The determinants of economic growth in Pakistan: Does stock market development play a major role?

Mohammad Mafizur Rahman
School of Accounting, Economics and Finance
Faculty of Business
University of Southern Queensland, Australia
Email: rahman@usq.edu.au

and

Mohammad Salahuddin
School of Business Studies
Faculty of Business
Southeast University, Bangladesh
Email: salahuddin0000@yahoo.com

Abstract:

This paper provides an empirical analysis of relationship between economic growth and its determinants with special focus on the stock market development in Pakistan. Using data for the period from 1971 to 2006 we have employed **FMOLS** and **ARDL** bounds-testing for the long run relationship and ECM for the short run dynamics. The findings suggest a positive relationship between efficient stock market and economic growth both in short run and long run. Financial instability and inflation have negative effect, and human capital and foreign direct investment have positive effect on growth. The results are consistent with the theoretical predictions.

Key Words: Stock Market Development, Economic Growth, Co-integration

JEL Classifications: N2, E2, C32

1. Introduction

There exist ample literature on economic growth and its determinants. Recent developments in growth theory have been primarily theoretical although significant progress has also been made in growth empirics. Among the determinants of economic

growth, stock market development is increasingly becoming an important factor to impact upon it. The importance of stock markets lies in the contributions of it. Some of the facts in regard to the relationship between financial markets development and economic growth extensively discussed in the literature are as follows. First, at the initial stages of economic development, financial markets are undeveloped and very small in their magnitude. During these stages, financial markets are primarily dominated by banks and other similar types of financial intermediaries. There is almost no role of stock markets or, even if they exist in any form, their size is negligible. Second, when financial intermediaries expand with capital accumulation, the number of sophisticated and more tailored financial instruments increases, as do the level of sophistication and complexity of financial contracts and the flow of resources and funds accruing to the financial market. Stock markets start developing both in terms of the number of listed firms and market capitalization. Third, when the economy continues to grow, equity markets develop further as well as the banking system. Similarly, other financial intermediaries also develop. Fourth, researchers recognize the common view that the stock markets appear to develop in a non-monotonic ways. In economies where stock markets are relatively small, capital accumulation seems to be followed by a relative increase in banks' share in the financial system and in economies where the stock market has already reached a reasonable size, further development of the market causes an increase in the equity markets' share. In other words, evidence shows that the equity/debt ratio first decreases and, only with further development of the stock market, this ratio increases.

The phenomenal growth of equity markets during recent past along with the staggering growth in emerging equity markets have turned the focus of new literature towards the linkage between stock market performance and growth of an economy. However, there exists very little empirical evidence on the relationship between stock market development and long run economic growth. In the developing and emerging markets like Pakistan such evidence is almost zero with the exception of one study by Levine and Zervos (1998). Hence the importance of this study is justified.

The objective of this paper is to examine the effects of various determinants on economic growth with special focus on the effect of stock market development on it in Pakistan both in the short run and the long run. To the best of our knowledge, ours is the first attempt that undertakes a study where **ARDL**-bounds testing (Autoregressive Distributive Lag Model) is applied utilizing the small time series data covering the period from 1971-2006. Hence it is a contribution to the existing literature.

The rest of the paper is organized as follows; section **2** reviews the literature, section 3 explains the model, data and methodological framework, section 4 presents the results and interpretations; and section 5 deals with conclusions and policy implications.

2. Literature Review

Since recently, there has been significant progress in growth empirics. Most of the developments are concerned with the estimation of cross country and time series growth equations and the methodology used is based on standard growth accounting. A more recent approach is concerned with estimating growth equations using panel data. Traditional growth determinants include variables such as financial development, factor productivity, savings, investment, inflation rate, FDI, literacy rate etc. The relationship between growth and these variables are well-established empirical facts. Most of the recent explanations of economic growth focus on achieving growth through increases in factor productivity and/or factor utilization. Since the main focus of this study is to examine the relationship between stock market development and economic growth, this section is dedicated to the review of available literature on this relationship.

Levine and Zervos (1998) showed a positive and significant correlation between stock market development and long run economic growth in their study of 47 countries. However, their study relies on a cross-sectional approach with well known empirical limitations. Theoretically, the conventional literature on growth was not adequate to explore the relationship between financial markets and economic growth due to the fact that it is primarily focused on the steady-state level of capital stock per worker or productivity, but not on the rate of growth, that is, in fact, endorsed to exogenous technical progress. The growing interest of recent literature in the link between financial

development and growth stems from the insights of endogenous growth models, in which growth is self-sustaining and influenced by initial conditions. In this framework, the stock market is shown not only to have level effects but also rate effects.

Nevertheless, a debate now exists within this framework. On one side, the view is that stock markets promote long-run growth. Greenwood and Smith (1996) argue that stock markets lower the cost of mobilizing savings facilitating investments into the most productive technologies and diversifying the risks. Obstfeld (1994) indicates that international risk sharing through internationally integrated stock markets improve resource allocation and accelerate growth. Bencivenga, et. al. (1996) and Levine and Renelt (1992) suggested that stock market liquidity plays a major role in economic growth. While on the other, profitable investments require long run commitment of capital savers prefer not to give up control of their savings for long periods (Holmstrom and Tirole, 1993) [1].

Considerable amount of literature suggest that the development of stock markets is positively related with the level of economic development and accumulation of capital. This conclusion unequivocally support the idea that as economies develop equity markets tend to expand both in terms of the number of listed companies and in terms of market capitalization [Atje and Jovanovich, (1993); Korajczyk, (1996); Demirguc-Kunt and Maksimovic, (1996); Levine and Zervos, (1998) and Blackburn et, al (2005)]. However, these findings have not indicated a direct and monotonic expansion of the share of equity markets in the financial system. In fact, the development of equity markets always appears to be preceded and accompanied by the general expansion of the overall efficient financial system. Therefore, the co-evolution of real and financial variables is a complex and multifaceted phenomenon. In reality, the expansion of stock markets generally follows the development of commercial banks and other financial intermediaries, which, in many cases, continues as equity markets expand [Korajczyk, (1996); Demirguc-Kunt

[1] Liquid equity markets alleviate this fear by providing assets to savers those are easily liquidated at any time, simultaneously allowing firms permanent access to capital that are raised from equity issues. Liquidity has also been argued to increase investor incentive to acquire information on firms and improve corporate governance and thereby facilitating growth

and Maksimovic, (1996); Levine and Zervos, (1998) and Blackburn et, al (2005)]. This development builds an apparently puzzling situation: an expanding equity market along with a development of financial system persistently dominated by banks and their innovative products. Yet, if the evidence often appears to be incomprehensible, and in many circumstances very hard to interpret, some simple general stylize facts about the correlation between financial development and economic growth can be drawn from the empirical literature [Levine and Renelt, (1992); Roubini and Sala-i-Martin, (1991)].
Furthermore, Atje and Jovanovich (1993) have concluded that there is strong positive correlation between the level of financial development and stock market development and economic growth. Levine and Zervos (1998) also emphasize on the fact that stock market liquidity measured as the value of stock traded relative to the size of the market and the size of the economy is significantly and positively related to the rate of economic growth. They also suggest that the level of banking development measured as the ratio of bank loans to the private sector to GDP, is directly related with the level of economic growth. This similarity of significance in stock market development in the course of economic growth is also confirmed by Beck and Levine (2001); and they argue that the expansion of both banks and stock markets significantly affects growth.

Some general stylized facts about the development of equity markets can be drawn from the literature. Demirgüç-Kunt and Maksimovic (1996) confirm that stock markets do not develop in a monotonic way, neither, does the development of equity markets directly crowd out the banking sector and other financial intermediaries. Rather, the dynamics of equity markets seem to depend on the level of economic development and on the level of the stock market development itself. In specific terms, when economies have small and underdeveloped stock markets, capital accumulation leads to an increase in the share in the economy of debt and bank financing. Therefore, during the course of economics development, stock markets also develop further. This development of stock markets leads to a relative increase of equity financing in the economy. In other words, given that the stock market development depends on growth, the bank debt/equity ratio in the economy tends to increase at low levels of capital accumulation and to decrease only when stock markets have reached a reasonable size [Atje and Jovanovich (1993);

Demirgüç-Kunt and Maksimovic, (1996); Levine and Zervos (1998); and, Beck and Levine (2001)]. It is also mentioned that partial compensation in company stocks mitigated the severe principal agent problems. The relationship is non monotonic. As the number of shareholders with voting rights increases, the diffused ownership makes corporate control more difficult. Financial markets are also considered as effective and efficient channels of savings mobilization. Stock markets establish a market place where investors are inclined and comfortable to give up control of their savings. A large fraction of small investors participate in stock market due to small denomination of securities.

Demirgüç-Kunt and Maksimovic, (1996) also argue that at initial stages of economic development, the expansion of stock markets increases both the opportunity for risk sharing and the flow of information in the market. These, in turn, allow firms easy and cheap access to bank loans and to increase the level of leverage. However, at the later stage as stock markets develop further, issuing equity becomes more convenient because of the declining costs and firms substitute equity for debt. Pagano et, al, (1998) conclude that because of trading externalities in the market and the deliberate behavior of listing companies, the size of the stock market is critical in explaining its own development. Indeed, it will increase the risk sharing opportunities through risk portfolio diversification when firm raise capital from equity financing.

The role of stock market in improving informational asymmetrics has been questioned by Stiglitz (1985). It is argued that stock markets reveal information through rapid price changes creating a free rider problem that reduces investors' incentives to initiate costly search. There are also some doubts in regards to contribution of liquidity itself to long-term growth. It is indicated that increased liquidity may prevent growth in three ways. Firstly, it may reduce saving rates through income and substitution effects. Secondly, by reducing uncertainty associated with investments, greater stock market liquidity may reduce saving rates because of the ambiguous effects of uncertainty on savings. Thirdly, stock market liquidity encourages investors' shortsightedness negatively affecting corporate governance and thereby reducing growth. The ex post monitoring of management and exertion of corporate control also induces the need for financial

intermediaries. This is the focus of the costly state verification literature (Williamson, 1987). The monitor need not be monitored when his asset holdings are perfectly diversified (Diamond, 1984). Stock markets, in fact, allow better corporate control. Equity capital introduces a new possibility of aligning interests between the management and the ownership of the firm.

3. Model, Data and Methodological Framework

To assess the relationship between stock markets' development, and economic growth in a small developing economy like Pakistan, we utilize log-linear model as follows:

$$LGNPPC = \alpha_{\circ} + \beta_1 MC + \beta_2 LFD + \beta_3 LFNFD + \beta_4 LINF + \beta_5 LFDI + \beta_6 LLTR + \varphi_i \qquad (1)$$

Where;
$LGNPPC$ =Log of real GNP per capita, MC = Market Capitalization (the amount of capital as share of GDP proxied by stock market development) LFD = Log of Financial Development (proxied by credit to private sector as share of GDP), $LFNFD$ = Log of Financial Instability (measured by standard deviation of the inflation rates), $LINF$ = Log of Inflation Rate, $LFDI$ = Log of Foreign Direct Investment (in millions of dollars) as share of GDP, $LLTR$ = Log of Literacy Rate (the ratio of the number of people completing primary education to total population). The reason for taking log is that taking the natural logarithm of a series effectively linearizes the exponential trend (if any) in the time series data since the log function is the inverse of an exponential function (Asteriou and Price, 2007).

Table-1

Theory Intuition and Expected Signs

Variable	Theory intuition	Expected sign
Market Capitalization	Improvement in the efficiency and size of stock markets will circulate as cholesterol in the process of economic growth positively.	+
Financial Development	The expected sign of increase in credit to private sector spurs the economic activity in the economy through their causal channels.	+
Financial Instability	Financial instability induces to decline the investment activities directly and indirectly that deters the economic growth	-
Inflation Rate	Inflation measures the monetary instability that affects the economic performance through its detrimental impacts.	-
Foreign Direct Investment	Economic growth is expected to be influenced positively by FDI alongwith spillover effects through employment generating process.	+
Literacy Rate	Higher literacy rate improves the efficiency of an economy by providing more productive labor force.	+

Annual data of all variables have been collected from World Development Indicators database (WDI, 2006), World Bank, Economic Survey of Pakistan (2006), and International Financial Statistics (IFS, 2006).

Descriptive statistics and correlation matrix of the variables of our selected model are expressed in Table 2a and 2b respectively.

Table-2a
Descriptive Statistics

Variables	Real GNP Per Capita	Market Capitalization	Credit-Private	FDI	Financial Instability	Inflation	Literacy Rate
Observations	**36**	**36**	**36**	**36**	**36**	**36**	**36**
Std. Dev.	0.356	4.226	0.128	0.942	1.264	0.549	0.236
Skewness	-0.150	2.684	-0.559	-0.649	-0.319	0.192	-0.188
Kurtosis	3.259	10.697	3.687	2.605	2.308	2.653	1.912
Sum	332.880	88.462	115.192	-32.151	-131.818	71.733	123.360
Sum Sq. Dev.	4.319	607.466	0.562	30.179	54.395	10.250	1.901

Table 2b

Correlation matrix

Real GNP per capita	**1.000**						
Market Capitalization	0.7303	**1.000**					
Credit-Private	0.7718	0.4207	**1.000**				
FDI	0.8397	0.5518	0.6083	**1.000**			
Financial Instability	-0.5058	-0.3936	-0.3458	-0.4959	**1.000**		
Inflation	-0.5194	-0.1804	-0.5228	-0.2538	0.1444	**1.000**	
Literacy Rate	0.9252	0.6873	0.7100	0.8673	-0.3781	-0.4090	**1.000**

Methodological Background

Unit Root Tests

We conduct three unit root tests namely, the augmented Dickey Fuller (ADF), Phillips-Peron (PP) and Kwiatkowski, Philips, Schmidt and Shin (KPSS) tests. The difference between the ADF and the KPSS test is that while the former obtains the test statistic under the null of nonstationarity, the latter assumes the null of stationarity to run the test. As for the ADF test, one can reject the null hypothesis in only 13 out of 40 cases. On the other hand, the KPSS test rejects the null hypothesis of stationarity in 20 out of 40. Literature reveals that ADF and P-P tests do have low explaining power especially in

small sample data set. Shift has been focused to Kwiatkowski, Philips, Schmidt and Shin (1992)[2] to investigate the order of integration for concerned actors in the model.

ARDL Approach for Co-integration

This paper applies recently developed the autoregressive distributed lag model (ARDL) approach introduced in Pesaran *et al*. (2001) in order to investigate long run relationship between stock market development and economic growth in Pakistan. Traditionally, the cointegration approach has widely been used to establish long–run relationship among certain variables. The method of cointegration requires that variables be integrated of the same order. If the order of integration among variables is not the same, then long–run relationship among them can not be established. The order of integration is, however, established by using unit root tests which might suffer from low powers failing to reject the null of nonstationarity. Moreover, the results of these tests largely depend on the choice of optimal lag length, which can not be conclusively determined. The ARDL model overcomes this problem by introducing bounds testing procedure to establish long run relationship among variables. It does not require, as such, that variables of interest have the same order of integration to model long run relationship.

The first advantage of ARDL is that it can be applied irrespective of whether underlying regressors are purely *I(0)*, purely *I(1)* or mutually co-integrated (Pesaran and Shin, 1999). The second advantage of using the bounds testing approach to Co-integration is that it performs better than Engle and Granger (1987), Johansen (1991) and Philips and Hansen (1990) co-integration test in small samples. The third advantage of this approach is that, the model takes sufficient number of lags to capture the data generating process in a general-to-specific modeling framework . Finally, ARDL is also having the information about the structural break in time series data.

Under certain environment, Pesaran and Smith (1995) later PSS (Pesaran, Shin and Smith, 2001)[3] established that long run association among macroeconomic variables may

[2] Theoretical form of KPSS test is based on Bahmani-Oskooee and Glean, 2007, pp:2497.

be investigated by employing the ARDL Model. After the lag order for ARDL procedure, Ordinary Least Squares (OLS) may be utilized for estimation and identification. Valid estimation and inference can be drawn through presence of unique long run alliance that is crucial. Such inferences may be made not only on the long run but also on the short run coefficients which imply that the ARDL model is correctly augmented to account for contemporaneous correlations between the stochastic terms of the data generating process (DGP). It is concluded that ARDL estimation is possible even where explanatory variables are endogenous. Moreover, ARDL remains valid irrespective of the order of integration of the explanatory variables. But ARDL procedure will collapse if any variable is integrated at ***I(2)***.

After the completion of ARDL estimation, the next step is to construct Error Correction Model (ECM) suggested by PSS (Pesaran, Shin and Smith, 2001).

Firstly, we try to find out the direction of relationship between stock markets development and economic growth in the case of Pakistan by analyzing the PSS F-test statistics. The calculated *F-statistic* is compared with the critical value tabulated by Pesaran and Pesaran (1997) or Pesaran *et al*. (2001). If the *F*-test statistic exceeds the upper critical value, the null hypothesis of no long-run relationship can be rejected regardless of whether the underlying orders of integration of the variables are *I(0)* or *I(1)* . Similarly, if the *F*-test statistic falls below the lower critical value, the null hypothesis is not rejected. However, if the sample *F-test* statistic falls between these two bounds, the result is inconclusive. When the order of integration of the variables is known and all the variables are *I(1),* the decision is made based on upper bounds. Similarly, if all the variables are *I(0),* then the decision is made based on lower bounds.

The ARDL method estimates $(p+1)^k$ number of regressions in order to obtain optimal lag length for each variable, where p is the maximum number of lags to be used and k is the number of variables in the equation. The model can be selected using the model selection

[3] This theoretical formation ARDL technique is based on Chandana, (2001)

criteria like Schwartz-Bayesian Criteria (SBC)[4] and Akaike's Information Criteria (AIC). SBC is known as the parsimonious model: selecting the smallest possible lag length, whereas AIC is known for selecting the maximum relevant lag length. In the second step, the long run relationship is estimated using the selected ARDL model. When there is a long run relationship between variables, there should exist an error correction representation.

To establish the stability of the **ARDL** model, sensitivity analysis. is conducted to make sure that there is no serial correlation among the regressors, the model is properly specified, the residuals are normally distributed and that it is free from heteroscedasticity. The stability test is conducted by employing the cumulative sum of squares of recursive residuals (**CUSUMsq**) confirmed that the model is stable. Examining the prediction error of the model is another way of ascertaining the reliability of the **ARDL** model.

4. Empirical Results

Since, present study appears to be initial attempt to identify the links between different variables and economic growth with special emphasis on the relationship between the stock market development and economic growth in the case of a small developing economy like Pakistan, we have empirically estimated whether a statistically significant relationship exists between economic growth and its determinants. in the long-run as well as in the short-run. The preliminary step in this analysis is concerned with establishing the order of integration of each variable. For this purpose, to get reliable results of equation 1, the implicit assumption is that variables in equation 1 are *I(1)* and co-integrated. We employed the test for the existence of a unit root in the level and first difference of each of the variables in our sample using the Augmented Dickey Fuller (ADF) and Philip-Perron (P-P) tests. ADF and P-P tests statistics check the stationarity of series. The results in Table 3 show that the Real GNP per Capita, Financial Development, Financial

[4] The mean prediction error of AIC based model is 0.0005 while that of SBC based model is 0.0063 (Min B. Shrestha, 2003).

Insatiability, Market capitalization, Inflation Rate, Foreign Direct Investment and Literacy Rate are *I(1).* Both tests confirm the stationarity of variables at 1st difference.

Table 3

Unit-Root Estimation

Variables	ADF test at 1st Difference			Philip-Perron test at 1st Difference			KPSS test at 1st Difference	
	Intercept and trend	Prob-value	Lags	Intercept and trend	Prob-value*	Lags	Intercept and trend	Lags
LGNPC	-5.4412	0.0005	**0**	-5.4889	0.0004	**5**	0.0952	**5**
MC	-3.2718	0.0903	**4**	-3.7901	0.0295	**2**	0.0528	**3**
LFD	-5.4461	0.0005	**0**	-5.4068	0.0005	**2**	0.0802	**3**
LFNFD	-4.0445	0.0178	**3**	-7.0639	**0.000**	**0**	0.0673	**3**
LINF	-5.3166	0.0007	**0**	-5.3044	0.0007	**2**	0.0962	**6**
LFDI	-3.2084	0.1008	**2**	-10.8134	**0.000**	**0**	0.0820	**3**
LLTR	-5.3681	0.0006	**1**	-10.9699	**0.000**	**5**	0.0501	**0**

Lag Length Criteria

Lags Order	Akaike Information Criterion	Schwarz Bayesian Criterion	Log likelihood	Determinant resid covariance	Determinant resid covariance (dof adj.)
1	-0.397956	2.116049	62.76526	5.88E-11	3.84E-10
2	-4.921927	-0.160312	186.2118	2.96E-14	2.06E-12

Notes: *McKinnon (1996) one-sided p-values.

To observe the partial impact of independent variable on dependent one in long run relationship, we turned to ARDL for long run relationships as mentioned in Table 4**.** The main assumption of ARDL is that included variables in model are having co-integrating order *I(0)* or *I(1)* or mutually . This lends support for the implementation of bounds testing, which is a three step procedure, in the first step we selected lag order on the basis of SBC because computation of F-statistics for co-integration is very much sensitive with

lag length, so lag order of 2 is selected on lowest value of SBC[5]. The total number of regressions estimated following the ARDL method in equation 1 is $(2+1)^7 = 2187$. Given the existence of a long run relationship, in the next we used the ARDL co-integration method to estimate the parameters of equation (1) with a maximum order of 2 to minimize the loss of degrees of freedom.

The results of bounds testing approach for long run relationship represent that the calculated *F- statistic* is 4.68(see table 4) which are higher than the upper level of bounds critical value of 4.61 and lower bounds value of 3.88, implying that the null hypothesis of no Co-integration cannot be accepted indicating that there is indeed a co-integration relationship among the variables at 5% level of significance.

Table-4
Lag Length and ARDL Results

Test-statistic	Calculated-Value **(Wald-Test)**[6]	Lag-order	Significance level	Bound Critical Values (restricted intercept and restricted trend)	
	8.654	1		I(0)	I(1)
F-statistic	(**7.355**)		1%	4.99	5.85
	4.681	2	5%	3.88	4.61
	(3.241)		10%	3.82	4.02
Short Run Diagnostic Tests *Serial Correlation LM Test =0.325(0.574)* *ARCH Test = 0.276(0.603)* *White Heteroscedisticity Test = 0.797 (0.679)* *Normality J-B Value = 1.688(0.528)* *Ramsey RESET Test = 1.413 (0.247)*					

Sensitivity analysis includes some diagnostic tests (results shown at the lower part of table-4 where figures in the parenthesis show t values) which confirm that there is no serial correlation, the model is properly specified, the regressors are normally distributed and that there is no conditional heteroscedasticity in the distribution of residuals. Both models in

[5] At lower value of SBC, value of AIC is also low as shown in Table 6 in second row. The value of F-stat is very much sensitive with lag length, so choose the value of F-stat to check co-integration at lower value of AIC.
[6] We base on calculation of F-statistics but not on the estimates of Wald-Test.

Table-5 (model 1a without the error term and model 1b with the error term) indicate that, economic growth is positively and significantly associated with an improvement in the performance of stock markets in the country. This highlights the importance and contribution of stock market development to economic growth through its direct and indirect channels. Enhancement in financial intermediation and quality of financial institutions also improves economic activities through causal channels as clearly evident from literature. Financial instability weakens the stock market-growth and finance-growth nexus through detrimental impacts that decelerate economic growth directly.

Table-5
Estimated Long Run Coefficients ARDL Approach

Dependent Variable: LGNPPC				
Variables	**Co-efficient**	**Prob-value**	**Co-efficient**	**Prob-value**
Constant	6.1902 **(7.656)**	**0.0000**	7.1602 **(10.929)**	**0.0000**
MC	0.0192 **(3.427)**	**0.0019**	0.0228 **(4.621)**	**0.0001**
LFD	0.4679 **(2.437)**	**0.0214**	0.7578 **(4.177)**	**0.0003**
LFNFD	-0.0263 **(-1.699)**	**0.1003**	-0.0240 **(-1.589)**	**0.1232**
LFDI	0.0773 **(1.986)**	**0.0569**	0.0929 **(2.715)**	**0.0112**
LINF	-0.1139 **(-3.2020)**	**0.0034**	-0.1393 **(-4.096)**	**0.0003**
LLTR	0.5498 **(2.858)**	**0.0079**		
ER			0.1634 **(2.949)**	**0.0064**
R^2 = 0.94385 **F-Statistics** =78.452(0.00) **AIC** = -1.734 **Durbin-Watson** =1.570			**R^2** = 0.9446 **F-Statistics** = 79.67(0.00) **AIC** = -1.748 **Durbin-Watson** =1.78	

Note: t-values are given in parentheses.

Foreign direct investment is appeared to be associated positively and significantly with economic growth. This indicates that foreign direct investment stimulates the economic activities and also improves the quality of human capital through spillover effects. Inflation reduces the economic growth through its detrimental impacts significantly. Improvement in

human capital also enhances the potential of the economy as explained in steady-state phenomenon in economic development, which indirectly and directly increases economic growth. We also see that economic reforms improve the long run growth. We excluded human capital from the model due to specification problem. Having found a long run relationship, we applied the ARDL-ECM version to investigate the short run dynamic relationships. After investigating the long run impact of concerned variables in the basic model, we turned to short run dynamic model as follows;

$$\Delta LGNPPC = \alpha_{\circ} + \sum_{j=0}^{n} \beta_1 \Delta LMC + \sum_{J=0}^{n} \beta_2 \Delta LFD + \sum_{j=0}^{n} \beta_3 \Delta LFNFD + \sum_{j=0}^{n} \beta_4 \Delta LIFL + \sum_{j=0}^{n} \beta_5 \Delta LINV + \sum_{j=0}^{n} \beta_6 \Delta LLTR + \eta CE_{t-1} + \varepsilon_t$$

---------- (2)

The ECM results are reported in Table 6. The results indicate that, market capitalization, improvement in the efficiency of financial sector's performance promote the economic growth positively and significantly at 10 % and 5% significant level and impact of lag of differenced term of FD is having negative association with economic but enhances the economic growth in future period. Financial instability and literacy rate do not have any significant effect on growth while inflation influences the growth negatively and significantly at 5 percent level of significance. Foreign direct investment is positively correlated with economic activity also in the short span of time in Pakistan indicating the evidence of improving the economic growth by attracting more foreign direct investment in the country.

The error correction term CE_{t-1}, which measures the speed of adjustment to restore equilibrium in the dynamic model, appear with negative sign and is statistically significant at 1 percent level ensuring that long run equilibrium can be attained. The coefficient of *CE(-1)* is equal to 0.801 for short run model implying that the deviation from the long-term inequality is corrected by 80.1 % percent over each year. The lag length of short run model is selected on the basis of AIC and SBC.

Table-6

ECM Short Run Dynamic Version

Dependent variable = ΔLGNPC		
Regressors	**Co-efficient**	**Prob-value**
Constant	0.0290 **(1.053)**	0.3027
ΔMC	0.0092 **(1.943)**	0.0638
ΔLFD	0.7798 **(4.049)**	0.0005
ΔLFD(-1)	-0.4549 **(-2.335)**	0.0283
ΔLFNFD	-0.0061 **(-0.596)**	0.5566
ΔLINF	-0.0653 **(-2.167)**	0.0404
ΔLFDI	0.0764 **(2.824)**	0.0094
ΔLFDI(-1)	-0.0270 **(-1.119)**	0.2739
ΔLLTR	-0.5986 **(-0.615)**	0.5446
CR(-1)	-0.801 **(-4.713)**	0.0001
R^2 =0.787302 **Adjusted R^2** =0.707540 **AIC** =-2.207044 **Schwarz criterion** =-1.758114 **Durbin-Watson**=2.10 **F-statistic**=9.870659 (0.00)		

Note: ARDL (1, 1, 2, 1, 1, 2, 1) selected on the basis of AIC and SBC.

Finally, we examine the stability of the long run parameters together with the short run movements for the equation**.** To this end, we rely on cumulative sum (CUSUM) and cumulative sum squares (CUSUMSQ) tests. The same procedure has been utilized by Pesaran and Pesaran (1997), and Mohsen *et., al*. (2002) to test the stability of the long run coefficients**.** The tests applied to the residuals of the ECM model (Table 6) along with the critical bounds graphed in Figures 1**.** As can be seen in the figures, the plot of CUSUM and CUSUMsq statistics stay within the critical 5% bounds for all equations [Insert Figure 1 & 2].

5. Conclusions and Policy Implications

This paper employs FMOLS and ARDL bounds testing approach to examine the relationship between various factors and economic growth with special attention to the relationship between stock market development and economic growth both in the short run and in the long run using time series data for Pakistan for the period from 1971 to 2006. Our findings suggest that there exist significant positive relationship between stock market development and economic growth. The results are consistent with theoretical predictions. The implications of the present study are that although there have been some developments in the stock markets of Pakistan in the recent past, yet, a strong need for implementation of effective regulations that contribute to transparency and effectiveness, exists. At present, there are only three stock markets in Pakistan. namely Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE) and Islamabad Stock Exchange (ISE). The integration of regional markets might be a viable option for economic growth. Financial instability impedes growth. Our empirical results showed its expected negative impact on economic growth. The findings also emphasize the negative impact of inflation on economic growth. The banking reforms launched in Pakistan in the last few years reduced financial instability. Inflation should be limited to 4-5%. and the government has crucial role to play to this end The result also shows that human capital and physical capital influence economic growth positively.

Finally, this study considers both public and private investment as complimentary (crowding-in) and emphasizes on the role of government to improve the efficiency of

financial sector of the economy along with its direct role in enhancing human and physical capital in boosting economic growth.

References:

Asterio, D. and S. Price(2007). 'Applied Econometrics, A Modern Approach. Palgrave Macmillan.

Atje, R. and Jovanovic, B. (1993). 'Stock markets and development', European Economic Review, 37: 632-40.

Beck, T. and Levine, R. (2001). 'Stock markets, banks, and growth: correlation or causality?', Policy Research Working Paper 2670, Washington DC: World Bank.

Bencivenga, Valerie, R. and Smith, Bruce, D.(1991). 'Financial Intermediation and Economic Growth.' Review of Economic Studies, 58(2), pp. 195-209.

Blackburn, K., Bose, N., and Capasso, S. (2005). 'Financial development, financing choice and economic growth', Review of Development Economics, 9 (2): 135-49.

Demirgüç-Kunt, A. and Maksimovic, V. (1996), 'Stock market development and financing choices of firms', World Bank Economic Review, 10: 341-69.

Diamond, D. (1984). 'Financial intermediation and delegated monitoring', Review of Economic Studies, 51: 393-414.

Dickey DA, Fuller WA, (1979), "Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association 74: 427–431.

Economic Survey of Pakistan (2006), Ministry of Finance, Government of Pakistan .

Engle, R F. and Granger, G.W.J, (1987), "Co-integration and Error Correction: Representation, Estimation and Testing". Econometrica, 55, 251-276.

Greenwood, J. and Smith, B. (1997). 'Financial markets in development, and the development of financial markets', Journal of Economic Dynamics and Control, 21: 141-81.

Holmstrom, B. and Tirole, J. (1993). 'Market liquidity and performance monitoring', Journal of Political Economy, 101 (4): 678-709.

International Monetary Fund(IMF). International Financial Statistics, (IFS, 2006), Washington, DC.

Johansen S., (1991), "Estimation and hypothesis testing of co-integrating vectors in Gaussian vector autoregressive models", Econometrica, 59: 1551–1580.

Johansen, Soren and Katarina Juselius (1990). "Maximum Likelihood Estimation and Inference on Cointegration- with Applications to the Demand for Money." Oxford Bulletin of Economics and Statistics 52(2): 169-210.

Johansen S, (1995), "Likelihood-Based Inference in Co-integrated Vector Autoregressive Models. Oxford University Press: Oxford.

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P. and Shin, Y. (1992) "Testing the Null of Stationarity Against the Alternative of a Unit Root: How Sure Are We That Economic Time Series Have a Unit Root?", *Journal of Econometrics*, 54, pp. 159–78

Korajczyk, R. (1996). 'A measure of stock market integration for developed and emerging markets', The World Bank Economic Review, 10 (2): 267-89.

Levine, R. and Renelt, D. (1992). 'A sensitivity analysis of cross-country growth regressions', American Economic Review, 82: 942-63.

Levine, R. and Zervos, S. (1998). 'Stock markets, banks and economic growth', American Economic Review, 88: 537-57.

Mohsen, Bahmani Oskooee, Ng R.. W., (2002). LongRun Demand for Money in Hong Kong: An Application of the ARDL Model. International journal of business and economics, Vol. 1, No. 2, pp. 147155.

Obstfeld, Maurice (1994). 'Risk-Taking, Global Diversification, and Growth', American Economic Review, 84(5), pp. 1310-29.

Pagano, M., Panetta, F., and Zingales, L. (1998). 'Why do companies go public? An empirical analysis', Journal of Finance, 53: 27-61.

Pesaran, M. and Smith, R. (1995). "Estimating long-run relationships from dynamic heterogeneous panels", *Journal of Econometrics*, Vol. 68, pp.79–113.

Peseran, M. H., Peseran, B. (1997). Working with Microfit 4.0: Interactive Econometric Analysis, Oxford: Oxford University Press.

Pesaran, M. H. and Shin, Y. (1999). 'An Autoregressive Distributed Lag Modeling Approach to Cointegration' Chapter 11 in Econometrics and Economic Theory in the 20th Century; The Ragner Frisch Centennial Symposium, Cambridge University Press

Pesaran, M. H., Shin, Y., Smith, R. J., (2001). 'Bounds Testing Approaches to the Analysis of Longrun Relationships' Journal of Applied Econometrics16,pp.289-326.

Phillips, P. C. B., Hansen, B. E. (1990). 'Statistical inference in instrumental variable regression with I (1) Processes' Review of Economic Studies 57:99–125.

Roubini, N. and Sala-i-Martin, X. (1991). 'Financial development, the trade regime and economic growth', NBER Working Paper 3876.

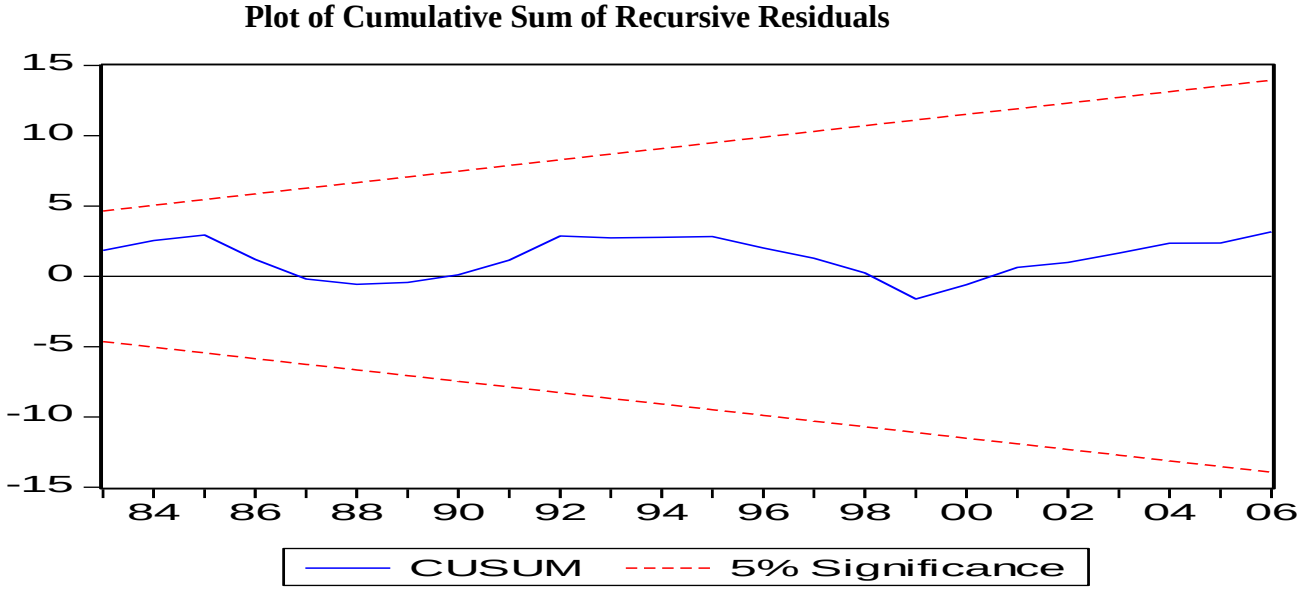
Stiglitz, J. (1985). 'Economics of Information and the Theory of Economic Development' Revista de Econometrica, 5 (1), pp. 5-32.

Williamson, S.D. (1987b). 'Financial intermediation, business failures, and real business cycles', Journal of Political Economy, 95: 1196-216.

World Bank. World Development indicators(WDI, 2006), The world Bank, Washington, DC.

Appendix

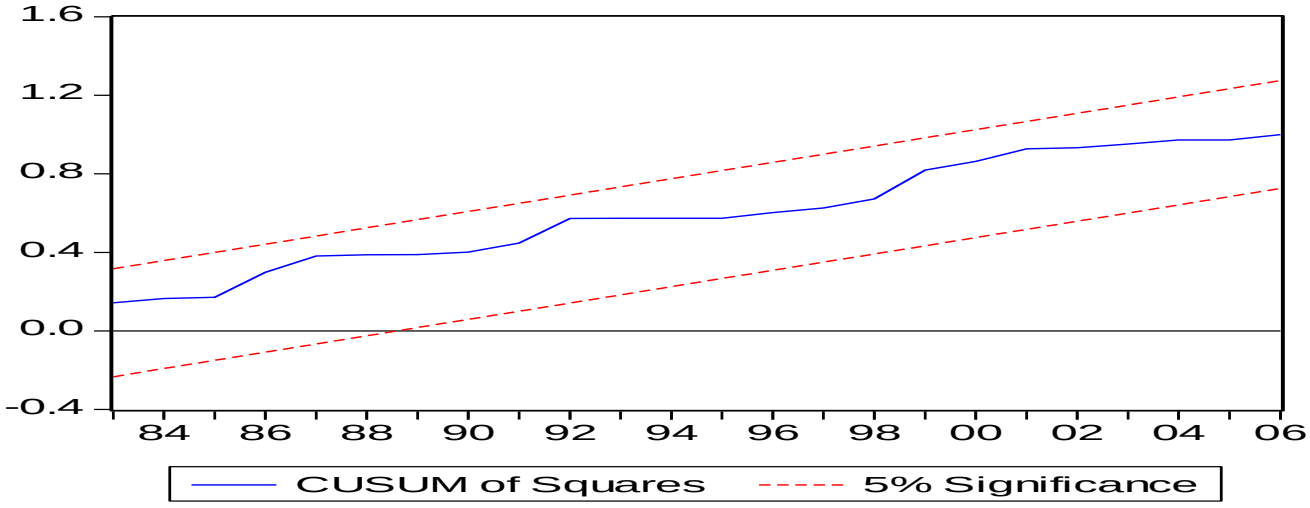
Figure 1



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.