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

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ABSTRACT

This paper provides an empirical analysis of the relationship between economic growth and its determinants, with special focus on stock market development in Pakistan. Using data for the period from 1971 to 2006, we employ 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 markets and economic growth, both in short run and long run. Financial instability and inflation have negative effects while human capital, foreign direct investment and stock market liquidity have positive effects on growth. The results are consistent with the theoretical and empirical predictions.

1. INTRODUCTION

THERE EXISTS AN AMPLE LITERATURE on economic growth and its determinants. Recent developments in growth theory have primarily been 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 explanatory factor. The importance of stock markets lies in the contributions it makes. Some of the facts regarding the relationship between financial market development and economic growth, discussed extensively in the literature, are as follows: Firstly, in the initial stages of economic development, financial markets are undeveloped and very small in their magnitude. During these stages, financial markets are dominated primarily 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. Secondly, 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 capitalisation. Thirdly, as the economy continues to grow, equity markets develop further, as well as the banking system. Similarly, other financial intermediaries also develop. Fourthly, researchers recognise the common view that the stock markets appear to develop in a non-monotonic way. 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, increasing only with further development of the stock market.

The phenomenal growth of equity markets in the 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 developing and emerging markets such as Pakistan such evidence is almost zero, with the exception of one study by Levine and Zervos (1998).

Pakistan is an important but typical developing country. It is typical in the sense that most developing countries are similar to each other with respect to some structural characteristics related to their stages of economic and political development (Salahuddin and Islam, 2008). Most, including Pakistan and all its neighbouring countries such as India, Bangladesh, Maldives, Sri Lanka, Bhutan and Nepal, have been classified as low income and highly indebted poor countries. With the exception of Sri Lanka and tiny states Maldives and Bhutan, per capita income of all South Asian countries including Pakistan is less than $1000 (World Development Indicators Database, 2007). The proportion of the population living under the poverty line in these countries is also notable.

It is also an important country because of its nuclear capability. Maintaining peace and stability, not only in Pakistan but also in the entire South Asian region, has become a priority issue to the world super powers. It is understandable that macroeconomic instability will increase poverty in Pakistan which, in turn, will trigger more violence and contribute to making the region more volatile. Hence we strongly believe that the findings of this study will be useful for the policymakers of Pakistan, both to shape their economic future as well as for the policymakers of other developing countries especially those of Pakistan's neighbours, which have similar structural char-

acteristics. Therefore, we have selected Pakistan as our country of study. Hence the motivation 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 role of stock market development 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, utilising time series data covering the period from 1971-2006. Hence it is a contribution to the existing pool of literature on the topic.

The rest of the paper is organised 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

In recent times, 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 relationships 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 utilisation. 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 focused primarily on the steady-state level of capital stock per worker or productivity, but not on the rate of growth, which is attributed 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 the one side, the view is that stock markets promote long-run growth. Greenwood and

Smith (1997) argue that stock markets lower the cost of mobilising savings, facilitating investments into the most productive technologies and diversifying the risks. Obstfeld (1994) indicates that international risk-sharing through internationally integrated stock markets improves resource allocation and accelerates growth. Bencivenga, *et al.* (1996) and Levine and Renelt (1992) suggested that stock market liquidity plays a major role in economic growth. According to them, the stock market plays at least two important functions in enhancing economic growth. First, it allows investors' financial portfolios to be altered with low transaction costs and makes financially-traded assets less risky. Further, it provides an exit mechanism for both investors and entrepreneurs and improves the efficiency of financial intermediation. On the other hand, profitable investments require the long run commitment of capital savers, preferring not to give up control of their savings for long periods (Holmstrom and Tirole, 1993)[2].

A considerable literature suggests that the development of the stock market is positively related to the level of economic development and accumulation of capital. This conclusion unequivocally supports the idea that as economies develop, equity markets tend to expand both in terms of the number of listed companies and market capitalisation (Atje and Jovanovic, 1993; Korajczyk, 1996; Demirgüç-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. This development builds an apparently puzzling situation: an expanding equity market along with the development of a 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 stylised 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 Jovanovic (1993) have concluded that there is a strong positive correlation between the level of financial development and stock market development and economic growth. Levine and Zervos (1998) emphasise 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. Fase and Abma (2003) also corroborate this relationship in a study of selected Asian countries. Nieuwerburgh, Buelens and Cuyvers (2006) claim strong evidence that stock market development caused economic growth in Belgium. Wu, Hou and Cheng

(2010) found a long run equilibrium relationship between banking development, stock market and economic development in a study of 13 European Union countries. They also suggest the level of banking development is related directly with the level of economic growth. It is also argued that the expansion of both banks and stock markets affects growth significantly. Empirical research strongly supports the view that banks promote economic growth at the firm, industry and country levels. The institutional framework of the banking sector can affect economic growth significantly. This implies that a well developed banking system fosters economic growth. There exists a positive and significant relationship between bank stock returns and economic growth (Cole *et al*, 2008).

Some stylised 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 crowd out the banking sector and other financial intermediaries directly. 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 economic 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 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 Jovanovic, 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 mitigates 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 mobilisation. 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 markets because of the small denomination of securities.

It is argued that, at the 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 increase the level of leverage. However, at later stages as stock markets develop further, issuing equity becomes more convenient because of declining costs, and firms substitute equity for debt. Pagano et al, (1998) conclude that because of trading externalities in the market and the deliberate behaviour of listed 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 firms raise capital from equity financing.

The role of stock market in improving information asymmetries 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 with regard to the contribution of liquidity itself to long-term growth. It is indicated that increased liquidity may prevent growth in three ways. Firstly, it may reduce savings 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' short-sightedness, affecting corporate governance negatively 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.

Financial integration also enhances growth. The degree of market integration can be assessed in a number of ways; covered and uncovered interest parity conditions, real interest parity, saving and investment correlation technique etc. Overall trade and portfolio capital flows among South Asian countries, including Pakistan, are negligible. Furthermore, data on offshore financial assets denominated in domestic currency, or data on forward exchange rates, are not adequately available as most of developing countries, including Pakistan, do not have such effective markets. Governments often regulate the domestic interest rate and data on market interest rates are not properly available. Most of the studies use saving-investment correlation techniques to estimate the degree of financial market integration. Recent empirical evidence (Wahid *et al*, 2008) suggests a poor saving-investment correlation in Pakistan, which does not necessarily indicate higher capital mobility implying higher degree of financial integration. Since the size of Pakistan's economy is quite insignificant compared to the size of global economy, financial integration is not a proven measure to enhance economic growth. Hence we did not include financial integration measures in our study.

3. Data, model and methodological framework

Annual data on all variables for the period from 1971 to 2006 were collected from *World Development Indicators* (WDI, 2006) database World Bank, *Economic Survey of Pakistan* (2006), *Economic Survey of Pakistan* (2007) and *International Financial Statistics* (IFS, 2006).

To assess the relationship between stock market development and economic growth in Pakistan, we utilise a log-linear model as follows:

$$LGNPPC = \alpha_{\circ} + \beta_1 MC + \beta_2 LFD + \beta_3 LFNFD + \beta_4 INFR + \beta_5 LFDI + \beta_6 LLTR + \beta_7 LSTL + \varphi_i \quad (1)$$

where *LGNPPC* = Log of real GNP per capita, *MC* = market capitalisation (measured by total capital as share of GDP-proxying stock market development), *LFD* = log of financial development (measured by credit availability to the private sector as share of GDP), *LFNFD* = log of financial instability (measured by standard deviation of inflation rates), *INFR* = 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 the total population), *LSTL* = log of stock market liquidity, which is taken as the value of stock traded as a share of GDP. A limitation of this study is that we failed to incorporate the variable banking development in our study, as data on the indicators of this variable were not adequately available for the country concerned.

Table 10: Theory, intuition and expected signs

Variable	*Theory and intuition*	*Expected sign*
Market Capitalisation	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 economic activity in the economy through their causal channels.	+
Financial Instability	Financial instability induces a decline in 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, along with spillover effects through employment generation.	-
Literacy Rate	A higher literacy rate improves the efficiency of an economy by providing a more productive labour force.	+
Stock market liquidity	The effect of stock market liquidity on economic growth is mixed.	+/-

Logarithmic transformations of variables are very popular in econometrics for a number of reasons: first, many economic time series data exhibit a strong trend; second, taking the natural logarithm of a series effectively linearises 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); a third advantage is that it allows the regression coefficients to be interpreted as elasticities. Since this paper is dealing with time series data, we preferred to take log of the variables to avoid cumbersomeness in the modelling.

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

Table 2a: Descriptive statistics

	Real GNP Per Cap.	*Market Cap.*	*Credit-Private*	*FDI*	*Financial Instability*	*Inflation Rate*	*Literacy Rate*	*Stock market Liquidity*
Obs.	36	36	36	36	36	36	36	36
Std. Dev.	0.356	4.226	0.128	0.942	1.264	1.496	0.236	1.643
Skewness	-0.150	2.684	-0.559	-.649	-.319	1.134	-0.188	.297
Kurtosis	3.259	10.697	3.687	2.605	2.308	3.001	1.912	2.345
Sum	332.880	88.462	15.192	-32.151	-131.818	170.733	123.360	95.276
Sum Dev^2	4.319	607.466	0.562	30.179	54.395	45.135	1.901	60.268

Table 2b: Correlation matrix

Real GNP per capita	1.000							
Market Capitalisation	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 Rate	-0.4257	-0.3510	-0.5035	-0.4943	0.3813	1.000		
Literacy Rate	0.9252	0.6873	0.7100	0.8673	-0.3781	-0.4090	1.000	
Stock Market Liquidity	0.3995	0.7124	0.6762	0.6185	0.5272	0.3789	0.4823	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 literature reveals that the ADF and P-P tests have low explanatory powers especially with a small sample data set. A shift has been focused on Kwiatkowski, Philips, Schmidt and Shin (1992) to investigate the order of integration for concerned actors in the model.

ARDL Approach for co-integration

This paper applies the recently developed autoregressive distributed lag model (ARDL) approach introduced in Pesaran *et al.* (2001), in order to investigate the long run relationship between stock market development and economic growth in Pakistan. The reasons for using ARDL are that it has a number of advantages over other methods to estimate long run relationships between variables. The first 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 is that it performs better than Engle and Granger (1987), Johansen (1991) and Phillips and Hansen (1990) co-integration tests in small samples. The third advantage is that the model takes a sufficient number of lags to capture the data generating process in a general-to-specific modelling framework. Finally, ARDL also provides information about the structural break in time series data.

Under a certain environment, Pesaran and Smith (1995) later PSS (Pesaran, Shin and Smith, 2001) established that a long run association among macroeconomic variables may be investigated by employing the ARDL Model. After the lag order for ARDL procedure, Ordinary Least Squares (OLS) may be utilised for estimation and identification. Valid estimation and inference can be drawn through the presence of a 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 implies 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 will collapse if any variable is integrated at I(2).

After the completion of ARDL estimation, the next step is to construct an Error Correction Model (ECM) suggested by PSS.

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 PSS.

The ARDL method estimates $(p+1)k$ regressions in order to obtain the 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 model selection criteria such as Schwartz-Bayesian Criteria (SBC)[3] and Akaike's Information Criteria (AIC). 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 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) to confirm 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 the present study attempts to identify the links between different variables and economic growth, with a special emphasis on the relationship between the stock market development and economic growth in the case of a small developing economy like Pakistan, we estimate empirically whether a statistically significant relationship exists between economic growth and its determinants in the long-run as well as in the short-run. We employ the test for the existence of unit root in levels and first differences of each of the variables in our sample using the Augmented Dickey Fuller (ADF) and Phillips-Perron (P-P) tests. The ADF and P-P test statistics check the stationarity of a series. The results in Table 3 show that all the variables are I(1). Both tests confirm the stationarity of variables in first differences.

To observe the partial impact of independent variables on the dependent variable in a long run relationship, we turned to ARDL as mentioned in Table 4. As a first step, we select the lag order on the basis of SBC, because computation of F-statistics for co-integration is very much sensitive to lag length. A lag order of 2 is selected. 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 use ARDL co-integration to estimate the parameters of equation (1) with a maximum order of 2, to minimise the loss of degrees of freedom.

The results of the bounds testing approach for a long run relationship produces a calculated F- statistic of 4.72 (see table 4). This is higher than the critical value of upper level of bounds value of 4.61 and lower bounds value of 3.88, implying the null hypothesis of no co-integration cannot be accepted, thus indicating there is indeed a cointegrating relationship among the variables at the 5 per cent level of significance.

Table 3: Unit-root tests

Variables	ADF test at first difference			P-P test at first difference			KPSS test at first 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
INFR	-4.1241	0.0015	1	-3.3257	0.0012	2	0.0156	4
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
LSTL	-3.2615	0.0006	1	-6.3712	0.000	0	0.4256	3

Lag-length criteria

Lags Order	Akaike Information Criterion	Schwarz Bayesian Criterion	Log likelihood	Determinant residual covariance	Determinant residual covariance (dof adj.)
1	-0.381673	1.155286	65.162459	3.17E-12	2.45E-10
2	-3.621248	-0.160312	189.1329	2.18E-14	2.36E-14

Note: *McKinnon (1998) one-sided p-values.

Sensitivity analysis involves some diagnostic tests (results are shown in the lower part of Table 4 (the figures in parentheses are t-values) which confirm that there is no serial correlation, the model is properly specified, the regressors are normally distributed and there is no conditional heteroscedasticity in the distribution of residuals.

Table 5 presents the coefficients of two models: model 1a without error term and model 1b with the error term. Both models indicate that economic growth is positively and significantly associated with an improvement in the performance of the stock market, as evident from the positive and significant coefficient of stock market liquidity.

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 improve 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. Stock market liquidity positively and significantly affects economic growth.

Table-4: Lag Length and ARDL Results

Test-statistic	*Calculated-Value (Wald-Test)*[4]	*Lag-order*	*Significance level*	*Bound Critical Values (restricted inter-cept and restricted trend)*	
	5.163	1		I(0)	I(1)
	(6.221)		1%	4.99	5.85
F-statistic	4.722	2	5%	3.88	4.61
	(3.347)		10%	3.82	4.02

Short-run diagnostic tests

Serial Correlation LM Test =01.97(0.642)
ARCH Test = 0.254(0.583)
White Heteroscedisticity Test = 0.677 (0.569)
Normality J-B Value = 1.574(0.476)
Ramsey RESET Test = 1.367 (0.232)

Table 5: Estimated Long Run Coefficients ARDL Approach

	Dependent Variable: LGNPPC			
	Model 1a		*Model 1b*	
Variable	*Coefficient*	*Probability*	*Coefficient*	*Probability*
Constant	4.2413	0.0017	7.2124	0.0013
	(5.734)		(12.929)	
MC	0.1207	0.0007	0.1137	0.0033
	(1.478)		(4.124)	
LFD	0.4136	0.0001	0.0334	0.0006
	(2.219)		(2.432)	
LFNFD	-0.0179	0.0012	-0.0192	0.0001
	(-1.244)		(-3.266)	
LFDI	0.0558	0.0097	0.1537	0.0055
	(1.731)		(2.338)	
INFR	-0.1257	0.0015	-0.2165	0.0014
	(-2.118)		(-3.993)	
LLTR	0.3627	0.0062	.4547	0.0020
	(1.974)		(2.219)	
LSTL	.2445	0.0017	.2037	0.0001
	(2.203)		(2.433)	
ER			0.2198	0.0007
			(3.455)	
	R^2 = 0.87251		R^2 = 0.9050	
Note:	F-Statistics =72.745 (0.01)		F-Statistics = 75.894(0.00)	
t-statistics in	AIC = -1.273		AIC = -1.674	
parentheses	Durbin-Watson =1.921		Durbin-Watson =1.864	

Foreign direct investment appears to be associated positively and significantly with economic growth. This indicates that foreign direct investment stimulates economic activity and improves the quality of human capital through spillover effects. A higher rate of inflation reduces significantly economic growth, through its detrimental impacts. Improvement in human capital also enhances the potential of the economy, as explained in the steady-state phenomenon in economic development, which indirectly and directly increases economic growth. We also see that economic reforms improve long run growth. We exclude human capital from the model because of specification problems. 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 relevant variables in the basic model, we turn to the following short run dynamic model:

$$\Delta LGNPPC = \alpha_{\circ} + \sum_{j=0}^{n} \beta_1 \Delta LMC + \sum_{J=0}^{n} \beta_2 \Delta LFD + \sum_{j=0}^{n} \beta_3 \Delta LFNFD + \sum_{j=0}^{n} \beta_4 \Delta IFLR$$
$$+ \sum_{j=0}^{n} \beta_5 \Delta LINV + \sum_{j=0}^{n} \beta_6 \Delta LLTR + \sum_{j=0}^{n} \beta_7 \Delta LSTL + \eta CE_{t-1} + \varepsilon_t \qquad (2)$$

The ECM results are reported in Table 6. They suggest that market capitalisation and improvement in the efficiency of the financial sector's performance promote economic growth positively and significantly at 10 per cent and 5 per cent significant levels. The impact of the lag of the differenced FDI term has a negative relationship with economic growth, but enhances economic growth in future periods. Financial instability and literacy rate do not have a significant effect on growth, while a higher inflation rate influences the growth negatively and significantly at the 5 per cent level of significance. Foreign direct investment is positively correlated with economic activity also in the short run in Pakistan, indicating economic growth can be boosted by attracting more foreign direct investment.

The error correction term CE_{t-1}, which measures the speed of adjustment to restore equilibrium in the dynamic model, appears with a negative sign and is statistically significant at the 1 per cent level, ensuring that long run equilibrium can be attained. The coefficient of CE_{t-1} is 0.726 for short run model, implying that the deviation from long-term disequilibrium is corrected by 72.6 per cent over each year. The lag length of the short run model is selected on the basis of AIC and SBC. All the results support theoretical and empirical considerations.

Table 6: ECM Short Run Dynamic Version

Dependent variable = ΔLGNPC

Regressors	*Coefficient*	*Prob-value*
Constant	0.3426 (2.199)	0.0079
ΔMC	0.2174 (2.110)	0.0043
ΔLFD	0.1540 (2.032)	0.0007
ΔLFD(-1)	-0.2783 (-2.394)	0.0099
ΔLFNFD	-0.0557 (-1.357)	0.0179
ΔINFR	-0.2015 (-1.683)	0.0028
ΔLFDI	0.0575 (2.226)	0.0075
ΔLFDI(-1)	-0.3192 (-2.377)	0.0020
ΔLLTR	-0.4325 (-1.357)	0.0377
ΔLSTL	0.4258 (1.2016)	0.0001
CE_{t-1}	0.726 (-2.465)	0.0026

R^2 =0.826763 Adjusted R2 =0.793442
AIC =-2.107843 SBC5 =-1.739867
Durbin-Watson=1.97 F-statistic=10.346247 (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 utilised 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 and 2. As can be seen in the figures, the plot of CUSUM and CUSUMsq statistics stays within the critical 5% bounds for all equations.

Figure 1: Plot of Cumulative Sum of Recursive Residuals

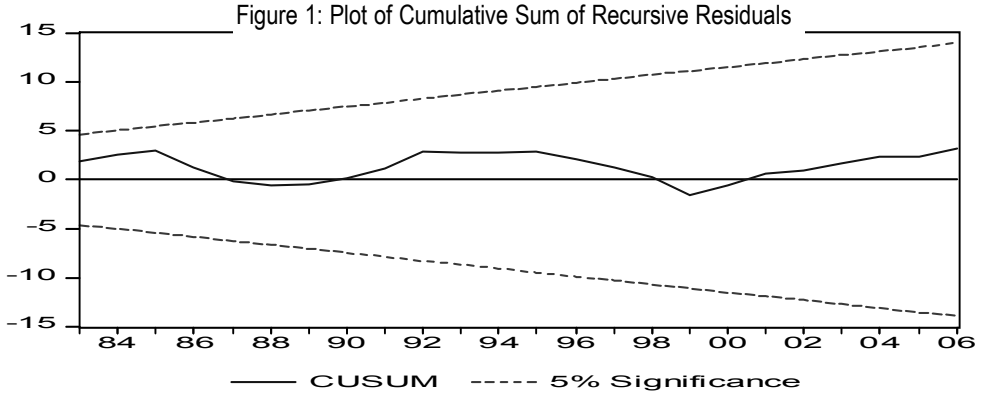
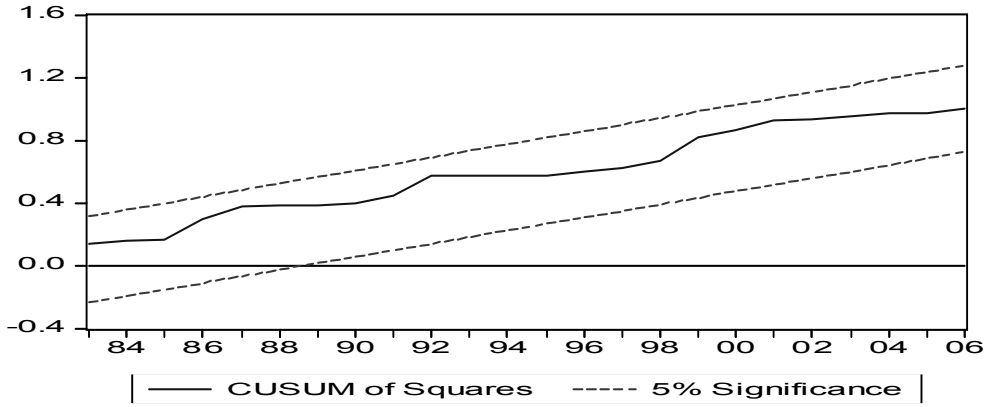


Figure 2: Plot of Cumulative Sum of Squares of Recursive Residuals



5. Conclusions and policy implications

This paper employs FMOLS and ARDL bounds testing to examine the relationship between various factors and economic growth, with special attention paid to stock market development and economic growth both, in the short run and long run, using time series data for Pakistan for the period from 1971 to 2006. Our findings suggest that there exists a significant positive relationship between stock market development and economic growth. The results are consistent with theoretical and empirical predictions. The implications of the present study are that although there have been some developments in the stock market of Pakistan in the recent past, there is still a strong need for implementation of effective regulations that contribute to transparency and effectiveness. At present, there are only three stock markets in Pakistan. namely the Karachi, Lahore and Islamabad Stock Exchanges. The integration of regional markets might be a viable option for economic growth. Financial instability impedes growth. Our empirical results show its expected negative impact on economic growth. The findings also emphasise the negative impact of higher inflation on economic growth. The banking reforms launched in Pakistan in the last few years have reduced financial instability. Inflation should be limited to 4 - 5 per cent and the government has a crucial role to play to this end. Stock market liquidity has a positive effect on economic growth. The results also show that human capital and physical capital influence economic growth positively. Finally, the findings indicate that a proper policy of financial reforms in Pakistan is likely to accelerate economic growth. Policy makers in other developing countries such as Bangladesh, Sri Lanka, etc. which have a similar economic structure, pursue suitable financial reforms to improve economic growth in their respective countries.

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ENDNOTES

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2. Liquid equity markets alleviate this fear by providing assets to savers which are easily liquidated at any time, simultaneously allowing firms permanent access to capital raised from equity issues. Liquidity has also been argued to increase investors' incentives to acquire information on firms and improve corporate governance, thereby facilitating growth.

3.The mean prediction error of AIC based model is 0.0005 while that of SBC based model is 0.0063 (Shrestha, 2003).

4. We base this on calculation of F-statistics but not on the estimates of the Wald-Test.

5. At lower values of SBC, the value of AIC is also low, as shown in Table 6 in the second row. The value of the F-stat is sensitive to lag length, so we have chosen the value of the F-stat to check co-integration at lower values of AIC.

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