Pakistan Economic and Social Review
Volume 46, No. 2 (Winter 2008), pp. 85-99

MACROECONOMIC DETERMINANTS OF INTERNATIONAL MIGRATION FROM PAKISTAN

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Abstract. Income inequalities and poverty are the main causes of international migration. The Pakistani workers were found in several countries of the world. Nearly half a million economic workers are working overseas, mostly in Middle Eastern countries because of oil boom. The outflow of workers varied in the year 1973 through 2005. The fluctuation behavior of international migration in Pakistan was mainly attributed to the economic conditions of home as well as the host countries. Pakistan is over populous country mired with unemployment, abject poverty and inflation. The unemployment rate in the country is nearly 9 percent, nearly one third of the population lives below poverty line which is further exacerbated with 10-12 percent food inflation. In the early 1970s, lots of unskilled workers left the country to Middle Eastern countries. There is hardly any study which documented the determinants of migration in Pakistan. This paper investigated the determinants of international migration in Pakistan. The time series data were analyzed to identify the determinants of migration. The stationary properties of each time series used in the study were tested and each was found to be integrated of order one. Therefore, Cointegration and vector error correction models were used to establish the long run and short run relationship among the parameters of the determinants.

The analysis revealed that the migration from Pakistan was found positively related with inflation and unemployment rate in the country and was negatively related with real wage rate. Thus inflation, unemployment and declining wage rate were the push factors for international migration from Pakistan. Moreover, the findings of the research paper showed that the international migration was also influenced by the inflow of the remittances positively. The size and amount

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of remittances was mainly dependent upon the economic conditions of the host country. Therefore, the inflow of remittances was safely considered as the pull factor of international migration from the country. Based on research results, it seems important to introduce labour friendly migration policies and the Manpower Ministry should find niche markets for potential workers. The government should also consider providing different skills and trades to compete with workers of other countries. This will further augment the flow of remittance in the country.

I. INTRODUCTION

The people living in one part of the world basically moved to other parts for their livelihood and Pakistan is no exception. There were also, a number of other reasons for migration, for instance, war and lawlessness in the home country. Mostly researchers have focused on explaining why people move from one area to another. There were several theories to explain international migration. One of the most important economic considerations was fetching higher income through the process of migration. There were also other factors that affect the decision to emigrate, such as family and friendship networks. The most important models by (Stark, 1990; Massey *et al.*, 1994; Bauer *et al.*, 1998) and other researchers attempted to explain why international immigration occurs.

The Push-Pull theory of migration traced out the economic factors of migration in the sending country as well as in the receiving country. The factors of migration include but not limited to demographic pressure, high unemployment and low living standards in the home country. . These factors were identified as push-factors. The factors of migration in the receiving country included the demand for labour, promising economic opportunities, and political freedom and these factors were identified as pull factors. Migration, any type, whether documented or undocumented, forced or voluntary, can be explained in terms of push-pull factors (Datta, 1998). Push factors attribute to the negative characteristics operating at the center of origin whereas pull factors identify the positive characteristics (Datta, 2002) at the center of destination.

The economics of migration focuses on the expectation of a higher income abroad as a main cause of decisions to emigrate. There were also other variables that exert an important influence on decisions to migrate, including non-economic reasons, such as war, ethnic discrimination and political persecution at home. The choice of country of destination was also often influenced by the existence of a network of family and friends who have migrated previously to a specific country (Solimano, 2002).

More systematically, the magnitude and direction of international migration flows were influenced by the following factors (Solimano, 2002): (*a*) Per capita income or real wage differentials between sending and receiving countries for a given skill; (*b*) the state of the business cycle and economic prospects in both sending and receiving countries; (*c*) Network effects; (*d*) Immigration policies; (*e*) Costs of migration; (*f*) Cultural differences between countries; and (*g*) Geographical distance and proximity. Empirical analysis of migration flow (Hatton and Williamson, 1998; Borjas, 2001) showed that migrants tend to attach a high value to the existence of friends and relatives in their choice for selection of the country of destination because family, friends and ethnic/national networks constituted an important support factor for migrants.

Mayda (2007) investigated the determinants of migration inflows into fourteen OECD countries by country of origin, between 1980 and 1995. The effect of average income and income dispersion in destination and origin countries on migration was analyzed. The impact of geographical, cultural, and demographic factors as well as the role played by changes in destination countries' migration policies was captured in the study. Walsh (1974) estimated the determinants of migration in the Ireland. The results showed that Irish net migration was responsive to relative labour market conditions in Ireland and Britain. The wage differentials and unemployment differentials were found significant determinants of the net migration from Ireland.

The Pakistani workers were found in a number of countries of the world. The flow of migrant workers from Pakistan was 12300 in 1973, 16328 in 1974 and 23077 in 1975. This outflow of migration was reached to 129847 in 1980, 115520 in 1990, 110136 in 2000 and 143329 in 2005 (Bureau of Emigration and Overseas Employment, GOP, 2006). The high rate unemployment (9 percent), food inflation (10 percent) and nearly one third of the population below the poverty line (GOP, 2006) forced the workers to migrate abroad. In the decade of 1980s, majority of economic workers migrated to the Middle East. The migration of Pakistani worker to the Middle East was unique in many ways. Firstly, the primary migrants were young males who sent a bulk of the earnings to their families in Pakistan. Secondly, the migrants were unskilled workers from the low-income households which enabled their families to set up small businesses, acquire real estate and make substantial improvements in their standard of living. However, the construction boom in the Middle East was slowed down in the early 1990s (*Economic Survey*, 2001-02). This resulted decrease in employment opportunities overseas for migrated to these countries for higher earnings.

The out flow of migrant workers showed a cyclical behaviour from the year 1973 through the year 2005. This has puzzled the policy makers in the Ministry of Labour. There could be some push and pull factors causing these fluctuation.

Thus, the study of the determinants of migration was quite important for policy maker to understand a broad spectrum of migration. The present study provides useful parameters for making labour policies and enabling environment for productive investment in the home country. The intent of this paper was to explore the major macroeconomic determinants of international migration from Pakistan and to suggest recommendation for migration policy formulation in the country.

II. DATA AND METHODOLOGY

Time series data were used in estimating the macroeconomic determinants of international migration in Pakistan from the year 1973 through the year 2005. The data was taken from the Federal Bureau of Statistics, Islamabad and Bureau of Emigration and Overseas Employment, Islamabad. Augmented Dickey Fuller (ADF) unit root test was used to determine the order of integration of the variables used in the analysis. All the variables used in the model were found integrated of the same order, *i.e.* I (1). Therefore, Johansen (1988) and Johansen and Juselius (1990) maximum likelihood estimation approach was used to test the Cointegration and all variables were found cointegrated. The results of unit root tests and co integration were provided in the appendix. Hence, their long run relationship was estimated via ordinary least square method (OLS). Vector Error Correction Model (VECM) was used for the estimation of short run adjustment of the variables toward their long run relationship.

A migration model was specified for estimating the macroeconomic determinants of the international migration from Pakistan. The functional form of the migration model was:

$$NW = F\,(INF, RREM, UR, RWR) \tag{1}$$

The econometric model for the estimation was:

$$LNW = \beta_0 + \beta_1\, LUR + \beta_2\, LRWR + \beta_3\, LINF + \beta_4\, LRREM + e_t \tag{2}$$

Where:

LNW = Log of number of workers;

LUR = Log of unemployment rate;

LRWR = Log of real wage rate;

LINF = Log of inflation rate;

LRREM = Log of real remittances (Rs. Million); and

e_t = shows error term.

In this econometric model, migration was considered a flow variable. Therefore, the number of workers going abroad every year was used to denote the migration. The migration was a dependent variable in the model. The explanatory variables were: unemployment rate, real wage rate and inflation rate in the country. The migration process was also dependent upon the amount of remittances received by Pakistan every year.

III. RESULTS AND DISCUSSION

The Augmented Dickey-Fuller (ADF) residual-based test approach suggested by Engle and Granger (1987) and the Johansen's Full Information Maximum Likelihood (FIML) approach proposed by Johansen (1988) and Johansen and Juselius (1990) were used to test Cointegration in the research paper. The variables in the research study were cointegrated exhibiting a long run relationship. The long run relationship was determined with the help of ordinary least square (OLS) method. The results of the OLS estimates were given in Table 1. No serial correlation among the residuals was detected as DW was ranged in between 1.5 to 2.5).

The result revealed that the migration was positively related with the unemployment rate in the country. The coefficient of unemployment rate was 0.709 and was highly significant at 0.01 per cent probability level. The magnitude of the parameter was high showing a large impact on migration. This explained that when there was unemployment in the country; people were compelled to leave the country for livelihood and sustenance. Resultantly they move to foreign countries at very high psychic and unbearable logistic costs.

The migration was negatively related with real wage rate in the home country. The estimated coefficient was –1.58 and was highly significant. The low wage rate forced the workers to move out and caused a massive brain drain from the country especially the skilled and professional workers. The recent initiative of the Higher Education Commission to provide salary package commensurate with international level, attracted qualified people to teach in the home country.

The results of the study were compared and contrasted with other studies. Walsh (1974) estimated the determinants of migration in the Ireland and concluded that the wage differentials and unemployment differentials were significant determinants of the net migration from Ireland. The results were comparable with the present study.

Migration was found positively related with inflation rate in country and was highly significant at 0.01 per cent probability level. Therefore, people started to migrate abroad for fulfilling their basic needs through earned remittances. The worker from the low income segments of the society migrated to foreign countries due to high inflation, unemployment and abject poverty.

The estimates of unemployment rate, real wage rate and inflation in Pakistan amply supported the push-pull theory of migration. In order to arrest the out migration, the government needs to generate employment opportunities, control inflation and reduce poverty.

TABLE 1

Regression Results Relating Migration with Independent Variables in Pakistan

Variable (ln)	Coefficient	Std. Error	t-Statistic	Prob.
ln *C*	9.444	2.094	4.509***	0.0001
ln *INF*	0.453	0.143	3.167***	0.0037
ln *RREM*	0.562	0.111	5.052***	0.0000
ln *RWR*	–1.580	0.485	–3.255***	0.0030
ln *UR*	0.709	0.153	4.616***	0.0001

R^2	0.80
Adjusted R^2	0.77
Durbin-Watson	1.82

*Indicates that the coefficient was significantly different from zero at 0.10 per cent probability level.

**Indicates that the coefficient was significantly different from zero at 0.05 per cent probability level.

***Indicates that the coefficient was significantly different from zero at 0.01 per cent probability level.

The migration was positively related with the size of the real remittances received in the country. The estimated coefficient was 0.562 and was highly significant. It indicated that the increased volume of remittances due to favourable economic conditions in the host countries provided incentives for the migration. The flow of real remittances in the Pakistan might be considered the pull factor of migration. The people decide to migrate abroad due to better economic conditions prevailing in the host countries. The promising economic conditions in the host countries boost the remittance and people further move abroad. Therefore, the results of the study were comparable with the theory of migration.

The results of the error correction mechanism were reported in Table 2. The first difference of number of migrated workers, *i.e.* migration was the dependent variable with the first difference of some selected explanatory variables in Pakistan.

TABLE 2

The Regression Results Relating First Difference of Migration with the First Difference of Independent Variables in Pakistan

Variable (ln)	Coefficient	Std. Error	t-Statistic	Prob.
C	–0.010	0.047	–0.226	0.822
Δ *INF*	0.272	0.114	2.380**	0.024
Δ *RREM*	0.442	0.182	2.423**	0.022
Δ *RWR*	–0.717	0.497	–1.441	0.161
Δ *UR*	1.283	0.366	3.505***	0.001
$E_t(-1)$	–0.544	0.175	–3.095***	0.004

R^2	0.76
Adjusted R^2	0.73
Durbin-Watson	1.75

*Indicates that the coefficient was significantly different from zero at 0.10 per cent probability level.

**Indicates that the coefficient was significantly different from zero at 0.05 per cent probability level.

***Indicates that the coefficient was significantly different from zero at 0.01 per cent probability level.

Δ Indicates the first difference of the variable used.

The results in Table 2 indicated that migration was positively related with inflation rate, unemployment rate and real remittances received in the country in the short run. The negative relationship was observed between migration and real wage rate of the workers in the country. The adjustment coefficient was –0.54 showing the dynamic process of long run. The positive coefficient of migration demonstrated the pull push theory of migration.

The elasticities of migration with respect to selected determinants were considered important for policy implications. The results reported in Table 1 and Table 2 were useful for estimating the long run and short run elasticities. The estimates in Table 1 and Table 2 were transformed into equation (3) and (4).

$$\log NW = 9.44 + 0.453 \log INF + 0.562 \log RREM - 1.580 \log RWR + 0.709 \log UR \quad (3)$$

$$\Delta \log NW = -0.010 + 0.272\, \Delta \log INF + 0.442\, \Delta \log RREM - 0.717\, \Delta \log RWR + 1.283\, \Delta \log UR - 0.544\, e_t(-1) \quad (4)$$

The long run and short run elasticities of migration were calculated by differentiating equation (3) and (4). The sign Δ in equation (4) denoted the short run relationship among the variables. The results of these elasticities were reported in Table 3. The process of migration was very sensitive to determinants having elasticity greater than one. For example, in this study, the elasticity of migration with respect to wage rate in the long run was >1 showing that people will migrate with extended gestation period, however the elasticity of unemployment was greater than one in the short run and people tend to move immediately.

TABLE 3

Long Run and Short Run Elasticities of Migration from Pakistan

Variables	Long Run Elasticities	Short Run Elasticities
INF	0.453**	0.272***
RREM	0.562**	0.442***
RWR	–1.580	–0.717***
UR	0.709***	1.283***

*Indicates that the coefficient was significantly different from zero at 0.10 per cent probability level.

**Indicates that the coefficient was significantly different from zero at 0.05 per cent probability level.

***Indicates that the coefficient was significantly different from zero at 0.01 percent probability level.

IV. CONCLUSION AND POLICY RECOMMENDATIONS

Income inequalities and poverty at home countries are the main causes of international migration all over the world. The Pakistani workers were found in many countries. Nearly over 500,000 workers have migrated to other countries from the year 1973 through the year 2005. The migration was the result of push and full factors. The high unemployment rate, high incidence and poverty were considered as push factors and inflow of remittance was the pull factor for out migration. This behavior of international migration from Pakistan was due to a number of reasons including the economic conditions at home as well as host countries. The present study examined the effect of various macroeconomic determinants on the outflows of migrant worker from Pakistan.

The results explained that the international migration from Pakistan was positively related with the unemployment rate in the country. The coefficient of unemployment rate was 0.709 and was highly significant. The migration showed positive relationship with inflation rate in the country. The estimated coefficient of the inflation rate was 0.453 and was found significant. The migrants tend to move abroad in case of high unemployment rate and inflation in the home country. The migration was positively related with the size of the real remittances received in the country. The estimated coefficient was 0.562 and was highly significant. It indicated that the increased volume of remittances due to favourable economic conditions in the host countries provided incentives for the migration. The people decide to migrate abroad due to better economic conditions prevailing in the host countries. The better economic and employment opportunities in the host country boosted the remittances and people further moved abroad. Finally, the real wage rates in Pakistan affected the emigration flow negatively and the coefficient of the real wage rate was –1.580 and was significant. The results of the study fully support the push (unemployment, inflation and low wage rate and pull (magnitude of remittance) factors affecting the out migration.

The government labour friendly policies can facilitate the emigration process in Pakistan. The migrated worker will send remittances to their left behind families and it will encourage remittances for longer-term growth and income security in Pakistan. The following measures were suggested for long run promotion of migration in Pakistan.

Pakistan is over populated country having shortage of job opportunities. Therefore, niche markets for labour must be searched through proactive labour policies.

The saving rate was very low in Pakistan. The saving can be mobilized through the foreign remittances in the country. Therefore, Government must streamline the saving schemes in country to attract the foreign remittances.

The policies must be formulated to create investment climate and provide incentives to the migrants to promote domestic commerce in Pakistan.

Overseas Pakistani Foundation (OPF) should provide investment guidance to migrants for release of information on the available credit facilities, savings schemes and business advisory services. Business counseling should also be provided to the migrant workers for establishing domestic business in productive sectors.

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Appendix Table 1

Unit Root Tests Using Augmented Dickey-Fuller Method

Variables	Without Trend	With Trend
LNW	0.008	–2.54
LRREM	–2.94	–2.56
LUR	–1.51	–2.69
LRWR	–2.80	–2.73
LINF	–2.68	–2.73

- Critical value for the augmented Dickey-Fuller statistic with intercept and without trend was –2.96 (p = 0.05 per cent).
- Critical value for the augmented Dickey-Fuller statistic with intercept and trend was –3.56 (p = 0.05 per cent).

Appendix Table 2

Unit Root Tests Using Augmented Dickey-Fuller Method

Variables	Without Trend	With Trend
Δ *LNW*	–2.98	–3.89
Δ *LRREM*	–3.58	–361
Δ *LUR*	–3.99	–5.25
Δ *LRWR*	–3.35	–3.28
Δ *LINF*	–4.62	–4.66

- Critical value for the augmented Dickey-Fuller statistic with intercept and without trend was –2.96 (p = 0.05 per cent)
- Critical value for the augmented Dickey-Fuller statistic with intercept and trend was –3.57 (p = 0.05 per cent)
- Δ Indicates the first difference of the series.

Appendix Table 3

Selecting the Order of VAR for the Migration Model

List of variables included in the unrestricted VAR:			
LNW LRREM LUR LINF LRWR			
List of deterministic and/or exogenous variables:			
CONSTANT			
Order	AIC	SBC	Adjusted LR test
10	7.49	–1.02	–
9	8.49	0.54	0.005 [.95]
8	5.32	–2.06	2.89 [.24]
7	4.87	–1.93	3.91 [.27]
6	.83	–5.40	7.41 [.12]
5	1.81	–3.86	7.42 [.19]
4	2.15	–2.96	7.89 [.25]
3	1.40	–3.14	9.10 [.24]
2	1.96	–2.02	9.42 [.31]
1	–1.38	–4.78	12.43 [.19]
0	–1.81	–4.65	13.42 [.20]

Note: p-values in the parentheses.

AIC = Akaike Information Criterion, SBC = Schwarz Bayesian Criterion.

Appendix Table 4

Johansen Cointegration Results for Migration Model

Relationship	Hypotheses		Eigen Values	Critical Values
	H_0 : r	H_a : r		
LNW, LRREM, LINF, LRWR, LUR	0	1	39.58	34.40
	1	2	32.23	28.27
	2	3	19.57	22.04
	3	4	8.61	15.87
	4	5	3.44	9.16
The critical values were given (p = 0.05 per cent) levels for Cointegration.				

Appendix Table 5

Johansen Cointegration Results for Migration Model

Relationship	Hypotheses		Trace Values	Critical Values
	H_0 : r	H_a : r		
LNW, LRREM, LINF, LRWR, LUR	0	1	103.43	75.98
	1	2	63.85	53.48
	2	3	31.62	34.87
	3	4	12.05	20.18
	4	5	3.44	9.16
The critical values were given (p = 0.05 per cent) levels for Cointegration.				

Pakistan Economic and Social Review
Volume 46, No. 2 (Winter 2008), pp. 101-116

THE DEMAND FOR NITROGEN, PHOSPHORUS AND POTASH FERTILIZER NUTRIENTS IN PAKISTAN

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Abstract. This study has been conducted to find out the factors which have been affecting demand for fertilizer as specified equations for nitrogen, phosphorus and potash, are estimated by using both the static as well as the dynamic models. The results are acceptable from both an economic and statistical point of view. The estimated price elasticity of demand demonstrates variations between the nutrients. The Cobb-Douglas production function has been applied to the analysis and Ordinary Least Square in double log form was used for estimation. The results suggest that the demand for nitrogen and phosphorous are price inelastic both in the short run as well as in the long run while for potash fertilizer, the elasticity of demand is price elastic both in the short run and in the long run. Future shift in fertilizer demand will be dependent on the reduction in the relative price of fertilizer. It indicates either increase in agricultural commodity price or decrease in fertilizer price.

I. INTRODUCTION

Fertilizers constitute a key component of the modern farm technology for achieving increased production through improving soil fertility. The introduction of the high yielding cereal varieties in 1966-67, having higher nutrient requirements, ushered in the 'fertilizer era' in Pakistan and set the stage for 'green revolution'. Prior to this, the use of fertilizer was nominal

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(NFDC, 1996). Application of commercial fertilizers in Pakistan began in 1952-53, and the off-take was only 1,000 nutrient tonnes of nitrogen. Phosphorus was introduced to farmers in 1959-60 with an initial usage of 100 nutrient tonnes. Potash fertilizer off-take started in 1966-67 with a volume of 120 nutrient tonnes. These trends in fertilizer usage emphasized the importance and role of fertilizer in the economy of Pakistan. There has been a continuous rise in the consumption of fertilizers. During the year 2000-01 total fertilizer sales were 2966,000 nutrients tonnes, augmented by 851 percent from 312,000 nutrient tonnes sold in 1969-70 (Table 1). The major increase was for nitrogen, which increased by 822 percent, *i.e.* from 274,000 nutrients tonnes to 2526 (000) nutrient tonnes. Nitrogenous fertilizers now account for 78 percent of commercial fertilizer off-take in Pakistan with phosphorous and potash accounting for 21 and about 0.7 percent, respectively.

TABLE 1

Fertilizer Nutrients Off-take in the Selected Years in Pakistan

Year	Nitrogen (N)	Phosphorous (P_2O_5)	Potash (K_2O)	Total
1952-53	1.00	0.0	0.00	1.00
1959-60	19.30	0.1	0.00	19.40
1966-67	112.76	3.9	0.12	116.80
1969-70	273.95	36.64	1.34	311.93
1979-80	805.99	228.46	9.60	1044.05
1990-91	1471.64	388.50	32.76	1892.90
2000-01	2265.58	677.58	22.87	2966.03
2003-04	2526.73	673.46	21.79	3221.98

Source: *Fertilizers and Their Use in Pakistan*, NFDC Publication, 3/96.

Economic Survey of Pakistan 2004-05.

Analysis of fertilizer demand on type basis may help to take proper decisions regarding their distribution. This paper is an attempt to alleviate this situation by presenting the empirical results of the aggregate demand for nitrogen (N), phosphorus (P), and potash (K), for macro plant nutrients as well as the combined demand for NPK.

FERTILIZER DEMAND

The demand for input is a derived demand and it is determined by the underlying demand for the final product being produced by the technical characteristics of the production function. Fertilizer is one of the inputs used in crop production. In the given study Cobb Douglas has been used as production function and demand for fertilizer has been derived via profit function. This study focuses on previous studies of the fertilizer demand and outlines the theoretical framework and models specification.

PREVIOUS STUDIES

This section presents a summary of previous studies of the demand for fertilizer and discusses the model used for the analysis. Griliches (1958) estimated aggregate demand functions for fertilizer used on all crops in the Unite States and verified for the period from 1911 to 1956 that most of the increase in fertilizer use could be explained by changes in fertilizer and crops prices and by the previous period's fertilizer use. During 1959 regional demand functions for total fertilizer consumption over the period from 1931 to 1956 was estimated. He estimated a large portion of the variation in regional fertilizer use and concluded that price elasticities of demand varied across regions. Gunjal, Roberts and Heady (1980) estimated fertilizer demand function for five major crops. It was observed that elasticities of demand with respect to prices and other explanatory variables were not similar for fertilizer applied to different crops. Carman (1979) disaggregated fertilizer use by major nutrients (NPK) and estimated nutrient demand function for 11 Western States. The estimated price elasticity of demand demonstrated considerable variation between states and nutrients.

The price elasticities of demand for phosphatic and nitrogenous fertilizer for Australia were estimated by Penm and Vicent (1987). They estimated that phosphoric fertilizer's price elasticity of demand is low both in the short run and long run, while the price elasticity of demand for nitrogenous fertilizers appeared higher, especially in case of application to wheat. Variations in fertilizer prices appeared to be relatively unimportant in explaining variations in application rate for both phosphatic and nitrogenous fertilizers.

Mahmood (1995) studied to estimate fertilizer demand function for Bangladesh typewise (Urea, TSP and MOP). He used Cobb-Douglas production function and, estimation was done using OLS in double log form. It was found that price of Urea does not play a significant role in determining its demand but prices of TSP and MOP are important for the determination

of demand function and these demands are price elastic. Non-price factors are also important as demand factors, and fertilizer demand in all the three types has seasonal variation.

Subramaniyan and Nirmala (1991) made a macro analysis of fertilizer demand in India for the period between 1966-67 to 1985-86, the short-run price elasticity for fertilizer was –1.3 and the adjustment coefficient was 0.84. The long-run price elasticity for fertilizer demand worked out to be –1.54, indicating that the demand for fertilizer is price elastic. Timmer (1974) found considerable differences in the estimates of the elasticity in the short run and long run. Choudhry and Javed (1976) studied nitrogenous fertilizer demand in nutrient form for the period 1965-66 to 1973-74 and concluded that the demand for fertilizer is price responsive. Salam (1977) estimated fertilizer demand in the Punjab and used demand for fertilizer as a function of relative price, lagged output price, tube-wells number, acreage and trend etc., and found that relative price of fertilizer and increased acreage under major crops were important factors in fertilizer demand. Chemonics (1985) estimated nitrogen and phosphorous fertilizers demand for the period 1968-69 to 1983-84.

Dholakia and Jagdip (1995) derived the fertilizer demand function in India and they estimated short-run and long-run price elasticity. They found that fertilizer demand in India is price inelastic both in the short-run and in the long-run.

Hansen (2004) estimates nitrogen fertilizer demand elasticities for Danish crop farms using the dual profit function approach on micro panel data. The model includes several farm specific parameters, allowing to estimate the mean demand elasticity and test for homogeneity of elasticities across panel farms. The mean own price elasticity for nitrogen is –0.45, and there is a significant standard deviation from this mean for individual farms of 0.24.

THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

The purpose of this paper is to estimate three nutrient demand functions from time series data and to find out policy implications from the estimated elasticities of demand. In this regard, separate major plant nutrients demand functions are estimated for nitrogen (N), phosphorus (P) and potash (K), using static and dynamic models. The analysis is based on time series data from 1970-71 to 2000-01. The sources of the data for this study are *Economic Survey* (various issues) and *Fifty Years of Pakistan in Statistics* as

well as National Fertilizer Development Center (NFDC) reports. The data on all variables are given in Appendix I.

This paper is organized as fallows: Section II deals with model specification (Static and Dynamic) and estimation. Section III discusses empirical application and results and, finally, section IV presents concluding remarks.

II. MODEL SPECIFICATION AND ESTIMATION

STATIC MODEL

The demand for inputs such as fertilizer is usually a derived demand. Thus the demand for fertilizer can be derived from a given aggregate production function for the agricultural commodities. In economic theory, the utilization of any input like fertilizer, depends upon the profit maximization conditions and the production, *i.e.* technology adoption. Assuming Cobb-Douglus production function with two inputs, the following profit function has been considered.

$$Y = A\, F^{\alpha}\, L^{\beta}\, \mu_0 \qquad \text{Production function} \qquad (i)$$

$$\Pi = P_1\, Y - P_2\, F - P_3\, L \qquad \text{Profit Identity} \qquad (ii)$$

Where Y = Output

F = Fertilizer

L = Labor

Π = Profit

P_1 = Output Price

P_2 = Fertilizer Price

P_3 = Labor Price or any other input price

By using profit maximization conditions $\frac{\partial \Pi}{\partial F}$ and $\frac{\partial \Pi}{\partial L}$

$$\frac{Y}{F} = \frac{P_2}{\alpha P_1 \cdot \mu_1} \qquad (iii)$$

$$\frac{Y}{L} = \frac{P_3}{\beta P_1 \cdot \mu_2} \qquad (iv)$$

In the above relation, μ_1 and μ_2 are random terms. Expressing (*i*), (*iii*) and (*iv*) in logarithmic form and solving for *F*, the narration obtained is:

$$\log F = \frac{\log A + \log\left(\frac{P_2}{\alpha P_1}\right)(\beta - 1) + \beta \log(\mu_1 - \mu_2) - \log \frac{P3}{P_1} + \log \mu_0 - \log \mu_1}{1 - \alpha - \beta} \qquad (v)$$

Relation (*v*) indicates that any demand function for fertilizer must incorporate product price, price of fertilizer and other input technological shift and random distribution term. Based on this, the demand function for fertilizer in the present study has been specified using double log form as:

$$\ln Qi = b_0 + b_1 \log (P_f/P_c) + b_2 \log HYV + b_3 \log W + b_4 \log Y_{t-1} + b_5 \log T + b_6 \ln A + \mu$$

Qi = Plant nutrient off-take (*i* = N is nitrogen, P is phosphorus and K is potash)

P_f/P_c = Ratio of fertilizer price index to 5 major crops price index

Y_{t-1} = Farm income in year *t*–1 from major and minor crops

HYV = Area under high yielding varieties in million hectare

W = Water available at farm-gate MAF

A = Area under principal crops in million hectare

T = Trend variable

THE DYNAMIC MODEL

The dynamic model considers that the process of adjustment in the independent variables is generally based on the relationship between the expected and the actual values of the variables, but in the dependent variables, it is generally the relationship between the desired versus realized quantities that provide the basis of the adjustment process. The Nerlovian Adjustment Model used by Griliches and many subsequent researchers seems to capture some of the dynamic elements in fertilizer demand better than simple static models without merely resorting to time trends. The model itself is straightforward. Thus we use the partial adjustment with adoptive expectations model for deriving the short-run and long-run elasticities of fertilizer demand. The model is specified as under:

$$C_f^*{}_t = \beta_0 + \beta_1 P_{ft} + \mu_t \qquad (vi)$$

$$(C_{ft} - C_{ft-1}) = \delta (C_f^*{}_t - C_{ft-1}) \qquad (vii)$$

Equations (*vi*) and (*vii*) yield the estimating equation.

$$C_{ft} = \beta_0 \delta + \beta_1 \delta P_{ft} + (1 - \delta) C_{ft-1} + \delta \mu_t \qquad (viii)$$

C_{ft} = Actual consumption of fertilizer,

$C_{f\,t}^{*}$ = Desired consumption of fertilizer in the long-run,

P_{ft} = Fertilizer price index relative to price index of five major crops,

δ = Adjustment coefficient ($0 \leq \delta \leq 1$), and

μ_t = Random disturbance term

Since the variables are in logarithms, the short-run elasticity of demand for fertilizer with respect to relative price is given by the estimate of $\beta_1 \delta$ and the long-run elasticity is given by $\beta_1 = \beta_1 \delta / 1 - (1 - \delta)$.

III. EMPIRICAL APPLICATION AND RESULTS

RESULTS OF THE STATIC MODEL

The results of the static model are presented in Table 2. All the explanatory variables used in the model are statistically significant as well as signs are as expected. The demands for Nitrogenous fertilizer (N), Phosphorus fertilizer (P_2O_5) and Potash fertilizer (K_2O) are estimated separately.

Nitrogen

The estimated coefficients for the nitrogen demand equations are shown in Table 2. The results are acceptable from both economic theory and statistical viewpoint. The signs on all of the coefficients are as hypothesized and the coefficients are significant at 99 percent level of confidence. The multiple correlation coefficient R^2 indicates the variables included and explains 94 percent of the variation in the off-take of nitrogen. The Durbin-Watson statistic indicate '*d*' as 1.50. From the Durbin-Watson tables it is found that at the 5% level the critical '*d*' values are $d_L = 1.297$ and $d_u = 1.570$. On the basis of the usual '*d*' test it is impertinent to say whether there is positive correlation or not because the estimated '*d*' value lies in the indecisive range. But on the basis of modified '*d*' test the hypothesis of no (first-order) positive correlation can be rejected as $d < d_u$.

The coefficient for the real price index of nitrogen is –0.42 and t-statistics is statistically significant at 99% confidence level. As the equation is estimated in linear logarithms, the coefficients can be interpreted as elasticities. The results indicate that the demand for nitrogen is price

inelastic. The trend variable has the positive impact on nitrogen sales in the equation and the coefficient is significant at 99% level of significance.

TABLE 2

Regression Coefficients and Related Statistics for Nitrogen Fertilizer, Phosphorus Fertilizer and Potash Fertilizer Demand, 1970-2001[a]
Static Model

Variables	Fertilizers		
	Nitrogen (N)	Phosphorus (P_2O_5)	Potash (K_2O)
Coefficients			
Constant	4.98 (10.55)	1.40 (2.71)	1.03 (0.26)
ln (P_f/P_c)	–0.42 (–4.16)	–0.66 (–5.58)	–2.68 (–9.36)
ln Y_{t-1}		0.36 (3.79)	
ln T		0.51 (4.19)	
T	0.06 (20.25)		0.07 (3.94)
ln W			2.24 (2.82)
R^2	0.94	0.965	0.892
d^b	1.50	1.53	1.52

The dependent variable is ln *Qi* where *Qi* (*i* = N is Nitrogen, P is Phosphorus and K is Potash).

'*b*' is the Durbin-Watson statistic. The critical value at the five percent level of significance is: $d_L = 1.297$, $d_U = 1.570$ (For 31 observations and 2 explanatory variables at 5%), $d_L = 1.229$, $d_u = 1.650$ (31 observations and 3 explanatory variables).

Figures in parentheses are t-statistic.

Phosphorus

The estimated regression coefficients for the phosphorus demand are shown in Table 2. The sign of the estimated coefficients are in accordance with prior expectations. The equation has R^2 value of 0.965, which shows overall

goodness of fit of the estimated regression model. Autocorrelation is not a problem as estimated '*d*' was 1.53. From the Durbin-Watson tables, it is found that at the 5 percent level the critical d values are: $d_L = 1.229$ and $d_u = 1.650$. On the basis of '*d*' test, the estimated '*d*' value lies in the indecisive range. But on the basis of the modified '*d*' test the hypothesis of no first order positive autocorrelation can be rejected since $d < d_u$. Fertilizer crop price index ratio coefficient has a negative sign and is statistically significant at 99% confidence level. The demand for phosphorus is price inelastic, as the coefficient is –0.66. The lagged farm income variable is positive as expected and statistically significant at 99% confidence level. The coefficient for the trend has the expected sign and is significant at 99% confidence level.

Potash

The results of estimating potash demand equation is shown in Table 2. Again the results are in line with expectations and the coefficients have the hypothesized signs. The R^2 value is 0.892 and the Durbin-Watson statistic is satisfactory. Price Index Ratio variable has the expected negative relationship to potash off-take. The estimated demand for potash is very elastic and the coefficient tends to be statistically highly significant at 99% confidence level. The coefficient for the trend variable is positive and highly significant. The coefficient for water available at farm-gate is positive and significant at 99% level of confidence. The response of potash off-take to change in water at farm-gate is very elastic with the coefficient –2.68.

RESULTS OF THE DYNAMIC MODEL

Since the variables are in logarithms, the short-run elasticity of demand for fertilizer (N, P and K) with respect to its relative price index is given by the estimate of $\beta_1 \delta$, while the long-run elasticity is given by $\beta_1 \delta / 1 - (1 - \delta)$.

Nitrogen

The estimated coefficients for the nitrogen demand equations are given in Table 3. The results are acceptable from both on economic theory and statistical viewpoint. The signs on all of the coefficients are as hypothesized and the coefficients are significant at 99 percent level of confidence. The multiple correlation coefficients R^2 indicate the variables included, explaining 98 percent of the variation in the off-take of nitrogen. The estimated Durbin-Watson '*d*' is 1.71, which is close to 2. In the Autoregressive models, it cannot be trusted to computed '*d*' to find out whether, there was serial correlation in our data. Using the estimated '*d*' value and the '*h*' statistic formula, the following is obtained:

TABLE 3

Regression Coefficients and Related Statistics for Nitrogen Fertilizer, Phosphorus Fertilizer and Potash Fertilizer Demand, 1970-2001[a]
Dynamic Model

Variables	Fertilizers		
	Nitrogen (N)	Phosphorus (P_2O_5)	Potash (K_2O)
Coefficients			
Constant	1.82 (3.25)	0.83 (2.06)	7.72 (5.48)
ln (P_f/P_c)	–0.14 (–1.92)	–0.35 (–3.11)	–1.85 (–5.65)
ln Q_{i-1}	0.64 (6.64)	0.48 (4.65)	0.43 (4.55)
ln T		0.21 (1.95)	
T	0.02 (3.17)		0.06 (4.88)
ln Y_{t-1}		0.20 (2.46)	
δ	0.3580	0.5160	0.5680
R^2	0.98	0.98	0.92
d^b	1.71	2.36	2.44
d^h	0.27	–1.20	–1.40

The dependent variable is ln *Qi* where *Qi* (*i* = N is Nitrogen, P is Phosphorus and K is Potash.

'*b*' is the Durbin-Watson statistic, '*h*' is the Durbin '*h*' test if '*h*' lies between –1.96 and 1.96 do not reject the null hypothesis that there is no first-order (positive or negative) autocorrelation.

Figures in parentheses are t-statistics.

'δ' Coefficient adjustment

$$h = [1–1/2\ d) \sqrt{n} / 1–n\ [\text{var}\ (\alpha_2)]$$

$$h = 0.271$$

The estimated '*h*' leads to the acceptance of the hypothesis that there is no serial correlation (of the first order).

By applying White's Heteroscedasticity-test to the residuals obtained from the regression:

$$n.R^2 \underset{\text{asy}}{\sim} \chi^2\ df$$

$$31(0.263) \sim 11.0705$$

$$8.53 \sim 11.0705$$

On the basis of White's Test, that there is no heteroscedasticity, it is, therefore, concluded that the above equation gives unbiased estimates of the regression coefficients. Since the variables are in logarithms, the short run elasticity of demand for nitrogenous fertilizer with respect to its relative price is given by the estimate of $\beta_1\ \delta$, while the long run elasticity is given by $\beta_1\ \delta/1 – (1 – \delta)$. For this period between 1970-71 and 2000-2001, the short run price elasticity for nitrogenous fertilizer demand was –0.14 and the adjustment co-efficient was 0.3580. The long run price elasticity for nitrogenous fertilizer demand worked out to be –0.40, indicating that the demand for nitrogenous fertilizer is inelastic. In the short run, nitrogenous fertilizer demand decreases by 1.4 percent and in the long run by 4 percent, in response to a 10 percent increase in its real price.

Phosphorus

The estimated coefficients for the phosphorus demand equations are given in Table 3. The results are acceptable from both on economic theory and statistical viewpoint. The signs on all of the coefficients are as hypothesized and most of the coefficients are significant at 99 percent level of confidence. The multiple correlation coefficients R^2 indicate the variables included, explaining 98 percent of the variation in the off-take of phosphorus fertilizer. The estimated Durbin-Watson 'd' is 2.36. Using the estimated 'd' value and the 'h' statistics formula, the following equation has been obtained:

$$h = [1–1/2\ d) \sqrt{n}/1–n\ [\text{var}\ (\alpha_2)]$$

$$h = –1.23$$

The estimated '*h*' leading to the acceptance of the hypothesis that there is no serial correlation (of the first order).

By applying White's Heteroscedasticity Test to the residuals obtained from the regression

$$n.R^2 \underset{\text{asy}}{\sim} \chi^2 \, df$$

$$31(0.193) \sim 11.0705$$

$$5.983 \sim 11.0705$$

On the basis of White's Test, that there is no heteroscedasticity, it is, therefore, concluded that the above equation gives unbiased estimates of the regression coefficients. For the period between 1970-71 and 2000-2001, the short run price elasticity for phosphorus fertilizer demand was –0.35 and the adjustment co-efficient was 0.5160. The long run price elasticity for nitrogenous fertilizer demand worked out to be –0.68, indicating that the demand for phosphorus fertilizer is inelastic. In the short run, phosphorus fertilizer demand decreases by 3.5 percent and in the long run by about 7 percent, in response to a 10 percent increase in its real price.

Potash

The short-run price elasticity for potash fertilizer demand was –1.85 and the adjustment coefficient was 0.5680. The long-run price elasticity for potash fertilizer demand worked out to be –3.26, indicating that the demand for potash fertilizer is price elastic. In the short-run, potash fertilizer demand decreased by about 19 percent and in the long-run by about 23 percent, in response to a 10 percent increase in its price index ratio.

IV. CONCLUDING REMARKS

In the study, attempts have been made to estimate fertilizer demand function by type. Estimation was completed for N, P, and K. The estimated demand equations are of general agreement as the signs of the estimated coefficients are in accordance with prior expectation. All the coefficients are statistically different from zero and the results are consistent with the theory. In this study, the macro plant nutrients (N, P, K) demand functions were derived and short run as well long run price elasticities were estimated. Our results indicate that the demand for nitrogen (N) and phosphorus (P) are price inelastic while the demand for potash fertilizer is price elastic. A 10 percent increase in the relative price of fertilizer may lead to a less than 2 to 3.5 percent decrease in the short run and about 4 to 7 percent decrease in the long run in the nitrogenous and phosphorus fertilizers per hectare. As for potash fertilizer, it was found that in the short run there was 18.5 percent

decrease, while in the long-run there was 32.6 percent decrease in demand with an increase of 10 percent in the relative price of fertilizer. Thus, according to findings, demand for nitrogenous (N) and phosphorus (P) fertilizers are price inelastic both in the short-run and in the long-run, while for potash (K) fertilizer it was price elastic both in the short-run and in the long-run. Furthermore, the time variable used to measure shift in the production technology had a strong positive impact on off-take of fertilizer and its coefficients were highly significant.

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APPENDIX I

Year	N	P	K	Y	*Pc*	*Pf*	*Pf/Pct*–1	*W*
1970-71	15.13	1.83	0.07	823.25	31.21	64.04	–	69.95
1971-72	20.72	2.24	0.04	928.34	34.48	57.13	183.05	71.10
1972-73	22.82	2.88	0.08	976.83	40.51	46.56	135.05	81.17
1973-74	18.71	3.18	0.15	1365.05	51.42	62.38	153.97	80.06
1974-75	20.89	3.49	0.12	1731.22	66.94	87.80	170.76	88.02
1975-76	24.51	5.75	0.16	1915.19	69.50	92.59	138.32	85.95
1976-77	28.06	6.48	0.13	2047.92	75.48	81.94	117.90	84.57
1977-78	28.78	8.18	0.31	2389.82	84.71	80.24	106.30	89.44
1978-79	35.45	9.74	0.39	2610.05	92.45	76.50	90.31	87.39
1979-80	41.93	11.89	0.50	2932.14	92.35	85.99	93.01	81.14
1980-81	43.61	11.74	0.50	3431.41	100.00	100.00	108.28	97.79
1981-82	41.99	11.38	1.10	3840.95	114.26	87.31	87.31	96.45
1982-83	47.49	13.22	1.28	4057.03	118.85	99.86	87.40	101.4
1983-84	45.74	13.00	1.42	3928.74	132.06	123.12	103.60	103.69
1984-85	46.93	14.75	1.24	4595.29	132.09	123.12	93.23	102.81
1985-86	55.63	17.25	1.62	5086.25	134.58	123.12	93.21	104.73
1986-87	63.76	19.56	2.03	5056.09	137.63	133.40	99.12	109.72
1987-88	65.66	20.16	2.31	6013.15	144.32	137.12	99.63	112.22
1988-89	60.71	17.89	1.12	6726.18	157.01	151.81	105.19	114.66
1989-90	68.39	17.82	1.87	6842.59	171.74	170.57	108.64	117.14
1990-91	67.44	17.80	1.50	8138.82	193.75	215.32	125.38	119.62
1991-92	67.34	18.32	1.07	10231.81	181.04	233.89	120.72	122.05
1992-93	72.87	21.76	1.07	9669.76	194.12	243.92	134.73	125.12
1993-94	75.88	21.23	1.06	5984.25	214.43	330.69	170.35	128.01
1994-95	78.50	19.35	0.75	14325.31	266.39	385.10	179.59	129.65
1995-96	88.13	21.89	1.31	15432.64	279.23	428.04	160.68	130.85
1996-97	87.33	18.46	0.37	16947.17	330.92	532.91	190.85	132.05
1997-98	90.06	23.91	0.87	20126.58	376.27	551.20	166.57	122.15
1998-99	91.02	20.16	0.91	22147.10	390.46	595.97	158.39	133.78
1999-00	97.45	26.20	0.81	23013.22	384.58	680.40	174.26	133.28
2000-01	102.98	30.80	1.04	23141.43	401.15	651.82	169.49	134.77
2001-02	102.62	28.04	0.84					134.63
2002-03	101.72	29.41	0.93					134.48
2003-04	114.23	30.45	0.98					134.78

N = Nitrogenous fertilizer off take per hectare, P = Phasphatic fertilizer off take per hectare, K = Potash fertilizer of take per hectare, *Y* = Real Farm income from major and minors crops, *Pc* = Five major crops price index 1980-81=100, *Pf* = Fertilizer price index 1980-81=100, Pf/Pc_{t-1} = Fertilizer crops price index ratio, and W = Million Acres Feet

Pakistan Economic and Social Review
Volume 46, No. 2 (Winter 2008), pp. 117-132

TRENDS IN TOTAL FACTOR PRODUCTIVITY IN PAKISTAN AGRICULTURE SECTOR

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Abstract. Total factor productivity (TFP) has emerged as an important source of agriculture growth. However, this area remained neglected by researchers as well as policy makers in Pakistan. The studies which have estimated agriculture TFP growth in Pakistan are very few and they have tended to overstate it by ignoring the variation in capacity utilization, hours worked and improvement in labour productivity as a result of increased level of education and training. The present study has avoided this pitfall and has accurately measured TFP growth. According to this study, agriculture TFP in Pakistan has grown at an annual average rate of 0.28 percent which explains more than 7 percent of the growth of agriculture value added. The study recommends that TFP should be given proper attention by the government. Appropriate policy, such as diffusion of relevant information among the farmers, increased area under cultivation, and timely availability of fertilizer at affordable prices for the farmer, should be devised to accelerate TFP and value added growth in the agriculture sector of Pakistan.

I. INTRODUCTION

Agriculture is an important sector of Pakistan economy. It provides living to 66 percent of population of the country. Besides, it accounts for 21 percent of GDP, absorbs 43.4 percent of employed labour force, and contributes 11 percent to export earnings.[1] As such, agriculture growth is very crucial for economic growth in Pakistan. Agriculture sector supplies raw materials to manufacturing sector. It also provides market for manufactured products.

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[1]*Pakistan Economic Survey 2006-07*.

During the period 1950-2004 agriculture value added grew at an annual average rate of 3.6 percent which has exceeded the average population growth rate of 2.9 percent during this period.[2] Various factors have signify-cantly contributed to the growth of agriculture. Among these, the most important are technological progress embodied in high-yielding varieties of food grain and cotton, public sector investment in agriculture, research and extension expenditures (R&E) and physical infrastructure. Although agriculture sector growth has significantly contributed to the growth rate of GDP of 5 percent during this period, however, its own performance has shown violent behaviour over time. Table 1 provides trends in growth rates of value added in agriculture sector of Pakistan. On one hand, agriculture value added grew at a meagre rate of only 1.8 percent during the 1950s. On the other hand, it showed a respectable rate of growth of 5.12 percent during the 1960s. In other periods its growth remained between these limits.[3]

TABLE 1

Growth Rates of Agriculture Sector (Decadal Averages)
(Percent)

Period	Growth Rate	Share in GDP
1950s	1.76	47.70
1960s	5.12	40.68
1970s	2.32	34.50
1980s	4.10	27.62
1990s	4.54	25.34
2001-05	3.38	24.25
1951-2005	3.55	34.36

Source: *50 Years of Pakistan in Statistics*, Volume I, Summary and Pakistan Economic Survey, Various Issues.

The sources of agriculture value added growth include, among others, the growth of inputs such as labour, capital and area under cultivation. Apart

[2]Calculated by the present authors using data from *Pakistan Economic Survey*, 2004-05 and *50 Years of Pakistan in Statistics*, Volume I, Summary, Government of Pakistan.

[3]These figures are calculated by the authors using data from *50 Years of Pakistan in Statistics*, Volume I, Summary and Pakistan Economic Survey, Various issues.

from these, there is another important source of agriculture value added growth. This source is total factor productivity (TFP). TFP is also an important contributor of value added in the agriculture sector. The fluctuations in TFP cause fluctuations in agriculture value added. Thus, there is a compelling need to capture the fluctuating trends in TFP growth in the agriculture sector. The main objective of this paper is to estimate TFP growth in agriculture sector of Pakistan. The rest of the paper is organized as below: In section II, a review of existing studies on agriculture TFP growth is presented. Section III presents the methodologies and sources of data used for the estimation of TFP. In section IV measurement of variables is discussed. Estimation of results is presented in section V. Finally, section VI contains conclusion and policy implications and recommendations.

II. REVIEW OF PREVIOUS STUDIES

There have been very few studies estimating TFP growth for the agriculture sector of Pakistan. The pioneering among these is the study by Wizarat (1981). She used annual time series data for the period 1953-1979 to estimate arithmetic TFP index in the growth accounting framework. According to her estimates TFP growth in the agriculture sector of Pakistan remained at 1.1 percent. Ali (2004) has pointed out various limitations of her study.[4]

Evenson and Pray (1991) used cross-section district-wise and annual time series data to estimate Tornqvist-Theil approximation to the Divisia index over the period of 1965-85. Their estimate of average annual growth of TFP was 1.07, *i.e.* slightly less than that of Wizarat (1981). Rosegrant and Evenson (1992) also found the same estimates of TFP based on T-T index over the period 1957-85 as found by Evenson and Pray (1991). However their estimates for sub-periods greatly varied (see Table 2). Khan's (1994) estimate of TFP growth based on Arithmetic index over the period 1980-93 was 2.1 percent. However, in his (1997) study when he used T-T index and extended the sample over the period 1960 to 1996 his estimate of TFP growth sharply fell to 0.92 percent. Kemal *et al* (2002) employed arithmetic index in the growth accounting framework to estimate TFP over the period 1964-65 to 2000-01. Their estimate of annual average growth rate of TFP was only 0.37 percent. Ali (2004) calculated both the arithmetic index and T-T index over the period 1960-96. His estimate of TFP growth based on arithmetic index was 2.17 percent when 1960-61 weights were used. When

[4]The study assumes linear production function which implies perfect substitutability between labour and capital. Capital input has been used as a stock variable whereas the more appropriate is the concept of service flow.

he changed the weights to 1980-81 the estimate of TFP drastically fell to only 0.40 percent. The estimate of TFP growth based on T-T index was 2.3 percent.

A common limitation of these studies is their inability to adjust the capital stock for variation in its utilization and the labour force for improvement in its skill resulting from increased level of education and training. The present study is free from this shortcoming.

TABLE 2

Total Factor Productivity Growth in Agriculture Sector of Pakistan: 1953-96

Study	Period of Study	Estimation Methodology and Nature of Data	Average Annual TFP Growth Rate (Percent)
Wizarat (1981)	1953-79	Arithmetic index / Annual time series	1.1
Evenson and Pray (1991)	1956-85	T-T index / Cross-section district-wise / annual time series	1.07
Rosegrant and Evenson (1992)	1957-85	T-T index / annual time series	1.07
	1957-65		1.65
	1965-75		1.86
	1975-85		–0.36
Khan (1994)	1980-93	Arithmetic index / annual time series	2.1
Khan (1997)	1960-96	T-T index / annual time series	0.92
Kemal *et al.* (2002)	1965-2001	Arithmetic index / annual time series	0.37
Ali (2004)	1960-96	Arithmetic index / (Weights 1960-61)	2.17
		(Weights 1980-81)	0.40
		T-T index / annual time series	2.3

III. METHODOLOGY AND SOURCES OF DATA

METHODOLOGY

In the growth literature, since Solow (1956), the growth accounting method is most widely used. We have used this method for the estimation of total factor productivity of agriculture sector of Pakistan. This method for the

estimation of TFP became popular due to the work of Kendrick (1961) and Denison (1962). This method estimates TFP as a residual. This approach is capable of decomposing the contribution of factor inputs and technological change to output growth. The starting point of this approach is a standard Neo-classical production function of the form:

$$Y = F(K, L, A, t) \tag{1}$$

Where Y represents value added in agriculture, K the capital input, L the labour input, A the area under cultivation and, 't' stands for the time.

Differentiating equation (1) with respect to time, dividing it by Y, and rearranging it we get:

$$\frac{dY/dt}{Y} = \frac{\partial F/\partial K}{Y} K \cdot \frac{dK/dt}{K} + \frac{\partial F/\partial L}{Y} L \cdot \frac{dL/dt}{L} + \frac{\partial F/\partial A}{Y} A \cdot \frac{dA/dt}{A} + \frac{\partial F/\partial t}{Y} \tag{2}$$

In equation (2) the term $\frac{\partial F/\partial t}{Y}$ represents the proportional rate of shift of the production function. It is also known as technical change or TFP. The terms $\frac{\partial F/\partial L}{Y} L$, $\frac{\partial F/\partial K}{Y} K$ and $\frac{\partial F/\partial A}{Y} A$ are the factor shares of labour, capital, and area, respectively. If we denote growth rates of output, capital, labour and area inputs by small letters like y, k, l and a, and the shares of K, L, and A by S_K, S_L, and S_A respectively, then, equation (2) can be written as:

$$y = S_K k + S_L l + S_A A + TFPG \tag{3}$$

Where $TFPG$ is growth rate of TFP. Equation (3) can be solved for $TFPG$ as:

$$TFPG = y - S_K k - S_L l - S_A A \tag{4}$$

Using the data for growth rates of Y, K, L and A, and for factor shares of K, L and A equation (4) can be used to calculate $TFPG$. The contribution of K, L and A can also be found by multiplying their growth rates by their respective factor shares.

In the calculation of TFP it is generally assumed that production function is a well-behaved Neo-classical production function that allows the decomposition of sources of growth. Perfect competition, profit maximization and constant returns to scale are the other usual assumptions of growth accounting approach.

Under the above assumptions, equation (4) can alternatively be written as:

$$TFPG = y - \alpha k - \beta l - (1 - \alpha - \beta) A \quad (5)$$

Equation (5) calculates *TFPG* as a residual. It proxies as a "catch-all" variable and represents that part of output growth which cannot be explained by the growth of factor inputs. It is, therefore, a measure of our ignorance (Chen, 1997). It also measures the shift in the production function. The shift of the production function may be caused by a number of factors such as: "technical innovation, organizational and institutional change, shifts in the societal attitude, fluctuations in demand, changes in factor shares, omitted variables and measurement errors" (Basudeb and Bari, 2000:7).

DATA SOURCES

For the estimation of TFP growth in the agriculture sector of Pakistan, time series data about value added, area, labour and capital inputs are required. The sample period for this study is from 1965-66 to 2004-05. The data about capital stock is not available in national income accounts. Therefore, it has been estimated from gross fixed capital formation (GFCF) using perpetual inventory method.[5] The data about value added, cultivation Area, labour force and GFCF for agriculture sector, for the years from 1963-64 to 1995-96 were taken from *50 Years of Pakistan in Statistics*, Volume I, Summary, Federal Bureau of Statistics (FBS), Statistics Division, Government of Pakistan (GOP), Islamabad. The required data for the remaining period were taken from Pakistan Statistical Year Book 2006, FBS, Statistics Division, GOP, Islamabad. The value added and capital stock, are measured in millions of Rupees at constant factor costs of 1980-81.[6] The labour input is measured in millions of hours worked. Finally, the area input is measured in millions of acres.

IV. MEASUREMENT OF VARIABLES

Traditionally, the capital input is measured in net terms, *i.e.* net of depreciation. The crude measure of TFP includes the effect of technical efficiency as well as the effect of improved (intensive) use of inputs. In order to avoid the errors of measurement in TFP estimates we have adjusted the

[5]The estimation of capital stock is described in the Appendix.

[6]The year 1980-81 is a normal year and has been used as a base in national income accounts of Pakistan. Further, this year lies almost in the middle of our sample period. These are very reasons that we have used this year as a base for converting data series to a common base.

capital stock for variation in its utilization. One way of adjusting the TFP estimates for business fluctuations is the *Wharton Method*.[7] In this method, potential output is estimated by fitting a linear trend to capital output ratio (K/Y) and then the ratio of actual output to potential output is used as capacity utilization rate for adjusting the capital stock.[8]

Traditional estimates of TFP use the labour input as number of workers employed in the production. However, over time the average hours worked may change as a result of business fluctuations and/or as a result of changes in the behaviour of workers regarding their choice between leisure and work hours. Besides, the level of education and training acquired by the workers also improves over time. If TFP figures are estimated without making allowance for variations in the hours worked and improvement in the quality of labour as a result of education and training, the TFP estimates are likely to be overstated. In order to avoid the possible bias in the TFP estimates we have measured the labour input in terms of hours worked using data from various issues of *Labour Force Survey*. Further, we have adjusted the labour input for average schooling years (including the university education). The details of adjustment of the labour input for variations in the hours worked and for average schooling years[9] are given in the Appendix.

V. INTERPRETATION OF RESULTS

Table 3 contains the growth rates of value added in agriculture, inputs and TFP for the period 1965 to 2005. Following equation was used to calculate TFP estimates for the agriculture sector of Pakistan.

$$TFPG_t = \hat{V}_t - 0.37\hat{K}_t - 0.27\hat{L}_t - 0.36\hat{Area}_t \qquad (6)$$

Where $TFPG_t$ = Growth rate of *TFP* in the agriculture sector

$\hat{V}_t$ = Growth rate of value added in the agriculture sector

$\hat{K}_t$ = Growth rate of capital stock adjusted for business fluctuations

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[7]The other methods are *the Production Function method*, *Proxies for capacity utilization rate*, and *short-run adjustment*. The details of these methods are given in Oguchi (2004).

[8]The details of this procedure are given in the Appendix.

[9]The data regarding hours worked and education levels were not available for some years because *Labour Force Survey* was not conducted in those years. The missing values were generated through interpolation and extrapolation.

$\hat{L}_t$ = Growth of labour force adjusted for education and work hours

$\hat{Area}_t$ = Growth rate of area under all crops

The weights were obtained from the GLS[10] estimation of the Cobb-Douglas[11] production function under the assumption of constant returns to scale.

The average growth rate of value added in the agriculture sector over the sample period remained at 3.78 percent, however, growth performance widely fluctuated — ranging from the highest of 6.36 percent during the second half of the 1960s to the lowest of 1.98 percent during the recent half decade of 2001-05. The capital stock in the agriculture sector grew at an average rate of 1.95 percent during the sample period. Its highest growth rate stood at 3.69 percent during the 1980s whereas its lowest growth rate remained at 1.2 percent during the recent half decade 2001-05. Employed labour force in the agriculture sector showed an average growth rate of 1.03 percent over the sample period. Its minimum growth of 0.98 percent was observed during the 1970s. It recorded the highest growth rate of 1.22 percent during the 1990s. The area under all crops grew at an average rate of 0.52 percent over the sample period. Its growth fluctuated from the highest rate of 1.92 percent during the last half of the 1960s to the lowest of minus 0.06 percent during the recent half decade 2001-05. The TFP grew at an average rate of 0.28 percent. It started from a reasonably high growth rate of 1.6 percent during the later half of the 1960s. Its growth fell to minus 0.31 percent during the 1970s. It further deteriorated to minus 0.88 percent during the 1980s. It recovered and grew to 1.61 percent during the 1990s. During the recent half decade 2001-05 it again showed a negative growth rate of 0.23 percent. The higher TFP growth figures, in the agriculture, during the 1960s may be attributed to green revolution technology. In the 1970s, the depressive performance of TFP growth was the result of floods, viral

[10]Autocorrelation in the error term was found through LM procedure. The coefficient of autocorrelation was estimated through grid search procedure. The estimated value of autocorrelation coefficient was 0.62. This value was used to transform the variables and then GLS was applied.

[11]The shares of labour and capital in output can be estimated using wage rate and interest rates data which are not commonly available in developing countries like Pakistan. The alternative method is to estimate the shares of labour and capital by estimating the Cobb-Douglas form of production function, under the assumption of constant returns to scale, by an appropriate econometric technique.

diseases, and shortage of critical imported agriculture inputs because of very high petroleum prices. In the 1980s government liberalized sugar, pesticides and fertilizer industries. Monopoly power of Rice and Cotton Exports Corporation was abolished. The prices of outputs were raised. But the prices of inputs were also brought to the international standards. The bank credit increased for agriculture sector. A new high-yielding variety of cotton was developed. In spite of these policies TFP failed to recover and it remained negative. In the 1990s the government tried to bring input and output prices closer to international levels. It reduced subsidies and enhanced the role of private sector. As a result TFP growth improved to 1.61 percent in the 1990s. During first two years of the recent half decade a crippling drought touched the country and as a result agriculture growth turned to negative. In the following years due to increased availability of water TFP growth improved a little. During this half decade the use of all inputs also fell. All these factors led to negative growth of TFP in this period.

TABLE 3

Trends in Agriculture Value Added, Inputs and TFP Growth Rates
(Percent)

Source of Growth	1965-66 to 1969-70	1970-71 to 1979-80	1980-81 to 1989-90	1990-91 to 1999-2000	2000-01 to 2004-05	1965-66 to 2004-05
Value added	6.36	2.32	4.10	4.54	1.98	3.78
Capital	1.78	1.13	3.69	1.50	1.20	1.95
Labour	1.06	0.98	0.86	1.22	1.08	1.03
Cropped Area	1.92	0.51	0.43	0.22	-0.06	0.52
TFP	1.60	–0.31	–0.88	1.61	-0.23	0.28
Contribution to Value Added Growth by:						
Capital	27.97	48.70	90.14	32.96	60.48	51.53
Labour	16.67	42.35	20.90	26.94	54.31	27.22
Cropped Area	30.17	22.10	10.56	4.74	–3.13	13.74
TFP	25.19	–13.15	–21.59	35.35	–11.66	07.40

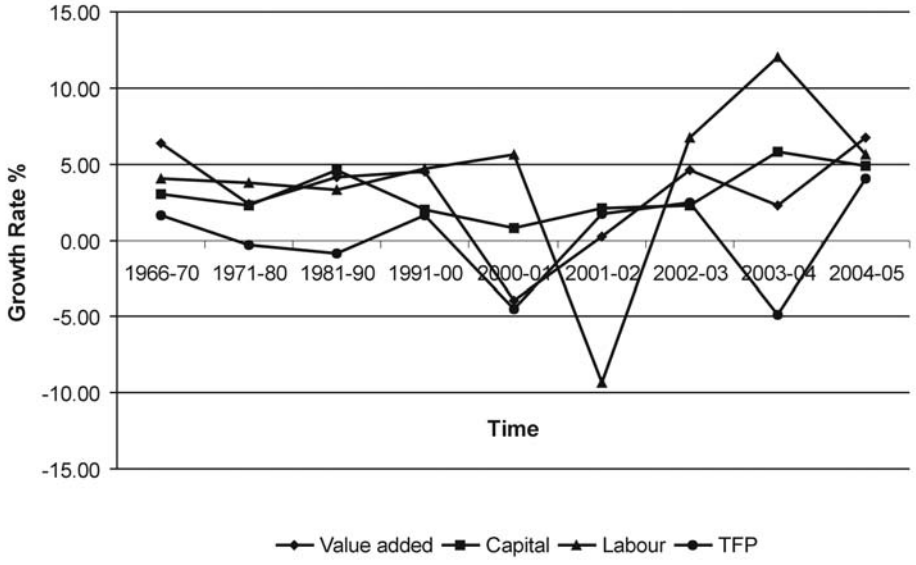
Source: Authors' estimates based on data taken from *50 Years of Pakistan in Statistics* and *Statistical Yearbook 2006*, FBS, GOP, Pakistan.

Figure 1 reveals that value added growth is more sensitive to growth rates of capital stock and cropped area but less sensitive to labour input

growth. TFP growth is pro-cyclical, *i.e.* rising during expansion and falling during recessions. Capital growth is also closely associated with value added growth. The growth of labour force and cropped area are poorly associated with growth of value added.

FIGURE 1

Value Added (Adjusted) Inputs and TFP Growth (Solow Residual)



Source: Author's estimates based on data taken from *50 Years of Pakistan in Statistics* and *Statistical Year Book 2006*, FBS, Government of Pakistan.

The average contribution of capital stock to value added growth over the sample period remained at 51.53 percent. The next highest contribution to growth of value added was 27 percent by the labour force. The average contributions of cropped area and TFP were only 14 percent and 7 percent, respectively. It means that main contributors to growth of value added are the capital and labour inputs. The contribution of cropped area is only about 14 percent. The contributions of inputs and TFP to agriculture value added growth widely fluctuated over the sample period. Capital growth made highest contribution during the 1980s and the lowest contribution during the later half of the 1960s. The contribution of labour force to value added growth remained highest during the recent half decade of 2001-05 and it remained the lowest during the later half of the 1960s. Cropped area's maximum contribution was during the later half of the 1960s. During the

recent period of 2001-05, its contribution was minus 3.13 percent. The TFP made highest contribution of 35.35 percent during the 1990s and the lowest contribution of about minus 22 percent during the 1980s.

VI. CONCLUSION AND POLICY IMPLICATIONS

Total factor productivity (TFP) has emerged as an important source of growth. But unfortunately in Pakistan TFP could not attract due attention of the researchers and policy makers. There are very few studies which have focussed on the estimation of TFP in the agriculture sector of Pakistan. However, these studies have produced overstated figures for agriculture TFP in Pakistan by ignoring the variation in the utilization of productive capacity, on one hand, and variation in the hours worked and improvement in the skills of workers resulting from increased level of education and training, on the other.

The present study has overcome this limitation by properly adjusting the capital and labour inputs for variation in capacity utilization and by incorporating the changes in wok hours and improvement in skills of labour force as a result of increased education and training.

The average growth rate of TFP in the agriculture sector of Pakistan remained at 0.28 percent. In Pakistan, we face limitations on the expansion of capital stock and cultivated area. The only available way of increasing agriculture value added is through increased TFP growth. However, unluckily this area could not catch the attention of authorities. It is strongly recommended that Federal Bureau of Statistics should estimate TFP on yearly basis and these estimates should be published along with other economic data. The government should also devise appropriate policies, such as diffusion of relevant information among the farmers, increased area under cultivation and timely availability of fertilizer at affordable prices for the farmer, to promote growth of agriculture TFP in the country.

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APPENDIX

ESTIMATION OF CAPITAL STOCK

The capital stock has been estimated using the perpetual inventory method which argues that the present stock of capital is the accumulation of past streams of investment.

$$K_t = w_t I_t + w_{t-1} I_{t-1} + \ldots + w_{t-T} I_{t-T} \quad \text{(A-1)}$$

Where $w_t = 1$, $0 < w_{t-I} < 1$ and I_{t-T} is the oldest surviving capital asset.

Assuming the geometric decay of capital stock and denoting the rate of depreciation by ϕ equation (A-1) can be written as:

$$K_t = I_t + (1-\phi) I_{t-1} + (1-\phi)^2 I_{t-2} + \ldots + (1-\phi)^T I_{t-T} \quad \text{(A-2)}$$

Writing equation (A-2) for $t-1$ and multiplying on both sides by $(1-\phi)$ gives us:

$$(1-\phi) K_{t-1} = (1-\phi) I_{t-1} + (1-\phi)^2 I_{t-2} + (1-\phi)^3 I_{t-3} + \ldots + (1-\phi)^{T+1} I_{t-(T+1)} \quad \text{(A-3)}$$

Subtracting equation (A-3) from (A-2), we get:

$$K_t - (1-\phi) K_{t-1} = I_t \quad \text{(A-4)}$$

The term involving $I_{t-(T+1)}$ drops out because any capital asset older than T periods no more exists. Equation (A-4) can be alternatively written as:

$$K_t = (1-\phi) K_{t-1} + I_t \quad \text{(A-5)}$$

From equation (A-5), we can deduce step-by-step that:

$$K_1 = (1-\phi) K_0 + I_1$$

$$K_2 = (1-\phi) K_1 + I_2 = (1-\phi)[(1-\phi) K_0 + I_1] + I_2 = (1-\phi)^2 K_0 + (1-\phi) I_1 + I_2$$

$$K_3 = (1-\phi) K_2 + I_3 = (1-\phi)[(1-\phi)^2 K_0 + (1-\phi) I_1 + I_2] + I_3 = (1-\phi)^3 K_0 + (1-\phi)^2 I_1 + (1-\phi) I_2 + I_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

and for any period t as:

$$K_t = (1-\phi)^t K_0 + (1-\phi)^{t-1} I_{t-(t-1)} + (1-\phi)^{t-2} I_{t-(t-2)} + (1-\phi)^{t-3} I_{t-(t-3)} + \ldots + (1-\phi)^1 I_{t-1} + (1-\phi)^0 I_{t-0} \quad \text{(A-6)}$$

Using summation notation equation (A-6) can be written as:

$$K_t = (1-\phi)^t K_0 + \sum_{i=0}^{t-1} (1-\phi)^i I_{t-i} \quad \text{(A-7)}$$

Two issues are involved in the estimation of capital stock using equation (A-7). These are the estimation of initial capital stock, K_0 and determination of rate of depreciation, ϕ.

Initial capital stock K_0 can be estimated in a number of ways. One way, as used by Nehru and Dhareshwar (1993), is to estimate the initial investment by running a linear regression of log of investment against the time trend. The estimated value of initial investment is then used to estimate the initial capital stock using equation (A-8) as:

$$K_{t-1} = I_t / (\phi + g) \qquad \text{(A-8)}$$

Where g is the rate of growth of output and ϕ is the rate of depreciation.

The second issue involved in the estimation of capital stock is to decide about the rate of depreciation. Ideally, the best way to estimate rate of depreciation of capital stock is to conduct a survey and then use the survey data to estimate the required rate of depreciation. But due to dearth of time and high cost involved, that is not feasible. The alternative way is to use estimates of other studies. Following Nehru and Dhareshwar (1993) and Kemal *et al.* (2002) we have assumed the rate of depreciation to be 4 percent.

Adjustment of the Capital Stock for Business Fluctuations

We have used the Wharton Method[12] to adjust the capital stock for business fluctuations. The steps involved in this method are as follows:

(*a*) Generate a capital/output (K/Y) series from capital and output data to be used for the analysis.

(*b*) Run a linear regression of this (K/Y) series against time and generate the estimated (K/Y) series.

(*c*) Plot the actual and fitted (K/Y) series against time.

(*d*) Draw a line parallel to the (K/Y) trend line passing through the minimum points of the actual (K/Y) series.

(*e*) The capacity or potential capital/output (K^*/Y^*) ratio will lie on the lower line.

(*f*) Potential output is measured using the equation: $Y^* = K / (K^* / Y^*)$.

(*g*) Take the ratio of actual to potential output, (Y/Y^*) as the capacity utilization ratio.

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[12]For details of this method see Oguchi, (2004).

(*h*) The product of K and (Y/Y^*) is the adjusted capital stock series.

Adjustment of Labour Input for Work Hours and Education

The *Labour Force Survey* published by FBS, Government of Pakistan, contains details of hours worked by labour force employed in various economic activities like GDP, Agriculture, Manufacturing, and Services sectors etc. In each activity, the number of hours worked in each class, are multiplied by the fraction of labour force lying in that class. The sum of these products is the weighted average of hours worked in a particular activity.

The *Labour Force Survey* also gives the details of education levels acquired by various fractions of employed labour force. The weighted average of various education levels in an economic activity was taken as the average school years. The fraction of employed labour force acquiring a particular level of education was used as a weight. The average education level series were then used to adjust the labour force for variation in education levels using the following equation:

$$L_{t,ce} = Lt\ (1 + \lambda e) \qquad \text{(A-9)}$$

Where

$L_{t,ec}$ = Total labour force employed in an activity adjusted for education level.

Lt = Total number of workers employed in an activity.

λ = The literate fraction of employed labour force in an activity.

e = Average education level of the employed labour force in an activity.

Then multiplying the constant-education labour force with the average hours worked gave us the total labour input adjusted for variations in hours worked and in education level.

Pakistan Economic and Social Review
Volume 46, No. 2 (Winter 2008), pp. 133-146

IMPACT OF EDUCATION ON SOCIO-ECONOMIC STATUS OF VILLAGERS LIFE: A CASE STUDY OF SHRIEN WALA VILLAGE OF FAISALABAD DISTRICT

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Abstract. This research paper investigates impact of education on socio-economic status of rural life in Faisalabad district. Empirical results show that economic growth of any economy not only depends on physical capital but also on the human capital. Education is most the important and valuable factor on overall environment of society, but primary education has fewer effects on the behavior of rural residents in a selected village of Punjab.

I. INTRODUCTION

Economic growth of any country is not only dependent on the physical capital but also on the human capital. Developed human capital has a positive effect on the economic growth, political stability and social environment. Education is the most important variable, which plays an important role in the development of human capitals. A number of empirical studies have shown it that the pace of economic growth of the developed countries could not be achieved without the stock of human capital.

Among all stages of education, primary education has a central place. Notwithstanding, primary schooling provides basic principle to society. It may also improve living standard, develop industrial projects, which gives high financial rates of return. By taking measures to extend and improve primary schooling and expenditures on the poorest population groups,

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wherein these expenditures subsequently increase the productivity of such people and tackling the poverty problems directly. It represents not only a more attractive in many countries but also a less risky means of increasing the income of poorest people (Coldwell *et al*., 1979).

In recent years, the government of Pakistan has started nation-wide survey; Pakistan integrated household survey (PIHS), to address the imbalances in the social sector. This survey provides rich information on the above-mentioned variables that were missing in the earlier household surveys. This study uses the date of PIHS to examine the returns to education by using Mincerian-earning function and thus aims to fill the vacuum that, due to the lack of appropriate data exists in the literature in the Pakistan. We will first estimate the earning function with continuous school years with the assumption of uniform rate of returns for all school years. It is argued that different school years impart different skills, therefore, we extend our analysis to level of education, *i.e.* How much increase in earnings takes place with an extra year of schooling at different levels, such as, primary, middle, matric, intermediate, bachelors and masters.

The overall literacy rate in 1997-98 was estimated at 40%; 51% for males and 28% for females; 60% in urban areas and 30% in rural areas. These rates are still among the lowest in the world due to various measures taken by the government in recent years, the enrolment rates have increased considerably (Economic Survey, 1998).

Due to low levels of educational attainment and lack of technical and vocational education, Pakistan's labor market is dominated by less educated and unskilled labor. A considerable rise in the number of educational institutions and enrolment after 1980s is not yet reflected in Pakistan's labor market. This might be because most of the bachelor's and master's degree programs emphasize only on academic education without developing specific skill. The sluggish demand for the graduates of these programs in the job markets leads to unemployment among the educated and the job market remains dominated by the less educated. In this scenario, it becomes important to explore the role of education for the economic benefit of the individuals.

The remaining layout of this paper is as follows: After this introductory section, Section II shows framework of literature review, Section III presents methods, procedures and the impact of education on socio-economic status, Section IV provides results and discussion, and, finally, Section V concludes the paper.

II. REVIEW OF LITERATURE

Goodwin *et al.* (1984) viewed the primary factors affecting settlement patterns in rural areas of the United States using factor analysis of survey responses from 1,156 households in Oklahoma. Their results indicate that quality of services, age of home and availability of services; rural atmosphere and job and family considerations impact are most important factors.

Von *et al.* (1992) studied that gender differences in education in Muslim developing countries are related to the prevalence of Islam, but this decomposition model says otherwise.

Bhuyan *et al.* (1996) examined that the differential fertility in 16 contiguous villages of both Savar and Dhamrai Upazila in Dhaka district, Bangladesh and find fertility between working and nonworking women did not differ significantly. Deccache *et al.* (1997) reported health promotion and health education have limited to evaluation of the effectiveness of actions and programmes. Wirakartakusumah *et al.* (1998) examined the effects of public health, family planning, education, electrification, and water supply programs on fertility, child mortality, and school enrollment decisions of rural households positively in East Java, Indonesia. Rath *et al.* (1998) reported that the impact of educational status, income, indicate that a combination of these factors are associated with reduced fertility, longer birth intervals, and lower levels of infant mortality.

Dubois *et al.* (2003) described the source and the scope of social inequalities in infant feeding practices. They examine the extent to which different recommendations are followed in different social groups and highlight the main factors influencing the total adherence to these recommendations at the population level. The study follows a representative sample ($n = 2103$) of the children born in 1998 in the province of Quebec (Canada). Detailed information on breast-feeding and complementary feeding was collected at 5 and 17 months by face-to-face interviews with the mother. The independent variables were mother's age, mother's education level, poverty level, family type, socio-economic status (SES) and living area. Odds ratios (adjusted for baby's rank in the family, birth weight and premature birth) are presented for breast-feeding, and for formula and cows' milk consumption, at different ages.

Ansari *et al.* (2003) reported that Ambulatory Care Sensitive Conditions (ACSCs) are those for which hospitalization is thought to be avoidable with the application of preventive care and early disease management, usually delivered in the ambulatory setting. This study presents detailed analyses of

ACSCs as a measure of health outcome that might vary with access to primary health care in rural and urban regions of Victoria.

III. THEORETICAL MODEL AND ESTIMATION METHODOLOGY

Human capital model developed by Becker (1964) and Mincer (1974) is hereby used to find the relationship between social economic status of people of Shrien Wala village at different level of schooling. In version of mathematical, the equation can be expressed as:

$$\ln SES_t = \beta_0 + \beta_1 Edu_t + €_t \quad (1)$$

ln *SES* represents socio economic status. The nomenclature of *SES* is given under:

S_F = Size of family,

I_F = Family income,

S_H = Structure of the house (1 for paka and 0 for otherwise),

N_R = Number of rooms,

W_E = Women education (1 if they like it, 0 otherwise),

W_H = Women health facility (1 if they visit the doctor, 0 otherwise),

F_P = Family planning (1 if they use contraceptives, 0 otherwise),

V =Vaccination (1 if yes, 0 otherwise),

P_A = Production per acre,

N_D = Diet (1 if they take egg, meat or milk daily, 0 otherwise), and

Edu = represents level of education like primary, middle, matric, intermediate and above and $€_t$ is the error term.

In order to find the returns to education at different level of education, we estimate the following equation:

$$\ln SES_t = \beta_0 + \beta_1 E_1 + \beta_2 E_2 + \beta_3 E_3 + \beta_4 E_4 + E_5 \beta_5 + €_t \quad (2)$$

Where E_1 = Primary education, where $\beta_1 = 1$ if $0 < \text{Edu} \leq 5$

E_2 = Primary education, where $\beta_2 = 1$ if $5 < \text{Edu} \leq 8$

E_3 = Primary education, where $\beta_3 = 1$ if $8 < \text{Edu} \leq 10$

E_4 = Primary education, where $\beta_4 = 1$ if $10 < \text{Edu} \leq 12$

E_5 = Primary education, where $\beta_5 = 1$ if $12 < \text{Edu} \leq$ higher education

The coefficients associated with E_1, E_2, E_3, E_4 and E_5 in equation (2) show an increase in socio-economic status of people of Shrien Wala village with one year increase in education at respective levels.

The returns to education can be computed at each level as:

Return to Primary = $5\beta_1 E_1 + \beta_2 E_2 + \beta_3 E_3 + \beta 4 E_4 + E_5 \beta_5$

Returns to Middle = $5\beta_1 + 3\beta_2$

Returns to Matric = $5\beta_1 + 3\beta_2 + 2\beta_3$

Returns to Intermediate = $5\beta_1 + 3\beta_2 + 2\beta_3 + 2\beta_4$

Returns to higher education = $5\beta_1 + 3\beta_2 + 2\ \beta_3 + 2\beta_4 + 2\beta_5$

The data used in this study are collected from the Shrien Wala village of District Faisalabad. The collection of data in this study was a field survey. To do so, an open-ended and close-ended questions questionnaire was designed. In this study, roundabout 100 households were interviewed. To measure differences, a dummy variable is used that takes the value 1 for yes and zero otherwise.

The main source of collecting information about change in life style and performance of respondents with education level is one to one interview, for which approximately 30 brief questions were set in questionnaire. In each sample household, the interview was started after formal discussion about his/her name, caste and address of house. Further, after asking respondent's educational level, family size, family income, structure of house and number of rooms, source of income, types of sanitation, and method of solid waste were asked in order to get some information about his/her life style.

In second section, the respondents engaged in agriculture sector were asked about their landholdings, method of cultivation, credit facilities and use of fertilizers and seeds. These two sections were based on the quantities measurements. In the third and last section, some behavioral questions were asked for qualitative measurements of different educational level, which contains 10 different questions like decision power, types of communication, assessment of women education, family planning and most important child caring activities like their diet, vaccination and medicines in case of their illness.

Out of 13 families living in the kacha houses, 9 live in one room houses. They have no toilet, kitchen, store and cattle-shed for themselves and livestock. About 30% of population of village live in one room house, 33% live in two-room houses and 22% live in three room houses. The source of

drinking water is hand pumps. A typical two room dwelling in the rural areas has 16 ft × 10 ft and 10 ft × 12 ft rooms having a veranda. They have water pumps and small bathrooms. The size of smaller room is 10 ft × 12 ft.

IV. RESULTS AND DISCUSSIONS

There are two types of results such as Quantitative Results and Qualitative Results. Out of total 100 respondents, there were 64 males and 36 females. Among them 85 were married and 15 were single. 88 respondents were engaged with informal sector, 9 with formal sector and 3 were doing no job.

TABLE 1

List of Different Age Group Respondents

Age Group (Years)	Number
18 - 30	31
31 - 40	24
41 - 50	15
51 - 60	23
61 - 70	06
71 - 80	01

Source: Computed by the author on the basis of the results obtained in the survey.

Table 1 shows that 31 respondents have age between 18-30 years, 24 having age 31-40, 15 falling between 41-50 years, 23 respondents have the age between 50-60 while only 7 are 60 years of age

TABLE 2

Percentage of Respondents by Their Education Level

Education Level	Percentage
No Schooling	53
Primary	18
Middle	11
Matric	5
Above	13

Source: Computed by the author on the basis of the results obtained in the survey.

Table 2 shows that out of 100 interviewed respondents, 53 were uneducated and 47 were educated. Within 47 educated respondents, there were 18 primary educated, 11 middle, 5 matriculate, 11 having college education while 2 were university educated respondents.

TABLE 3

Distribution of Income

Education Level	Average Respondent's Monthly Income (Rs.)	Average Family Monthly Income (Rs.)	Per Capita Income (Rs.)
No Schooling	2945.00	7765.60	2021
Primary	3323.50	8694.00	2343
Middle	4495.50	10541.00	2253
Matric	3300.00	10320.00	2943
Above	8254.00	11923.00	2428

Table 3 describes the relation of education level and the monthly income. In the 2nd column, average respondent income is calculated. There is positive relationship between education level and average income of respondents. The average income increases as the educational level increases except in the case of matriculated people. In the 3rd column the average family income is calculated. This shows a relationship that the average family income increases with the increase in the education level. Per capita income, calculated in the 4th column also shows a positive relationship with the education level.

TABLE 4

Use of Source of Communication by Different Educational Levels

Education Level	VCR	Phone	Radio	Satellite	News Papers
No Schooling	75	14	43	7	4
Primary	92	15	38	8	23
Middle	100	50	62	0	25
Matric	80	40	40	0	20
Above	92	70	62	0	62

Table 4 shows the relationship between education level and the use of different type of communication devices. In 2nd column the relationship between the education level and the use of Television is discussed. Interestingly, there is a positive relationship between the two variables, *i.e.* with the increase in the education level the demand for TV sets also increase. The main cause of this increase is the awareness regarding the world issues, the national problems and favorite programs. Similar is the case with the use of telephone. The use of telephone increases with the increase in the education level. The only exception in the case of use of telephone is in the matriculated group, this may be due to the sample error because only 5 matriculated respondents were interviewed among the sample of 100. In the fourth column the relationship between the use of Radio and education level is presented. There is a positive relationship between the use of Satellite Dish Antenna and the education level. Surprisingly, there is no clear relationship observed between the use of Dish and the education level. Among the set of respondents only a small percentage of people belonging to no education and primary education use dish antenna while respondents from all other groups do not use the device. While the last column shows the relationship between the education level and the reading of newspaper. There exists a positive relationship between the education level and the reading of newspaper.

TABLE 6

Attitude of Respondents Having Different Education Groups

Education Level	Self	Mutual Opinion
No Schooling	58	42
Primary	33	67
Middle	45	55
Matric	40	60
Above	23	77

Table 6 describes the behavior of respondents about the decision making with different education level. It is observed that involvement in decision-making increases with the increase in the education level. One reason for this behavioral change is the fact that the educated man is relatively more liberal and open-minded. People think that the involvement of their family will make decision that is more positive and will be better for all. That is why; they accept the importance of their family members, *e.g.* wives, children and parent. From the table it is clear that 58% of uneducated people don't involve

their families in decision-making, probably, they feel insult to take any type of opinion from their families. 33% of primary, 45% of middle, 40% of matric and 23% of higher educated people do not involve their families in decision-making activity. The most involved family in the decision-making activity. The most involved family in the decision-making is the family with the highest educated respondents of College and University, *i.e.* 77%. From the above discussion, it can be concluded that the involvement of family members in decision-making increases as the education level of respondents increases.

TABLE 7

Use of Family Planning, and Health Care Activities

Education Level	Liking of Women Education (%)	Women's Health Facility (%)	Family Planning (%)	Vaccination (%)
No Schooling	52	82.60	51	27
Primary	88	88	82	50
Middle	91	91	82	57
Matric	100	100	75	75
Above	92	100	67	90

Table 7 shows the relationship of level of education with the liking of women's education, women's health facilities, role of family planning and vaccination. 2nd column shows the percentage of liking for female education, *i.e.* how many people like to educate their daughters. The attitude is very much visible from the table, *i.e.* as the respondents climbs the educational ladder, the more liberal behaviour towards female education they have. Sophistication, liberal attitude, broader vision can be among the reasons for such an attitude.

The 3rd column gives the availability of the female health facilities. The relationship is once again positive, *i.e.* the awareness about the female health increases with the increase in the education level. The 4th column shows the relationship between the education level and the use of contraceptives. The column depicts a positive relationship between the education level and the role of family planning. Only 51% uneducated respondents like the use of contraceptives, while 75% of higher and 67% of lower educated people like it. Here is a very interesting situation with the primary and middle education group. The 82% people form these age groups recognize the importance of

family planning. So, it is clear that 5 to 8 years of schooling have more positive effect on the use of contraceptive activities. The last column discusses the relation between the courses of vaccination with the different education levels. With the acquisition of more education, persons are more aware of the importance of vaccination.

TABLE 8

Daily Diet Taken by Different Educational Group

Education Level	Milk	Eggs	Fruit	Meet	Rice	Wheat
No Schooling	45	28	26	30	97	100
Primary	75	33	33	58	100	100
Middle	62	50	37	75	100	100
Matric	75	75	50	75	100	100
Above	90	80	40	90	100	100

Table 8 shows the daily diet of respondent's children. Usually small children need milk, eggs, fruit, beef, wheat and rice in their daily diet. More educated people are more aware of this daily diet chart. In the entire table it is clearly visible that with the increase in the education levels the use of milk, eggs, fruit, meet, rice and wheat increases. The most important fact is that wheat and rice are being used by almost all the members of all education groups. The reason may be that these two constitute a major portion of diets of people of Pakistan due to social, economic and geographic reasons.

TABLE 9

Use of Different Types of Sanitation Facilities

Educational Level	Govt. Provisions (%)	Village Community (%)	Own (%)	Any Other (%)
No Schooling	70.50	19.60	7.80	1.9
Primary	81.25	18.75	0	0
Middle	70.00	30.00	0	0
Matric	80.00	20.00	0	0
Above	92.30	76.00	0	0

Table 9 describes the different types of sanitation used by the respondents belonging to different education levels. 70.5% of uneducated

respondents get government service and it is almost same for the middle education persons. The condition is better for the primary and the high education group, *i.e.* 81.25% and 80% respectively, and it increases with the College and University achievers, *i.e.* 92.3%. All other respondents who do not get government professionals use source generated by their village community but about 10% of uneducated persons use other sources generated by their own or from any other source. It is clear from the table that as the education level increases there is less dependency on the village community and they rely on government services.

TABLE 10

Estimation of Child Care Facilities

Education Level	Doctor (%)	Hakims (%)	Dispen-sary	Taweez	House Tips
No Schooling	29.00	12.50	60.40	16.60	25.00
Primary	92.80	0	21.42	7.10	7.14
Middle	75.00	12.50	75.00	0	0
Matric	75.00	0	25.00	0	0
Above	90.00	10.00	20.00	0	0

Table 10 describes the relationship between the education level and the childcare activities. In 2nd column it is discussed that how many people of different education levels consult doctor during the illness of their children. Only 29% of uneducated people consult doctors and this ratio increases with the increase in the education level and it is highest in the primary education group where the ratio is 92.80%. In 3rd column the role of Hakim is discussed, 12.50% of uneducated and middle pass respondents consult Hakims during illness. 4th column shows that 60% of uneducated people get medicine from dispensary with out complete check up of their child. This tendency is being decreased with the increase of education level and there is quite an interesting situation in column 5, which shows that 16.60% of uneducated people and 7.10% of primary pass people believe in Taweez instead of doctor and similarly in column 6, it is clear that only uneducated and primary pass people rely on house tips. No other class is interested in Taweez and house tips. Therefore, it is clear that, with the spread of education people depend on doctors and medicine facilities rather on Hakims and house tips.

TABLE 11

Regression and Logit Model's Results

	OLS						Logit						
Independent Variables	Intercept	E_1	E_2	E_3	E_4	E_5	E_1	E_2	E_3	E_4	E_5	R_2	R_1
SF	2.37* (2.98)	0.23 (0.98)	0.44 (0.93)	0.33 (0.25)	0.42 (0.35)	0.39 (1.03)	–	–	–	–	–	92%	–
IF	2.42* (3.09)	0.42 (0.97)	0.59 (0.32)	0.63 (1.29)	0.72* (2.82)	0.88* (2.73)	–	–	–	–	–	93%	–
SH	2.49* (3.82)	–	–	–	–	–	0.74 (1.03)	0.88 (1.23)	0.90 (1.39)	1.02* (2.93)	1.05* (2.99)	–	78%
NB	4.79* (4.02)	1.02 (0.78)	2.05 (1.73)	3.56* (2.92)	4.42 (2.97)	3.79* (2.78)	–	–	–	–	–	90%	–
WE	2.82* (2.22)	–	–	–	–	–	0.92 (1.39)	0.79 (1.22)	0.88 (1.31)	1.03* (2.92)	1.09* (2.99)	–	72%
WH	2.95* (3.07)	–	–	–	–	–	0.02 (0.98)	0.17 (1.32)	1.39* (2.76)	1.38* (2.97)	1.44* (2.78)	–	69%
FP	2.82* (3.09)	–	–	–	–	–	0.83 (1.09)	0.32 (1.39)	0.88 (1.45)	1.39* (2.98)	1.82* (3.34)	–	71%
PA	2.07* (4.23)	2.39* (2.38)	1.32* (2.75)	1.22 1.30	1.82* (2.92)	1.89* (2.79)	–	–	–	–	–	89%	–
ND	2.09* (4.56)	–	–	–	–	–	0.89** (2.32)	0.41* (2.24)	0.73* (2.95)	0.69* (2.77)	0.67* (2.87)	–	88%

Present study shows that village traditions look dominated in the decision of family size. All coefficients in this regard are insignificant. First three levels of education have insignificant effect whereas the other two levels have a significant effect on the per capita of income of the family. Nevertheless, all coefficients have positive signs. For the equation of structure house, Logit model is used. First three levels of education have insignificant effect on the structure of house, while last two equations have positive and significant impact. Because, more educated people generate more income. The relationship between number of living rooms and education is measured by Least square regression. The results show that only higher level of education have positive and significant impact on number of livings rooms. In the equations of women education, women health and family planning, the results indicate that higher education level has positive and significant impact on the education, health and family planning instead of low level of education. As the education level of the head of the family increases, the education standard of other family members also increases. The use of new technology, new crop varieties or access to sophisticated equipment are outcomes of education. Diet equation shows significant and positive results at all level of education. This may be due to cultural, social environment and pure foods of village.

V. CONCLUSIONS

This study suggests that role of primary education on rural's life is insignificant. This is so because educational system in Pakistan, especially in the rural areas, is insufficient to achieve its targets. However, partially it has some importance in the agricultural sector. It implies that primary schooling increases the income of the farmer and is a cause of reduction in the poverty. Similarly, primary education creates the good sense of diet. However, an important conclusion drawn in this study is that only 10 years of schooling has positive and significant impact on the all variables, so it may be concluded that in Pakistan, the minimum level of education that gives the individuals some sense about the life is Matriculation. This suggests that authorities should have to give proper attention towards primary and secondary agricultural based education and higher education, which enable someone to become the productive agent of the economy.

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Pakistan Economic and Social Review
Volume 46, No. 2 (Winter 2008), pp. 147-160

AN EMPIRICAL ANALYSIS OF THE DETERMINANTS OF BANK SELECTION IN PAKISTAN
A Customer View

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Abstract. This study analyzes the major determinants of a bank selection by a customer in the banking industry of Pakistan. It is based on a survey of 358 customers of private, privatized and nationalized banks located in the city of Lahore (Pakistan). The findings of the study reveal that the most important variables influencing customer choice are customer services, convenience, online banking facilities and overall bank environment. The study aims to bridge the existing gap in local banking literature through identifying the important bank selection determinants and concludes with some policy implications which are expected to have an impact on the marketing efforts of Pakistani banks.

I. INTRODUCTION

The trend towards globalization has introduced many changes in the economic and business environment all over the world. Pakistan is no exception to these changes and almost all industries including the banking sector, in one way or the other, are being affected by this trend. In consequences of this, banking sector in Pakistan is becoming increasingly more competitive. Commercial banks in Pakistan like banks operating in the developed countries are putting more emphasis on providing more facilities and services to their customers.

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The banking sector of Pakistan has undergone considerable changes since the government of Pakistan announced its policy to privatize commercial banks. Pakistan moved towards liberalization and financial sector deregulation in 1990 in order to implement structural reforms agenda and to strengthen its financial system. This started with the privatization of state-owned commercial banks and induction of new ones from private sector to establish a market-based banking system (Akhtar, 2002). In the age of globalization the provision of effective and quality services to their business customers is becoming a key determinant of the growth and prosperity of banking sector in Pakistan. As a result, Pakistani banks are offering a broadened range of services to cater the needs of sophisticated and demanding customers.

During the last one and a half decade, the banking sector of Pakistan has witnessed a massive change from a slow government dominated sector to a more responsive and a competitive sector. The case of Pakistan's banking sector is cited as a major success story on how restructuring and privatization can transform a sector which can contribute significantly towards economic growth. Mergers and acquisitions in the banking sector are also likely to increase the competitive pressures. As Pakistan has also opened its doors to foreign commercial banks, some foreign banks are in a process of acquiring such smaller banks which have a good branch network. Similarly, some new groups are buying out foreign banks' operations in Pakistan. All these changes are posing major challenges and competition for banks to make their customers more "loyal" by providing them more facilities and services.

As economic environment is rapidly changing and customers are becoming more demanding and sophisticated, it has become important for financial institutions to determine the factors which are pertinent to the customers' selection process (Boyd *et al.*, 1994). Therefore, for this sector, the quest lies in determining the basis on which customers, both depositors and borrowers, make their selection process for a bank. This study aims at to explore these determinants in more detail in Pakistan and also identifies the orientation of customers relative to these factors. This research will further help in determining the specific factors which customers perceive as important in their choice of a commercial bank.

The remainder of the paper is organized as follows: In Section II, relevant literature is reviewed. Section III presents the purpose of the study. Methodology is discussed in section IV. Data analysis and discussion of findings are given in section V. Summary and Conclusions are presented in Section VI followed by references.

II. LITERATURE REVIEW

Many studies have identified the banking needs of business customers. Schlesinger *et al.* (1987) in their study conducted in New York State found that the three most important factors in selecting a bank for small business customers were lending rates, accessibility of borrowing, and the number of services offered. Price of service was also found to be an important bank selection factor in another survey conducted by Buerger and Ulrich (1986).

Chen (1999) conducted a survey of 336 domestic-owned and 39 foreign-owned banks in Taiwan in 1997 to identify critical success factors adopting various business strategies in the banking sector. Data was analyzed using factor analysis technique which highlighted four factors, namely the ability of the bank to manage operations, bank marketing, developing bank trademarks and financial market management.

Another survey was undertaken by Thornton and White (2001) to analyze consumers' attitude towards the usage of financial distribution channels. Their findings revealed that banks adopt a multiple distribution channel to meet the needs of different market segments. This study suggested that if a financial institution finds that its profit comes mainly from service-oriented customers, then it would be best for the banks to concentrate on human interface type of services like branch network. And if banks were to attract or retain convenience, technological or change oriented customers, then they should focus more on online electronic type of distribution channels. Furthermore, in a competitive banking scenario, customer service, user-friendly technology, and more sophisticated customer products are important components within the marketing mix, but communication is also emerging as a crucial element in the marketing activity of a bank (Andrew, 1990).

Holstius *et al.* (1995) cited efficiency and courtesy as the most important attributes in determining overall customer satisfaction, while other important attributes were convenience of location, range of services, reputation and availability of innovations. Similarly, the importance of location decisions in satisfying customers is also emphasized in the previous studies (Kaynak and Kucukemiroglu, 1992; McCullough *et al.*, 1986). Laroche *et al*. (1986) conducted a survey in Canada and found that speed of services, and factors relating to the competence and friendliness of bank personnel and convenience of location were the major factors which consumers perceived as important in their selection of a bank.

Zineldin (1996) conducted a survey of 19 potential factors which customers consider as important in the selection of a bank in Sweden. These

factors include reputation, recommendation by others, interesting advertisement, convenience of location, opening hours and high technological services. Each respondent was asked to rate the importance of each of the above-mentioned factors on a scale of 5 (very important) to 1 (completely unimportant). His study revealed that friendliness and helpfulness of personnel, accuracy in account/transaction management, availability of loans and provision of services were the most important factors. Another study on bank selection criteria by Yue and Tom (1995) was based on Chinese-Americans residing in Sacramento, California. The important factors of bank selection by the customers were found to be efficiency of services offered, bank's reputation, bank fees, location, and interest rates on saving accounts.

Nielsen *et al.* (1998) conducted a nationwide survey in Australia for 25 banks and 2,500 bank business customers to rank the factors to be considered more important in bank selection process. Their findings revealed that business firms placed more importance on the willingness of the bank to accommodate their credit needs and the efficiency of the bank in its day-to-day operations. Whereas bankers placed more importance to their ability to offer competitive prices, a full range of products and services and the provision of a personal banking relationship. Another study conducted for Athens (Greece) by Mylonakis *et al.* (1998) who studied 811 bank customers to identify the important factors for bank selection criteria. Their study pointed out location convenience, attention to customers, personalized service as the most important factors in the selection of a bank. Driscoll (1999) identified five factors (convenience; price; product selection; service; and ambience) that customer perceive as important for selecting their financial services providers.

A review of literature indicates that studies related to bank selection criteria have been mainly conducted in case of more developed countries (Denton and Chan, 1991). Such studies have contributed substantially to the literature on bank selection but their findings may not be applicable to developing countries like Pakistan due to different cultural, political and economic setup. As a set of determinant factors that have a significant role in bank selection in one region may prove to be insignificant in another (Almossawi, 2001). In case of Pakistan, Jamal *et al.* (2003) took a survey of 300 customers of a specific bank and studied the determinants of customer satisfaction in the retail banking in Pakistan. Their results indicate a strong relationship between service quality and customer satisfaction. Thus, current literature on banking in Pakistan lacks studies on bank selection criteria and this study is an attempt to bridge this gap.

III. THE PURPOSE OF THE STUDY

Banking sector in Pakistan has been growing significantly despite its social and economic problems. However, only a few studies are found which made an effort to determine the crucial factors that customers perceive as important in their choice of bank in Pakistan. This study is initiated to accomplish this aim. The main objectives for conducting this research are:

1. To determine the importance of selected factors used by Pakistani customers in choosing their bank.
2. To compare the perceived usefulness of the services offered by private, nationalized and private deposit banks.
3. To provide Pakistani bank executives with insights into the kinds of service customers find most appropriate for their banking needs.

IV. METHODOLOGY

Commercial banking in Pakistan has undergone through considerable changes during the last decade. For instance, during 1990s, the Government of Pakistan decided to privatized most of the nationalized banks. Since then, this sector is becoming more and more competitive. Banks are concentrating more on selling personal loans and offering consumer goods financing (such as car leasing, house loans, etc.) and are trying to achieve larger market shares. Commercialized banks are also offering mutual fund investments both in stock market and money market to their customers.

This study was conducted in the city of Lahore (the second largest city of Pakistan). Almost all the major banks have their branch offices in the city. For this analysis, the data have been collected about the customers of nationalized (National Bank of Pakistan, The Bank of Punjab and First Women Bank), privatized (Muslim Commercial Bank, United Bank Limited and Allied Bank) and private banks (ABN Amro Bank, Bank Alfalah and Soneri Bank) operating commercially in the selected area (Garden Town). Nine banks were selected for the analysis (three for each category). The data for the study was collected from 358 bank customers through a specifically designed questionnaire covering the various attributes that customers perceive as important in their choice of a commercial bank.

Non-probability sampling technique was adopted. Surveyed customers were not selected by any criteria and only the location of the banks was chosen. Some of those who visited a particular bank branch during the study period were included. A total of 450 questionnaires were administered out of

which 358 were completely filled in. Thus, a response rate of over 79% was achieved.

The questionnaire was structured to collect information about the ownership of the bank (whether private, privatized or nationalized) and the importance of different factors while choosing a deposit bank. For measuring this lickert type scaling was used (1 = Not Important and 5 = Mandatory). Twenty different factors were listed in this category and most of these were derived from similar studies conducted in other countries (Laroche *et al.*, 1986, Zineldin, 1996, Karin Holstius and Erdener Kaynak, 1995) as well as from current banking literature with necessary adaptations made for the Pakistani banking system. Reliability test was conducted for these factors and cronbach alpha value came out to be 0.82 (see Appendix I). The third part of the questionnaire explored information about respondent's profile, *i.e.* his/her age group, income level, qualifications, employment and type of account.

V. DATA ANALYSIS

The demographic and socioeconomic characteristics of the respondents are shown in Table 1. The respondents profile gives an indication to the banks customer's age group, their income level, qualification, employment status, account type and their affiliation with a particular bank. The customer's demographics show that most of the customers for private and privatized banks fall in the age group of 21 to 30 years, whereas age group of 31 to 40 years has more representation in case of nationalized banks. Similarly, most of the customers in all three types of banks have university level qualifications. 37.5% of customers employed in public sector organizations have their accounts in nationalized banks whereas 39.8% of customers employed in private sector have opted for private banks. 61.9% of customers are holding saving accounts in nationalized banks, 57.4% of customers in private banks are holding current accounts and 54.7% customers in privatized banks again are holding saving accounts.

Table 2 highlights the customers' perceptions towards the most important factors that they perceive in their choice of a commercial bank. Mean values are calculated and arranged in descending order. It was not surprising that the most important factors to bank customers overall in the bank selection process were the banks' external and internal image, that the bank offered convenient banking hours and that the bank was easy accessible from their home or workplace. On the other hand, any impact of Urdu or

English language used for documentation and profit rate were identified as least important factors.

TABLE 1

Respondents Profile

		Privatized (N = 137)	Nationalized (N = 97)	Private (N = 121)
Age (Years)	21-30	61.3%	19.6%	52.9%
	31-40	21.9%	41.2%	27.3%
	41-50	13.9%	35.1%	12.4%
	51-60	2.2%	4.1%	6.6%
	> 60	0.7%		0.8%
Monthly Income	10,000-19,999	63.5%	67.0%	41.3%
	20,000-29,999	20.4%	25.8%	31.4%
	30,000-39,999	5.8%	6.2%	15.7%
	40,000-49,999	4.4%		5.0%
	>50,000	5.8%	1.0%	6.6%
Qualifications	Matric	1.5%	2.1%	5.7%
	FA	9.5%	12.4%	11.4%
	BA	34.3%	49.5%	30.1%
	MA	29.2%	14.4%	27.6%
	Others	25.5%	21.6%	25.2%
Employment	Corporate	14.6%	26.0%	39.8%
	Public	24.1%	37.5%	18.7%
	Self Employed	27.7%	30.2%	23.6%
	Others	33.6%	6.3%	17.1%
Type of Account	Current	37.2%	36.1%	57.4%
	Savings	54.7%	61.9%	36.1%
	Fixed	6.6%	2.1%	2.5%
	Others	1.5%		4.1%
Affiliation with Bank	1 Year	16.9%	14.1%	18.9%
	2 Years	36.8%	34.8%	45.9%
	3 Years	20.6%	39.1%	19.7%
	4 Years	25.7%	12.0%	13.9%
	5 Years			1.6%

TABLE 2

Mean and Ranking

Bank Selection Determinants	Ownership						
	Privatized		Nationalized		Private		Total
	Mean	N	Mean	N	Mean	N	Mean
Profit Rate	2.2857	133	2.1237	97	2.6	115	2.3449
Convenience	2.8971	136	2.8125	96	3.2414	116	2.9885
Bank Timings	3.0515	136	3.134	97	3.4628	121	3.2147
Accessibility	3.0515	136	3.1031	97	3.4545	121	3.2034
Image of the Bank	3.3504	137	3.0103	97	3.7049	122	3.3792
Parking Facilities	2.5221	136	2.9485	97	2.7213	122	2.707
ATM Services	2.7239	134	2.4124	97	2.7583	120	2.6496
Online Banking	2.5954	131	1.6804	97	2.8824	119	2.438
Attitude of the Staff	3.0221	136	2.8247	97	3.4667	120	3.119
Customer Services	2.7647	136	2.7113	97	3.314	121	2.9379
Overdraft Privilege	2.6842	133	2.4167	96	2.8596	114	2.6676
Internal Environment	3.0657	137	3.0833	96	3.3833	120	3.1785
Sitting Arrangements	2.9185	135	3.0825	97	3.0847	118	3.02
Bank Charges	2.6765	136	2.8021	96	2.8571	119	2.7721
Mass Media Advertisement	2.8456	136	3.1458	96	2.9913	115	2.9769
External Appearance of Bank	2.8309	136	2.9897	97	3.322	118	3.0399
Easiness to Open an Account	3.0149	134	3.0515	97	3.2833	120	3.1168
Charges on Minimum Balance	2.4962	133	2.75	96	2.7712	118	2.6599
Knowledge about your Business	2.6567	134	2.5567	97	2.9231	117	2.7184
Use of Urdu Knowledge along with English in Bank Documentation	2.3359	131	1.567	97	2.6897	116	2.2384

Factor Analysis was used to identify the principle factors that customers perceive as important for their bank selection. Table 3 represents the results of factor analysis. All characteristics with factor loadings of 0.50 and above

were retained. Extraction method is based on principal component analysis. The authors have identified three major factors for the customer choice for each of the three types of banks, *i.e.* private, privatized and nationalized banks. For privatized banks the most important factors for bank selection are the bank's image, customer services and online banking facilities. Next to these are the factors related to parking facilities provided by the banks and the charges applied on maintaining minimum balance. For nationalized banks, bank's internal environment along with external image came out to be the most important factor. Overdraft facility and convenient opening of an account were also cited as important determinants of bank selection by the customers. For private banks better customer service, online banking and bank's know how on customer's business were considered to be important determinants.

TABLE 3

Factor Analysis

	Privatized Banks			Nationalized Banks			Private Banks			Total		
	F1	F2	F3	F1	F2	F3	F1	F2	F3	F1	F2	F3
Q1	0.65									0.68		
Q2	0.61									0.67		
Q3				0.74								
Q4	0.61									0.68		
Q5	0.74			0.70								
Q6		0.60										
Q7				0.66								0.64
Q8	0.70								–0.71			0.80
Q9				0.67								
Q10	0.71						0.68					
Q11					0.75							
Q12				0.80							0.71	
Q13											0.67	
Q14												
Q15				0.75							0.61	
Q16				0.77							0.74	
Q17						0.58						
Q18			0.64									
Q19								0.58				

TABLE 4

Multivariate Analysis

	Privatized Banks		Nationalized Banks		Private Banks		Total	
Dependent Variables	Slope	P value	Slope	P value	Slope	P value	Slope	P value
Age	1.39	0.12	0.76	0.00	0.43	0.34	0.25	0.00
Income level	0.95	0.83	0.30	0.42	0.56	0.09	0.18	0.01
Qualification	1.93	0.00	0.24	0.92	0.71	0.01	0.14	0.05
Employment	1.03	0.16	0.50	0.04	0.26	0.58	0.11	0.04
Type of account	0.88	0.42	0.59	0.00	0.58	0.01	0.12	0.02
Affiliation	1.06	0.13	0.20	0.83	0.41	0.39	0.08	0.65

Table 4 provides with results of multivariate analysis. These results will provide bankers in private, privatized and nationalized banks with insight into demographics of their customer base. This would help banks to position themselves in accordance with the needs of their respective clients. In depth review of this analysis reveals that employees employed in public sector are more likely to hold a bank account in nationalized banks. Similarly, higher qualification level makes bank customers more in favour of certain factors that private and privatized banks are likely to offer.

VI. SUMMARY AND CONCLUSIONS

Pakistani banks are under the process of moving into a more competitive financial atmosphere with a wider variety of financial services. This study has focused on determining the major factors in a bank selection by the customers. The findings of the study reveal that online banking facility, profit rate, banks internal environment and external appearance, convenience and accessibility are some of the important factors in a bank selection by the customers. Convenient location of bank branch and accessibility is also considered to be one of the important choice determinants. This is in accordance with the findings by Anderson *et al.* (1976). While bank service charges, use of Urdu language along with English in bank documentation, employee's attitude and sitting arrangements were found to be insignificant factors. However, bank employee attitude and behaviour was considered to be a significant factor in the West (The Digital Retail Banking Survey, 1992)

where customers looked for friendly attitude of employees working at their selected banks. However, it is worth mentioning that these bank selection determinants may vary from area to area due to difference in demographic characteristics of the population.

This study can help bankers to identify the major factors that their customers perceive as important in a bank selection and can provide a guide to the banks in designing their future strategies in a competitive economy.

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APPENDICES

Appendix I

Reliability Test

No. of Cases	No. of Items	Alpha
303	20	0.8201

Appendix II

One Way ANOVA

Factors Regression		Age		Income level		Qualification		Employment		Type of account	
		F Value	P Value	F Value	P Value	F Value	P Value	F Value	P Value	F Value	P Value
Privatized Banks	F1	4.13	0.00	0.97	0.43	1.62	0.17	3.36	0.02	2.16	0.09
	F2	0.61	0.66	1.96	0.10	1.29	0.27	1.05	0.37	2.13	0.10
	F3	0.32	0.87	1.00	0.41	0.87	0.49	0.68	0.59	2.05	0.11
Nationalized Banks	F1	0.60	0.61	0.99	0.39	0.69	0.60	1.99	0.12	2.60	0.08
	F2	3.11	0.03	1.40	0.25	0.75	0.56	0.03	0.99	2.66	0.07
	F3	0.20	0.86	0.27	0.85	0.82	0.52	3.06	0.32	0.75	0.44
Private Banks	F1	1.51	0.20	1.53	0.20	1.19	0.32	2.18	0.08	1.74	0.16
	F2	1.16	0.33	2.46	0.05	2.12	0.08	1.25	0.29	1.50	0.22
	F3	0.27	0.90	0.32	0.87	2.01	0.10	0.89	0.47	1.20	0.31
Total	F1	2.60	0.04	3.69	0.00	2.66	0.03	3.62	0.01	3.04	0.03
	F2	1.28	0.28	1.29	0.27	1.23	0.29	1.12	0.35	0.13	0.94
	F3	3.12	0.02	2.18	0.07	2.28	0.06	3.74	0.01	1.52	0.21

Pakistan Economic and Social Review
Volume 46, No. 2 (Winter 2008), pp. 161-200

DETERMINANTS OF ENROLLMENT IN PRIMARY EDUCATION
A Case Study of District Lahore

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Abstract. This study is an attempt to analyze the primary school enrollment status in the city of Lahore; and provide estimates regarding the impact of household's quantitative characteristics on enrollment decision. Primary data is collected from 3320 households where 2520 households belonged to the urban areas and 800 households belonged to the rural areas. Computations are carried out using both OLS and Logit models. The factors contributing positively and significantly to net enrollment of children at primary school level are found to be family size, dwelling ownership, expenses on education, literacy ratio and dependency ratio. It is also established that access to school is not a very significant factor towards inhibiting school attendance. Some of the results, with respect to the contribution of family size and dependency ratio to enrollment, are contradictory to the prior determined thoughts. Briefly, it can be concluded that despite the positive effect of some of the characteristics of individuals and households on gross as well as net enrollment, there are various more strong qualitative factors across the socio-economic spectrum that have differential impacts on school enrollment. Consequently, legislative measures need to be implemented to make primary education compulsory, in order to motivate all the children of respective age to complete primary school education.

I. INTRODUCTION

The contribution of education towards economic development has been well recognized. Despite the criticism of Chicago School Approach, which said that the productivity role of education was negligible,[1] a slow and steady, re-

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[1]Arrow (1973) and Spence (1973).

emergence of faith in human capital marked the 1980s. The developing countries and international agencies started focusing on human investment. The contribution of education to economic growth has been found to be positive and significant not only in monetary terms but also in physical terms, such as farm efficiency and labor productivity. Education has also been found to be a significant factor in the reduction of poverty, improvement in income distribution and various dimensions of social, demographic and political development.[2] Interestingly the relative significance of human capital is higher in developing countries, than in developed countries.[3]

Considering education to be a tool of paramount importance for mobilization of human resources for sustainable socio-economic growth, the government has been involved in formulating and implementing numerous policies to develop and improve the education system in order to make it compatible with requirements of the country.

ROLE OF GOVERNMENT OF PAKISTAN IN PROMOTING EDUCATION

At the time of its inception, the literacy rate of Pakistan was about 10 percent. At that time it inherited only 10,000 primary schools, but due to the implementation of various policy measures and reforms, the number of primary schools in the country have reached 164,970 (84,179 for males and 80,791 for females) in 2003-04.[4] The education system at school level in consonance with national, social, ideological and economic need of the country has been the prime assignment of every successive government. In 1992 National Education Policy was developed which recommended measures for the next 10 years. Prioritizing on the basis of significance, the education sector always got the goodwill of the policy makers and again in 2001 an Action Plan based on National Education Policy (1998-2010) was taken as an improved framework for developing specific targets and implementation strategies. The main focus of the reforms was to make primary schools more functional by providing the missing basic facilities and amenities to create an environment that was conducive to learning so that the children do not drop out on account of dysfunctional environment.

Punjab is a densely populated province with population of 73.621 million, which is 55.6 percent of the total population of the country. The

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[2]Talik (1989) and Talik (1994).

[3]Psacharopoulos (1984).

[4]Government of Pakistan, 2005.

population of the children belonging to the primary school going age group (05-09 years) is 11.226 million constituting 15.2 percent of the total population. Among these 51.8 percent are males while the remaining 48.2 percent are females.

Rural Population of Punjab accounts for 68.7 percent of the total population. The ratio of primary school going age children to total population is 15.8 percent in the rural areas. Such ratio in case of males is 16.0 percent and for females is 15.7 percent in rural areas of Punjab. In urban areas, the population of school going age children is relatively lower as compared to the rural areas. Children of the respective official age who attended school or completed primary education account for 49.9 percent overall. The proportion of such children (male & female) is higher in the urban region, which could be attributed to the school environment and other facilities available in urban localities. Consequently, children of school going age, who never attended school, account for 50.1 percent. In case of rural and urban areas the proportion of such children is 56.4 percent and 34.4 percent respectively, with a relatively higher percentage of females in both the areas.[5]

Recently the Government of Punjab has embarked upon an extensive reform program to enhance the quality of education in the province. In 2004 the World Bank extended US $100million, the first of a series of three IDA adjustment credits in support of the reform efforts. The effort of the reform's program by government was classified in three major components:

Public Finance Reforms: The government has increased public expenditure on pro-poor services with a focus on education, by increasing provincial public sector expenditures with conditional grants for district government.

Devolution Reforms: In line with the devolution initiative, increased decision authority on resource allocation has been passed on to district governments. The provincial government would develop a framework to determine the role of service providers and users and institutionalize performance-based budgeting.

Education Sector Reforms: To improve education sector performance the government is taking measures to strengthen education accountability, by establishing transparent criteria for teacher recruitment and development process. These reforms support the effective use of School Councils (SCs) to

[5]Government of Pakistan, 2001.

strengthen parents and children's participation in the process and to generate improvements in monitoring and evaluation of the education sector.

Certain primary school development pertaining to recent experience is briefly described below:

NGO Management of Public Schools (1998): The Charitable Trust Corporation for the Advancement, Rehabilitation and Education, adopted schools of Metropolitan Corporation, Lahore.

Early Childhood Education (1998-2010): The National Education Policy formally provided recognition to Kachi class at primary level, as a proxy for early childhood.

Universal Primary/Elementary Education: The objective of this program was Education For All (EFA). The targets determined under this development activity were to increase gross participation rate from 83 percent to 100 percent.

Universal Quality Primary Education (2004): The Project was initiated in six districts (Kasur, Shiekhupura, Sargodha, Mianwali, Rahim Yar Khan and Rajinpur) of Punjab to build the capacity of the District Government, District Education Team, Nazims, Union Councilors, NGOs; and strengthen partnership of 10700 Communities to support the process of achieving the UQPE in educationally effective, child friendly and gender sensitive schools.

A number of other development programs have been initiated with an extensively advertised mass literacy campaign carrying the slogan, "Our Dream — An Educated Punjab" to achieve the UN Millennium Development Goal (MGD) of Universal Primary Education by 2015.

EDUCATION IN THE CITY OF LAHORE

Lahore is the most economically and socially developed district of the Punjab province. The population of Lahore district is 6.319 million with 17.6 percent in rural and 82.4 percent in urban area. Children belonging to the School going age group comprised 13.5 percent of the total population in 1998. Around 34.6 percent of the children remained out of school. The ratio of children who never attended school is lower in the urban region of Lahore. Hence increasing primary school enrollment has been an extremely important goal for the Government of Punjab. Various strategic measures have been formulated and implemented by the government to encourage the children belonging to the school going age group to complete at least primary education cycle.

However, despite the implementation of all the policy measures and reforms for universalizing access and promoting equality and quality at primary school level, the targets of education for all could not be achieved even in the most economically and socially developed district (Lahore) of the Punjab province. There is thus a need to study the enrollment to identify the causes, and policy gap leading towards slow growth rate in enrollment in Lahore District.

II. OBJECTIVES OF THE STUDY

The study has been designed to make two contributions to the literature on primary school enrollment. Firstly, an assessment of the impact of policy measures adopted at public level to increase enrollment and keep the students continue school till completion up to primary level, is carried out. This would reflect where the city stands presently in terms of gross as well as net enrollment at primary level. Secondly, the study provides estimates regarding the impact of household's quantitative characteristics on enrollment decision. Though internal efficiency of the schools and the functioning pattern of the education system also have direct bearings on enrollment of children to primary school, this aspect could not be considered due to data constraint.

Considering the sequence of the theoretical concept of research process, the literature is reviewed in section III. A description of the sampling procedure and methodology is presented in section IV, and results of the study are elaborated in section V. To assess contribution of the various factors in enrollment up to primary education level, econometric models are applied. The results of these models have been discussed in section VI. Conclusions and proposed suggestions are given in section VII.

III. REVIEW OF LITERATURE

An increase in primary enrollment has always been a priority for every successive government. It has been a debatable issue in every era and relevant measures have been proposed and implemented, during every regime. It is a major issue concerning most of the developing nations. Some of the available literature dealing with this issue has been presented here.

Handa (1999) points out that raising primary school enrollment is easier said than done. The relative importance of school supply versus households demand factors remains controversial, with serious implication for education policy. For the study he used household's characteristics data and information on school infrastructure. The impact of school characteristics on household's schooling decision was measured via a reduced form demand

equation for children's schooling. The independent variables of this equation included characteristics of the individual (age), household characteristics that capture access to resources (age and sex of the head, literacy status of head etc.) and the vector of school infrastructural characteristics.

Marginal probabilities were derived by using probit estimation. The sample included children of primary school age (7 to 11years old) and the dependent variable accounted for whether the child was currently enrolled in school at the time of the survey. The results indicate that the education of adult household members seems most important in stimulating child enrollment. Moreover the dimensions of school quality, access or availability, and efficiency, all work to stimulate enrollment, although the effects are small and differ some what by gender.

Aakvik *et al.* (2005) have analyzed the effect of aspects of family background such as family income and parental education on the educational attainment of persons born from 1967 to 1972 in Norway. Standard OLS regression was applied to compute study estimates, where the dependant variable accounted for the level of education of the individual, and the independent variables included family income, family education and mother's labor supply.

The individual and household characteristics are clearly very important determinants of school enrollment, particularly for girls. A child's probability of enrollments is increasing in parental education, with mother's education being relatively important in encouraging girls' enrollment. The estimates also confirm the importance of some village contextual effects.

IV. SAMPLING PROCEDURE AND METHODOLOGY

Sampling procedure entails the process involved in order to ensure effective representation of the universe concerned areas, and determination of the sample size. Considering the scope and objective of the study, mainly primary data was needed to derive the concerned conclusions. The data used in this study is primarily collected from the study titled, "District-Based Multiple Indicators Cluster Survey (2003-04)". The study was conducted by Planning and Development department in collaboration with the Federal Bureau of Statistics and United Nation Children Funds (UNICEF). For that study the multistage cluster sample was done by the Federal Bureau of Statistics. To ensure statistical validity, a reasonably large sample size was selected for each district. Since the ensuing study was confined to the district Lahore, the sampling procedure adopted was that of MICs study. The Lahore

District was classified in to seven towns. Each town constitutes a separate stratum which was further sub-stratified according to low, middle and high income groups, based on the information collected with respect to each enumeration block at the time of demarcation/ updating of urban areas sampling frame.

The Lahore district was classified into the following seven towns for sampling purpose:

- Gunj Bakhsh Town
- Shalimar Town
- Allama Iqbal Town
- Aziz Bhatti Town
- Nishter Town
- Ravi Town
- Cantt Area

Rural area of the district was also included in each respective town considering a separate stratum for data collection purpose.

TABLE 1

Sample Size of the Households for the Study

Towns	Total		Urban Area		Rural Area	
	PSUs	SSUs	PSUs	SSUs	PSUs	SSUs
Gunj Bakhsh Town	46	552	46	552	–	–
Shalimar Town	37	484	27	324	10	160
Allama Iqbal Town	42	564	27	324	15	240
Aziz Bhatti Town	28	380	17	204	11	176
Nishter Town	39	524	25	300	14	224
Ravi Town	44	528	44	528	–	–
Cantt Area	24	288	24	288	–	–
Total	260	3320	210	2520	50	800

All of the above seven towns are classified in to Primary sampling units (PSUs) and from them 260 primary sample units were considered to be the sample size of the study. Based on actual listing of each sample PSU, 16 and

12 households were selected from the rural and urban sample area respectively, adopting systematic sampling technique with random start. Consequently 260 PSUs (210 from Urban Area and 50 from Rural Area) were the sample size, whereas the secondary sampling units (SSUs) comprised 3,320 households among which 2,520 households were from the urban area and 800 households from rural area. The details regarding the sample size of the study are given in the Table 1.

METHODOLOGY

To elaborate the answers of certain questions relating to study objectives and test certain hypotheses, estimates derived using mean and percentage are presented in a cross tabulation form. Moreover, χ^2 test has been used to assess the proportionate variation's effect on the characteristics of study interest emerged due to sample size of a specific segment separated under data processing pattern. Furthermore, in order to isolate the contribution of the factors determining the participation rate at primary level of education, econometric models have been applied.

As described in the literature review, earlier studies have mainly used the logit or probit functions in order to assess the determinants of participation rate. The probability of applying these models was optioned on the basis of participation rate for which the mean (one if child is enrolled in school) ranged from 0.49 to 0.70. This could lead towards variation in the dependent dummy. In the study the net enrollment mean was 0.677 and gross enrollment mean rate was 0.987. Since the nature of available data and the relevancy of the variables determine the econometric properties of the model, the OLS method would be a relatively better measure to assess the contribution of the determinants having bearings on school attendance at primary school level. However, an endeavor has been made to assess the contribution of the considered variables to enrollment by applying logit function as well.

The linear OLS model is applied for the study with specified regression equation as under:

$$Y = \beta_1 + \beta_2 X + \beta_3 X_1 + \ldots . \beta_n X_n + \xi \quad (1)$$

The generalized form of the considered equation was as under:

$$P = \beta_1 + \beta_2 Fs + \beta_3 Py + \beta_4 He + \beta_5 Dw + \beta_6 Dr + \beta_7 Sac + \beta_8 Lit + \beta_9 Pc + \beta_{10} Ee + \xi \quad (2)$$

Where

P = Proportion of enrolled children at primary level of education with respect to population of school going age (5-9 years) children.

Fs = Family Size

Py = Per Capita Income of the Households

He = Years of School of the Head of the Household

Dw = Dwelling Ownership

Dr = Ratio of Dependent to Working Members (Dependency Ratio)

Sac = Access to School (0 in the Concerned Area Otherwise Distance in Km.

Lit = Literacy Ratio

Pc = Per Capita Consumption

Ee = Education Expenses of the Households.

ξ = error term

For logit function the dependent variable is replaced by the dummy variable such as:

P = 1 (Households with even one of the children enrolled at primary level of education)

P = 0 (Households with none of the children enrolled at primary level of education)

The equation was as under:

$$P = \beta_1 + \beta_2 Fs + \beta_3 Py + \beta_4 He + \beta_5 Dw + \beta_6 Dr + \beta_7 Sac + \beta_8 Lit + \beta_9 Pc + \beta_{10} Ee + \xi \quad (3)$$

V. RESULTS

The principal research question involves the determination of quantitative factors contributing positively to enrollment of the school going age children (5-9 years) from initial stage to primary level of education. In order to establish the direction leading towards the answer of the question, it is essential to assess the characteristics of the households, which have direct bearings on education of children, gross and net enrollment pattern at various stages of education up to primary level.

CHARACTERISTICS OF THE HOUSEHOLDS

The characteristics, generally accepted having direct bearings on enrollment pattern, are dwelling ownership, family size and its composition, literacy ratio, dependency ratio, and school going age children.

1. Dwelling Ownership Pattern

Dwelling ownership pattern on one hand is an indicator of the living standard of the household, while on the other hand it reflects the income share left for food and nonfood consumption expenditure. The data presented in Table 2 gives the pattern of ownership of houses in Lahore. It is observed that 78.6 percent of the households in Lahore district are owners, while the remaining 21.4 percent of the households are found to be accommodated in self rented houses (12.5 percent); government subsidized rented houses (4.20 percent), and rent free houses (4.7 percent). The proportion of the households who occupied rented houses was the highest in cantonment area. Rural area of Lahore District has been confined to Shalimar, Allama Iqbal, Aziz Bhatti and Nishter towns. In certain rural areas more than 90 percent of the households are reported to have their own houses. Generally, there is no concept of renting out houses at village level because people do not own additional houses. However, since the rural areas are adjacent to the urban localities in rural Lahore, a small proportion is occupying rented houses. Consequently 3.5 percent of the households are living in rented houses and 4.1 percent are living in rent free houses.

TABLE 2

Dwelling Ownership Pattern by Towns in Lahore District

Towns	Own	Own (mortgaged/ pledged)	Rented	Govt. (subsidized)	Rent Free
Gunj Bakhsh	70.5	0.9	15.2	6.1	7.2
Shalimar	84.7	–	10.1	2.1	3.1
Allama Iqbal	77.4	0.4	10.8	8.4	3.0
Aziz Bhatti	85.3	–	6.8	1.8	6.1
Nishter	85.8	–	11.3	1.0	1.9
Ravi	73.4	1.3	16.3	2.3	6.7
Cantt area	67.9	0.7	17.1	8.7	5.6
Lahore	78.1	0.5	12.5	4.2	4.7

2. Family Size and its Composition

Family size and work force within the household are essential determinants of the income and consumption expenditure. These determinants ultimately help in analyzing the percentage of the sharing expenses of the family with respect to different social and economic activities.

The data presented in Table 3 reveal that 6.3 members constitute the average family size at district level. This figure ranges from 6.1 to 6.8 members at the town level. The family is a composite of males (51.8 percent) and females (48.2percent), while the children below the age of 9 account for 22.3 percent (10.6 percent below 5 years and 11.7 percent in the bracket of 5 to 9 years) of the total population. The proportion of males is higher relative to females at the district as well as the town level. Children in both the categories, *i.e.* below 5 years and 5 to 9 years are the lowest proportion of the population in case of Allama Iqbal town. This generally reveals that the average family size comprises 4 children.

Dependency ratio is the ratio of the non-working age population to the working age population. Since countries define working age population differently, UN definition of working age, which is 15 to 64 years, is considered to compute dependency ratio. The formula applied to estimate dependency ratio is as under:

$$\text{Dependency Ratio} = \frac{\text{Population under the age of 15 years and over the age of 65 years}}{\text{Population ranging between the ages of 15 to 64 years}}$$

The dependency ratio is estimated to be 0.636 at the district level. Interestingly, one might highlight the possibility that the dependent group is partially involved in income generating activities in order to earn living due less ratio of working force within the household. This could essentially form a child labor group. This group therefore, remains out of school and is unable to complete the primary education cycle which causes an increase in the drop out rate. There is, thus, a need to implement the population controlling measures effectively to decrease the dependency ratio and ultimately divert the parent's attention towards relatively better nourishment and education of the children (Table 3).

TABLE 3

Family Profile of the Sample Households by Towns in District Lahore

Towns	Average Family Size	Ratio of Males/ Females	Children (< 5 Years)		Children (5-9 Years)		D Ratio %
			Total	Male/ Female	Total	Male/ Female	
Gunj Bakhsh	6.1	51.1 (48.9)	10.6	51.0 (49.0)	9.9	53.2 (46.2)	0.567
Shalimar	6.8	51.5 (48.5)	12.0	50.0 (50.0)	12.6	54.8 (45.2)	0.725
Allama Iqbal	6.1	52.1 (47.9)	8.8	50.3 (49.7)	10.7	50.7 (49.3)	0.593
Aziz Bhatti	6.3	51.9 (48.1)	11.1	47.6 (52.4)	13.2	46.2 (53.8)	0.688
Nishter	6.4	52.8 (47.2)	11.6	52.5 (47.5)	12.3	54.6 (45.4)	0.673
Ravi	6.3	51.7 (48.3)	10.1	47.1 (52.9)	11.6	51.4 (48.6)	0.609
Cantt area	6.3	51.0 (49.0)	10.8	51.8 (48.2)	11.7	53.5 (46.5)	0.616
Lahore	6.3	51.8 (48.2)	10.7	50.1 (49.9)	11.6	52.2 (47.8)	0.636

3. Literacy Ratio of the Households

Literacy ratio is one of the indicators for human resource development. Literacy helps to increase the comprehension of an individual specifically towards learning the working skills. According to the most recent definition (MOE, 2001) a literate person is one who can read and write in any language, and can also add and subtract. In this study, however, a person who can read or write in any language is considered literate. Literacy ratio is estimated by taking into account the lowest age end, *i.e.* 10 years and above and 15 years and above. The estimated literacy ratio for 10 years and above was 71.0 percent with 74.9 percent for males and 66.8 percent for females. Literacy ratio was higher in Lahore district compared to the average literacy ratio of Punjab province (47% for +10 years and 52% for +15 years).

TABLE 4

Literacy Ratio of the Households by Towns in District Lahore

Towns	10 Years and above			15 Years and above		
	Total	Male	Female	Total	Male	Female
Gunj Bakhsh	79.6	81.5	77.6	75.8	79.4	72.1
Shalimar	63.5	65.9	61.0	59.8	63.5	55.7
Allama Iqbal	74.1	78.0	69.9	69.0	73.6	63.8
Aziz Bhatti	55.1	58.7	51.1	53.5	58.1	48.2
Nishter	69.7	61.6	76.7	62.7	71.6	52.5
Ravi	70.7	75.3	65.7	68.8	74.5	62.5
Cantt area	73.9	78.1	69.6	71.9	77.0	66.8
Lahore	71.0	74.9	66.8	67.2	72.4	61.6

ACCESS TO PRIMARY EDUCATION INSTITUTIONS

Since the proximity of educational institutions generally has a positive correlation with enrollment, expanding access to primary schooling has always been a prime concern for the government of Punjab. Various strategic measures, mentioned above have been adopted by the government in order to bring the children to school. Private sector has also been involved in an attempt to increase enrollment by establishing educational institutions. A majority (95.5 percent) of the households reported having access to the educational institutions because of existence of such institutions in the area. Such proportion ranged from 92.2 percent to 99.7 percent in case of various towns. Around 85 percent identified location of school at a distance of 1.0 Km. This situation reflected that access to the educational institutions is available in all the respective areas and hence, accessibility is not a core problem with respect to sending the children to school (Table 5).

TABLE 5

Accessibility Status of Primary Schools by Towns in the District Lahore (Percent)

Towns	Existence of School in the Area	Distance of School from Respective Area				
		Total	1 Km	2 Km	3 Km	Do not Know
Gunj Bakhsh	95.8	4.2	89.5	10.5	–	–
Shalimar	95.9	4.1	94.4	5.6	–	–
Allama Iqbal	93.9	6.1	70.4	22.2	7.4	–
Aziz Bhatti	99.7	0.3	–	100.0	–	–
Nishter	92.2	7.8	81.8	9.1	6.1	3.0
Ravi	97.9	2.1	100.0	–	–	–
Cantt Area	93.0	7.0	94.4	–	5.6	–
Lahore	95.5	4.5	85.0	10.2	3.9	0.8

ENROLLMENT PATTERN OF CHILDREN AT PRIMARY LEVEL

Various policies and reforms aiming to increase primary enrollment have been implemented overtime. To assess the impact of all these strategic measures net and gross enrollment of the children at primary school level are estimated.

Net Enrollment: Net enrollment ratio is the percentage of enrolled students of the official age group (5-9 years) at a particular level of education, with respect to the population of the same age group.

The formula is as under:

$$NE_{pt} = \frac{EP_t}{TP_t} \tag{4}$$

Where:

NE_{pt} = Net Enrollment at Primary level of education in Year t.

EP_t = Enrolled Students of Age group 5 to 9 at Primary level of education in year t.

TP_t = Total Population of age group 5 to 9 in year t.

Gross Enrollment: refers to the ratio between the total enrollment at a particular level of education regardless of age, and the population corresponding to the official age (5 to 9 years) at that level. The formula is as under:

$$GRE_{pt} = \frac{TE_{pt}}{TP_t} \tag{5}$$

Where:

GRE_{pt} = Gross Enrollment at Primary Level of education in year t.

TE_{pt} = Total Enrollment at Primary Level of education in Year t (Regardless of Age).

TP_t = Total Population of Corresponding Official Age group (5-9 years) in period t.

1. Net Enrollment

Net enrollment is a very precise measure since it only takes into account the students of the official age group, for the concerned level of education. It is a relatively better indicator in order to assess the inclination of parents towards educating their children, at an early age. Early schooling practice creates the comprehension ability in children, and they can be better members of the society as they move on. Irrelevancy of the age factor to a specific stage of education may cause complexities and have an inverse effect on the learning process of the students as they may indulge in certain undesirable societal concerns.

Certain variations in net enrollment were observed in different towns. The highest enrollment was found to be for the Cantt area (73.4 percent), while Aziz Bhatti town ranked at the bottom in terms of primary school enrollment. This gap can be attributed to the socio- economic condition of the residents of the respective areas. Preference of the parents to educate male children is obvious from the present enrollment scenario in all the towns except that of Ravi and Nishter. The demographic profile and the conceptual psychology of the rural population with respect to future of the educated youth proved to be a major factor accounting for the existing gap in enrollment between the rural and urban areas. There was a difference of 15.0 percent points in the net enrollment of rural and urban areas. Apparently all the development measures implemented by the public sector to increase enrollment did not prove to be much successful towards changing the behavioral attitude of the rural population. Moreover, despite the fact that the

private sector was quite dominating in urban as well as rural areas, a nominal improvement was observed in net enrollment (Table 6).[6] However, at a national level net enrollment rate reported an increase of 10 percentage points.[7] In the province of Punjab province net enrollment was registered to the extent to 51.0 percent in 2002-03.[8]

TABLE 6

Net Enrollment at Primary Level by Towns in District Lahore (Percent)

Town	Urban			Rural			Overall		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Gunj Bakhsh	70.4	71.6	68.9	–	–	–	70.4	71.6	68.9
Shalimar	73.7	78.6	68.1	61.5	59.5	63.4	69.1	71.5	66.5
Allama Iqbal	75.2	74.3	76.1	62.7	67.3	57.6	69.0	70.6	67.3
Aziz Bhatti	66.9	68.5	65.3	42.9	42.4	43.4	52.8	53.5	52.1
Nishter	76.0	70.1	81.8	59.6	61.9	56.5	66.5	65.1	68.2
Ravi	72.4	71.1	73.3	–	–	–	72.4	71.1	73.7
Cantt area	73.4	80.3	65.8	–	–	–	73.4	80.3	65.8
Lahore	72.6	73.6	71.4	56.7	58.6	54.4	67.7	68.8	66.2

2. Gross Enrollment

In case of gross enrollment, the results depict a very encouraging situation as the efforts of the public and private sectors proved to be effective in coming closer to the target of 100.0 percent participation rate. The rural areas were also closer to the level of the urban areas. Rural areas of Shalimar and Aziz Bhatti towns were found to be ahead of all others with 100 percent gross enrollment rate for males as well as females (Table 7).

This result therefore indicates that the achievement of targeted participation rate could be made possible by including the kachi class, and ignoring the upper and lower level of the official age for the primary education level. Under the prevalent education system a student has to undergo various stages such as nursery, prep and then class one. This practice makes a six years old child to be student of class-1. In the case of well reputed private schools, admission procedure starts from the registration of a three years old child, which is not considered the school age. Therefore, under these procedural limitations the net enrollment rate remained below

[6]67.7 percent in 2002-03 from 65.4 percent in 1998.

[7]42.0 percent in 2001-02 to 52.0 percent in 2004-05.

[8]MICS (2003-04).

the planned targets. Consequently, there is a dire need to review the educational system at the initial stage of learning considering the relevant age of the children and existing stages of the education up to primary level. This would even help avoid financial exploitation of poor families.

TABLE 7

Gross Enrollment at Primary Level by Towns in Lahore District (Percent)

Towns	Urban			Rural			Overall		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Gunj Bakhsh	97.7	97.2	98.4	–	–	–	97.7	97.2	98.4
Shalimar	98.7	99.4	97.8	100.0	100.0	100.0	99.2	99.6	98.6
Allama Iqbal	98.6	99.0	98.2	98.1	97.3	99.0	98.3	98.1	98.6
Aziz Bhatti	99.3	98.6	100.0	100.0	100.0	100.0	99.7	99.4	100.0
Nishter	96.9	96.9	97.0	98.9	98.7	99.1	98.1	98.0	98.1
Ravi	99.1	99.5	98.6	–	–	–	99.1	99.5	98.6
Cantt area	99.6	99.2	100.0	–	–	–	99.6	99.2	100.0
Lahore	98.5	98.6	98.5	99.2	98.9	99.5	98.7	98.7	98.8

3. Enrollment by Family Size

An Inverse association is found between family size and enrollment pattern. As the size of the family increases, consumption expenditure increases, leaving a very little share of income for education, health and other social activities. The dependency ratio has an important role to play. More the dependency ratio, less would be the saving of the family available for such activities. The cross tabulation non-symmetrical results indicate that family size does not have a significant impact on the enrollment of children at primary school stage, both at the district and town level (Table 8). However, in certain towns, gender disparity still exists (Annexure 1).

To capture the variations in proportions on the basis of population of respective group of family size, Chi-square test is applied at district and town level. The hypothesis to be tested is whether the family size and enrollment are independent of each other.

Estimates reveal that the hypothesis is not rejected, since the P-value is greater than 0.10 (estimated P-value 0.439) with $\chi^2 = 3.77$. The derived results therefore indicate that the family size and enrollment rate are independent of each other (Annexure 2).

At town level, however, the results are somewhat different, as there is interdependency between enrollment and family size in all the towns except Ravi and Nishter. The situation reflected that some other associated socio-economic factors may be responsible towards leading both the variables to independency.

TABLE 8

Net Enrollment at Primary Level by Family Size by Towns in Lahore District (Percent)

Towns	Family Size (Nos.)				
	0-3	4-6	7-9	10-11	12 & above
Gunj Bakhsh	83.3	79.0	66.7	68.8	55.9
Shalimar	100.0	73.8	65.9	67.2	67.6
Allama Iqbal	71.4	73.8	70.0	57.9	53.1
Aziz Bhatti	25.0	53.6	54.9	41.7	54.8
Nishter	57.1	70.5	68.0	59.5	58.3
Ravi	71.4	77.1	70.7	65.8	65.7
Cantt area	66.7	73.7	75.2	61.5	78.3
Lahore	65.8	72.1	67.1	60.7	61.4

Gross Enrollment by Family Size

The hypothesis underlying the assessment of gross enrollment by family size postulates that the larger the family size, the less would be the relative gross enrollment at primary education level. Simple cross tabulation measures indicate that the gross enrollment and family size are independent of each other and there is no relationship between the family size and such enrollment. Slight fluctuations are obvious in proportion of the gross enrollment by family size groups, which ranged from 98.2 percent to 100 percent at district level for various family size groups. A similar situation is found in all the towns of the district (Table 9). However, there is no discrepancy in the case of males and females (Annexure 3).

Further, χ^2 test is used to analyze the association between proportions of gross enrollment by family size groups. In case of overall district level, the p-value is greater than 0.10 and the hypothesis that family size and gross enrollment are independent is not rejected. Consequently, there is no

relationship between these two factors. However in Gunj Bakhsh, Shalimar and Allama Iqbal towns the estimated χ^2 value reflected dependency or relationship between family size and gross enrollment, which might be attributable to family labor force, income and living status of the households in these areas (Annexure 4).

Hence, it can be concluded that in certain cases family size is not the problem, but dependency ratio and income level associated with some unobservable variables determine the gross enrollment at primary school level.

TABLE 9

Gross Enrollment at Primary Level by Family Size by Towns in Lahore District (Percent)

Towns	Family Size (Nos.)				
	0-3	4-6	7-9	9-11	12 & above
Gunj Bakhsh	100.0	98.7	97.2	100.0	94.9
Shalimar	100.0	97.6	100.0	100.0	100.0
Allama Iqbal	100.0	97.9	99.0	94.7	100.0
Aziz Bhatti	100.0	99.2	100.0	100.0	100.0
Nishter	100.0	98.6	97.5	97.3	100.0
Ravi	100.0	98.8	98.9	100.0	100.0
Cantt Area	100.0	98.7	100.0	100.0	100.0
Lahore	100.0	98.5	98.9	98.7	98.9

4. Enrollment by Income Groups

Income is one of the major determinants of enrollment at primary school level as the resourceful households are in a better position to provide education to their children. In this study we account for the per capita income of households to create symmetry in the analysis pattern.

Net Enrollment by Income Groups

The estimates depict fluctuations in proportion of the enrolled students in case of various income groups. However a non-symmetrical upward trend develops a positive relationship between income groups and net enrollment at district as well as town level. Hence, there is an association between the

level of income and the enrollment at district as well as at town level (Table 10). A decrease in gender disparity was observed, as the proportion of the enrolled female children generally increased with the increase in per capita income and was relatively more than male children (Annexure 5).

TABLE 10

Net Enrollment at Primary Level by Per Capita Income Groups by Towns in Lahore District (Percent)

Towns	Per Capita Income Group (Rs./Month)				
	0-1000	1000-2000	2000-4000	4000-6000	6000 & above
Gunj Bakhsh	61.7	78.5	74.6	70.6	76.2
Shalimar	63.8	79.2	73.1	100.0	100.0
Allama Iqbal	62.2	70.7	87.0	88.9	84.6
Aziz Bhatti	49.6	54.2	64.7	77.8	-
Nishter	63.1	70.1	77.4	85.7	90.9
Ravi	67.9	77.4	78.0	66.7	75.0
Cantt Area	69.7	79.7	83.3	100.0	72.2
Lahore	62.3	73.7	77.0	80.0	79.1

The χ^2 test has been used to eliminate the effect of variations in sample size falling in different income groups. The estimates are quite supportive of the prior concept which maintained that income has a positive impact on enrollment. Our results show that there is an increase in the net enrollment with an increase in income at district as well as town level (Annexure 6). Hence it can be concluded that considering other factors, it is important to increase per capita income at household level to increase enrollment and keep the enrolled children in school premises to complete the primary education cycle.

Gross Enrollment by Income Groups

By analyzing the impact of income on gross enrollment, we are essentially testing the hypothesis which states that "the higher the income of the households, the higher would be the gross enrollment at primary education level". It is felt that child labor is prevalent in poor households as the children are able to help their poor parents earn bread and butter. The data presented in the Table 11 reflects non-symmetrical results with slight variations among considered income groups and the gross enrollment at

primary education level. Thus independency between the two factors is obvious not only on the district level but also at the town level. Similar results as were in case of overall children were observed by gender (Annexure 7).

To confirm the results given in cross–tabulation, χ^2-test is applied and the estimated results are found to be supporting the independency of the considered variables at district level as well as at town level, except that of Shalimar and Ravi towns (Annexure 8).

Briefly it can be concluded that the households are well aware of the significance of the education specifically up to primary level and are sending their children to schools irrespective to their family size and earned income.

TABLE 11

Gross Enrollment at Primary Level by Per Capita Income Groups by Towns in Lahore District (Percent)

Towns	Per Capita Income Group (Rs./Month)				
	0-1000	1000-2000	2000-4000	4000-6000	6000 & above
Gunj Bakhsh	99.4	96.2	96.8	100.0	95.2
Shalimar	100.0	98.6	92.3	100.0	–
Allama Iqbal	97.8	99.1	98.1	100.0	100.0
Aziz Bhatti	99.6	100.0	100.0	100.0	–
Nishter	98.1	97.9	96.8	100.0	100.0
Ravi	99.6	98.6	100.0	66.7	100.0
Cantt area	99.3	100.0	100.0	100.0	100.0
Lahore	99.1	98.5	97.8	98.0	98.5

5. Enrollment by Dependency Ratio

As described in section 5.1.2 the dependency ratio is estimated to be 0.636 at district level, where it ranges from 0.567 to 0.725 for various towns. Consequently, possibilities can be explored where the dependent group is partially involved in some income generating activities in order to earn a living.

Net Enrollment by Dependency Ratio

The underlying hypothesis states that higher the dependency ratio, lesser will be the enrollment because of excessive consumption expenses on living. The

estimates presented in Table 12 indicate fluctuations in proportionate enrollment at every interval of the dependency ratio of sample households. This situation emerged by gender at district as well as town level, where the difference is only of magnitude of fluctuations (Annexure 9). The conclusion, therefore, suggests that the number of dependents and the working force at household have no bearing on sending the children to school. Hence, there might be some other qualitative and quantitative factors at household level or school environment resulting in the absence of children from school.

Chi-square test has also been applied to minutely assess the association of the net enrollment and the dependency ratio. There was a discrepancy in estimated results at town level with the dependency of both the considered variables in certain towns; while in others there was no association between the dependency ratio and net enrollment. However at district level, the dependency ratio and net enrollment were independent of each other, as the hypothesis was not rejected (Annexure 10).

This leads to the conclusion that enrollment is essentially a multi-dimensional phenomenon and association of different relevant factors relating to the household as well as school level at the same time does not have a positive or negative impact.

TABLE 12

Net Enrollment at Primary Level by Dependency Ratio
by Towns in Lahore District

Towns	Dependency Ratios (Percent)				
	0-0.50	0.50-0.75	0.75-1.0	1.0-2.0	2.0 & above
Gunj Bakhsh	67.3	65.8	73.3	71.8	66.7
Shalimar	65.0	78.0	71.4	61.7	68.6
Allama Iqbal	70.2	65.8	62.5	71.2	71.8
Aziz Bhatti	68.8	65.7	50.9	50.0	51.0
Nishter	73.3	69.8	70.7	68.0	55.6
Ravi	71.7	75.0	63.7	77.6	70.3
Cantt. Area	75.0	78.6	54.5	77.4	70.5
Lahore	70.3	71.2	65.6	68.6	64.3

Gross Enrollment by Dependency Ratio

The Gross enrollment of children at primary level of education is assessed in order to test the hypothesis that more the dependency ratio, lesser would be the gross enrollment of children at primary level of education. The estimated results show that the dependency ratio is not a significant factor with respect to gross enrollment, since at all levels of dependency ratio the gross enrollment was about the same with mild fluctuations not only at district level but also at town level. This leads towards the conclusion that other social factors winning the consent of the parents with respect to children enrollment decision at primary level are stronger than that of the factors affecting livings of the households (Table 13)**.** By gender the situation is encouraging, as the results indicated equalization in behavior of the households towards enrollment at school. However, the dependency ratio proved insignificant in this context as well (Annexure 11). These results therefore negate the gender disparity issue, and the traditional concept of keeping the female children out of school.

Chi-square test is again used to examine the association between the two variables considering the sample size under the range of dependency ratio's intervals. These estimates are presented in Annexure 12. Generally the dependency ratio and gross enrollment are independent of each other which indicated that the family size or the earners in the households are not a problem for the gross enrollment.

TABLE 13

Gross Enrollment at Primary level by Dependency Ratio
by Towns in Lahore District

Towns	Dependency Ratios (Percent)				
	0-0.50	0.50-0.75	0.75-1.0	1.0-2.0	2.0 & above
Gunj Bakhsh	98.2	97.4	96.7	98.2	97.8
Shalimar	100.0	100.0	100.0	98.1	100.0
Allama Iqbal	100.0	100.0	96.6	97.7	99.1
Aziz Bhatti	100.0	100.0	100.0	99.3	100.0
Nishter	97.8	96.2	96.0	99.0	99.0
Ravi	95.0	100.0	98.9	100.0	100.0
Cantt. Area	100.0	100.0	100.0	98.9	100.0
Lahore	98.3	98.9	98.0	98.7	99.5

Due to the fact that the district of Lahore is socio-economically ahead of all the other districts in Punjab, specific measures adopted by the public sector and provision of improved school infrastructure under public administration to expand education up to primary level resulted in awareness and significance of education at household level. This led to the fact that all the expected hypotheses are not rejected and some of the responsible factors proved to be abortive in this regard.

6. Enrollment by Household Head's Education

The decision of primary enrollment of children is contingent upon the level of awareness and experience of the head of the household. An educated head determines the option for their children regarding their enrollment at school by comparing the costs and benefits of education. Though it is difficult to value education specifically at the initial stage, it increases societal awareness and helps in acquiring certain skills which enables an individual to become a productive member of the society.

TABLE 14

Net Enrollment by Education of the Head of Households by Towns in District Lahore

Towns	Education of the Head of the Households (Percent)					
	Illiterate	Primary	Middle	Matric	Above Matric	Others
Gunj Bakhsh	58.8	64.3	60.0	78.6	80.2	73.9
Shalimar	63.0	63.4	71.1	80.8	80.0	83.3
Allama Iqbal	59.2	69.1	62.9	76.5	83.6	94.4
Aziz Bhatti	45.0	41.9	67.6	70.5	64.4	100.0
Nishter	57.1	81.1	65.1	73.4	74.0	83.3
Ravi	60.3	78.4	69.8	80.2	81.8	88.9
Cantt area	67.6	75.0	65.2	75.4	80.0	100.0
Lahore	57.9	69.0	66.4	77.1	78.4	84.8

The estimates presented in Table 14 reveal that when a household is headed by an illiterate person, there is a lower probability that children of age of 5-9 would be enrolled in primary school, both at district and town level. Though a non symmetrical relation was obvious between the education level of the household head and the net enrollment of children at primary school education, the head of the households with matric and above matric level of education are found to be superior in terms of net enrollment of children at primary level. Similar results are observed in the case of enrollment by gender (Annexure 13).

To capture the ambiguities of the sample size of each group constituted on the basis of illiterate and educational status of literate, χ^2 test is applied. Since the P-value was less than 0.01 at district level, the hypothesis that education of the head of the household was independent to net enrollment of the children at primary level was rejected (Annexure 14). Thus, the education of the head of the household has a positive and significant relationship with net enrollment. However, the difference in other associated variables result in contradictory findings in case of Shalimar, Allama Iqbal and Ravi towns, where failing to reject the hypothesis indicates independency of the two variables. Despite some contradictory results, this ultimately leads towards the point that education of the head of the households might prove an effective tool to increase net enrollment at primary level. Hence, there is a need for effective implementation of adult education scheme to create awareness in parents with respect to benefits of initial stage of education of children.

7. Gross Enrollment by Household Head's Education

The developed hypothesis maintains that there is a positive relationship between education of the head of the household and gross enrollment of the children. The estimates presented in Table 15 represent that gross enrollment up to primary level is generally independent of the educational status, at district and town level. Similar situation was registered and fluctuations were observed within educational status of the literate head of the households and gross enrollment of the children at primary level. Consequently, no specific or symmetrical trend appeared in this context. Moreover, the proportion of the children enrolled at primary school level was so high, that it was difficult to separate the contribution of the head's educational status to gross enrollment. Nothing was obviously discriminating the results computed by gender in this context with no association between head of the household's education and the gross enrollment of the children at primary school level (Annexure 15).

TABLE 15

Gross Enrollment by Education of the Head of Households by Towns in District Lahore

Towns	Education of the Head of the Households (Percent)					
	Illiterate	Primary	Middle	Matric	Above Matric	Others
Gunj Bakhsh	97.4	100.0	100.0	98.0	97.9	91.3
Shalimar	99.6	100.0	100.0	97.4	98.3	100.0
Allama Iqbal	98.9	98.2	97.1	100.0	95.5	100.0
Aziz Bhatti	100.0	100.0	97.3	100.0	100.0	100.0
Nishter	96.5	100.0	100.0	98.9	98.0	100.0
Ravi	99.3	98.6	100.0	99.1	97.7	100.0
Cantt area	98.6	100.0	100.0	100.0	100.0	100.0
Lahore	98.7	99.4	99.3	98.9	98.1	97.0

Chi-Square test has been applied to check the association of education of the head of the household and gross enrollment. At district level there was no association between the two variables with estimated P-value 0.7961, *i.e.* greater than 0.01. By towns such situation was observed in case of Ravi town and Cantt Area. In all other towns the inter-dependency exists, indicating the effects of other associated social and economic factors (Annexure 16).

VI. RESULTS OF THE ECONOMETRIC MODELS

The models used for analysis in this study seek to establish the contribution of various quantitative factors towards net as well as gross enrollment at primary level of education. Raising enrollment at primary level of education has always been the top priority in education reforms implemented by every successive regime in the past and at present. Certain physical and monetary incentives at school level have managed to change the conceptual psychology of the parents by participation approach through School Council (SC). The status of net and gross enrollment indicating the implications of the policy tools is presented in a tabulation form. To examine the contribution of various quantitative factors at household level, econometric models, *i.e.* OLS as well as logit function are applied. The results of both these models are presented in Table 16.

TABLE 16

Results of the Econometric Models
(Dependent Variable — Gross Enrollment)

Variables	Simple Linear Regression		Logit Function	
	Coefficient	t-Statistic	Coefficient	Z-Statistic
Constant	–57.215	–7.271*	–4.779	–13.374*
Education of HH	2.558	3.064*	0.053	1.565
School Distance	–1.576	–0.265	–0.029	–0.114
Family Size	12.300	25.020*	0.361	15.872*
Dwelling Ownership	2.586	2.369*	0.131	2.857*
Household Income (per capita)	–9.88E-05	0.379	8.48E-06	0.458
Education Expenses	0.002	1.029	0.0002	2.977*
Literacy Ratio	–0.224	–4.686*	–0.003	–1.545
Dependency Ratio	80.506	50.633*	3.059	26.513*
Consumption Expenditure per capita	4.57E-05	0.048	–8.13E-05	–1.656
^R^2		0.555		0.451
Adjusted R^2		0.554		
F-ratio		451.797		

^In case of logit Function McFadden R^2

*Significant at 99.0 percent precision level

It is very easy to say education for all, but it is rather difficult to bring all the children to school. There are many qualitative and quantitative factors inhibiting the children belonging to the school going age group to be at school. Since the data constraint, specifically of the qualitative nature has been encountered, only quantitative characteristics of the households are considered for applying the models. In the case of simple linear model, the factors that emerged as positive contributors to gross enrollment are education of the head of the households, family size, dwelling ownership and dependency ratio. The results regarding contribution to gross enrollment, which are controversial to the prior determined thoughts, are specifically for family size and dependency ratio, as obviously a large family size with high

dependency ratio is expected to bear more expenses on living necessities, with a relative meager amount left for social concerns of the households. However it can be conceptually argued that as a greater number of children leads to an increase in the dependency ratio, an increase in gross enrollment might also be observed. Moreover, the level of education of the head of the household strictly determines the level of gross enrollment. This measure proved more effective to account for an increase in gross enrollment than the literacy ratio, which contributed significantly but negatively. An underlying reason might pertain to the age factor to which other literate members show lack of interest or have no decision power in sending the children who are older than the school-age to school and the final decision would be of the educated head of the household in this context.

In the logit function, the estimated results are somewhat different from the simple linear regression where the positive contribution of the education of the head turns out to be non significant. Moreover, the earlier negative contribution of the literacy ratio to gross enrollment, also proves to be non significant. Another variable, which affects the gross enrollment positively and significantly accounts for the expense of the household on education, which indirectly indicates the recognized importance of education of the children by the members of the household at all stages. The remaining variables included in the equations proved insignificant towards contribution to gross enrollment.

As described earlier, net enrollment is a better measure to assess school attendance. Econometric models (OLS and Logit Functions) are also applied considering the net enrollment as the dependent variable. The estimated results of this are presented in Table 17.

The computed estimates of the models applied to net enrollment are not much different from the estimates of gross enrollment models. The factors contributing positively and significantly to net enrollment of children at primary school level are family size, dwelling ownership, expenses on education, literacy ratio and dependency ratio in case of both the OLS and logit models. The distinct factors are the literacy ratio and the education of the head of the households, which contributed negatively and significantly and positively and significantly to gross enrollment respectively. However, in case of net enrollment, the findings are quite contradictory to gross enrollment models. In this case a positive and significant contribution of the literacy ratio to net enrollment was found, which appeared as an indicator of motivating cognitive and non-cognitive environment. The education of the head of the households pointed in the opposite direction and proved to be an

ineffective tool in this context. Others factors such as per capita income of the households, school distance, per capita consumption expenditure emerged as less important factors with respect to net enrollment with positive or negative non significant contribution.

TABLE 17

Results of the Econometric Models
(Dependent Variable — Net Enrollment)

Variables	Simple Linear Regression		Logit Function	
	Coefficient	t-Statistic	Coefficient	Z-Statistic
Constant	–20.239	–4.637	–4.441	13.970
Education of HH	–0.313	–0.676	–0.004	–0.128
School Distance	–4.597	–1.394	–0.335	–1.514
Family Size	3.038	11.131	0.233	12.336
Dwelling Ownership	1.511	2.489	0.084	2.114
Household Income (per capita)	2.35E-05	0.162	–820E-06	–0.378
Education Expenses	0.005	3.631	0.0003	3.276
Literacy Ratio	0.242	9.133	0.015	8.216
Dependency Ratio	28.242	32.007	1.889	25.055
Consumption Expenditure Per Capita	–0.0007	–1.368	–6.22E-05	1.356
^R^2		0.309		0.303
Adjusted R^2		0.307		
F-ratio		161.549		

^In case of logit Function McFadden R^2

Briefly it can be concluded that despite the positive effect of some of the characteristics of the individuals and households on gross as well as net enrollment, there are various more strong qualitative factors across the socio-economic spectrum that tend to have differential impacts on school enrollment. Parental psychology has a major role to play in this regard. Most parents belonging to poor households feel a certain type of job insecurity regarding education, specifically when they can only afford education up to

primary level. Consequently there is a need to implement certain revolutionary measures that would aim to create awareness regarding the importance of the basic education. To have more effective response of the basic education it is equally important to establish basic technical training units specifically in the rural areas in order to equip the children having primary or middle level education with some specific technical skills that would enable them to earn a living for their families.

VII. CONCLUSIONS AND POLICY IMPLICATIONS

The conclusions derived from the estimated results reflect the importance of education of the children by the members of the households. Our main results contradicted the prior determined thoughts, as some of the major characteristics were found to be independent of enrollment. Consequently, parental conceptual psychology, *i.e.* what would be the future career of a child equipped with education up to primary, middle or even matric level, was the main inhibiting factor in children's school enrollment decision of the households. Hence, there is a need to implement certain revolutionary measures to create awareness regarding importance of the basic education not only to adopt any income generating activity but also to comprehend the societal aspirations. To have strong response of the basic education it is equally important to establish basic technical training units in rural areas to equip the children having primary or middle level education with some specific technical skill leading them to adopt income generating activities through self-business or employment in industrial sector. Moreover some legislative measures should be implemented to make primary education compulsory to bring all the children of respective age to school to achieve the goal of educated Punjab.

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Annexure 1

Net Enrollment at Primary Level by Family Size by Towns in Lahore District (By Gender) (Percent)

Towns	Family Size (Nos.)									
	0-3		4-6		7-9		9-11		12 & above	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gunj Bakhsh	100.0	80.0	77.5	80.9	69.3	63.6	62.5	73.7	64.7	44.0
Shalimar	–	100.0	75.0	72.5	68.8	62.9	72.2	60.0	69.2	64.0
Allama Iqbal	100.0	50.0	75.6	71.6	74.7	65.7	52.4	64.7	41.2	66.7
Aziz Bhatti	33.3	–	52.6	54.5	55.4	54.4	50.0	31.3	56.2	53.3
Nishter	50.0	100.0	72.8	67.7	63.0	72.8	60.9	57.1	57.9	58.8
Ravi	100.0	60.0	74.4	79.7	71.6	69.9	75.0	55.6	47.6	92.9
Cantt Area	66.7	66.7	85.7	58.8	81.0	69.1	69.2	53.8	72.7	83.3
Lahore	66.7	65.0	73.5	70.6	68.8	65.6	63.3	57.4	59.9	63.4

Annexure 2

Results of Chi-Square Test
(Family Size and Net Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	21.90	4	0.0002
Shalimar	43.73	4	0.0000
Allama Iqbal	14.76	4	0.0052
Aziz Bhatti	27.47	4	0.0000
Nishter	6.48	4	0.1660
Ravi	3.96	4	0.4117
Cantt Area	8.91	4	0.0633
Lahore	3.77	4	0.4387

Annexure 3

Gross Enrollment at Primary Level by Family Size by Towns in Lahore District (By Gender) (Percent)

Towns	Family Size (Nos.)									
	0-3		4-6		7-9		9-11		12 & above	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gunj Bakhsh	100.0	100.0	98.9	98.5	96.0	98.5	100.0	100.0	94.1	96.0
Shalimar	–	100.0	98.9	96.3	100.0	100.0	100.0	100.0	100.0	100.0
Allama Iqbal	100.0	100.0	97.4	98.5	98.9	99.0	95.2	94.1	100.0	100.0
Aziz Bhatti	100.0	100.0	98.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nishter	100.0	100.0	98.8	98.5	98.0	97.1	95.7	100.0	100.0	100.0
Ravi	100.0	100.0	98.9	98.7	100.0	97.8	100.0	100.0	100.0	100.0
Cantt Area	100.0	100.0	97.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Lahore	100.0	100.0	98.5	98.5	99.0	98.8	98.2	99.3	98.7	99.2

Annexure 4

Results of Chi-Square Test (Family Size and Gross Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	10.64	4	0.0310
Shalimar	8.03	4	0.0904
Allama Iqbal	10.92	4	0.0274
Aziz Bhatti	4.01	4	0.4049
Nishter	6.63	4	0.1569
Ravi	3.01	4	0.5558
Cantt Area	4.01	4	0.4049
Lahore	1.99	4	0.7368

Annexure 5

Net Enrollment at Primary Level by Per Capita Income Groups by Towns in Lahore District (By Gender) (Percent)

Towns	Per Capita Income Group (Rs./Month)									
	0-1000		1000-2000		2000-4000		4000-6000		6000 & above	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gunj Bakhsh	65.6	56.8	78.8	78.1	70.6	74.2	80.0	57.1	64.2	100.0
Shalimar	67.6	58.8	80.0	78.4	75.0	71.4	100.0	100.0	–	–
Allama Iqbal	67.0	57.6	70.0	71.4	80.0	95.8	80.0	100.0	85.7	83.3
Aziz Bhatti	50.9	48.4	51.2	57.1	68.4	60.0	75.0	80.0	–	–
Nishter	62.5	63.9	71.2	68.9	64.7	92.9	66.7	100.0	100.0	85.7
Ravi	66.9	69.0	73.8	80.2	84.6	70.8	50.0	100.0	100.0	66.7
Cantt Area	77.1	69.7	85.7	74.2	100.0	60.0	100.0	100.0	75.0	70.0
Lahore	65.0	59.2	73.3	74.0	76.9	77.2	76.9	83.3	76.5	81.8

Annexure 6

Results of Chi-Square Test
(Per Capita Income Groups and Net Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	8.22	4	0.0839
Shalimar	41.31	3	0.0000
Allama Iqbal	33.09	4	0.0000
Aziz Bhatti	20.02	4	0.0002
Nishter	27.36	4	0.0000
Ravi	5.36	4	0.2507
Cantt Area	36.91	4	0.0000
Lahore	11.19	4	0.0245

Annexure 7

Gross Enrollment at Primary Level by Per Capita Income Groups by Towns in Lahore District (By Gender) (Percent)

Towns	Per Capita Income Group (Rs./Month)									
	0-1000		1000-2000		2000-4000		4000-6000		6000 & above	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gunj Bakhsh	98.9	100.0	95.5	96.9	93.8	100.0	100.0	100.0	100.0	87.5
Shalimar	100.0	100.0	100.0	97.3	91.7	92.9	100.0	100.0	–	–
Allama Iqbal	97.3	98.3	100.0	98.2	96.7	100.0	100.0	100.0	100.0	100.0
Aziz Bhatti	99.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–	–
Nishter	98.3	97.9	98.1	97.8	94.1	100.0	100.0	100.0	100.0	100.0
Ravi	100.0	99.0	100.0	97.5	100.0	100.0	50.0	100.0	100.0	100.0
Cantt Area	98.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Lahore	99.0	99.2	99.0	98.0	96.5	99.2	96.2	100.0	100.0	97.0

Annexure 8

Results of Chi-Square Test
(Per Capita Income Groups and Gross Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	6.79	4	0.1473
Shalimar	20.35	3	0.0001
Allama Iqbal	4.04	4	0.4006
Aziz Bhatti	–	–	–
Nishter	5.22	4	0.2659
Ravi	135.51	4	0.000
Cantt Area	4.01	4	0.4049
Lahore	0.45	4	0.9785

Annexure 9

Net Enrollment at Primary Level by Dependency Ratio by Towns in Lahore District (By Gender)

Towns	Dependency Ratio (Percent)									
	0-0.50		0.51-0.75		0.76-1.0		1.01-2.0		2.0 & above	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gunj Bakhsh	67.9	66.7	73.9	53.3	69.1	80.0	75.6	67.5	63.2	69.2
Shalimar	73.9	52.9	83.3	70.0	70.7	72.2	67.9	66.3	71.7	65.3
Allama Iqbal	76.9	61.9	61.5	75.0	51.2	73.3	75.8	66.7	64.1	81.1
Aziz Bhatti	88.9	42.9	68.8	63.2	44.8	57.1	50.7	49.4	51.1	50.9
Nishter	63.3	93.3	65.4	74.1	68.4	73.0	69.2	66.7	55.6	55.6
Ravi	72.4	71.0	75.0	75.0	65.2	62.2	73.1	83.1	70.6	70.0
Cantt Area	66.7	87.5	76.9	80.0	75.0	42.9	88.0	65.1	81.3	58.6
Lahore	71.0	69.4	72.0	70.2	63.1	68.3	70.7	66.4	67.5	61.4

Annexure 10

Results of Chi-Square Test (Dependency Ratio and Net Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	1.96	4	0.7425
Shalimar	7.01	4	0.1352
Allama Iqbal	2.98	4	0.5609
Aziz Bhatti	14.12	4	0.0069
Nishter	8.27	4	0.0821
Ravi	5.57	4	0.2336
Cantt Area	19.72	4	0.0006
Lahore	1.56	4	0.8155

Annexure 11

Gross Enrollment at Primary Level by Dependency Ratio by Towns in Lahore District (By Gender)

Towns	Dependency Ratio (Percent)									
	0-0.50		0.51-0.75		0.76-1.0		1.01-2.0		2.0 & above	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gunj Bakhsh	100.0	96.3	95.7	100.0	98.2	94.3	96.7	100.0	94.7	100.0
Shalimar	100.0	100.0	100.0	100.0	100.0	100.0	99.1	96.9	100.0	100.0
Allama Iqbal	100.0	100.0	100.0	100.0	97.7	95.6	95.4	100.0	100.0	98.4
Aziz Bhatti	100.0	100.0	100.0	100.0	100.0	100.0	98.6	100.0	100.0	100.0
Nishter	100.0	93.3	96.2	96.3	94.7	97.3	98.1	100.0	100.0	97.8
Ravi	100.0	90.3	100.0	100.0	97.8	100.0	100.0	100.0	100.0	100.0
Cantt Area	100.0	100.0	100.0	100.0	100.0	100.0	98.0	100.0	100.0	100.0
Lahore	100.0	96.3	98.7	99.2	98.1	97.9	98.1	99.4	99.6	99.3

Annexure 12

Results of Chi-Square Test (Dependency Ratio and Gross Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	0.51	4	0.9723
Shalimar	8.03	4	0.0904
Allama Iqbal	5.74	4	0.2198
Aziz Bhatti	4.01	4	0.4049
Nishter	3.93	4	0.4159
Ravi	15.86	4	0.0032
Cantt Area	4.01	4	0.4049
Lahore	0.88	4	0.9277

Annexure 13

Net Enrollment at Primary Level by Education of Head of the Households by Towns in Lahore District (By Gender)

Towns	Education Status (Percent)									
	Illiterate		Primary		Middle		Matric		Above Matric	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gunj Bakhsh	63.9	52.8	66.7	61.9	70.0	53.3	70.9	88.4	80.9	76.5
Shalimar	65.2	60.4	73.9	50.0	72.0	70.0	81.8	79.4	82.8	78.4
Allama Iqbal	63.7	54.5	60.7	77.8	75.0	46.7	72.7	80.0	88.1	83.7
Aziz Bhatti	46.6	43.6	31.6	50.0	76.0	50.0	73.3	69.0	60.0	72.7
Nishter	55.4	59.3	76.7	88.0	63.6	66.7	74.0	72.7	77.8	72.4
Ravi	55.4	64.2	78.6	78.1	68.0	72.2	79.4	81.3	82.6	83.3
Cantt Area	77.5	54.8	81.0	63.6	54.5	75.0	86.4	69.2	87.9	70.8
Lahore	60.0	55.7	69.0	69.0	69.1	63.1	76.6	77.6	80.6	76.

Annexure 14

Results of Chi-Square Test
(Education of Household's Head and Net Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	21.23	5	0.0007
Shalimar	21.33	5	0.0007
Allama Iqbal	45.76	5	0.0000
Aziz Bhatti	96.23	5	0.0000
Nishter	23.94	5	0.0002
Ravi	28.67	5	0.0000
Cantt Area	43.75	5	0.0000
Lahore	23.44	5	0.0003

Annexure 15

Gross Enrollment at Primary Level by Education of Head of the Households by Towns in Lahore District (By Gender)

Towns	Education Status (Percent)									
	Illiterate		Primary		Middle		Matric		Above Matric	
	Male	Female	Male	Female	Male	Female	Males	Female	Male	Female
Gunj Bakhsh	96.7	98.1	100.0	100.0	100.0	100.0	98.2	97.7	95.6	98.0
Shalimar	99.3	100.0	100.0	100.0	100.0	100.0	100.0	94.1	100.0	97.3
Allama Iqbal	100.0	97.7	96.4	100.0	100.0	93.3	100.0	100.0	92.8	100.0
Aziz Bhatti	100.0	100.0	100.0	100.0	96.0	100.0	100.0	100.0	100.0	100.0
Nishter	96.4	96.5	100.0	100.0	100.0	100.0	98.0	100.0	100.0	96.6
Ravi	100.0	98.8	100.0	96.9	100.0	100.0	98.4	100.0	100.0	96.7
Lahore	98.6	98.7	99.5	99.4	99.3	99.2	98.9	98.9	97.6	98.3

Annexure 16

Results of Chi-Square Test
(Education of Household's Head and Gross Enrollment)

Towns	χ^2	DF	P-value
Gunj Bakhsh	21.32	5	0.0007
Shalimar	10.69	5	0.0579
Allama Iqbal	10.36	5	0.0656
Aziz Bhatti	15.08	5	0.0100
Nishter	11.02	5	0.0509
Ravi	3.43	5	0.6342
Cantt Area	5.01	5	0.4149
Lahore	2.37	5	0.7961

Pakistan Economic and Social Review
Volume 46, No. 2 (Winter 2008), pp. 201-234

THE PROFILE OF DEBT STRUCTURE: MONETARY AND FISCAL POLICIES A Case of Pakistan (1971-2007)

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Abstract. This paper examines a complete profile of public debt structure for the past three decades in the context of the fiscal and external sector imbalances as the key determinants of public debt burden. Despite initiation of several reforms the stock of public debt, its growth and debt servicing remain to be high. Increase in debt is almost equally attributed to domestic and external debt and the structure of debt remain to be the same. Increased reliance on short term domestic debt from the central bank indicates the structure of debt is dominated by short-term debt. The rescheduling and restructuring of debt in the first half of 2000s had brought some relief in the external debt indicators. However, the rising fiscal and external accounts gap, in the second half of 2000s, has adversely affected the debt to GDP ratio and growth in external debt remains high. Obvious implication of growing debt stock is that the debt servicing cost would increase, fiscal adjustment would be difficult and debt sustainability indicators may deteriorate in the future.

I. INTRODUCTION

The economy of Pakistan continues to rely heavily on domestic and external resources to meet its deficits; large resource gap is a mirror image of its economic performance and also reflects the way macro economic accounts were managed overtime. Clearly, government spending on goods and services and repayment of public debt needs to be covered by the sources of funds available to the government, *i.e.* raise funds through taxation, create high-powered money or borrow. This financial constraint implies that

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government has one degree of freedom less than it appears. It cannot fix money growth, borrowing, spending and taxes independent of each other. If money growth, taxes and borrowing are set exogenous then government expenditure cannot be set exogenously. Even if government expenditure is considered as endogenous where government spending is adjusted to make fiscal space for interest payment on debt, high GDP growth may be unsustainable if adjustments are made in the development expenditure, which were most often cut in the past to create fiscal space.

Undoubtedly the economy is principally governed by the interplay of monetary and fiscal policies; and all macroeconomic indicators have remained highly sensitive to these policies pursued in the past. Both these policies are the key determinants of the structure of public debt stock, its growth and debt servicing. One major concern in this regard is that government expenditure and its role extends beyond its resources causing increased fiscal deficit. Whereas, the resources generated through tax and non-tax sources are insufficient to meet the growing expenditure needs.

Public expenditure needs have grown at a faster pace due to inflexibility of major expenditure heads, limited maneuvering space, pressures to over-commit resources and increasing burden of continuous support for inefficient public sector enterprises. The most damaging consequence of unrestrained public expenditure is the emergence of twin deficits problem and eventually increase in domestic and external debt along with increase in interest payment on debt. This tendency led to further deterioration of the fiscal deficit position. The overall debt that started to swell in the 1980s became unsustainable in 1990s; persistent primary deficit was recorded until FY 1995-96 and the same situation has re-emerged since 2005.

Despite the reform process public debt was 54.4 percent of GDP in 1980, increased to 102.85 percent by 2000 and is still as high as 67.7 percent of GDP in 2007. Debt servicing, as a percent of tax revenues was as high as 103 percent in 2000, which increased to 123 percent in 2002 and declined to 60 percent by 2007 has again increased to 64 percent of tax revenue by 2008 whereas the Fiscal Responsibility Limitation Act, 2005 require a revenue surplus by FY 2008.

Similarly, the ratio of the total external debt obligation to foreign exchange earnings rose from 204 percent in 1980 to 334 percent in 2000 and is 145 in 2007.[1] The ratio of debt service payment to foreign exchange

[1]The sustainable limit is 200 percent as suggested by Debt Reduction and Management Committee (Mach 2001).

earnings has risen sharply, from 16.5 percent in 1980 to 27.3 percent in 2000.[2] In other words, most of the foreign exchange earnings are paid to the foreign creditors leaving little for import of essential goods and services. Moreover, Pakistan's stock of external debt as a percentage of GDP and also as percent of export of goods and services is above the average of developing and South Asian countries (World Bank, 2005). The debt servicing indicators are also higher than the average of developing countries as a group (*see* Annexure 2).

Thus, the fundamental question addressed in this paper is whether the magnitude, structure, composition and growth of public debt has changed overtime and to what extent the inter play of fiscal and monetary management in general and the reform policies in particular have impacted the burden of debt stock, its structure, composition, growth and debt servicing.

This paper is organized in the following manner: Section II establishes the linkage between monetary and fiscal management to assess how the fiscal and external sector deficits were financed that eventually contributed to the build up of public debt. Section III reports the complete profile of debt that includes the basic aspects of structure of public debt, its composition, percentage share, growth trends and debt servicing over time (1971-2007). A comparative debt indicator analysis is also undertaken in order to meaningful comparison of pre and post 2000 debt to GDP ratios.[3] Section IV briefly discusses the external debt management and section V gives the conclusions emerging from this study and policy implications. All the estimates mentioned in various sections are based on data set of CD_ROM IFS (2006), Global Development Finance (CD-2007) and various issues of Economic survey of Pakistan, whereas the data set for the last two years was taken from *Economic Survey of Pakistan* and (2006-07) and *Annual Report* of State Bank of Pakistan 2007.

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[2]Following a credible strategy of debt reduction over last few years, Pakistan succeeded in reducing external debt and foreign exchange liabilities by $1.386 billion by June 2002. During year 2002-03, Pakistan succeeded in reducing another $0.945 billion worth of debt and liabilities.

[3]This comparison is warranted because of the fact that the Debt Policy Coordination Office of the Government of Pakistan is now using GDP statistics rebased at FY 2000 prices for calculating debt indicators. In this study the GDP statistics of pre-2000 would be converted at the new base, *i.e.* at FY 2000 prices, and the figures of post 2000 periods would be adjusted at the previous base for making the accurate comparison of debt ratios.

II. AN APPRAISAL OF FISCAL AND MONETARY MANAGEMENT (1971 TO 2007)

While historically, both taxation and budgetary issues were a major concern of public and the politicians, the monetary and debt management policies have been relatively passive instruments until 1990. It was the imperatives of macro economic adjustment and stabilization policies that brought monetary policy and debt management also to the forefront as the key determinants of the future course of economy. The budgetary financing priorities have always impacted the monetary conditions in the economy and impinged upon the effectiveness of monetary policy.

Before the financial sector reforms period (1990s) the National Credit Consultative Council (NCCC) formulated the Annual Credit Plan. Monetary expansion and credit allocation to the various sectors was made with specified set of guidelines and direct controls were the main instruments to regulate the banking and credit system.[4] Treasury Bills were issued on ad hoc basis whenever the government required funds for budgetary purpose and the state owned banks were to buy the bills at fixed rates of return. Besides treasury bills government also used the National Savings Schemes to raise debt by offering high rate of returns.

In the pre reform set up the monetary policy objective of price and financial sector stability was fairly attained and growth took place at a regular sustainable pace. Table 1 report that the average growth rate of GDP was 5 percent in 1970s and rose to 7 percent in 1980s. Although the inflation rate was more than 12 percent on average in the 1970s, mainly due to rapid increase in world oil prices, it was brought down to 7.6 percent in the decade of 1980s along with a slight decline in reserve money growth from 15.8 percent in 1970s to 14.8 percent in 1980s.

During the same period fiscal deficit was as high as 7.6 percent in 1970s and 6.8 percent of GDP in 1980s. Overall fiscal effort was low and major emphasis of taxation policy during this time was on indirect taxes and high tax rates. Taxes were levied on 'easy to tax' areas like excise duty at production stage or at the import stage, *i.e.* customs and sales tax etc. The sales tax structure was regressive and the corporate tax rates were extremely

[4]The side effects of these direct controls of the pre reform set up were that unfortunately a number of distortions were created in the form of lower deposit rates, low savings and inefficient resource allocation. Moreover the specialized finance schemes of central bank including trade finance and credit for capital goods producing industries etc added to the inefficiencies in the financial system (Janjua, 2003).

high and discriminatory. High protective barriers were in place through tariffs, which resulted into anti export bias. Too many exemptions, concessions and low incidence of taxes on consumption reduced the tax base, increased the incidence of tax evasion and avoidance. The taxation system lacked transparency and fairness; it was based on manual operations and caused undue delays and harassment. The revenue targets were routinely missed and tax to GDP ratio remained persistently low and stagnant around 12 to 13 percent of GDP. Thus, the resource gap was either financed by monetizing the deficit or by borrowing from non-bank and the external sources, and fiscal space was created by keeping the share of development expenditure low as a percentage of GDP.

TABLE 1

Overall Macroeconomic Environment

Variables/Years	1970s	1980s	1990s	2000s[5]
Growth Rates				
GDP	5.0	7.1	4.4	5.8
Inflation (GDP Deflator)	12.2	7.6	10.0	6.3
Percent of GDP				
Saving	11.2	14.8	13.8	17.3
Investment	17.1	18.7	18.3	18.6
Budget Deficit	7.6	6.8	7.3	4.6
Current Account Balance	–5.2	–2.8	–4.1	–0.02

Source: Various Issues of *Economic Survey of Pakistan.*

This resource gap is also reflected in the low growth of domestic savings that ranged between 11 percent of GDP to 14.8 percent of GDP. The contribution of public sector savings to domestic savings remained insignificant, private savings as the major component of domestic savings ranged between 10 to 13 percent of GDP and savings of the corporate sector have remained stagnant despite having a major share in financial sector domestic credit allocation. Thus, the growth and economic policies pursued were not accompanied with significant increase in savings rate in particular saving in financial instruments.

[5]Estimates for the decade of 2000s are based on data for the time period 2000-2007 and do not provide a decade wise comparison which may obscure the actual position and trends to some extent.

TABLE 2

Fiscal Indicators: Revenues and Expenditure

Variables/Years	1970s	1980s	1990s	2000s
Percent of GDP				
Tax	11.4	13.2	13.0	12.5
Non-Tax	2.3	3.6	4.2	4.0
Revenues	13.7	16.8	17.2	16.4
Grants	0.6	0.7	0.3	0.9
Total Revenues Grants	14.3	17.6	17.6	17.4
Percent of GDP				
Interest payments	1.7	3.3	6.0	6.6
Defense	6.0	6.3	5.8	3.9
Current Expenditure	13.7	17.8	19.8	17.8
Development Expenditure	3.3	2.9	3.4	3.7
Net Lending to PSEs	4.9	3.7	1.7	0.4
Grand Expenditure	21.9	24.3	24.8	22.0
Percent of GDP				
Primary Deficit	5.9	3.5	1.3	–2.0
Fiscal Deficit	7.6	6.8	7.3	5.0

Source: CD_ROM IFS (2006).

Since 1990s, the financial sector of Pakistan has undergone a major reform process and the pre 1990 set up of monetary policy and monetary management was replaced by a market based system of monetary and credit management although until recently the credit distribution continued to be based on annual credit plan.[6] During this period monetary policy objectives of price stability and sustainable economic growth were largely not met, GDP growth was as low as 4.4 percent, fiscal deficit was 7 .3 percent of GDP, reserve money growth and inflation increased to 10.7 percent and 10

[6]Despite financial reforms general awareness about the existing financial and saving instruments like stocks, mutual funds, modarabas etc is limited to urban areas of big cities, the low and middle income group still rely on informal sources of savings and the equity market still has a narrow base.

percent respectively.[7] The major causative factors of monetary expansion during the period of eighties and nineties originated from net domestic assets caused by government borrowing.

In the post reform period fiscal deficit was the most critical issue to be dealt with, as its impact on the external sector balance of payments deficits and effectiveness of monetary policy remained to be high via the price expectations and the exchange rate channels of transmission mechanism. To tackle macroeconomic and fiscal imbalances the fiscal and monetary policy coordination was strengthened, to adopt revenue rising and expenditure cutting measures so as to control inflationary potential of credit expansion to the government Janjua (2003). The share of direct taxes increased from 18 percent to 34 percent and the share of indirect taxes declined from 82 percent to 66 percent mainly due to decline in share of customs and excise duty whereas the share of sales tax increased. Tax rates were reduced and switched from 'production and investment' to tax on 'consumption and income'.

TABLE 3

Monetary Sector Indicators

Variables/Years	1970s	1980s	1990s	2000s
AS Percent of M2				
Government Borrowing	44.9	44.8	49.7	22.4
Private Sector credit	49.7	55.3	54.6	99.4
Domestic Credit	94.7	100.1	104.3	255.7
M2 as % of GDP	44.4	47.4	46.8	23.7
Reserve Money (Growth %)	15.8	14.8	13.6	14.5

Source: CD_ROM IFS (2006)

Further, the cost of public debt on domestic bank and non-bank sources of financing fiscal deficit was rationalized. Government debt was raised through auction of T-bills and government bonds. Despite these measures the tax to GDP ratio remained stagnant, reduction in expenditures was met with little success and whatever fiscal adjustment was made it was primarily

[7]Other factors that periodically contributed to price increase were supply side bottlenecks, the adjustment of government-administered prices, exchange rate pass through, increased indirect taxes and inflationary expectations.

through cuts in development expenditure. Although the major tax reforms improved the tax structure it did not improve the tax to GDP ratio. Reforms pushed the interest rates upwards with fiscal deficit increasing and the interest expenditure rose to 8.3 percent of GDP in FY 2000 compared to 5.5 percent of GDP in FY 1990. Premature liberalization and improper sequencing of reforms deteriorated the fiscal position through rising interest expense on domestic debt (Cole and Betty, 1999; Yaqub Muhammad, 1998).

The period of 2000s witnessed both contractionary and expansionary phases of the monetary policy. Tight monetary stance in the early period of 2000s was mainly driven by the objective of maintaining the value of Rupee and to remain within the net domestic assets target set under the IMF program for government borrowing from the State Bank. At the same time record high inflow of foreign exchange through remittances led to reserve money growth as high as 14.5 percent. Later easy monetary policy stance led to sharp decline in interest rates and the bench mark T bill rates declined from 12.8 to a record low of 1.6 percent. Government debt held by SBP was retired. As a result the growth rate of GDP remained steady, averaging close to 6 percent. Fiscal deficit declined to an average of 3.5 percent, revenue collection registered positive improvement and tax receipts increased substantially, inflation was 3.5 percent on average and the rising trends in public as well as external debt were arrested as a result of prudent debt management policy. However, this phenomenon of improved macro economic performance could not be maintained for long and the gains achieved in the first half of 2000s were easily eroded. The fact remains that development expenditure to GDP ratio is low, and fiscal deficit after a decline again rose to 7.6 percent of GDP by 2008. The annual monetary targets for growth of money supply were easily missed and despite tight monetary stance reserve money grew as high as 14.5 percent on average in 2000s causing inflation to increase from an average of 3.5 percent during 2000-03 to over 10 percent during 2005-07 and further increased to 20 percent in 2008.

In addition to the fiscal deficit, the external sector accounts remained non impressive through out the past three decades, both the trade and the current account balances always remained in deficit. Consistent trade and current account deficit was mainly due to rising imports, stagnant exports, rising interest payments and varying level of remittances. As shown in Table 4, persistent deficit in the current account has implications for the public debt stock and it's servicing. To finance the external account deficit reliance on external borrowing increased. By 1990s trade was liberalized to a great extent, tariff restrictions and quota restrictions were removed, exchange rate

was liberalized and made fully convertible on current account. Despite these measures the trade to GDP ratio remains low, the value of exports grew by 6 percent on average annually and the current account remained persistently negative except for the first half of 2000s.

TABLE 4

External Sector Indicators

Variables/Years	Percent of GDP			
	1970s	1980s	1990s	2000s
Trade Gap	–6.79	–9.47	–4.81	–3.62
Interest payments	1.00	1.63	1.80	1.33
Remittances	3.13	7.40	2.96	3.82
Current Account Balance	–5.19	–2.79	–4.07	–0.02
Foreign Direct Investment	0.05	0.31	0.85	1.36
Portfolio Investment		0.14	0.52	–0.08

Source: CD_ROM IFS (2006) and *Economic Survey of Pakistan*, various issues.

Prior to the reform period exchange rate was based on managed float system and the level of variation in exchange rate was low. However, in the post reform period exchange rate variation increased sharply indicating volatility in the exchange rate. Rupee remained under pressure and to manage the pressure of foreign exchange reserves capital controls were initiated. A two-tier exchange rate system was introduced which was unified later in 2000. In 2003, SBP managed to purchase record level of foreign exchange in the inter bank market and accumulated huge foreign reserves that stabilized the rupee value for a few years Janjua (2003). Current account improved due to rise in workers remittances, fall in interest payments as a result of prepayment of expensive debt, restructuring of expensive loans with cheap loans, inflow of funds for logistic support and high growth in export earnings.

However, during the second half of 2000s improvement in current account was reversed and the current account deficit for the FY 2007-08 alone has been as high as 9 percent of GDP and continues to rise, leading to a record trade deficit that now is almost the same as country's official foreign exchange reserves. Moreover the services account that had also begun to rise sharply due to rapidly rising remittances amounting to $ 18.5 billion during the last five years has also started slowing down. The greater access to the

markets of USA and EU countries that helped in achieving significant upsurge in Exports has also slowed down. As a result rupee has come under severe pressure, it depreciated by almost twenty percent and the foreign exchange reserves dwindled from almost US $ 14 billion to US $ 6 billion during 2007-2008.

To sum up the evaluation of macro economic policies reveal that, except for the decade of 1990s, despite high growth rate of GDP domestic savings were insufficient to meet the fiscal and external sector gaps. The resource gap was financed throughout from domestic sources and external finances. Thus an obvious result of these fiscal and monetary policy preferences and low domestic savings was an ever-rising inflation, accumulation of public debt and debt servicing as percentage of GDP.

III. PUBLIC DEBT

The appraisal of fiscal and monetary policies suggests that the issue of high stock of public debt and its servicing is obviously the outcome of these policies. Since the overall structure and composition of public debt has a central place in the analysis of debt management and it is important to examine and assess the extent to which the fiscal and monetary policies and the reform process has impacted the various aspects of public debt overtime.

STRUCTURE OF PUBLIC DEBT

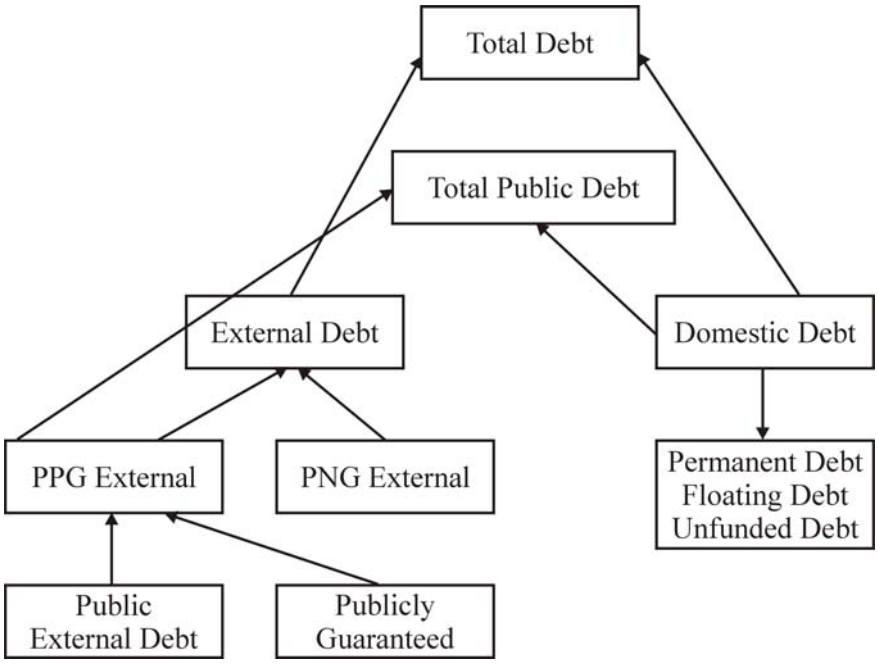
A chart (Figure 1) gives a bird's eye view of the structure of debt that includes the two main classifications of debt, *i.e.* Domestic debt and External debt, whereas public debt includes domestic debt as well as public portion of external debt. Distinction between domestic debt and external debt is essential as both may have different implications for the macroeconomic environment of a country and debt repayment. Domestic debt is serviced in rupees from government revenues and is an important part of current expenditure that has implications for fiscal space, growth and development expenditure. Whereas the external debt stock (including public external and private external debt) is to be paid in US dollars and depreciation of Rupee adversely impacts the external debt and balance of payments position Hasan (2000). Main components of public debt on which our analysis is based are:

Public Debt

Measured as the cumulative government borrowing to finance the resource gap and budget deficits. Its two major components include (*i*) domestic debt (bank and non-bank) and (*ii*) external debt (excluding non-guaranteed debt by government).

FIGURE 1

Structure of Debt



Where PPG is Public and publicly guaranteed debt, and
PNG is Private non-guaranteed debt.

(*a*) **Domestic Debt:** It is measured as the debt issued to the government by banks, non-bank financial institutions and the general public. It also includes borrowings of the state enterprises and private non-guaranteed domestic borrowing.

(*b*) **External Debt:** It is measured as public and publicly guaranteed debt and private non-guaranteed debt borrowed from bilateral and multilateral sources internationally.

Since the overall fiscal gap, as percent of GDP has remained high throughout the four decades under review, Table 5 broadly summarize the percentage share of two main sources of financing the resource gap, *i.e.* the domestic sources (including bank and the non-bank) and the external sources. Domestic finance remained the dominant source of financing the fiscal deficit and relative to bank borrowing government relied more on non-bank borrowing to finance its fiscal deficit. With the exception of the decade of 2000s, the combined share of external borrowing and domestic bank

borrowing, in deficit financing has remained high. However, their total share declined from 59 percent in 1990s to 38.5 percent in 2000s and the remaining 61.5 percent of deficit financing was done through non inflationary non bank borrowing which suggests that overtime the domestic debt obligations and fiscal deficit were largely impacted by the fiscal and monetary policy financing priorities of that time. Failure to mobilize resources and manage expenditures impacted the debt management efforts and the overall debt stock remained high.

TABLE 5

Fiscal Indicators: Gaps and Financings

Variables/Years	1970s	1980s	1990s	2000s
Percent of GDP				
Primary Balance (surplus)	5.9	3.5	1.3	–2.0
Overall Deficit	7.6	6.8	7.3	5.0
Percent of Overall Deficit				
External Financing	50.9	22.6	30.7	26.5
Domestic Financing	49.1	77.4	69.3	73.5
Bank borrowing	21.2	27.8	28.5	12.0
Non-Bank borrowing	28.0	49.6	40.8	61.5

Source: CD_ROM IFS (2006).

PUBLIC DEBT TREND – REBASING OF GDP

Before examining the trend in the structure of public debt in detail, it is worthwhile to take note of the fact that published data pre and post 2000 period is based on different base years. For making any meaningful comparison it is worthwhile to adjust the data at the prevailing and previous base year, it is interesting to report that the findings of the debt management office in fact under report the public debt to GDP ratio when data Post FY 2000 is adjusted at prevailing and previous base year.

Table 6 reports that in Rupee terms Public debt increased from Rs.127 billions in 1980 to Rs. 674 billions in 1990 and to Rs. 3266 billions in 2000, which lately peaked at Rs. 4935 billions by June 2007. The public debt situation of Pakistan in actual fact started worsening in the decade of 1990s and was the worst in the early years of 2000s and it is reported to be as high as 102.8 percent of GDP which declined sharply[8] to 56.7 percent of GDP by

[8]The Debt Policy of Pakistan (2005-06) and State Bank Annual Report (2008).

2007. However, this improvement is the outcome of statistical bias engineered through rebasing the data for GDP at price level of FY 2000 and is therefore questionable. After adjusting the data at the previous base it is found that in FY 2000 the debt to GDP ratio was 102.8 at the previous base and it actually declined to 67.7 percent of GDP in 2007 instead of the reported 56.7 percent of GDP measured at the new base of FY 2000.

TABLE 6
Composition of Public Debt in Pakistan

Years	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007
Billions Rupee										
Domestic Debt	57	377	1579	1731	1718	1854	1979	2129	2322	2597
External Debt	71	298	1687	1769	1822	1916	2000	1963	2147	2338
Public Debt	128	675	3266	3500	3540	3770	3979	4092	4469	4935
Public Debt As % of										
Gross Domestic Product (Previous base)	54.4	79.0	102.8	102.3	97.6	93.8	85.9	74.6	70.3	67.7
Gross Domestic Product (2000 base)	45.6	66.1	86.1	85.6	81.7	78.6	71.9	62.5	58.8	56.7
Shares of Public Debt										
Domestic Debt	44.5	55.9	48.3	49.5	48.5	49.2	49.7	52.0	52.0	52.6
External Debt	55.5	44.1	51.7	50.5	51.5	50.8	50.3	48.0	48.0	47.4

Source: Data for the last two years from *Economic Survey of Pakistan* (2006-07). CD_ROM IFS (2006).

Data regarding the percentage share of domestic and external debt in public debt shows that overtime the structure of public debt has witnessed modest change. Although the share of domestic debt has increased from 44.5 percent in 1980 to 52.6 percent in 2007, the importance of share of external debt in public debt remains high despite the fact that it fluctuated from 55.5 percent to 47.4 percent during the same period. Table 6 shows the total public external debt increased rapidly overtime, it was Rs. 71 billions in 1980s and increased to Rs.298 billions in 1990, it rose to Rs.2000 billions by June 2004 and further increased to Rs 2338 billion by 2007. In this way the share of external debt in public debt was as high as 55.5 percent of public debt in 1980s. However in the later half of 1980s external debt declined mainly due to tougher conditionality of the donors, *i.e.* IMF, IBRD etc., and the share of external debt reduced to the level of 44.1 percent of the public debt in 1990 and again increased to almost 50 percent in the decade of 2000s with slight variations annually.

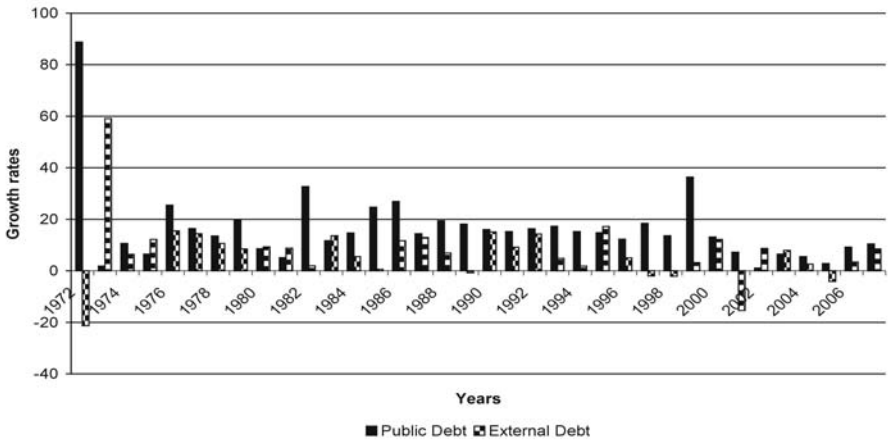
TABLE 7
Annual compound Growth Rates

Years	1970s	1980s	1990s	2000s
Domestic Debt payable in Rupee	18.1	21.2	15.6	8.2
External Debt payable in Rupee	26.9	14.4	20.1	5.8
Total Public Debt	21.9	17.6	17.6	7.0

Source: *Global Development Finance* (CD-2007).

Similarly, with the exception of a few years growth in public debt has not only remained positive through out but has been quite high. The persistent and large fiscal deficit led to growth in public debt by an average rate of 21.9 percent in 1970s and remained 17.6 percent per annum in the decade of 1980s and 1990s (*see* Table 7/Annexure 1). Growth in public debt in the decade of 2000s has fluctuated significantly and after a consistent decline since 2001 growth in public debt has once again increased and was almost 10% in 2007.[9] It is worthwhile to note that although growth rate of public external debt was lowered in the decade of 1980s to 14.4 percent, it however increased in the subsequent decade of 1990s and was also higher than the growth rate of public domestic debt which grew at 15.6 percent on average compared to 21.2 percent in1980s (*see* Table 7).

FIGURE 2
Graph of Public and External Debt Growth Rates



[9]The debt stock increased by 27 percent during 2007-08 and the growth of domestic and external debt was as high as 26 percent and 29 percent respectively. By the end of 2008 debt stock was Rs. 6302 billion.

COMPONENTS OF DOMESTIC DEBT

The three components of domestic debt comprising of permanent debt (medium and long term), floating debt (short terms) and unfunded debt (non-bank borrowing) are given in Table: 8. It is shown that the shares of floating and unfunded debt have been high relative to permanent debt.

TABLE 8

Structure of Domestic Debt

Years	1972	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007
	Billion Rupees										
Permanents	9	15	95	260	281	368	428	537	526	500	553
Floating	5	35	145	647	738	558	516	543	778	940	1108
Unfunded	3	11	138	672	712	792	909	896	854	857	937
Total Debt	17	61	378	1579	1731	1718	1854	1975	2158	2297	2598
	Growth Rates										
Permanents	3.6	11.2	23.5	1.0	8.3	30.9	16.3	25.4	–2.0	–5.0	10.6
Floating	73.6	12.6	7.2	15.3	14.0	–24.4	–7.4	5.2	43.3	20.8	17.8
Unfunded	16.5	14.3	15.1	17.0	6.0	11.2	14.8	–1.5	-4.6	0.3	9.3
Total Debt	20.1	12.5	13.8	13.4	9.6	–0.8	7.9	6.6	9.3	6.4	13.1
	Shares of Total Debt										
Permanents	54.4	24.3	25.1	16.4	16.2	21.4	23.1	27.2	24.4	21.8	21.3
Floating	29.7	57.1	38.3	41.0	42.6	32.5	27.9	27.5	36.1	40.9	42.7
Unfunded	15.9	18.6	36.6	42.5	41.1	46.1	49.1	45.3	39.6	37.3	36.1
Total Debt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *Pakistan Economic Survey* (Various issues).

The share of permanent debt, which is mostly raised by issuing long-term government bonds of different tenors, *i.e.* 3, 10, 20 and 30 years (Pakistan Investment Bonds PIBs) and prize bonds, has remained the lowest in domestic debt. In fact except for slight variations its share has remained almost the same in the past three decades, *i.e.* 1980 to 2000s. It increased marginally from 24.3% in 1980 to 25.1% in 1990, during the second half of 1990s its share decreased significantly to 16.4% and after an increase of 24.4% in 2005 it declined further to 21.3 percent in 2007. This reflects modest development of capital market for long-term government securities and heavy reliance on short-term money market borrowings.

The share of short-term floating debt, secured mostly through the sale of market treasury bills, declined significantly from 57 percent in 1980 to 38.3 percent in 1990, which again rose to 42.6 percent in 2001. After declining to 27.5 percent in 2004 it re emerged as a dominant component of total domestic debt and its share was the highest as 42.7 percent in 2007. These fluctuations in the share of floating debt are a reflection of variations in market interest rates as a result of financial sector reforms that led to market based auction of treasury bills and increased cost of borrowing of this component of domestic debt. Recent increase in the share of floating debt in total domestic debt also reflects increased reliance of government on monetizing its debt, which has serious implications for inflation and erosion of growth.

The unfunded debt comprising of National Savings Schemes, was equally preferred as it is a non-inflationary source of domestic finance. Attractive returns on the National Savings Schemes with the added advantage of tax exemption helped in mobilizing domestic savings. Heavy institutional investment in these saving schemes also brought a sharp rise in the unfunded debt and it was at par with floating debt. Thus the share of unfunded debt in total domestic debt has persistently increased from 18.6 percent in 1980 to 36.6% in 1990 and 49.1 percent in 2000.

However, the with drawl of tax exemptions, ban on institutional investment and the rationalization of interest rate in various instruments of the National Saving Schemes in 2000 and subsequent periods resulted in sharp decline in growth rate and share of unfunded debt in domestic debt. Although the share of unfunded debt recorded a modest decline in the second half of 2000s, its share remained almost one third, *i.e.* 36.1 percent of domestic debt in 2007.

From the above information it can be suggested that the structure of domestic debt has not changed significantly over the years, floating and unfunded debt remain to be the two major sources of domestic debt. This reflects the limited options of savings instruments available to the public at large.[10]

[10]More recently the unfunded debt has recorded high growth between 2005 and 2007 from –4.6 to 9.3 respectively. This impressive performance of unfunded debt has been mainly due to revision of rate of returns, removal of institutional ban on investment in saving schemes, government's preference for non bank medium to long term borrowing and the introduction of pensioner's and senior citizen's pensioner schemes offering higher returns.

So far as the growth rate of the three components of domestic debt is concerned, it has varied significantly overtime, which is a reflection of the changing preference for different sources of debt and the prevailing market conditions of that time. However, the overall growth of domestic debt mostly remained high except for a momentary decline in the growth of domestic debt in 2002, which again recorded a rapid increase in the subsequent years.

TABLE 9

Domestic Debt and Impact of Reforms on Debt Management (Rs. Billion)

	Pre Reform Period		Beginning	Post Reform Period	
	1980	1985	1990	1995	2000
Domestic Debt	Rs. 61	Rs. 153.0	Rs. 377	Rs. 807.6	Rs. 1579
As percent of GDP					
Domestic Debt	25.5	32.4	44.5	42.9	51.6
Permanent debt	5.6	7.8	11.5	15.4	10.2
Floating debt	15.0	15.5	16.9	15.6	20.4
Unfunded debt	4.9	9.1	16.1	11.9	21.0
As % of Total Revenue					
Domestic Debt	155.2	197.6	240.1	254.0	305.8
Permanent debt	34.4	47.6	62.1	91.3	60.5
Floating debt	91.1	94.4	91.3	92.5	120.6
Unfunded debt	29.7	55.6	86.7	70.2	124.7

Source: *Pakistan Economic Survey* (Various issues).

Similarly, Table 9 gives a comparison of the various financial sector reform measures on domestic debt and its management. It is observed that in the post reform period the domestic debt situation instead of improving actually deteriorated. The debt burden in terms of GDP was 44.5 percent in 1990, which rose to 51.6 percent in 2000. The situation is even worse in terms of revenue, which increased from 240.1 percent of revenue in 1990 to 305.8 percent in 2000.

STRUCTURES AND COMPOSITION OF EXTERNAL DEBT

Prior to 1970s, the external debt was relatively small and primarily an official phenomenon comprising of loans obtained mostly on concessional terms. However, since the early 1980s, short-term expensive commercial loans also began to play an increasing role for balance of payments support.

Later in 2000s Pakistan also resorted to borrowing in the international capital market by floating bonds at floating rates, which has led to increase in its external debt and debt-servicing burden.

Table 10 shows the composition of external debt, the four components include public and publicly guaranteed debt, private non guaranteed debt, short term commercial debt and IMF loans. The volume of total external debt of Pakistan remains to be very high despite the fact that the total external debt to GDP ratio and foreign exchange earnings ratio has declined.

TABLE 10
Composition of External Debt (million $)

Years	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007
Long Term	8213	15562	31832	27017	29143	31565	32712	31580	33995	37267
Public and Publicly Guaranteed	8196	15425	29288	24863	27106	29752	31135	30085	32410	35265
Private Non-Guaranteed	17	137.2	2545	2154	2037	1813	1578	1495	1585	2002
Use of IMF	624	878	1708	1550	1906	2072	1991	1677	1491	1407
Short Term	589	2963	1766	1311	1416	1396	1245	1233	169	25
Total Debt	9425	19403	35306	29878	32465	35033	35948	34491	35655	38699
External Debt as % of										
Gross Domestic Product	39.8	48.7	57.5	51.1	54.9	51.0	44.7	37.3	33.5	32.2
Export of Goods and Services	329	306	369	292	287	258	231	199	175	183
Foreign exchange earning*	204	234	334	264	237	197	185	160	143	145

Source: *Global Development Finance* (CD-2007).
*Foreign exchange earning is equal to export of goods and services including workers remittances.

Table 10 shows that the total outstanding stock of external debt was as low as $ 9.43 billions in 1980 which doubled to $ 19.40 billions in 1990; it amounted to $ 35.3 billions in 2000, it further increased to $ 38.7 billions in 2007.[11] Although external debt as percentage of GDP has declined modestly between 1980 to 2007 from 39.8 percent to 32 percent respectively, it has declined substantially as a percent of export of goods and services and foreign exchange earnings.

[11]The total external debt increased to $ 46 billion by end of June 2008.

TABLE 11

External Debt Profile

Years	1970s	1980s	1990s	2000s
	Share in total Debt			
Long term	90.9	81.6	84.2	91.8
Public and Publicly Guaranteed	90.6	81.3	79.6	86.3
Private Non-Guaranteed	0.3	0.3	4.6	5.5
Use of IMF	6.0	8.7	4.7	5.0
Short Term	3.1	9.7	11.1	3.2
	Growth rate			
Long term	12.2	6.0	7.6	4.0
Public and Publicly Guaranteed	12.2	6.0	6.8	4.4
Private Non-Guaranteed	19.0	23.4	40.4	-0.8
Use of IMF	41.9	4.0	8.1	0.3
Short Term	17.2	24.7	0.5	-26.1

Source: *Global Development Finance* (CD-2007).

Table 11 reports the structure of external debt as dominated by long-term debt with slight variations overtime. The average share of long-term debt was almost 90.9 percent during 1970s, declined to 81.6 percent in 1980s and increased from 84.2 percent to 91.8 percent of the total by the end of 1990s and 2000s respectively. The share of pubic and publicly guaranteed external debt (PPG) in long term debt relative to private non guaranteed debt remained dominant throughout and was on average as high as 90.6 percent of the total debt in 1970s, after a slight decline in the decades of 1980s and1990s it was as high as 86.3 percent in the decade of 2000s. Although, the growth rate of public and publicly guaranteed debt has been declining while the dominance of public external debt remains unchanged over the past three decades. The private non-guaranteed external debt was increasing in 1990s as compared to its share in the earlier decades, but it had always been below 10 percent of the total external debt. The private sector share in external debt was 0.3 percent in 1980s, 4.6 percent in 1990s, and 5.5 percent in 2000s. Although, the share of short-term debt remained high at 11.1 percent particularly during 1990s (*see* Table 11), its growth has declined significantly since the decade of 1990s and was negative in 2000s.

TABLE 12

Public and Publicly Guaranteed Debt

Years	1970s	1980s	1990s	2000s
	Share in PPG			
Official Creditor	93.8	92.6	94.0	94.7
Multilateral	17.4	25.4	48.1	51.5
Bilateral	76.3	67.2	46.0	43.2
Private Creditor	6.2	7.4	6.0	5.3
	Growths Rates			
Official Creditor				
Multilateral	11.3	13.8	10.7	5.1
Bilateral	13.5	3.1	3.1	3.5
Private Creditor	2.9	7.9	13.4	10.6

Source: *Global Development Finance* (CD-2007).

In terms of creditors, public and publicly guaranteed debt includes debt from official creditors both multi lateral and bilateral and also debt from private creditors. The share of official creditors in public and publicly guaranteed external debt was 93.8 percent in 1970s and 92.6 percent on average during 1980s; it however increased from 94 percent in 1990s, to 94.7 percent in 2000s on average. The bulk of increase over the period 1980-2005 has been recorded under multilateral debt. The average share of multilateral debt in official creditors has increased from 25.4 percent in 1980s to 48.1 percent in 1990s and further increased to around 51.5 percent in 2000s whereas the share of bilateral creditors decreased from 76.3 percent in 1970s to 67.2 percent in 1980s to 43.2 percent in 2000s. On the other hand, the public and publicly guaranteed external debt owed to private creditors declined to 5.3 percent in 2000s from 7.4 percent in 1980s in general. The average share of private creditors constituted 6.2 percent of the public and publicly guaranteed external debt in 1970s but it declined to 5.3 percent during 2000s (Table 12).

Table 13 indicates that over the years, share of concessional debt in the long-term external debt was as high as 78.4 percent in 1970s and 81.1 percent in 1980s. It was however touched a minimum of 64.4 percent in

1990s and has improved to 70.9 percent in 2000s. Similarly during the same period the share of multilateral concessional debt has persistently increased from a low level of 12.8 percent to 46.6 percent between 1970s and 2000s, while the share of bilateral concessional debt declined steadily from its highest ever level of 87.2 percent in 1970s to 53.4 percent in the decade of 2000s.[12]

TABLE 13

Share in Concessional Loan

Years	1970s	1980s	1990s	2000s
	Share in Long term Debt			
Concessional	78.4	81.1	64.4	70.9
Non-Concessional	21.3	18.5	30.2	20.5
	Share in Concessional			
Multilateral	12.8	20.7	40.4	46.6
Bilateral	87.2	79.3	59.6	53.4

Source: *Global Development Finance* (CD-2007):

PUBLIC DEBT SERVICING

As shown above the stock of public debt has been persistently rising leading to ever rising debt servicing obligations. In absolute terms the interest payment on both domestic and external debt has always been high and so has the total debt servicing.

Even, in terms of percentages of a few selected indicators debt servicing still remains to be high. For example, in 1980, 24.5 percent of total revenues were used for debt servicing which reached to 43.24 percent in 1990 and in 2005, 54.51 percent of total revenues were being consumed for debt servicing and the scope of development expenditure was very limited. Similarly as a percentage of GDP, debt servicing amounted to as high as two thirds of the current expenditure in 2001 which means it was three to four times higher than the development expenditure in the first half of the decade of 2000s.

[12]The total capital inflows in the form of aids and concessional loans from Pakistan Aid Consortium and OPEC countries were about $ 23 billions from 1973-1990.

TABLE 14

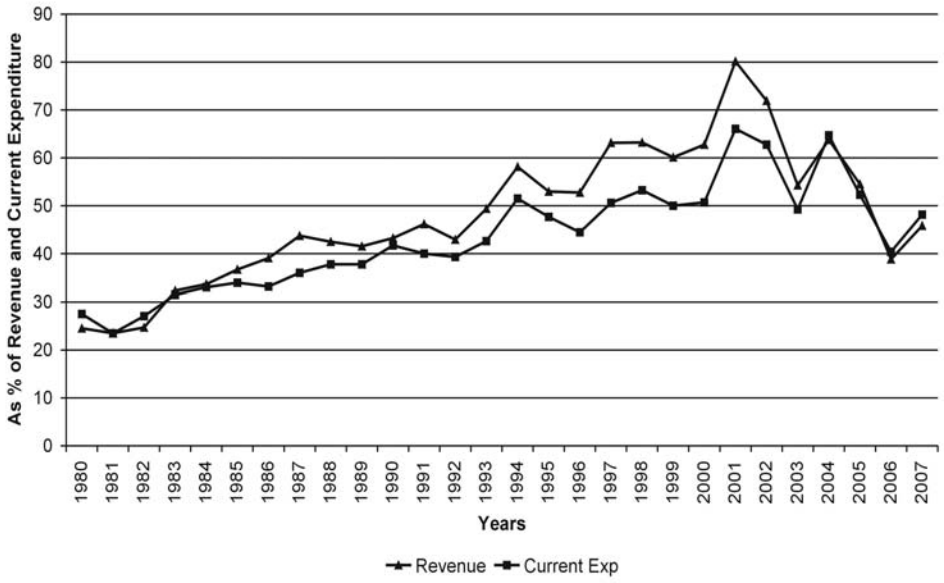
Composition of Public Debt Servicing

Years	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007
Interest Payments	Billion Rupees									
Domestic	1.8	31.2	184.2	259.5	267.3	208.3	271.0	299.3	234.5	310.4
External	3.1	16.9	52.3	53.2	51.4	49.2	46.7	48.9	42.1	48.4
Total	4.9	48.1	236.6	312.7	318.7	257.4	317.7	348.2	276.6	358.8
Amortization	4.5	22.7	96.8	116.2	126.4	123.2	167.6	112.4	85.4	67.3
Debt Servicing	9.3	70.8	333.4	428.9	445.1	380.7	485.3	460.6	362.0	426.1
	As percentage of									
Tax Revenue	29.9	62.1	86.4	101.4	96.9	72.4	83.7	70.0	52.0	58.1
Total Revenue	24.5	43.2	62.8	80.2	71.9	54.3	63.8	54.5	38.8	45.8
Current Expenditure	27.5	41.7	50.7	66.1	62.7	49.2	64.7	52.3	40.4	48.1
Grand Expenditure	17.5	32.6	45.0	57.7	50.2	42.3	51.1	41.4	29.8	34.7
GDP	4.0	8.3	10.5	12.5	12.3	9.5	10.5	8.4	6.6	7.3

Source: *Global Development Finance* (CD-2007).

FIGURE 3

Trends in Debt Servicing from 1980 to 2005



Domestic debt servicing of various components of domestic debt reported in Table 14 shows that the debt servicing burden deteriorated in general and more importantly the impact of reforms worsened in terms of percent of GDP, revenue and debt levels. For example, debt servicing in terms of GDP for permanent debt rose from 1.3 percent in 1990 to 1.9 percent in 2000 due to introduction of Federal Investment Bonds at high coupon rates, which increased interest from 11.5 percent in 1990 to 18.6 percent in 2000. Similarly debt servicing burden of floating debt in terms of GDP increased from 0.7 percent in 1990 to 1.5 percent in 2000 due to a shift from tap T bill system with 6 percent yield to auction based T bills with yields from 8 to 17 percent and also a shift from ad hoc T bills yielding 0.5 percent to auction based yields. Further interest rates on floating debt also increased from 3.9 percent in 1990 to 7.6 percent in 2000.

TABLE 15
Domestic Debt Servicing

	Pre Reform Period		Beginning	Post Reform Period	
	1980	1985	1990	1995	2000
As percent of GDP					
Domestic Debt	1.1	2.3	4.3	4.8	7.0
Permanent Debt	0.4	0.7	1.3	1.8	1.9
Floating Debt	0.3	0.4	0.7	0.8	1.5
Unfunded Debt	0.3	1.0	2.0	1.3	2.8
As percent of Total Revenue					
Domestic Debt	7.0	13.8	23.2	28.6	41.3
Permanent Debt	2.4	4.2	7.1	10.6	11.2
Floating Debt	2.1	2.5	3.5	5.0	9.2
Unfunded Debt	1.6	6.0	10.7	7.9	16.8
As Percent of Debt level					
Domestic Debt	4.5	7.1	9.6	11.3	13.5
Permanent Debt	7.0	9.0	11.5	11.6	18.6
Floating Debt	2.3	2.9	3.9	5.5	7.6
Unfunded Debt	5.4	11.6	12.3	11.3	13.5

Source: Financial Sector Assessment SBP (2003).

External debt servicing figures reported in Table 15 also shows that it increased from $ 763 millions in 1980 to $ 1850 millions in 1990 and reached to $ 2883 millions in year 2000; registering an average increase of 9.5 percent and 7.3 percent per annum respectively during the decades of 1980s and 1990s. On average $1.8 billions were paid annually in debt servicing during 1990s.[13] The terms of the loans negotiated during this period were extremely unfavorable, *i.e.* high interest rates, short maturity period and declining percentage of grant element.[14] The increased reliance on short-term commercial borrowing contributed towards buildup of debt servicing payments. Although the interest payment on external debt continues to be rising in the decade of 2000s the debt-servicing burden, which was highest in 2004 amounting to US $ 3710 million, has declined significantly in the second half of the 2000s.

TABLE 16

External Debt Servicing (millions $)

Years	1970	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007
Interest Payments	106	312	790	1012	908	837	841	810	752	754	863
Long Term	94	231	480	901	792	736	762	752	691	724	829
IMF	12	29	53	46	50	46	33	23	17	16	24
Short Term	0	52	257	64	66	55	45	34	44	14	10
Principal Repayment	139	452	1060	1872	1984	2058	2108	2900	1894	1382	1165
Long Term	125	330	872	1613	1763	1840	1677	2309	1494	1239	1045
IMF Repurchases	14	122	188	259	221	218	431	592	400	143	120
Total Debt Servicing	244	763	1850	2883	2892	2895	2948	3710	2646	2136	2028

Source: *Global Development Finance* (CD-2007).

Overall, during the last couple of years the debt servicing liabilities have declined sharply from 62.8 percent of total revenues and 50.7 percent of the current expenditure in 2000 to 54.5 percent of revenue and 52.3 percent of current expenditure in year 2005. Debt servicing as a percentage of GDP has also declined significantly in the decade of 2000s, this reduction was caused

[13]Total debt repayment during 1991-1999 were about $32 billions (Pakistan economy during 1990s by ABN AMRO Bank).

[14]On average Grant elements were 86% of Total ODA in 1952-53, 66% in 1954-55, 23% during 1978-88 and 12% during in 1989-2000 (*Economic Survey of Pakistan*).

by high GDP growth. The reduction in interest payment burden is also the outcome of declining interest rates domestically, debt management strategy and the premature payment of expensive debt amounting to US $ 1.17 billion to ADB. However, these favorable trends seem to have reversed lately in 2007 due to a rise in interest rates and maturity of government bonds issued domestically and externally.[15]

DEBT MANAGEMENT AND EXTERNAL DEBT

The rising debt burden and debt servicing made it essential to adopt a debt management strategy that aims at reducing debt burden sharply by 2010. A debt reduction strategy was set in FY 2001-02 to work towards debt rescheduling and debt restructuring from bilateral sources besides other measures to reduce the cost of debt.[16]

Historically Pakistan has been availing debt relief under various packages, *i.e.* the consortium interim relief, the stand by arrangement of IMF and rescheduling of debt during 1972-1982. Besides that debt relief programs were also signed with IMF during 1988-1999. Debt relief was again secured in 1999 and January 2001. The last rescheduling agreement, was negotiated with the Paris Club in December 2001 wherein the rescheduling, of entire outstanding stock was availed.

Debt rescheduling only provide a temporary relief and it implies that all flows of debt servicing including arrears accumulated are postponed and are to be paid after a grace period. Unlike the past, relief was obtained in both debt stock as well as debt flow, *i.e.* on the entire stock of public and publicly guaranteed bilateral debt of $ 12.5 billions. It contains the Official Development Assistance (ODA) debt of $ 8.73 billion and Non-Official Development Assistance debt of $ 4.1 billion. The ODA rescheduled debt is repayable over a period of 38 years including 15 years of grace period with same interest rate as provided in the original contracts. The Non-ODA rescheduled debt is to be repaid over a period of 23 years including 5 years of grace period at an appropriate market rate. In this way the total

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[15]In case of external debt the debt servicing burden is likely to increase further as payments for rescheduled multilateral debt stock will resume in FY 2008, the Euro bonds and Sukuk issued will be due in FY 2009 and onwards, thus the trend in the indicators of debt servicing may deteriorate.

[16]In the form of increased access to European markets, the rescheduling of debt by Paris Club and higher remittances from expatriate Pakistani's largely helped in stabilizing the external sector. It also focused on improving debt carrying capacity, reducing future borrowing, and continuation of the privatization process.

cancellation of debt comes to $ 1.062 billions. Thus total amount of $ 11.80 billions rescheduled; includes the debts from non-Paris Club creditors. It is estimated that debt rescheduling resulted in an estimated relief of $ 1.2 billion to $ 1.5 billion annually in payments of debt servicing from 2001-02 to 2004-05 (Hussain, 2005).

The second aspect of debt management strategy was that while multi-lateral debt cannot be rescheduled or reprofiled Pakistan substituted hard term loans by soft term loans to reduce the overall burden of debt servicing. The non-concessional loans obtained in the past from the World Bank, Asian Development Bank and IMF are repaid and replaced with new loans on concessional terms. For instance, IDA and PRGF were obtained on con-cessional terms compared to the stand-by arrangements negotiated in 2000. The Asian Development Bank was also to increase its assistance, however, more recently there is a shift from concessional Asian Development Fund (ADF) to non-concessional ADF terms (Hussain, 2005).

TABLE 17

Debt Restructuring

	1974	1999	2000	2001	2002
Total Amount		3399	919	12852	145
Debt Stock Rescheduled		615	29	11398	
Principal Rescheduled		2158	653	1325	0
Official		1453	575	1187	
Private		705	78	138	
Interest Rescheduled		626	237	129	145
Official		508	200	109	145
Private		118	37	20	

Source: *Global Development Finance* (CD-2007).

The third part of debt management strategy was that in contrast to the past trend of building reserves through commercial short term borrowing which added to the stock of debt and the debt servicing obligations, reserves were built mostly by mopping up excess supply of foreign currencies available in the open market and in the inter bank market. Although Pakistan successfully built up its reserves amounting to approximately US $ 13

billion, simultaneously it led to rapid increase in the net foreign component of reserve money that eventually led to high inflation (Hussain, 2005).

It was supposed that this relief along with fresh disbursements from multilateral and bilateral creditors' would have favorable effect on the balance of payments position, foreign exchange reserve position and credit rating of the country. However, the recent increasing current and fiscal sector imbalances, rising debt stock and non concessional borrowing at floating rates, forthcoming maturity of Euro Bonds in the coming few years, depreciation of rupee etc are a source of concern and if the resource gap continues to widen it may aggravate the already rising debt situation mentioned above.

TABLE 18

Average Terms of New Commitments

Years	1975	1980	1985	1990	1995	2000	2003	2005
All Creditors								
Interest rate (%)	4	4	6	5	5	6	2	2
Maturity Years	34	30	27	23	17	13	20	24
Grace Period	8	7	6	6	5	3	5	8
Grant Elements (%)	54	48	34	35	31	20	53	58
Official								
Interest rate (%)	3	3	5	5	5	6	2	2
Maturity Years	35	35	28	23	19	13	20	27
Grace Period	9	8	7	6	5	3	5	8
Grant Elements (%)	56	62	36	35	33	21	52	64
Private Creditors								
Interest rate (%)	7.0	11.0	9.0	9.0	7.0	8.0	2.0	5
Maturity Years	9.0	11.0	11.0	11.0	4.0	5.0	30.0	5
Grace Period	1.0	1.0	2.0	5.0	1.0	1.0	9.0	5
Grant Elements (%)	10.0	-4.0	5.0	5.0	8.0	4.0	67.0	18

Source: *Global Development Finance* (CD-2007).

Furthermore the terms and conditions of new commitments from official creditors are becoming harder as is reflected in Table 18. The interest rate

has increased to 6 percent in 2000, from a level of 3 percent in 1980, which remained stable at level of 5 percent from 1985 up to 1995. The average maturity of new lending dropped from over 35 years in 1980 to 13 years in 2000 and increased to 20 years in 2003, the average grace period declined from over 8 years to 5 years in the same period and again increased to 8 years in 2007. Moreover, the grant element in new lending decreased from 62 percent in 1980 to less than 21 percent by 2000 and then increased again up to 64 percent in 2005.

IV. CONCLUSION AND POLICY IMPLICATIONS

The analysis presented above indicates that although a modest improvement in the public debt situation has been attained yet the structure of debt remains unchanged, the stock of debt has increased; growth of public debt has remained positive throughout and is quite high presently. It is also found that the share of domestic debt is high relative to the external debt and the combined share of floating and unfunded debt in domestic debt remains very high. Although debt servicing of domestic debt as percentage of total revenue has declined significantly, as percentage of GDP and current expenditure it is still high. Similarly, the volume of external debt of Pakistan remains to be high despite the fact that the total external debt to GDP ratio and foreign exchange ratio has declined. The long-term external debt dominates the debt stock and the share of short-term debt has declined significantly, however, the terms and conditions for new debt commitments remained unfavorable throughout. The share of multilateral debt has increased against the bilateral debt and the share of concessional and non-concessional debt remains more or less unchanged. The recent rescheduling and restructuring of debt provided some relief in terms of debt servicing and repayment which seem to have been eroded by the recent drawing down of foreign exchange reserves and depreciation of rupee. Thus the growing debt burden indicates fiscal and financial reforms have at best kept the debt structure, and its composition the same, growth rate of debt remain high , the saving investment gap persist and Pakistan continues to borrow more to meet its fiscal and external sector deficits.

Whether any significant improvement in the debt situation is expected in the near future will depend on the degrees of freedom available. The scope of reducing current as well as development expenditure remains limited. Reduction in fiscal deficit would therefore depend largely on government's ability to mobilize revenue and its efficient utilization. Similarly correction of external sector imbalances is conditional upon the extent to which exports can increase as the scope of reduction in imports remain limited and any

attempt to enhance growth by increase in imports will only be consistent if exports also increase. Thus the scope of reducing fiscal and external accounts resource gap is limited to the extent to which revenue and exports can be increased and the ease with which imports can be substituted, the direction of movement in oil prices, sustained increase in remittances and pressure on exchange rate. The fiscal and external imbalances have been building up over the past many years and the increasing debt burden is a mirror image of the many weakness in the real, fiscal, financial and external sectors of the economy. These weaknesses will continue to impact the future prospects of self-reliance adversely. Fiscal space may shrink in the future and the economic managers may remain preoccupied with managing interest rate, inflation and exchange rate pressure. Thus both the domestic and external debt position is likely to deteriorate in the future and the debt sustainability indicators may be affected adversely.

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Annexure 1

Structure of Public Debt

Year	Public Debt (Rs. mls)		Total External		As Percent of GDP		Growth Rate	
	Domes-tic	External	Total	Debt (mls $)	Public Debt	External Debt	Public Debt	External Debt
1971	12873	13223	26096	3635	51.7	34.4		
1972	16667	32604	49271	2860	91.1	30.8	88.8	–21.3
1973	17818	32329	50147	4552	75.0	71.9	1.8	59.1
1974	17426	38049	55475	4845	63.9	55.2	10.6	6.4
1975	21245	37857	59102	5438	53.2	48.4	6.5	12.2
1976	27420	46728	74148	6278	56.9	47.7	25.5	15.5
1977	32700	53579	86279	7184	57.6	47.5	16.4	14.4
1978	38530	59435	97965	7947	55.6	44.6	13.5	10.6
1979	49371	67983	117354	8625	60.2	43.8	19.8	8.5
1980	56754	70738	127492	9425	54.4	39.8	8.6	9.3
1981	60088	73924	134012	10256	48.2	36.5	5.1	8.8
1982	76656	101172	177828	10452	54.9	34.3	32.7	1.9
1983	87856	110726	198582	11869	54.5	41.5	11.7	13.6
1984	106554	121240	227794	12524	54.3	40.3	14.7	5.5
1985	143930	140155	284085	12594	60.2	40.7	24.7	0.6
1986	193385	167003	360388	14064	70.0	44.1	26.9	11.7
1987	225246	187030	412276	15881	72.0	47.7	14.4	12.9
1988	284492	207744	492236	16983	72.9	44.2	19.4	6.9
1989	327534	253658	581192	16855	75.6	42.2	18.1	-0.8
1990	376596	297652	674248	19402	79.0	48.7	16.0	15.1
1991	441580	335003	776583	21195	76.4	46.8	15.2	9.2
1992	527595	375233	902828	24233	74.9	49.9	16.3	14.3
1993	612642	446040	1058682	25400	79.4	49.5	17.3	4.8
1994	695972	523891	1219863	25853	78.1	50.1	15.2	1.8
1995	800464	600083	1400547	30292	75.1	50.0	14.8	17.2
1996	915180	658158	1573338	31796	74.2	50.6	12.3	5.0
1997	1050221	813108	1863329	31160	76.7	50.2	18.4	–2.0
1998	1183230	934390	2117620	30492	79.1	49.3	13.6	–2.1
1999	1392463	1494966	2887429	31479	98.3	50.2	36.4	3.2
2000	1578809	1687434	3266243	35306	102.8	57.5	13.1	12.2
2001	1730991	1769233	3500224	29878	102.3	51.1	7.2	–15.4
2002	1717934	1822163	3540097	32465	97.6	54.9	1.1	8.7
2003	1853675	1916478	3770153	35033	93.8	51.0	6.5	7.9
2004	1978969	1999757	3978726	35948	85.9	44.7	5.5	2.6
2005	2129100	1962797	4091897	34491	74.6	37.3	2.8	–4.1
2006	2321700	2146900	4468600	35655	70.3	33.5	9.2	3.4
2007	2597000	2337700	4934700	38699	67.7	32.2	10.4	8.5

Source: *Global Development Finance* (CD-2007).

Various issues of *Annual Reports* of State Bank of Pakistan.

Annexure 2

A Cross-Country Comparison of External Debt Indicators

Debt Ratios/Years	1990	2000	2004
Total External Debt (% of Gross National Income)			
Pakistan	49.5	45.9	45.5
All Developing Countries	36.1	40.2	35.2
Low-Income Developing Countries	56.8	45.7	40.1
Middle-Income Developing Countries	32.1	39.3	38.3
South Asia	31.3	26.8	22.5
External Interest payments (% of Gross National Income)			
Pakistan	2	1.4	1.1
All Developing Countries	1.7	2.1	1.7
Low-Income Developing Countries	1.9	1.1	0.9
Middle-Income Developing Countries	1.7	2.3	1.6
South Asia	1.7	0.9	1.6
Total External Debt (% of Exports of Goods and Services)			
Pakistan	231.2	289.8	191.5
All Developing Countries	178.3	121.4	87
Low-Income Developing Countries	350.1	186.2	147.9
Middle-Income Developing Countries	152.9	113.3	98.6
South Asia	303	155.3	112.7
Total External Debt Service (% of Exports of Goods and Services)			
Pakistan	21.3	25.2	16
All Developing Countries	19.7	20	12.5
Low-Income Developing Countries	22.9	13.1	17.3
Middle-Income Developing Countries	19.3	20.8	18.9
South Asia	27.5	15	18.8
External Interest Payments (% of Exports of Goods and Services)			
Pakistan	9.3	8.7	4.5
All Developing Countries	8.5	6.4	3.5
Low-Income Developing Countries	11.6	4.6	3.4
Middle-Income Developing Countries	8.1	6.6	4.2
South Asia	14.7	5.5	3.5

Sources: *Global Development Finance* (CD-2007).

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