Trade, Financial and Growth Nexus in Pakistan

Muhammad Arshad Khan[**] and Abdul Qayyum[*]

Abstract

This paper empirically investigates the impact of trade and financial liberalization on economic growth in Pakistan using annual observations over the period 1961-2005. The analysis is based on the *bound testing approach* of cointegration advanced by Pesaran *et al* (2001). The empirical findings suggest that both trade and financial liberalization policies play an important role in enhancing economic growth in Pakistan in the long-run. However, the short-run responses of real deposit rate and trade policy variables are very low, suggesting further acceleration of reform process. The feedback coefficient suggests a very slow rate of adjustment towards long-run equilibrium. The estimated equation remains stable over the period of study as indicated by CUSUM and CUSUMQ stability tests.

Resumen

El presente artículo analiza empíricamente el impacto de la liberalización financiera y de mercados en el crecimiento económico de Paquistán, mediante observaciones anuales durante el período 1961-2005. Dicho análisis se basa en el enfoque de cointegración, propuesto por Pesaran *et al*. (2001). Los resultados empíricos obtenidos sugieren que tanto las políticas de liberalización financiera como las de mercados desempeñan un papel muy importante en el desarrollo económico de Paquistán a largo plazo. Sin embargo, los resultados a corto plazo de las variables de la tasa real de depósito y las políticas de mercado son inferiores, lo que apunta a una mayor aceleración del proceso de reforma. El feedback del coeficiente muestra un ritmo lento de ajuste que tiende al equilibro a largo plazo. La ecuación estimada permanece estable durante el período de estudio, tal y como se indica en las pruebas de estabilidad de CUSUM y CUSUMQ.

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1.- Introduction

The relationship between trade liberalization, finance reforms and economic growth has been well documented in the economic literature. A considerable body of literature suggests a strong and positive link between trade liberalization, financial development and economic growth. It has been argued that trade and financial liberalization policies reduce the inefficiency in the production process and positively influence economic growth. This argument is strengthened by the fact that countries with more open trade and financial policies may grow faster than those with restricted trade and financial policies. An increasing openness is expected to have positive impacts on economic growth (Jin, 2000; Fry, 1995, 1997; Darrat, 1999; Levine, 1997; Mckinnon, 1973; Shaw, 1973 and World Bank, 1989). There is growing consensus that both liberalization policies are expected to exert positive impacts on economic growth.

Shumpeter (1911) argued that services provided by financial intermediaries are essential for economic development. Financial liberalization deepens financial markets and thereby promotes economic growth (Mckinnon, 1973 and Shaw, 1973). Steps towards financial and trade liberalization were taken by many developing countries including Pakistan to achieve higher level of growth. Thus, an empirical research is needed to determine the effectiveness of financial and trade liberalization policies with regard to growth in a developing country like Pakistan. Examining the impacts of both policies is particularly important in the case of Pakistan, which followed restrictive policies till early 1990s. The costs of these restrictive policies have been enormous and reflected in a low level of financial savings, investment and economic growth.

The positive relationship between financial and trade variables and economic growth is explained by incorporating efficiency effects which mainly results from the reduction of rent seeking and from the gains in internal and external economies of scale due to financial and trade liberalization (Bhagwati, 1988; Lee, 1993; Krueger, 1998; Fry, 1997). This efficiency effect considered as a major source of long-run growth. The endogenous growth theory predicts that both financial and trade liberalization along with investment in physical and human capital enhance economic growth (Romer, 1986; Lucas, 1988, Rivera-Batiz and Romer, 1991; and King and Levine, 1993a).

Research suggests that financial deepening effectively channels savings to productive investment opportunities, improves corporate governance, reduces transaction and information costs, and enhances specialization, and so forth (Bencivenga and Smith, 1991; De Gregorio and Guidotti, 1995; Greenwood and Jovanovic, 1990; Levine, 2004).

Financial development can affect growth through three main channels (Aziz and Duenwald, 2002): (i) it can increase the marginal productivity of capital by collecting information to evaluate alternative investment projects and by risk sharing; (ii) it can raise the proportion of savings channeled to investment via financial development ─ by reducing the resources absorbed by financial intermediaries and thus increasing the efficiency of financial intermediation; and (iii) it can raise the private saving rate. Moreover, Ansari (2002) has noted that financial development contribute to economic growth in the following ways: (i) financial markets enable small savers to pool funds, (ii) savers have a wider range of instruments stimulating savings, (iii) efficient allocation of capital is achieved as the proportion of financial saving in total wealth rises, (iv) more wealth is created as financial intermediaries redirect savings from the individuals and the slow-growing sectors to the fast-growing sectors, (v) financial intermediaries partially overcome the problem of adverse selection in the credit market, and (vi) financial markets encourages specialization in production, development of entrepreneurship, and adoption of new technology.

Similarly, removal of trade restrictions helps to stabilize the development process by improving efficiency and return economies from distorted factor prices to production frontiers. Moreover, trade openness will improve domestic technology, production process will be more efficient, and hence productivity will rise (Jin, 2000). Trade liberalization and growth relations may occur through investment, and trade openness may provide greater access to investment goods (Levine and Renelt, 1992). Countries that liberalize their external sector and reduce impediments to international trade can experience relatively higher economic growth. It is generally agreed that an open trade regime is crucial for economic growth and development (Sukar and Ramakrishna, 2002).

The main objective of both liberalization policies is to increase productivity through reducing inefficiency in investment. The existing literature examines the impact of financial[1] and trade liberalization[2] separately despite their shared importance in increasing efficiency of investment. The empirical evidence related to the joint impact of financial and trade variable on economic growth is underdeveloped. The joint impact of trade and finance was initially highlighted by Roubini and Sala-i-Martin (1991) and Barro (1991). The inclusion of both variable by Roubini and Sala-i-Martin (1991) highlighted the importance of both financial and trade variables in the economic growth. Thus our testable hypothesis is that *both financial development and trade liberalization jointly increase economic growth*.

[1] Khan *et al* (2005).
[2] Din *et al* (2003).
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This paper makes *three* main contributions to the empirical literature on trade, finance and growth. *First*, it examines the joint impact of trade liberalization and financial development on growth in Pakistan. *Second*, unlike previous studies instead of using different indicators of financial development separately, we used financial development index as a proxy for government financial policy to assess its impact on real GDP. *Thirdly*, it applies recent econometric techniques of cointegration namely, the bound testing approach to cointegration developed by Pesaran *et al* (2001) to examine the relationship between trade, finance and growth. This modeling technique does not require any precise identification of the order of integration of the underlying data. Furthermore, ARDL estimation is applicable even the explanatory variables are endogenous, and the existence of a long run relationship is independent of whether the explanatory variables are I (0), or I (1).

The rest of the paper is organized as follows: section 2 deals with the brief overview of the financial and trade policies being pursued by Pakistan. Section 3 explains the model specification, data issues and econometric methodology. Empirical findings are discussed in section 4, while concluding remarks and some policy implications are given in the final section

2.- Overview of the Financial and Trade Policies in Pakistan

Economic growth of developing countries is heavily based on the financial sector's credit allocation. Overall financial development is necessary for economic growth at the macro-level (Andersen and Tarp, 2003; Khan and Senhadji, 2000; Levine, 2002). A more advanced intermediation enables firms to raise and manage large amount of funds more effectively, resulting in a rapid economic development. Particularly, the development of financial sector is an important for developing countries because bank-based system has greater impact on growth at the early stage than does a market-oriented system (Fase and Abma, 2003; Tadesse, 2002; Iimi, 2004). This section briefly reviews the financial and trade liberalization policies pursued by the government to enhance growth.

2.1 Financial Sector Reforms

In Pakistan, the banking sector reforms were initiated under broader macroeconomic structural adjustment programs in the early 1990s. Through these reforms, the government has been aiming to make the financial industry more competitive and transparent by privatizing formerly nationalized commercial banks, liberalizing interest rates and credit ceilings, strengthening the supervisory capacity of central bank and standardized accounting and auditing

systems (Iimi, 2004).

Prior to the 1990s, the financial sector in Pakistan remained heavily controlled[3]. Interest rates were set administratively and were usually remained negative in real terms. Monetary policy was conducted primarily through direct allocation of credit. Money market was under-developed, and bond and equity markets were virtually nonexistent. Commercial banks often had to lend priority sectors with little concern for the borrowing firm's profitability. Despite the opening of non-bank financial sector for private investment in mid-1980s, state-owned financial institutions hold almost 93.8 percent of the total assets of the entire financial sector at the end of 1980s. Moreover, the status of financial institutions were precarious due to, *inter alia*, high intermediation costs resulting from overstaffing, large number of loss-incurring branches, poor governance with low quality banking services, accumulation of non-performing loans and inadequate market capitalization. These inefficiencies and distortions caused severe macroeconomic difficulties in the late 1970s and 1980s. In order to remove these distortions and spur economic growth, the government of Pakistan undertook a wide range of reforms in the early 1990s to strengthen its financial system and to provide an adequate macroeconomic environment.

The objectives of these reforms were to prepare industrial conditions for market competition, strengthening corporate governance and supervision, and adopting a market-based indirect system of monetary, exchange and credit management. These reforms includes[4]: (a) privatization of nationalized commercial banks and fostering competition[5], (b) strengthening regulatory, supervisory, and enforcement capacity of the SBP, (c) lowering the cost of capital by dealing with non-performing loans, reducing corporate tax burden and brining cost-income ratio down, (d) revising the legal structure particularly the foreclosure laws, (e) broad based access to the middle income and lower income groups by opening up provision of credit for agriculture, small and medium enterprises (SMEs), consumer financing, and micro credit, (f) introducing and enforcing stringent corporate governance, internal controls, transparency and enhanced disclosure standards, (g) liberalizing the foreign exchange regime, and (h) promoting technological upgradation of the banking industry through the introduction of e-banking, ATMs etc.[6]

[3] All commercial banks were nationalized in January, 1974, with the aim at making credit availability to highly priority sectors of the economy which previously had limited access to investable funds (see Haque and Kardar, 1993 for detailed account).

[4] The early phase of financial reforms started in the late 1980s to earlier 1990s.

[5] 10 new private banks started their operations in 1991 and 23 private domestic banks operating in the country including Habib Bank Limited (HBL), ABL, MCB and United Bank Limited (UBL). The process of liberalization started in the early 1990s and except National Bank Limited (NBP) more than 50 percent shares of the public sector have been privatized. There are about 14 foreign banks have been operating in the country.

[6] For further detail see Khan (2003) and Khan and Qayyum (2007).

2.1.1 Impact of financial Reforms

After liberalization, the price of financial services was intended to be determined by the banks on competitive basis, with little intervention from the SBP. To achieve the twin objectives of reducing government cost of borrowing on domestic debt and encouraging private sector credit expansion, the SBP has been pursuing a relatively easy monetary policy since July 1995 to July 2000. The weighted average lending rate gradually come down from 15.6 percent in 1998 to 8.81[7] percent in June 2005, but the real interest rate has increased from 3.6 percent in 1996 to 10.9 percent in 2000 and then following the declining trend and reached to –0.49 percent in June 2005 (see table 1). This reduction in lending rate indicates a little improvement in the profitability of the banks but purely *ad hoc* and not in the lines of the liberalization. Similarly, the weighted average deposit rate reduced from 6.8 percent in 1998 to 1.37 percent in June 2005; the real deposit rate remained negative except for the period 1999-2002. This reduction in the deposit rate will reduce the savings even further.

Table 1: Interest Rate Behaviour in Pakistan

Year	Inflation Rate	Weighted average Lending Rate		Weighted average Deposit Rate		Interest Rate Spread	
		Nominal	Real	Nominal	Real	Nominal	Real
1990-95	10.57	12.55	1.98	6.53	-4.05	6.02	5.95
1996	10.8	14.4	3.6	6.4	-4.4	8.00	8.00
1997	11.8	14.6	2.8	6.8	-5.0	7.8	7.8
1998	7.8	15.6	7.8	6.8	-1.0	8.8	8.8
1999	5.7	14.8	9.1	6.5	0.8	8.3	8.3
2000	3.6	13.52	10.9	5.47	1.9	8.05	9.00
2001	4.4	13.61	9.21	5.27	0.87	8.34	8.34
2002	3.5	13.19	9.69	3.61	0.11	9.58	9.58
2003	3.1	9.40	6.3	1.61	-1.49	7.79	7.79
2004	4.6	7.28	2.68	0.95	-3.65	6.33	6.33
2005	9.3	8.81	-0.49	1.37	-7.93	7.44	7.44

Source: SBP Annual Reports (various issues)

The interest rate spread[8] is an important indicator for the financial sector's competitiveness and profitability. Spread typically declined when competition among banks increases to access the financial market to increase their customer's base. But in Pakistan, the high lending rate and low deposit rate have generated large spread[9] nearing 7.44 percent in June 2005 as against 6.33 percent in 2004. The high lending rate will increase the cost of borrowing

[7] Although in 2004 the rate fell to 7.28 percent.

[8] Interest Rate Spread = (Average Lending Rate – Average Deposit Rate).

[9] High interest rate spread is generated by factors such as high administrative costs, overstaffing and unavoidable burden of non-performing loans (for further detail, SBP's financial sector assessment 2003-2004).

and hence discourage investment. The low deposit rates discourage savings, resulting high debt/GDP ratio, deterioration of banks balance sheet, lowering economic growth, and increase in poverty. Furthermore, the large spread also reflects perceived sovereign risk (Khan, 2003). Over the period 1999-2002 the real interest rate became positive and varied between 0.9 and 2.0 percent after having been negative over the period 1989-1998[10] but the interest rate spread remains 7.44 percent which is still very high. Hence, measures should be taken to bring down the interest rate spread in order to enhance both savings, investment in the country.

To measure the financial deepening[11], the standard indicators used in this study include the ratios of M2/GDP, BDL/GDP, MCH/GDP, PSC/GDP, SMC/GDP, CC/M2 and CC/GDP[12]. Table 2 shows that the ratio of M_2/GDP increased steadily. Higher values of M_2/GDP represent a deeper financial sector. In 1990 the average monetary assets were around 32.27 percent of GDP; these increased to 49.3 percent of the GDP in 2004 and slightly come down to 48.6 percent of the GDP in 2005. This could be due to the availability of the other instruments outside the M_2[13]. Since M_2 is more saving-investment oriented and the steady growth in M_2/GDP caused positive impact on economic growth. However, M_2/GDP recorded gradual growth, showing more deepening of financial sector. An alternative measure of financial depth, which is frequently used in the literature, is the ratio of bank deposit liabilities to GDP. This ratio provides direct information on the extent of financial intermediation. This indicator may be expected to exert a causal influence on real GDP and is indicative of the stage of financial depth at a particular point in time (Demetriades and Hussein, 1996). A steady growth in this ratio over the period of study also indicates an improvement in the financial intermediation. However, there is ample room for further growth given the recent privatization of the large public sector commercial enterprises.

[10] For the period 1971 to 2003, the average real interest rate (which is defined as the nominal interest rate minus rate of inflation) remained negative (. i.e. -0.05), and for the same period, the real interest rate varied between 5.39 to –18.00 percent.

[11] In this study we have used finance deepening and financial development interchangeably.

[12]M2/GDP, BDL/GDP, MCH/GDP, PSC/GDP, SMC/GDP, CC/GDP are respectively ratio of broad money (currency +demand deposits+time deposits+foreign currency accounts) to gross domestic product, ratio of bank deposit liabilities to gross domestic product, ratio of money cleared through clearing house to gross domestic product, ratio of private sector credit to gross domestic product, ratio of stock market, capitalization to gross domestic product, and currency in circulation to gross domestic product.

[13] This is due to the lack of access to the banking system, the use of credit as means of payments etc. As financial liberalization began and other financial instruments were developed, this ratio tends to decline (Khan, 2003).

Table 2: Indicators of Financial Deepening (in percent)

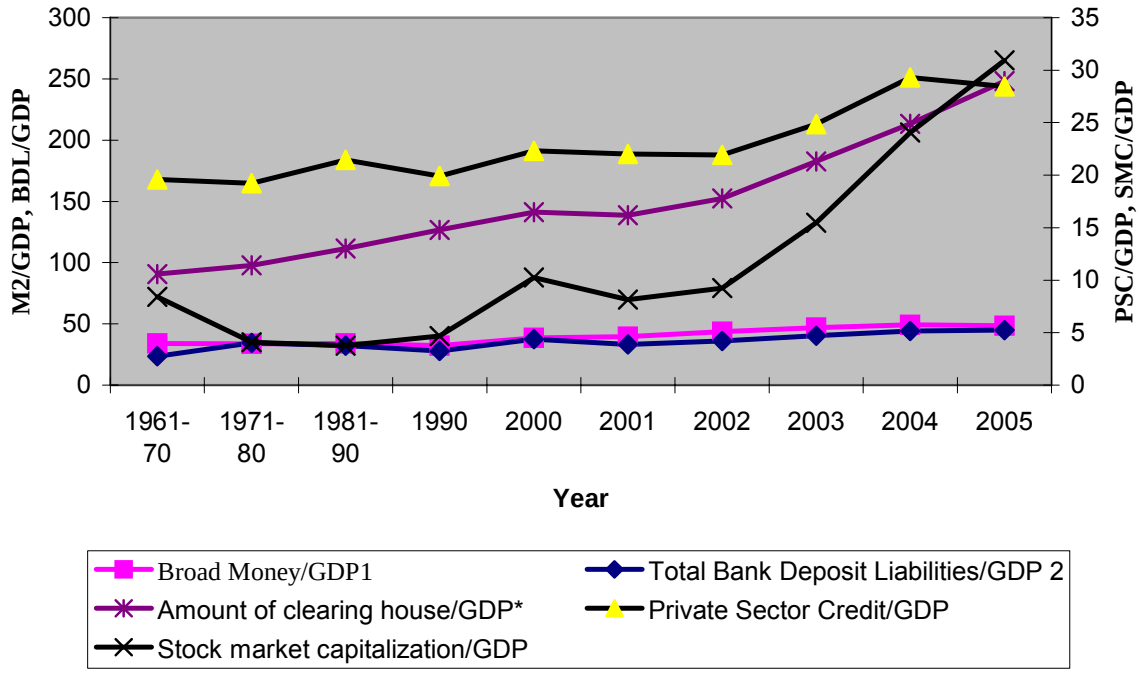
Indicators	1961-70	1971-80	1981-90	1990	2000	2001	2002	2003	2004	2005
Broad Money/GDP[1]	34.03	33.90	34.02	32.27	38.59	39.64	43.80	46.99	49.36	48.61
Total Bank Deposit labilities/GDP[2]	23.52	34.47	32.36	27.91	37.51	33.23	36.03	40.32	44.16	45.02
Amount of clearing house/GDP*	90.74	97.70	111.63	126.88	141.23	138.68	152.48	182.72	213.26	248.26
Currency/M_2	45.13	32.29	32.28	37.56	27.80	26.02	25.30	25.04	23.99	23.00
Currency/GDP	16.06	13.53	13.29	14.73	10.82	10.31	11.08	11.77	11.84	11.18
Private Sector Credit/GDP	19.60	19.24	21.45	19.92	22.33	22.02	21.92	24.87	29.30	28.44
Stock market capitalization/GDP	8.42	4.08	3.75	4.68	10.24	8.15	9.26	15.48	24.05	30.95

Note: [1] Broad money (money + quasi money). Broad money includes the sum of currency outside the banks plus demand, time, savings and foreign currency deposits of residents other than the central government. [2]Total Bank Deposit Liabilities are equal to liquid liabilities minus currency in circulation. Demetriades and Luintel (1996) argue that without deducting currency in circulation, we are left with primarily a measure of monetization, not financial depth (p.360).

* The amount of money cleared through cheques by the clearing house can also be used as an indicator of financial services development.
Source: IFS CD-ROM and Pakistan: Financial Sector Assessment 1990-2000, 2001-2002 (Published by SBP).

The ratio of bank deposit liabilities to GDP assesses the degree of financial deepening in the economy. A steady growth in this ratio over the period of study indicates deepening financial sector. Similarly the amount of money clears by banks through cheques relative to GDP increases gradually also showing the increase in financial intermediation and deepening the domestic financial sector because of the wide spread availability of the financial services offered by the financial institutions. Figure 1 depicted the trend behavior of each financial indicator.

Figure 1: Financial Development Indicator Relative to GDP



The other tools of financial deepening (development) include currency to M2 ratio and currency to GDP ratio reflecting the increase in total deposits relative to currency in circulation and degree of monetization in the economy, which was 23 percent and 11.18 percent of the GDP in 2005 respectively. The stock market capitalization, which was 4.68 percent of GDP in 1990, is now 30.95 percent of GDP in 2005.

2.2 Trade Liberalization

Pakistan has pursued a mixed economy approach to development following import substitution industrialization policies in order to: (i) strengthen the industrial base (ii) achieve self

reliance, (iii) protect domestic infant industries, (iv) insulate the domestic economy into external shocks stemming from international capital markets, and (v) reduce the chronic balance of payments deficits and use scarce foreign exchange resources.

To achieve these objectives, the government imposed various quantitative and qualitative restrictions on trade to protect domestic industries. During the 1960s a more liberal policies being opted by the government where the private sector was encourage to play a greater role.[14] Consequently, both industrial production and exports registered a reasonable increase during this period. However, this trend was reversed during 1970s because of nationalization of industries, financial institutions and an increasing domination of public sector in the economic activities. Although, the government took various measures such as, devaluation of Pak-rupee vis-à-vis US-dollar, elimination of export bonus scheme and discontinuation of restrictive import licensing scheme to boost exports. But these steps do not register any significant impacts on exports.

In the late 1980s, Pakistan was faced with high macroeconomic imbalances as a result of the growing inefficiency and losses in the public sector. To restore the business confidence and to reduce inefficiency and losses in the public sector, the government implemented a wide range of structural and institutional reforms in the early 1990s. The most specific measure undertaken by the government includes:

- Reduction of maximum tariff rate on imports from 225 percent in 1986-87 to 25 percent in 2005 (Husain, 2005; Kemal, 2001 and Anwar, 2002). The average tariff rate has come down to 11 percent as compared to 65 percent a decade earlier (Husain, 2005). Similarly, the number of custom duty slabs was reduced from 13 in 1996-97 to 4.
- Quantitative import restrictions were lifted except those relating to security, health, and public morals, religious and cultural related.
- All para-tariffs have been merged in to the statutory tariff regime, and import duties on 4000 items were reduced.

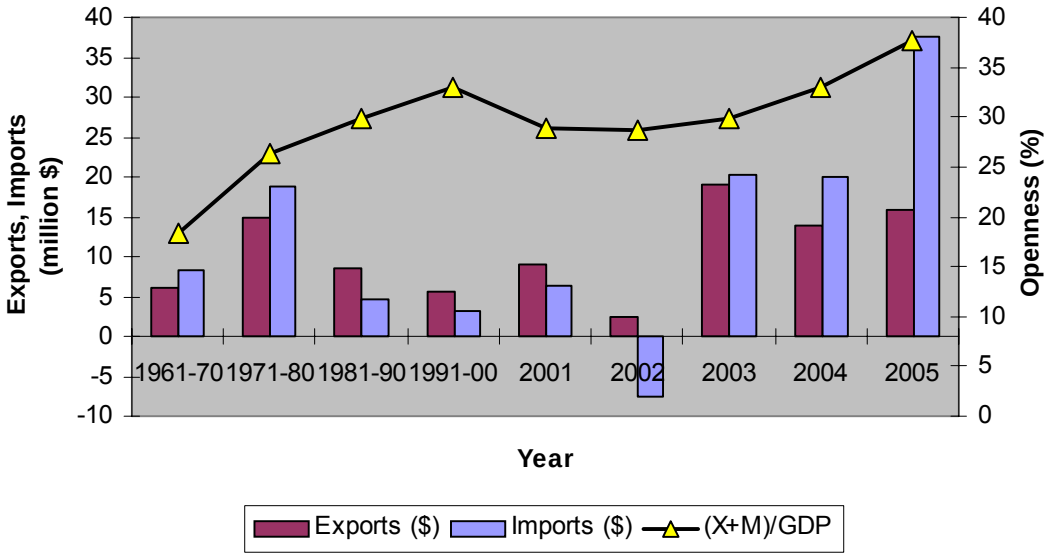
[14] Although highly protected trade regime remained effective in this period. However, some additional policies such as, an overvalued exchange rate, export bonuses, preferential credit access to industries with export potential and automatic renewal of import licenses, were introduced to encourage exports (Yasmin *et al*, 2006)

Table 3: Growth Rates of Exports and Imports and Degree of Openness (%)

Year	1961-70	1971-80	1981-90	1991-00	2001	2002	2003	2004	2005
Exports ($)	6.07	14.97	8.52	5.61	9.07	2.32	19.14	13.84	15.93
Imports ($)	8.35	18.78	4.54	3.22	6.25	-7.53	20.13	20.04	37.64
(X+M)/GDP	18.28	26.31	29.93	32.90	28.91	28.68	29.89	32.99	37.65

Source: State Bank of Pakistan (Handbook of Pakistan Economy, 2005)

Figure 2: Exports, Imports, and Degree of Openness (%)



These measures have brought down effective rate of protection, eliminate the anti-export bias and promote competitive and efficient industries. A number of laws[15] were also been promulgated to bring the trade regime in line with WTO regulations.

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Despite the substantial reduction in tariff rate, removal of all non-tariff barriers and successive devaluation of the currency[16], the growth in exports in the 1990s was only 5.6 percent per annum as compared to 14.97 percent in the 1970s and 8.5 percent in the 1980s (see table 3 and figure 2). However, the overall trade to GDP ratio has risen from 26.31 percent in 1970s to 37.65 percent today in Pakistan. This gives an indication of higher level of trade integration

[15] Such as anti-dumping, countervailing measures and intellectual property rights

[16] The average annual depreciation of exchange rate was about 10 percent in the 1990s (i.e. Rs.24 in 1990 to Rs.60 in 2000).

In order to encourage foreign direct investment, restrictions on capital inflows and outflows were gradually lifted. Investors were also allowed to purchase up to 100 percent of the equity in industrial companies on repatriable basis without any prior approval. Furthermore, investment shares issued to non-residents could be exported and remittance of dividend and disinvestments proceeds was permissible without any prior permission of SBP. In 1994, restrictions on some capital transactions were partially relaxed, and foreign borrowing and certain outward investments were allowed to some extent. Full convertibility of the Pak-rupee was established on current international transactions. The establishment of an interbank foreign exchange market also marked an important step towards decentralizing the management of foreign exchange and allowing market forces to play a greater role in exchange rate determination.

3.- Model Specification, Methodology and Data Issues

Theoretical literature predicts that real income; financial development and real interest rate are positively correlated. The positive relationship between the level of output and financial development resulted from the complemetarity between money and capital (Mckinnon, 1973). Furthermore, the removal of ceilings on deposit rate results in positive real interest rate, which increase savings and hence economic growth. King and Levine (1993a, 1993b) predict a positive relationship between real income, financial development and real interest rate.

Based on these theoretical postulates, the relationship between real output and financial development can be specified as:

$$y_t = \alpha_0 + \alpha_1 fd_t + \alpha_2 r_t + \varepsilon_t \qquad (1)$$

Where y_t is real output, fd_t is the financial sector development, r_t is the real deposit rate and ε is an error term. Except real deposit rate, all the variables are expressed in logarithmic form.

Theoretical and empirical research indicates a strong and positive correlation between trade liberalization and economic growth over long period of time. Sachs and Warner (1995) has pointed out that open economies has grown about 2.5 per cent faster than closed economies and the difference is larger among developing countries. Jin (2000) argued that trade liberalization and openness has provided an important base of economic activity. Thus, an increasing openness is expected to have a positive impact on economic growth.[17] Barro (1991) provided

[17] More recent studies after the Asian Economic Crisis of 1997-99, have challenged some of these findings. Rodrigues and Rodrik (1999) have raised question about measuring the degree of openness, and have identified many other factors that affect growth. They concluded that trade liberalization does always leads

evidence that increasing openness had a positive effect on GDP growth per capita. Edwards (1992) also found a positive and significant effect of openness on GDP growth. It can be argued that through the openness countries are able to benefit from information spillovers such as scientific advances and improvements. Sukar and Ramakrishna (2002) argued that countries that liberalize their external sector and reduce impediments to international trade could experience relatively higher economic growth. Thus, we extend equation (1) by incorporating the variable tl_t which capture the impact of trade liberalization on real output. Now equation (1) can be written as:

$$y_t = \alpha_0 + \alpha_1 fd_t + \alpha_2 r_t + \alpha_3 tl_t + \varepsilon_t \qquad (2)$$

To examine the long run relationship between real GDP, trade liberalization, financial development, and real deposit rate, we employ bound testing approach to cointegration within the framework of Autoregressive Distributed Lag (ARDL) developed by Pesaran *et al* (2001). The main advantage of this methodology is that it does not require that the variables in a time series regression equation are integrated of order one and could be implemented regardless of whether the underlying variables are I (0), I (1), or fractionally integrated.

An ARDL (p,q) model of equation (2) in the form of unrestricted error-correction can be formulated as:

$$\Delta y_t = \sum_{j=1}^{p-1} \gamma_j \Delta y_{t-j} + \sum_{j=0}^{p-1} \delta_j \Delta x_{t-j} + \varphi\left[y_{t-1} - \{\gamma + \pi_i x_{t-1}\}\right] + \varepsilon_t \qquad (3)$$

Where y_t is the growth of real GDP and x_t is a vector of explanatory variables (i.e. fd, r, tl), γ and δ are the short-run coefficients related to growth and its determinant, π_i are the long-run coefficients, φ is the speed of adjustment to the long-run relationship, and ε is error term. The term in square brackets contains the long-run relationship, which acts as forcing equilibrium condition:

$$y_t = \gamma + \pi_i x_t + u_t \qquad \text{where} \quad u_t \sim I(0) \qquad (4)$$

For the presence of a long run relationship amongst the variables of equation (2) is tested by means of bounds testing procedure proposed by Pesaran *et al* (2001). The bounds testing procedure is based on the F -stat (or Wald statistics) for cointegration analysis. The asymptotic distribution of the F -statistic is non-standard under the null hypothesis of no cointegration

to higher growth. Batra (1992), Batra and Slottje (1993) and Leamer (1995) concluded that freer trade is the primary source of economic downturns.

between the examined variables, irrespective of whether the explanatory variables are purely I (0) or I (1). To implement the bound test, the null hypothesis is tested by considering the unrestricted error correction model (UECM) for real GDP in equation (2) and a joint significance test was performed as:

$$H_0 : \pi_i = 0 \text{, and} \qquad H_1 : \pi_i \neq 0 .$$

Pesaran *et al* computed two sets of critical values for a given significance level. One set assumes that all variables are I (0) and other set assumes that they are all I (1). If the computed F -statistic exceeds the upper critical bounds value, then the H_0 is rejected. If the F -statistic falls into the bounds then the test becomes inconclusive. If the F -statistic lies below the lower critical bounds value, it implies no cointegration.[18]

Once the long-run relationship is identified, then the long-run and short-run estimates for equation (3) were estimated using ARDL with the following specification:

$$y_t = \phi_0 + \sum_{i=1}^{k} \phi_1 y_{t-i} + \sum_{i=0}^{k} \phi_2 fd_{t-i} + \sum_{i=0}^{k} \phi_3 r_{t-i} + \sum_{i=0}^{k} \phi_4 tl_{t-i} + \eta_t \qquad (5)$$

At the second stage of ARDL cointegration method, it is also possible to perform a parameter stability test for the appropriately selected ARDL representation of the UECM.

3.1 Data Description

The present study is based on the annual data covering the period from 1961-2005. Literature on financial development suggests several indicators used as proxy to measure financial liberalization (deepening/intermediation). However, in this study we basically calculated four financial development indicators related to banking and stock market. *Firstly*, total bank deposit liabilities relative to GDP which is calculated by taking the difference between liquid liabilities of the financial system minus currency in circulation divided by GDP.[19] This considered the broadest measure of the financial intermediation. *Secondly*, ratio of private sector credit to GDP, which measures how much intermediation, is performed by the banking system. *Third*, amount of money cleared through clearing house relative to GDP. *Lastly*, the ratio of stock market capitalization to GDP is calculated as the stock market capitalization divided by GDP.

[18] This is similar to the Johansen and Juselius multivariate cointegration procedure, which has five alternative cases for long run.

[19] The standard measure of financial development is the ratio of M2 to GDP (World Bank, 1989). However, this ratio measures the extent of monetization rather than financial development. In developing countries, monetization can be increasing without financial development; therefore, M2/GDP is not a satisfactory indicator of financial development. Therefore, we define ratio total bank deposit liabilities to GDP as proxy of financial development.

But the problem is that each indicator of financial development exerted different impact on real GDP and the derived coefficients may be biased. To avoid this problem, and following Kelly and Mavrotas (2003) we use total bank deposit liabilities ratio, value of clearing house ratio, credit allocation to private sector ratio and stock market capitalization ratio, to construct financial sector development index ($FSDI$). We used as $FSDI$ a proxy of government financial policy i.e. financial development (fd) .

Real GDP (y) is obtained as a ratio of nominal GDP[20] to consumer price index (CPI 2000=100). Data on these variables are taken from IFS CD-ROM. The variable trade openness relative to GDP (tl) is calculated by taking the ratio of sum of exports and imports to GDP. Data on exports, imports and deposit rate (r) are taken from Handbook of Pakistan's Economy published by SBP (2005). Inflation is calculated as a percentage by taking the log-difference of CPI, while real deposit rate is calculated by taking the difference between deposit rate and inflation rate.

3.2 Construction of Financial Development Index ($FSDI$)

Measuring financial development is very complex and complicated process because there is no clear-cut definition as to what financial development is. Bandiera *et al* (2000) argued that an ideal index of financial sector development should include various aspects of regulatory and institutional reforms. However, measuring this aspect of government policy is very difficult if not possible task (Kelly and Mavrotas, 2003). Inclusion all the policy variables separately in the same model cause serious estimation problems such as, multicolinearity etc. In order of avoid these problems, we use four different types of financial development indicators to construct the financial sector development index by using principal component method.[21] These indicators include the ratio of total bank deposit liabilities to GDP which give an indication of the absolute size of the financial institutions, the ratio of clearing house amount to GDP which indicate the wide spread provision of financial services, the ratio of the private credit to GDP which measures the activities of the financial intermediaries and the ratio of the stock market capitalization to GDP. The index represents a particular government financial policy variable. The financial development index also indicates a steady improvement in the financial sector (see table 4 and figure 3).

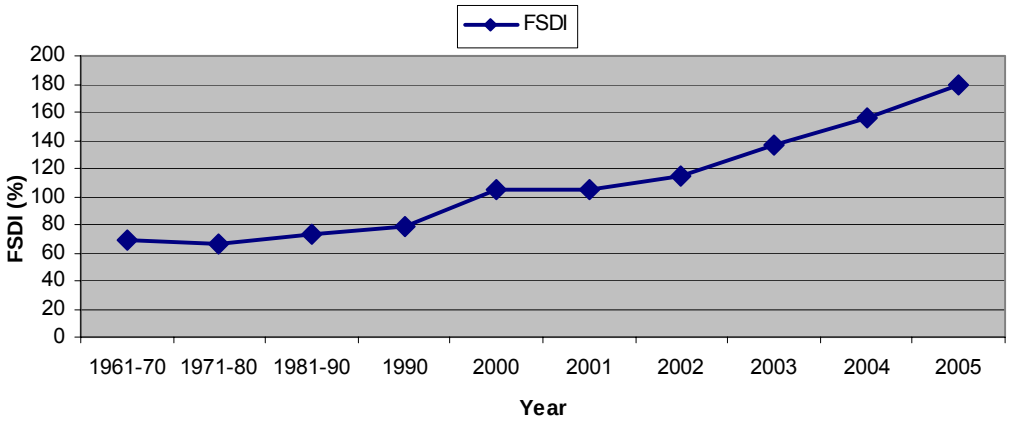
[20] Nominal GDP is adjusted for 1999-2000 base.
[21] The method of principal components is discussed in detail in Theil (1971).

Table 4: Financial Sector development Index ($FSDI$)

Year	1961-70	1971-80	1981-90	1990	2000	2001	2002	2003	2004	2005
FSDI	68.57	66.14	73.55	78.29	105.29	104.28	114.11	135.87	156.17	179.23

Source: author's calculation based on IFS and State Bank of Pakistan's data

Figure 3: Financial Sector Development Index (FSDI)



4.- Empirical Findings of Finance, Trade and Growth

Two-step ARDL cointegration procedure is implemented in estimation of equation (2) for Pakistan using annual observations over the period 1961-2005. In the first stage, the order of lags on the first-differenced variables for equation (3) is obtained from UECM by mean of Schwarz Bayesian Criterion (SBC)[22]. The SBC gives a more parsimonious number of lags than other criteria such as Akaike Information Criterion (AIC).[23] Given the limited number of observations, we experimented up to 2 lags on the first-difference and computed F -statistics for the joint significance of lagged levels of variables in equation (3). The computed F -test statistic for each order of lags is presented in table 5.

[22] Bahmani-Oskooee and Bohl (2000) and Bahmani-Oskooee and Ng (2002) argued that the results of this stage are sensitive to the order of VAR.
[23] See Bernstein (2000).

Table 5: Statistics for Selecting Lag Order and the Existence of Long-Run Relationship

No. of Lag	AIC	SBC	$CHSQ_{SC\,(1)}$	F-statistic
1	97.6794	87.9928	0.2184	28.2522*
2	97.3983	86.9723	0.0811	31.4732*

* indicate significant at the 1% level of significance

Based on the minimum value of SBC, the lag length of order 2 is selected for each series. When 2 lags are imposed, there exists a long-run relationship between y_t, fd_t, r_t and tl_t because the calculated F -statistic (31.4732) is greater than the critical values of the upper level of the bound (i.e. 5.83) at the 5% level of significance. This result gives strong indication of cointegration among the variables included in equation (2).[24]

Given the existence of a long run relationship, in the next step we used the ARDL cointegration method to estimate the parameters of equation (2) with maximum order of lag set to 2 based on SBC. The long run results of equation (2) based on SBC are reported in panel A of table 6. The diagnostic test results of equation (2) based on short run estimates are displayed in panel B of table 6.

The empirical results presented in table 6 indicate that the estimates possessed expected signs and are statistically significant at the 1% level of significance. The overall results are in accordance with the prediction that trade and financial policies have a positive impact on real GDP. These results also imply that liberalization policies enhance economic growth rather than growth inducing liberalization. The contribution of financial policy is more than the trade policy to development, which is consistent with the fact that financial liberalization facilitates trade liberalization.

The study also found a positive and significant impact of fd and r on real GDP (y). This positive impact supports the prediction of Mckinnon and Shaw hypothesis that an increase in real interest rate facilitates financial savings and real income. Moreover, an acceleration of financial development raises the capacity of financial intermediaries to supply funds, which help to enhance investment and economic growth. These results are also in the lines with King and Levine (1993a, 1993b), Levine *et al* (2000), Beck *et al* (2000), Levine (1999) and Khan and

[24] At lag 2, the residuals are white noise as indicated by the Lagrange Multiplier test of serial correlation. i.e. $CHSQ_{SC\,(1)}$

Senhadji (2000) find positive effects of financial depth on economic growth[25]. These results provide clear evidence that there is a long-run relationship between output and financial development, and therefore the casual relationship runs from financial development to output[26]. Since the magnitude of financial policy (financial development) is higher than that of real interest rate which support the argument that in a developing country like Pakistan the availability of funds

Table 6: ARDL Estimates

Panel A: Long- run Coefficients Dependent Variable: y_t		
Regressor	Coefficient	t-values
fd_t	1.0291	3.4511*
r_t	0.0329	3.0555*
tl_t	0.3715	8.3371*
Intercept	9.9908	33.5708*
Panel B: Short-run Diagnostic Test Statistics		
$\chi^2_{SC(1)}$	0.16400	
$\chi^2_{FF(1)}$	2.9289	
$\chi^2_{NO(2)}$	1.6418	
$\chi^2_{Het(1)}$	1.6413	

Note: ARDL (1, 1, 1, 0) selected on the basis of SBC. The full tables of the short run estimates are available from the author. χ^2_{SC}, χ^2_{FF} χ^2_{NO} and χ^2_{Het} are Lagrange multiplier statistics for test of residual correlation, functional from mis-specification, non-normal errors and heteorskedasticity, respectively. These statistics are distributed as Chi-square values with degree of freedom in parentheses.

rather the cost of funds is more important to raise real income. The low coefficient of real interest rate implies that an increase in interest rate alone is unable to expedite economic growth. These findings are consistent with earlier findings derived by Khan *et al* (2005).

[25] These studies utilized panel data for the empirical purpose.

[26] We have also implemented cointegration test by taking financial development (fd_t) as dependent variable, but we does not find any evidence of cointegration. The results are available from the authors.

The study also finds a positive and significant impact of trade liberalization policy (tl_t) on real GDP (y_t). This result implies that trade liberalization allows market forces to channel resources towards relatively productive sectors and hence leads to a rise in market efficiency. It also increases markets for new products and generates economies of scale. These results confirmed the earlier findings of Din *et al* (2003).

To find the short-run causality between y_t and fd , and y_t and tl_t , we estimate error-correction model and the results are given in table 7. The estimated lagged error-correction term (ECM_{t-1}) is negative and highly significant. This result further supports the cointegration among the variables entered in equation (2). The feedback coefficient is -0.09, suggesting a slow adjustment process. Nearly 9 percent of the disequilibria of the previous period's shock adjust back to the long-run equilibrium in the current year. The results further suggest that in the short-run financial development exerted negative and insignificant impact on the economic growth. This result implies that economic growth is long run process not short-run.

The results further suggest that there is no evidence of short-run causality running from financial development to economic growth as indicated by the χ^2 -test. However, short-run causality between output and trade liberalization does not rejected as indicated by the χ^2 test (panel B of table 7). This result implies that output growth and trade liberalization is interdependence. The short-run response of real deposit rate is significant but very small, suggesting the need for further liberalization of interest rate. Furthermore, the changes in the trade policy exerted positive and significant impact on economic growth in the short-run. However, the impact of trade policy changes is so small in the short run.

Table 7: Error Correction Representation of ARDL Model

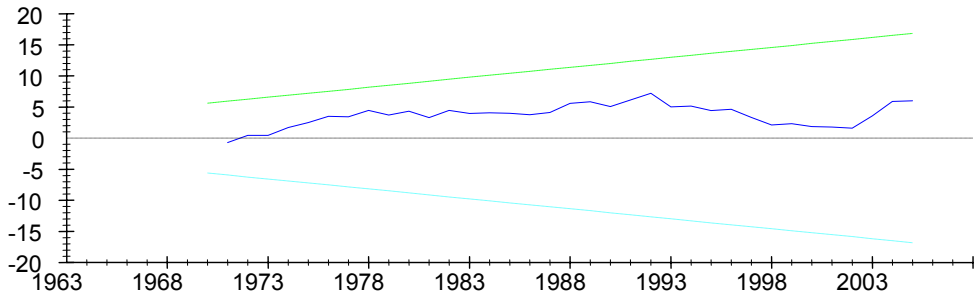
Panel A: Results of Error-Correction Model		
Dependent Variable: Δy_t		
Regressor	Coefficient	t-values
Δfd_t	-0.0806	-1.7654
Δr_t	0.0057	4.2958*
Δtl_t	0.0334	2.6122**
Δ Intercept	0.8974	3.3162*
ECM_{t-1}	-0.0898	-3.0555*
R^2 R^2_{adj} F-stat AIC SBC S.E Regression R.S.S Equation-LL DW-stat	0.36 0.25 5.066 97.4013 91.2371 0.02 0.20 104.4013 2.12	
Panel B: Short-run Causality tests between output and financial development and output and trade liberalization		
$\Delta fd_t = 0$	$\Delta tl_t = 0$	
$\chi^2(1) = 3.1167$	$\chi^2(1) = 6.8237$*	

Note: ARDL (1, 1, 1, and 0) selected on the basis of SBC. R.S.S, LL, AIC and DW are respectively residual sum of squares; log likelihood, Schwarz Bayesian Criteria and Durbin Watson stat.
*, ** indicate significant at the 1% and 5% level of significance respectively.

$$ECM = y_t - 1.0291 * fd_t - 0.0329 * r_t - 0.3715 * tl_t - 9.9908 * Intercept$$

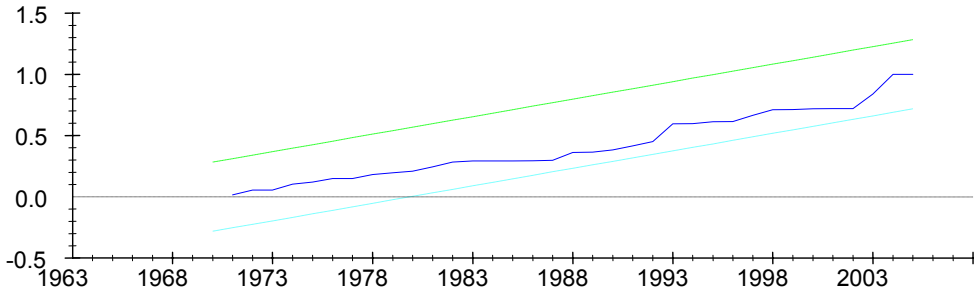
To assess the structural stability of the estimated model, we also performed the CUSUMSQ test of stability. Figure 4 and 5 plots the CUSUM and CUSUMSQ.

Figure 4: Plot of Cumulative Sum of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

Figure 5: Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

It can be seen respectively from the figure 4 and 5 that the plots of CUSUM and CUSUMSQ statistic is well within the critical bounds implying that all the coefficients in the estimated model are stable.

5.- Conclusions

This paper examines the impact of trade and financial policies and real interest rate on real GDP in Pakistan over the period 1961-2005. The study utilized bound testing approach of cointegration advanced by Pesaran *et al* (2001). Empirical result reveals the presence of a long-run relationship between real GDP, trade liberalization, financial development and real interest rate. The results further show that in the long-run fd, r, and tl exerted positive impact on y. However, in the short run fd is negatively associated with economic growth, but remains statistically insignificant. The study also found a positive impact of trade openness on economic growth both in the long as well as in the short-run. This result highlighted the importance of trade liberalization in order to enhance economic growth. However, financial liberalization has relatively higher impact on y than does tl in the long-run. The low effectiveness of real interest rate indicates that interest rates alone are unlikely to expedite economic growth. The feed back

coefficient is negative and significant, but the speed of adjustment is rather slow. Availability of funds is more important rather than the cost of funds to promote economic growth.

Based on the above findings we can derive some important policy implications: if policymakers want to promote growth, then attention should be focused on long-run policies, for example, the creation of modern financial institutions and further development stock markets. Furthermore, the study suggests that Pakistan should go more of trade and financial liberalization to enhance more economic growth. The continuation of such policies with strong commitment is also recommended in order to promote and sustained economic growth.

References

Aziz, Jahangir and Christoph Duenwald (2002), "Growth-Finance Intermediation Nexus in China", IMF Working Paper No. WP/02/194, International Monetary Fund: Washington D.C.

Anwar, Tilat (2002), "Impact of Globalization and Liberalization on Growth, Employment and Poverty: A Case Study of Pakistan", WIDER Discussion Paper No. 17

Ansari, M.I (2002), "The Impact of Financial Development, Money, and Public Spending on Malaysia National Income: An Econometric Study", Journal of Asian Economics, Vol. 13, pp. 72-93.

Andersen, T., and F. Tarp (2003), "Financial Liberalization, Financial Development and Economic Growth in LDCs", Journal of International Development, Vol. 15, pp. 189-209.

Bernstein, D.J. (2000), "To What Degree Do Central Banks Sterilize the Effects of Capital Flows on Domestic Money Supply?", Applied Economic Letters, Vol. 7, No.1, pp.15-19.

Bandiera, O., G. Caprio, P. Honohan and F. Schiantarelli (2000), "Does Financial Reforms Raise or Reduce Savings?", Review of Economic and Statistics, Vol. 82, No. 2

Barro, R.J. (1991), "Economic Growth in a Cross Section of Countries", Quarterly Journal of Economics, Vol. 106, pp. 407-444.

Beck, T., Levine, R. and Loyaza, N. (2000), "Finance and the Sources of Growth", Journal of Financial Economics, Vol.58, pp.261-300.

Batra, R. (1992), "The Fallacy of Free Trade", Review of International Economics, Vol.1, pp. 19-31.

Batra, R. and Slottje, D.J. (1993), "Trade Policy and Poverty in the United States: Theory and Evidence, 1947-1990", Review of International Economics, Vol.1, pp.189-208.

Bencivenga, V.R, and B.D. Smith (1991), "Financial Intermediation and Endogenous Growth", Review of Economic Studies, Vol.58, No.2, pp. 195-209.

Bahmani-Oskooee, M. and Bohl, M.T. (2000), "German Monetary Unification and the Stability of German M3 Money Demand Function", Economic Letters, Vol. 66, pp. 203-208.

_____ and Ng, R.C.W. (2002), "Long Run Demand for Money in Hong Kong: An Application of ARDL Model", International Journal of Business and Economics, Vol.1, pp.147-155.

Bhagwati, J. (1988), "Export-Promoting Trade Strategy: Issues and Evidence", The World Bank Research Observer, pp. 27-57.

Din, Musleh-UD, E.Ghani, and O.Siddique (2003), "Openness and Economic Growth in Pakistan", The Pakistan Development Review, Vol.42, No.4, pp.795-807

Demetriades, P.O and Hussein, A.K. (1996), "Does Financial Development Cause Economic Growth? Time Series Evidence from 16 Countries", Journal of Development Economics, Vol.51, pp.387-411.

_____ and Kul B. Luintel (1996), "Financial Development, Economic Growth and Banking Sector Controls: Evidence From India", Economic Journal, Vol. 106, pp.359-374.

De Gregorio,J., and P.E. Guidotti (1995), "Financial Development and Economic Growth", World Development, Vol.23, No.3, pp.433-448.

Darrat, Ali. F. (1999), "Are Financial Deepening and Economic Growth Causality Related? Another Look at the Evidence", International Economic Journal, Vol.13, No.3, pp.19-35.

Edwards, S. (1992), "Trade Orientation, Distortions, and Growth in Developing Countries, Journal of Development Economics, Vol. 39, pp. 31-57

Fry, M.J. (1997), "In Favour of Financial Liberalization", Economic Journal, Vol.107, pp.754-770.

Fase, M. and R. Abma (2003), "Financial Environment and Economic Growth in Selected Asian Countries", Journal of Asian Economics, Vol. 12, pp. 11-21.

Haque, Nadeem Ul and Shahid Kardar (1993), "Constraints to the Development of Financial Markets in Pakistan", IMF Mimeo

Husain, Ishrat (2005), "Economy of Pakistan: An Overview", Key Note Address at the Expo 2005 Conference held at Karachi on February 3, 2005.

Iimi, Atsushi (2004), "Banking Sector Reforms in Pakistan: Economies of Scale and Scope, and Cost Complementarities", Journal of Asian Economics, Vol. 15, pp. 507-528.

Jin, Jang C. (2000), "Openness and Growth: An Interpretation of Empirical Evidence from East Asian Countries", The Journal of International Trade and Economic Development, Vol.9, No.1, pp.5-17

King, R.G. and Levine, R. (1993a), "Finance and Growth: Schumpeter Might be Right", Quarterly Journal of Economics, Vol. 108, pp.717-737

_____ (1993b), "Finance, Entrepreneurship and Growth", Journal of Monetary Economics, Vol. 32, pp.30-71

Krueger, Anne O. (1998), "Why Trade Liberalization is Good for Growth", Economic Journal, pp. 1513-1522.

Kelly, R. and G. Mavrotas (2003), "Financial Sector Development ─ Futile or Fruitful? An Examination of the Determinants of Savings in Sri Lanka", WIDER Discussion Paper No. 14, United Nations University.

Khan, S.M. and Senhadji, A.S. (2000), "Financial Development and Economic Growth: An Overview", IMF Working Paper 00/209 (Washington, DC: International Monetary Fund).

Khan, M. Arshad (2003), "Restructuring of Financial Sector in Pakistan", Journal of the Institute of Bankers Pakistan, Vol. 70, pp.49-68

Khan, M. Arshad, Abdul Qayyum and Saeed Ahmed Sheikh (2005), "Financial Development and Economic Growth: The Case of Pakistan", Presented in the 21st Annual General Meeting and Conference of PSDE, 19th-21st December 2005.

Kemal, A.R. (2001), "Globalization and South Asia", Mahbub Ul Haq Human Development Review, Vol.1 No. 1, pp.61-74.

Leamer, E.E. (1995), "A Trade Economist's View of U.S. Wages and Globalization", Brooking Conference Proceedings.

Lucas, R.E. Jr. (1988), "On the Mechanics of Economic Development", Journal of Monetary Economics, Vol.22, pp.3-42

Levine, R. (2004), "Finance and Growth: Theory and Evidence", NBER Working Paper No. 10766

_____ (2002), "Bank-Based or Market-Based Financial Systems: Which is Better?", Journal of Financial Intermediation, Vol. 11, pp. 398-428.
_____ (1999), "Financial Development and Growth: Where Do We Stand", Estudios de Economia, Vol. 26, No. 2, pp. 113-136.
_____ (1997), "Financial Development and Economic Growth: Views and Agenda", Journal of Economic Literature Vol. 35, pp.688-726.
_____ and S. Zervos (1998), "Stock Markets, Banks and Economic Growth", American Economic Review, Vol. 88, No. 3, pp. 537-558.
_____, Norman Loayza, and Thorsten Beck (2000),"Financial Intermediation and Growth: Causality and Causes", Journal of Monetary Economics, Voil.46, pp.31-77.
_____, and Renelt, D. (1992), "A Sensitivity Analysis of Cross-Country Growth Regressions", American Economic Review, Vol. 82, pp. 942-963.
Lee, Jong-Wha (1993), "International Trade Distortions, and Long-run Economic Growth", IMF Staff Papers, pp.299-328.
Mckinnon, R.I. (1973), "Money and Capital in Economic Development", Brooking Institution, Washington, DC
Pesaran, M.H., Yongcheol Shin and Richard J. Smith (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", Journal of Applied Econometrics, Vol. 16, pp.289-326.
Rodriguez, F., and D. Rodrik (1999), "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence", NBER Working Paper No. 7081.
Rivera-Batiz, L.A. and P.M. Romer (1991), "International Trade with Endogenous Technological Change", European Economic Review, pp. 971-1004.
Romer, P.M. (1986), "Increasing Returns and Long-run Growth", Journal of Political Economy, pp.1002-1037.
Robinson, J. (1952), "The Rate of Interests and Other Easys", Macmillan, London.
Roubini, Nouriel and Sala-i-Martin, Xavier (1991), "Financial Development, Trade Regimes and Economic Growth", NBER Working Paper No. 3876.
Schumpeter, J.A. (1911), "*Theorie der Wirtschaftlichen Entwicklung* [The Theory of Economic Development]", Leipzig: Dunker & Humblot, translated by Redvers Opie. Cambridge, MA: Harvard University Press, 1934.
Sukar, Abdulhamid, and G.Ramakrishna (2002), "The Effect of Trade Liberalization on Economic Growth: The case of Ethiopia", Finance India, Vol.XVI, No.4, pp.1295-1305.
Sachs, J.D., and A Warner (1995), "Economic Reforms and the Process of Global Integration", Brooking Papers on Economic Activity, Vol.1, pp.1-118.
Shaw, E.S., (1973), "Financial Deepening in Economic Development", Havard University Press, Cambridge, M.A.
State Bank of Pakistan, "Annual Reports" (Various Issues), State Bank of Pakistan, Karachi.
_____, "Quarterly Bulletin" (Various Issues), State Bank of Pakistan, Karachi.
_____ (2002), "Pakistan: Financial Sector Assessment 1990-2000", State Bank of Pakistan, Karachi.
Theil, H (1971), "Principles of Econometrics", London: North Holland.
Tadesse. S. (2002), "Financial Architecture and Economic Performance: International Evidence", Journal of Financial Intermediation, Vol. 11, pp. 429-454.
World Bank (1989), "World Development Report 1989", Oxford University Press, New York.
Yasmin, Bushra, Zainab Jehan and M.A. Chaudhary (2006), "Trade Liberalization and Economic Development: Evidence from Pakistan", The Lahore Journal of Economics, Vol.11, No. 1, pp. 19-34.