported by Shahbaz et al. (2010) that if 1 rupee of domestic savings is going to finance domestic investment while capital going abroad for more profitable ventures is equivalent to rupee 1.35. The perpetual outflow of capital would also keep the current account in deficit. The worrisome situation is that more 45 percent foreign direct investment has been declined in Pakistan during 2008-09 to 2009-10 (GoP, 2010). All these channels tend to restrict to attain benefits from trade openness to market capitalization and hence stock market development in the country.

After the investigation of long run effects of determinants of stock market development, next step is to analyse short run dynamic impact independent variables on dependent variable i.e. stock market capitalization. The results are reported in Table-7. The significance of ECM_{t-1} validates established cointegration between the variables of concern which implies that variations in stock market development are function of variation in forcing variables and the levels of disequilibrium in cointegration relationship (Bannerjee et al. 1998). It intimates us the rate of spend of adjustment from short run towards long run equilibrium path every year. Our results reveal that the estimate of ECM_{t-1} is equalant to -0.741% and implies that any change in short run towards long run stock market capitalization is corrected by 74.14% per year.

Table-7: Short Run Elasticities

Dependent Variable = $\Delta \ln MC_t$				
Variable	Coefficient	Std. Error	T-Statistic	Probability
Constant	0.0306	0.1169	0.2620	0.7954

$\Delta \ln IPI_t$	0.4498	1.2392	0.3630	0.7195
$\Delta \ln FD_t$	0.14442	0.6771	2.1328	0.0425
$\Delta \ln FD_{t-1}$	0.7908	0.3423	2.3103	0.0291
ΔINF_t	0.4345	0.1519	2.8594	0.0083
$\Delta \ln INV_t$	0.8082	0.3412	2.3683	0.0256
$\Delta \ln TR_t$	-0.0863	0.0434	-1.9871	0.0575
ECM_{t-1}	-0.7413	0.2269	-3.2659	0.0031
R-Squared = 0.5770 Adjusted R-Squared = 0.4631 S.E. of Regression = 0.2175 Akaike info Criterion = -0.0100 Schwarz Criterion = 0.3491 F-Statistic = 5.0669 Prob(F-statistic) =0.0010 Durbin-Watson = 2.0590				
Robustness Checks				
Diagnostic Tests	Test-Statistics		Prob-Value	
	0.9252		0.6296	
$\chi^2 NORMAL$	0.2512		0.7798	
$\chi^2 SERIAL$	0.2889		0.5948	
$\chi^2 ARCH$	0.3741		0.9091	
$\chi^2 WHITE$	0.0406		0.8419	

χ^2 *REMSAY*		

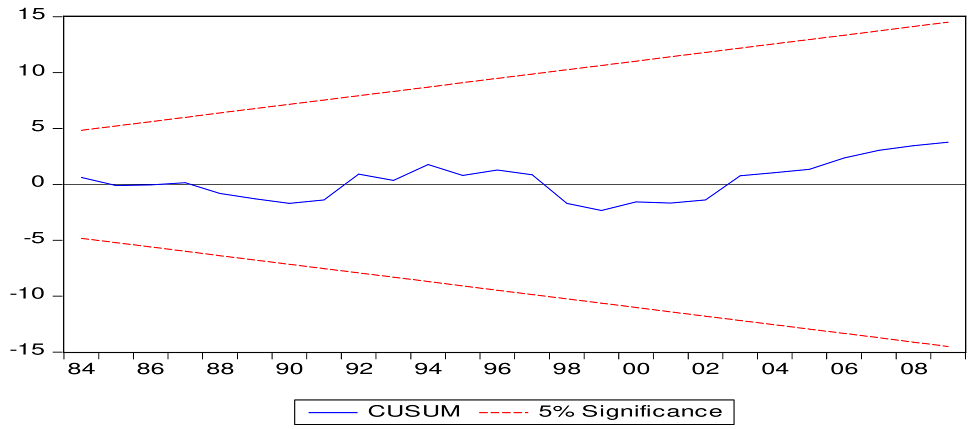
The results reported in Table-7 indicate that a rise in economic growth has positive but insignificant affect on stock market development. Inflation is positively linked with stock market development and it is statistically significant at 1% significance level. The differenced and lagged differenced terms of financial development promote stock market capitalization at 5% level of significance. An increase in investment improves performance of stock markets by promoting market capitalization and has dominated effect. The impact of trade openness is negative and it is statistically significant at 10% significance level.

Stability Test

For stability of long and short run coefficients, we apply the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMsq) test. Figures 1 and 2 present the graphs of the CUSUM and CUSUMsq tests. Following Bahmani-Oskooee and Nasir (2004), the equation appear correctly specified. The stability of the ARDL model can also be evaluated using the CUSUM and the CUSUMsq of the recursive residual test (*see* Bahmani-Oskooee and Nasir, 2004).

Figure-1

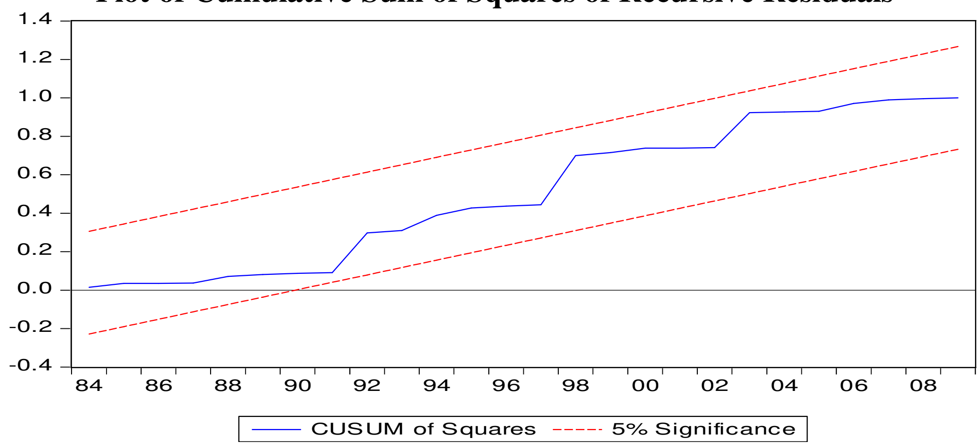
Plot of Cumulative Sum of Recursive Residuals



The straight lines represent critical bounds at 5% significance level.

Figure-2

Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level.

Both graphs show that our ARDL estimates are stable and model is correctly specified.

VECM Granger Causality Analysis

The existence of cointegration between the variables leads us to perform Granger causality tests to detect the direction of causal relationships. The direction of causality between the variable enables the policy makers to formulate comprehensive economic policy to improve the performance of stock markets in the country. In doing so, we use the VECM multivariate framework Granger causality to analyze the casual relationship between economic growth, financial development, inflation, investment, trade openness and stock market capitalization. We assess the five well-matched hypotheses such growth-stocks hypothesis, finance-stocks hypothesis, inflation-stock hypothesis, investment-stocks hypothesis and trade-stocks hypothesis. The main advantage of the VECM Granger causality approach is that it provides evidence about short run and long run as well. The significance of ECM_{t-1} with negative sign indicates long run causality and for short run causality, joint significance LR test of the lagged independent actors is used.

Our empirical results regarding the direction of causality suggest that the ECM_{t-1} coefficients have negative signs with statistical significance in all the VECMs except in growth-equation. In a stock market equation, it is reported that economic growth, financial development, inflation, investment and trade openness Granger cause stock market development. Financial development is Granger caused by stock market development, economic growth, inflation, investment and trade openness. Stock market development, economic growth, financial development, investment and trade openness contribute to Granger cause inflation and investment is Granger caused by stock market capitalization, financial development, economic growth, inflation and trade openness. Finally, stock market capitalization, economic growth, financial development, inflation and investment Granger cause trade openness.

Overall our results indicate that the unidirectional causal relation is found running from economic growth to stock market capitalization in long run. This finding is contradictory with view by Shahbaz et al. (2008) who reported that stock market development and economic growth Granger cause each other. The findings may be biased due to omission of relevant variables[5]. Economic growth Granger-causes financial development is again contradictory with findings by Butt et al.

[5] Shahbaz et al. (2008) used bivariate system to investigate causality between economic growth and stock market development using real GDP per capita and share market prices respectively.

(2006). Butt et al. (2006) indicated that in case of Pakistan, supply-side hypothesis is found[6]. Inflation Granger causes economic growth in short while economic growth Granger causes inflation in long run. The bidirectional financial development and stock market capitalization reveals that both financial markets are interdependent. Trade openness Granger causes inflation in short run as well as in long run which implies that trade openness plays like safety-wall against inflation in Pakistan while the rise in inflation declines share of trade through the reduction in exports. It implies that an increase in inflation raises cost of production that leads to a decline in production and exports are decreased and hence trade share is lowered. Results indicate that financial development and investment Granger cause each other. This shows that financial development offers loans at cheaper interest rate and promotes investment activities and economic growth is promoted and in return, an increase in economic growth raises the demand for loans and enhances the trust of investors on financial services and performance of banks is increased due investment-friendly policies by financial sector that indices financial development.

Table-8: Long and Short Run Granger Causality Analysis

Variables	Short-run						Long-run
	$\sum \Delta \ln MC_t$	$\sum \Delta \ln IPI_t$	$\sum \Delta \ln FD_t$	$\sum \Delta INF_t$	$\sum \Delta \ln NV_t$	$\sum \Delta \ln TR_t$	ECM_{t-1}
	F-statistics [p-values]						t-statistics
$\sum \Delta \ln MC_t$	….	0.6613 [0.5266]	3.7873 [0.0394]**	4.8206 [0.0189]**	1.2061 [0.3193]	1.1074 [0.3489]	-0.6768** [-2.1790]
$\sum \Delta \ln IPI_t$	0.7161 [0.5002]	….	0.1799 [0.8366]	2.7347 [0.0880]***	0.2848 [0.7550]	1.8457 [0.1826]	….

[6] The causality running from financial development to economic growth is considered as supply-side hypothesis.

$\sum \Delta \ln FD_t$	0.4338 [0.6540]	2.3907 [0.1160]	….	0.5932 [0.5615]	3.7623** [0.0401]	3.1687*** [0.0627]	-0.8014* [-3.1342]
$\sum \Delta INF_t$	0.7781 [0.4721]	0.4433 [0.6478]	1.7767 [0.1937]	….	1.9647 [0.1651]	4.2538** [0.0281]	-0.1268* [3.19849]
$\sum \Delta \ln NV_t$	1.0168 [0.3789]	0.4170 [0.6643]	2.8514*** [0.0803]	0.3797 [0.6887]	….	0.0844 [0.9193]	….
$\sum \Delta \ln TR_t$	4.0426** [0.0327]	1.9845 [0.1624]	1.7811 [0.1930]	4.6709** [0.0210]	0.1484 [0.8629]	….	-0.1040* [-3.6789]

The bidirectional causality between inflation and stock market capitalization is found and same inference can be drawn between inflation and financial development. This implies that a rise in inflation will lower performance of financial markets while sound and developed financial markets declines inflation through production-enhancing effect. The feedback hypotheses are also found between inflation and investment, investment and trade openness, stock market capitalization and investment, financial markets (banks and stock markets) and trade openness etc. Overall, the results of Granger causality analysis are in conformity with the cointegration, long-run and short-run results.

Table-9: Short and Long run Joint Granger Causality

Dependent Variable	Short and Long run Joint Granger Causality					
	$\sum \Delta \ln MC_t, ECM_{t-1}$	$\sum \Delta \ln IPI_t, ECM_{t-1}$	$\sum \Delta \ln FD_t, ECM_{t-1}$	$\sum \Delta INF_t, ECM_{t-1}$	$\sum \Delta \ln NV_t, ECM_{t-1}$	$\sum \Delta \ln TR_t, ECM_{t-1}$
	F-statistics [p-values]					
$\sum \Delta \ln MC_t$	….	4.7403** [0.0112]	3.2391** [0.0392]	3.8583** [0.0241]	4.1513** [0.0186]	3.5772** [0.0312]
$\sum \Delta \ln FD_t$	5.2169* [0.0075]	8.3863* [0.0007]	….	6.0790* [0.0038]	3.5013** [0.0334]	5.6262* [0.0054]
$\sum \Delta INF_t$	10.2349* [0.0002]	8.7028* [0.0006]	6.0566* [0.0039]	….	10.8863* [0.0002]	12.1717* [0.0001]
$\sum \Delta \ln TR_t$	6.9331* [0.0020]	10.0841* [0.0003]	4.7866** [0.0108]	6.4041* [0.0030]	4.6914** [0.0117]	….

The results of short-and-long run joint causality are reported in Table-9 which is actually part of Table-8. The findings are conformity with long and short run results found by OLS and ECM approaches. The bidirectional causal relationship is confirmed between inflation and financial markets (banks and stocks), financial sector and stock markets, trade openness and stock market capitalization, financial development and investment, investment and market capitalization, investment and trade openness and, trade openness and inflation while economic growth Granger causes stock market development and financial envelopment in long run while investment, inflation and trade openness both in short-and-long runs. The VECM Granger causality analysis also reveals that economic growth, financial development, inflation, investment and trade openness are stimulators to improve the performance of stock market development.

Conclusions and Policy Implications

Financial markets i.e. stock markets are considered are very important factor in economic activity and hence in economic growth and, macroeconomic environment can affect the development of stock markets. In doing so, this study has explored major determinants of stock market development in case of Pakistan using annual frequency data for the period of 1974-2010. To analyze the impact of macroeconomic variables on stock market capitalization, the ARDL bounds testing approach to cointegration and VECM granger causality have been applied while Zivot-Andrews structural break unit root test is used to test the order of integration of the variables.

Our results confirmed cointegration amongst the variables. It is found from our analysis that economic growth improves the performance of stock markets. Inflation and financial development have a positive effect on stock market capitalization. Investment is a major contributor to increase market capitalization in Pakistan. Trade openness is inversely linked with stock market development. The VECM Granger causality analysis confirmed the validation of feedback hypothesis between financial development and stock market capitalization, inflation and stock market development, stock market capitalization and investment, trade openness and stock market capitalization, investment and financial development, inflation and investment, inflation and trade openness while unidirectional causality is also found from economic growth to stock market development, financial development, inflation, investment and trade openness.

In the context of policy implications, this study suggests that government should regulate financial sector especially stock markets to optimal fruits of trade openness. Side by side, government must also provide incentives to foreigners for investment as foreign direct investment also enhances stock market capitalization which not only promotes economic activity but also develops capital markets.

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