GC UNIVERSITY, LAHORE

GCU

ECONOMIC JOURNAL

ESTD-1864

Department of Economics
GC University, Lahore
Pakistan

GCU
ECONOMIC JOURNAL

CONTENTS

ARTICLES

An Analysis of the Relationship between Debt Burden and Human Resource Development: A Case Study of Pakistan

Muhammad Afzal, Hafeez-ur-Rehman, and Ishrat Begum[*]

Abstract: This paper attempts to analyze the relationship between debt burden and human resource development in Pakistan using annual data for the period 1971-2005. Pakistan has been receiving heavy doses of foreign aid in the form of loans since independence. The burden of debt has been increasing on the Pakistan economy over time. Many researchers have tried to analyze this problem and used traditional OLS techniques to measure the impact of burden of debt on human resource development and on other macroeconomic variables like inflation. A new and more effective econometric technique, ARDL, has been used to analyze the relationship between burden of debt and human resource development. It shows that there is a relationship between burden of debt and human resource development in Pakistan and the empirical results support the traditional view that raising investment is a key to achieve the high rate of employment. The domestic debt is not positively contributing towards human resource development. The long-run impact of foreign debt and total debt is positive but not statistically significant. This paper concludes that unproductive use of debt is responsible for low capital formation in Pakistan.

1. Introduction

The inflow of foreign capital through debt and other means is always welcomed in most developing countries. Foreign capital is considered to be necessary to bridge both the saving-investment gap and the trade gap in developing countries like Pakistan. Furthermore, foreign capital is advocated for establishing the pre-conditions for economic growth, strengthening of institutions and building infrastructure. Dearth of physical as well as human capital and technology is one of the major causes of high average cost of production and low productivity of labour and capital in developing countries. Foreign capital brings sufficient physical and financial capital along with technical know-how, skilled personnel,

[*] The authors, respectively, are Lecturer and Associate Professor in Economics at the University of the Punjab, Lahore (Pakistan), and Lecturer in Political Science at Queen Mary College, Lahore.

organizational experience, market information, advanced production techniques and innovations in products, etc. Pakistan relied heavily on foreign and domestic debt to fill both internal and external gaps.

The experience of the economically developed and some of developing countries provided the empirical support on the usefulness of foreign capital. Marshall Plan had provided massive economic assistance for the rehabilitation of the war-affected economies. Unlike developed countries, LDCs lack necessary social infrastructure and institutional support for the efficient utilization of foreign aid. It is now being suggested that even if it is conceded that aid promotes growth, the important question is: who benefits from aid supported growth? Developing countries have a controversial view about foreign aid especially in the form of debt. It has been argued that foreign aid is one of the tools used by the industrialized and developed donor nations to dictate economic and political policies of recipient developing countries. Economists believe that aid can only succeed in transforming a country's socio-economic profile if the government of the recipient country makes an effort to bring about structural and institutional changes in the economy in order to attain the 'take-off' stage. Unfortunately, in many developing countries like Pakistan, governments have used aid to provide temporary relief to their economies, to finance the budget deficit and bridge the internal and external gaps. Pakistan, like other developing countries, has also been deficient in domestic resources to finance investment and large budget deficits. The treatment of budget deficits needs to be considered from the viewpoint of national accounts. The basic accounting identity for deficits is as follows:

Budget deficit=Primary Budget Deficit + Interest Payments on Outstanding Public Debt

Budget deficits can be financed either by money creation, use of foreign reserves, foreign borrowing and domestic borrowing. In equation form:

Budget Deficit=Money Creation + Foreign Reserve Use + Foreign Borrowing + Domestic Borrowing

The first two sources are not commonly used due to the fear of high inflation and unsatisfactory situation of foreign reserves and the last two have traditionally been the largest sources of financing budget deficit etc. in

developing countries. Pakistan started its planned development efforts in 1955 with considerable amount of foreign aid support in the hope that it would reduce the resource gap which was acting as a constraint on its growth. It was hoped that sustained economic growth would reduce this dependence, ultimately making Pakistan politically stable and economically self-sufficient. However, reality turned out to be totally different. Rather than being successful in eliminating dependence on aid, the country had received heavy doses of foreign aid.

Pakistan has been unable to provide climate to attract foreign capital, especially FDI, due to political instability, weak economic policies and lack of human capital. Debt burden increased over time and the country was caught in severe debt-servicing problem, because of the poor foreign trade policies, unproductive use of foreign debt etc. Pakistan was forced to receive heavy doses of more aid to fulfill its debt servicing obligations. Debt-servicing has become immense problem for Pakistan.

The financial experts, economists and social scientists while analyzing the economic conditions hold various governments responsible for rowing the Pakistan's economy into the swamp of external and internal debts. They are of opinion that instead of developing a just taxation system for collecting revenues by expanding the tax base, they found it easy to borrow to run the state affairs in a lavish style. The corrupt government officials took advantage of cumbersome tax procedures for personal gains which worsened the situation. The country's poor economic performance demands the analysis of the debt situation and its impact on different fields of life, especially human resources.

Debt may have good or bad effects on the human development process. So, it is highly important to analyze the impact of debt on the human development process of Pakistan. The present study attempts to analyze the impact of domestic debt, foreign debt and total debt on human indicators of Pakistan's development process.

1.1 Objectives of the Study

The objectives of the present study are as follows:

- To determine the size and volume of domestic, foreign and total debt

- To assess over time growth rate of debt

- To analyze the effect of debt on human aspect of development

- To suggest policy measures for improvement in debt situation of the country.

The paper is organized as follows: Section 2 provides a historical background of debt and debt burden. Section 3 presents a review of literature. Methodology and data sources are discussed in Section 4. Empirical analysis and estimated results are presented in Section 5. Finally, Section 6 consists of conclusions and recommendations.

2. Historical Background of Debt and Debt Burden

Several new phenomena and institutions emerged after World War II. League of Nations had failed and formation of UNO and two blocs system took place. The world was divided into two blocs, *i.e.* Communist Bloc and Capitalist Bloc. The four leading countries, known as Allied Powers, charted the new shape of the world as well as shares for themselves. The formation of United Nations was decided towards the end of the war. Bretton Woods conference decided in 1944 to establish the International Bank for Reconstruction and Development (IBRD) and the International Monetary Fund (IMF). The United States, being the richest country in the group, assumed the role of political and economic leadership for most of the world. It offered to be the host country for all the three important international organizations, and provided the necessary facilities.

The foreign aid phenomenon emerged with the introduction of Marshall Plan and the interference of rich countries in the internal as well as external affairs of poor countries started. Furthermore, the IBRD (International Bank for Reconstruction and Development) and its two affiliates, IDA

(International Development Association) and IFC (International Finance Corporation) provided loans, concessional assistance and technical support to the developing countries.

In the early years, Pakistan received foreign aid which has high proportion of grant and smaller proportion of loans. Gradually, the position reversed and the terms of foreign loans and credits became harder significantly. Furthermore, the commercial loans were made available on higher interest rates to the developing countries. By and large, the hardening of terms reflected by higher average interest rates and lower average maturity periods of the loans have adversely affected Pakistan's external debt servicing.

2.1 Public Sector Expenditure

The burden of debt repayment (the debt servicing as a percentage of GDP) has now become the largest component of the budget, even higher than development expenditure as a percentage of GDP. As is obvious from Table 1, defence expenditure exceeded the development expenditure in 1972-73. The development expenditure was 5.78% of GDP, while defence expenditure was estimated to the extent of 5.90% of the GDP for that year; then there emerged fluctuating variation between the two. But the same situation was observed in 1986-87 when the defense expenditure was estimated at 7.20% of the GDP against the development expenditure of 6.32% of the GDP.

In 1990-91, the development expenditure was equal to defence expenditure i.e. 6.40% of GDP. Beyond 1991-92, defence expenditure was higher relative to development expenditure. (The situation reflected political instability in the country that restricted the development process.)

In 2001-02, development expenditures was 2.9% of GDP, whereas the defence expenditures was 3.4%. The debt servicing expenditure remained fluctuating from 1.30% to 4.80% of GDP during the considered period, *i.e.* 1972-73 to 2005-06. Debt servicing expenditure was about equal, *i.e.* 3.80% of GDP to development expenditure (3.90% of GDP) in 1997-98. Consequently, a remarkable share of the budget was being spent on defence and debt servicing, which continued at the cost of development process.

**Table 1: Public Sector Expenditures in Pakistan (% of GDP)**

Years	Development Expenditure	Defence Expenditure	Debt Servicing
1972-73	5.78	5.90	3.00
1973-74	6.25	5.90	2.20
1974-75	8.87	5.90	2.20
1975-76	9.49	5.90	1.90
1976-77	10.04	5.80	2.10
1977-78	8.70	5.90	1.80
1978-79	9.48	6.00	2.20
1979-80	8.14	6.10	2.50
1980-81	8.38	5.50	2.10
1981-82	8.17	5.70	1.60
1982-83	8.06	6.40	2.20
1983-84	6.68	6.40	2.30
1984-85	7.00	6.70	2.50
1985-86	7.73	6.90	2.80
1986-87	6.32	7.20	3.30
1987-88	6.92	7.00	2.90
1988-89	6.25	6.60	2.80
1989-90	6.55	6.80	3.10
1990-91	6.40	6.40	2.90
1991-92	7.60	6.30	3.10
1992-93	5.70	6.60	3.20
1993-94	4.60	5.90	3.40
1994-95	4.40	5.60	3.40
1995-96	4.40	5.60	3.40
1996-97	3.50	5.30	3.60
1997-98	3.90	5.10	3.80
1998-99	3.40	4.90	2.60
1999-00	2.60	4.0	2.10
2000-01	2.20	3.20	2.8
2001-02	2.90	3.4	1.7
2002-03	2.2	3.3	1.3
2003-04	3.1	3.2	3.2
2004-05	3.5	3.2	4.8
2005-06	4.2	3.2	4.6

Sources: Economic Survey, various issues; SBP Annual Report, various issues.

Figure 1 below present's trends in development, defence and debt servicing (DS) expenditure of Pakistan

Figure1: Trends in Pakistan's Expenditure
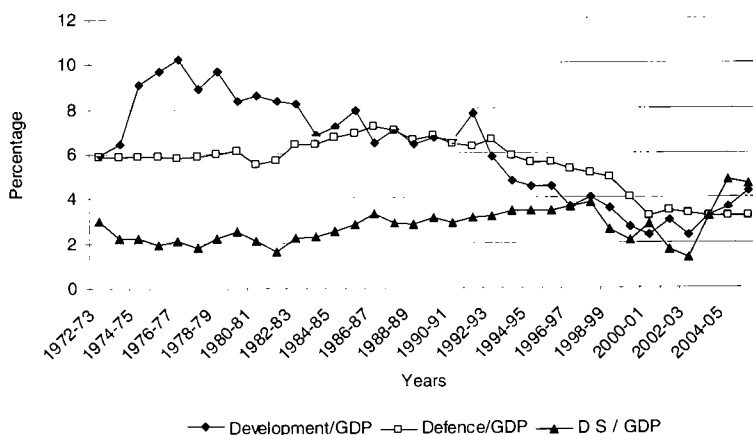
2.2 *Volume of Public Debt*

With the rising fiscal deficit and reduction in the foreign assistance to the country, there emerged an increase in the internal borrowing, which led to a sharp increase in the interest rate. High net mobilization of the resources through national savings scheme resulted in the increased share of domestic debt in overall debt. (The share of domestic debt has increased from 48% in FY 1996 to 50.4% in FY 00), Domestic debt as a ratio of GDP was 11.4% in 1972-73 which rose to 43.6% and 49.9% in 1990-91 and 2000-01, respectively. In 2005-06, such ratio was 32.5%. Table 2 presents the shifts in the composition of Pakistan's public debt.

TABLE 2: Pakistan's Public Debt (Rs. Billions)

Year	Domestic Debt	External Debt	Total Debt
1972-73	7.70(11.40)	29.48 (43.68)	37.18(55.08)
1973-74	7.79 (8.84)	43.87 (49.8)	51.66(58.64)
1974-75	11.57(10.41)	47.53 (42.75)	59.10(53.16)
1975-76	17.12(13.13)	57.03 (43.75)	74.15(56.88)
1976-77	23.44(15.65)	62.84(41.96)	86.28 (57.62)

|			
1977-78	26.72(15.15)	71.24(40.38)	97.96(55.53)
1978-79	40.08 (20.54)	77.28(39.61)	117.36(60.15)
1979-80	41.69(17.78)	85.80(36.58)	127.49 (54.36)
1980-81	47.15(16.95)	86.86(31.22)	134.01 (48.17)
1981-82	90.63 (27.96)	87.20 (26.9)	177.83 (54.86)
1982-83	80.23 (22.02)	118.36(32.48)	198.59(54.50)
1983-84	100.25 (23.88)	127.64(30.41)	227.89 (54.29)
1984-85	143.9(30.5)	147.44 (29.7)	291.34 (60.2)
1985-86	200.8 (39.0)	186.8(36.3)	387.6(75.3)
1986-87	247.3 (43.2)	208.6 (36.4)	455.9(79.6)
1987-88	288.6 (42.7)	232.4 (34.4)	521.0(77.1)
1988-89	331.1 (43.0)	299.4 (38.9)	630.5(81.9)
1989-90	378.3 (44.2)	328.9 (38.4)	707.2 (82.6)
1990-91	445.1 (43.6)	376.0 (36.8)	821.1 (80.5)
1991-92	521.8(43.1)	436.3 (36.0)	958.1 (79.1)
1992-93	602.4 (44.9)	517.2(38.6)	1119.6(83.4)
1993-94	702.0 (44.6)	749.4 (47.7)	1451.4(92.2)
1994-95	798.6 (42.4)	785.1 (41.7)	1583.7(84.1)
1995-96	908.9 (42.0)	951.0(43.9)	1859.9(85.9)
1996-97	901.4(42.5)	975.9 (46.0)	1877.3 (88.5)
1997-98	1037.2 (42.7)	1147.3(47.2)	2184.5(90.0)
1998-99	1176.2(43.9)	1483.1 (55.4)	2659.3(99.8)
1999-00	1375.9(46.8)	1614.4(54.9)	2990.3(104.2)
2000-01	1559.9(49.6)	1682.5(53.5)	3242.4(105.4)
2001-02	1731.0(41.6)	2059.5 (60.3)	3790.5(93.3)
2002-03	1717.9 (39.0)	2005.6 (54.4)	3723.5(85.9)
2003-04	1853.7(38.4)	1682.5(53.5)	3536.2(79.3)
2004-05	1979.5(35.8)	2059.5 (60.3)	4039.0(71.4)
2005-06 (P)	2129.1 (32.5)	2005.6 (54.4)	4134.7(63.9)

Sources: Economic Survey, various issues; SBP Annual Report, various issues. The values in parentheses show the ratios of debt to GDP.

Domestic debt was Rs. 7.7 billion in 1972-73. It reached Rs. 2129.1 billion in 2005-06. On the average, the domestic debt increased annually at the rate of 18.57% from 1972-73 to 2005-06.

The stock of external debt in 1972-73 was Rs. 29.48 billion. It increased to Rs. 2005.6 billion in 2005-06. On the average, the foreign debt increased annually at the rate of 13.64% from 1972-73 to 2005-06. The details regarding domestic debt, external debt and total debt have been presented in Table 2.

External debt was 43.7% and 49.8% of GDP in 1972-73 and 1973-74 (the highest in 1970s), respectively. It fell to 26.9% in 1981-82. It was 36.8% and 36.0% in 1990-91 and 1991-92, respectively. From 1972-73 to 205-06, the ratio of external debt to GDP fluctuated between 26.9% (1981-82) to 60.3% (2001-02 and 2004-05). The trends in domestic debt, foreign debt, and total debt are presented in Figure 2.

Figure 2: Trends in Pakistan's Public Debt

—◆— Total Debt —■— Domestic Debt —▲— Foreign Debt
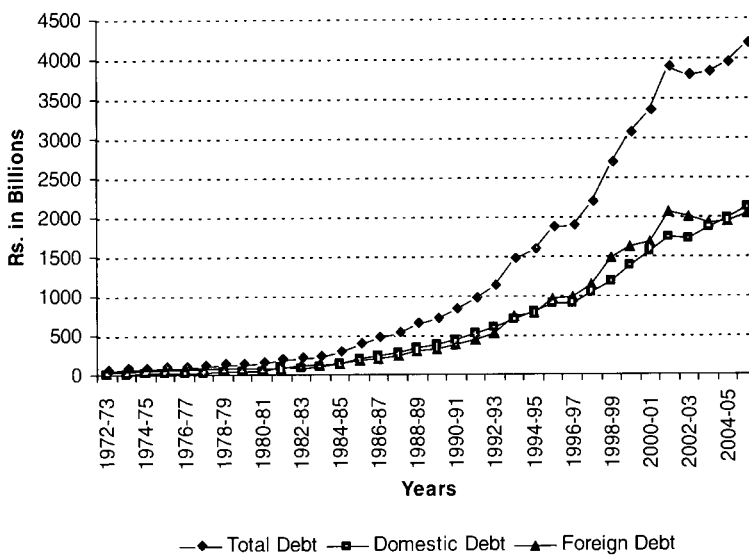
2.3 Status of Debt Overtime

Debt is classified as foreign debt and domestic debt, whereas the sum of domestic debt, foreign debt and foreign liabilities constitute total debt. To assess regime-wise average annual percentage increase in total debt, domestic debt and foreign debt was estimated and presented in Table 3.

Table 3: Regime-wise Average Annual Percentage Increase in Debt

Period	Domestic Debt	Domestic Debt as a % of GDP	Foreign Debt	Foreign Debt as a % of GDP	Total Debt	Total Debt as a % of GDP
1972-73 to 1976-77 (Bhutto's regime)	32.04 (11.74)	8.19 (6.79)	20.83 (2.21)	1.02 (−2.31)	23.42 (4.41)	1.23 (−0.22)
1977-78 to 1987-88 (Zia's regime)	26.85 (18.30)	10.92 (10.98)	12.55 (4.95)	1.61 (−1.54)	20.46 (10.21)	3.34 (3.39)
1988-89 to 1998-99 (Benazir & Nawaz's regime)	13.51 (2.95)	0.20 (−0.97)	17.35 (6.43)	3.57 (2.38)	15.53 (4.78)	2.0 (0.79)
1999-00 to 2001-02 (Musharraf period)	12.16 (−2.88)	−5.72 (−2.49)	13.00 (−2.20)	4.80 (−4.63)	12.66 (−2.45)	−5.37 (−4.87)
2002-03 to 2005-06 (Guided democracy)	7.55 (−2.94)	−5.89 (−6.35)	3.68 (−6.23)	−0.15 (−9.52)	5.36 (−4.92)	7.83 (−8.25)
1972-73 to 2005-06	18.57 (7.58)	3.22 (2.52)	13.64 (3.14)	0.67 (−1.70)	15.39 (4.69)	0.45 (−1.27)

The values in parentheses show the debt in real terms. The data presented in Table 3 indicate that the highest increase in foreign as well as domestic debt took place in Bhutto regime in nominal terms. There occurred a significant decrease (13.51%) in domestic debt's average annual percentage in post-Zia period, while in case of foreign debt the same situation was during Zia period in nominal terms.

Average annual percentage increase in total debt showed downward trend within the period considered and it was the lowest during the Musharaf period.

Average annual percentage increase in domestic debt in real terms was the highest in Zia period (18.30%) and the lowest in the Musharaf period, even negative. The average annual percentage increase in foreign debt was the highest in Bhutto's regime (20.83%)) and the lowest in the Musharaf period (3.68%). In case of total debt, the average annual percentage increase was the highest in Bhutto's regime (23.42%) and the lowest in Musharaf period (5.36%). Debt as a percentage of GDP in real terms remained fluctuating during different regimes.

2.4 Indicators of Debt for Pakistan

A number of studies have acknowledged the importance of political factors in accumulation as well as for rescheduling of debt. Political decisions to borrow, to distribute resources among alternative uses and, most importantly, to service debt are as important as economic capability. Dornbusch (1989) argued that "domestic policies (including political decisions) were an important, often the main, influence in bringing about the large accumulation of debt." The studies incorporate these factors as a measure of government policy in the analysis. Moghadam (1995) suggested that larger the public sector relative to total economy, the greater the probability of default. Therefore, ratio of Government expenditure to GNP measuring the size of the government is included in the analysis. Positive correlation is expected, i.e. large size of government sector indicates high influence of political motives resulting in greater probability of default. In other words, the political decision of increased government role in the economy carries the risk of reduced perceived credit worthiness.

Political factors with financial ratios cannot be ignored as determinant of debt accumulation and debt rescheduling. Politically unstable region's government may acquire debt to provide national security (Moghadam, 1995). Indebtedness of any country may increase when governments borrow to purchase weapons to combat the internal or external security problems. Thus, defense expenditure as a percentage of government expenditure is used to measure instability of any government.

The values of concerned indicators and their trends showed overtime changes in the incidence of debt and debt service charges. The values of the ratio of outstanding debt to GNP of Pakistan depict a fairly fluctuating trend. Specifically, the values of this ratio decreased first from 49.45% in 1973-74 to 24.95% in 1981-82 and then increased and fluctuated up to 1993-94. This ratio was 56.26% in 2001-02. When the loan of a country, according to the World Bank, reaches to 80% of its GNP, it becomes unsustainable. Although from this point of view, the debt burden of Pakistan did not become unbearable. But a country should not feel at ease when its foreign debt equals 50% or more of its GNP.

Debt service as a percentage of GNP, foreign exchange earnings as a percentage of debt, external debt as a percentage of export earnings and debt service as a percentage of exports earnings are other indicators of debt burden. World Bank considers a country's debt unsustainable if her external debt as a percentage of export earnings exceeds to 220 to 250%. Pakistan's debt always remained unsustainable according to this criterion, as in Table 5.

Table 5: Economic and Political Indicators of Pakistan's Debt

Years	Debt outstanding as % of GNP	Debt Service as % of GNP	Foreign Exchange Reserves as % of Debt	External Debt as a % of Export Earnings	Defence Expenditures as a % of Government Expenditures	Government. expenditures as a % of GNP
1972-73	43.38	2.06	12.93	344.75	59.35	10.89
1973-74	49.45	2.19	13.44	431.75	42.21	13.10
1974-75	42.31	2.27	9.79	462.08	42.84	14.26
1975-76	42.77	2.90	10.06	506.80	46.01	13.11
1976-77	40.48	2.66	9.46	556.40	44.71	11.60
1977-78	37.78	1.96	9.56	548.84	42.47	11.99
1978-79	36.86	3.00	12.83	456.60	34.06	14.15
1979-80	33.94	4.13	15.79	366.51	36.32	13.75
1980-81	28.87	3.08	13.75	296.65	39.02	13.03
1981-82	24.95	3.77	15.49	331.94	43.22	12.33
1982-83	29.31	4.79	22.31	343.65	41.44	13.88

1983-84	27.78	4.95	13.17	341.84	37.25	15.66
1984-85	28.88	5.01	10.62	388.21	38.04	16.41
1985-86	33.60	5.50	9.80	376.67	37.60	17.03
1986-87	34.26	5.58	8.58	329.26	35.56	19.09
1987-88	32.99	6.63	6.99	296.26	35.18	18.97
1988-89	37.53	7.20	7.10	331.99	33.35	19.21
1989-90	36.84	7.40	5.06	308.92	35.38	18.38
1990-91	36.00	7.04	5.22	271.91	33.03	18.80
1991-92	40.24	8.43	6.12	254.06	32.92	18.90
1992-93	38.51	8.03	8.14	292.16	32.10	20.29
1993-94	47.88	8.59	13.58	364.67	31.27	18.75
1994-95	41.76	8.21	8.39	312.57	30.21	18.40
1995-96	45.01	9.55	4.40	322.66	28.23	20.06
1996-97	40.51	10.74	5.99	299.99	27.98	18.90
1997-98	43.24	10.48	5.04	307.46	25.70	19.97
1998-99	50.92	9.55	2.71	379.95	.26.22	18.79
1999-00	39.40	11.06	3.29	363.87	24.01	16.72
2000-01	40.35	10.49	1.73	312.11	20.32	15.72
2001-02	43.15	9.30	3.01	367.15	21.28	15.82
2002-03	37.72	9.91	5.79	307.47	21.68	15.91
2003-04	33.88	6.02	9.78	271.88	24.23	13.24
2004-05	31.84	5.2	9.43	226.85	22.44	14.04
2005-06	28.54	4.56	7.79	281.48	21.96	13.96

Sources: Economic Survey, various issues; SBP Annual Report, various issues

The role of political instability in development process has been receiving a great attention by the economists. The research suggests that political instability is deleterious to economic growth in developing countries (Alesina *et al.*, 1996; Fosu, 1992; Barro, 1991). Defence expenditure as a percentage of government expenditure is a form of measuring political instability. The extent of political instability can be measured by the ratio of

defence expenditure to government expenditure. If this ratio is higher, it means there is more political instability and *vice versa*. According to the estimates presented in Table 5, in 1972-73, this ratio was 59.35% which constantly fell to 21.68% in 2002-2003.

On the basis of the above discussion, it may be concluded that the debt as a percentage of GDP increased at a faster rate in the late 1990s than that in earlier years of the study period. However, debt service liability as a ratio of export receipts and as a ratio of foreign exchange earnings in particular has been characterized by relatively small yearly variations throughout the period of analysis. Yet, even small variations indicate significant changes in the incidence of debt-service liability. The other implication of small variations in this ratio is that there has been no decrease in the debt service liability of Pakistan. Rather the incidence of the debt service liability has increased as indicated by a regularly rising trend in its ratio to GNP. However, Pakistan's foreign debt had not become unsustainable, although it reached very close to it in some years..

3. Review of Literature

A very limited work has been done on the subject matter. The impact of foreign and domestic debt on the human aspect of development has hardly been examined in any study. Very few studies were focused on this topic and even these have touched this topic partially.

In the early 1960s a number of studies on development constraints in LDCs emphasized the lack of domestic savings and foreign exchange as being the two most important constraints on development [Chenery and Strout, (1966)]. Chenery and Strout (1966) proposed the application of two-gap model to fifty under developed countries including Pakistan. According to them, two types of constraints impeded growth, trade constraints and savings constraints. They emphasized not only the requirement of aid to fill the trade gap but also the effective utilization of this assistance.

Otani and Villanueva (1990) conducted an empirical study on the determinants of long-term growth of developing countries in which they established a model based on "New Growth Literature", which predicted that the equilibrium economic growth rate was influenced by parameters such as saving rates, export growth, rate of spending on HRD etc. They

used cross section data of 55 countries and employed OLS technique to find that there was a negative relationship between interest rate and growth rate through external borrowing.

Roy *et al.* (1997) analyzed the relative impact of domestic and foreign public debt on economic, social and human development indicators. They concluded that increasing investment in agriculture with the help of external debt could be beneficial to the economy.

Siddiqui and Siddiqui (2001) examined the impact of external debt on economic growth in south Asian countries and tested if there was nonlinearity in this debt growth relationship. They all concluded that the indicators like debt burden, investment-GDP ratio, external competitiveness, etc. help in improving the economic management. They pointed out that in case of Pakistan mismanagement of resources, macro imbalance, loss of competitiveness in the international market and the role of political interest group had aggravated the debt burden situation.

4. Methodology and Data Sources

Understanding relationship between human resources development (HRD) and foreign debt is very important for understanding economic development. Employed labour force is used as a best proxy for human resource contributing to development process. To check direct and indirect contribution of other factors on HRD, a developed relation of expected variables with debt that might affect HRD have been used as an explanatory variable in the model. To investigate the relationship between HRD and debt, the following log-linear model is used:

$$Lfe = \beta_0 + \beta_1(RGDPPC) + \beta_2(Inv) + \beta_3 TOT + \beta_4(EEH) + \beta_5(PI)$$
$$+ \beta_6(DV) + \beta_7(DS) + \varepsilon_I \qquad (1)$$

where,

Lfe = Log of labour force employed as a ratio of total labour force

RGDPPC = Log of real GDP per capita

Inv = Log of investment to GDP ratio

TOT = Log of terms of trade

EEH = Log of government expenditure on education and health (Proxy for social development process)

PI = Log of defence expenditure as a percentage of current expenditure considered as a proxy for PI

DV = Log of debt variable [total debt (TD), domestic debt (DD), foreign debt (FD)] as a ratio of GDP

DS = Log of debt servicing as a ratio of GDP

ε_i = Error term

Real GDP Per Capita is the main indicator used for measuring economic growth and further economic development. Following macroeconomic theory, the sign of estimate of β_1 is expected to be positive or negative. High economic growth generates more employment opportunities. On the other hand, if the labour force feels that their wages are low enough, they will reduce their supply and prefer leisure.[1]

Investment leads towards increase in country's productivity which ultimately affects GDP per capita growth rate and hence employment. So the sign of β_2 is expected to be positive. The fluctuation in economic environment may lead towards negative as well as positive impact of TOT on GDP per capita and hence employment pattern of the country. Thus, the sign of β_3 is expected to be positive or negative.

The trade balance is defined as ratio of exports over imports (X/M) for three reasons. First, it enables researchers to express the trade balance in logarithm so that the first differenced variables reflect the rate of change in each variable. Second, the ratio measure is not sensitive to units of measurement (Bahmani-Oskooee and Alse, 1994). Indeed, previous research has shown that the results could be sensitive to units of

---

[1]The sign of also depends upon the working behavior of a nation. A nation having high working behavior prefers more employment as their real GDP per capita increases.

measurement (see evidence in Miles, 1981). Finally, the ratio measure reflects the trade balance in real or nominal terms (Bahmani-Oskooee and Brooks, 1999).

Strengthening of social institutions and activities by making expenditures on health and education is an essential factor leading towards human resources development (HRD). Human resource is a real resource, which is used to activate the other resources to ensure initiation, continuity and completion of development process. The proper functioning of social institutions and activities positively contributes towards human resource development. So EEH (social development process) is regarded as one of the most important ingredients of human resource development. The sign of the coefficient of the variable EEH is expected to be positive.

The political situation as well as the environment created under specific regime, contributes in determining the direction towards country's economic growth. Political instability inversely affects the economic as well as human development process. Moreover, the development approaches developed under specific political environment and the implementation strategy adopted for these approaches also contribute in determining the probability of the productive use of the available resources. Consequently, the contribution of political government might be positive or negative.[2]

To estimate political instability in quantitative terms, defence expenditure as a percentage of government expenditure has been used as a proxy for political development process. The literature suggests that in politically unstable regions government may acquire debt to provide national security (Moghadam, 1995). Indebtedness of any country may increase when government borrows to purchase weapons to combat the internal or external security problems. The defence expenditure as a percentage of government expenditure is used to measure political instability in Pakistan. The sign of β_5 is expected to be negative.

---

[2]Insurrection or revolution, military-led coups d'etat have been particularly characteristic of the developing economies. This form of elite political instability is observed to be growth-inhibiting in developing countries (Alesina et al., 1996; Fosu, 1992; Barro, 1991). Successful coups (involuntary changes in government) are usually used as a measure of political instability.

Serious consequences specifically for the human development emerge due to debt burden in heavily indebted poor countries. Direct and indirect effects of various relevant variables including debt and debt servicing on labour force employed have been included in the model. However, debt may have favourable or unfavourable effects on human resource development. So the impact of debt on labour force employed may be positive or negative. The annual data over 1970-71 to 2005-06 have been collected from various issues of Pakistan Economic Survey, Annual Reports of State Bank of Pakistan and International Financial Statistics (IFS). The impact of debt on human resource development has been estimated by using Autoregressive Distributed Lag (ARDL) framework for Pakistan.

ARDL Approach

Many a methods are present in the literature for conducting the cointegration test; the most widely used methods include the residual based Engle-Granger Test 1987, Maximum Likelihood Based Johansen Test, 1991; 1992 and Johansen-Jusellius Test (1990). All these residual based cointegration tests are inefficient and can lead to contradictory results, especially when the variables are of more than I(1). All the above methods require that the variables in the system are of equal order integration. These methods do not include the information on structural break in time series data and suffer from low predictive power. Pesaran and Shin(1995) and Pesaran *et al.* (2001) have introduced an alternative cointegration technique that counters all of the above said problems, known as Autoregressive Distributive Lag or ARDL bounds testing. The important features of ARDL approach are:

- This method can distinguish dependent and explanatory variables (*i.e.* avoiding the problems of endogeneity).

- This method can estimate the long and short-run components of the model simultaneously, removing problems associated with omitted variables and autocorrelation. Thus, estimates obtained from the ARDL method of cointegration analysis are unbiased and efficient, since they avoid the problems that may arise due to serial correlation and endogeneity.

- The model takes sufficient number of lags to capture data generating process in a general to specific modeling framework.

The main advantage of the ARDL procedure lies in the fact that it can be applied irrespective of whether the regressors are 1(0) or I(1).

In turn, this avoids the pre-testing problems associated with standard cointegration analysis, which requires the classification of the variables as either 1(0) or I (1). We have used log-linear model in the present study.

$$
Lfe = \beta_0 + \beta_1(RGDPPC) + \beta_2(Inv) + \beta_3 TOT + \beta_4(EEH) + \beta_5(PI)
$$
$$
+ \beta_6(DV) + \beta_7(DS) + \varepsilon_t \tag{1}
$$

In any ARDL model, regressors include lagged values of the dependent variable and current and lagged values of one or more explanatory variables.

The error-correction version of ARDL model pertaining to variables in equation (1) is as follows:

$$
\Delta \log Lfe_t \quad = \quad a_0 + \sum_{i=1}^{n} a_{1i} \Delta \log Lfe_{t-i} + \sum_{i=0}^{n} a_{2i} \Delta \log RGDPPC_{t-i} +
$$

$$
\sum_{i=0}^{n} a_{3i} \Delta Inv_{t-i} + \sum_{i=0}^{n} a_{4i} \Delta \log TOT_{t-i} + \sum_{i=1}^{n} a_{5i} \Delta \log EEH_{t-i} + \sum_{i=0}^{n} a_{6i} \Delta \log PI_{t-i}
$$

$$
+ \sum_{i=0}^{n} a_{7i} \Delta \log DV_{t-i} + \sum_{i=0}^{n} a_{8i} \Delta \log DS_{t-i} + \delta_1 \log Lfe_{t-1} + \delta_2 \log RGDPPC_{t-1}
$$
$$
+
$$

$$
\delta_3 Inv_{t-1} + \delta_4 \log TOT_{t-1} + \delta_5 \log EEH_{t-1} + \delta_6 \log PI_{t-1} + \delta_7 \log DV_{t-1} + \delta_8 \log
$$

$$
DS_{t-1} + \varepsilon_t \tag{2}
$$

The first part of equation (2) a's represents the short term dynamics of the model whereas part second with δ's reveals the long run relationship.

5. Empirical Results and their Analysis

Human development possesses a unique characteristic not shared by others. Human development has been the focal point of all the development strategy. Since the development project had been opted with the employment provisions, the debt (foreign and domestic) may have direct impact on labour force employment. To assess equation (2) concerning impact of debt (domestic and foreign) on human resource development, we estimated by using ARDL approach. The results are presented in Tables 6, 7, 8 and 9.

Each table consists of Panel A and Panel B. Panel A reports the short run coefficient estimates of all lagged first order differenced variables in ARDL model (short run coefficient estimates). Not much interpretation could be attached to short term coefficients. They are all showing the dynamic adjustment of all the variables.

In Panel B, the long-run (LR) coefficients are presented. These are the coefficients of δs from ARDL model. Following the literature, these long-run elasticities on Lfe are normalized by dividing $-\delta_1$. The coefficient of expenditures on education and health is positive in all the models but statistically significant only in models 1 and 4, indicating that the social development indicator will generate employment in the long-run.

Table 6: Full Information Estimate of Equation (2) Model 1(HRD: Labour Force Employment as a ratio of total labour force) 1970-71 to 2005-06

Panel A:Short-Run Coefficient Estimates (for domestic debt)

Variable	Lag Order	
	0	**1**
Δ HRD		0.42(2.63)
Δ Inv	0.025(2.06)[a]	
Δ TOT	0.006(0.48)	
Δ EEH	0.046(2.47)	
Δ PI		−0.056(−3.25)
Δ DD	−0.013(−1.81)	
Δ DS	−0.003(−0.47)	

Panel B   **Long-Run Coefficient Estimates and Diagnostics**

Constant	ln Inv	ln TOT	Ln EEH	ln PI	ln DD	ln DS
4.28 (102.84)	0.014 (2.23)	0.004 (0.048)	0.026 (2.609)	0.063 (13.121)	−0.007 (−1.861)	−0.002 (−0.472)

$\overline{R}^2 = 0.88$, $EC_{t-1} = -0.753$ (−6.895), $^{b}LM = 3.501$, $^{c}RESET = 1.138$

Notes: [a] The number inside the parenthesis is the value of the t-ratio, [b]LM is the lagrange multiplier test for serial correlation. It has a χ^2 distribution with one degree of freedom. The critical value at the 5% level of significance is 3.84, [c]RESET is Ramsey's specification test. It has a χ^2 distribution with only one degree of freedom. The critical value at the 5% level of significance is 3.84.

Table 7: Full Information Estimate of Equation (2) Model 2 (HRD: Labour Force Employment as a ratio of total labour force) 1970-71 to 2005-06

Panel A: Short-Run Coefficient Estimates (for foreign debt)

Variable	Lag Order	
	0	**1**
Δ HRD		0.421(2.453)
Δ Inv	0.026(1.93) [a]	
Δ EEH	0.17(1.359)	
Δ PI	0.047(2.491)	−0.061(−3.423)
Δ FD	0.014(1.223)	
Δ DS	−0.005(−0.0752)	

Panel B: Long-Run Coefficient Estimates and Diagnostics

Constant	ln Inv	Ln EEH	Ln PI	Ln FD	ln DS
4.22 (123.159)	0.015 (2.157)	0.009 (1.367)	0.071 (22.563)	0.008 (1.319)	−0.003 (−0.756)

$\overline{R}^2 = 0.87$, $EC_{t-1} = -0.728$ (−6.177), $^b LM = 3.351$, $^c RESET = 0.003$

Notes: ^{a}The number inside the parenthesis is the value of the t-ratio. ^{b}LM is the lagrange multiplier test for serial correlation. It has a χ^2 distribution with one degree of freedom. The critical value at the 5% level of significance is 3.84. ^{c}RESET is Ramsey's specification test. It has a χ^2 distribution with only one degree of freedom. The critical value at the 5% level of significance is 3.84.

Table 8: Full Information Estimate of Equation (2) Model 3 (HRD: Labour Force Employment as a ratio of total labour force) 1970-71 to 2005-06

Panel A: Short-Run Coefficient Estimates (for total debt)

Variable	Lag Order	
	0	1
Δ HRD		0.389(2.167)
Δ RGDPPC	−0.006(−0.145)^a	
Δ Inv	0.028(1.858)	
Δ TOT	−0.003(−0.181)	
Δ EEH	0.048(2.276)	0.044(1.745)
Δ PI	0.047(2.329)	−0.044(−2.098)
Δ TD	0.024(1.25)	−0.051(−2.559)
Δ DS	−0.001(−0.111)	

Panel B: Long-Run Coefficient Estimates and Diagnostics

Constant	ln RGDPPC	ln Inv	ln TOT	Ln EEH	ln PI	ln TD	ln DS
4.15 (19.63)	−0.004 (−0.146)	0.016 (1.857)	0.021 (1.798)	0.002 (0.18)	0.063 (4.881)	0.013 (1.091)	−0.0006 (−0.1102)

$\bar{R}^2 = 0.89$, $EC_{t-1} = -0.778$ (−6.074), $^bLM = 3.704$, $^cRESET = 0.284$

Notes: [a]The number inside the parenthesis is the value of the t-ratio. [b]LM is the lagrange multiplier test for serial correlation. It has a χ^2 distribution with one degree of freedom. The critical value at the 5% level of significance is 3.84. [c]RESET is Ramsey's specification test. It has a χ^2 distribution with only one degree of freedom. The critical value at the 5% level of significance is 3.84.

Table 9: Full Information Estimate of Equation (2) Model 4 (HRD: Labour Force Employment as a ratio of total labour force) 1970-71 to 2005-06

Panel A: Short-Run Coefficient Estimates (for domestic and foreign debt)

Variable	Lag Order	
	0	**1**
Δ HRD		0.436(2.696)
Δ Inv	0.027(2.138)[a]	
Δ EEH	0.041(2.277)	
Δ PI	0.044(2.492)	−0.0455(−3.357)
Δ DD	−0.013(−1.928)	
Δ FD	0.007(0.574)	

Panel B: Long-Run Coefficient Estimates and Diagnostics

Constant	ln Inv	Ln EEH	ln PI	ln DD	ln FD
4.28 (102.90)	0.015 (2.389)	0.023 (2.285)	0.064 (15.052)	–0.007 (–1.934)	0.004 (0.591)

$\overline{R}^2 = 0.88$, $EC_{t-1} = -0.786$ (–6.733), $^bLM = 3.825$, $^cRESET = 1.158$

Notes: ^{a}The number inside the parenthesis is the value of the t-ratio. ^{b}LM is the lagrange multiplier test for serial correlation. It has a χ^2 distribution with one degree of freedom. The critical value at the 5% level of significance is 3.84. ^cRESET is Ramsey's specification test. It has a χ^2 distribution with only one degree of freedom. The critical value at the 5% level of significance is 3.84.

The elasticity coefficient of investment is not only positive but also statistically significant in all the models. The impact of defence expenditure as a ratio of government expenditure is positive and highly statistically significant in all the models in the long-run. This is quite consistent with the observed phenomenon in Pakistan that defence personnel not only contribute in defence services but also on the civil side, even after their retirement. Moghadam (1995) suggests that politically unstable region's government may acquire debt to provide national security. Government generates more employment to combat internal and external security threats. Governments and the public use more resources to secure their lives and property and hence generate security related jobs.

The elasticity coefficient of openness (TOT) is positive but statistically insignificant. The relationship between labour force employment and debt servicing is negative and insignificant. The role of domestic debt on HRD is negative and significant. The long-run impact of domestic debt is negative and significant in models 1 and 4.

The long-run coefficient of foreign debt is positive but not statistically significant. This implies that investment on social overheads, as had been

the case of foreign funded projects, was not properly and effectively used to generate enough employment. Similar result was found in case of total debt with respect to its contribution.

After examining long-run relationship among variables, the short-run dynamics of these variables can be examined by the error correction representation of ARDL model based on equation (1). Error correction coefficient shows how quickly/slowly variable returns to equilibrium and it must possess a significant negative sign. The negative sign shows convergence and absolute value of it indicates speed of adjustment to restore equilibrium in the dynamics model.

Various studies have shown that the significant negative sign lagged error correction term (EC_{t-1}), is a more efficient way of establishing cointegration. The estimates of δ_1 to δ_8 are used to form error correction term.

$$EC_{t-1} = \delta_1 \log Lfe_{t-1} + \delta_2 \log RGDPPC_{t-1} + \delta_3 Inv_{t-1} + \delta_4 \log TOT_{t-1} + \delta_5 \log EEH_{t-1} + \delta_6 \log PI_{t-1} + \delta_7 \log DV_{t-1} + \delta_8 \log DS_{t-1}$$

After replacing the linear combination of lagged level of variables in ARDL model of equation (2) by EC_{t-1}, the model is re-estimated by imposing the same lag structure selected by BIC and look for the significance of EC_{t-1}. A negative and significant coefficient of EC_{t-1} will be an indication of cointegration. The coefficient of EC_{t-1} is negative and significant in all of the models as shown by Panel B of each model. This implies that in Pakistan, labour force employment, real GDP per capita, investment, terms of trade, expenditure on health and education, expenditure on defence, debt variables and debt servicing are cointegrated. Short-run dynamics results also indicate that HRD worsens as domestic debt rises. HRD does not improve sufficiently enough by increasing foreign debt and total debt because their coefficients are statistically significant. The Lagrange Multiplier (LM) statistic which is distributed as χ^2 with one degree of freedom is also reported in Panel B of each model. Ramsey's RESET test for functional form is also reported in Panel B of each model, which have distributed as χ^2 distribution with one degree of freedom. Since calculated Ramsey's RESET is less than its critical value of 3.84 in models 1, 2 and 3, it is concluded that ARDL models are correctly specified.

A graphical presentation of CUSUM and CUSUM SQ tests of models 1, 2, 3 and 4 are provided in Figures 3, 4, 5 and 6, respectively. As can be seen, the plots of the two tests do not cross the critical value line, indicating stability in labour force employment in all the models. It also indicates that in Pakistan, a stable long-run relationship between labour force employment and all of the explanatory variables of equation (2) exists.
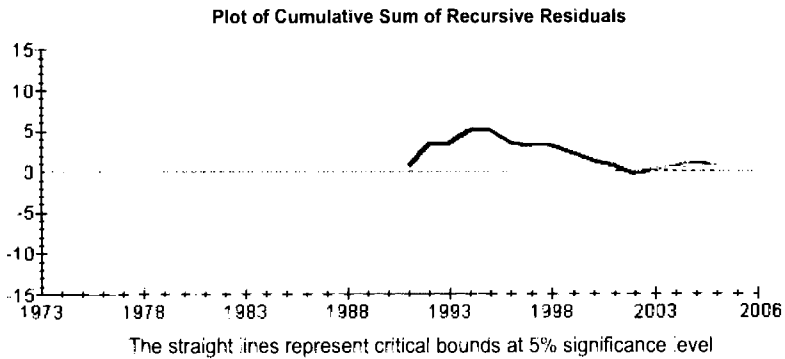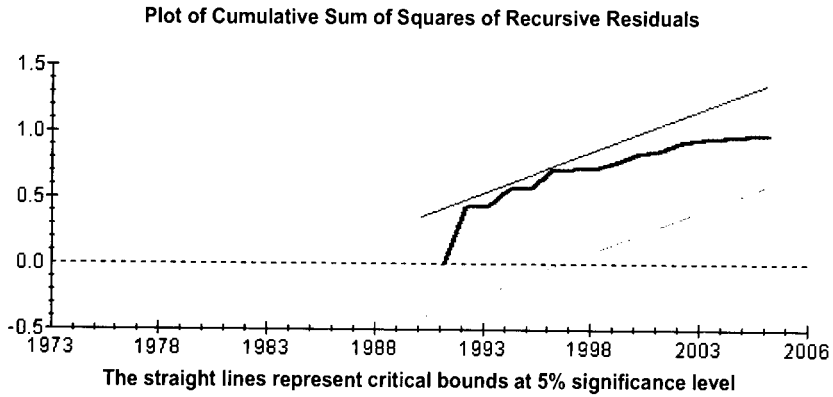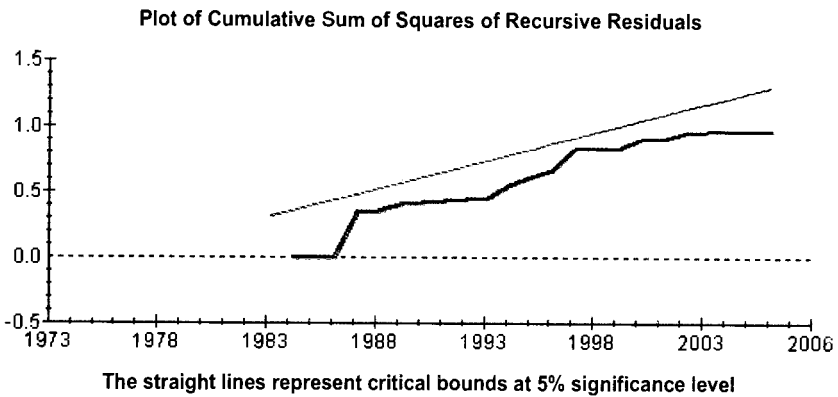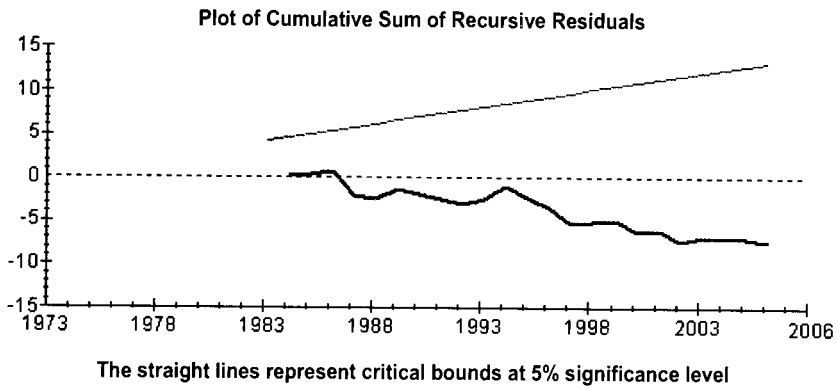
Figure 3: Model 1

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Figure 4: Model 2

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Figure 5: Model 3

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Figure 6 : Model 4

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

6. Conclusion and Recommendations

The debt problem in most of the developing countries has reached an alarming situation. Pakistan faces a grave debt problem that threatens the economic future of the country. Financial experts, while analyzing the economic conditions, hold various governments responsible for rowing the economy into the swamp of external and internal debts. Overtime, the terms of foreign loans and credits have become significantly harder. The terms of loans and credits became harder as not only the grant element has become quite insignificant but that aid also became donor-driven, *i.e.* on the pre-specified terms and conditions of the donors. The average annual increase in domestic debt in nominal terms was 18.95 percent during 1972-73 to 2005-2006 while in real term the estimate was 7.58 percent. The average annual increase in foreign debt in nominal as well as real term was 13.64% and 3.14%, respectively. The average annual increase in total debt was estimated at 15.39 percent in nominal term and 4.69 percent in real term during 1972-73 to 2005-2006.

The highest increase in foreign as well as domestic debt took place under Bhutto regime in nominal terms while it remained lowest from 1999-00 todate. Domestic debt, foreign debt and total debt in real terms remained highest during Zia's regime.

In this study, the empirical results support the traditional view that raising investment is a key to achieve a high rate of labour force employment. Expenditures on education and health that result in a more productive labour force and total factor productivity have a positive and significant impact on labour force employment. Indebtedness of a country may increase when government borrows to purchase weapons to combat the internal or external security problems. The positive and significant impact of expenditure on defence as a ratio of government expenditures on human resource development supports the observed phenomena that defence personnel are not only contributing in defence services but they also contribute on the civil side after their retirement from armed forces. Domestic debt is contributing negatively towards human resource development. The long-run impact of foreign debt and total debt is positive but not statistically significant. This implies that investment in social

overheads was not properly and effectively used to generate sufficient employment.

Keeping in view the above discussion, it can be concluded that unproductive use of debt has contributed to the debt burden. There is a need to take effective measures to reduce the burden of debt on the Pakistan economy.

These measures may include the provision of both physical and social infrastructure and investment incentive oriented economic environment for public and private sector investment to exploit the growth potential. There is also a need to reduce public sector non-development expenditure to contain and reduce deficit financing. Encouragement must also be provided to exports.

References

Alesina, A., S. Ozler, N. Roubini and P. Swagel 1996. "Political instability and economic growth" *Journal of Economic Growth* 1: 189-211.

Bahmani-Oskooee, M. and J. Alse 1994. "Short-run versus long-run effects of devaluation: error correction modeling and cointegration" *Eastern Economic Journal* 20: 453-464.

Bahmani-Oskooee, M. and T. J. Brooks 1999. "Bilateral J curve between US and her trading partners" *Welwirtschaftliches Archive* Band 135, Heft 1: 156-165.

Barro, Robert J. 1991. "Economic Growth in a Cross-section of Countries" *Quarterly Journal of Economics* 5: 407-443.

Chenery, Hollis B. and Alan M. Strout 1966. "Foreign Assistance and Economic Development" *The American Economic Review* 56(4): 679-733.

Dornbusch, Rudiger 1989. "Debt Problems and the World Economy" In: Jeffery D. Sach, ed. *Development Country Debt and Economic Performance,* 331-358. Chicago: The University of Chicago Press

Fosu, A. K. 1992. "Political Instability and Economic Growth: Evidence from Sub-Saharan Africa" *Economic Development and Cultural Change* 40(4): 829-841.

Government of Pakistan 1970-2000. *Pakistan Economic Survey.* Islamabad: Economic Advisor Wing, Finance Division

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

Miles, M. A. 1981. "Currency Substitution: Some Further Results and Conclusion" *Southern Economic Journal* 48: 78-86.

Moghadam, M. R. 1995. "Debt Rescheduling in Less Developed Countries: World or Regional Crisis?" *The Journal of Developing Areas* 30:11-23

Otani,Ichiro and D. Villanueva.1990. "Long-term growth in developing countries and its determinants: An empirical analysis" *World Development Report No* 18.

Pesaran, M. H. and Y. Shin 1995. "An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis" In: *Centennial Volume of Ranger Frisch*, edited by S. Storm, A. Holly and P. Diamond. Cambridge: Cambridge University Press

Pesaran, M.H., Y. Shin and Smith 2001. "Bounds testing approaches to analysis of level relationships" *Journal of Applied Econometrics* 16: 289-326.

Roy, K. C., Y. R. Vadlamudi and N. D. Kamnaratne 1997. "The impact of domestic and foreign debt on the Indian development process" *Indian Journal of Quantitative Economics* 12(2): 85-103.

Siddiqui, Rizwana and Rehana Siddiqui 2001. "Determinants of debt rescheduling in Pakistan" *The Pakistan Development Review* 40(4): 689-704.

State Bank of Pakistan 1972-2003. *Annual Report.* Karachi: SBP Press

Impact of Trade Liberalization on the Current Account Balance of Pakistan

Atif Ali Jaffari[*]

Abstract: This study investigates the impact of trade liberalization or openness on current account balance of Pakistan for the period 1976-2006. According to the findings of the study, trade liberalization, GDP growth and changes in terms of trade are important determinants of current account balance of Pakistan. The results show that a rise in overall trade by 1 percent of GDP worsens the current account balance by 0.32 percent of GDP. Furthermore, one percent rise in GDP growth worsens the current account balance by 0.11 percent of GDP in the next year, and an increase in terms of trade by 1 percent deteriorates the current account balance as ratio of GDP by 0.06 percent. The policy implication of the study is that trade liberalization should be accompanied by enhancement of export competitiveness to achieve a sustainable current account balance.

1. Introduction

Trade liberalization or openness (OPEN) is considered to affect economic growth positively. The channel starts with trade liberalization leading to efficient resource allocation, greater competition, a boost in the flow of knowledge and faster rate of technical progress, affecting economic growth positively [Dollar (1992), Sachs and Warner (1995), Edwards (1998), and Frankel and Romer (1999)]. However, trade liberalization does not come without economic and social costs for developing countries. Trade liberalization may promote excess demand for imports relative to exports resulting in high trade and current account deficits, thus, affecting growth adversely. According to Khan and Zahler (1985), "trade liberalization may promote growth from the supply side but, if the balance of payments worsens, growth may be adversely affected from the demand side because the payments deficits resulting from liberalization are unsustainable and not easily rectified by relative price (real exchange rate) changes."

[*] Analyst at State Bank of Pakistan, Karachi. This paper represents the views of the author and should not be interpreted as reflecting those of the State Bank of Pakistan.

According to the World Development Indicators (World Bank, 2005), the average tariff rate in the world went down from 10.5 percent to 6.5 percent between 1990 and 2002 and the ratio of imports plus exports GDP rose from 75.2 percent to 86.8 percent. Pakistan has also experienced continuous trade liberalization throughout 1990s and the process of reform is still going on. Pakistan's major trade policy instrument is tariff, accounting for about a fifth of total revenue and based on ad-valorem. Average effective tariff rate has fallen to 14.9 percent in FY2006 which used to be around 50 percent in early 1980s and around, 40 percent in the beginning of 1990s, as shown in Figure 1.

Figure 1: Average Effective Tariff Rate in Pakistan

Years
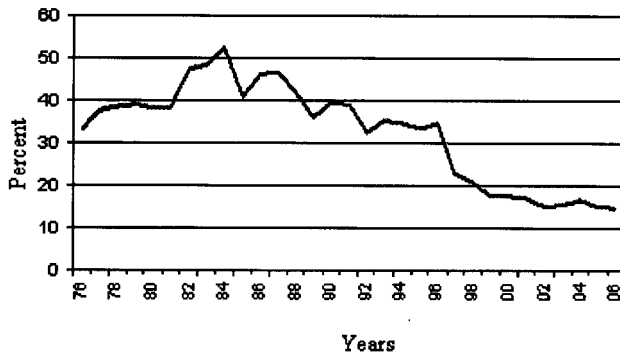
The ratio of imports plus exports to GDP (OPEN) of Pakistan has increased over time reaching 34 percent in 2006, as shown in Figure 2.

Figure 2: Trade Liberalization in Pakistan
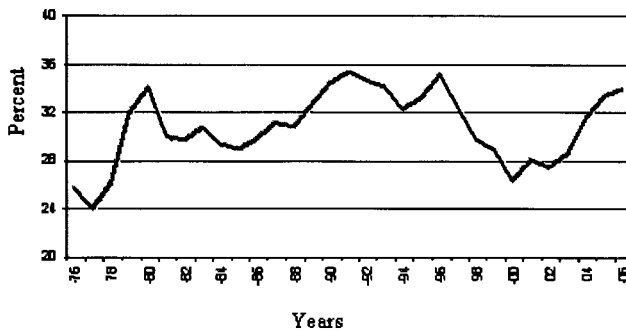
Years

The current account balance of Pakistan remained in deficit during last three decades except a few years, as shown in Figure 3.

Figure3: Current Account Balance of Pakistan
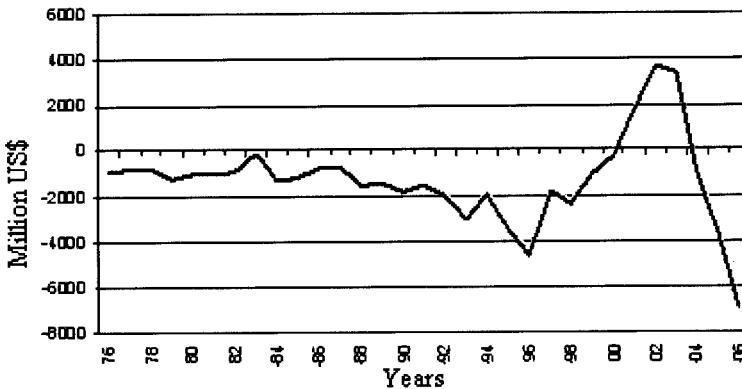
During FY06 the current account deficit reached a record high level of US$ 4.990 billion (3.9 percent of GDP) which is expected to rise further (cross 5 percent of GDP) in FY07.[1] Economists and policy makers at various levels are worried about rising current account deficit of Pakistan.[2] In this context, the present study empirically investigates the impact of trade liberalization on current account balance of Pakistan.

There has been no previous country-specific study examining the impact of trade liberalization on trade deficit or balance of payments of Pakistan. In the following parts of the paper, section 2 briefly reviews recent literature on the topic. Section 3 presents data and methodology applied, section 4 gives estimation results and section 5 presents concluding remarks.

2. Literature Review

The empirical literature on the relationship between trade liberalization and economic growth is dominated by the view that the impact of trade openness on economic growth is positive. Dollar (1992) uses two indices of trade orientation-an index of real exchange rate distortions, and an index of

---

[1] During FY06 imports growth was recorded 33.1 percent as compared to 14.0 percent growth in exports.

[2] Edward (2001), for costs associated with running large current account deficits in developing countries.

real exchange rate variability-and shows that each of these indices is negatively correlated with growth in a sample of 95 developing countries. Sachs and Warner (1995) combine high tariff and non-tariff measures with high black market exchange rate premium, socialism and monopolization of exports to identify non-open economies. The study finds that more open economies register high growth. Edwards (1998) uses nine alternative indices of trade policy to investigate the impact of openness on productivity growth in 93 countries. The study finds a positive impact of openness on productivity growth. Furthermore, the study shows robustness of results to the use of openness indicators, estimation technique, time period and functional form.

Rodriguez and Rodrick (2001) disagree with the conclusion of Dollar (1992), Ben-David (1993), Sachs and Warner (1995), Edwards (1998), and Frankel and Romer (1999) that openness is associated with higher growth rates. They show that openness, simply in the sense of liberal trade policies, seems to be no guarantee of faster growth. However, the conclusion of most researchers involved in either country studies or multi-country statistical tests that lower trade barriers in combination with a stable and non-discriminatory exchange rate system, prudent monetary and fiscal policies and corruption-free administration of economic policies promote economic growth, still seems to hold sway.

In a recent paper, Yanikkaya (2003) investigates the relationship between a large number of openness measures and growth. The study uses two types of openness measures, wherein the first group employs various measures of trade volumes (except population density) and the second group uses trade restrictions. The study concludes that growth effects of trade volumes are consistent with the existing literature. However, contrary to the conventional view on the growth effects of trade barriers, the results show that trade barriers are positively and, significantly associated with growth, especially for developing countries. Lopez (2004) finds that North American Free Trade Agreement (NAFTA) has not improved growth performance in Mexico. Since the mid-1980s, the propensity to import has exceeded the propensity to export and this has worsened the growth rate consistent with balanced trade, and this is a major explanation of the slowdown of Mexico's growth in recent years.

In contrast to a vast empirical literature regarding the impact of trade liberalization on economic growth, there are very few studies concerning the impact of trade liberalization on the trade balance, current account balance or balance of payments. On the supply side, trade openness might be helpful in promoting growth but, at the same time, it could generate excess demand for imports leading to worsening of the current account balance of the country which has negative implications for growth in the long run. Khan and Zahler (1985) examine the effect of trade and financial liberalization on the economies of Argentina, Chile and Uruguay. They find that the volume of trade increased but the current account of the balance of payments went into severe deficit, and that capital flows generated by interest differentials were not sufficient to finance the deficits without adjustment as well. UNCTAD (1999) examines the effect of trade liberalization on trade balance for sixteen countries over the period 1970 to 1995 using panel data techniques, and finds a significant negative relation. Chinn and Prasad (2000) investigate the determinants of current account balance for both developing and developed countries. They conclude that trade liberalization worsens current account balance of the developing countries; however, financial deepening improves current account balance. Further, current account balances are positively affected by fiscal balances and initial stock of capital. Parikh (2004) finds that trade liberalization promotes growth, the growth itself has a negative impact on trade balance and this in turn could have negative impacts on growth through deterioration in trade balance and adverse terms of trade. Paulino and Thirlwall (2004) use panel data and times series/cross section analysis to estimate the effect of trade liberalization on export growth, import growth, the balance of trade and the balance of payments for a sample of 22 developing countries including Pakistan that have adopted trade liberalization policies since the mid-1970s. They find that liberalization stimulated export growth but less than import growth, leading to worsening of the balance of trade and payments.

In case of Pakistan, a few studies have investigated the impact of openness on economic growth. Iqbal and Zahid (1998) employ a multiple regression framework to investigate macroeconomic determinants of growth in Pakistan including openness. The study finds positive impact of openness on economic growth. However, the study applies Ordinary Least Squares estimation methodology without investigating stationarity properties of the

time series. Khan *et al.* (1995) examine the causality between exports and economic growth in Pakistan and conclude that exports promote growth. Kemal *et al.* (2003) also examine the relationship between exports and economic growth in South Asian economies including Pakistan and find a positive association between exports and economic growth for all countries. Din *et al.* (2003) examine the causality between openness and growth by using annual data for Pakistan from 1960 to 2001. They find absence of causality between openness and economic growth in the short run. However, they observe bi-directional causality between openness and economic growth in the long run. The limitation of their study is that Granger causality approach is based on the statistical properties of the data and not on structural relationship implied by economic theory. No previous country specific study has examined impact of openness on trade balance, current account balance or balance of payments of Pakistan. This study fills the gap by exploring the impact of trade openness on current account balance of Pakistan.

3. Data and Methodology

The study follows Paulino and Thirlwall (2004) and Lopez (2004) to develop following model:

$$X = A\,[RER]^{a1}\,Y_f^{\ a2} \tag{1}$$

Assume the above export demand function where A is a constant, RER is real exchange rate, Y_f is world income, a_1 and a_2 denote price and income elasticities, respectively.[3] Taking log (natural) of the variables and differentiating with respect to time, the rate of growth of exports is expressed as follows:

$$x = a_0 + a_1\,rer + a_2\,y_f \tag{2}$$

Similarly, the imports demand function can be written as,

$$M = B\,[RER]^{b1}\,Y_d^{\ b2} \tag{3}$$

---

[3] $RER = P^f\,.ER/P^d$,   Increase in RER represents depreciation of rupee against US dollar.

where B is a constant, Y_d is domestic income, b_1 and b_2 denote price and income elasticities, respectively. Taking log of the variables and differentiating with respect to time, the rate of growth of imports is expressed as follows:

$$m = b_0 + b_1\ rer + b_2\ y_d \qquad (4)$$

Next, trade balance is specified as a difference between exports and import values as:

$$TB = X - M \qquad (5)$$
$$TB = P_x.\ (X) - P_m\ (M)$$

Taking log of the variables and differentiating with respect to time, the growth of trade balance is expressed as follows:

$$tb = (p_x - p_m) + (x - m) \qquad (6)$$

where "x" and "m" are the rates of change of the volumes of exports and imports, respectively.

The difference between the rate of change of export prices and import prices $(p_x - p_m)$ measures the rate of change in terms of trade, tot.

Substituting x and m in equation (6) based on equations (2) and (4), and rearranging gives equation (7),

$$tb = c_0 + c_1 rer + c_2 yf + c_3 yd + c_4 tot + e_t \qquad (7)$$

where c_0 is a constant term and e_t is the error term. Equation (7) is then extended to include variable trade openness (tropen). Further, yd is replaced by yd(-1) assuming that output growth affects trade balance with a lag.

$$tb = c_0 + c_1 rer + c_2 yf + c_3 yd(-1) + c_4 tot + c_5 tropen + c_6 Dum01 + e_t \qquad (8)$$

Since, trade liberalization not only affects merchandise trade but also services, we test for the impact of liberalization on the current account of the balance of payments as a ratio of GDP (CABR).

$$CABR = c_0 + c_1 rer + c_2 yf + c_3 yd(-1) + c_4 tot + c_5 tropen + c_6 Dum01 + e_t \tag{9}$$

where the dependent variable CABR is the current account balance to GDP ratio; rer is percentage change of real exchange rate between Pak-rupee and US Dollar; y_d is domestic GDP growth in the previous year; y_f is world income growth; tropen is trade openness (or liberalization) calculated as the percentage share of exports plus imports in GDP; tot is the growth in terms of trade and DUM01 is dummy variable to capture change in CAB from deficit to surplus after 9/11 shock.,[4] and e_t is an error term. It is expected that c_1 is positive as real exchange rate depreciation leads to enhanced competitiveness of exports, thus improving trade balance and current account balance of the country, c_2 is expected to be positive as increase in foreign income leads to increase in demand of our exports, c_3 is expected to be negative as high domestic income leads to greater demand for imports, c_4 would be positive (negative) if substitution effect is lower (greater) than income effect of improvement in terms of trade, c_5 is expected to be negative when as a result of openness imports are liberalized and exports growth do not match imports growth, and c_6 is expected to be positive as it captures current account surplus in two years after the 9/11 shock mainly due to high remittances inflows.

The study uses annual time series data from 1976 to 2006, and data source for all variables except import duties and world income is IFS-CD ROM. The source of data on average effective tariff rate is Central Board of Revenue, Pakistan; and, data on world GDP is taken from World Development Indicators (World Bank, 2005).

3.1 Determinants of Current Account Balance

In the recent literature following variables are considered as important determinants of currant account balance.

---

[4] Figure 3 shows that current account of Balance of Payments remained in deficit in last three decades except a few years after 9/11 shock.

3.2 Trade Openness

Trade openness may increase or decrease current account deficit of a country depending on whether the liberalization has increased exports or imports. However, for developing countries it is observed that trade liberalization brings rapid increase in imports as compared to exports, thus worsening current account balance.

3.3 Growth in Domestic Output

An increase in the domestic output growth is expected to expand current account deficit as high growth requires greater investment and inputs, particularly, machinery and energy. Further, increase in domestic income prompts demand for imports of high quality consumer goods. If the current high growth rate of GDP is interpreted as signaling increases in permanent income, then according to Life Cycle Hypothesis, the proportion of consumption in current income could increase. Consumers would upgrade their lifestyle by demanding high quality imported goods, which would deteriorate trade and current account balances.

3.4 Public Expenditure

In developing countries public expenditure has perceptible reflection in the current account position of the country. The negative relationship between public deficit and current account balance is commonly known as twin deficit hypothesis in the literature. In the absence of a full Ricardian offset via private saving, an increase in the government budget balance could lead to an increase in national saving (Chinn and Hiro, 2005).

3.5 World Output Growth

The output growth in developed countries is expected to generate greater demand for the exports of the developing countries thus affecting current account balance positively. However, exports of developing countries have been under quota restriction. Further, developing countries export raw materials which are less sensitive to international income.

3.6 Real Exchange Rate Depreciation

Real exchange rate depreciation of the domestic currency enhances the competitiveness of exports thus affecting current account position of the country positively. Further, imports become expensive in terms of domestic currency leading to low demand for imported goods.

3.7 Terms of Trade

Terms of trade improvement could affect current account positively or negatively. Terms of trade improvement causes larger earnings for the same level of exports of a country thus affecting current account positively. But rise in prices of exports could shrink demand for exports and expand imports depending on elasticities of imports and exports.

4. Empirical Findings

Before estimating the impact of trade liberalization on current account ratio, the stationarity properties of the data were checked using the Augmented Dickey Fuller (ADF) test. Table 1 reports the results of the ADF test.

Table 1: Augmented Dickey Fuller Test

Variables	At Level	
	Intercept Only	Trend and Intercept
GGDP	-4.62(0)c	-4.50(0)c
GTOT	-5.18(0)c	-5.13(0)c
CABR	-3.49(6)b	-3.61(6)b
TROPEN	-3.59(1)b	-3.46(1)a

a, b and c denote significance of test statistic at 10%, 5% and 1% level of significance, respectively, against the null hypothesis of unit root. Figures in the parenthesis represent lags selected on the basis of Akaike Information Criterion (AIC). The white noises of residuals were also checked in ADF test.

All variables included in the regression (equation 9) are stationary. The model is estimated by Ordinary Least Square (OLS) method, as it provides

unbiased estimates of parameters in presence of stationary variables in the model. The estimation results (equation 9) are reported in Table 2. The estimation results show that trade liberalization, GDP growth and terms of trade changes are important determinants of CABR of Pakistan. The results show that a rise in overall trade by 1 percent of GDP worsens CAB by 0.32 percent of GDP. One percent rise in GDP growth worsens CAB by 0.11 percent of GDP in the next year and rise in growth of terms of trade by 1 percent deteriorates the CABR by 0.06 percent. The dummy variable to account for 9/11 effects on the current account balance is positively and significantly affecting CABR. All variables in the regression have expected signs.[5]

Table 2: Impact of Trade Liberalization on Current Account Balance

Explanatory Variables	Coefficients	t-statistic	Prob.
Constant	0.07	2.38c	0.0255[a]
DLGDP (-1)	-0.11	-3.23c	0.0036[a]
TROPEN	-0.32	-3.24c	0.0035[a]
GTOT	-0.06	-2.21c	0.0371[b]
Dum01	0.06	7.44c	0.0000
Adjusted R-squarer = 0.81 Durbin-Watson Stat = 1.72			
Diagnostic Tests			
Jarque–Bera Normality Test = Chi ^{2}(2) = 2.47 (0.29) Breusch-Godfrey LM Test = Chi ^{2}(1) =0.44 (0.51) Engle's ARCH LM Test = Chi ^{2}(1) =0.09 (0.76) Ramsey's RESET Test = Chi ^{2}(1) =0.90 (0.34)			

a, b, and c reflect significance at 10%, 5% and 1% level respectively.
Figures in brackets are probabilities.

Table 2 also reports results of residual tests to check normality, serial correlation and autoregressive conditional hetroskedasticity. The results show that residuals are normally distributed as Jarque-Bera normality test statistic is insignificant. Breusch-Godfrey LM test statistic is insignificant showing that there is no evidence of serial correlation. Engle's ARCH test

---

[5] The variables real exchange rate depreciation, world income growth, average effective tariff rates, fiscal balance and financial deepening were also considered as controlled variables but dropped as found insignificant.

statistic is insignificant showing no evidence of auto regressive conditional hetroskedasticity. Further, Table 2 also reports results of Ramsey's regression specification error test. The results show that test statistic is insignificant, thus no evidence of incorrect functional form. Finally, CUSUM and CUSUM of Squares tests were performed to test parameter or variance instability. The plots of recursive residuals as well as of squares of recursive residuals do not go outside the area between critical lines. Thus there is no evidence of parameter or variance instability.

5. Conclusion and Policy Implications
Trade openness is believed to encourage efficient utilization of resources through competition, inflow of knowledge and new techniques of business introduced by trading partners which has a strong correlation with the process of high economic growth. However, it is the supply side story. Rapid liberalization of trade could generate excess demand for imports leading to worsening of the current account balance of the country. Followed by trade liberalization, Pakistan is currently experiencing high current account deficit which is expected to cross 5 percent of GDP in FY07. The objective of this study, therefore, has been to empirically investigate the impact of trade liberalization on current account balance of Pakistan. In doing so, the stationarity properties of all variables were checked, and all included variables in the regression are stationary.

According to the findings of the study, trade liberalization, GDP growth and terms of trade changes are important determinants of CABR of Pakistan. The results show that a rise in overall trade by 1 percent of GDP worsens CAB by 0.32 percent of GDP. One percent rise in GDP growth worsens CAB by 0.11 percent of GDP in the next year and increase in growth of terms of trade by 1 percent deteriorates the CABR by 0.06 percent. The dummy variable to account for 9/11 effects on the current account balance is positively and significantly affecting CABR. All coefficients of the explanatory variables in the regression have expected signs. The variables real exchange rate depreciation, world income growth, average effective tariff rates, fiscal balance and financial deepening were also considered as controlled variables but dropped after being found insignificant.[6]

---

[6] The author has also prepared a weighted GDP of Pakistan's five major exporting countries; this series is available on request.

The policy implications based on empirical findings of the study are:

- For a sustainable current account balance in Pakistan, the process of import liberalization should be accompanied by measures to enhance export competitiveness.[7]

- The process of rapid economic growth in recent years has aggravated demand for imports due to domestic supply constraints; therefore output gap should be reduced through productivity enhancement and by tackling supply side bottlenecks.

The limitation of the study is that it focuses on a particular question instead of analyzing impact of openness on the economy in macroeconomic modeling framework. Future research in this direction could focus on developing alternative openness measures and their impact on fiscal and trade deficits in a macroeconomic framework.

---

[7] Rapid liberalization of imports can cause payments difficulties as well as dislocations in the economy, unless it is appropriately sequenced or combined with effective measures designed to enhance competitiveness and to promote exports (see, e.g. UNCTAD, 1999).

References

Ben-David, D. 1993. "Equalizing exchange: trade liberalization and income convergence" *Quarterly Journal of Economics* 108(3):221-240.

Chinn, M. D. and I. Hiro 2005. "An update on medium-term determinants of current account balances" *NBER* Working Paper No. 11761.

Chinn. M. D. and E. S. Prasad 2000. "Medium term determinants of current accounts in industrial and developing countries: an empirical exploration" *NBER* Working Paper No. 7581.

Din, M., E. Ghani and O. Siddique 2003. "Openness and economic growth in Pakistan" *The Pakistan Development Review* 42(4): 795-807.

Dollar, D. 1992. "Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDC's 1976-85" *Economic Development and Cultural Change* 40(3): 523-544.

Edwards, S. 1998. "Openness, productivity and growth: what do we really know?" *The Economic Journal* 108(447): 383-398.

Edwards, S. 2001. "Does the Current Account Matter?" *NBER* Working Paper 8275.

Frankel, J. and D. Romer 1999. "Does Trade Cause Growth?" *American Economic Review* 89(3): 379-399.

Iqbal, S. and G. M. Zahid 1998. "Macroeconomic determinants of economic growth in Pakistan" *The Pakistan Development Review* 37(2): 125-148.

Kemal, A. R., M. Din, and U. Qadir 2003. "Global research project: Pakistan country report on sources of economic growth" Pakistan Institute of Development Economics Islamabad

Khan, A. H., A. Malik, and L. Hasan 1995. "Exports, growth and causality: an application of cointegration and error-correction modeling" *The Pakistan Development Review* 34(4): 1001-1012.

Khan, M. S. and R. Zahler 1985. "Trade and financial liberalization given external shocks and inconsistent domestic policies" IMF Staff Papers 32: 22-55.

Lopez, P. Pacheco 2004. "The Impact of Trade Liberalization on Exports, Imports, the Balance of Payments and Growth: the Case of Mexico" *UKC Studies in Economics* Paper No. 04-01.

Parikh, Ashok 2004. "Relationship between trade liberalization, growth and balance of payments in developing countries: an econometric study" *Haamburgisches Welt Wirtschafts-Archive* (HWWA)Hamburg Institute of International Economics Discussion Paper No 286.

Paulino, A. S. and A. P. Thirlwall 2004. "The impact of trade liberalization on exports, imports and the balance of payments of developing countries" *The Economic Journal* 114: 50-72.

Rodriguez, F. and D. Rodrick 2001. "Trade policy and economic growth: a skeptic's guide to the cross-national evidence" *NBER Macroeconomics Annual* 2000.
Sachs, J. D. and A. Warner 1995. "Economic reform and the process of global integration" *Brookings Papers on Economic Activity* 1: 1-118.

UNCTAD 1999. *Trade and Development Report* Geneva.

World Bank 2005. *World Development Indicators 2005.* Washington D.C. World Bank

Yanikkaya, H. 2003. "Trade openness and economic growth: a cross-country empirical investigation*" Journal of Development Economics* 72: 57-89.
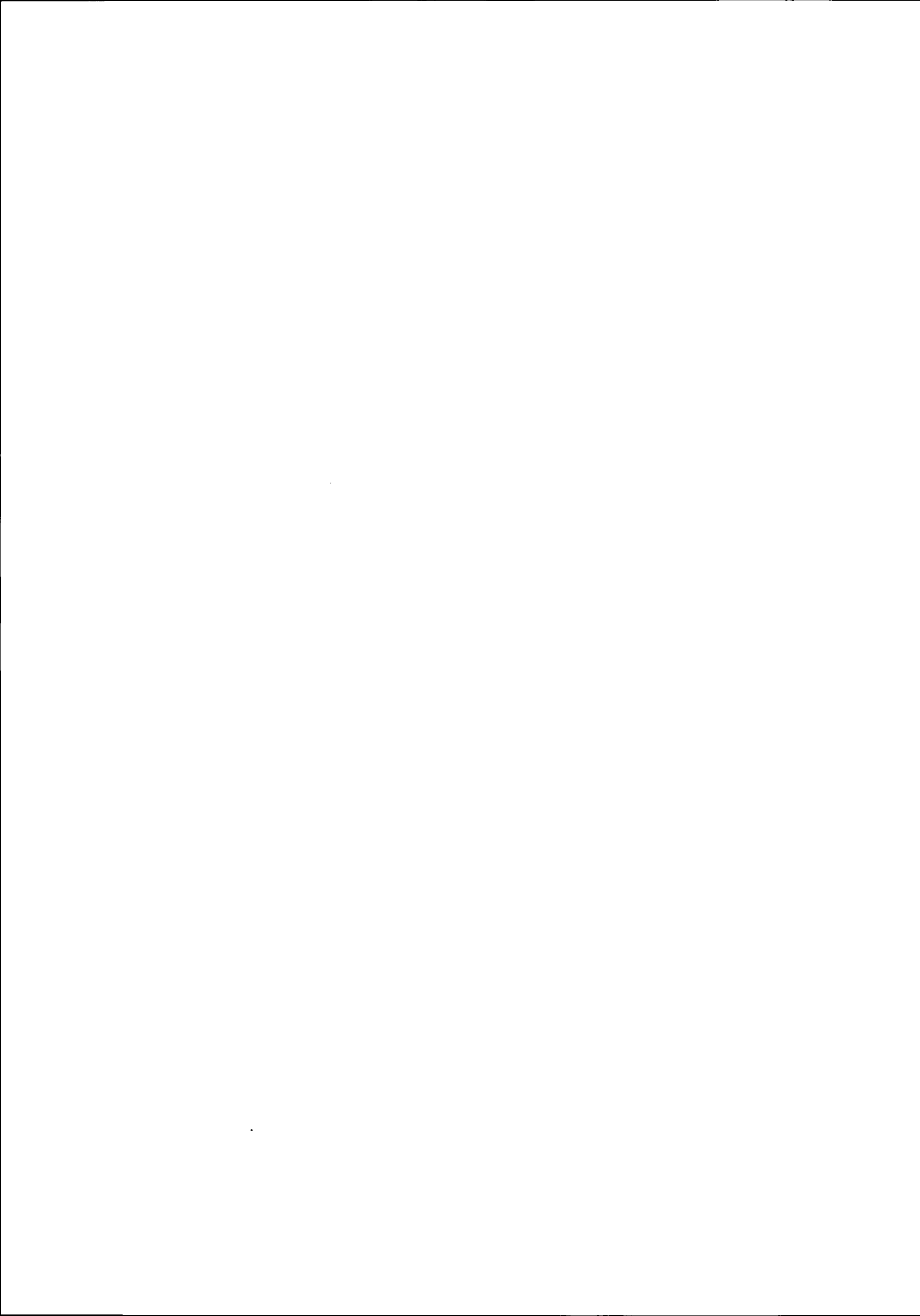
Impact of Locational Choice on the Cost-Plus Pricing and Social Welfare

Parvez Azim[*]

Abstract: Minimum transportation cost is one of the prime objectives of industrial location choice both for weight gaining and weight losing industry. It has been demonstrated in this paper that, in general, the median location is the point at which the total transportation cost involved delivering the product to the buyers is less than what it would be at the mean or the mode of the distribution of the population. Therefore, decision to locate at the median will decrease the average cost, which will translate into lower cost-plus pricing, which in turn will maximize social welfare.

1. Introduction

Industrial experts and economists understand how firms are located under different pricing policies and other conditions which vary from one location to another. "Although specific needs vary from industry to industry, all industrial plants require transportation services to convey raw materials to the plant and to ship the finished product to the market". (Rogers1975, p.47). It is clear from this statement that transportation is a factor that affects every site selection. The movement of materials, both externally and internally, as well as the transportation costs of the final product can sum up to a very high percentage of the cost of the final product; therefore, transportation often has a major impact on choosing location in a given area.

All factors such as the shape of the demand functions, alternate pricing policies adopted by the firm(s) i.e. f.o.b. mill pricing or basing-point pricing policy, the form of delivery cost functions, personal choices, uncertain

[*] Foreign Professor, Department of Economics, GC University, Lahore. This paper draws heavily on chapter 6 of the author's Ph.D. dissertation.

expectational values, the conjectural variations of the managers of firms, the particular distribution of customers and the degree of competition in the industry that could possibly influence a site selection choice are important.

Overlooking any one of these could lead to non-optimal location. In the literature, transportation was considered to be more important than other factors by many writers and hence will be discussed in this paper.

To be more specific, international trade, by its very definition, implies trade taking place between spatially separated markets; therefore spatial analysis can be useful in policy formulation, *inter alia*, industrial location choice. For a production site to be profitable, price must be equal to the average cost of production in the long run. Thus, if the market size is too small to equate an average revenue at least with average cost, no industry would survive in that area in the long run. For every industry, there must be some minimized market which its economies of scale require in order for production to be profitable. For these reasons and others, the profit maximizing site may not be at the geographic centre of the market area. The geographic centers of the market are of interest because of their proximity to the buyers, which lead to lowest transportation costs or lowest input supplies. It is believed that as much as 10 percent of plant operating costs can be saved annually by virtue of a proper geographic choice.

At this point, in the search for a site the aim is to pinpoint specific possibilities, i.e. the location should be at the median, between the mode and the median or between the mean and the median of the distribution of the consumer density population; keeping in mind the aim of locating a production site where it involves the minimum shipping expenditure to deliver the good to the consumers. This paper deals with an aspect of the location decision. A rather general way for sellers to maximize profit is by reducing expenditures and typically transportation costs are among those which can easily be lowered. This paper demonstrates how this objective is achieved by shifting the producer location site at or around the median of the given population distribution. With the assumption that the nature of the demand function of the consumers (i.e. be it linear, concave or convex) and production cost excluding the transportation costs is everywhere the same, the best location for the production process is at the point of minimum transport cost for a given 'locational figure'. In the long-run, the industry

must be in equilibrium, that is, it must locate where transportation cost is minimized and hence cost-plus price is minimum.

2. Analysis

For each combination of material sources and markets there must be a point or points at which the total transportation cost involved in manufacturing and delivering the product to the buyers is less than it would be at any other location. Under selected *ceteris paribus* assumptions the best location for the production process will be at the point of minimum transport cost. In order to elaborate upon this elementary formulation, the following geometrical presentation is in order. In Figure 1, let there be buyers A through I on the skewed curve with their exact location represented by their respective coordinates. Suppose the firm is located at the weighted median. It is further assumed that a marginal transportation cost function h(L-V) is constant, where L is the seller's location and V is the buyer's location. As the distance in a finite space changes from the seller's location at L to a particular consumer's location V, the derivative of h (.), h(L-V)=0, the location L will be at the median of the distribution if [see Rydel (1967)] the equality holds, where D(V) is the density of buyers

$$\int_0^L h(L-V)\,D(V)\,dV = \int_l^L h(V-L)\,D(V)\,dV \qquad (1)$$

If $h'(L-V) > 0$ in the neighborhood of the median of the distribution, the "weighing" factor h(L – V) increases with distance and L moves to the mean as shown in Figure 1 below.

Figure 1: Movement of seller toward the mean (final location in between the mean and the median)
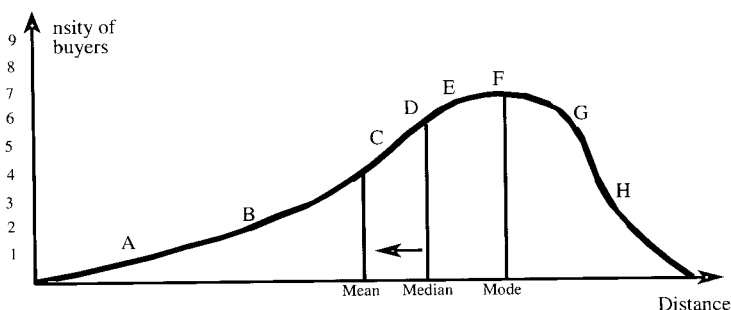
If $h'(L-V)<0$ the equation (1) forces L to a point between the median and the mode as shown in Figure 2 below.

Figure 2: Movement of seller toward the mode (final location in between the median and the mode)
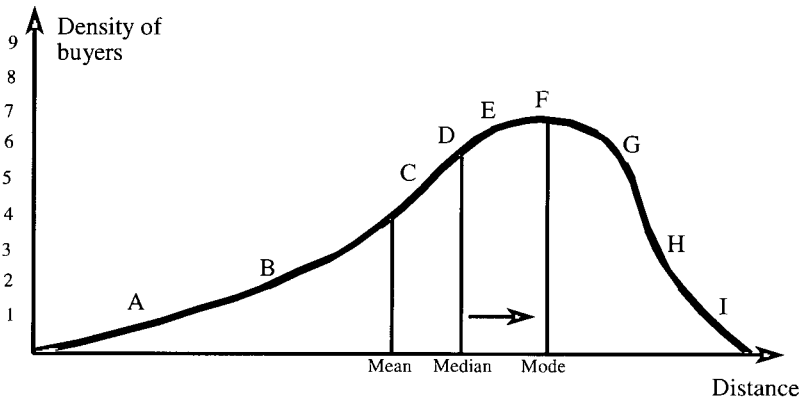
Figures 3, 4 and 5 represent location of the seller at the mode, the median and the mean, respectively. In these Figures, length of the rays emanating from the seller's location and reaching the consumers at locations A through I with their respective coordinates represent the distance to be covered in delivering the product to the consumers' locations. The objective is to find the location which gives a transport cost advantage over other locations. The sum of distances from each point of location to buyers are given below. The Euclidean distance 'd' between two points (x_1,y_1) and (x_2,y_2) would be:

$$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

Location	Euclidean Distance (d)
Mode	70.09Km
Median	66.07Km
Mean	66.76Km

The transportation cost involved would be the highest when the location choice is the mode, the second highest would be at the mean and the

minimum transportation cost is obtained when the industry location is at the median of the distribution as its distance is smallest of all, consequently cost-plus pricing will be the lowest at the median (Azim,1989). A location choice involving a higher transportation costs, such as the mode or the mean cost, would cause a cost-minimizing manager to move to the median. The impact of location choice and different pricing policies play a very important role in regional science.

Regarding the cost-plus pricing policy, it is believed that use of cost-plus pricing is simply a tool used by business in pursuing the goal of long-run profit maximization. As such, cost-plus prices are related to, although not identical to, prices based on marginal revenues and marginal costs. Mathematically:

$TR = PQ$

Differentiation with respect to quantity Q gives us marginal revenue MR.

$$\text{MR} = \frac{d(\text{TR})}{dQ} = \frac{d(PQ)}{dQ} = P + \frac{dP}{dQ}Q \quad \textit{which could be written as}$$

$$MR = P\left(1 + \frac{1}{E_P}\right) \quad \textit{where } E_P \textit{ is the price elasticity of demand and } E_P = \frac{dQ}{dP}\frac{P}{Q}$$

Profit maximization requires that MR=MC. As a simplifying assumption,

let MC=AC. Thus the profit–maximizing price is the solution to

$$P\left(1 + \frac{1}{E_P}\right) = AC \quad \textit{which can be written as} \quad P\left(\frac{E_P + 1}{E_P}\right) = AC, \textit{ this gives us}$$

$$P = AC\left(\frac{E_P}{E_P + 1}\right)$$

This equation can be interpreted as a cost-plus pricing scheme (Petersen and Lewis, 1990, p.493). That is, the price is based on a markup over average costs. In our case average costs vary at each location, being highest at the mode, the second highest at the mean and the minimum at the median. The AC would be the lowest at the median because the distance involved in transportation of the finished product is the minimum. Consequently, the cost-plus price would be the minimum, relatively speaking. The cost-plus pricing is the mechanism by which managers pursue profit maximization. In

fact, the cost-plus pricing may be the most rational approach in maximizing profits.
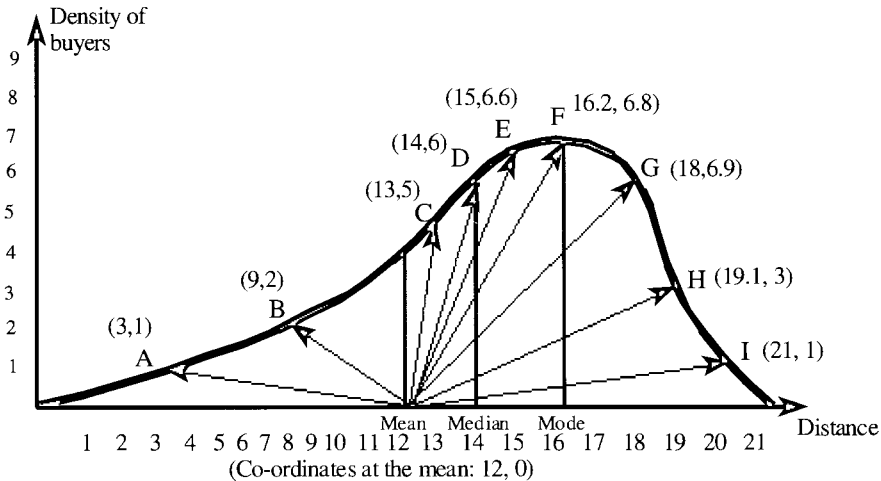
Figure 3: Distance of the buyers when seller is located at the mode

(Co-ordinates at the mode = 16.8, 0)
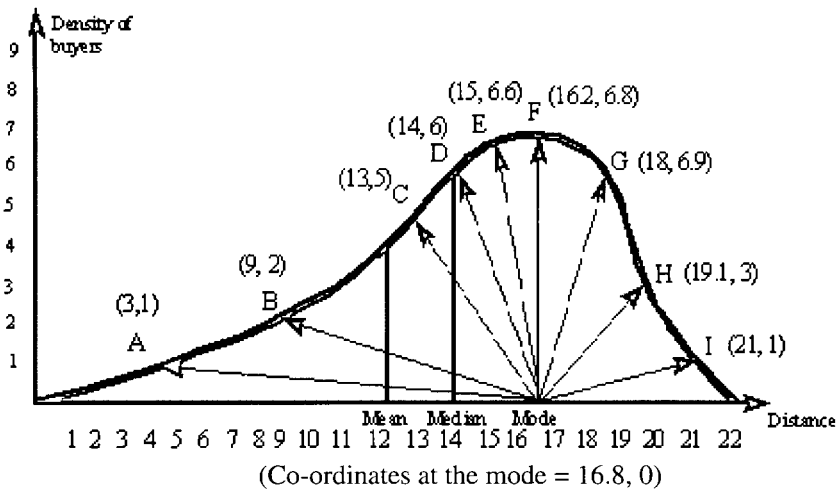
Figure 4: Distance of the buyers when seller is located at the median

(Co-ordinates at the median: 13.6, 0)
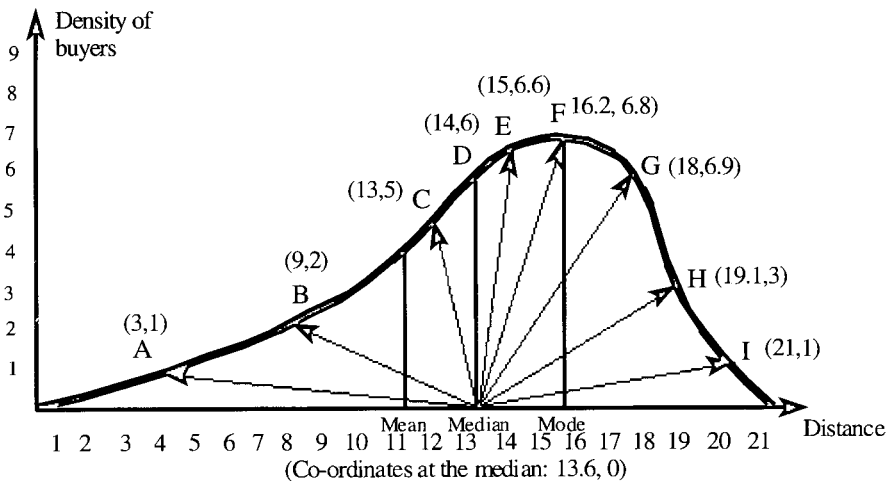
Figure 5: Distance of the buyers when seller is located at the mean

(Co-ordinates at the mean: 12, 0)

The need exists to use cost-benefit analysis to evaluate the impact of selection of a location site when the objective is to maximize profit by the firm. Cost-benefit analysis refers to a decision making process to answer the economic questions, *inter alia,* 'where to produce' and 'how much to produce'. It considers the social benefits to all in society and the social costs of an economic activity. Production and consumption is at the social optimum level at a quantity when the social marginal cost (SMC) equals the social marginal benefits (SMB):

$$SMC = SMB$$

This approach aims to achieve efficient allocation of resources because it considers all benefits and all costs. Social marginal cost (SMC) comprises private marginal cost (PMC) and external costs (EC):

$$SMC = PMC + EC$$

PMC falls on producers and consumers who themselves undertook an economic activity. EC are third party effects or spillover effects which are bad; money value cannot be placed on such costs. Examples are pollution and environmental effects.

Figure 6: The Optimal Production
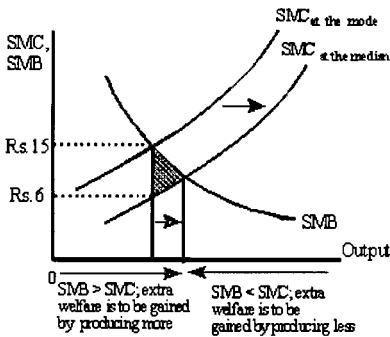
Figure 7: Comparison of SMCs at Level the three Location Sites
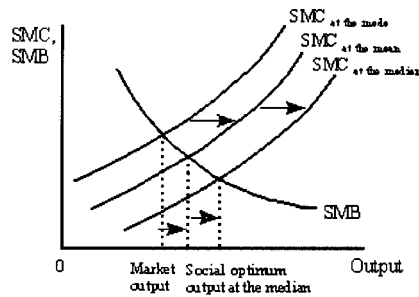
Production at the median will decrease total cost because of less transportation cost component of the total cost, which, in turn, will decrease the price level of the product (cost-plus pricing), causing a rightward shifting of the SMC and increasing the level of production as shown in Figure 6. The new equilibrium price (let it be Rs. 6) will be lower and the equilibrium quantity higher than on the initial supply curve when the production was at the mode. When production is not taking place at the median, there would be under-production at market output level as shown in the Figure 6.

In Figure 6 society values an additional unit of the good as being worth Rs. 15 and its cost is Rs. 6. Production at other than the median location suggests that the society is under-allocating resources and the more of it should be produced as shown by the arrow to achieve allocating efficiency where SMB = SMC. The shaded triangle in Figure 6 represents a rise in social welfare. Figure 7 compares the equilibrium price and the equilibrium quantity produced at the mode, the median and the mean. It is clear from Figure 7 that the equilibrium price is the lowest and the equilibrium quantity produced is the greatest at the median. Production at the median will result in a welfare gain to society which is equal to the shaded triangle in Figure 6. The socially efficient output will, therefore, be greater than otherwise. The shaded area represents the monetary measure of the welfare loss to society when firms are producing at other than the median location site. Therefore, production at the mean or the mode is not justifiable from

economic point of view, because economics deals with not only 'what to produce', 'how much to produce', and for 'whom to produce', but also 'where to produce' i.e. the least cost production site which happens to be the median location in our case where the social welfare is maximum.

3. Conclusion

According to the maximum-profit theory of location of a firm, for each combination of material sources and markets there must be a point or points at which the total transportation cost involved in manufacturing and delivering the product to the buyers is less than it would be at any other location. Under selected *ceteris paribus* assumptions throughout the landscape, the best location for the production process will be at the point of minimum transport costs, which has been demonstrated to be the median of the distribution of population. This paper also compares cost advantages of different potential locations sites. The mode was found to be the least cost advantageous, the mean being the intermediate and the most cost advantageous site was found to be the median.

In order to determine the optimum plant size, we need to obtain the firm's combined long-run cost function. This total long-run average cost (TLAC) is the sum of the long-run average processing cost plus shipping costs. The median location shifts the TLAC downward which in turn increases the efficient plant size (optimal output level) i.e. volume of production and/ or number of plants on a given geographical area. This will lead to an increase in the social welfare of the society shown by a shaded triangle in Figure 6. To sum up, the median location increases profit of producer, leads to higher volume of production, lowers prices to customers which in turn lead to a rise in the social welfare of the society.

References

Azim, Parvez 1989. "Median location" *Pakistan Journal of Statistics* 5(3):253-257.

Petersen, H. Craig and W. Chris Lewis 1990. *Managerial Economics.* 2nd ed., New York: Macmillan

Rogers, D.W. 1975. *Transport.* In: Frank L. Cross and John L. Simons, eds., *Industrial Plant Siting.* 47-52. Westport, CT.: Technomic Publishing Co., Inc.

Rydel, C.P. 1967. "A Note on a location principle between the median and the mode" *Journal of Regional Science* 7: 185-195.

Pupil Teachers' Motivation and Behaviour towards the Choice of Government or Private Sector Education as Career

Muhammad Imran Yousuf and Muhammad Nadeem Anwar[*]

Abstract: The purpose of this descriptive survey was to explore and describe why graduates who were enrolled in Bachelor of Education degree chose teaching as a career. Twenty nine pupil teachers from four universities in Pakistan participated in the study. There were several findings from the study. First, it was found that 24 out of 29 pupil teachers in the study planned to become teachers. Second, career choice was related to intrinsic and extrinsic career choice motives. Pupil teachers choosing government sector education as a career had intrinsic motives. On the other hand, pupil teachers who anticipated careers in private sector education had extrinsic career choice motivation. Third, pupil teachers who planned to pursue government sector education careers were more efficacious than their peers who planned to pursue private sector education careers or were undecided about their careers.

1. Introduction

Career development starts early in a person's life and is shaped by personal and environmental factors (Bandura, 1986). Personal and social experiences influence helping professionals' career choices. Professionals in the helping professions often choose careers based upon childhood experiences, personal and professional goals, beliefs and values, and being inspired by family and peers to serve others (Fischman *et al.*, 2001). Further, the presence of teachers in the family was a significant factor influencing teacher candidates' decisions to teach.

Personality plays a role in the careers people choose. People fall into one of six personality types: realistic, investigative, artistic, social, enterprising, or conventional. People tend to seek careers where they can be around others that are similar to themselves, creating a positive work environment and

---

[*] The authors, respectively, are Lecturer, Division of Continuing Education, University of Arid Agriculture, Rawalpindi; and Lecturer, Department of Education, University of Sargodha.

experience. People who are in work environments with others like themselves will be more satisfied and successful.

Walsh and Huston (1988) suggested that the teaching profession may attract individuals who consider the job a good "fit" for them and who want to make a contribution to society and work with young people. Perhaps some feel that this "fit" is a calling to serve in the career.

Additionally, Ginzberg (1988) suggested that career choice is a three-stage process that begins at childhood and develops through teenage years. During the final stage, realistic (age 17 through young adulthood) people familiarize themselves with alternatives and eventually develop a compromise that allows them to use their talents and interests while as many of their goals and values as possible will be satisfied. Perhaps some considering careers, will be drawn to a greater extent by intrinsic or altruistic motives, while others may be pulled toward other careers due to extrinsic motives depending upon the motives and values of those making the career choices.

Various factors explain career choice for people in general, for those in helping careers, and more specifically for those in career and technical education. Some of the research that has helped to identify these influential factors has been focused specifically on determining the influences on career choice, while other research has determined the factors through gathering data on what causes individuals to remain in and/or leave careers. The researchers summarized the review of literature into six factors—both intrinsic and extrinsic motives—that influenced career choice of pupil teachers. Three of these factors, (a) serving others, (b) touching people's lives/making an impact, and (c) "calling" to a career, measured intrinsic career choice motivation, while the remaining three, (d) salary and benefits, (e) balance between career and personal time, and (f) opportunities for advancement/personal growth, measured extrinsic career choice motivation.

People are likely to be attracted to teaching because of a combination of altruistic, intrinsic, and extrinsic motives (Seng Yong, 1995). People do not enter teaching to satisfy needs, but rather to help young people and to help the education system. Studies on prospective and practicing teachers actually revealed that the two main altruistic reasons for choosing teaching were the desire to work with young people (Brown, 1992) and the desire to

contribute to society. Research in other helping careers has indicated that people enter those careers for similar reasons. It has been shown that altruism, a desire to help others, or intrinsic motivation are factors that strongly explained a part of the decisions of those choosing to enter a career in nursing (Parker and Merrylees, 2002).

While intrinsic factors influence some to enter helping careers, extrinsic factors have been shown to influence teachers' decisions to leave the teaching profession. A market-responsive model has been used to explain why people choose careers. This model suggests that individuals make career choices based on demand and the level of compensation (Ochsner and Solmon, 1979). This model predicts that students prepare for an occupation that will be in high demand and will maximize their earnings. Though a much more extrinsically-focused model, the research in teaching has supported its suggestion, as well.

Teachers' salaries relative to alternative occupations pursued by college graduates had an effect on career choices of prospective and current teachers. In addition to investigating reasons for entering a career, some of the research reviewed related to reasons for leaving careers, as well. These include maintaining a balance between career and personal time (Fischman *et al.*, 2001), salary and opportunity for advancement (Litt and Turk, 1985), lack of support from the principal, problems with student discipline, lack of student motivation, and lack of respect from community, parents, administrators, and students (Marlow *et al.,*1996). Research in another helping field, Extension education, has shown that a portion of agent attrition in that field is also related to pay, excessive time requirements, and too many requirements for advancement—reasons which are extrinsic.

It was initially assumed that motivation had to be generated from outside, but it is now understood that each individual has his own set of motivating forces (Yousuf, 2007). Recruiting and retaining quality teachers is crucial to attaining excellence in education (Darling-Hammond, 1999). Pupil teachers who possess the characteristics of being qualified, caring, and competent are likely to be sought after by non-profit and business organizations, which could also benefit from these characteristics. The teaching profession competes against other important professions for the most talented people, and changes that have occurred in education in recent years have made it

possible for qualified pupil teachers to secure employment outside of the classroom at very competitive salaries.

2. Purpose and Objectives

The purpose of the study was to explore and describe why graduates who were enrolled in Bachelor of Education degree chose teaching as a career and to identify anticipated career choices for pupil teachers after their student teaching internships.

3. Methods and Procedures

This was an exploratory descriptive survey. The target population was a census of all pupil teachers who were enrolled in Bachelor of Education in the spring semester of 2006. Twenty-nine out of 30 pupil teachers from four universities responded to the questionnaire. Demographically, 52% were women, 72% were enrolled in high school education classes for at least one year, and 66% were enrolled in four years of high school education. Sixty-nine percent of the participants were members of the Private Schools Organization (PSO) for at least one year. Respondents were asked to rank-order six items that influence career choice, from (1) most important to (6) least important. Three of these items, (a) serving others, (b) touching people's lives/making an impact, and (c) "calling" to a career, measured intrinsic career choice motivation, while the remaining three, (d) salary and benefits, (e) balance between career and personal time, and (f) opportunities for advancement/personal growth, measured extrinsic career choice motivation. The three items that measured intrinsic career choice motivation were summed to represent the type of career choice motivation of participants. The rank-order sum of the three intrinsic items ranged from 6 to 15. Participants' sums that were in the 6 to 10 range were identified as having an intrinsic motivation. Participants' sums that were in the 11-15 range were identified as having an extrinsic motivation.

4. Findings

Regarding career choice, 83% (N = 24) indicated in their responses that, at the end of their student teacher experience, their anticipated career choice was government sector education (e.g., high school teacher). Additionally, 10% (N = 3) indicated their anticipated career choice was private sector

education, and 7% (N = 2) were undecided. Regarding career motives, 42% (N = 10) of the pupil teachers whose anticipated career choice was government sector education ranked the three extrinsic motives highest among the six career choice motives provided (Table 1). These 10 pupil teachers had the lowest possible rankings for intrinsic motives (i.e., 1, 2, or 3). Eighty percent of the government sector education pupil teachers based their career choice on intrinsic motives. Of those who chose private sector education, two of the three pupil teachers based their career choice on extrinsic motives. The two pupil teachers who were undecided in their anticipated careers were split between intrinsic and extrinsic motives.

Table 1: Frequencies of Rankings of Motives by Career Choice (N = 29)

Career Choice	Intrinsic Motives (Rank-order sum)				Extrinsic Motives (Rank-order sum)			
	6	7	9	10	11	12	14	15
Government Sector Education (N = 24)	10	4	5	1	1	2	0	1
Private Sector Education (N = 3)	1	0	0	0	0	2	0	0
Undecided (N = 2)	0	0	1	0	0	0	1	0

The groups were compared on their mean rankings of motives. Pupil teachers who planned to pursue a government sector education career had an average mean ranking of 7.82 (SD = 2.06) for intrinsic motives and 13.18 (SD = 2.06) for extrinsic motives. Pupil teachers who planned to pursue a private sector education career had an average mean ranking of 12.00 (SD = .00) for intrinsic motives, and 9.00 (SD = .00) for extrinsic motives. The two pupil teachers who were undecided regarding their career had an average mean ranking of 9.67 (SD = 4.04) for intrinsic motives, and 11.33 (SD = 4.04) for extrinsic motives. Pupil teachers planning to pursue government sector education careers based their decision on intrinsic motives compared to their peers. Pupil teachers who planned to pursue private sector education careers based their decision on extrinsic motives

compared to those who were undecided. Pupil teachers who were undecided on their career plans identified with both intrinsic and extrinsic motives. There was a substantial association between intrinsic motives and career choice (= .56) and a moderate association between extrinsic motives and career choice (= .41). These associations had a large and medium effect sizes, respectively.

Table 2: Descriptive Data for Motives and Teachers' Sense of Efficacy

by Career Choices

Career Choice	Government Sector Education (N = 24)	Private Sector Education (N = 3)	Undecided (N = 2)
Intrinsic Motives [a]	7.82 (2.06)	12.00 (.00)	9.67 (4.04)
Extrinsic Motives [a]	13.18 (2.06)	9.00 (.00)	11.33 (4.04)
Teaching Self-Efficacy [b]	5.76 (1.35)	4.93 (.00)	4.25 (.21)

Note. [a]Range of summed rank-orders, (1) most important to (6) least important, was 6.00 - 15.00 for intrinsic motivation items.

[b]Scale: (1) Nothing; (3) Very little; (5) Some influence; (7) Quite a bit; (9) A great deal.

5. Conclusions

The researchers found that 24 of the 29 participating pupil teachers planned to become teachers. This was higher (83%) than the overall average placement rate of 59% and 73% who probably wanted to teach, which suggests that these pupil teachers were motivated and had positive student teaching experiences. However, the small, one-shot nature of this study limits the generalizability of this finding. Overall, the findings should not be generalized beyond this small census study. This study needs to be

replicated and conducted on a larger scale to strengthen the generalizability of the findings. By having a larger sample, structural equation modeling should be used to determine causal relationships between variables and career choice. Teacher educators should seek to understand factors (e.g., student teaching experience and relationship with the cooperating teacher) that influence pupil teachers' career choices. Further study on student teachers' self-actualizing experiences may serve as motivation for pupil teachers to enter the career in which the experience happened (Heneman *et al.*, 1980).

Career choice was related to intrinsic and extrinsic career choice motives. Pupil teachers choosing government sector education as a career had intrinsic motives.

On the other hand, the pupil teachers that planned to pursue careers in private sector education had extrinsic career choice motivation. This conclusion corroborated with the literature, in that those in helping careers tend to choose those careers for altruistic reasons (Eick, 2002). This also supported the literature in career and technical education indicating the same finding (Ruhland, 2001). Because of the differences in motives, teaching self-efficacy, and leadership behaviours of the pupil teachers, this suggests that individuals are attracted to the teaching profession if they consider the job a good fit for them. Although the skill sets are similar, the nature and culture of work in government sector education is different than private sector education or business and industry. Recruitment efforts for future teachers should be based on intrinsic motivation. Recruiters should advise potential agricultural education teachers (i.e., those that are interested in the intrinsic benefits) based on intrinsic motives as students make decisions about their major subjects.

Pupil teachers' sense of efficacy was related to career choice. Pupil teachers who plan to pursue government sector education careers had a higher sense of teaching self-efficacy than their peers who planned to pursue private sector education careers or were undecided about their careers. This conclusion supported studies that found that students had more interest in a given career when they had stronger self-efficacy beliefs (Betz and Hackett, 1981). This finding suggests that pupil teachers identify more closely with classroom teaching competencies than their peers who plan to pursue private sector education careers. Although teaching responsibilities are a

component of a private educator's job responsibilities, the overall responsibilities also include administrative leadership, personnel and volunteer management, and programme management. This could be the reason why participants planning to pursue private sector education careers reported higher leadership behaviours. Due to the broader scope of job responsibilities in education, a self-efficacy instrument should be created that includes administrative leadership and personnel and programme management. This would help pupil teachers assess their self-efficacy regarding the different skill sets utilized in education. Faculty should continue to help students in education develop a sense of efficacy, and further research should be conducted to understand how a teacher's sense of efficacy influences career choice.

References

Bandura, A. 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall

Betz, N. E., and G. Hackett. 1981. "The Relationship of Career-related Self-efficacy Expectations to Perceived Career Options in College Women and Men" *Journal of Counseling Psychology* 28: 399-410.

Brown, M. M. 1992. "Caribbean First-year Teachers' Reasons for Choosing Teaching as a Career" *Journal of Education for Teaching* 18(2):185-195.

Darling-Hammond, L. 1999. *Teaching Quality and Student Achievement: A Review of State Policy Evidence*. New York: National Commission on Teaching and America's Future

Eick, C. J. 2002. "Study Career Science Teachers' Personal Histories: A Methodology for Understanding Intrinsic Reasons for Career Choice and Retention" *Research in Science Education* 32: 353-372.

Fischman, W., D. A. Schutte, B. Solomon, and G. Wu Lam 2001. *The Development of an Enduring Commitment to Service Work New Directions for Child and Adolescent Development* 93: 33-44.

Ginzberg, E. 1988. "Toward a Theory of Occupational Choice" *Career Development Quarterly* 35: 358-363.

Heneman, H. G., D. P. Schwab, J. A. Fossum and L. D. Dryer 1980. *Personnel-Human Resource Management* Homewood, IL: R. D. Irwin.

Litt, M. D. and D. C. Turk 1985. "Sources of Stress and Dissatisfaction in Experienced High School Teachers" *Journal of Educational Research* 78: 178-185.

Marlow, L., D. Inman, and M. Betancourt-Smith 1996. *Teacher Job Satisfaction*. ERIC Document Reproduction Service (No. ED 393802)

Ochsner, N. and L. Solmon 1979. *Forecasting the Labor Market for Highly Trained Workers*. Los Angeles: Higher Education Research Institute, University of California, Los Angeles

Parker, J. and S. Merrylees 2002. "Why Become a Professional? Experiences of Care-giving and the Decision to Enter Social Work or Nursing Education" *Learning in Health & Social Care* 1(2): 105-114.

Ruhland, S. K. 2001. "Factors that Influence the Turnover and Retention of Minnesota's Technical College Teachers" *Journal of Vocational Education Research* 26(1): 56-76.

Seng Yong, B. C. 1995. "Teacher Trainees' Motives for Entering into a Teaching career in Brunei Darussalam" *Teaching and Teacher Education* 11(3): 275-280.

Walsh, W. B. and Huston, R. E. 1988. "Traditional Female Occupations and Holland's Theory of Employed Men and Women" *Journal of Vocational Behaviour* 32: 358-365.

Yousuf, M.I. 2007. "Motivating the Motivators Education-Zine" *The News International*.http://Jang.com.pk/thenews/sep2007-weekly/education-15-09-2007/index.html

Book Review

There is a scramble for energy in the world. Countries once known as laggards, including some very large developing countries, have joined the high growth league and literally fuelled the energy demand, straining supplies to the limits. One such large developing country lies in South Asia i.e. India. Despite high growth, India continues to be like the other South Asian countries which are low-income, oil importing developing countries. High growth, a necessary though not a sufficient condition for higher personal incomes, requires ever increasing input of energy. Energy security is thus crucial to the success of poverty reduction in South Asia, a region with the highest concentration of the poor in the world. In this background, the publication of the book under review is timely. A very distinguished group of researchers from across the region has contributed to this volume, which contains a wealth of relevant information and enriching analyses.

As a measure of vulnerability, it is pointed out that imports range from 27 to 87 per cent of commercial energy. And as a pointer to insecurity, it is projected that the present high growth could only be sustained by a 300 per cent increase in energy consumption by 2020. Even at this level, energy consumption per capita, another key indicator of progress, would not hit a respectable place in the global league tables. On the average, one-fourth of the energy consumption is from traditional fuels, an aspect the consequences of which have not been explored adequately in the volume.

How must the region secure its supply? For oil and gas, while there are suggestions for joint exploration, the fact remains that the region has to look beyond its borders. Though India is acquiring stakes in some oil fields abroad, the preferred option is gas for its environment friendliness as well as relatively greater potential availability. The region is flanked by

resource-rich countries like Maynmar on the East and Iran and the Central Asian States on the West and North West. While one pipeline may be relatively more economical than the other, the economics of all pipelines makes more sense than the politics around them. Statesmanship, rather than the wrangling about prices and hackneyed security perspectives, will determine the future course of action. Within the region, only Bangladesh has a surplus in gas, with prospects of mutually gainful trade in that part of the region.

The volume makes the sensible argument that though the nuclear option should be kept open, it must not be counterpoised to the option of gas pipelines. Even if all the present nuclear plans are brought to fruition, the proportion of nuclear energy in the total energy supply will remain small.

Coal is a huge indigenous resource in the region and, therefore, merited a more elaborate discussion. Some 70 percent of India's installed capacity of electricity comes from coal with insignificant to nil contribution in Pakistan and Bangladesh, the other two countries with substantial deposits. An import-dependent, energy-short region has to carefully assess the economic, technological and environmental considerations in the use of this indigenous resource.

Hydroelectricity is a cleaner source of energy, but not without other environmental costs. At the moment the region exploits only 15 per cent of its potential. Bilateral trade arrangements in hydel power already exist between Bhuttan and India and India and Nepal. Pakistan had offered its surplus thermal power to India in 1998. However, recalling the experience of an integrated electricity distribution system before independence, the countries can be best served by a region-wide grid. The strongest parts of the book are the discussion of important technical issues related to grid construction and the contentious problems arising in any negotiation on cross-border trade in electricity.

Alternative energy sources such as wind and solar power have been highlighted in terms of the institutional arrangements that have been put in place. An analysis of the cost of development and the required incentives-mix would have enhanced the value of the research programme.

Another area which has received inadequate attention is energy conservation. In 2003, GDP per unit of energy use in South Asia was higher than the average for developing countries, but it was far below the average for the two largest energy consumers—India and Pakistan. Studies carried out at the ENERCON (National Energy Conservation Centre) show that energy conservation is the quickest and most cost-effective route to augment supply. In money terms, the resulting saving amounts to $1.5 billion per annum—roughly one-fourth of the total energy imports of Pakistan. To realize this saving, however, the country will need to invest around $ 200 million per annum in technical, behavioural and institutional change. The countries of the region can enormously benefit through knowledge-sharing in this crucial area.

The authors, the editor and SAPANA deserve to be commended on making a valuable contribution to the understanding of regional cooperative possibilities in South Asia through a focused analysis of energy, an area with maximum potential for laying down a durable infrastructure for peace, progress and poverty reduction.

Pervez Tahir
National Energy
Conservation Centre
(ENERCON)
Islamabad

GCU ECONOMIC JOURNAL

G.C. University

Katchery Road, Lahore 54000, Pakistan. UAN 111-000-010, Fax: +92(42)9213341
E-mail: economic.journal@gcu.edu.pk

SUBSCRIPTON FOR PUBLICATION

Kindly enter a subscription for the following publication of the GCU Economic Journal

Publication	Yearly subscription (with in Pakistan)	Yearly subscription (outside Pakistan)	Period (No. of Years)	Total Payment
GCU Economic Journal	Rs. 500.00	US $ 50	_____	_____

The subscription is to be in the following name and address:

Name: _____

Address: _____

_____

_____

A crossed cheque/demand draft for the sum of Pakistan Rupees/US $ _____ made out in the name of GC University, Lahore is enclosed.

Please address your order to GC University, Katchery Road, Lahore 54000, Pakistan.

Signature: _____

Name: _____

Date: _____