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MONEY DEMAND FUNCTION FOR PAKISTAN (DIVISIA APPROACH)

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Abstract. The money demand function plays a key role in monetary policy formulation. Pakistan economy witnessed severe monetary problems in last few years, which call for a thorough investigation of the root cause. The study tried to estimate money demand function using Divisia type-weighted aggregates, instead of Simple sum official aggregates. Both long run and short run money demand functions were estimated and Stability was also tested. The money demand function based on broader Divisia aggregate ($DivM_2$) was found to be the stable money demand function for Pakistan. The results indicated that the Divisia based money demand estimates were more realistic and had more information content. The study suggested that State Bank of Pakistan should abandon the Simple sum aggregation technique and switch over to the Divisia aggregates, which have more aggregation theoretic foundations.

I. INTRODUCTION

The money demand function plays a pivotal role in monetary policy formulation. Over the last decade or so, the financial landscape of Pakistan has undergone significant changes. The experience of liquidity crisis and its devastating consequences on the economy call for a thorough and in-depth analysis of the root cause. Monetary aggregates play the role of anchor in monetary policy formulation. Modern literature has shed doubts over the conventional monetary aggregation techniques. The aggregation techniques may be the root cause of instability of money demand function and monetary

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problems. Monetary and Financial Statistics Manual (MFSM) of IMF states that, "The Financial instruments with higher transaction cost (with relatively less liquidity) can be classified under broader monetary aggregates and *vice versa*" (IMF, 2000). These guidelines clearly advocate the use of weighted aggregates, while in Pakistan; the State Bank of Pakistan is using Simple sum aggregates.

The demand for money was mostly studied at macroeconomic level, but in order to find out the main determinants of money demand, there was a need to perform deep analysis of its microeconomic foundations. Currently, the common practice among central banks was to construct money measures from a list of possible components by simply adding together those assets that were considered likely sources of monetary services. These were usually highly liquid financial assets and the approach was referred in the literature as *simple-sum* aggregation (Serletis, 2007).

In recent years, however, such a monetary aggregation procedure was questioned and explicit attention was focused on the use of microeconomic and aggregation-theoretic foundations in the construction of monetary aggregates. Currently, in most of the central banks for monetary aggregation, Simple-Sum Index was widely used. In Simple-Sum aggregation, all monetary components are treated as dollar-for-dollar perfect substitutes.

Simple-sum aggregation is vastly used in the literature; however, it is defensible only if the component assets are perfect substitutes. Barnett (1980), in his classic article, "Economic Monetary Aggregates: An Application of Index Number and Aggregation Theory" raised many objections on the application of simple-sum aggregation and suggested the use of Index number theory for aggregation. Diewert (1976) attached the economic properties to the statistical indices and thus devised the link between aggregation theory and statistical index number theory, which paved the way for weighted monetary aggregates.

In Pakistan, the State Bank of Pakistan was still using the simple sum method for monetary aggregation which was replaced by Divisa aggregates in many advanced countries. Moreover, microeconomic foundations of demand for money, which were helpful in devising a sound monetary policy, were yet ignored. In Pakistan, most of the literature focused only the official aggregates and the monetary sector research was confined to the estimation of money demand function and testing its stability. The only study on the topic which compared the simple sum and Divisia indices was that of Tariq and Matthews (1997), but this study was conducted in a period when financial sector of Pakistan was not much developed.

The demand for money decision basically emerged from the individual choice behavior, thus there was a need to analyze the factors, which played significant role in the determination of an individual's cash balance decision. The current study tried to bridge this gap in Pakistani literature. Rest of the study is organized as: next comes the comparison of Simple sum and Divisia aggregates in the literature, after that the formulation of Divisia aggregates was discussed, followed by Analysis of Money demand function based on these aggregates. In this analysis, first time series properties of the data were tested and then one by one all three aggregates were used for money demand analysis. At the end the results of overall analysis were summarized and some insights were gathered.

II. SIMPLE-SUM AND DIVISIA MONETARY AGGREGATES

The Simple-sum monetary aggregation has the problem that it disregards the 'Prices'. A 'price' in the context of monetary assets is the opportunity cost of holding money, or, in other words, the 'User cost of the money'. For these reasons, Friedman and Schwartz (1982), Barnett (1980) and Barnett *et al.* (1984) raised objections against simple sum aggregation and Fisher (1922) described simple sum as the most awful possible index based on its known properties. In this situation, weighted aggregates (Divisia type) appeared as a substitute; which were free of the pitfalls of the simple sum aggregates.

A significant number of studies have established empirically the supremacy of Divisia over simple sum aggregates. Barnett (1980, 1983), Barnett *et al.* (1984) and Acharya and Kamaiah (2001) have strongly recommended the Divisia as the superior aggregate. Belongia (1996), Anderson, Jones and Nesmith (1997), Lucas (2000), Schunk (2001), Stracca (2001, 2004), Duca and VanHoose (2004), and Drake and Mills (2005) provided recent discussions on the merits of the Divisia index relative to the conventional simple sum index.

In spite of strong theoretical background of Divisia, most of the central banks still follow simple sum aggregates, with the argument that both these aggregates provide more or less similar results. But recent literature was strongly advocating the clear-cut differences between the robustness of Divisia and simple sum aggregates. Belongia (2005) opined that it would not be true to describe little differences in the statistical estimates of the two aggregates as 'insignificant differences', because the simple sum aggregation did not have any theoretical base or statistical properties.

III. FORMULATION OF DIVISIA MONETARY AGGREGATES

Barnett (1978) introduced the idea of 'User Cost of Money', which was actually the foundation stone for microeconomic analysis of the monetary aggregation process. User cost of monetary assets enabled the economists to investigate the representative consumer's choice set, not only over the consumption goods, but also the monetary services. Thus, representative consumer's utility was now a function of consumption goods, leisure and monetary services.

$$u = u\,(c, l, x) \tag{1}$$

Where:

c = vector of the services of consumption goods

l = leisure time, and

x = vector of the services of monetary assets.

As this was a weakly separable utility function, the study focused only towards the consumer's monetary problem. Following Serletis and Shahmoradi (2005, 2007), the study assumed that the consumer' monetary problem as:

$$\max f\,(x) \text{ subject to budget constraint } p'x = y$$

where 'x' as defined above was the vector of services of monetary assets, p was the corresponding vector of monetary assets' user cost and 'y' was the expenditure on monetary services. As the monetary assets were of different nature, so the utility function of the consumer became

$$f\,(x) = f\,(f_A\,(x_1, x_2, x_3, x_4), f_B\,(x_5, x_6, x_7, x_8), f_C\,(x_9, x_{10}) \tag{2}$$

where x_1 to x_{10} were different monetary assets. Details are given in Table 1.

Keeping in view these subgroups, Divisia Quantity and Divisia Price Indices were calculated. The annual data for Pakistan economy is used comprising the time period of 1972-2007. Main data sources are Handbook of Statistics on Pakistan Economy (2005) by State Bank of Pakistan (SBP), various Statistical Bulletins of State Bank of Pakistan and CD-ROM of International Monetary Fund (IMF). For designing the demand system based on above given objective function instead of using the simple-sum index, the Divisia quantity index was estimated to allow for less than perfect substitutability among the monetary components. Based on above given sub-grouping, three Divisia quantity aggregates namely; DivM_0, DivM_1, and

$DivM_2$ were designed. For formulating Divisia quantity aggregates, the study used the methodology given in Barnett (1980) and used by Serletis (1988, 1991) and Serletis and Shahmoradi (2005, 2007).

TABLE 1

Component Assets of Monetary Subgroups

Sub-Group	Variable name	Asset
A	X_1	Currency in Circulation
	X_2	Other Deposits with SBP
	X_3	Currency in tills of Scheduled Banks
	X_4	Banks' deposits with SBP
B	X_5	Current Deposits
	X_6	Call Deposits
	X_7	Other Deposits
	X_8	Saving Deposits
C	X_9	Time Deposits
	X_{10}	Residents Foreign Currency Deposits

$$\log M_t^D - \log M_{t-1}^D = \sum_{j=1}^{n} w_{jt}^* \left(\log x_{jt} - \log x_{j,t-1}\right) \tag{3}$$

Where the left hand side of equation showed growth rate in Divisia aggregate over two periods of time, on the right hand side the factor $\left(\log x_{jt} - \log x_{j,t-1}\right)$ was the growth of quantities of component assets, while w_{jt}^* was the Divisia weight. The composition of Divisia weights was defined as the expenditure shares averaged over the two periods of the change.

$$w_{jt}^* = \frac{1}{2}\left(w_{jt} + w_{j,t-1}\right) \tag{4}$$

for $j = 1, ..., n$, where w_{jt} was the expenditure share of asset j during period t, and was calculated as:

$$w_{jt} = \frac{p_{jt} x_{jt}}{\sum_{k=1}^{n} P_{kt} x_{kt}} \tag{5}$$

where p_{jt} was the nominal user cost of asset j, derived in Barnett (1978) as,

$$p_{jt} = p^{*} \frac{R_t - r_{jt}}{1 + R_t} \tag{6}$$

According to Barnett (1978), user cost was the opportunity cost of holding a certain amount of the j^{th} asset. In the given expression, P^* was the true cost of living index, r_{jt} was the market yield on the j^{th} asset, and R_t was the yield available on a 'benchmark' asset that is held only to carry wealth between multi periods.

The selection of benchmark asset was also an issue. The previous studies used gilt yields, corporate bond yields and Treasury bill yields etc. as the benchmark assets. But as Drake and Fleissig (2004) identified that it was possible for the yield on an asset to occasionally exceed the benchmark return, producing a negative rental price, a particular asset should not be nominated as benchmark. Due to this reason, the study followed Drake and Fleissig (2004) and used 'envelope approach', in which the benchmark asset was decided for each period separately, depending upon the yield for that particular period. In this way different assets could have been the benchmark for different years.

After formulating the Divisia quantity index, its corresponding Divisia price index was formulated. Divisia price index is also termed as Divisia Price Dual. The price dual was calculated as:

$$\log P_t^D - \log P_{t-1}^D = \sum_{j=1}^{n} w_{jt}^{*} \left(\log p_{jt} - \log p_{jt-1} \right) \tag{7}$$

Where, P_t^D was price dual of Divisia and p_{jt} was the user cost of monetary asset 'j' in time period t.

This price dual of Divisia was defined as the weighted sum of the rate of change of the prices of component assets, where the weights were defined as the shares of component assets in the total expenditure on all assets in the index. The remaining procedure and data was similar to that of Divisia quantity index.

IV. MONEY DEMAND ANALYSIS BASED ON DIVISIA MONETARY AGGREGATES

After the formulation of three Divisia quantity aggregates and their corresponding three Divisia price duals, the stability of demand function

based on Divisia aggregates was checked. For this purpose, the same methodology was repeated, that was used for the simple-sum aggregates — M_0, M_1 and M_2. First, the individual series were tested for unit root and the Cointegration tests were applied, to check for long run relationship. At the end, Error Correction Mechanism (ECM) was used to capture the short run effects of the model.

An important step in the formulation of Divisia quantity indices and their corresponding price duals was the choice of benchmark asset. Instead of choosing a specific monetary asset as a benchmark asset, this study followed Drake *et al*. (2003) and used envelopment approach. In this way different assets could perform as benchmark asset for different years. The indices, thus formulated were free of many drawbacks, which could result due to a specific benchmark asset.

These weighted aggregates and their price duals were then subjected to stationarity check and then money demand functions based on these money aggregates were formulated through cointegration and ECM methodologies. Divisia aggregates were designed through the procedure outlined in previous paragraphs and their corresponding price duals were obtained through overtime cumulating the weighted sum of individual prices of assets. The shares of component assets in the total expenditures were treated as weights. These series were used for further analysis of money demand function.

STATIONARITY AND COINTEGRATION

In order to test for stationarity, all three Divisia aggregates were subjected to Augmented Dickey Fuller test. The results indicated that all three newly constructed time series of Divisia Monetary aggregates and their price duals were stationary at levels, but the log of real GDP (LRGDP) and log of financial innovations (LFI) were non-stationary at levels (Financial Innovation is captured through the ratio of M_2 minus Currency in circulation over GDP; Ratio of M_2 – CC/GDP). Both these variables were stationary at first difference.

As the results in Table 2 indicated, all the three monetary aggregates ($DivM_i$) and their price duals (PD_i) were stationary at levels. The study was aimed at exploring the long run money demand relationship and rest of the variables in the model were integrated of order one, so the order of integration of the model variables was not the same. In this situation the Johansen and Juselius (1990) approach was also not applicable. If order of integration of the model variables was not the same, the only available option was to use Autoregressive Distributed Lag (ARDL) approach.

TABLE 2

Augmented Dickey-Fuller Test for Unit Root in Level I(0)

Variables	With Intercept but No Trend	With Intercept and Trend
$DivM_0$	–4.541*	–6.579*
$DivM_1$	–4.669*	–4.937*
$DivM_2$	–4.923*	–5.050*
PD_0	–6.654*	–6.535*
PD_1	–5.912*	–5.846*
PD_2	–5.826*	–5.755*
LRGDP	–1.156	–1.749
LFI	–2.117	–2.778

*The coefficient is significantly different from zero at 0.05 percent probability level.

The ADF statistic are –2.9591 and –3.5615 for models 'with Intercept but no Trend', and 'with Intercept and Trend' respectively at 0.05 percent probability level.

ARDL approach was introduced by Pesaran *et al.* (1996) and was applied in this study through two step procedure as described in Pesaran *et al.* (1996). First, for the checking of existence of any long run relationship between the model variables, a joint hypothesis was tested. The null hypothesis that there was no long run relationship between the model variables was tested against the alternative hypothesis of existence of long run relationship.

MONEY DEMAND MODEL BASED ON $DivM_0$

The money demand models based on Divisia Reserve money ($DivM_0$) was a function of log of real GDP, Price dual of Divisia (PD_0) and log of financial innovation (LFI). Among these variables, $DivM_0$ and PD_0 were integrated at levels, *i.e.* I(0), while LRGDP and LFI were I(1), hence ARDL approach was the logical choice for cointegration analysis. In ARDL approach, there were two steps involved; as a first step, the hypothesis for the existence or otherwise of long run relationship was tested. Here the choice of order of VAR was of utmost importance, because the F-statistic of joint hypothesis was sensitive to the order of VAR. The ARDL equation used in this regard was:

$$DDivM_{0t} = a_0 + \sum_{i=1}^{n} b_i DDivM_{0,t-i} + \sum_{i=1}^{n} c_i DLRGDP_{t-i} + \sum_{i=1}^{n} d_i DPD_{0,t-i} + \sum_{i=1}^{n} e_i DFI_{t-i} + \delta_1 DivM_{0,t-1} + \delta_2 PD_{0,t-1} + \delta_3 LRGDP_{t-1} + \delta_4 LFI_{t-1} \cdots \quad (8)$$

Where, a, b, c, d, e, and δ_i were coefficients, D was used for difference of variables, and 'n' indicated the number of lags used.

The F-statistic so obtained was compared with the critical values provided in Pesaran and Pesaran (1997) and Pesaran *et al*. (2001). These critical values were different for different models as well as for the number of regressors. The F-statistic of the reserve money model with 'Unrestricted intercept and no trend' was 5.8835, while the critical value lower and upper bounds for $j = 3$ were 3.800 and 3.219 respectively at 5 percent level of significance ('j' indicated the number of regressors). As the F-statistic was greater than upper bound at 5 percent level of significance, it was the indication of existence of long run relationship between money demand and other model variables.

TABLE 3

Autoregressive Distributed Lag Estimates of $DivM_0$
ARDL (0, 1, 1, 0) Selected Based on AIC

Regressor	Coefficient	Standard Error	T-Ratio
PD_0	–0.019**	0.005	–3.664
$PD_0(-1)$	–0.044**	0.020	–2.202
LRGDP	20.737*	12.032	1.723
LRGDP(–1)	–17.228	16.841	–1.439
LFI	42.114	39.479	1.067
C	147.126***	10.786	13.641
R-Square = 0.42 DW stat = 2.491 F-stat = 3.982			

*, ** and *** indicate that coefficients are significant at 0.10, 0.05, 0.01 percent probability level respectively.

The next step in ARDL methodology was finding out ARDL estimates and error correction representation. In this regard, the lag orders of the variables were selected through Akaike Information Criterion (AIC), in other options; R-square, Schwarz Bayesian Criterion (SBC) and Hannan and Quinn Criterion (HQC) were available. The study used all the four criteria but AIC was found better in the present case at order of VAR equal 2. The estimations were carried out in Microfit software in which the lag length of variables was selected under inbuilt algorithm. ARDL estimates of the model of Divisia M_o were computed and these estimates were based on AIC. The results were given in the Table 3.

The results shown above indicated that the price dual of Divisia (PD_0) was significantly affecting the demand for money both at levels and also at first lag. There was a negative relationship between quantity of money demanded and price of money (Price dual). Moreover, relationship of income and money demand was also significant at 0.10 percent probability level. Larger coefficient of income variable indicates that increase in GDP results in higher demand for liquid assets, *i.e.* M_0. But the variable of financial innovations was not significant. R-square, Durban Watson statistic and F-statistic were normal, showing good statistical properties of the model.

The long run coefficients of the ARDL model with ARDL (0, 1, 1, 0) were also showing the same pattern as of ARDL estimates. Once again in long run estimates, the coefficients of price dual and real GDP were significant but the coefficient of financial innovation was not significant. The long run reserve money demand function was:

$$\underset{\quad}{\text{Div}M_0} = \underset{\quad}{147.1263} - \underset{(13.6406)}{0.0635\ PD_0} + \underset{(-1.8465)}{3.5109\ \text{LRGDP}} + \underset{(3.4323)}{42.1141\ \text{LFI}} \qquad (9)$$
$$\underset{\quad}{\qquad} \qquad \underset{\quad}{\qquad} \qquad \underset{(1.0667)}{\qquad}$$

(t-values were in parenthesis)

This long run relationship was illustrating that one unit change in price of money resulted in 0.06 units decrease in demand for money and one unit increase in real income resulted in 3.5 units increase in the demand for money. The reserve money demand function based on Divisia described that there was no significant impact of financial sector developments on the demand for reserve money in the long run. This phenomenon indicates that most of the financial instruments introduced were focused at mobilizing savings or consumer financing and not for the increase in reserve money.

In order to capture the dynamics of the money demand function error correction model was estimated. The results of error correction representation were shown in Table 4.

TABLE 4

Error Correction Representation for $DivM_0$ ARDL Model

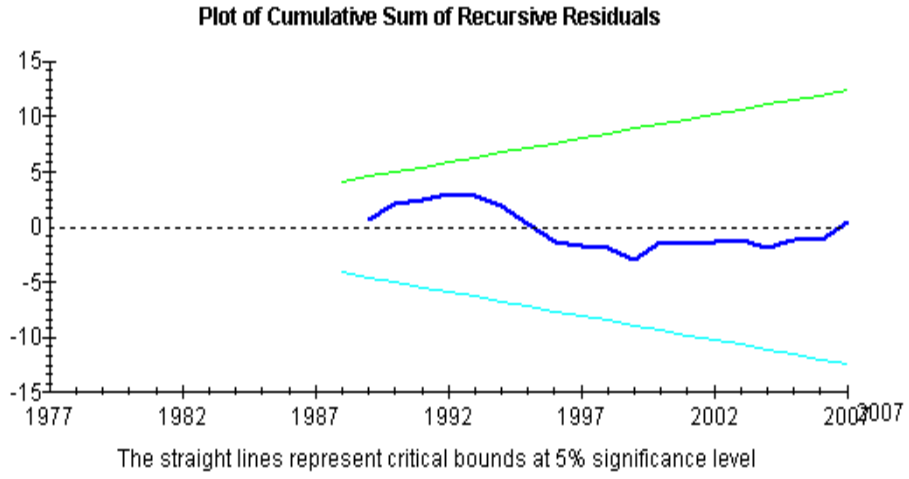
Regressor	Coefficient	Std Error	T-Ratio	Prob.
Intercept	147.126***	10.7859	13.6406	0.000
DPD_0	–0.1917***	0.0052	–3.6644	0.007
DLRGDP	20.737***	12.0324	1.7234	0.078
DLFI	42.1141	39.4797	1.0667	0.295
ECM(–1)	–0.820	0.3141	2.6110	0.02
R-Square = 0.68 DW stat = 2.491				

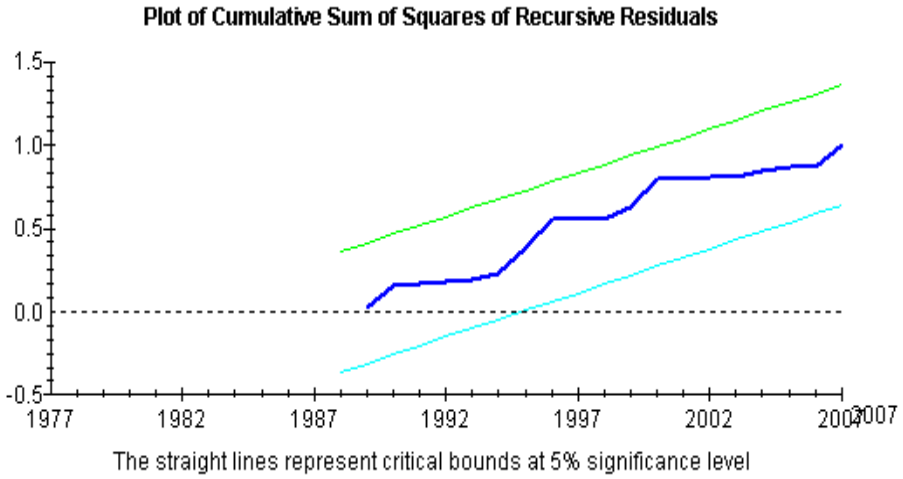
*, ** and *** indicate that coefficients are significant at 0.10, 0.05, 0.01 percent probability level respectively

The results of error correction model indicated that in the short-run opportunity cost variable (Price dual of Divisia) had a negative and significant impact on money demand, while real income also had a strong and highly significant impact on individual decisions of money demand. The error correction term showed a high speed of adjustment of disequilibrium.

FIGURE 1

CUSUM and CUSUMSQ Plots of $DivM_0$ Model





The CUSUM and CUSUMSQ plots of the residuals of the model showed a consistent and stable pattern, indicating that the long run relationship was a stable relationship (Figure 1).

MONEY DEMAND MODEL BASED ON $DivM_1$

After the estimation of reserve money function, the narrow money demand function was estimated. $DivM_1$ was a broader than the $DivM_0$ aggregate, because it contained along with all the components of $DivM_o$, current deposits, call deposits and the saving deposits as well. The behavior of $DivM_1$ was expected to be different from the reserve aggregate. As mentioned in the previous section, two variables of the narrow money function namely; $DivM_1$ and PD_1 were stationary at levels and rest of the variables, *i.e.* LRGDP and LFI were integrated of order one, so the possible option for cointegration analysis was the ARDL approach. The ARDL model of $DivM_1$ was subjected to cointegration analysis with first differences of PD_1, LRGDP and LFI with lags. In the first step of ARDL based cointegration analysis, the joint hypothesis of presence of long run relationship was tested and the value of F-statistic was compared with the ARDL critical bounds given in Pesaran *et al.* (2001). As the F-statistic (7.1561) was greater than the upper bound (3.219), which indicated the presence of long run relationship. Thus on the basis of this cointegration result, the ARDL estimates were achieved with order of VAR 2 and by using AIC for lag selection. The Akaike Information Criterion selected the lag length of (4, 4, 3, 3) for $DivM_1$, PD_1, LRGDP, and LFI respectively. The long run estimates for the reserve money demand ($DivM_1$) were:

TABLE 5

Long run Coefficients for $DivM_1$ Based on ARDL (4, 4, 3, 3) Model

Regressor	Coefficient
PD1	–0.0034* (–1.7258)
LRGDP	5.0320** (2.2318)
LFI	–49.9880 (–0.3544)
Intercept	169.9308*** (4.6572)
R-square = 0.74 DW statistic = 2.66	

*, ** and *** indicate significant at 0.10, 0.05 and 0.01 percent probability level respectively.

(t-values in parenthesis)

The results showed that price dual of Divisia and real income were significant at 0.01 percent and 0.05 percent probability levels respectively as well as both had the correct signs, but once again financial innovation was insignificant and also had negative sign, which was contrary to the economic theory. The results were illustrating that the long run money demand function was dependent upon user cost of asset and income.

TABLE 6

Error Correction Representation for $DivM_1$ ARDL Model

Regressor	Coefficient	Std Error	T-Ratio	Prob.
Intercept	164.208***	65.145	2.521	0.023
$dDivM_13$	0.356*	0.199	1.794	0.092
dPD_12	–0.034***	0.012	2.709	0.010
dLRGDP	40.111*	22.086	1.816	0.081
dLFI1	280.745***	97.375	2.883	0.011
ECM(–1)	–0.966***	0.385	–2.510	0.023
R-Square = 0.85 DW stat = 2.65				

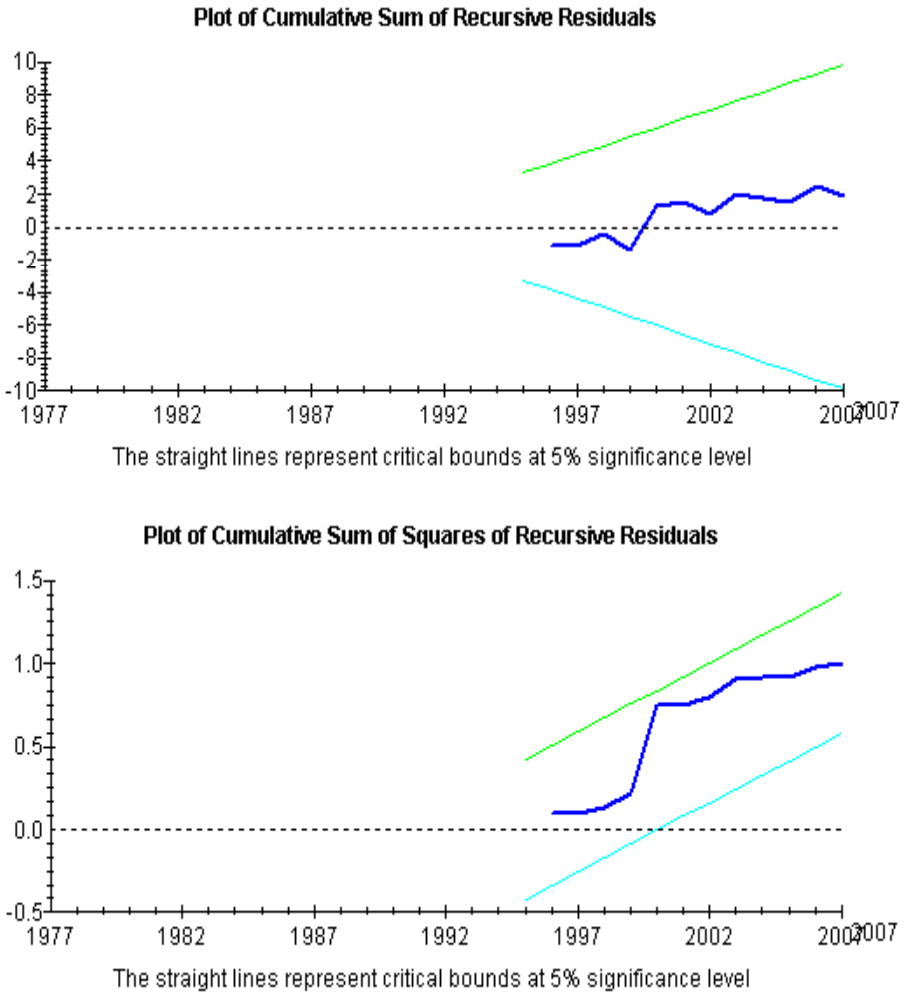
*, ** and *** indicate that coefficients are significant at 0.10, 0.05,0.01 percent probability level respectively.

The analysis of error correction model represents that most of the variables were significant at 10 percent probability level and at most of the lag lengths the variables showed correct signs. In few lagged variables the significance was not achieved. The error correction term was indicating the disequilibrium of the previous period being corrected with very high speed.

The results were confirmed through the check of stability of residuals. Both the CUSUM and CUSUMSQ plots were within the 5 percent critical bounds (Figure 2).

FIGURE 2

CUSUM and CUSUMSQ Plots of $DivM_1$ Model



MONEY DEMAND MODEL BASED ON $DivM_2$

The $DivM_2$ was the broad money aggregate which included the components of $DivM_0$, $DivM_1$ and time deposits. These aggregates were designed with the same components as were in the official aggregates M_2 but the methodology of aggregation was different. The official aggregates were formulated through simple summation but $DivM_2$ was designed through the weighted aggregation based on relative moneyness of the component assets.

The long run money demand function based on broad money was the function of broad money's corresponding price dual (PD_2), real income (LRGDP) and financial innovation (LFI). The variables of $DivM_2$ and PD_2 were stationary at levels as shown in the Table 2 and rest of the model variables were integrated of order one. This mixed order of integration of model variables illustrated that ARDL approach was the logical choice for Cointegration analysis and error correction mechanism.

In the first step of cointegration analysis, through single equations approach the joint hypothesis of 'no cointegration' among the model variables was tested against the presence of cointegration. The null hypothesis of 'no cointegration' was rejected because the calculated F-statistic (6.0741) was greater than the upper bound of ARDL critical values (3.219). Non-acceptance of the null hypothesis implied the existence of long run money demand relationship based on Divisia broad money ($DivM_2$).

TABLE 7

Autoregressive Distributed Lag Estimates for $DivM_2$
ARDL (0, 1, 0, 0) selected based on SBC

Regressor	Coefficient	Standard Error	T-Ratio
PD_2	–0.037*	0.021	–1.731
$PD_2(-1)$	–0.030*	0.017	–1.809
LRGDP	3.475*	1.958	1.775
LFI	175.843**	76.186	2.308
C	151.956***	19.796	7.676
R-Square = 0.43 DW stat = 1.96			

*, ** and *** indicate that coefficients are significant at 0.10, 0.05, 0.01 percent probability level respectively.

In the second step, the ARDL estimates, long run coefficients and error correction model were estimated. For the estimations, order of VAR was specified as two and results with all criteria were calculated, but SBC based results were more robust. The ARDL estimates based on Schwarz Bayesian Criterion were reported in Table 7.

The ARDL estimates were based on SBC and selected lag length was (0, 1, 0, and 0) for $DivM_2$, PD_2, LRGDP and LFI respectively. These ARDL estimates were of secondary importance, while the long run coefficients were of the prime importance which illustrated the magnitude and direction of the relationship.

The long run coefficients of the model were:

$$DivM_2 = 151.9562 - 0.0670\ PD_2 + 3.4754LRGDP + 175.8430LFI \quad (10)$$
$$(7.6760) \quad (0.0281) \quad (1.7747) \quad (2.3081)$$

(Values in parenthesis were t-values)

This long run relationship indicated that price dual of Divisia M_2 (opportunity cost of money) had a negative relationship with the demand for broad money, while real income and financial innovation had positive impact on money demand. These results were in line with the economic theory and indicated that as the user cost of money or opportunity cost of holding money decreased, people preferred to hold more balances. Similarly, with the increase in money incomes, people also demanded more money, while easy financial developments and sophistications in modes of payment and lesser user cost in terms of time and money for drawing the money also positively effects the demand for money in the long run.

TABLE 8

Error Correction Representation for $DivM_2$ ARDL Model

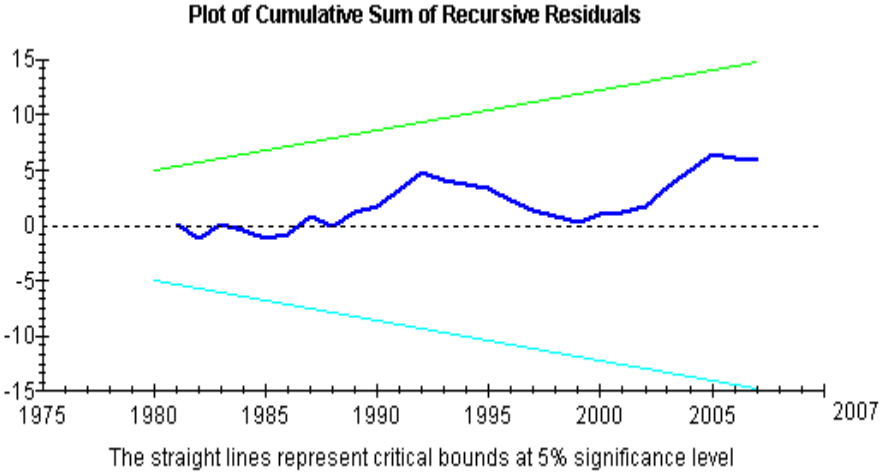
Regressor	Coefficient	Std Error	T-Ratio	Prob.
Intercept	151.956***	19.796	7.676	0.000
dPD_2	–0.037*	0.021	–1.731	0.089
dLRGDP	3.475*	1.958	1.775	0.087
dLFI	175.843**	76.186	2.308	0.029
ECM(–1)	–0.983**	0.451	2.179	0.029
R-Square = 0.6095 DW stat = 1.9633				

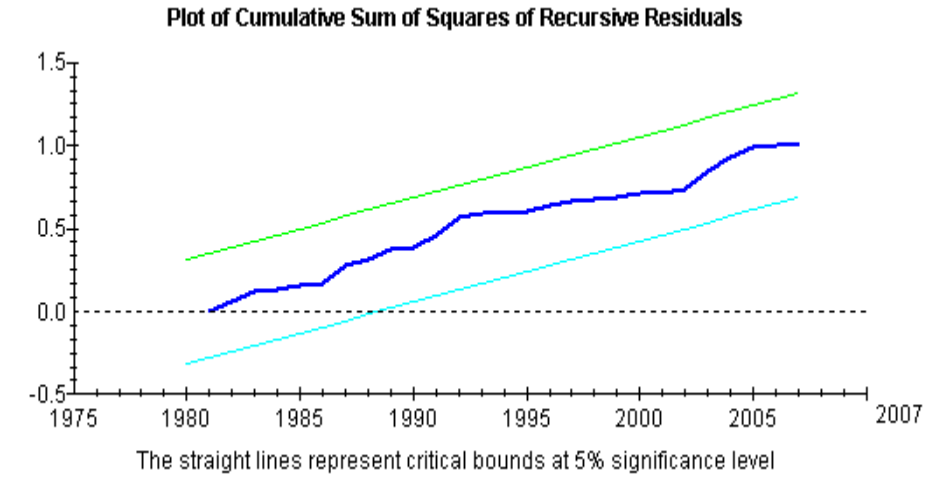
*, ** and *** indicate that coefficients are significant at 0.10, 0.05,0.01 percent probability level respectively.

The results of ECM also showed that the disequilibrium of the previous period was almost fully settled in the current period as was evident from the coefficient of the error correction mechanism. The results for short run indicate that statistically there is more sound relationship among the model variables as compared with the long run estimates. The statistical properties of the model were also satisfactory as shown by the results in Table 8.

FIGURE 3

CUSUM and CUSUMSQ Plots of $DivM_2$ Model





In order to check the stability of the long run and short run estimates, the residuals were subjected to CUSUM and CUSUMSQ tests. The CUSUM and CUSUMSQ plots indicated that the recursive residuals and their squares,

both were within 5 percent significance bounds indicating the stability of the money demand function. The CUSUM and CUSUMSQ plots are given in Figure 3.

These Divisia based results of money demand models were little at variance with the only study in Pakistan on the topic, *i.e.* Tariq and Matthews (1997). The study by Tariq and Matthews (1997) concluded that in Pakistan there was not much difference in results of money demand relationship based on simple sum and Divisia aggregates. The present study showed that the Divisia based aggregates have more elaborate results as compared with their simple sum counterpart. The variable of financial innovation was significant, which was an indication of the development of the financial sector of Pakistan. Serletis (2005) pointed out that in the initial stages of financial development, the economies of scale were not available, so financial development did not show significant impact on money demand, but after achieving the economies of scale, the transaction costs come down and the money demand would be positively affected.

As the results of two studies indicate gradual increase in effectiveness of weighted aggregates, the observations of Serletis (2005) indicate that monetary aggregates should be formulated using weighted aggregation. Although, the results of current study are not supporting the hypothesis of discarding simple sum method more convincingly, yet these results are hinting towards the reason for ineffectiveness of current interest rate targeting policy of SBP.

In the light of above results and the guidelines of International Monetary Fund for monetary aggregates, it is imperative for the State Bank of Pakistan to switch over to the weighted aggregation system, because it will ensure the effectiveness of the monetary policy. Moreover, the results of long run and short run analysis suggest that income and financial development play a significant role in the money demand decision of the individuals. The role of interest rate as an effective monetary policy tool has been over emphasized. The study indicated that only interest rate targeting cannot provide monetary economic stability. For an effective monetary policy, true monetary aggregates can serve as the guidelines for the policy makers.

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COMMENTARY ON ROLE OF RECEPTIVE AND EXPRESSIVE INFLUENCE TACTICS AND BEHAVIOURS IN PERSONAL SELLING PROCESS

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Abstract. In modern times, organizations have been identified as an important part of societal existence and reliant on effective interpersonal relationships. For profit-seeking organizations, the infusion of capital plays an essential role in the continued existence and functioning of organizational health. The primary activity for most market-driven companies is generating profits and shareholder value from sales initiatives. As capitalist societies change their focus from production to consumption orientations, corporations are moving toward controlling this consumption by attempting to get people to consume through marketing functions (Ritzer, 2005). Organizations have an increased interest in developing mutually beneficial long-term influence relationships with their clients through the use of an organizational sales force considering the rising and intensified competition. These organizational sales members that engage in personal selling initiatives play a vital role in the overall success or failure of businesses. In this connection, the current study reviews the previous studies in order to explore how salespersons can use different influence tactics and behaviours effectively to achieve strategic goals of the organizations. The study concludes that when a salesperson has established a realistic but optimistic goal, considered the state of the relationship, and analyzed the contextual factors, he/she is in a good position to select the tactical approach and specific behaviours that are most likely to accomplish the results he/she plans to achieve. Effective deployment of different receptive and expressive influence behaviours by the salespersons can result into increased flexibility in dealing with clients with diverse backgrounds and requirements, improved conflict resolving skills and

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more positive and productive personal and professional relationships with the clients. Thus, sales managers are urged to ensure their sales force develop their skills of receptive and expressive influence behaviours in a balanced way as critical means to improve their sales performance and to nurturing mutually beneficial relationships with valued clients.

I. ROLE OF SALESPERSONS IN PERSONAL SELLING

The beginning of the 20th century began to lay the foundations for the development of sales departments, sales management, and formal education in selling (Powers, Koehler, and Martin, 1988). In the era (2003-present) of sales competency, organizations focus on the buying experience of the clients which is highly dependant on the salesperson's competence for building relationships, solving problems, and bringing true value to them and not just winning the sale. Mostly market-driven companies are generating profits and shareholder value from different sales initiatives. As capitalist societies change their focus from production to consumption orientations, corporations are moving toward controlling this consumption by attempting to get people to consume through marketing functions (Ritzer, 2005). The mounting and intensified competition realized organizations of the necessity to building and nurturing mutually beneficial strategic relationship with their clientele by employing their sales force. These organizational sales representatives engage in personal selling initiatives play a vital role in the overall success or failure of contemporary businesses. In this connection, the current study reviews the previous studies in order to explore how salespersons can use different influence tactics and behaviours effectively to achieve strategic goals of their organizations. However, the role of salespersons in developing, establishing and sustaining relationships with customers has become increasingly complex.

Since markets are rapidly changing, so the knowledge assets and intellectual capital are of paramount importance in determining organizational and market success (Stewart, 2001). Technology and culture are changing business economies in completely new and increasingly fragmented ways where consumers have almost endless choices (Anderson, 2006). Even with the globalization of the economy in terms of profits, personal relationships still matter for many businesses. In efforts to best facilitate personal interactions with customers, many profit-seeking organizations utilize a sales force. Thus, due to the salespersons direct link to sales via client interaction and the high expense involved in their training and maintaining, profitability of the organization is greatly influenced by their effectiveness (Zoltners, Sinha, Lorimer, 2004). The personal sales interaction is key to both being

competitive and spurring consumption for organizations and economies existing in capitalistic markets (Korczynski, 2005). As such, the success of salespersons of the organization determines the economic health of the company. Utilizing a sales force to sell products is considered as strategic decision by an organization because of the availability of the wide-range of sales channel options for selling products and services. Channel choices include, but are not limited to, sales partners (*e.g.*, distributors, resellers), stores and Internet, etc. Many organizations decide to sell utilizing a mix of multiple sales channels in order to maximize reach to current and/or potential clients. Consultative selling, value-added selling, professional selling, needs satisfaction selling, customer-oriented selling, strategic selling, relationship selling, solution selling, and partnering are all terms often used interchangeably, to describe the personal selling process (Marone and Lunsford, 2005). Rackham and DeVencentis (1999) pointed out that clients are attaching increased importance on consultative and enterprise/partnering selling approaches compared to others.

Oakes (1990) describes that salespersons undergo multi-phased sales process including prospecting and qualifying prospects, interviewing potential customers, closing the sale, and providing service to clients. Among the important communication interactions in which sales force may engage include collecting information about prospective customer, developing sales strategy based on information, and communicating messages to implement organizational strategy, evaluating the impact of these messages, and making adjustments based on this evaluation (Weitz, 1978). The customization and tailor-made communication to establishing, nurturing and sustaining relationships with clients is where the concept of 'personal selling' is derived. Thus, sales forces are particularly well-suited toward the acquisition and retention of customers because they can provide two-way communication with clients, can customize the product offering and message to a customer's specific needs and buying process, can create relationships with customers and other partners, and can act as an important information gathering resource for the firm (Zoltners, Sinha and Lorimer, 2004). Salespeople are on the front lines for organizations, are in the best vantage point identifying market trends, and need to be nurtured by organizational leaders as important information gathers (Liu and Comer, 2007) as many salespeople do understand the importance of information to the organization itself (Klompmaker, 1980).

While maintaining a sales force is generally the most expensive sales channel to utilize (Friedman and Furey, 1999), a sales force in turn also has the advantage of being the most consultative and adaptive sales channel

option (Friedman and Furey, 1999). The value attached to a sales person's personal contact with the customer often makes using a sales force the most effective method for making a sale (Sujan, Weitz and Sujan, 1988). This is because salespersons are able to interact with potential clients through one-on-one interactions, typically have the most expert knowledge about the good or service being sold, and are generally more committed to selling the product. Researchers contend that successful interpersonal relationships in marketing efforts are important for building trust and commitment for business transactions (Heide, 1994; Zhao and Cavusgil, 2006). Some researchers warn not all businesses rely on interpersonal relationships but rather focus on high quality and consistent offerings (*e.g.*, Iyer, Sharma and Evanschitzky, 2006). Personal selling offers the richest communication option through face-to-face interactions given that it allows for consultation and the asking and responding to clients' issues successfully (Schuster and Danes, 1986; Rackham, 1988). For many organizations selling complex products, relationships, and solutions, personal selling is a necessity for market penetration and expansion. Managers of market-driven firms must understand their clients' preferences and ensure they make the most of their sales force (Leigh and Marshall, 2001). Thus, organizational managers must utilize their sales force in a more effective manner that creates customer value rather than acting simply as transmitters of information and order takers (Rackham and De Vincentis, 1999).

Some scholars argue no single job type is more important to the success or failure of a business than that of personal selling because sales persons represent the company to customers and are critical relationship builders (*e.g.*, Anderson and Huang, 2006). Substantial number of investigations in sales and marketing context has focused on the effect of the salespersons' characteristics on their sales performance. Early traditional research into sales success was viewed as a function of the sales person's job satisfaction, motivation, ability, role clarity, and other attributes particular to the sales his or her biographical or psychological profile (Riordan, Oliver, and Donnelly, 1977). The most frequently studied theme pertaining to personal selling is the examination of the selling processes and techniques of salespersons (Williams and Plouffe, 2006). Selling process and technique studies examine individual level approaches to improving the effectiveness of client and prospect interactions and sales outcomes, respectively.

Research examining and explaining the effectiveness of personal selling has since found mixed results and published research in journals examining personal selling success has been broken up into a range of topics. Sales research has investigated variables relating to sales success that include

influence strategies, personality traits/behavioural dispositions, and sales persons' resources and capabilities. Walker, Churchill and Ford (1977) identified a salesperson's performance as being a function of his or her:

(*a*) level of motivation,

(*b*) sales aptitude, and

(*c*) perception of how his or her role should be performed.

However, as Weitz (1981) notes, much research in selling has remained inconsistent and at times has yielded contradictory results, even for variables that can be assessed with high reliability such as age, education, and sales experience. Personal selling depends on successful interpersonal communication which is the most basic activity for the salespersons during personal selling negotiations (Williams and Spiro, 1985) whereby their success results in how well they achieve a common understanding enabling them achievement of mutually benefiting goals (Webster, 1968). A sales person's presentation efforts are especially important whereby good negotiation are more effective than poor negotiation especially for complex, new brands **(**Levitt, 1967).

A sales person's interpersonal competencies have been identified as an important skill set for facilitating sales relationships and understanding organizational buyer-seller relationships. Spekman and Carraway (2006) stated these interpersonal competencies include a salesperson's abilities for speaking and listening well, relating to others in a one-on-one situation, even if the customer has different values or perspectives, and interacting appropriately in diverse situations. Liu and Comer (2007) found that there are definite factors management can harness to support the retrieval of critical sales information by their salespeople that include recruiting/hiring salespeople with good negotiation skills, providing training, and insuring support from upper management for information retrieval. Salespersons could be able to acquire valuable information from their clients, by employing receptive influence tactics, is an important interpersonal competency for salespeople allowing him or her to adjust persuasive messages about a product or service during interactions with clients.

Asking questions to the customer has been advocated as a useful method for gathering information and understanding client's needs. Schuster and Dane (1986) found using questions were an important part of making a sale and customers respond to both product and relationship aspects of conversations. Schuster and Dane (1986) state asking questions aid the sales person in task comments (*e.g.*, discovering customers' needs, answering

objections) and socio-emotional comments (*e.g.*, acknowledging the customer, releasing tension). To aid in tailoring a presentation, the sales person should also ask appropriate questions to find relevant information and more effectively communicate and match product to client's needs (*e.g.*, Rackham, 1988; Ziglar, 1991; Freese, 1999). Asking questions are important for adaptive selling because questions help the sales person to diagnose the product/service needs of a customer, control the flow of conversations and the flexibility alter persuasive appeals and sales strategies to utilize with the customer (Pettijohn, Pettijohn, Taylor and Keillor, 2000).

Since most organizations are so reliant on sales initiatives, the interpersonal sales relationships the sales forces engages in with clients is extremely important and has a number of implications for organizational success in regards to pulling in both intelligence about customer needs in the marketplace and monetary resources generated from sales. Every sales interaction is important to the organization because of the opportunity costs involved (Spiro and Perreault, 1979). It must be acknowledge the nature of selling is becoming increasingly complex, has changed dramatically in the past decade, and the relationship between the sales person and customer has changed, especially due to customer expectations of salespeople to be more knowledgeable, respond faster, and provide solutions to their problems (Cron, Marshall, Singh, Spiro and Sujan, 2005). A salesperson's ability to adapt within a selling situation is one of the most frequently studied topics pertaining to influence techniques used in personal selling and was first noted in the sales and sales management literature primarily during the 1980s (Fine, 2007). Sales theorists have suggested that successful salespeople are able to evaluate and adjust their sales approaches to fit perceptions of customers and such adjustments improve performance. Research has shown salespeople use different sales approaches in different situations. Early research contributing to the notion of adaptive selling was conducted by Wise (1974) who notes the need for sales persons to judge prospects quickly using stereotypes and rules of thumb to determine what type of sales approach to employ. Wise's research found customers that were dressed well when visiting new car salespeople were treated "better" than those who were poorly dressed.

Spearheaded by Weitz, sales and marketing scholars are responsible for a great deal of research examining relationships between sales person behaviour and customer decision making in regards to adaptive selling. Weitz (1978) queried salespeople from a large industrial manufacturer and found a significant relationship between performance and strategy formulation abilities. This scholar contends that a salesperson's impression

of the customer is based on an evaluation of: choice space or the customer's decision process for making choices; choice rule or how a customer combines information in the choice space to reach a decision; and modifiability, the degree to which a salesperson believes he or she can influence or change the customer's choice space and/or choice rules. A significant relationship was found between cognitive abilities and performance is related to the salesperson's ability to correctly analyze the impressions of the customer. In related research, Spiro and Perreault (1979) examined the combinations of influence strategies used by salespeople during a sales call based on five different influence strategies that included legitimate, expert, referent, integration, and impression management. The researchers also sought to evaluate the impact of antecedent situation characteristics on the salesperson's choice of influence. For example, they postulated that expectations and influence attempts would be different if the salesperson was dealing with a regular customer versus a new customer. The results indicate that selling situation impacted the salesperson's choice of influence strategy mix and different patterns of influence use were identified. The use of influence strategy depends on to what extent the customers are involved in buying process and how much importance they place on their purchase. Hence, the study effectively showed a relationship between influence tactics used by the salesperson and the sales situation. Weitz's (1981) contingency framework proposed that effective selling is a series of salesperson's behaviours contingent upon the resources of the salesperson, the characteristics of the buyer-seller relationship, and the nature of the customer's buying task.

Weitz's framework assumes there is no one sales situation or one way to sell. Different approaches and salesperson's characteristics are needed to sell to new business versus established business and customers having varying personalities. Salespeople can realize long-term benefit from using customer-oriented selling but also incur costs such as a loss in short-term sales due to longer selling cycles. Thus, customer-orientation makes sense when benefits outweigh the costs and are likely when:

(*a*) the sales person can offer a range of alternatives and has the expertise to determine which alternatives will satisfy customer needs;

(*b*) the salesperson's customers are typically engaged in complex buying tasks;

(*c*) the salesperson typically has a cooperative relationship with his or her customers; and

(*d*) repeat sales and referrals are an important source of business for the salesperson.

Additionally Weitz, Sujan, and Sujan's (1986) framework for adaptive selling implies that adaptive selling behaviour increases with experience. This contention was supported by a meta-analysis conducted by Franke and Park (2006). Sujan, Weitz and Sujan (1988) advocated improving sales productivity by having sales people work 'smarter' not 'harder'. The authors contend better sales people are more effective sellers due to being better at adaptive selling. In turn, adaptive selling is enhanced by knowledge and motivation. Sujan, Weitz, and Sujan (1988) propose ten ways to increase salesperson's productivity by making them 'smarter' that include:

1. utilization of scenarios in training;
2. how to better categorize customers based on "underlying" attributes such as personalities or behavioural styles rather than "superficial" attributes such as sex and age;
3. provide salespeople with market research;
4. integration of company information (*e.g.*, products, presentation techniques, polices) based on customer classifications;
5. using expert salespeople in training;
6. making the job fun by attending to both intrinsic and extrinsic rewards; being careful that compensation isn't rewarding the wrong type of behaviours from the sales force (*e.g.*, rewarding only consequences of work not content);
7. providing feedback;
8. encouraging salespeople to analyze success and failures;
9. helping salespeople to manage themselves; and
10. building a sense of mutual commitment.

Perhaps the primary draw of adaptive selling is that it logically makes sense. The adaptive selling framework developed by Weitz, Sujan and Sujan's (1986) and the personality traits advocated by Spiro and Weitz (1990) seem to align with an ability to tailor and alter a pitch by salespeople. After all, what scholars and practitioners are searching for are those qualities that some individual salespeople possess that make them more persuasive, and thus, more successful in sales interactions with customers. The adaptive selling research proposes that salespeople have an opportunity to gather

information, process that information, and adjust to the customer based on the salesperson's skills and capabilities during a sales interaction. This requires communicative activities that include probing for information, asking questions, listening, and detecting verbal and nonverbal cues yet empirical relationships between such cues and selling effectiveness is meager (Morgan and Stoltman, 1990).

II. EFFECTIVENESS OF INFLUENCE TACTICS IN PERSONAL SELLING PROCESS

However, a related research stream is being investigated by sales and marketing scholars exploring the antecedent skills and capabilities of salespeople through an analysis of social cognitions (Porter and Inks, 2000). Research demonstrates that customers form attitudes about salespeople based, in part, on whether the salesperson uses a 'weaker' or 'soft' presentation style more oriented toward relationship building as compared to the "traditional hard sell" presentation that views a sales interaction as an engagement where there is a 'winner' or 'loser' and is often associated with negative salesperson stereotypes (Jolson, 1997; Weitz, Castleberry and Tanner, 2004; DeCarlo, 2005).

Due to the high stakes of the sales interaction, the high costs of training and maintaining a sales force, and the intrinsic need for the influx of capital within the organization, garnering an understanding of effective and ineffective sales efforts has been a leading pursuit of scholars studying personal selling (Fine, 2007). Studying personal selling is an important undertaking for communication scholars considering that salespersons have been identified as being among the most important negotiators in a business organization (Nontarantonio and Cohen, 1990). However, a few studies have been conducted, to the best the researchers' knowledge, to investigate the role of the expressive and receptive influence tactics and behaviours in personal selling process. Thus the current study attempts to contribute to the knowledge base of the personal selling by uncovering effective influence behaviours, both verbal and nonverbal, employed by sales force to build valued, profitable and lasting business relationships with the clients. The understanding of effective deployment of the diversified influence tactics in the selling process has implications for theorists, practitioners, and students who want to pursue their career in sales.

In the world of rapid-fire changes and intensified competition, salespersons are required to build solid and mutually beneficial influence relationships with the clients to achievement of the strategic objectives of the

organizations. Effective use of influence skills of the salespersons can result into more positive and productive personal and professional relationships with the customers, greater ability to choose and use different receptive and expressive influence behaviours tactically to achieve strategic objectives, increased flexibility in dealing with clients from backgrounds and requirements, and improved skills for resolving conflict. When a salesperson has established a realistic but optimistic goal, considered the state of the relationship, and analyzed the contextual factors, he/she are in a good position to select the tactical approach and specific behaviours that are most likely to accomplish the results he/she plans to achieve.

Salespersons' use of verbal and nonverbal behaviours such as facial expression, voice tone, and body gestures, etc. can contribute to or detract them from the impact of their influence objectives. Using any influence behaviour effectively requires, first of all, the salespersons should be clear about the results they want to obtain. Next, they need to think about the clients they are going to influence and the current state of influence relationship with them. Salespersons should consider the selling situation and the issues that might affect their sales outcome. They can select the tactics and then the behaviours that are most likely to be useful under the circumstances. However, during the actual influence event, salespersons should stay alert to the client's responses and monitor whether he or she is moving closer to or further from their goal.

III. EXPRESSIVE INFLUENCE TACTICS AND BEHAVIOURS IN ACTION

Expressive influence tactics and behaviours enable salesperson to stimulate client's thinking with an exciting idea about the product or service, to change their minds by presenting excellent arguments, and to offer them proposal which they hardly want to refuse. The expressive influence tactics used by salespersons could be telling, selling, negotiating and enlisting. (1) In telling influence tactics, salesperson can tell clients by suggesting or by expressing his needs. (2) He can sell the idea by offering objective evidences and reasons or by referring to shared values and goals. (3) He can negotiate by offering incentives or by describing consequences. (4) He can enlist by envisioning a desired future or by encouraging the clients to become as a part of prestigious clientele of the renowned organization. Tell behaviours of the salesperson influence the clients by letting them know what he wants and needs from them. This has been observed that people become willing to help and support one's efforts if they know what one would like them to do. Sell behaviours of the salesperson influence by showing clients reasons for and

benefits from them taking desired action. Negotiate behaviours influence by offering clients a fair exchange for taking or refraining from taking an action. However, enlist behaviours influence by creating enthusiasm and putting the clients in the picture.

Nonverbal communication could play very import role in expressive behaviours. However, salespersons should use it carefully to induce particular action. For example, smiling of the salesperson is perceived by clients as natural and expression of enthusiasm while enlisting. However, it may indicate uncertainty and nervousness of the salesperson while exercising telling, selling, or negotiating behaviours. Eye contact should be used carefully with expressive influence. Too much of it may be perceived by clients as challenging and aggressive. Direct eye contact can be best used at key points where salesperson wants to add emphasis. The rest of the time, salesperson can look at the client's forehead or cheekbones. This should be polite, but not invasive.

Too many salespeople overuse or misuse expressive influence. However expressive influence, if used effectively by salespersons, can lead clients to desired sales objective. It is especially effective when clients are uncertain or unaware of the product/service and have respect for and trust in the salesperson. Expressive influence behaviours could be perceived by the clients that salesperson mean business and take it very serious matter. Salespersons thus communicate their enthusiasm for the sales proposition and exhort the clients to share it. In summary, salesperson should use expressive influence behaviours in the selling situations when he or she:

- wants the clients to know what he or she needs.
- has a solution to a problem that has been expressed by the client.
- desires to generate enthusiasm and energy.
- wants to bring disagreements of the client out in the open.
- aspires to move toward obtaining sales agreement or gaining commitment to it.

IV. RECEPTIVE INFLUENCE TACTICS AND BEHAVIOURS IN ACTION

On the other hand, salesperson's receptive influence invites clients to share information and action. Since most salespeople tend to overuse expressive behaviours when they wish to influence, they also tend to under-use

receptive behaviours. It is not obvious to everyone that receptive behaviours offer an effective way to influence others directly. Receptive behaviours, used skillfully, can guide salesperson and the client toward collaborative or integrative sales agreement. Salesperson cannot really influence his clients to do something that they consider to be against their best interests, since influence implies choice. Receptive influence indicates respect for the ideas and concerns of the clients and acknowledges their authority. Simultaneously, it creates a channel for the conversation that is flexible, yet goal-directed. This is how it differs from using similar communication behaviours when salesperson do not have a goal in mind, where his or her intention may simply be to gather information or to assist clients in solving his or her own sales objectives. Salesperson as an influencer, consciously and openly moves toward a particular goal.

Just as expressive behaviour can be used in a way that disempowers the clients, receptive behaviours are used most often by salespeople in a manipulative way in which they act as if they have no agenda, but behaving in a way that makes it clear that one exists. This is an ineffective and dishonest use of receptive behaviour on the part of the sales warriors. It seldom works very well the first time, and it most certainly will not work a second time. As the saying goes, "Fool me once, shame on you — fool me twice, shame on me!" Phrasing a statement as a question does not mean it will be perceived as receptive behaviour. For example, questions that include the phrases, "Don't you think …" or "Do you agree …" are almost always expressive in nature. Because receptive guidance must be light, rather than heavy, in order to be effective, it is essential that the salesperson should adopt a neutral, non-judgmental point of view to effectively influence the clients which could result into achievement of the sales goals. If questions and comments promote — even subtly — the salesperson's point of view, they will be treated, correctly, as expressive statements.

Salespeople sometimes misuse receptive influence behaviours in the hope that they will not be caught influencing and the client will believe that the negotiated outcome was his own idea. This virtually never works. Clients are mostly sensitive to having words put into their mouths and do not want to be fooled or coerced into particular action. Because of the nature of receptive influence, it is almost never a one-way process. In drawing out and learning about the clients, the salespeople should adapt and adjust and develop new ideas — sometimes even changing the influence goal as a result of new information. Often, effective receptive influence behaviour provides an opportunity for both buyer and seller to accomplish important goals. Receptive behaviours include inquire, listen, attune, and facilitate.

1. Salesperson can use inquire influence behaviour by asking open-ended questions and drawing the client's point of view out. Such behaviours can influence the clients by establishing the topic, the issues, and the questions to be explored.
2. Salesperson can listen by checking understanding and by testing implications of what client has said. Listen influence tactic can be, by practiced, clarifying, selecting, and emphasizing key areas of interest to both salesperson and the client.
3. Salesperson can attune by identifying with the client and disclosing information about himself. These behaviours influence the clients by creating an atmosphere of trust and common ground between buyer and seller because people are most likely to be influenced by people whom they trust.
4. Salesperson can facilitate by clarifying issues and posing challenging questions. In addition to providing information, they can encourage clients to think along new lines, to consider new questions, and to deepen and expand their thinking about specific issues. This creates an opening for influence.

Nonverbal behaviours, such as making eye contact at key points when the salesperson asks a question or checking client's understanding (but not constantly or invasively), could be really of great help for salespersons. Gestures that are inclusive and inviting help the flow of conversation. Being sensitive to the rhythm of the client's speech and gestures and joining with it in a gentle way can help bring both parties into harmony. Relaxed facial muscles allow salesperson to respond in a natural way to the information that flows between buyer and seller. Sitting of the salesperson in a relaxed posture and inclining his head toward the client can communicate his interest. Relaxed, curious, and non-judgmental emotional and vocal tone could support receptive behaviours of the salespersons. If there is an edge to salesperson's voice, the client will probably shut down, assuming that he or she is probably in trouble with the salesperson. If that is the case, it is better that the salesperson should express his point of view first, to put it on the table, or to disengage temporarily until he can use receptive behaviour in a more non-judgmental way. Salesperson should be especially careful to leave silence after they speak, to allowing the client time to think about and make a response. He should avoid stepping on client's lines. He shouldn't leave the clients with the impression that he or she is uninterested or have nothing to say about a topic if that is not the case. Salespersons should be alert for nonverbal signs of the client that he or she has completed a thought or gotten

to the bottom of an issue so they will know when to interject an expressive comment. They should notice, for example, when the client drops his or her voice at the end of a sentence and adopts a more relaxed posture.

In summary, salespersons should use receptive influence behaviours under the following circumstances when they:

- need important information that is not self-evident.
- want clients to be committed to negotiated outcome.
- aspire to get to the bottom of a clients' problem.
- have desire to express respect for the clients and their opinions and ideas.
- come to know that client does not feel listened to.
- intend to use the information that they receive in a way that the client will agree is a benefit — or at least not harmful to him or her.

V. CONCLUDING REMARKS

When a salesperson has established a realistic but optimistic goal, considered the nature of the relationship with the clients, and analyzed the contextual factors, he/she is in a good position to select the tactical approach and specific influence behaviours that are most likely to accomplish the desired sales goals. Neither expressive nor receptive influence behaviours are better or worse than the other one. Each of the influence behaviours is intended to accomplish a particular influence result. Used thoughtfully, in combination, they can result into increased flexibility of the salespersons in dealing with clients having diverse backgrounds and interests, improved collaborative or problem solving skills and more profitable relationships with the clients. Thus, sales managers are urged to ensure their sales force develop their skills of receptive and expressive influence behaviours in a balanced way as critical instruments to the achievement of the sales quotas and nurturing long-term mutually beneficial and trusting relationships with valued clients.

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RELATIONSHIP BETWEEN SCHOOL EDUCATION AND ECONOMIC GROWTH IN PAKISTAN
ARDL Bounds Testing Approach to Cointegration

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Abstract. The present study is designed to investigate short-run and long-run linkage between school education and economic growth in Pakistan using annual time series data on real GDP, real physical capital, inflation and general school enrollment for the period 1970-71 to 2008-09. Cointegration between school education and economic growth is found in the present study. The results of this study also confirm the existence of direct relationship between school education and economic growth in Pakistan, both in the short-run and the long-run. Macroeconomic instability due to inflation retards economic growth both in the short-run and the long-run while it retards school education only in the long-run. A statistical significant and inverse relationship between school education and economic growth is observed only in the short-run.

I. INTRODUCTION

Education is generally considered as a powerful tool in reducing poverty, enhancing economic growth, empowering people, improving private earnings, promoting a flexible and healthy environment and creating competitive economy. It plays a vital role in shaping the way in which future generations learn to cope with the complexities of economic growth. Educational institutions prepare the citizens to be able to participate actively in all walks of life including economic activities. Human capital has proved

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itself to be one of the most important determinants of sustainable economic growth and hence development. The positive and significant contribution of human capital through education development is being well recognized. Most of the studies on education and productivity witness their significant positive correlation (Lockheed, Jamison and Lan, 1980). High drop out from school causes a decline in human capital which ultimately hampers development and economic growth (Seebens and Wobst, 2003).

Education has multidimensional impacts on the economy. On one side, it influences economic growth positively and on the other, it reduces poverty and creates such a social and political environment that attracts investment. It makes workers more productive, more polite and promotes reasonable socio economic policies. Education development plays a vital role not only in economic development but in the overall development process of the nation also. The role of education in building the efficient and effective labour force is well recognized. McMahon (1998), using cross country panel data for East Asia and measuring human capital by gross enrollment rates, found that secondary and higher education expenditures were more significant in enhancing enrollments.

Two periods, (*a*) 1950s and 1960s and (*b*) late 1980s and 1990s, are very important regarding economic growth theories. In the first period, physical capital proved to be the major contributing factor towards economic growth (neo classical growth theories). Neo classical theorists believe that increase in physical capital can enhance economic growth. In the growth models of Solow (1956), Cass and Coupmanes (1965), Romer (1987), Barro (1990), and some others, population and technological progress were exogenously determined. The research on growth theories in the first period failed to provide the satisfactory answer to the question of how a sustainable economic growth can be achieved? Human capital (acquisition of knowledge and skills) proved to be one of the main sources of sustainable economic growth in the second period (endogenous growth theories). Romer (1986, 1990) and Lucas (1988) in their endogenous growth models gave a central role to education in the economic growth process. Renelt and Levine (1992) found that education appeared to exert a high positive impact on economic growth.

The human capital formed in youth through better schooling is an important determinant of long-run economic growth. Schooling is persistently and consistently found to enhance productivity and hence individual's earning. Emadzadeh *et al.* (2000) analyzed the effect of education on economic growth in Iran and found that education had a positive and

significant effect on economic growth. Contribution of education towards growth in real output proved to be higher than physical capital contribution. Similar results for Iran were observed by Nili and Nafisi (2003), Mohamadi (2006), Dargahi and Gadiri (2003), and Komijani and Memernejad (2004).

The role of education cannot be ignored or dishonored for the development of competitive, integrated and knowledge based progressive society at national and international levels. It is an integral component or agent for the economic growth of a country. Educational enterprises and institutions serve as power houses for the production of progressive work force in the country (Saint, 2009). Process of education starts right from the birth of an individual and continues till the end of life. It is an ongoing process and is usually seen as growth. Education can be attained formally and informally (Moser and Eliot, 2005).

Human capital is measured by using its proxy as enrollment rate of primary, secondary and tertiary level (Chatterji, 1998). Countries having high rate of enrollment in schools made faster growth in per capita income because high enrollment rate causes rapid improvement in productivity (Bils and Klenow, 2000). Progress and prosperity of a nation depends upon the state of economy of a country. Economy of a country depends upon labour productivity which relies on education. In the long-run, growth of educational opportunities and level of education attained by the individual leads to the economic growth rate and household income (Seebens and Wobst, 2003).

The significance and direct role of education cannot be ignored for sustainable development. Poverty and inflation are stumbling block for achieving economic development. Education and human capital are essential ingredients for economic growth. Poverty and education are expected to be inversely correlated. Knowledge and skills are imparted through education (Tilak, 1994). Human poverty reduces as education improves because the latter enhances the income. This increase in income helps in fulfilling the basic needs of individuals. It is also noted that lack of education and poverty are mutually reinforced by each other at macro as well as micro levels. Education poverty leads to income poverty (Tilak, 2005; Awan, Malik and Sarwar, 2008).

Pakistan came into being in 1947, with literacy rate of about 10% and only 10,000 primary schools. After implementing various policy measurers and reforms, the literacy rate in Pakistan became 29.5%, 40.7%, 52.7% and 57.4% in 1980s, 1990s, 2000s and 2008-09 respectively This increase in literacy rate is far below the Millennium Development Goals's literacy rate.

The Government of Pakistan has set a target to raise the literacy rate to 85% by 2015. The number of primary, middle and high schools in the country has reached 147,700, 25,500 and 14,800 in 2000-01 and 157,400, 40,800 and 24,000 in 2007-08 respectively. The primary, middle and high school enrolment in the country has reached to 14,104, 3,759 and 1,565 thousands in 2000-01. It increased and became 18,715, 5,445 and 2,700 thousands in 2009-10. There are 230,699 educational institutions in the country in 2009-10 out of which 222,700 are school educational institutions (156,400 are primary, 41,500 are middle and 24,800 are high schools). Three levels of education, *i.e.* school, college and university exist in Pakistan. School level is further categorized as: Primary (grade 1 to 5), Middle (grade 6 to 8) and Matric (grade 9 to 10). Education in Pakistan is a provincial subject and only 2.1% of GNP was spent on it in the fiscal year 2008-09. Education expenditure as a percentage of GNP remained 0.8%, 2.3%, and 2.1% in 1980s, 1990s, and 2000s respectively (Finance Division, 2009). The main focus of different policy measures and reforms was to make school education more functional and more productive. In order to increase school education, schools educational expenditure as a percentage of GDP must be increased that has almost remained stagnant for decades. All the educational policies and reforms since independence focused on the improvement of supply side determinants of school education. Demand side determinants of school education, especially household demand side characteristics, need to be addressed to further increase school education.

Schooling of the individuals has a positive effect on the economic growth of a country. Schooling and economic growth are highly positively correlated with each other (Barro, 1991; Benhabib and Spiegel, 1994; Barro and Sala-i-Martin, 1995; 1997). There exist many other variables like inflation, poverty, physical capital, political instability, literacy, socioeconomic status, foreign aid, microeconomic and macroeconomic policies which affect directly or indirectly both the main variables, *i.e.* school education and economic growth. In spite of clear linkage between school education and economic growth, there exists hardly any study for Pakistan that has empirically examined the relationship among school education and economic growth with the inclusion of inflation and poverty. Much attention has been paid to empirically investigating the role of higher education in enhancing economic growth in Pakistan. The main purpose of the present study is to empirically examine the linkage between school education and economic growth of Pakistan in the presence of some other relevant economic variables like physical capital, poverty and inflation that may have significant relationship with the two variables under consideration.

It may be noted that the present study is confined only to relationship between general school education and economic growth. It does not study the role of technical and vocational school education because the time series data for technical and vocational education for the whole period 1970-71 to 2008-2009 are not available in case of Pakistan. This study does also not focus on the aspect that how supply side or demand side or both supply side and demand side determinants of school education affect the relationship between school education and economic growth. It may be further noted that this study is of unique significance because this is perhaps the first study in Pakistan that utilizes ARDL approach to cointegration to examine the short-run (SR) and long-run (LR) relationship between school education and economic growth in Pakistan.

OBJECTIVES OF THE STUDY

This study aims:

- To examine the relationship between economic growth and school education development with inclusion of some other macroeconomic variables such as physical capital, poverty and inflation.
- To evaluate empirically SR and LR effect of school education on economic growth in Pakistan.

II. METHODOLOGY AND DATA SOURCES

DATA SOURCES

The underlying study comprises of the relationship between school education and economic growth in Pakistan. In this study, the annual time series data for the period 1970-71 to 2008-09 were used. The data were taken from various issues of *Pakistan Economic Survey*, *Pakistan Labour Force Survey*, State Bank of Pakistan *Annual Reports* and *50 Years of Pakistan in Statistics*.

METHODOLOGY

The specification of the regression models for the variables: economic growth, school education and poverty are given below:

$$EGr = f(PC, MEI, Edu, POV) \quad \text{(Model 1)}$$

$$Edu = f(EGr, MEI, POV) \quad \text{(Model 2)}$$

$$POV = f(EGr, MEI, Edu) \quad \text{(Model 3)}$$

Various functional forms of the above models were experimented, however, only the best possible ones are presented below:

$$\ln(EGr) = \alpha_0 + \alpha_1 (PC) + \alpha_2 (MEI) + \alpha_3 (Edu) + \alpha_4 (POV) + \varepsilon_t \quad \text{(Model 4)}$$

$$\ln(Edu) = \beta_0 + \beta_1 \ln(EGr) + \beta_2 \ln(MEI) + \beta_3 (POV) + \varepsilon_t \quad \text{(Model 5)}$$

$$POV = \gamma_0 + \gamma_1 (EGr) + \gamma_2 (MEI) + \gamma_3 (Edu) + \varepsilon_t \quad \text{(Model 6)}$$

Where,

ln = Natural logarithm

EGr = Real GDP as a measure of economic growth. This proxy has been utilized by Abbas and Peck (2007), Jin (2008), Katircioglu (2009), Islam, Wadud and Islam (2007) and Chaudhary, Iqbal and Gillani (2009).

PC = Fixed capital formation in real term as a measure of physical capital. Gross fixed capital formation deflated by GDP deflator. This proxy for RPC has been used by Abbas and Peck (2007), Khorasgani (2008), and Chaudhary, Iqbal and Gillani (2009). PC is considered as the fundamental ingredient of growth theories.

Edu = School enrollment ratio (%) as a measure of general school education. School education enrollment ratio is derived by dividing total school enrollment (5-15 years) to the population of that age group. This proxy has been used by Hassan and Ahmed (2008).

MEI = Inflation rate or GDP deflator as one of the measure of macroeconomic instability.

POV = Head count index as a measure of absolute poverty.

To avoid any possibility of specification bias due to omission of important variables from a bivariate regression model, *i.e.* EGr = f (Edu), the variables: PC, MEI and POV have been included in the model.

The SR and LR relationship between school education and economic growth was estimated by using ARDL approach to cointegration. A brief introduction of ARDL model is given below.

AUTOREGRESSIVE DISTRIBUTIVE LAG (ARDL) APPROACH TO COINTEGRATION

ARDL approach to cointegration was developed by Pesaran *et al.* (2001). It is a unification of autoregressive models and distributed lag models. In any ARDL model, a time series is a function of its lagged values, current and lagged values of one or more explanatory variables.

ARDL approach to cointegration is not only capable of distinguishing between dependent and explanatory variables (*i.e.* it avoids the problem of endogeneity) but can also simultaneously estimate LR and SR components of the model. This approach also removes the problems associated with the omitted variables and autocorrelation. The estimates obtained from the ARDL approach to cointegration are unbiased and efficient since they avoid the problems that may arise due to serial correlation and endogeneity (Pesaran, Shin and Smith, 2001).

ARDL approach to cointegration has some merits over and above the other cointegration technique, such as: Engle and Granger (1987), Johansen (1988), Johansen-Juselius (1990), Gregory and Hansen (1996), Saikkonen and Lutkepohl (2000). The ARDL bounds testing approach to cointegration can be applied irrespective of whether the regressors are of I(0) or I(1). However, it requires that the dependent variable is of I(1) in levels and none of the explanatory variables is I(2) or higher.

Following Pesaran and Pesaran (1997), Pesaran and Shin (1999) and Pesaran and Smith (2001), the error-correction version of ARDL model of Model 1 can be written as follows:

$$\begin{aligned}\Delta \ln (\mathrm{EGr}) \quad = \quad & a + \sum_{i=1}^{n} b_i \ \Delta \ln (\mathrm{EGr})_{t-i} + \sum_{i=0}^{n} c_i \ \Delta (\mathrm{PC})_{t-i} + \\ & \sum_{i=0}^{n} d_i \ \Delta (\mathrm{MEI})_{t-i} + \sum_{i=0}^{n} e_i \ \Delta (\mathrm{Edu})_{t-i} + \\ & \sum_{i=0}^{n} p_i \ \Delta (\mathrm{POV})_{t-i} + \delta_1 \ln \mathrm{EGr}_{t-1} + \delta_2 \mathrm{PC}_{t-1} + \\ & \delta_3 \mathrm{MEI}_{t-1} + \delta_4 (\mathrm{Edu}_{t-1}) + \delta_5 (\mathrm{Pov}_{t-1}) + \varepsilon_t \qquad \text{(Model 7)}\end{aligned}$$

Similarly the error-correction version of ARDL models for Model 2 and Model 3 can be written. ARDL model uses a three-step procedure:

(*a*) Dynamic analysis

(*b*) Long-run relationship

(*c*) ECM analysis

The coefficients (a, b, c, d, e) of part first of Model 7 measure the SR dynamics of the model whereas δs represents the LR relationship.

III. EMPIRICAL RESULTS AND ANALYSIS

UNIT ROOT RESULTS

This study uses ADF, PP, and Ng-Perron unit root tests in order to check and make sure that the dependent variable is of I(1) in level and none of the variables is of I(2) or higher order.

TABLE 1
Augmented Dickey-Fuller Test (ADF) and Phillips-Perron Test (PP)

Variable	Augmented Dickey-Fuller Test (ADF)		Phillips-Perron Test (PP)	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
EGr	2.0139 (0.9998)	–0.4680 (0.9808)	5.820 (1.0000)	0.8287 (0.9997)
Δ EGr	–2.6762 (0.0877)	–3.583 (0.0452)	–2.6255 (0.0970)	–3.5735 (0.0461)
lnEGr	–2.0339 (0.2717)	–1.791 (0.6889)	–1.9565 (0.3040)	–1.8423 (0.6641)
Δ lnEGr	–4.5921 (0.0007)		–4.5638 (0.0008)	
PC	–0.3561 (0.9064)	–2.791 (0.2091)	1.1302 (0.9971)	–1.2431 (0.8867)
Δ PC	–3.3461 (0.0198)		–2.9566 (0.0486)	
MEI	–4.0974 (0.0028)		–4.0682 (0.0030)	
lnMEI	–1.0068 (0.7411)	–2.4109 (0.3684)	–0.9023 (0.7767)	–2.5234 (0.3158)
Δ lnMEI	–4.0542 (0.0032)		–4.0706 (0.0031)	
Edu	–0.7327 (0.8262)	–1.9747 (0.5960)	–0.7435 (0.8233)	–2.1111 (0.5233)
Δ Edu	–5.4329 (0.0001)		–5.4013 (0.0001)	
ln Edu	–0.7389 (0.8246)	–1.7870 (0.6913)	–0.7887 (0.8109)	–1.7870 (0.6913)
Δ ln Edu	–5.2750 (0.0001)		–5.2753 (0.0001)	
POV	–2.5521 (0.1117)	–1.5557 (0.7916)	–2.5521 (0.1117)	–1.3690 (0.8540)
Δ POV	–5.4794 (0.0001)		–5.5183 (0.0000)	

Figures in parentheses are p-values.

TABLE 2

Ng-Perron Unit Root Test

Variable	MZA	MZT	MSB	MPT
EGr with constant	–1.9088	–0.5983	0.3134	9.0767
EGr with constant and trend	–8.1787	–1.7511	0.2141	11.8887
Δ EGr with constant	–8.1389	–2.0079	0.24670	3.0455
Δ EGr with constant and trend	–15.4545	–2.7037	0.1750	6.3401
lnEGr with constant	–0.2253	–0.1092	0.4848	17.6150
lnEGr with constant and trend	–2.6258	–1.0415	0.3966	31.1309
Δ lnEGr with constant	–18.7520	–3.0084	0.1604	1.4976
PC with constant	–0.4259	–0.1509	0.3545	12.2510
PC with constant and trend	–22.7867	–3.2544	0.1428	4.7118
MEI with constant	–16.1061	–2.7460	0.1705	1.8582
lnMEI with constant	0.8777	0.5456	0.6216	30.3799
lnMEI with constant and trend	–4.2250	–1.4510	.0.3434	21.5431
Δ lnMEI with constant	–16.6351	–2.7991	0.1682	1.7825
Edu with constant	–0.0779	–0.0535	0.6863	29.4043
Edu with constant and trend	–6.1360	–1.71027	0.2787	14.8171
Δ Edu with constant	–16.5855	–2.8724	0.1731	1.5041
lnEdu with constant	0.0271	0.0198	0.7315	33.2428
lnEdu with constant and trend	–5.4635	–1.6012	0.2930	16.5219
Δ lnEdu with constant	–15.2890	–2.7694	0.1806	1.6135
Δ POV with constant	–1.5185	–0.8697	0.5727	16.1009
Δ POV with constant	–2.0798	–0.7847	0.3773	31.7087
Δ POV with constant and trend	–17.7239	–2.9503	0.1664	1.4787
1% level of significance with constant	–13.8000	–2.5800	0.1740	1.7800
5% level of significance with constant	–8.1000	–1.9800	0.2330	3.1700
10% level of significance with constant	–5.7000	–1.6200	0.2750	4.4500
1% level of significance with constant and trend	–23.8	–3.42	0.143	4.03
5% level of significance with constant and trend	–17.3	–2.9	0.168	5.48
10% level of significance with constant and trend	–14.20	–2.62	0.185	6.67

A summary of unit root results regarding order of integration based on different unit root criteria such as ADF, PP, and Ng-Perron Tests is given in Table 3.

TABLE 3

Order of Integration

Variables	ADF		PP		Ng-Perron	
	Intercept	Intercept and trend	Intercept	Intercept and trend	Intercept	Intercept and trend
EGr		I(1)		I(1)		I(1)
lnEGr	I(1)		1(1)		I(1)	
PC	I(1)		I(1)			I(0)
MEI	I(0)		I(0)		I(0)	
lnMEI		I(1)	I(1)			I(0)
Edu	I(1)		I(1)			I(1)
ln Edu	I(1)		I(1)		I(1)	
POV	I(1)		I(1)			I(1)

According to ADF, PP, and Ng-Perron unit root tests all the dependent variables, *i.e.* EGr, Edu, and POV in Table 3 are of I(1) and none of the variables is of I(2). So the appropriate technique to cointegration is the ARDL approach to cointegration.

COINTEGRATION

Following the first step in the ARDL model, this study looks at LR relationship between the variables by carrying out partial F-test. This test is sensitive to the number of lags used for each first differenced variable (Bahmani-Oskooee and Brooks, 1999). In this study lags upto four periods have been imposed on each first differenced variable. The estimated F-statistic for EGr, Edu and POV of models 1, 2 and 3 are reported in Table 4.

Cointegration among economic growth, PC, MEI, Edu, and POV in Model 1 exists when economic growth is the dependent variable because it is at least one F-value that is higher than the upper critical value. The null hypothesis of no cointegration among economic growth, MEI, Edu, and POV is also rejected when school education is serving as dependent variables in Model 2 because at least one F-value is higher than the upper critical bounds

value. No support for cointegration among economic growth, MEI, Edu, and POV is found in Model 3. However, the results at this stage are considered preliminary and this study seeks for more evidence of cointegration in the second stage of the analysis when an appropriate lag selection criterion is employed. Once cointegration among the variables of interest was established, then Models 1 and 2 were estimated by using ARDL approach.

TABLE 4

ARDL Approach to Cointegration: Results of F-Test

Variables	Lag Length				Result
	1	2	3	4	
ΔEGr $\{F_{EGr}$ (EGr|PC, MEI, Edu, POV)$\}$	5.45	1.33	2.30	2.17	Cointegration
ΔEdu $\{F_{Edu}$ (Edu|EGr, MEI, POV)$\}$	4.18	1.43	1.78	2.07	Cointegration
ΔPOV $\{F_{POV}$ (POV|EGr, MEI, Edu)$\}$	2.81	2.22	2.33	2.96	No Cointegration

3.65-4.66, 2.79-3.67and 2.37-3.20 are the lower and upper critical values for bounds testing ARDL for 1%, 5% and 10% significance levels, respectively.

To assess Model 1, concerning the effect of education, poverty and inflation on economic growth, we estimated Model 7 by using ARDL approach. The results of dynamic ARDL (2, 0, 3, 4, 0) model are reported in Table 5.

TABLE 5

ARDL (2, 0, 3, 4, 0) Based on Schwartz Criterion
(Dependent Variable = ln EGr)

Regressor	Coefficient	T-Ratio [Prob.]
ln EGr(–1)	0.39962	2.4200 [0.025]
ln EGr(–2)	0.48545	3.1190 [0.005]
PC	0.1040E-6	4.5247 [0.000]
MEI	–0.0015472	–3.2151 [0.004]
MEI(–1)	–0.0013749	–2.6328 [0.016]

MEI(–2)	–0.0021962	–4.3660 [0.000]
MEI(–3)	–0.0013580	–2.4387 [0.024]
ln Edu	0.0019646	1.8830 [0.074]
ln Edu(–1)	0.5592E-3	0.39117 [0.700]
ln Edu(–2)	–0.0019971	–1.4437 [0.164]
ln Edu(–3)	–0.0017290	–1.3541 [0.190]
ln Edu(–4)	0.0041531	4.5552 [0.000]
POV	–0.7837E-3	–0.85154 [0.404]
Constant	1.6755	4.9115 [0.000]

R^2 = 0.99, F-stat = 7055.8 [0.000], SBC = 95.32, Serial Correlation (LM) = 1.0441 [0.307], Ramsey's Reset Test = 2.3112 [0.128], Heteroscedasticity (LM) = 0.96818 [0.325], Normality (LM) = 0.028201 [0.986]

Stability of the model is tested by CUSUM and CUSUM Sqaure tests. Since the results of CUSUM and CUSUM Square tests proposed by Brown *et al.* (1975) stay within a 5% level (portrayed by two straight lines) show the significant and stable relation among the variables under consideration (Figure 1(a) and (b)).

FIGURE 1(a)

Plot of Cumulative Sum of Recursive Residuals

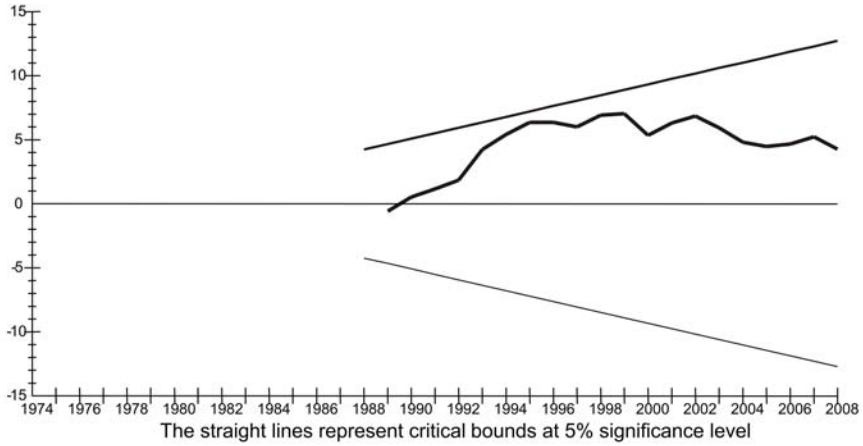
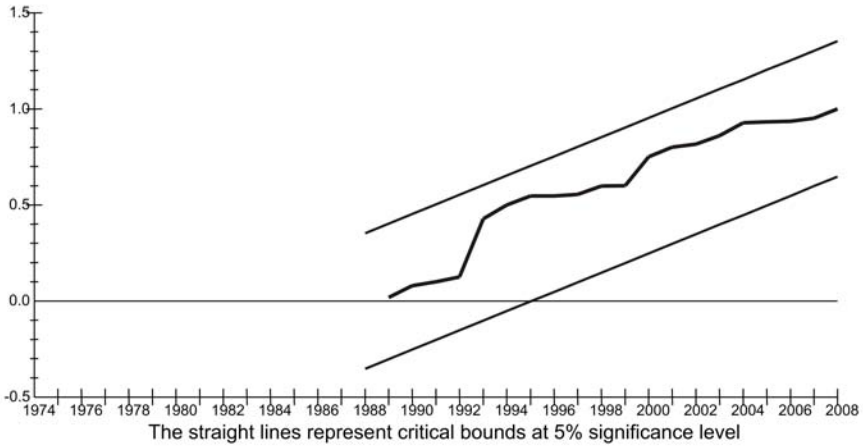


FIGURE 1(b)

Plot of Cumulative Sum of Squares of Recursive Residuals



After establishing stability and LR relationship, the results of LR coefficients using ARDL approach are presented in Table 6.

TABLE 6

Estimated LR Coefficients Using the ARDL (2, 0, 3, 4, 0) Approach and SBC (Dependent Variable = ln (EGr))

Regressor	Coefficient	T-Ratio (Prob.)
PC	0.9045E-6	7.1623 [0.000]
MEI	–0.056348	–5.2225 [0.000]
Edu	0.025673	5.3700 [0.000]
POV	–0.006819	–0.8889 [0.384]
Constant	14.5779	41.3225 [0.000]

The coefficients of physical capital and net school enrollment rate are positive and statistically significant, indicating that both physical capital and net school enrollment ratio enhance economic growth in LR. Human capital in the form of net school enrollment rate has positive and highly significant effect on economic growth (about 0.03%) at 5% significance level in LR. This is consistent with the findings of Emadzadeh *et al.* (2000), Nili and Nafisi (2003), Mohamadi (2006), Dargahi and Gadiri (2003), and Komijani and Memernejad (2004). Poverty has no significant effect on economic growth. The coefficient of macroeconomic stability measured by rate of

inflation is negative and significant. It means that economic growth retards as macroeconomic instability increases.

The next stage of analysis is the estimation of Error Correction Model (ECM) of ARDL (2, 0, 3, 4, 0) for the variable economic growth. After examining LR relationship among variables, the short-run dynamics of these variables can be determined by Error Correction Representation of ARDL model based on Model 1. ECM specification for ARDL (2, 0, 3, 4, 0) model is reported in Table 7.

TABLE 7

ECM Representation for Selected ARDL (2,0,3,4,0) Model Based on SBC
(Dependent Variable = Δ ln (EGr))

Variable	Lag Order			
	0	1	2	3
Δ ln (EGr)	–	–0.48545 [0.005]	–	–
Δ (PC)	0.1040E-6 [0.000]	–	–	–
Δ (MEI)	–0.0015472 [0.004]	0 .0035541 [0.000]	0.0013580 [0.023]	–
Δ (Edu)	0.0019646 [0.072]	–0.4269E-3 [0.709]	–0.0024241 [0.011]	–0.0041531 [0.000]
Δ (POV)	–0.7837E-3 [0.403]	–	–	–

ECM(–1): –0.1149 (0.000), ECM = ln EGr –0.9045E-6 (PC) +0.05635 (MEI) – 0.02567 (Edu) +0.006819 (POV) – 14.5779
R-Square = 0.83 R-Bar-Square = 0.72
F = 9.1627 [0.000] DW-statistic = 2.17
Values in parentheses are P-values.

The coefficient of Lagged Error Correction Term reveals how quickly/ slowly variables return to equilibrium and it must be a significant with negative sign for establishing cointegration. The absolute value of the coefficient of error correction term indicates speed of adjustment to restore equilibrium and the negative sign shows convergence in the short-run dynamic model. The negative and significant coefficient associated with lagged error correction term (EC_{t-1}) is also a more efficient way of establishing cointegration. The coefficient of ECM(–1) in this model is 0.1149 and this means that in each period, about 11.5% of shocks can be

justified as a long-run trend. The coefficient of EC_{t-1} in our model is negative and highly significant. It implies that, in Pakistan, economic growth, physical capital, school education, inflation and poverty are cointegrated when economic growth serves as dependent variable. The positive and significant effect of physical capital on economic growth is supported by both LR and SR dynamics models. The significant effect of net school enrollment ratio on economic growth is found in SR as well as in LR. An insignificant negative effect of poverty measured by head count index on economic growth is found in the short-run. Inflation, a measure of macroeconomic instability, retards economic growth both in SR and LR.

TABLE 8

ARDL (3, 4, 2, 3) Based on Schwartz Criterion
(Dependent Variable = ln Edu)

Regressor	Coefficient	T-Ratio [Prob.]
ln Edu(–1)	0.50299	3.2724 [0.004]
ln Edu(–2)	–0.12261	–0.6429 [0.528]
ln Edu(–3)	–0.25235	–1.6810 [0.109]
ln EGr	0.27774	0.66231 [0.516]
ln EGr(–1)	–1.3248	–2.3145 [0.032]
ln EGr(–2)	0.98700	1.5438 [0.139]
ln EGr(–3)	–0.083785	-–0.1569 [0.877]
ln EGr(–4)	1.0806	2.8931 [0.009]
ln MEI	0.7215E-3	0.00391 [0.997]
ln MEI(–1)	0.26992	1.1352 [0.270]
ln MEI(–2)	–0.61364	–3.4794 [0.003]
ln POV	–0.15884	–1.6351 [0.118]
ln POV(–1)	0.11123	1.0066 [0.327]
ln POV(–2)	–0.12737	–1.1727 [0.255]
ln POV(–3)	0.41994	4.3351 [0.000]
Constant	–9.9234	–5.0699 [0.000]

R^2 = 0.99, F-stat = 97.099 [0.000], SBC = 92.26, Serial Correlation (LM) = 0.9903 [0.656], Ramsey's Reset Test = 1.1740 [0.279], Heteroscedasticity (LM) = 1.8286 [0.176], Normality (LM) = .024719 [0.988].

To examine Model 2, concerning the effect of economic growth, poverty and inflation on school education, we estimated Model 2 by using ARDL

approach. The results of dynamic ARDL (3, 4, 2, 3) model are reported in Table 8.

Stability of Model 2 is tested by CUSUM and CUSUM Square tests. Since the results of CUSUM and CUSUM Square tests proposed by Brown *et al.* (1975) stay within a 5% level (portrayed by two straight lines) that shows a stable significant relationship among the variables (Figure 2).

FIGURE 2(a)

Plot of Cumulative Sum of Recursive Residuals

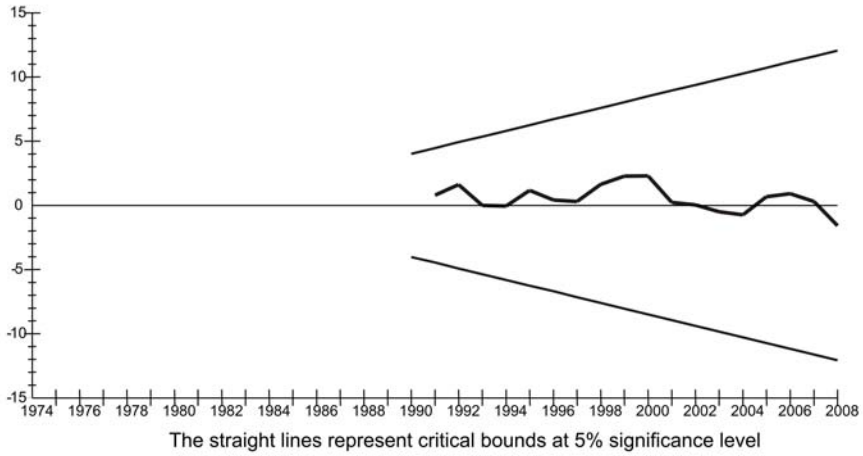
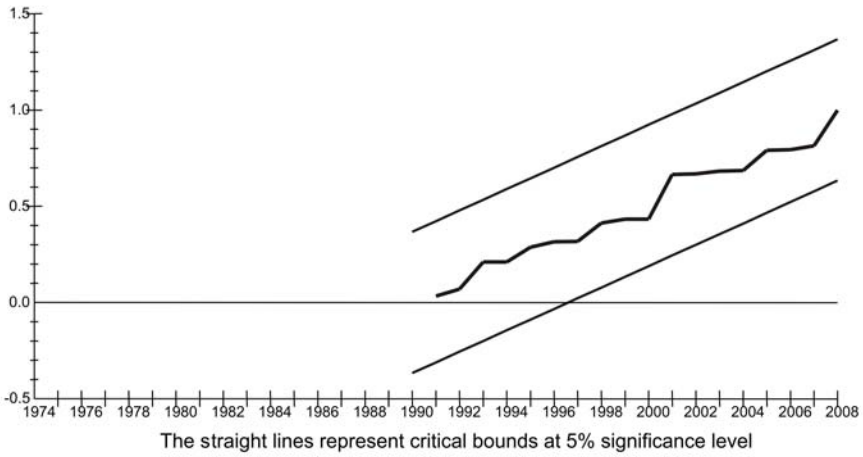


FIGURE 2(b)

Plot of Cumulative Sum of Squares of Recursive Residuals



After establishing the stability of the model, the LR coefficients of ARDL (3, 4, 2, 3) model are presented in Table 9.

TABLE 9

Estimated LR Coefficients Using the ARDL (3, 4, 2, 3) Approach and SBC (Dependent Variable = ln (Edu))

Regressor	Coefficient	T-Ratio (Prob.)
ln (EGr)	1.0742	6.2426 [0.000]
ln (MEI)	–0.39335	–4.0257 [0.001]
ln (POV)	0.28092	2.6665 [0.015]
Constant	–11.3804	–4.9383 [0.000]

The LR elasticity coefficients of economic growth and poverty for net school enrollment ratio are positive and statistically significant, indicating that both economic growth and poverty promote net school enrollment in LR. Macroeconomic instability retards school education in LR. Error Correction Mechanism (ECM) for Selected ARDL (3, 4, 2, 3) Model is presented in Table 10 (given on next page).

The coefficient of lagged ECM in model 2 is 0.87197 and this means that in each period, about 87.19% of shocks can be justified as a long-run trend. The coefficient of EC_{t-1} in our model is negative and highly significant. It implies that, in Pakistan, economic growth, school education, inflation and poverty are cointegrated when school education is the dependent variable. A significant and negative effect of poverty on school education is found in SR.

DIAGNOSTIC TESTS

Some diagnostic tests for all models were carried out for Serial Correlation, Model Specification, Normality that is based on a test of Skewness and Kurtosis of residuals and Heteroskedasticity. The models qualified all the above mentioned diagnostic tests.

TABLE 10

Error Correction Mechanism (ECM) Representation
for Selected ARDL (3, 4, 2, 3) Model Based on SBC
(Dependent Variable = Δ ln (Edu))

Variable	Lag Order			
	0	1	2	3
Δ ln (Edu)	–	0.37496 [0.023]	–	–
Δ ln (Edu)	–	–	0.25235 [0.107]	–
Δ ln (EGr)	0.27774 [0.515]	–	–	–
Δ ln (EGr)	–	–1.9838 [0.000]	–	–
Δ ln (EGr)	–	–	–0.99679 [0.024]	–
Δ ln (EGr)	–	–	–	–1.0806 [0.008]
Δ (MEI)	0.7215E-3 [0.997]	–	–	–
Δ (MEI)	–	0.61364 [0.002]	–	–
Δ (POV)	–0.15884 [0.116]	–	–	–
Δ (POV)	–	–0.29257 [0.007]	–	–
Δ (POV)	–	–	–0.41994 [0.000]	–

ECM(–1): –0. 87197 (0.000)
ECM = ln Edu – 1.0742 (EGr) + 0.39335 (MEI) – 0. 28092 (POV) – 11.3804
R-Square = 0.78 R-Bar-Square = 0.60
F = 5.5036 [0.000] DW-statistic = 2.02

Values in parentheses are P-values.

IV. CONCLUSION AND RECOMMENDATIONS

This study utilizes annual time series data on real GDP, real physical capital, poverty, inflation and general school enrollment ratio for the period 1970-71 to 2008-09 to examine short-run and long-run relationship between school education and economic growth in Pakistan. The results of this study confirm the establishment of cointegration among real GDP, poverty, inflation and school enrollment ratio when both the real GDP and school enrollment ratio served as dependent variables. The positive and significant effect of physical capital on economic growth is supported by both long-run and short-run dynamic models. The significant direct effect of net school enrollment ratio on economic growth is found in short-run as well as in long-run. Inflation, one of the measures of macroeconomic instability, retards economic growth both in short-run and long-run. It affects school education negatively and significantly only in the long-run. Chronic poverty is found to have no significant impact on economic growth both in short-run and long-run. This study also finds a very surprising result about the relationship between poverty and school education. The long-run impact of poverty on school education is found to be positive and significant while the SR impact of poverty on school education is found to be negative and significant.

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TRADE LIBERALIZATION AND TOTAL FACTOR PRODUCTIVITY GROWTH (1971-2007)

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Abstract. Using the framework of endogenous growth model, this paper empirically analyses the relationship between Trade Liberalization (TL) and Total Factor Productivity (TFP) growth in large scale manufacturing (LSM) sector of Pakistan during the period 1971-2007. First we measure the TFP growth using growth accounting technique. Secondly Auto Regressive Distributed Lag (ARDL) modeling approach has been applied to measure the relationship between TL and productivity growth. The estimated coefficients of openness are negative and statistically significant implies that the TL policy of the government has not yet brought about any epoch-making economic results particularly for the growth rate of TFP in LSM sector. The elimination of government intervention and restrictions has characterized all policy stances, yet liberalization alone is not sufficient to produce significant, conspicuous economic achievement. Government must also play important role in capitalizing infrastructural projects, in order to lay the foundation for a healthy competitive environment for the manufacturing sector.

I. INTRODUCTION

The role of trade and openness in economic development has been a key debate in the development literature for most of the second half of the century. The standard view of gains from trade is that the reduction of trade barriers will increase economic efficiency, by allowing consumers and

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producers to buy items from the lowest cost source. However, in recent years economists have sought other possible effects of trade. These includes the possibility that many industries have increasing returns to scale, which will magnifying the effects of any trade-induced growth; that increased trade will lead to more capital accumulation and that expanded trade can increase productivity through out the affected industries. According to *Global Economic Respects*: "A reduction in world barriers to trade could accelerate growth, provide stimulus to new forms of productivity — enhancing specialization, and lead to a more rapid pace of job creation and poverty reduction around the world" (World Bank, 2002).

The focus on productivity stems an observation that productivity[1] is a crucial factor leading to sustainable economic growth. Countries that are more open to the rest of the world have a greater ability to absorb technological advances generated in the leading nations.[2] However, the transfer of technology and associated knowledge spillovers from advanced to developing countries through export and import routes will be more successful in economies with better and more advanced education (Coe and Helpman, 1995). Increasing economy's skill base can have a positive effect on the growth of total factor productivity (TFP)[3] — the best overall measure of competitiveness, by facilitating structural change and technological improvements. Endogenous growth models emphasis that human capital and knowledge capital leading to improvement in technology creation, adoption and absorption are important determinants of productivity growth.[4] Furthermore, the return on investment in R&D, leading to technological development, is substantial. The impact of Trade Liberalization (TL) on productivity growth in the manufacturing sector remains a controversial issue (Satish and Kunal, 2002). However, contradicting the findings of several earlier studies, recent studies on productivity trends in developing countries has concluded that TFP growth in manufacturing accelerated after 1991 economic reforms in less-developing countries (Unel, 2003; Tsl, 2003).

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[1]Broadly defined; include efficient use of resources, technological progress and efficient management.

[2]Romer (1990, 1992), Grossman and Helpman (1991) and Baro and Sala-i-Martin (1995).

[3]TFP defined as the relationship between output produced and an index of composite of inputs, meaning the sum of all the inputs of basic resources notably labour, capital goods and natural resources. Eatwall and Newman (1991) captioned TFP as 'multi-factor' productivity.

[4]Arran (1967), Bruton (1995), Dehlman *et al.* (1985), Dension (1967), Lichtenberg (1994), and Lomer (1986).

A key contribution of present study to the existing literature is that since earlier studies estimated the trend rate of TFP growth in Pakistan as a whole, not on the sectoral basis, while present study is empirically examine the consequences of TL on the growth of Large-Scale manufacturing (LSM) sector in Pakistan, by examining the correlation between degree of openness and productivity. As an indicator of productivity, TFP indices of the LSM sector of Pakistan will be used. In order to capture the true effect of TL, we use different measures of openness in the analysis. In the study we use secondary data to measure productivity in the LSM sector of Pakistan and openness. The major data sources are government publications like Economic Survey of Pakistan (various issues), Pakistan Statistical Year Book, Censes of Manufacturing Industries (CMI) (different issues), 50 Years of Pakistan and Federal Bureau of Statistics. One confronts in doing research on manufacturing sector of Pakistan is lack of availability of adequate data. CMI is the only major source of detailed data on manufacturing sector but it has not been published regularly and it is officially acknowledged that there is underestimation of large-scale value added reported in CMI due to non-response factor. Assuming the under reporting makes only a negligible impact, CMI data could be used as an appropriate measure. To interpolate CMI data for inter-census years Trend Analysis and Quantum Index of Manufacturing (QIM) are used. The sample period of the study is 1971-2007.

The paper organized as follows: section II covers the relevant literature. Section III develops the methodology of the growth accounting. Section IV quantifying the measures of openness and V discuss the estimation technique. Section VI has estimation results and VII conclude the results and give some policy implications.

II. REVIEW OF RELEVANT LITERATURE

In recent years, the relation between TL and economic growth in developing countries has become a central topic of debate among development economists. There are number of studies linking economic growth to the openness of the trade regime (Little, Scitovsky and Scott, 1970; Krueger, 1978; Heitger, 1987; Romer, 1989; Michaely, Papageorgiou and Choksi, 1991; Dollar, 1992; Edwards, 1992; Harrison, 1995; Onafowora and Owoye, 1998). On the other hand, some other studies find little evidence to support a link between TL and economic growth (Sachs, 1987; Agosin, 1991; Taylor, 1991; Shafaeddin, 1994; Clarke and Kirkpatrick, 1992; Greenaway and Sapsford, 1994; Karunaratne, 1994; Jenkins, 1996; Greenaway, Morgan and Wright, 1997).

The impact of TL on productivity growth of manufacturing sector remains a controversial issue (Satish and Kunal, 2002). Contradicting the findings of several earlier studies, recent studies on productivity trends in developing countries has concluded the impact of TFP growth in manufacturing in LDCs (Unel, 2003; Tsl, 2003). A close look at the methodology adopted in these studies, however reveals certain severe shortcomings, raising doubts about the reliability of the findings. Corden (1974), Martin and Page (1983), Tybout (1992) and Pack (1988) explain why more open trade regimes lead to productivity improvements in the industrial sector. However, no clear confirmation of the hypothesis that countries with an outward orientation benefit from greater growth in productivity in manufacturing sector. During the 1980s TL seemed to be contagious in the developing world and was undertaken extensively in three regions: Latin America, Asia and Africa. Yet each region seems to have followed a different approach. The issue has been investigated at different levels: plants, firms or industrial sectors, with different measures of TL, with different model specifications.

Studies on the TFP growth in the context of Pakistan economy, to date are limited both in number and in sectoral details. Wizarat (1998, 2002) showed that for the period 1955-56 to 1980-81; TFP contributed only 7% to growth of LSM sector, despite the fact that sector grew rapidly during this period. For the period 1955-91, results show an increase in TFP trend in the period of 1955-65, stagnation in the period 1966-70 and a decline in the decades on 1970s and 1980s and the contribution of TFP to economic growth has been negative (–27%). Mahmood and Siddiqui (2000) analyze the state of technology and productivity in Pakistan manufacturing industries and suggested some strategic directions to build technological competence. Pasha *et al.* (2002) pointed out that the TFP growth of the manufacturing sector shows a persistent declining trend during the period 1973-98.

Sabir and Ahmed (2002) studied the impact of structural adjustment policies on TFP, concluded that, the average growth in TFP has declined from 2.8% in the pre-reform period (1973-88) to 0.7% in the post-reform period (1988-02), in the manufacturing sector it declined from 5.9 to 1.9%, respectively. Fatima *et al.* (2003) analyze the impact of international trade on TFP growth in Pakistan and found that openness has positive impact on the TFP growth in Pakistan, but due to high taxation, government intervention and regulation of domestic companies, TFP growth was low. Khan (2006) establishes macro determinants of TFP. Covering the sample period 1960-2003, the results confirm that macroeconomic stability, foreign direct investment, and financial sector development play an important role in the

TFP growth. Ahmed and Dutta (2006) analyze the relationship between trade policies and industrial growth in Pakistan and suggested that there exists a unique long-run relationship among the aggregate growth function of industrial value added and its major determinants; real capital stock, labour force, real exports, import tariff collection rate and the secondary school enrolment ratio.

III. METHODOLOGICAL FRAMEWORK

The mechanics linking trade and productivity is yet an open question in the theoretical framework. Endogenous growth theory, following the work of Romer (1986) and Lucas (1988), identify a number of factors that determine the growth rate of an economy. Among which increasing returns to scale, capital accumulation, innovations, openness to trade, research and development, and human capital formation are considered as the key factors in explaining the growth process in the economy.

It is well known that protection reduces the efficiency by shielding domestic market from external competition, and restricted access to imported inputs and technologies.[5] This result in the lower level of output and welfare then what could have been achieved in the absence of protection. It has been argued that liberalization — by improving a bias against exports and allowing resource allocation in line with the nation's comparative advantage — increase exportable output and exports intensity (Krueger, 1987; Bhagwati, 1988). However, Rodrick (1992) argues that there are no reasons to believe that protection discourages the productivity improvement; in fact it is import liberalization that retards productivity growth by shirking the domestic firm's sales and reducing the incentives to invest in technological effort. Due to low supply elasticities in LDCs, TL may not improve export performance (Stein, 1992; Mosley, 1993). In this context it is not clear whether liberalization really improves export intensity in LDCs. Likewise, the impact of liberalization on import penetration is inconclusive. If increased competition and greater access to imported inputs and technologies make domestic industries competitive then the import penetration would fall, otherwise not. Thus liberalization increases or reduces import penetration depends on the competitiveness of import competing sector, and whether TL really improves productivity growth in least developing countries required an empirical examination.

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[5]See Bhagwati and Srinivasan (1983, 1988, 1999), Krueger (1987) and Little *et al.* (1970).

The mechanism mentioned above is incorporated with the standard neo classical production function to deduce a reduced form that gives TL role in growth. The Solow growth-accounting technique (Solow, 1957) requires only the assumption of constant returns to scale in the production function and perfect competition. We estimated production function to obtain the respective weights of inputs through Ordinary Least Square (OLS). We can specify an aggregate production function as:

$$Y_t = A_t f(K_t, L_t) \tag{1}$$

Where '*Y*', '*K*' and '*L*' are value added, physical capital stock and labour force respectively, and '*A*' is the TFP of LSM sector in Pakistan.

We differentiate the above production function with respect to time, and obtain the growth rate of output decomposed into sources of growth: improvement in productive efficiency $\left(\frac{\hat{A}}{A}\right)$ and increase in factor inputs $\left(\frac{\hat{K}}{K}\right)$ and $\left(\frac{\hat{L}}{L}\right)$.

$$\frac{\hat{Y}}{Y} = \frac{\hat{A}}{A} + \frac{Af_k K}{Y}\frac{\hat{K}}{K} + \frac{Af_l L}{Y}\frac{\hat{L}}{L} \tag{2}$$

The $\frac{Af_k K}{Y}$ and $\frac{Af_l L}{Y}$ are the shares of capital (α_k) and labour (α_l) in total output respectively. Since the share of capital one minus the share of labour under the assumption of constant returns to scale, the growth rate of output is decomposed into TFP growth and the weighted sum of the growth of capital and labour is as follows:

$$\frac{\hat{Y}}{Y} = \frac{\hat{A}}{A} + (1-\alpha_k)\frac{\hat{K}}{K} + \alpha_l \frac{\hat{L}}{L} \tag{3}$$

Table 1 presents results of the estimates of Cobb Douglas production function for LSM sector. All the variables are in logarithmic form. The sum of the coefficients of labour force and capital stock is one (approximately). This indicates that underlying production function is constant return to scale and neutral in technical progress. This also implies that the overall growth rate of factor inputs is the weighted sum of the growth rate of inputs of labour and capital with the weights adding up to unity.

TABLE 1

Estimations of LSM Sector Production Function in Pakistan
Dependent variable: Real Value-Added in Manufacturing Sector

Constant	Physical stock of capital	Labour force	Adjusted R^2	SE of regression	DW stat
0.23 (1.03) [0.22]	0.85* (90.09) [0.01]	0.16 (–0.15) [0.04]	0.997	0.031	1.3

NOTE: Figures in ( ) and [ ] show the values of t-statistics and standard error, respectively. * show the level of significance at 1%.

Source: Author's estimation.

Having data on the growth rates of output and inputs along with the factor shares, we can measure TFP growth from the above equation as residual output growth, after subtracting the contribution of measured input growth from output growth. Therefore, the above equation can be presented in the following equation:

$$\frac{\hat{A}}{A} = \frac{\hat{Y}}{Y} - (1 - \alpha_k)\frac{\hat{K}}{K} - \alpha_l \frac{\hat{L}}{L} \tag{4}$$

IV. QUANTIFYING OPENNESS AND TRADE ORIENTATION

The literature on trade policy reforms includes several distinct concepts of 'TL'. It encompasses both openness and changes in trade orientation. Openness in an economy wide measures, whereas trade-orientation is the industry specific measure (Das, 2002). The lack of an agreed upon definition of TL makes it difficult to provide a 'right' measure of openness or trade orientation (Pritchet, 1996).[6] Measures of openness are usually of two kinds: incidence and outcome. Incidence based measures attempt to measure trade policies by direct observation of the policy instrument. The outcome-based measures assess the deviation of the actual outcomes from what the outcome would have been without the trade barriers (Baldwin, 1989). Most research

[6]Most empirical studies on the relationship between trade and economic performance have relied upon one or two indexes and have thus left themselves opened to criticism by reform skeptics. Further, Pritchett (1996) observes that various trade policy indicators are uncorrelated, thereby implying that different dimensions of trade policy may have different effects on growth.

has examined the relationship between economic growth and trade volumes, not policies — this is partly because measuring 'policy' poses difficult questions. It is sometime difficult to interpret the observed correlation between trade policies and growth (Levine and Renelt, 1992). Our focus in this study, however, is on the measures of trade orientation, which use to capture the impact of TL on industrial productivity growth. Important measurements used in this study are; Import penetration (IP), Price comparisons (QR), trade flows (TF) and IS and EP.

V. MODEL SPECIFICATION AND ESTIMATION TECHNIQUE

To examine the impact of openness on the growth rate of TFP we have employed autoregressive-distributed lag (ARDL) bound test approach to cointegration analysis. The ARDL modeling approach popularized by Pesaran and Pesaran (1997), Pesaran and Smith (1998), Pesaran and Shin (1999), and Pesaran *et al.* (2001), has numerous advantages. The main advantage of this procedure is that it can be applied regardless of the stationary properties of the variables in the sample and the model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modeling framework (Laurenceson and Chai, 2003, p. 28). Moreover, a dynamic Error Correction Model (ECM) can be derived from ARDL through a simple linear transformation (Banerjee *et al.*, 1993, p. 51), which allows for inferences on long-run estimates, which is not possible under alternative co-integration procedures (Sezgin and Yildirim, 2002). ARDL method has additional advantage of yielding consistent estimates of the long-run parameters that are asymptotically normal irrespective of whether the variables are I(0), I(1) or mutually integrated since there is no need for unit root pretesting, but it is still important to complement the estimation process with unit root test in order to ensure that none of the variables are integrated of higher order, *i.e.* I(2). Moreover, unit root tests yield different conclusions not only due to their different power, but also due to different lag length selected in each test.

It also shows that appropriate lags in the ARDL are corrected for both residual correlation and endogeneity. As long as the ARDL model is free of residual correlation, endogeneity is less of a problem (*see* Pesaran and Shin, 1999). The important advantage of ARDL against the single equation co-integration analysis such as Engle and Granger (1987) is that the latter is suffers from problems of endogeneity while the ARDL method can distinguish between dependent and explanatory variables. Indeed, one of the important advantages of ARDL procedure was that the estimation is possible

even when the explanatory variables are endogenous (Alam and Quazi, 2003). Hence, ARDL provides robust results in small sample sizes. Most importantly the model could be used with limited sample data (30 observations to 80 observations) in which the set of critical values were developed originally by Narayan (2004) by using GAUSS.

In view of the above advantages to illustrate the ARDL modeling approach the following simple model is considered:

$$GRTFP = \beta_0 + \beta_1 Y + \beta_2 K + \beta_3 L + \beta_4 HDI + \beta_5 \text{ Openness} + u \qquad (5)$$

Where, β's are parameters, u is error term and independent variables include value added (Y), stock of physical capital (K), labour force (L), human development index (HDI) and Openness (including different measures). The dependent variable is growth rate of TFP (GRTFP). For the above equation the unrestricted error correction version of the ARDL model is given by:

$$\begin{aligned}\Delta GRTFP_t = {} & \beta_0 + \beta_1 GRTFP_{t-1} + \beta_2 Y_{t-1} + \beta_3 K_{t-1} + \beta_4 L_{t-1} + \beta_5 HDI_{t-1} + \\ & \beta_6 \text{Openness}_{t-1} \sum_{i=1}^{m} \beta_7 \Delta GRTFP_{t-i} + \sum_{i=0}^{m} \beta_8 \Delta Y_{t-i} + \sum_{i=0}^{m} \beta_9 \Delta K_{t-i} \\ & + \sum_{i=0}^{m} \beta_{10} \Delta L_{t-i} + \sum_{i=0}^{m} \beta_{11} \Delta HDI_{t-i} + \sum_{i=0}^{m} \beta_{12} \Delta \text{Openness}_{t-i} + u \qquad (6)\end{aligned}$$

The first part of the above equation represents the long-run dynamics of the model whereas second part shows the short-run relationship in which Δ is the first difference operator, u_t is a white noise disturbance term and the equation indicates that growth rate of TFP tends to be influenced and explained by its past values so it involves other disturbances or shocks. Therefore, equation (6) was modified in order to capture and absorb certain economic shocks. The ARDL approach involves two steps for estimating the long-run relationship (Pesaran *et al.*, 2001). First step is to examine the existence of long-run relationship among all variables in the equations under estimation. Second step is to estimate the long-run and the short-run coefficients of the same equation. We run the second step only if we find a long-run relationship in the first step (Narayan *et al.*, 2004). So in order to test the long-run relationship equation (6) should be conducted by imposing restrictions on estimated long-run coefficients of the variables. The null and alternative hypotheses are as follows:

H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ (No long-run relationship)

H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$ (Long-run relationship exist)

The F-test has a nonstandard distribution, which depends on: whether variables included in the model are I(0) or I(1), the number of regressors and whether the model contains an intercept and/or a trend. Given a relatively small sample size in this study of 37 observations, the critical values used are as reported by Narayan (2004), which based on small sample size between and 80 observations.[7] The test involves asymptotic critical value bounds, depending whether the variable are I(0) or I(1) or mixture. Two sets of critical values generated, one set refers to the I(0) series and other for the I(1) series. Critical values for the I(1) series are referred to as upper bound critical values, while the critical values for I(0) series are referred as the lower bound critical values. If the calculated F-statistic is larger than the upper bound critical value, then the null hypothesis of no co-integration is rejected, and conclude that there is evidence of a long-run relationship between the variables irrespective of whether the variables are I(0) or I(1). If the test statistic is below the lower bounds, then the null hypothesis of no co-integration cannot be rejected and if it falls inside the critical value band, the test is inconclusive.

If there is evidence of long-run relationship (co-integration) of the variable, the following long-run models are estimated:

$$GRTFP(P) = \beta_1 + \sum_{i=1}^{p} \beta_2 (GRTFP(P))_{t-1} + \sum_{i=0}^{p} \beta_3 Y_{t-1} + \sum_{i=0}^{p} \beta_4 K_{t-1} + \sum_{i=0}^{p} \beta_5 L_{t-1} + \sum_{i=0}^{p} \beta_6 HDI_{t-1} + \sum_{i=0}^{p} \beta_7 OPENESS_{t-1} + \mu_t \quad \text{Model I}$$

Once co-integration is established, lag length is selected for each variable. The ARDL method estimates $(p+1)^k$ number of regressions in order to obtain optimal lag length for each variable, where p is the maximum number of lag to be used and k is the number of variables in the equation. The model can be selected using the model selection criteria like Schwartz-Bayesian Criteria (SBC) and Akaike's Information Criteria (AIC). SBC is known as the parsimonious model: selecting the smallest possible lag length, whereas AIC is known for selecting the maximum relevant lag length. For annual data, Pesaran and Shin (1999) recommended choosing a maximum of 2 lags. From, this the lag length that minimizes SBC is selected.

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[7]Pesaran and Pesaran (1997) and Pesaran *et al.* (2001), however, generated critical values based on 500 and 1000 observations and 20,000 and 40,000 replications, respectively, which suitable for large sample size.

The ARDL specification of the short-run dynamics can be derived by constructing an Error Correction Model (ECM) of the following model:

$$\Delta GRTFP(P) = \beta_1 + \sum_{i=1}^{p} \beta_2 \Delta(GRTFP(P))_{t-1} + \sum_{i=0}^{p} \beta_3 \Delta Y_{t-1} + \sum_{i=0}^{p} \beta_4 \Delta K_{t-1} + \sum_{i=0}^{p} \beta_5 \Delta L_{t-1} + \sum_{i=0}^{p} \beta_6 \Delta HDI_{t-1} + \sum_{i=0}^{p} \beta_7 \Delta OPENESS_{t-1} + \beta_8 ECM_{t-1} + \mu_t \quad \text{Model II}$$

where, ECM_{t-1} is the error correction term, defined as:

$$ECM_t = GRTFP(P) - \beta_1 - \sum_{i=1}^{p} \beta_2 (GRTFP(P))_{t-1} - \sum_{i=0}^{p} \beta_3 Y_{t-1} - \sum_{i=0}^{p} \beta_4 K_{t-1} - \sum_{i=0}^{p} \beta_5 L_{t-1} - \sum_{i=0}^{p} \beta_6 HDI_{t-1} - \sum_{i=0}^{p} \beta_7 OPENESS_{t-1} \quad (7)$$

All coefficients of short-run equation are coefficient relating to the short-run dynamics of the model convergence to equilibrium and β_8 represent the speed of adjustment.

To ascertain the goodness of fit of the ARDL model, diagnostic test and stability test are conducted. The diagnostic test examines the serial correlation, functional form, normality and heteroscedasticity associated with the model. The structural stability test is conducted by employing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ). Examining the prediction error of the model is another way of ascertaining the reliability of the ARDL model. If the error or the difference between the real observation and the forecast is infinitesimal, then the model can be regarded as best fitting.

VI. ESTIMATION RESULTS

Prior to the testing of co-integration, we conducted a test for order of integration of each variable using Augmented Dickey-Fuller (ADF) test. Even though the ARDL frame work does not require pre-testing variables to be done, the unit root test could convince us whether or not the ARDL model should be used because if any variable in Model I is integrated of I(2) or higher order then procedure is not applicable. Table 2 shows that there is a mixture of I(1) and I(0) of underlying regressors and therefore, the ARDL,

testing could be proceeded. Table 2 shows that growth rate of TFP in LSM sector (GRTFP), Human Capital (HDI), import penetration (IP), export promotion (EP), terms of trade (TOT) and trade flow (TF) are stationary at the level, *i.e.* I(0). Value added (*Y*), capital (*K*) and labour (*L*) are stationary at I(1). All the independent variables are in form of log.

TABLE 2

Unit-Root Estimation

Variables	Level		First difference	
	Intercept and Trend	No. of Lags	Intercept and Trend	No. of Lags
GRTFP (*P*)	–8.835*	1	–8.563	1
Value added (*Y*)	–0.188	1	–6.580*	1
Labour force (*L*)	–1.127	1	–10.448*	1
Capital (*K*)	–0.500	1	–7.112*	1
HDI	–4.102*	1	–6.740	1
IP	–3.383*	1	–5.471	1
EP	–3.992*	1	–6.457	1
TF	–4.811*	1	–5.689	1
TOT	–0.815*	1	–1.819	1

NOTE: * represents the level of significance at 1%, having critical values of –4.234972, –3.540328, –3.202445 with intercept and trend at level and at first difference.

The next step is estimating the Model I to examine the long-run relationship among the variable. As suggested by Pesaran and Shin (1999) and Narayan (2004), since the observations are annual, we choose 2 as maximum order of lags in ARDL and estimate for the period of 1970-2007. We also used the SBC to determine the optimal number of lags to be included in the conditional ECM model, whilst ensuring there was no evidence of serial correlation as emphasized by Pesaran *et al.* (2001). The lag length that minimizes SBC is one. The calculated F-statistics is display in Table 3.

TABLE 3

F-Statistic of Cointegration Relationship (Lag Length Selection)

Lag Order	F-Statistics
0	(6,22) = 1.423
1	(6,15) = 6.050*
2	(6,8) = 1.2725

NOTE: The relevant critical value bounds for F-statistics (an unrestricted intercept and no trend) are taken from Table CI. iii in Nayaran (2004). At 99% level, the critical value bounds for F-statistics are 4.016 and 5.797, indicates that computed statistics falls above the upper bound value.

The calculated F-statistics = 6.050) is higher then the upper bound critical value at 1% level of significance (5.797) using unrestricted intercept and no trend for the model. This implies that the null hypothesis of no co-integration cannot be accepted at 1% level of significance, therefore there is co-integration between the variables.

The empirical results of the long-run model: growth rate of TFP in LSM sector in Pakistan are presented in Table 4. All the explanatory variables are in form of log and openness is measured by the different quantity based measures including IP, EP, TF and TOT. The significant variables those appear to affect growth rate of TFP in LSM sector are *Y*, K (–1), L (–1), IP, TOT and HDI also have the significant coefficient. We include the one year time lag of *K* and *L* in the long-run model of growth rate of TFP in order to take into account the gestation period. Results illustrate that the contemporary value added (*Y*) has the affirmative effect on the growth rate of TFP of LSM sector and the impact is maximum among all the explanatory variables. K and L has the lag effect on the growth rate of TFP and among these two explanatory variables K have more impact on growth rate of TFP then the L. HDI has a negative effect on the growth rate of TFP in LSM sector. As research has proven that it is social and human development that makes a strong basis for sustainable economic development. Focusing exclusively on the liberalization of the economy neglecting other aspects of human and social development cannot be productive.

All the measures of the openness mentioned above showing the negative impact on the growth rate of TFP in LSM sector in Pakistan. Statistically significant negative coefficients of the different measures of the openness in

the long-run model suggested that rapid progress in TL do not caused a rise in productivity. The results of earlier studies show that when protection is reduced at moderate rate, the rise in productivity is highest, but when protection is reduced at an excessively fast rate or when it is not reduce at all, the rise in productivity is low (Ourata and Yokota, 1994).

TABLE 4

Long-Run Model (Model I)
Dependent Variable GRTFP

Autoregressive Distributed Lag Estimates ARDL (0,1,1,1,0,0) selected based on Schwarz Bayesian Criterion				
Variables	Coefficients (Openness measured as IP)	Coefficients (Openness measured as EP)	Coefficients (Openness measured as TF)	Coefficients (Openness measured as TOT)
C	–2.737* (–1.725)	–2.651* (–1.672)	0.365 (0.428)	–2.784* (–1.660)
Y	9.578* (39.903)	9.533* (39.710)	9.683* (85.212)	9.572* (37.609)
Y (–1)	–9.464* (–36.775)	–9.447* (–36.776)	–9.715* (–73.795)	–9.465* (–34.743)
K	–8.258* (–63.277)	–8.233* (–61.872)	–7.945* (–105.230)	–8.297* (–61.042)
K (–1)	8.314* (83.801)	8.302* (82.248)	7.942* (114.661)	8.364* (83.614)
L	–1.962* (–57.008)	–1.953* (–55.507)	–1.953* (–120.211)	–1.969* (–54.499)
L (–1)	2.000* (59.222)	2.008* (59.478)	1.966* (111.253)	2.001* (55.505)
HDI	–1.656* (–1.639)	–1.505 (–1.479)	0.380 (0.686)	–1.786* (–1.683)
Openness	–0.0816* (–1.744)	–0.098* (–1.779)	0.047* (1.711)	–0.0051 (–0.2622)
R^2	0.9986	0.998	0.9985	0.9984
Adjusted R^2	0.9982	0.998	0.9981	0.9980
DW- Statistic	2.1	2.2	2.3	2.3

Notes: * shows the level of significance at 1%. Value in parentheses is of t-statistic.

Source: Author's estimates.

The coefficient of the IP ratio anticipated to be positive since penetration of imported goods would cause competition in the domestic market and consequently rationalization of the competing sector as a whole or closing down of unprofitable enterprises would lead to improves sector productivity. There has been rise in the import penetration following the liberalization program (*see* Figure 1 in Appendix). However the estimation results are contrary to expectation. The estimated coefficient is negative and statistically significant implies that the increasing presence of imported goods lowered the productivity of the competing sector. This result can be interpreted in a way that increase in import penetration following liberalization did not result in improvement in competitiveness if import substitution industries and that the import liberalization proceeded so rapidly that earnings deteriorated.

There has been rise in the export promotion following the liberalization program (*see* Figure 2 in Appendix). However, its impact on the growth rate of TFP in LSM sector is negative and statistically significant. Increase in the export promotion despite poor productivity performance of the export oriented industries in the post-liberalization period, appears due to the lucrative export intensives which did not put real pressure to improve efficiency. Due to more open trade policy and high import penetration, a moderate increase in exports does not appear very supportive to increase the productivity. But still there is a room for exports to improve the productivity of the sector if exports increase greatly.

The coefficient of TF (import plus export to GDP ratio) is expected to be affirmative, since externality might be brought about for manufacturing exporters through the acquisition of commodity knowledge, production techniques and other benefits from foreign customers. If so, an export shock would be positively reflected on the growth rate of TFP in LSM sector of Pakistan. There has been nominal increase rise in the trade flows following the liberalization program (*see* Figure 3 in Appendix). However, the estimation results show that the coefficient is negative and statistically significant, *i.e.* the direction of the productivity effect is negative. Due to more open trade policy and high import penetration, a moderate increase in exports does not appear very supportive to increase the productivity.

The impact of TOT on the growth rate of TFP in LSM sector found to be statistically unclear in the long rum model (Model I), however negative like other measures of the openness. There has been gradual decrease in TOT during the analysis period (*see* Figure 4 in Appendix). The negative coefficient reflects the deficiency of the economy in adopting or imitating the technology that trickles through trade. There could also be the reason of

maximum dependence of domestic economy on the foreign manufacturing goods. Theory indicates that the TL effect positively on the TFP growth, but the results is still inconclusive in case of developing countries.

TABLE 5

Error Correction Model (Model II)
Dependent Variable ΔGRTFP

Variables	Coefficients (Openness measured as IP)	Coefficients (Openness measured as EP)	Coefficients (Openness measured as TF)	Coefficients (Openness measured as TOT)
C	–0.051 (–0.379)	–0.089 (–0.692)	–0.162 (–1.329)	0.038 (0.285)
Δ(GRTFP(–1))	–0.055 (–0.925)	–0.066 (–1.103)	–0.060 (–0.941)	–0.0071 (–0.115
Δ (Y)	9.365* (6.8138)	9.349* (6.739)	9.398* (6.601)	9.031* (6.951)
Δ (K)	–11.421* (–12.814)	–11.231* (–12.287)	–11.170* (–11.954)	–11.396* (–14.287)
Δ (K(–1))	4.379* (3.410)	4.722* (3.775)	5.704* (5.267)	3.270* (2.310)
Δ (L)	–2.045* (–8.767)	–2.013* (–8.266)	–2.074* (–8.588)	–2.051* (–9.372)
Δ (L(–1))	1.623* (4.467)	1.699* (4.666)	1.902* (5.670)	1.405* (3.804)
Δ (HDI)	–6.860 (0.348)	–5.975 (0.804)	–4.838 (–0.604)	–8.552 (–1.228)
Δ (Openness)	–0.416 (–1.487)	–0.442 (–1.270)	–0.584* (1.677)	–0.0036 (–0.041)
ECM (–1)	–0.476* (–2.831)	–0.413* (–2.622)	–0.363* (–2.370)	–0.661* (–3.497)
R^2	0.977	0.976	0.975	0.979
Adjusted R^2	0.969	0.967	0.966	0.972
DW-statistic	1.9	1.9	2.0	1.8

Notes: * shows the level of significance at 1%. Value in parentheses is of t-statistic.

Source: Author's Estimates.

The results of the error correction model (ECM) for the growth rate of TFP in LSM sector in Pakistan are presented in Table 5. Most of the coefficients in the ECM are significant except HDI. The lagged error term (ECM_{t-1}) is negative and significant at 1% level for the different measures of the openness. Short-run behavior of the growth rate of TFP does not support the short-run relation among the explanatory and dependent variable. The coefficients of ECM_{t-1} ranges between –0.363 to –0.661 for different measures of openness indicates average rate of convergence to equilibrium. In short-run model the growth rate of the *Y* has the highest positive impact on the growth rate of the TFP in LSM sector, whereas *K* and *L* have lag effect. Result shows that in short-run also all the measures of openness and HDI have negative but insignificant impact on the growth rate of TFP except TF having negative significant coefficient.

Diagnostic tests for serial correlation, normality, heteroscedasticity and functional form for long-run and short-run models are considered and finally, when analyzing the stability of long-run coefficients together with the short-run dynamics CUSUM and CUSUMSQ are applied.

VII. CONCLUSION

The evidence of positive relationship between TL and economic growth is not as convincing in the case of majority of developing countries as it is in the case of developed countries. TL of the Pakistan's economy during the 1990s, initiated largely under the IMF pressure, has not been dynamic in improving its social and economic development. Pakistan's economic growth rate was fairly good from last 5 to 6 years, after a sluggish economic growth in decade of 1990s. But the benefits of that growth do not transferred to the social sector of the economy. The share of the manufacturing sector in Pakistan's economic growth has declined steadily; mainly due to the way liberalization was carried out could not lead to a successful outcome. The reforms process was done only partially, due to lack of required institutional infrastructure and there were concerns that Pakistan will continue to face serious challenges for its social and economic development in future, as it moves towards liberalization, and it actually happened. Research has proven that it is social and human development that makes a strong basis for sustainable economic development. This is where Pakistan needs to pay attention. TL under the WTO regime is Pakistan's obligation, but at the same time it should be complied to in a manner with least implications for social sectors of the economy. Any future binding commitments by the Government must be made in consultation with relevant industry and business sectors. Pakistan should not liberalize more than what is required.

Any move towards liberalization should be carefully measured in terms of its prospective costs and benefits.

The above discussion shows that the TL policy of the government has not yet brought about any epoch-making economic results particularly for the growth rate of TFP in LSM sector. The elimination of government intervention and restrictions has characterized all policy stances, yet liberalization alone is not sufficient to produce significant, conspicuous economic achievement. Government must also play important role in capitalizing infrastructural projects, in order to lay the foundation for a healthy competitive environment for the manufacturing sector. The negative coefficient of the openness measures reflects the deficiency of the economy in adopting or imitating the technology that trickles through trade. There could also be the reason of maximum dependence of domestic economy on the foreign manufacturing goods. Theory indicates that the TL effect positively on the TFP growth, but the results is still inconclusive in case of developing countries. The above mentioned results also support the previous studies that the TL does not affect the productivity in case of Pakistan.

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APPENDIX

Figure 1

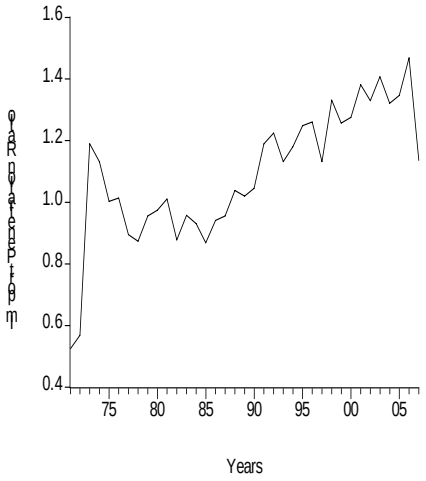


Figure 2

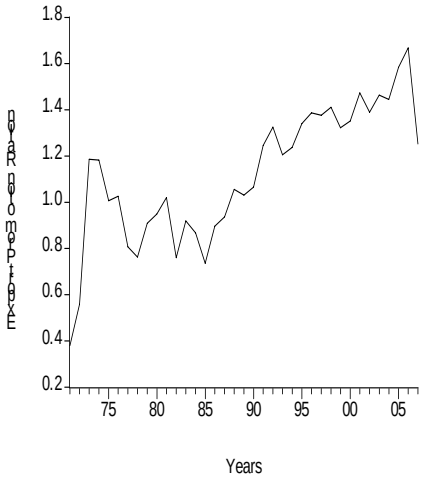


Figure 3

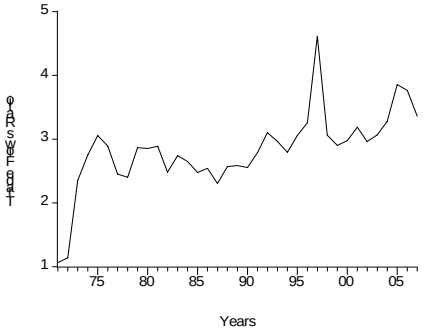
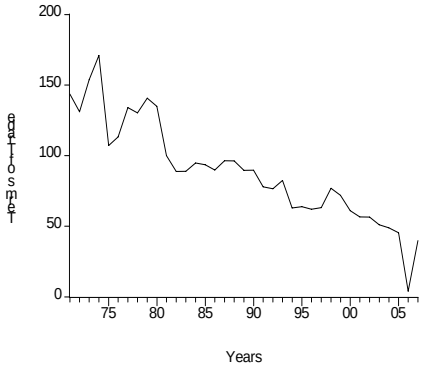


Figure 4



Source: Author's calculation based on the data from *Pakistan Economic Survey* (various issues).

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HIV/AIDS AND WELL-BEING IN SOUTH CENTRAL AND SOUTH-EAST ASIA

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Abstract. Using a cross-country data drawn from some of countries in South Central and South-East Asia and a regression analysis, this paper examines the impact of HIV/AIDS on the well-being of the people in these sub-regions. Holding the incidence of tuberculosis constant, the result indicates that the prevalence of HIV/AIDS has little or no significant impact on well-being. A situation that can be linked to efforts put in place by the governments of the countries in the sub-regions in curtailing the menace of HIV/AIDS. This result notwithstanding, the paper still suggests measures that can be used to curtail the spread and the treatment of the disease in the sub-regions.

I. INTRODUCTION

Recent data on the trend of HIV/AIDS in the world shows a reduction from 40.3 million people that were infected in 2005 to 33 million people in 2007. South Central Asia incidentally witnessed a reduction from 0.5 percent in 2005 to 0.3 percent in 2007. In South East Asia, the prevalence of HIV/AIDS stabilized with the rate at the same 0.5 percent in 2005 and 2007. At the country level, Thailand and Cambodia had the highest prevalence rate of 1.4 percent and 0.8 percent respectively (PRB, 2005; PRB, 2008). The mere fact that the prevalence rate of HIV/AIDS is less when compared to other sub-

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regions like sub-Saharan Africa still call for concern, against the background that HIV/AIDS is not just a public health problem but also a disease that has far reaching consequences for all social sectors and for development itself. As a health problem, HIV/AIDS has led to increase in morbidity and mortality which subsequently has created a development problem due to a massive fall in productivity of individuals and countries affected. HIV/AIDS has also led to the increase in the cost of health care services, decline in savings and capital formation (since funds needed for such are diverted to the treatment and care of the victims), decline in spending on education, higher expenditure on caring for orphans left behind by the disease, high level of poverty, food insecurity and malnutrition (World Bank, 1997; Barrett and Whiteside, 2000).

Drawn from the above scenario, this paper therefore examines the impact of HIV/AIDS pandemic on the well-being of the people living in South Central and South East Asia, using a set of cross country data and a multi-linear regression analysis.

The rest of the paper is structured as follows: Section II provides the theoretical framework for the study and a review of some related literature to the study. Section III provides the data source and methodology proposed for the study. Section IV provides and discusses the results. Conclusion and recommendations are contained in the last section.

II. THEORETICAL FRAMEWORK AND REVIEW OF RELATED LITERATURE

THEORETICAL FRAMEWORK

The impact of HIV/AIDS on well-being can be analyzed in the context of a Neo-classical model of human capital development. Following the views of Schultz (1960) cited in Meire (1970) there are three ways human capital can develop:

(*i*) through health care facilities and services, broadly conceived to include all expenditure that affect the life expectancy, strength and stamina and the vigor and vitality of the people;

(*ii*) on-the-job training, including old style apprenticeship organized by firms; formally organized education at the elementary, secondary and higher levels;

(*iii*) study programmes for adults that are not organized by firms including extension programmes notably in agriculture; and

(*iv*) migration of individuals and families to adjust to changing job opportunities.

In its wider sense, therefore, investment in human capital means expenditure on health, education and social services and in its narrow sense it implies investment in education and training.

Given the above scenario, the outbreak of the HIV/AIDS epidemic in any country will generally have two effects: First, it will decrease life expectancy, and hence the incentive to invest. Second, the epidemic will increase premature adult mortality. The death of the parents will have adverse effects on the human capital stock/development of the offspring. As adult household member decreases family incomes, children are forced to drop out of school to contribute to the family's income. Moreover, if one or both parents die the transmission of human capital formation is weakened, because these adults will not be able to transfer human capital to their offspring. Poor education of children will translate into lower educational attainment of later generations. Decrease in education will reduce resources available for the offspring in adulthood because the household income is a function of the adult human capital stock. This again will lead to a decrease in the investment in education for their own children. Furthermore, since the parents received less education, the intergenerational transfer of human capital to their children is weakened. The result of this process will be poverty trap, where orphans and their offspring will be caught in a cycle of low educational attainment. And since the formation of human capital is one of the main determinants of well-being and economic growth that has impacted on human capital will have severe impact on well-being of the people and the nations' development in the long-run (see also UN, 2004; Bengel, 2008).

REVIEW OF RELATED LITERATURE

The review of related literature on HIV/AIDS is centered on the meaning, the causes, the consequences and the trend of HIV/AIDS in the world and the South Central and South East Asia.

Meaning of HIV/AIDS

Human Immuno-deficiency Virus (HIV) is that virus that destroys the body immune system and Acquired Immune Deficiency Syndrome (AIDS) is the full blown break down of all body immunity that leads to a group of serious illness and opportunistic infections that develop after being infected with HIV. HIV infection is caused by two strains of the human immune deficiency virus, HIV-1 and HIV-2. HIV-1 is the most common form of HIV

that is predominating in different parts of the world, while HIV-2 is found predominantly in West Africa with some pockets in Angola and Mozambique. When compared with HIV-1, HIV-2 is less infectious and its clinical course is slower. Dual infection with HIV-1 and HIV-2 is possible. Once introduced into the human body, HIV attacks mainly a subset of immune system cells, which bear a molecule called Cluster Designation 4 (CD4). Specifically, the virus binds to two types of CD4-bearing cells: Cluster Designation 4+Lymphocytes (CD4+T)-cells and macrophages. These cells perform various tasks critical to the normal functioning of the immune system. CD4+ T-cells organize the overall immune response by secreting chemicals to help other immune cells work properly, while macrophages engulf foreign invaders and prime the immune system to recognize these invaders in the future (see World Bank, 1997; Lamptey *et al.*, 2002; WHO, 2003).

Causes of HIV/AIDS

HIV is transmitted through sexual intercourse, blood and blood products like unsafe blood transfusion, use of unsterilized instruments, traditional practices involving cuts, mother to child transmission during pregnancy, delivery and breast feeding, organ and tissue transplant. HIV cannot be transmitted by a sneeze, a handshake or other casual contacts. In developing countries, heterosexual intercourse accounts for an even greater proportion of cases. (Bulatao and Bos, 1992; World Bank, 1997; O'Malley, 2002; Robalino *et al.*, 2002).

According to Bonnel (2000) several economic, socio-cultural and epidemiological variables account for the spread of the HIV/AIDS. The main economic variables are poverty, gender inequality, income inequality and the extent of labour migration. Poverty, gender and income inequality make societies more vulnerable to HIV. For instance, a woman who is poor relative to a man will find herself at much greater risk of HIV infection. For labour migration, unequal regional development among countries as well as within countries can induce labour migration to urban areas or other countries. The resulting concentration of single men in urban areas or project sites is generally accompanied by a parallel increase in commercial and casual sex, with a concomitant rise in the risk of HIV infection. The socio-cultural variables include the type of sexual relations, religious belief, the structure of societies and conflicts. For instance, the type of sexual relations is important because it affects the relative spread of HIV among men and women. In some part of Asia, HIV is mainly spread through heterosexual relations. The epidemiological variables include co-factors that increase the

risk of sexual contacts resulting in HIV infection. Recent epidemiological studies have implicated genital/anorectal ulcer disease and non-ulcerative sexually Transmitted Diseases (STD) as important co-factors in the acquisition and transmission of HIV during sexual intercourse (Lamptey *et al.*, 2002; Olumide and Mohammed, 2004).

Consequences of HIV/AIDS

As observed by Cuddington (1993), World Bank (1993*a*), Ainsworth and Over (1994), World Bank (1995), World Bank (1997), Robalino *et al.* (2002) and Bell *et al.* (2003), the effects of HIV/AIDS can be grouped into two categories; those associated with rising morbidity rates and those associated with rising mortality rates for particular age cohorts, especially sexually active adults and children infected at birth. The rise in morbidity has three immediate effects: reduction in labour productivity, increase in health care spending and reduction in savings. The negative labour productivity effect will arise because sick or worried workers are less productive than happy and healthy workers. Even the productivity of those who do not have AIDS may fall as infection and illness rates among friends, families and co-workers rise. The health care expenditure effect refers to increase expenditures by households and the (public or private) on health care systems to assist AIDS patient and their families in coping with deteriorating health. The effects on saving can be seen from the following; the direct effect of higher medical expenditures which tend to reduce saving and the growth of per capita income, life expectancy, age structure, and the healthiness of the population. The fall in domestic saving will imply a reduction in capital formation, and if it were substantial, it would have a potentially large adverse effect on per capita income over the long term. On the other hand, the gradual rise in mortality rates caused by AIDS will have two important demographic consequences with macroeconomic effects. First, there will be a slower population growth rate, which will result in a smaller population at a future date. Second, a rising number of deaths from AIDS will shift the age structure of the population towards the younger age cohorts. The shifts in age structure can be expected to have important effects on both aggregate supply and aggregate demand. On the supply side, the size of the working-age population (and perhaps the participation rate of the labour force) will be reduced. The smaller working-age population will directly reduce potential output. The loss in output would be exacerbated by a fall in labour force productivity as the average age and experience of the labour force declines. On the demand side, the shift in the size and composition of the population will affect the level and composition of public expenditures as well as the economy's overall (private and public) saving rates. For example, the smaller

number of young people will place lower demands on the education system and the overall consumption rates will be higher because of the younger age structure (see also World Bank, 1993b; Ainsworth, 1998; Over, 1998; Squire, 1998; Ainsworth and Filmer, 2002; Lewis, 2005).

Barrett and Rugaleman (2001) and Wilson (2001) provided other consequences of HIV/AIDS to include household food insecurity and high levels of malnutrition among children, especially orphans who because of the death of infected adults that are farmers are deprived of sufficient food. The death of young adults through HIV/AIDS also reduced households' earning power and therefore, their ability to buy food and related goods and services. Illness and funerals forced households to spend most of their cash on care, treatment and other expenses, with adverse consequences for food availability. Labour shortages also force households to forgo cash in favour of fast-maturing food crops, thus curtailing the ability of afflicted households to generate cash. The death of the productive adults also shatters the social networks that provide households with community help and support. Survivors are left with few relations upon when to depend. Widows and their children face critical shortages of food and income, primarily due to disinheritance, lack of sufficient assets, lack of labour supply and exclusion from wider kinship networks (see also Barrett and Whiteside, 2000).

Trend of the Spread of HIV/AIDS

On a global scale, the HIV epidemic has stabilized, although with unacceptably high levels of new HIV infections and AIDS deaths. Globally, there were estimated 33 million people living with HIV in 2007. The annual number of new HIV infections declined from 3.0 million in 2001 to 2.7 million in 2007. Overall, 2.0 million people died due to AIDS in 2007, compared with an estimated 1.7 million in 2001. Women account for half of all people living with HIV worldwide, and nearly 60 percent of HIV infections in sub-Saharan Africa. Over the last 10 years, the proportion of women among people living with HIV has remained stable globally, but has increased in many regions. Young people aged 15-24 account for an estimated 45 percent of new HIV infections worldwide. An estimated 370,000 children younger than 15 years became infected with HIV in 2007. Globally, the number of children younger than 15 years living with HIV increased from 1.6 million in 2001 to 2.0 million in 2007. Almost 90 percent live in sub-Saharan Africa (UNAID, 2008).

In Asia, an estimated 5.0 million people were living with HIV in 2007, including the 380,000 people who were newly infected that year. Approximately 380,000 died from AIDS-related illnesses.

TABLE 1

Rate of HIV/AID in South Central and South East Asia 2007

Country	Population (Million)	Percentage of Population Ages 15-49 with HIV/ AIDS 2005	Percentage of Population Ages 15-49 with HIV/ AIDS 2006	Percentage of Population Ages 15-49 with HIV/ AIDS 2007
Afghanistan	32.7	< 0.1	< 0.1	–
Bangladesh	147.3	< 0.1	< 0.1	< 0.1
Bhutan	0.7	< 0.1	< 0.1	0.1
Brunei	0.4	< 0.1	< 0.1	–
Cambodia	14.7	1.6	0.6	0.8
East Timor	1.1	–	–	0.2
India	1,149.3	0.9	0.4	0.3
Indonesia	239.9	0.1	0.1	0.2
Iran	72.2	0.2	0.2	0.2
Kazakhstan	15.7	0.1	0.1	0.1
Kyrgyzstan	5.2	0.1	0.1	0.1
Laos	5.9	0.1	0.1	0.2
Malaysia	27.7	0.5	0.5	0.5
Maldives	0.3	–	–	–
Myanmar	49.2	1.3	1.3	0.7
Nepal	27.0	0.5	0.5	0.5
Pakistan	172.8	0.1	0.1	0.1
Philippines	90.5	< 0.1	< 0.1	< 0.1
Singapore	4.8	0.3	0.3	0.2
Sri Lanka	20.3	< 0.1	< 0.1	< 0.1
Tajikistan	7.3	0.1	0.1	0.3
Thailand	66.1	1.4	1.4	1.4
Turkmenistan	5.2	< 0.1	< 0.1	< 0.1
Uzbekistan	27.2	0.2	0.2	0.1
Vietnam	86.2	0.5	0.5	0.1

Sources: Population Reference Bureau (PRB) 2006, 2007 and 2008.

As indicated in Table 1, the National HIV infection levels for population ages 15-49 were highest in Thailand, Cambodia and Myanmar with 1.4, 0.8 and 0.7 percent respectively and lowest in Bangladesh, Philippines, Sri Lanka and Turkmenistan with less than 1 percent in 2007.

WELL-BEING: MEANING AND DETERMINANTS

Meaning

According to Narayan *et al.* (2000*a*, 2000*b*), well-being is synonymous with good quality of life which include material well-being often expressed as having enough bodily well-being which includes being strong, being in the right frame of mind and looking good; social well-being which includes caring for and settling children; having self-respect, peace, and good relations in the family and the community; having security, including civil peace, a safe and secure environment, personal and physical security, and confidence in the future; and having freedom of choice and action, including being able to help other people in the community.

Determinants of Well-Being

According to the World Bank (1991) and Petri (1993), one of the key determinants of well-being in a given country is the presence of stable macroeconomic policies and economic growth. For instance, when there exist sound fiscal and monetary policies in a country this will create a hospitable climate for public and private investment in both socio-economic activities which in turn promote productivity, increases income and the purchasing power of the people and their consumption-expenditure from which the nation's well-being improves.

The ability of individuals to have access to the basic needs of life, *e.g.* food, assets, land, work, health, education, water and shelter also determine well-being. As stated by Lipton and Ravallion (1995) and Narayan *et al.* (2000*a*), adequate food is a universal need for improved well-being. Access to adequate resources, especially land is another universal criterion of well-being. Ability to find a paid work, to obtain money, to buy clothes and to pay for health treatment and school expenses is another important determinant of well-being.

Closely related to the above is Sen's capabilities and entitlements doctrine. According to Sen (1985), as a determinant of well-being people's capabilities that refers to what people do and can do in their lives is also a determinant of well-being. It also includes things that can lead to a long and healthy life; to be knowledgeable; and having access to the resources needed for a decent standard of living, while entitlements tend to draw the attention

of the people away from the mere possession of certain goods toward human rights and the command over the use of goods and services and the use of various economic, political and social opportunities within the legal system.

Having access to state-provided infrastructural facilities is an essential criterion for well-being. As observed by Ward (1999), infrastructural services *e.g.* road, water and electricity are significant because economic and social infrastructure is an essential overhead capital — a key element in national wealth. For instance, private firms will not get established, nor function effectively and efficiently where the infrastructure which provides the basic mechanism remains dysfunctional, disconnected, run down and inadequate. In the same view, public assets that generate directly real consumption service flows that benefit the people will be insignificant to the overall quality of life of the people most especially women.

The existence of good governance in any society is also a pre-condition for improved well-being, since good governance allows for civil and economic liberties. Civil liberties such as the freedom of individual expression, a pluralistic and free media, the ability of groups to organize and freedom of dissent and criticism are also essential elements of civil liberties since they facilitate greater citizens' voice and enhance more effective government action on development. On the other hand, economic liberties would foster entrepreneurship, market activities and economic growth for the improvement of well-being to take place since there could be fewer regulations and fewer obstacles to individual economic opportunities (Boeninger, 1991; Brautigan, 1991; Landell-Mills and Serageldin, 1991; Isham *et al.*, 1997).

The significance of these determinants to the quality of life of the people in a particular country can be drawn from the annual performance of some key socio-economic indicators like the rate of poverty, life expectancy at birth, adult illiteracy, access to health, access to safe water, access to sanitation, infant mortality rate, prevalence of malnutrition, per capita income, inflation rate, external public debt, etc. In South Central and South East Asia, the quality of life of the people as indicated in Table 2 is not as bad as expected (even with the spread of HIV/AIDS), when compared with sub-Saharan Africa. For instance, despite Thailand, Cambodia and Myanmar's rating as countries with the highest HIV/AIDS prevalence rate in the sub-regions, these countries still record a high level of life expectancy at birth (put at 72, 62 and 61 years respectively). The rates that are far higher than those of South Africa and Zimbabwe that had 50 and 40 years respectively in 2007 (PRB, 2008).

TABLE 2

Some Socio-Economic Indicators of Well-Being
in South Central and South East Asia

Country	Life Expectancy at Birth (Years)* 2007	Infant Mortality Rate (per 1000* 2007	Access to Safe Water (%)** 2004	Access to Sanitation (%)** 2004	GNI PPP Per Capita (US$)* 2007	Population in Poverty (%) [National Poverty Line]**	External Debt % of GNI** 2006
Afghanistan	43	163	13	–	–	–	9.3
Bangladesh	63	52	74	39	1340	51.0	36.2
Bhutan	66	40	–	–	4980	–	–
Brunei	75	7	–	–	49900	–	–
Cambodia	62	67	41	17	1680	47.0	–
East Timor	60	88	58	36	3190	39.7	–
India	65	57	86	33	2740	36.0	60.0
Indonesia	70	34	77	55	3580	17.5	28.8
Iran	71	32	94	–	10800	–	–
Kazakhstan	66	29	86	72	9700	17.6	7.1
Kyrgyzstan	66	50	77	59	1950	49.9	–
Lao	61	70	51	30	1940	38.6	–
Malaysia	74	9	99	94	13570	15.5	–
Maldives	73	16	–	–	5040	–	–
Myanmar	61	70	78	77	–	–	–
Nepal	64	48	90	35	1040	41.8	50.3
Pakistan	63	75	91	59	2570	28.6	–
Philippines	69	25	85	72	3730	32.1	77.7
Singapore	81	2.4	100	100	48520	–	104.0
Sri Lanka	71	15	79	91	4210	25.0	93.0
Tajikistan	67	65	59	51	1710	74.9	–
Thailand	72	16	84	96	7880	9.8	26.2
Turkmenistan	62	74	72	62	6640	–	–
Uzbekistan	67	48	82	67	1680	27.5	–
Vietnam	73	16	85	61	2550	37.4	–

Sources: *Population Reference Bureau 2008 and ** World Bank 2008a

III. DATA SOURCE AND METHODOLOGY

A cross-country data drawn from 21 countries in South Central and South East Asia for the period 2007 were used (see Table 3). The variables considered for the study were well-being proxied by life expectancy at birth (years), the percentage of the total population between the age of 15 and 49 years living with HIV/AIDS in the sub-region and the incidence of tuberculosis. The data were obtained from the Population Reference Bureau World Population Data Sheet for the year 2008 and World Bank World Development Indicators also for the year 2008.

TABLE 3

The Number of Countries Selected for the Study in South Central and South-East Asia

Bangladesh	Cambodia	India	Indonesia	Iran	Philippines	Timor Leste
Kazakhstan	Malaysia	Nepal	Pakistan	Kyrgyzstan	Myanmar	Laos
Singapore	Sri Lanka	Tajikistan	Thailand	Turkmenistan	Uzbekistan	Vietnam

In specific terms, the analysis started with the specification of model and a multiple regression analysis of the Ordinary Least Square (OLS) in determining the impact of HIV/AIDS on well-being in South Central and South East Asia. Following Haacker (2004), Greener (2004), Ijaiya (2005a, 2005*b*) and Beeglea and De Weerdt (2008) methods of estimation and with some modifications the model for this study was stated as:

$$WB_i = f\,(HIV/AIDS_i\ Tuber_i) \tag{1}$$

When transformed into a linear equation the model thus becomes:

$$\ln WB_i = \beta_0 + \beta_1\ HIV/AIDS_i + \beta_2 \ln Tuber_i + U \tag{2}$$

Where:

$\ln WB_i$ = log[1] of well-being proxied by life expectancy at birth (years) in each country.

$HIV/AIDS_i$ = percentage of the total population between the age of 15 and 49 years living with HIV/AIDS in each country.

[1]The logarithmic transformation produced the best functional fit since it is used to avoid given undue weight to variables with extremely high value. In other words, they are used to stabilize or normalize the variance of a sample/variable (see Bland and Altman, 1996*a*, 1996*b*, 1996*c*; Bland, 2000; Ijaiya, 2001).

$\ln \text{Tuber}_i$ = $\log^2$ of the incidence of tuberculosis per 100,000 people in each country.

β_0 = the intercept.

β_1 = the estimation parameters associated with the influence of the independent variables (HIV/AIDS_i and $\ln \text{Tuber}_i$) on the dependent variable ($\ln \text{WB}_i$).

U = the error term.

To estimate the model, a multiple regression analysis was used in order to reflect the explanatory nature of the variables. To verify the validity of the model, two major evaluation criteria were used:

(*i*) the *a priori* expectation criteria which is based on the signs and magnitudes of the coefficients of the variables under investigation; and

(*ii*) statistical criteria which is based on statistical theory, which in other words is referred to as the First Order Least Square (OLS), consisting of R-square (R^2), F-statistic and t-test.

The R-square (R^2) is concerned with the overall explanatory power of the regression analysis, the F-statistic is used to test the overall significance of the regression analysis and the t-test is used to test the significant contribution of each of the independent variables on the dependent (Oyeniyi, 1997; Greene, 2003).

Drawing from the model, our *a priori* expectations or the expected pattern of behaviour of the independent variables (HIV/AIDS_i and InTuber_i) on the dependent variable (InWB_i) were $\text{HIV/AIDS}_i < 0$ and $\text{InTuber}_i < 0$, an indication that the more the prevalence of HIV/AIDS and tuberculosis the less the well-being of the people in South Central and South-East Asia.

IV. RESULTS AND DISCUSSION

The results of the regression analysis of the model conducted at 5 percent level of significance are presented in Table 4.

A look at the model show that it has an R^2 of 60 percent, which is the variation by which the dependent variable (well-being) is explained by the explanatory variables (HIV/AIDS_i and lnTuber_i), while the error term takes care of the remaining 40 percent, which are variables in the study that cannot

[2]Same as 1 above.

be included in the model because of certain qualitative features. At 5 percent level of significance, the F-statistic show that the model is useful in determining if the explanatory variable has any significant influence on the dependent variable, as the computed F-statistic which is 5.05 is greater than the tabulated F-statistic valued at 3.55.

TABLE 4

Regression Results of HIV/AIDS and Well-Being in South Central and South East Asia.

Variable	Co-efficient estimates and t-values
Intercept (t)	4.48 (48.54)
$HIV/AIDS_i$ (t)	0.034 (0.14)
$InTuber_i$ (t)	–0.06 (–3.17)*
R^2	0.60
F	5.05

t-value in parenthesis * statistically significant at 10 percent level of significance.

Holding the incidence of tuberculosis constant, the co-efficient estimate and the associated t-value of prevalence of HIV/AIDS in the sub-regions did not have the expected signs, thus contradicting our *a-priori* expectation. Statistically too, the prevalence of HIV/AIDS is not significant to well-being at 5 percent level. This result is in conformity with the studies by Rai *et al.* (2007) and USAID (2008). According to USAID, the reduction in the prevalence rate of HIV/AIDS that has had little impact on well-being of the people in the sub-regions could be linked to some of the pragmatic measures taken over the years to combat the spread of HIV/AIDS in the sub-regions. For instance, in India, combating the spread of HIV/AIDS started in 1992 with the establishment of the National AID Control Organization (NACO) to formulate HIV policy and monitor prevention and control projects. In the same year, the Government of India also launched the first phase of its National AIDS Control Programme (NACP-I). NACP-I, which ended in 1999, had several elements, including HIV surveillance and related activities, screening of blood and blood products, and a public education campaign. With NACP-II, which lasted from 1999 to 2006, the focus shifted from raising awareness to interventions to change behaviour. Currently in its third phase, NACP-III (2007-2012) is designed to reverse the spread of HIV/AIDS by placing higher priority on prevention efforts while also seeking to integrate care, support, and treatment strategies (see also UNDP, 2007).

Other efforts aimed at combating the disease include increase in funding for HIV/AIDS activities from $ 58 million in 2003 to $ 204 million in 2007, and the establishment of the National AIDS Council under the leadership of the Prime Minister. The Council brought together the heads of the different ministries. It was also understood that for the past three years, government hospitals in the high-prevalence states of Tamil Nadu, Andhra Pradesh, Maharashtra, Karnataka, Manipur, Nagaland, and Delhi have distributed Indian-manufactured antiretroviral drugs (ARVs) free of charge and now ARVs are provided in many other states under a national program. The Indian Government has a target of providing free antiretroviral therapy (ART) to 300,000 people living with HIV/AIDS by 2011 (USAID, 2008).

In the views of Rai *et al.* (2007), the bulk of the credit to the fight against HIV/AIDS in Pakistan goes to the private sector. Over 50 non-governmental organizations (NGO) are working to improve the HIV/AIDS status quo in Pakistan. Their work ranges from providing needle-exchange programs for Injecting Drug Users (IDUs) to spreading awareness about HIV/AIDS to the masses. Worth mentioning is the organization, 'AMAL', which means 'action' in Pakistan's national language, Urdu. It has outreach HIV training programs focusing not only on IDUs but also for the out-of-the-limelight population, female sex workers. On the other side, the current government policy falls under the auspices of the National HIV/AIDS Strategic Framework. The program has four foci: improved HIV prevention, expanding interventions among vulnerable groups, preventing transfusion related infections and improving infrastructure. With over Rs. 2.9 billion (US $ 48 million) at its disposal, the program hopefully chalk out a practical, concrete plan and then initiate work for implementation (see World Bank 2008*b*).

V. CONCLUSION AND RECOMMENDATIONS

An empirical study on the impact of HIV/AIDS on well-being in South Central and South East Asia was carried out using a cross-country data and a regression analysis. With incidence of tuberculosis kept constant, the result indicates that the prevalence of HIV/AIDS has little or no significant impact on well-being in the sub-regions. This result notwithstanding governments, non-governmental organizations and individuals in the sub-regions should continue to intensify efforts at combating the spread of the disease.

Important steps in this direction are the sustainace and increase in the funding of all HIV/AIDS activities; improve the coordination, efficiency and effectiveness of HIV and AIDS programmes and projects; increase the

effectiveness of the national coordinating agencies, particularly in mobilising and disbursing resources, as well as engaging donors to streamline funding requirements; strengthen the role of the National AIDS Control Organizations in all countries in order to have greater coordination and communication between the various actors involved in combating HIV/AIDS; and encourage the implementation of innovative projects and programmes (such as workplace programmes and cash transfer schemes) that tend to have larger welfare effects on the people living with HIV/AIDS.

Equally important is the need to continue to influence the behaviour of the people via the introduction of programmes that would promote safer behaviour, like safer sex, safer injecting practice and easing social constraints that are detrimental to the people, most especially women; and the reduction of income poverty that has increased the rate of commercial sex workers and drug abuse in the sub-regions.

The governments of the countries in these sub-regions should also put in place policies that would provide equal access to productive resources and social services (like health care, safe water, food and nutrition security to the most affected, irrespective of their gender, ethnic or religious background). Because it is believe that the more access people living with HIV/AIDS have to these facilities the longer they are likely to live. Finally, the result from this analysis should serve a legitimate eye opener for other regions of the world, particularly sub-Saharan Africa, where HIV/AIDS and poverty occurrence are higher, as well as, welfare situation is poor.

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EXPLORING THE EFFECT OF TOTAL FACTOR PRODUCTIVITY GROWTH ON FUTURE OUTPUT GROWTH
Evidence from a Panel of East Asian Countries

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Abstract. Total factor productivity (TFP) has gained increased importance as it has been helpful in accelerating the rate of economic growth in developed countries. The East Asian Countries (EACs) have also followed the developed countries. There has been a debate among growth economists whether the unprecedented growth of these countries has been factor-driven or productivity-driven. In this backdrop, the present study has tested the predictability of TFP for economic growth in four EACs (Hong Kong, Korea, Malaysia and Thailand) using the fixed effects regression model and the pooled regression model over the period 1970-2004. The study concludes that productivity growth is a significant source of output growth as well as of investment growth. Further, the countries under study converge to their own steady state paths.

I. INTRODUCTION

One of the major areas of research in economics has been to identify factors of output growth. There is ample literature on the subject matter. These factors differ from country to country. If these factors can be identified, it would be helpful to accelerate growth by focusing on the major leading sources of growth. In this regard, Solow (1956) initiated a new debate by identifying that economic growth involves technical change. The same became known as total factor productivity growth (TFPG), in economic literature. Later his thesis became popular because certain economies attained a very high growth rate as compared to others. This fact attracted

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many researchers to look beyond the mere accumulation of factors of production. The debate has not yet been settled. In the study of economic growth two tendencies are observed.

(*i*) Rich countries enjoyed higher savings and capital formation rate.

(*ii*) In these countries resources were put to more efficient use.

Because of above two facts growth rate in these countries generally remained high as compared to others. The second observation led to the study of TFPG. These studies explaining TFPG are directed on the one hand to the developed world and on the other hand it addresses the issue of developing countries, *i.e.* the lackluster, non-persistent, and slow growth. The studies pertaining to developing countries can be classified on the basis of theories supporting the idea of TFPG, and the factor accumulation theories with special reference to the East Asian tigers.

TFP remains important because it not only measures economic growth and cross-country growth differences, but also economic fluctuations and business cycle frequencies (Comin and Mark, 2006). Higher TFP indicates better level of technology, higher per worker capital, and larger returns. It enhances an economy's ability to produce more output from a given stock of inputs. Thus TFP captures all effects that raise the productivity of physical factors including technical change, human capital, vintage capital, development expenditures, economies of scale, government policies, international trade policies and remittances etc. Another practically important point which goes into the favour of TFP studies is scarcity of real factors as a result of which, long term sustained growth becomes impossible. The other course which remains open is to put the available resources to more productive and efficient use which is possible with the improvement in technology. This is the core of the TFP thesis.

The objective of this study is to explore the effect of TFP growth on the future investment and economic growth in respect of a panel of East Asian countries (EACs). The present study uses data on TFP measured through the growth accounting approach. Another objective of this study is to investigate the predictive ability of growth accounting measure of TFP.

The rest of the study is organized as follows: Empirical studies are reviewed in section II. Section III discusses theoretical foundations of the growth accounting approach for measuring TFP growth, relations between TFP growth and future investment growth and output growth. Methodology and sources of data are explained in section IV. Empirical results are interpreted in Section V. Finally, section VI concludes the study.

II. REVIEW OF LITERATURE

In economic literature, there exist two views about economic growth. One view is called "accumulationist view" or "traditional view". It is because traditionally growth has been linked to accumulation of resources. The other school of thought, called the "revisionist" school is a reaction to the former. The followers of this school of thought derive support in favour of their view from the miracle of EACs. They argue that factors other than accumulation were responsible for the economic miracle of Asian tigers (Han, 2003).

Young (1992) and Kim and Lau (1994) made a pioneering research in the accumulationist framework. Young (1992) measured TFPG for Singapore and Hong Kong. He found that TFPG was zero for Singapore and it was negligible in case of Hong Kong. He also noted that much of the growth in these two countries was the result of accumulation of resources. Young (1995) compared TFPG of non-agriculture sectors of EACs with that of OECD and less developed countries. He found that TFPG ranged from 0.2 percent to 2.3 percent in case of EACs, from 0.4 percent to 2 percent in case of OECD, and from 0.8 percent to 1.6 percent in case of less developed countries. On the basis of this comparative study he concluded that TFPG in EACs is not much different from that of OECD and less developed countries. In the above backdrop he argued that rapid growth in EACs is the result of factor accumulation.

Kim and Lau (1994) investigated the sources of economic growth in the post world war II period. They included East Asian countries and G5 industrialized countries in their sample. The study assumed that the production function was elastic enough to allow for productivity increasing technical change. They measured TFP with respect to time. According to their estimates 48 to 72 percent of the output growth in EACs was the result of capital accumulation. In contrast, technical progress along with innovation caused 46 to 71 percent of total output growth in the industrialized world.

Supporters of revisionist view, *e.g.* Atkinson and Stiglitz (1969) and Lapan and Bardhan (1997), argued that technical progress is not evenly spread in all sectors of the economy. Generally it is restricted to few sectors only. Sometimes it is very conspicuous in one sector. This limited technological progress indicates the fact that technical advancement is not all-pervasive. It is specific because it involves research with particular combinations of inputs. Successive capital-intensive innovations generate more profit and as a result, investment in those sectors increase, which in turn enhances overall output growth in these sectors. Under the conventional

approach for TFPG estimation, this output growth is associated to capital deepening and hence the role of technical progress remains ignored.

Van and Wan (1997) followed Atkinson and Stiglitz (1969) and reached at similar findings. They suggested that under sector-specific technical progress, growth would remain restricted to that sector. Van, *et al* (2003) studied technological progress in Korea, Singapore, and Taiwan over the period 1972-1992. They found sector-specific technological progress in case of these countries. They compared their findings with previous studies based on the aggregate production function. According to their findings previous studies have underestimated the contribution of technology in Korea, Singapore, and Taiwan.

Han (2003) investigated the predictive ability of TFPG for a large sample of countries over the period 1966-1990. He divided the sample into sub-samples of top 24 OECD countries, top 20 OECD countries, 34 non-OECD (developing) countries and 4 East Asian countries. He used TFPG as independent variable and growth rate of real per capita GDP and investment as dependent variables in two different models. He did this on the assumption that if TFPG represents technical progress then its effect should be positive and significant on future investment and future economic growth. If the above relations hold higher TFP growth is expected to be followed by higher future investment and higher future output growth. This gives the idea of testing the predictive ability of TFP growth for future economic growth. Results of the study showed that TFPG positively and significantly affects future economic growth in the full sample, and in the sub-sample of OECD countries. Weak evidence for TFP growth as a significant predictor of future economic growth in non-OECD countries was also found. However, the study could not find evidence that TFPG is significantly correlated with future economic growth in the East Asian countries. Yet, he argued that such results for EACs might be due to small time span which varied from 1966 to 1990.

III. THEORETICAL FOUNDATIONS

GROWTH ACCOUNTING METHOD

We have used growth accounting approach for estimation of TFP growth. This approach starts with an aggregate production function of the neoclassical form as:

$$Y_t = F(K_t, L_t, t) \tag{3.1}$$

Where Y_t, K_t and L_t represent output, capital input and labour input in physical units respectively and t represents time. The function F is assumed to be subject to constant returns to scale.

In the above model technical change shifts the function F over time. If there is a technical progress the function F shifts upward and a technical regress causes F to shift downward. Technical progress, in the above context, means an output growth keeping the inputs fixed.

Technical change comes over time in a special form referred as Hicks-neutral (Solow, 1957).[1] We can write the above aggregate production function in the case of Hicks-neutral technical progress as:

$$Y_t = A(t)\, F(K_t, L_t) \tag{3.2}$$

In equation (3.2), $A(t)$ measures the effects of technical changes on the shifts of aggregate production function over time and is known as total factor productivity (TFP). Differentiating equation (3.2) with respect to time we have:

$$\frac{dY}{dt} = \dot{A}F(K,L) + A\frac{\partial F}{\partial K}\frac{\partial K}{\partial t} + A\frac{\partial F}{\partial L}\frac{\partial L}{\partial t} \tag{3.3}$$

Using the convention $\frac{dY}{dt} = \dot{Y}$, $\frac{\partial K}{\partial t} = \dot{K}$, and $\frac{\partial L}{\partial t} = \dot{L}$, and dividing both sides of equation (3.3) by Y we have:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \frac{\partial Y}{\partial K}\frac{K}{Y}\frac{\dot{K}}{K} + \frac{\partial Y}{\partial L}\frac{L}{L}\frac{\dot{L}}{L} \tag{3.4}$$

In equation (3.4), $\frac{\partial Y}{\partial K} = A\frac{\partial F}{\partial K}$ and $\frac{\partial Y}{\partial L} = A\frac{\partial F}{\partial L}$.

Denoting $\frac{\partial Y}{\partial K}\frac{K}{Y}$ by S_K and $\frac{\partial Y}{\partial L}\frac{L}{Y}$ by S_L, where S_K is the capital elasticity of output or relative share of capital in output and S_L is the labour elasticity of output or relative share of labour in output, we can write equation (3.4) as:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + S_K\frac{\dot{K}}{K} + S_L\frac{\dot{L}}{L} \tag{3.5}$$

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[1]Hicks-neutral technical change expresses that the efficiency of both the capital stock and labour force increases at the same rate

Under the assumption of constant returns to scale we can replace S_L by $(1 - S_K)$ in equation (3.5) and write it as:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + S_K \frac{\dot{K}}{K} + (1 - S_K)\frac{\dot{L}}{L}$$

Denoting output per worker by y and capital per worker by k, we can write the above equation as follows:

$$\frac{\dot{y}}{y} = \frac{\dot{A}}{A} + S_K \frac{\dot{k}}{k} \tag{3.6}$$

In equation (3.6), $\frac{\dot{y}}{y}$ is the growth of output per worker, $\frac{\dot{k}}{k}$ the growth of capital per worker, and $\frac{\dot{A}}{A}$ the growth rate of total factor productivity. The above equation describes the basic relationship, which is used to measure TFP growth in growth accounting approach. Given the above production function we can decompose growth of output per worker into two parts, one due to growth of capital per worker and the other due to technical progress. TFP growth $\left(\frac{\dot{A}}{A}\right)$ is measured in the growth accounting approach as follows:

$$\frac{\dot{A}}{A} = \frac{\dot{y}}{y} - S_K \frac{\dot{k}}{k} \tag{3.7}$$

If three data series, output per worker, capital per worker and share of capital are available then TFP growth can easily be measured using equation (3.7) through growth accounting approach. Han (2003) argued that in an aggregate production function of a Cobb-Douglas form share of capital, S_K, is time-invariant. He, further, suggested two ways to estimate S_K. First, share of labour, S_L, is easy to calculate through the aggregate wage-bill (WL) divided by total output, where W is the average wage and L is total employment. Since, in an aggregate production function under constant returns to scale, $S_K = 1 - S_L$, so S_K is measurable. Second, output per worker can be regressed on a constant and capital per worker according to the equation (3.6). In this equation share of capital appears as the coefficient of capital per worker. This method is convenient to use in case of a panel study. He argued that it is quite hard to get data on average wage level and total employment for a number of countries, so aggregate wage-bill method is not advisable to calculate the share of capital. However, in the regression method

one must assume that all countries included in the panel have the same production function and same capital share. After running the regression according to equation (3.6) under the above mentioned assumptions, TFP growth can easily be calculated using equation (3.7). In the present study we have used our own estimate of capital share to measure the TFPG.

Since required data on capital stock was not available, we constructed it using perpetual inventory method. This method measures capital stock as the accumulation of the flow of past investments as:

$$K_t = \sum_{i=0}^{t} I_{t-i}(1-\delta)^i \tag{3.8}$$

Where K_t is the capital stock in the current period, I_t is investment level in the current period and δ is the rate of depreciation of capital. The problem in estimating the above equation is the selection of depreciation rate, δ. Following Nehru and Dhareshwar (1993), Collins and Bosworth (1996) and Khan (2006) we used 4 percent depreciation rate of capital.

EFFECT OF TFP GROWTH ON FUTURE INVESTMENT AND ECONOMIC GROWTH

According to the Neoclassical growth model, technical progress causes an upward shift of the aggregate production function and the economy adjusts to a new steady state. At the initial level of capital per worker (k), output per worker (y) increases, due to increased marginal product of capital (MPk). This increased MPk raises investment which in turn, raises the level of capital per worker above the initial level. Capital per worker will continue increasing until MPk reaches its initial level.[2] Increased investment raises the output per worker. If TFP growth rightly measures technical change then positive change in TFP would raise the investment level, which would cause output per worker to increase. The effect of TFP growth on future economic growth can be further enhanced with the help of time lags involved in the process of capital formation. It takes several periods for the actual stock of capital to reach its desired or optimum level. Koeva (2000) explored that different US industries need 13 to 86 months for the installation of new plants. Since investments cannot be made at once rather these are continued reasonably in the future once started in the present, the current technical progress affects the future output growth through investment.

[2]This statement is true only under the assumption of constant relative factor price.

IV. DATA AND METHODOLOGY

DATA AND VARIABLES

This study includes four East Asian countries (Hong Kong, Korea, Malaysia and Thailand) and uses annual time series data over the period 1970-2004. For the countries included in this study data on different variables are collected from three sources: The Penn World Tables (PWT) mark 6.2, The International Financial Statistics (IFS) dated 2007 and World Development Indicators (WDI) dated 2007. The main objective of this study is to test whether TFP growth affects future output growth? This requires data on TFP growth and growth of real per capita GDP. TFP growth was calculated using growth accounting approach. For this, we need two time series: capital stock per worker (k) and GDP per worker (y). To construct capital stock per worker and GDP per worker, data on gross fixed capital formation (GFCF) and GDP are used from IFS and data on labour force from WDI. Total factor productivity growth (TFPG) was estimated using equation (3.7). Capital share was estimated to be 0.57.

The channel through which TFPG affects future output growth is that TFPG raises marginal productivity of capital per worker (MP_k) which raises rate of investment. Increased investment raises the real output per capita (RGDP). Since investment responds to TFPG with a time lag, therefore, the later affects future output growth through its effect on the former. To investigate the relationship of TFPG with growth of investment we need one more data series on investment growth. To test the effect of TFPG on investment growth we use two different measures of investment growth: the growth rate of total fixed investment (GFI) and the growth rate of investment share of GDP (GISH) as used by Han (2003).

To estimate the effect of TFPG on RGDP we used growth rate of RGDP per capita (GRGDP). Data on GFI are collected from WDI, and data on GISH and GRGDP are taken from PWT.

This study regressed growth of real GDP on first lags of TFPG, and first lags of growth rates of GFI and GISH in separate equations. The study also includes several time-varying control variables, commonly used in growth models, as independent variables besides investment and TFPG. Among these control variables we included growth rate of inflation (INF), government's share of GDP (GOVSH), population growth rate (GP), and Growth rate of private credit (GPC). We collected data on INF, GP and GPC from IFS, whereas data on GOVSH were collected from PWT. To test the

convergence of real GDP per capita we used one period lagged natural log of GRGDP (*i.e.* $LGRGDP_{t-1}$).

ECONOMETRIC MODEL

All the variables used in this study are growth rates. They are expected to be integrated of order 0, *i.e.* I(0). To confirm our expectations regarding this we performed two panel unit root tests, which include Levin *et al* (2002) and Im *et al.* (2003). Levin, Lin, and Chu (LLC) test assumes that there is a common unit root process across cross-sections, whereas the Im, Pesaran and Shin test allows for individual unit root processes across cross-sections. Null hypothesis in these panel unit root tests assumes the unit root. If null hypothesis is rejected then a series is said to be stationary.

To test the effect of TFPG on future output growth we employ two models: a pooled cross-section, time-series model and a fixed-effects penal data model. Pooled cross-section, time-series model disregards space and time dimensions. Our pooled model takes the following form:

$$GRGDP_{it} = \beta_0 + \beta_1 TFPG_{it-1} + \beta_2 LGRGDP_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \qquad (4.1)$$

Where: $i = 1, 2, 3, \ldots, N$ and $t = 1, 2, 3, \ldots, T$

In the above equation $GRGDP_{it}$ is the dependent variable, $TFPG_{it-1}$ is the first lag of TFPG for country i in time period t, $LGRGDP_{t-1}$ is the first lag of natural log of GRGDP and X_{jit} is the set of M control variables for country i in time period t, whereas U_{it} is the error term. The model specified in equation (4.1) estimates the effect of TFPG on future output growth. It also tests whether β-type conditional convergence of real GDP per capita exists or not for the full sample and sub-samples. Negative sign of β_2 exhibits that each country's real GDP per capita converges to its own steady state level.

To test the effect of two measures of investment growth on future output growth along with the effect of TFPG our model takes the following form.

$$GRGDP_{it} = \beta_0 + \beta_1 TFPG_{it-1} + \beta_2 LGRGDP_{it-1} + \beta_3 GFI_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \qquad (4.2)$$

Where: $i = 1, 2, 3, \ldots, N$ and $t = 1, 2, 3, \ldots, T$

GFI_{it-1} is the first lag of GFI for country i in time period t and other variables are same as in equation (4.1).

$$GRGDP_{it} = \beta_0 + \beta_1 TFPG_{it-1} + \beta_2 LGRGDP_{it-1} + \beta_3 GISH_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.2')$$

Where: $i = 1, 2, 3, \ldots, N$ and $t = 1, 2, 3, \ldots, T$

$GISH_{it-1}$ is the first lag of GISH for country i in time period t.

To investigate the effect of TFPG on future investment we used the same pooled model specified as (4.2) with slight modification. In this case we excluded first lag of LGRGDP and GFI from the model and used GFI and GISH as dependent variables.

$$GFI_{it} = \beta_0 + \beta_1 TFPG_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.3)$$

Where: $i = 1, 2, 3, \ldots, N$ and $t = 1, 2, 3, \ldots, T$

$$GISH_{it} = \beta_0 + \beta_1 TFPG_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.4)$$

Where: $i = 1, 2, 3, \ldots, N$ and $t = 1, 2, 3, \ldots, T$

In addition to pooled regression model we employed fixed effects panel data model. Since pooled regression model disregards the space and time dimensions, we employed fixed effects penal data model to estimate the variability of all coefficients across individual countries. Hsiao (1986) argued that useable degrees of freedom in panel models are higher and the chances of collinearity are lower as compared with cross sectional or time series models. Cross sectional analysis does not allow each country to assume country specific production function. In case, some explanatory variable is correlated with country specific effects in cross sectional analysis then such analysis may suffer from omitted variable bias. Panel data models allow the variability of coefficients across individuals and make it possible to avoid omitted variable bias.

Our fixed effects panel data models take the following form:

$$GRGDP_{it} = \beta_{0i} + \beta_1 TFPG_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.5)$$

$$GRGDP_{it} = \beta_{0i} + \beta_1 TFPG_{it-1} + \beta_2 GFI_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.6)$$

$$GRGDP_{it} = \beta_{0i} + \beta_1 TFPG_{it-1} + \beta_2 GISH_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.7)$$

$$GFI_{it} = \beta_{0i} + \beta_1 TFPG_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.8)$$

$$GISH_{it} = \beta_{0i} + \beta_1 TFPG_{it-1} + \sum_{j=1}^{M} \lambda_j X_{jit} + U_{it} \quad (4.9)$$

Where: $i = 1, 2, 3, \ldots, N$ and $t = 1, 2, 3, \ldots, T$

β_{0i} is the constant term which represents the country specific effects for country *i*. Since we use dummy variables to estimate the variability of the coefficients across individuals, the above model is also called least-square dummy variable (LSDV) model.

V. EMPIRICAL FINDINGS

We estimated the capital share of output according to equation (3.6). The result is shown in Table 5.1. The estimated value of the capital share of output is 0.57 and it is statistically significant at one percent level of significance. The value of the constant is the average TFPG.

TABLE 5.1

Estimation of Capital Share of Output

$\left(\frac{\dot{A}}{A}\right)$	S_k	Adj. R^2	DW-stat	F-stat
4.15** (1.214)	0.57* (0.026)	0.875	1.678	948.94

Figures in parentheses are standard errors and * indicates statistical significance at 1%, and ** at 5% level.

Two unit root tests of all the time series are conducted in this analysis. Unit root tests investigate whether the time series are stationary or not. Results of unit root tests are presented in Table 5.2.

All unit root tests strongly reject the null hypothesis of unit root for all of the series included in the study, which indicate that all the time series included in this study are stationary at the level. Absence of unit roots is in

accordance with the expectations as all the series used in this study are growth rates.

TABLE 5.2

Unit Root Tests
(Null hypothesis: Unit root)

Series	Method	Statistic	Cross-Sections
GRGDP	Levin, Lin & Chu t	–7.209*	4
	Im, Pesaran and Shin W-stat	–4.404*	4
TFPG	Levin, Lin & Chu t	–3.374*	4
	Im, Pesaran and Shin W-stat	–3.025*	4
GFI	Levin, Lin & Chu t	–3.535*	4
	Im, Pesaran and Shin W-stat	–3.012*	4
GISH	Levin, Lin & Chu t	–2.568*	4
	Im, Pesaran and Shin W-stat	–2.006**	4
INF	Levin, Lin & Chu t	–3.870*	4
	Im, Pesaran and Shin W-stat	–3.259*	4
GP	Levin, Lin & Chu t	–2.421*	4
	Im, Pesaran and Shin W-stat	–1.722**	4
GPC	Levin, Lin & Chu t	–7.896*	4
	Im, Pesaran and Shin W-stat	–6.328*	4
GOVSH	Levin, Lin & Chu t	–1.775**	4
	Im, Pesaran and Shin W-stat	–1.968**	4

*indicates statistical significance at 1%, and ** at 5% levels.

TFPG AND FUTURE ECONOMIC GROWTH

The effect of TFPG on future economic growth is shown in Table 5.3. The growth rate of real GDP per capita (GRGDP) is used as dependent variable

and the first lag of TFPG [TFPG (–1)] is used as predictor of output growth. Besides this, we used four control variables: growth rate of inflation (INF), growth rate of population (GP), growth rate of private credit (GPC) and growth rate of government share in GDP (GOVSH), which are commonly used in growth regression models.[3] Further, we included one period lagged values of natural log of real GDP per capita [LGRGDP (–1)] in pooled regression models to check the conditional convergence of output growth for the countries included in the sample. Table 5.3 contains six regressions. First three regressions are pooled regressions, whereas, the last three are fixed-effects panel regressions. First regression of each type excludes any measure of investment as a predictor of output growth. Second regression, however, includes first lag of growth of total fixed investment [GFI(–1)]; whereas third regression includes first lag of growth of investment share of GDP rather than lagged values of GFI.

The effect of TFPG on future economic growth is shown in Table 5.3. The results presented in the table reveal that TFPG is a significant predictor of future output growth according to two regression models in pooled regression analysis and according to all models in fixed-effects panel regression analysis. The only exception is the 3rd regression model in pooled regression analysis. The average magnitude of the significant coefficients of lagged TFPG in fixed-effects panel data models is 0.90. This average magnitude of the coefficients of lagged TFPG in fixed-effects panel data models means that a 10 percent increase in TFPG would lead to an increase in output growth rate by 9 percent in East Asian countries.

The effect of both the measures of investment, *i.e.* GFI and GISH on future economic growth is positive and statistically significant in both the pooled regression and the fixed-effects panel regression. The effect of government share of GDP (GOVSH) is negative and statistically significant in both the pooled and the fixed-effects panel regressions. The effect of growth of private credit is not statistically significant in any case. The effects of inflation and population growth are statistically significant only in fixed effects panel data models. The signs of the coefficients of the said variables are negative. The coefficients of lagged values of natural log of real GDP per capita [LGRGDP (–1)] in pooled regression models are negative and statistically significant which gives the evidence of existence of conditional convergence of output growth. This shows that each of the economies included in the study converges to its own steady state.

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[3]For details see Limam and Miller (2004) and Khan (2006).

TABLE 5.3

Effect of TFPG on Future Economic Growth
Dependent Variable: growth rate of real per capita GDP (GRGDP)

Independent Variables	Pooled Regression			Fixed-effects Panel Regression		
	1	2	3	1[4]	2[5]	3[6]
Constant	0.65* (0.09)	0.92* (0.11)	0.43* (0.17)	14.55* (0.56)	6.34* (0.37)	16.85* (0.95)
TFPG(–1)	0.027* (0.006)	0.048* (0.008)	0.013 (0.011)	1.045* (0.131)	0.500* (0.055)	1.169* (0.134)
GFI(–1)		0.012* (0.003)			0.573* (0.021)	
GISH(–1)			0.028*** (0.015)			0.477** (0.160)
INF	0.0001 (0.0007)	0.0001 (0.0007)	0.00005 (0.0007)	-0.023* (0.006)	–0.002 (0.002)	–0.019* (0.006)
GP	0.007 (0.008)	–0.005 (0.008)	0.009 (0.008)	–0.898* (0.092)	–0.137* (0.045)	–0.789* (0.097)
GPC	–0.0005 (0.0004)	–0.0004 (0.0003)	–0.0006 (0.0004)	0.001 (0.003)	0.001 (0.001)	0.003 (0.003)
GOVSH	–0.006* (0.0009)	–0.012* (0.001)	–0.004* (0.001)	–0.036** (0.016)	–0.056* (0.006)	–0.073* (0.020)
LGRGDP(–1)	–0.200* (0.004)	–0.217* (0.005)	–0.208* (0.004)			
Adj. R^2	0.998	0.999	0.998	0.884	0.983	0.891
DW-Stat	1.895	1.872	1.891	1.677	1.739	1.693
F-Stat	15235.54	14501.81	13188.89	126.213	835.735	120.316
Prob (F-Stat)	0.000	0.000	0.000	0.000	0.000	0.000

TFPG AND FUTURE INVESTMENT

The effect of TFPG on future investment is shown in Table 5.4. Two measures of investment, (GFI) and (GISH), are used as dependent variables

[4]Fixed effects are 0.85, 0.20, –0.09 and –0.96 for Hong Kong, Korea, Malaysia and Thailand respectively.

[5]Fixed effects are 2.63, 0.62, –1.25 and -2.00 for Hong Kong, Korea, Malaysia and Thailand respectively.

[6]Fixed effects are 0.60, 0.27, –0.08 and –0.79 for Hong Kong, Korea, Malaysia and Thailand respectively.

and the first lag of TFPG with different capital shares is used as an independent variable. The results show that TFPG is a significant predictor of future investment.

TABLE 5.4

Effect of TFPG on Future Investment

Independent Variable	Dependent Variable in Pooled Regression		Dependent Variable in Fixed-effects Panel Regression	
	GFI	GISH	GFI[7]	GISH[8]
Constant	6.05* (0.88)	4.35* (0.13)	16.70* (1.07)	3.16* (0.37)
TFPG(–1)	0.560* (0.127) Adj. R^2: 0.678	0.560* (0.127) Adj. R^2: 0.688	2.793* (0.126) Adj. R^2: 0.964	0.494* (0.065) Adj. R^2: 0.742

NOTE: Figures in the parentheses are standard errors and * indicates statistical significance at 1%.

The impact of TFPG on future investment is positive and significant in both the models. However, the magnitude of the coefficient of lagged TFPG significantly differs in the fixed effects panel model and the pooled model. Since the fixed effects panel models are better than pooled models on the basis of their assumptions, hence it is better to rely on fixed effects panel data model in our case. The significant effect of TFPG on future investment reinforces the idea that growth accounting approach is a good measure of TFPG.

VI. CONCLUSION

In this study we empirically examined the predictability of growth accounting measure of total factor productivity growth for four East Asian countries.[9] We used the output growth and investment growth as dependent

[7]Fixed effects are –3.55, 6.59, –0.03 and –3.01 for Hong Kong, Korea, Malaysia and Thailand respectively.

[8]Fixed effects are 0.23, –0.68, 0.09 and 0.36 for Hong Kong, Korea, Malaysia and Thailand respectively.

[9]The East Asian Countries included in the study are Hong Kong, Korea, Malaysia and Thailand.

variables to test the predictability of growth accounting measure of total factor productivity growth. Two different measures of investment growth, *i.e.* growth rate of total fixed investment and growth rate of investment share of GDP are used as dependent variables to estimate the effect of total factor productivity growth on future investment. Given the output per worker and capital per worker, total factor productivity growth depends on capital share of output.[10] We found that estimated capital share of output was 0.57. We used pooled regression models and fixed-effects panel regression models to investigate the effect of TFPG on future output growth and investment growth. Hypothesis of conditional convergence in income is also tested in this study.

The empirical findings showed that total factor productivity is a significant predictor of future output growth and investment growth. Since total factor productivity growth is a significant predictor of future output growth and investment growth, it is recommended that countries concerned should take such measures which give boost to total factor productivity growth. These include investment in human capital, skill, training, and technical progress etc. Our findings support the revisionist view, which suggests that TFPG has significantly contributed in output growth in East Asian countries.

The effect of total factor productivity growth on future investment growth is positive and significant at one percent level in both the pooled and fixed effects panel models. Two measures of investment growth: growth rate of total fixed investment and growth rate of investment share of GDP are included in the study to investigate the effect of total factor productivity growth on future investment. The effect of total factor productivity growth on future investment growth holds for both the measures of investment growth. This supports the idea that growth accounting approach is a good measure of total factor productivity growth.

Empirical results support the evidence of conditional convergence in income. Conditional convergence suggests that countries included in the sample converge to their own steady state level of output. The results of the convergence test of income reinforce the relevance of the endogenous growth theory in our case.[11]

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[10]For details see section III.

[11]Endogenous growth theory supports the idea of conditional convergence rather than absolute convergence. Absolute convergence postulates that all the countries converge to the same steady state level of output.

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CORRUPTION AND ITS DEEP IMPACT ON GOOD GOVERNANCE IN PAKISTAN

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Abstract. Good Governance flourish in a necessarily corruption free situation. Pakistan is unfortunately way down on the ladder on this account. Corruption of all magnitudes mega, moderate and petty permeates all tiers of governance and all segments of the society public, private, political, judicial, commercial and even religions. Paradoxically corruption acts as the balancing market mechanism here in a vastly unregulated administrative paradigm. There exists surreal economic rationale for this give and take at the individual level but economic cost to the society is stupendous. Corruption severely impacts the life of the citizens through less returns on resource use and adds manifold to their cost of living. Genesis of corruption in Pakistan can be traced to the mega events of 1940s to 1990s and even the current decade. Serious attempts at accountability originating in mid 1990s and fortified on the turn of the century farcically turned into tools of political patronage or victimization. For the last two years there is a practically a legal vacuum at the national level. A host of measures are needed to eradicate this menace. The awareness in the general public and emergence of a strong civil society, vociferous media and a newly independent judiciary all by themselves stand as a guarantee to the success of any future programme of accountability.

I. INTRODUCTION

Corruption defined as misuse of entrusted power for private benefit is unfortunately endemic in Pakistan. No structure, no tier and no office of public sector is immune from it. Its spread is enormous. It has reached every organ of state — beyond executive it has put its claws on judiciary and legislature even. It would be no exaggeration to say that the whole body of the state of Pakistan is suffering from this malaise and wailing under its dead weight. So enormous is its incidence that Pakistan is ranked 139th in the

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comity of nations on the scale of corruption free governance. This ranking is not at all enviable or acceptable.

TABLE 1

Transparency International; Corruption Perception Index
Pakistan Score and Ranking

Year	Pakistan Rank/Score	Pak Most Corrupt Rank	No. of Countries Ranked
2009	139/2.4	42	180
2008	134/2.5	47	180
2007	138/2.4	42	179
2006	142/2.2	20	163
2005	144/2.1	16	159
2004	129/2.1	19	147
2003	92/2.5	42	133
2002	77/2.6	26	102
2001	79/2.3	13	91
2000	N/A	N/A	90
1999	87/2.2	13	99
1998	71/2.7	15	85
1997	48/2.53	5	52
1996	53/1	2	54

Source: http://www.transparency.org.pk/.../CPI2009/CPI20 2009 Press Release November 2009.doc.

"Corruption manifests itself in various forms in Pakistan, including widespread financial and political corruption, nepotism, and misuse of power. Both petty and grand corruptions are prevalent in the country" (Chene, 2008). Corruption clouds almost all tiers of government; it is all pervasive and deeply entrenched. "The level of corruption in the society ultimately depends on the values and morals of that society" (Vittal and Mahalingam, 2004:237). Over the period acceptability of corruption has rather increased in the society and there is little evidence that people feel guilty about their own role in corruption. The scale of corruption is highest in development projects and procurement (including defense and public sector corporations) and the bank loan write offs. Whereas mega corruption is mainly in development projects, bank loans and procurements which rocks

the foundation of the economy, the common man is more interested in the petty and middle level corruption that he encounters in the daily dealings in the government offices.

According to one estimate the loss made to the national exchequer is over Rs. 200 billion per annum. This loss is caused collectively by all the government departments but the most prominent amongst them as per the Perception Survey carried out by Transparency International Pakistan are:

1. Power Sector
2. Tax and Customs
3. Police and Law Enforcement
4. Judiciary and Legal Profession
5. Health and Education
6. Land Administration

Source: http://www.prof-pakistan.com/2009/09/24/transparency-international-pakistan-highlights.

The main features of the Pakistan National Corruption Perception Survey 2009 and ranking in 2006 and 2002 NCPS are detailed below:

TABLE 2

Pakistan National Corruption Perception Survey (Institutions)

S. No.	Years		
	2009	2006	2002
1	Police	Police	Police
2	Power	Power	Power
3	Health	Judiciary	Taxation
4	Land	Land	Judiciary
5	Education	Taxation	Custom
6	Taxation	Custom	Health
7	Judiciary	Health	Land
8	Local Govt.	Education	Education
9	Custom	Railway	Railway
10	Tendering	Bank	Bank

Source: http://www.prof-pakistan.com/2009/09/24/transparency-international-pakistan-highlights.

In the opinion of 5,200 respondents the ranking of ten government departments are (Rank 1 being the most corrupt and 10 being the least corrupt).

II. GENESIS OF CORRUPTION IN PAKISTAN

The roots of corruption in Pakistan date back to the colonial period when the Britishers rewarded lands and titles to those who were their loyalists leading to nepotism and corruption (Awan, 2004:19). Two major crises played a fundamental role in the genesis of corruption in this part of the world; the spiral in the defense related purchases during and after the World War II and allotment of evacuee property after the partition of Indian subcontinent (UNDP, 2002:11). This was followed by industrial and trade licensing and patronage schemes like bonus voucher and route permits in 1950s and 1960s. The nationalization policy of the 1970s created new opportunities for corruption and gave birth to a new breed of corrupt government officers. The decade of 1980s witnessed the surge of corruption in religious and business circles.

The causes of this malady are to be found in the socio-cultural and political matrix of the Pakistani society which presently is faced with a gradual loss of value system and even identity. It is extremely difficult to ascertain the exact causes and their degree in matters pertaining to human psyche and temperament, yet according to a Perception Survey carried out by Transparency International Pakistan in year 2004, the following causes have been determined as the major contributors towards corruption and their estimated degree in percentage terms has also been indicated in Table 3.

TABLE 3

TI – Survey on Causes of Corruption — Mega and Petty

Lack of Accountability	31.68%
Low Salaries	16.54%
Monopoly of Power	16.43%
Discretionary Power	12.61%
Lack of Transparency	9.97%
Power of influential people	4.59%
Red Tapism	4.28%
Others	4.9%

Source: NACS – NAB, Government of Pakistan.

Petty corruption is mainly for getting access to public services or to bypass or twist the laws and the rules. Middle and grand corruption pertain to public contracting and procurement.

In a pre-dominantly capitalist economic order and the increasing adherence to principles of free market, rise in corruption and speed money clearly makes an economic sense. Some of the so-called economic reasons can be enumerated as under:

1. Bribe serves as an incentive for the government servants.
2. It is a kind of price that equates supply and demand in every field and office.
3. Paradoxically in many cases it reduces transaction cost for the petitioners/applicants by saving their time and miscellaneous costs on frequent visits.
4. In case of getting contracts, certain concessions or exemptions and buying shares and parcels of privatized firms the rate of return on every unit of bribe is phenomenal.
5. Similarly net gains through bribing the voters, score off the cost of the venture.
6. Payments for getting favourable decisions in civil suits may be only a fraction of the value of the suit. Similarly securing one's liberty in criminal cases involving huge sums has a lot of intrinsic value.
7. "High inequality can lead to greater incentives for corruption" (Yolles, 2008:88).

This is however only the commercial side of it. In the real economic sense it is a net loss to the society in terms of reduced availability of funds for development, artificial increase in cost per unit of resources use and increased impoverishment of the weaker sections of the society. "Corruption and poor governance limit economic growth and retard the development of a healthy private sector" (UNDP, 1997).

Whatever the causes or the rationale behind this massive trend of corruption whether justified or not the fact remains that it has deeply impacted the economy, the society, and the country. Some important areas affected by it are discussed as under:

1. The world economic forum's Global Competitiveness Report (2007-08) identifies corruption as the 3rd greatest problem for companies doing business in Pakistan after government bureaucracy

and poor infrastructure (Sala-i-Martin and Porter, 2008) It is therefore a direct impediment in the way of the Direct Foreign Investment (DFI) which is so badly needed to generate economic activity, create employment, and support the dwindling foreign exchange reserves.

2. With an effective check on corruption national exchequer can easily gain nearly double of the annual allocations earmarked under Kerry Lugar Bill carrying strikingly harsh conditions for national sovereignty and autonomy.

3. The cycle is really vicious rampant corruption in tax and custom and excise collection and WAPDA dues and costly public sector purchases, and inefficient major public sector entities like PIA, Railway, Steel Mill etc. cause a major deficit for the government every year in term of resource generation and expenditure that makes the government borrow from IMF and other foreign and domestic resources which through increased debt repayments broadens the gap and compels the government to increase the price of the utilities like electricity, gas, CNG and petroleum. That takes a heavy toll from the people of Pakistan. Resultantly corruption which is done at far away and much higher places from the common citizens has a direct and deep impact on their lives. Thus act of corruption, whether direct or indirect, close or remote is not innocuous for common man.

4. The country has lost many years of development effort because of eating up of development funds at a very large scale and because of over charging for almost every item of work.

5. Other than the government offices and public sector, corruption has thoroughly permeated the political arenas. Party tickets are openly bought and sold and so does the transaction flourish for hunting or hounding the voters. This has resulted in the dominance of political scene by the drug barons, black marketers, hoarders and speculators who not only have in many cases snatched away the true representative character from the democratic process in the country but who make good their investment in the election process through massive corruption while in power and add to the miseries and the cost of living of the common man.

6. Still worse is its impact on religious circles who sell fake degrees to the needy politicians with impunity, show fake entries of students to

get more Zakat money and sell religion edicts on need basis. At times it appears that the whole structure has been soiled and has replaced scholarship as it is becoming increasingly difficult to find a genuine religious scholar from any quarters.

7. Rampant trends of corruption have also badly affected the business ethics in the country which is devoid of any egalitarianism. Hood winking the regulators, stock piling, hoarding, and black marketing are the order of the day and individual business man, business firms, business groups and sometimes a whole industry is found pegged in these malpractices.

8. And when corruption affects the institution of the last resort that is the judiciary the country loses its track and direction. Absence of a fair judicial system does not affect the individual litigant alone it affects the whole economy where domestic and foreign investments shy away for fear of usurpation and misappropriation.

9. The worst of all is a break down of law and order because of pervasive corruption in police and lower judiciary. The influential, the wealthy and the mighty have a fair chance of getting away with what ever they do if they pay the right price at the right stage. This had lead to increased incidence of crimes of all nature and at all levels.

10. In short the unbridled corruption has negatively impacted all spheres of activity in the country and the whole society has suffered serious blows to its social fabric and working environment.

III. EFFORTS TO CURB CORRUPTION

Corruption can be curbed or limited through the presence of a monitor or a monitoring process (Khan *et al.*, 2004:3). Although provincial Anti Corruption Establishment were put in place in 1960s, and a Federal Investigation Agency was constituted to fight corruption in public sector, it turned out that anti corruption arm of the police is the most corrupt. Slowly and gradually the tendency for corruption gained momentum and got the better of governmental efforts.

The 1st serious attempt to fight corruption at national level was witnessed during the caretaker period after the dismissal of 2nd Benazir government in November 1996 when President Farooq Leghari established Ehtsab Commission headed by a retired senior judge. The effort was intensified by the next government, *i.e.* the 2nd Nawaz government in 1997

through the aegis of Ehtsab Bureau headed by Mr. Saif ur Rehman. The exercise was however taken as one sided and led to the erosion of moral authority for so pious an exercise.

The army government of 1999 started accountability with a lot of fan fare. It established National Accountability Bureau (NAB) with necessary investigation and judicial structures. It announced National Anti Corruption Strategy (NACS). NACS was a three-pronged strategy, *viz.*

1. Prevention
2. Awareness
3. Enforcement

The National Accountability Strategy announced in 2002 has been in limbo ever since its inception as it failed to gain the required political patronage/acceptance within the NAB establishment, due to lack of support from the donors, and for poor communication and exposure with the general public.

Some new systems were introduced for improving the public sector procurement and a whole new standard operating procedure (SOP) was laid down in the form of a manual by the newly constituted "Public Procurement Regulatory Authority" (PPRA) which over saw all purchases beyond the value of a Rs. 50 million.

The Auditor General's office introduced a new project titled "Project for Improvement in Reporting and Auditing" (PIFRA) with a view to adopt modern formats and technique for financial reporting and auditing.

On the side of judiciary and police it started a $ 350 million access to Justice Programme for capacity building and knowledge based and improved working environment.

Access to Justice Programme aimed at the following:

(*a*) Improving predictability and consistency between fiscal and human resources and the mandates of reformed judicial and public institutions at the federal, provincial and local level.

(*b*) Ensuring greater transparency and accountability in the performance of the judiciary, the police and administration justice institutions.

(*c*) Providing a legal basis for judicial, policy and administration reforms.

(*d*) Improving the efficiency time lines and effectiveness in judicial and police services.

(*e*) Supporting greater equality and accessibility in justice services for the vulnerable poor.

Source: http://friendsofpakistan.net/?tag=barometer-of-corruption.

The new Police Order, 2002, re-organized the force through separation of force into various branches, bureaus, sections and divisions. The goal was to improve the efficiency, it is to be seen whether it has achieved its objectives or resulted in increased corruption through a wider spread of functions and lack of coordination.

Similarly it is to be observed carefully whether the changes brought in the land administration at sub-divisional, district and divisional level have improved efficiency, transparency and fairness or it has achieved the reverse results. If pubic perception is any yardstick it is clearly in the negative direction.

The accountability effort was phenomenal with a thumping response from the public and a loud and clear message for the delinquents. But half of it evaporated due to political exigencies of election 2002 and the remaining half became thin air with the promulgation of National Reconciliation Order (NRO) in October 2007.

NRO was the worst law ever made in human history to formalize and legalize mega corruption. There was a significant back sliding in the accountability effort after the announcement of this ordinance. Accountability efforts which had started at a very promising note and with a telling effect especially with the establishment of NAB received set back close to the general election 2002 when the accountability structure was used for arm twisting of the politicians to rope them in for a new Kings Party. NRO was the last nail in coffin.

There has been a great void over the last over 2 years, *i.e.* between the promulgation of NRO in October 2007 and its annulment by the Supreme Court of Pakistan in December 2009. The whole accountability structure was diluted and was rather close to liquidation in that period.

The present government has preferred to let the accountability system remain suspended in the air and practically in the two years of the present democratically elected government there has not been a single major case registered or instituted by the government on its own.

At the moment there is big void, an immensurable vacuum, with actually no accountability law in force at the national level.

Along the way, however, there has been a significant development in the shape of the emergence of free press and media which is very promising for the fight against corruption.

IV. CONCLUSION AND RECOMMENDATIONS

"Poor governance leads to, and encourages and breeds, corruption in a number of ways, for instance through bribery and extortion, nepotism and fraud and embezzlement, It reduces the efficiency on which an economy depends, and by increasing the cost of investment, lowers the potential return. It also reduces the government's resources and hence its capacity for investment. Common to other South Asian countries, corruption in Pakistan is unique because it occurs up stream, it has wings which encourage flight of capital rather than wheel which encourage reinvestment and it often rewards rather than punishes as the legal processes to fight corruption are weak in themselves and the lower judiciary is amenable to letting off the accused if the 'price is right" (Ismail and Rizvi, 14).

"Corruption is not a problem that can be attacked in isolation. It is not sufficient for the criminal law to search for bad apples and punish them. Of course, the state may need to establish credibility by punishing highly visible corrupt officials, but the goal of such prosecutions is to attract notice and public support, not solve the underlying problem. Anticorruption laws can only provide a background for more important structural reforms" (Rose-Ackerman, 199:226).

For almost all the reforms introduced by the Musharraf government in governmental and administration fields the basic assumption was that the society was sufficiently educated and hence eager and ready to change. The assumption proved wrong and rocked the whole foundation of the reforms agenda as the society proved to be ready for grabbing new opportunities but not to change its work ethics.

If this society is to be saved and the country has to shake off the tag of a failing or failed state, urgent and stringent measures need to be taken. Some of which are recommended as under:

1. Judgment of the Supreme Court against NRO be implanted in letter and spirit.
2. Accountability from the top be started.

3. A national anti-corruption commission be set up as an independent watchdog.
4. End unnecessary or archaic discretionary laws.
5. Ensure time bound actions in offices.
6. Use independent private sector auditors.
7. Involve people in diagnosing corrupt systems.
8. Advocate that all 'illegal' money and property transactions in industrialized countries are treated at par with drug money.
9. The problem of corruption is quite severe at the lower judiciary and a system of alternative dispute resolution needs to be worked out urgently.
10. Require public officials to declare their assets.
11. Community participation especially of students be ensured.
12. Creating awareness particularly about the adverse impact on every one's life be highlighted to mobilize public against corruption. "The evolution of a public opinion, which must follow the spread of education, which rejects corruption either because it is morally wrong or because it is scientifically inefficient, or both" (Wraith and Simpkins, 1963:208).
13. Poverty alleviation and economic reforms (Hussain and Hussain, 1993:161).

The remodeling and over haul of higher judiciary and its clearance from PCO judges through a protracted and participatory process has brought a lot of awakening amongst the public along with the formation of a formidable civil society which has manifold increased the chance of a real purge in the system.

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MEASURING PERCEPTIONS OF WORK ENVIRONMENT AMONG EDUCATED FEMALE PUBLIC SERVANTS IN PAKISTAN

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Abstract. This paper provides empirical evidence on the extent to which the work environment of public sector organizations of Pakistan is sensitive to women's needs. Perception of Work Environment Index (PWEI) has been developed to measure satisfaction of female public servants with the opportunities, facilities and inter-relationships for smooth career advancement given their special needs and requirements. The data were collected by administering PWEI through face-to-face interviews with 300 women belonging to administrative, health and education sectors. Results show that while the work environment may not be openly hostile, women employees were dissatisfied with arrangements to accommodate their personal and family needs. Significant differences were found in perceptions of women belonging to different categories of public sector organizations. Unmarried females working on contract were more satisfied with the working conditions than married women on permanent posts.

I. INTRODUCTION

Working conditions in public sector organizations are often considered more amenable to women's needs relative to the private sector. These include better maternity leave benefits, shorter working hours, more job security, less stressful work etc. (Okun *et al.*, 2007). Even so, while conditions for women may be somewhat better than the private sector, many times special amenities needed by women, such as on-site daycare and transport, may be

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inadequate. The problem is aggravated if the interpersonal relationships between the female staff and their colleagues are not completely congenial or if attitude of supervisors is inflexible in terms of helping workers to reconcile professional and domestic duties (Cook, 2009).

As traditional gender roles dictate that females perform all chores related to household and dependent care without any help from the male family members, women undertake paid employment at the peril of carrying triple burden of professional, domestic and reproductive work (Moser, 1989). Conflict arising out of performance of divergent roles can affect a worker's mental and physical health (Repetti, 1987), limiting her ability to perform her duties efficiently especially when her work environment is not supportive of her needs (Siddiqui, 2007). In particular working women who are married and those who have young children are at risk of facing job-burnout and employment disruptions. Among such women perceptions of family-friendly organizational environment can lower absenteeism, reduce intention to turnover, increase job satisfaction, improve affective commitment and enhance job involvement (Cook, 2009).

Besides these positive employee outcomes, perceptions of a desirable work environment for female employees help in gender mainstreaming.[1] Advantages of gender mainstreaming for an organization include more gender diversity[2] which in turn improves competitiveness in acquisition of a skilled workforce and increases the organization's internal capacity and ability to manage change. Also, work attitudes of male and female employees are better in gender-balanced work environments than in environments where gender parity is skewed in either direction (Appold *et al.*, 1998). Inability to deal with gender diversity issues can produce many negative consequences for an organization such as:

- Losing competent female employees and having to sustain high cost to recruit and train their replacements;
- Creating a reputation that the organization is not a good place to work;

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[1]"It is a strategy for making women's as well as men's concerns and experiences a dimension of the design, implementation, monitoring and evaluation of policies and programmes in (an organization) … so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality" (*The Economic and Social Council Report for 1997, United Nations, 1997*).

[2]It is the degree to which there is gender-based variety within the workforce of an organization with optimal number of female and male employees working together.

- An organizational climate in which effort digresses away from work performance toward politics of how to attain justice; and
- Inability of the management to create a good rapport with female employees (Ospina, 2001).

Yet despite all the potential benefits of gender mainstreaming, initial cost of change may be quite high. As organizations import masculine and feminine role dichotomies from the society in which they function, an ideal worker is perceived as someone willing to put work commitments above all other activities in life (Ely and Myreson, 2000). Consequently, the concept that work can be streamlined and combined with family life in a manner which improves job performance, is opposed by individuals who associate crises-oriented masculine work patterns with high productivity and ascribe to stereotypical images of women as having lower capacity to perform on the job because they are relentlessly involved in household chores. If policies to promote women's welfare create notion of distributive injustice, this reduces work commitment among aggrieved workers (Chughtai and Zafar, 2000). A gender equitable and family-friendly environment improves worker productivity provided that the organization is being managed effectively (Bloom *et al.*, 2006). Therefore, well-managed public sector organizations create an enabling environment for women for maximization of social welfare and enhancement of female workers' productivity.

Empirical studies show that working women with tertiary education gravitate towards the public sector in Pakistan, yet evidence proving absence of gender discrimination at higher organizational levels is not convincing. Hyder and Reilly (2005) find that public sector workers in Pakistan have both higher average pay as well as higher education levels as compared to private sector workers and that the public sector has a more compressed wage distribution and a smaller gender pay gap than that of the private sector. They also present evidence against the existence of a 'glass-ceiling'[3] in Pakistan. However, as these writers themselves admit, this finding maybe 'imperfect' because women constituted only 12% of public sector employees and about 3% of private sector waged employees in their sample. They do not reveal the miniscule number of women who reach the 90th wage percentile to gain the advantage of receiving nearly as much pay as their

[3]Glass ceilings are the barriers which lie between women and equitable chances for professional development (Naff, 1994). Hyder and Reilly (2005) as well as Ahmed and Hyder (2009) measure glass ceiling as increase in gender wage gap throughout the wage distribution.

male counterparts. Similarly, Ahmed and Hyder (2009) claim to have found no 'glass-ceiling' in Pakistan based on a sample of workers which contained only 13% female representation overall, but they do not caution readers regarding this limitation. Wage inequality remains the focus of economic research investigating labor market gender discrimination in Pakistan. The importance of a gender sensitized, family-friendly, respectable work environment for attracting and retaining highly qualified female labor in the public sector has not been given due attention.

This paper provides empirical evidence on the extent of gender sensitivity or insensitivity, existing in the work environment of public sector organizations of Pakistan, as perceived by the educated female staff of these organizations. Section II describes the labour supply-side, socio-cultural employment constraints on Pakistani women with special emphasis on public sector initiatives for their uplift. Section III presents a perception scale that has been developed to measure satisfaction of female public servants with the opportunities, facilities and interrelationships for smooth career advancement given their special needs and requirements. Section IV outlines sampling and data collection methodology. In Section V, descriptive statistics and inferential analysis are used to identify the locus of hostility in public sector organizations. In section VI, the paper concludes by proposing and justifying a result-oriented approach to gender mainstreaming which is contextualized according to ground realities in public sector organizations of Pakistan.

II. BACKGROUND AND SETTING

Gender inequality is prevalent in most societies in different forms. It is also pervasive across different groups within societies, intersecting with other forms of inequality such that it is a feature of privileged as well as under-privileged groups (Kabeer, 2003). In Pakistan, public policy has been ineffective in dealing with gender inequalities. Most women suffer from disadvantages in education, health, access to assets and resources, employment opportunities and decision making capacity. The Gender Gap Index places Pakistan at 126th position out of 128 countries (WEF, 2007). Likewise, the gender-related development index (GDI), ranks Pakistan 124th out of 156 countries (HDR, 2007).[4] Needless to say that interventions to

[4]Between 2004 and 2008 the Government of Pakistan planned to initiate or continue programmes for "effective implementation of CEDAW (Convention on Elimination of All Forms of Discrimination Against Women)" at a cost of US $ 35.5 million out of which US $ 33.5 million were to come from external sources (UNDP, 2003).

mainstream gender in the country have not produced satisfactory results as yet, despite substantial investment by the government and international donor agencies in programmes for this purpose.

The challenge to redress gender inequalities in Pakistan is a daunting one. Local traditions and culture mostly perpetuate patriarchal values. Men are placed in a dominant productive role as breadwinners in the public sphere while women are given reproductive roles in the domestic sphere (Siddiqui *et al.*, 2006). However, the causes and extent of women's subordinate status differ substantially among various classes and regions. Poor women belonging to rural and tribal regions are the ones deprived of choices and opportunities in life. On the other hand, upper and middle class women living in urban areas have much more freedom of choice (Kazi and Raza, 1991). Having better access to education and other basic amenities, these women can choose to challenge gender stereotypes. Unfortunately, the education system in Pakistan, by and large, does not instill a sense of empowerment among women such that there is an inert acceptance of patriarchal norms even among some of the most educated and affluent of women in Pakistan. All the same, there may be many educated women who would be willing to utilize their education and training for making positive contributions to society if there are more gender equitable employment opportunities.

A study by Naqvi and Shahnaz (2002) has found that most of the women who are not in the labor force feel that by doing market work they would be displeasing the male heads of their families for going against social norms and compromising their family relationships and household responsibilities. There are two main implications here. First, that there are many social barriers restricting well-to-do women from undertaking formal employment. Second, that there are few honorable occupational choices flexible enough to allow educated women to balance work and family obligations.

Given this socio-cultural and economic context, policy statements like The National Policy for Development and Empowerment of Women (NPDEW) and National Plan of Action (NPA), which express the government's resolve to support women in actualizing their potential, do serve the purpose of bringing gender issues into the limelight but fall short of reducing gender inequalities on ground.

Other initiatives by the government such as reservation of seats for women in local bodies and higher-level legislature, establishment of Ministry of Women Development, formation of National Commission on the Status of

Women (NCSW), undertaking the Gender Support Programmes[5] and the Gender Reform Action Programmes,[6] also suffer from lack of coordination, commitment and effective administration (UNDP, 2009). In general public sector reforms in Pakistan have remained superficial and have failed to address root cause of dysfunctionalities (Haque, 1998; Iqbal, 2007).

It is therefore pertinent to ask, how can the government overcome implementation issues in promoting its gender and development agenda? The answer to this question lies in mainstreaming gender first and foremost within the ranks of the government and its allied agencies and building their capacity to deliver on development goals. The public sector has to be transformed so that it becomes sensitive to gender concerns and supports gender diversity. Presently, such may not be the case in Pakistan. For example, women's share in federal government employment is 4.66%. This figure is around 13% for Grade 14 and above. However in Grade 20 and above there are only 5% female officers (PPARC, 2003). In autonomous and semi-autonomous public sector organizations in Pakistan overall percentage of women employees is 3.12% and the ratio of female officers in grade 17 and above is 6.43% (PPARC, 2006). This shows that few women get recruited and promoted even within the public sector where the government has purportedly instituted many programmes for gender mainstreaming. Further, the NCSW in its report on 'Status of Women Employment in Public Sector Organizations' (2003) states that:

> "Often women are not considered on merit and Pakistan is characterized by a virtual absence of women at effective policy making and administrative levels. It appears that there is a deliberate effort to detract them from becoming administrators or managers."

The NCSW report also finds that the environment in government offices hampers women's active participation as women employees face harassment and discrimination. Their special needs like day care facilities and separate

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[5]The Gender Support Programme is a UNDP sponsored umbrella programme which includes interventions such as: Women's Political School project; Gender Responsive Budgeting Initiative; Gender Mainstreaming in Planning & Development Departments and Division; Institutional Strengthening of the NCSW; Gender Justice through Musalihat Anjuman; and Women's Access to Capital and Technology.

[6]Gender Reform Action Programme (GRAP) is a 4-programme which seeks to reforms budgeting and public expenditure mechanisms; to increase and improve women employment in the pubic sector; and to enhance women's political participation.

toilets are often ignored. Other sponsored reports give similar comments about work condition in government departments (WEC-PK, 2008).

Interestingly, quite the opposite view is expressed by some scholars. For example, Ahmed and Hyder (2009) expect to find no "taste of discrimination" among public sector organizations, essentially due to government policies which encourage equal opportunities for all. They feel it is only the private sector where working environment is not very attractive for females. Hyder and Reilly (2005) believe that public sector employment in Pakistan is attractive for women because of better pay, better work conditions, and the availability of other fringe benefits (e.g., pension rights and free medical benefits). This difference in the official and independent views regarding women's employment conditions warrants an in-depth investigation of the issue.

This paper has made two significant contributions to the inquiry on working conditions for women in the public sector. First, it has identified the different dimensions which constitute equitable working conditions for females. Secondly, it has been shown that although gender discrimination is perceived to exists, such perception is not intense or wide spread. There are however significant differences in perception between different categories of public sector organizations. The limitation of the paper is that a comparison between public and private sector work environments has not been made.

III. CONSTRUCTING PERCEPTION OF WORK ENVIRONMENT INDEX (PWEI)

The perception of work environment Index (PWEI) is a locally adapted, valid and reliable measure of the extent and nature of gender-based hostilities as experienced by female public sector employees in Pakistan. Analysis based on the data generated through PWEI will authentically represent the current status of gender equity in the public sector of the country and identify future course of action for targeted gender interventions.

REVIEW OF EXISTING MEASURES

The PWEI and its sub-dimensions have been aligned with existing psychometric scales to measure perceptions of working conditions. For example, Stokes *et al.* (1995) constructed a scale similar to PWEI for use in corporate settings. They have used the dimensions of dual standards and opportunities, sexist attitudes and comments, informal socializing, balancing work and personal obligations and remediation policies and practices to measure perceptions of supportive or hostile work environment for women.

The Nordic Council of Ministers (2000) designed a Questionnaire for measuring Psychological and Social factors at work (QPS). The organizational level contents of the QPS comprise of Likert type questions related to organizational culture and climate, communication, leadership, social interactions and group work. All these sub-dimensions of the QPS are meant to measure employee perceptions of working conditions within organizations in the Nordic region.

The Work Environment Scale (WES)-Form "R" developed and updated by Moos (2008) measures the social environment of work settings in private sector firms. It comprises ten dimensions: Involvement, coworker cohesion, supervisor support, autonomy, task orientation, work pressure, clarity, managerial control, innovations and physical comfort.

Another popular scale, developed by Karasek *et al.* (1998) is the Job Content Questionnaire (JCQ). This instrument has been used by medical practitioners for measuring impact of various social and psychosocial characteristics of jobs on an employee's health. The factors measured by JCQ include: decision latitude, which incorporates skill discretion and skill authority; psychological demands; support from supervisor for work related issues; coworker support; physical job demands; and job insecurity, which incorporates opportunities for advancement and pending risk of job loss.

Most of the existing instruments are configured to situation of workers in western work settings. Further most of these instruments are meant for use in the corporate sector. PWEI has taken concepts from existing tools to measure work conditions and has adapted them to suit the requirements of the current study.

PWEI AND ITS SUB-DIMENSIONS

The PWEI comprises of 15 items each measuring the level to which a respondent believes her environment is equitable and conducive to higher female work productivity. Each item is measured on a five point Likert scale. Of the five options for rating each item, option 1 represents complete disagreement, option 2 represents partial disagreement, option 3 represents lack of knowledge on neutrality, and option 4 and 5 represent partial and complete agreement with an item respectively. The final version of the PWEI incorporates three subscales or dimensions:

- Equality of Opportunity for Professional Development (EOPD)
- Female Staff Protection and Facilitation (FSPF)
- Congeniality of Inter-Personal Relationships (CIPR)

1. Equality of Opportunity for Professional Development (EOPD)

This dimension measures opinions of female employees regarding responsiveness of Human Resource (HR) policies in induction, training, promotion and rewards to their strategic gender needs. According to Moser (1993):

> "Strategic gender needs are the needs women identify because of their subordinate position to men in their society. They relate to gender divisions of labor, power and control. Meeting strategic gender needs helps women to achieve greater equality."

Gender inequity is not always obvious in the formal setup of public sector organizations as they are obliged to follow rules and polices based on strict merit and seniority criteria. It is possible though that these criteria may be flawed and there may be invisible barriers very often referred to as "Glass Ceilings" preventing female workers from reaching their potential (Naff, 1994).

HR policies which overtly or covertly discriminate against female incumbents impose both a spatial and a temporal restriction on women's opportunities for professional development. On a spatial level, across organizations where there is culture of discrimination, there would be few female employees who are well trained, well rewarded and able to reach senior posts. Even if there are special quotas for women to overcome gender imbalances, these remain underutilized. Women's predicament is brushed aside as being on outcome of their lack of interest in career building. The temporal aspect of discrimination impinges on women's chances to secure equality even in a long run time frame due to lack of change mechanisms within the organizations.

Lack of effective implementation of stated gender policies is a situation which is very common in the public sector organizations of Pakistan (UNDP, 2009). A superficial analysis of policy documents therefore does not reveal the ground realities prevailing in this sector. Perception based measures such as EOPD can expose hidden sources of discrimination where respondents express dissatisfaction with policies which claim to be gender sensitized.

Score on EOPD is calculated by summing the first four items of the PWEI as follows:

$$EOPDi = It1i + It2i + It3i + It4i \quad (1)$$

Terms in equation (1) stand for score of i^{th} respondent on EOPD, Item 1, Item 2, Item 3 and Item 4 of PWEI respectively.

2. Female Staff Protection and Facilitation (FSPF)

This subscale of PWEI assesses the extent to which female employees feel physically comfortable and safe in their professional roles. Further, this dimension investigates whether or not the working conditions accommodate women's practical gender needs. Moser (1993) defines practical gender needs as follows:

> "Practical gender needs are the needs women identify in their socially accepted roles in society. Practical gender needs do not challenge the gender divisions of labor or women's subordinate position in society, although arising out of them. Practical gender needs are a response to immediate perceived necessity, identified within a specific context."

The practical gender needs investigated by FSPF are: adequacy of transport, toilet and baby care facilities; facilitation in balancing work with family responsibilities; remedial measures for resolving specific female problems and protection from sexual harassment at the workplace. FSPF dimension of PWEI has the advantage of measuring women's internalized notions of how their practical gender needs should be accommodated. This is an important quality of the scale as women workers' practical gender needs cannot be standardized. For example, some women who were interviewed for this study expressed dissatisfaction with the toilet facilities for ladies on grounds that these were not perfectly hygienic, while others said that having to share toilet with males was a minor issue for them. Similarly, many unmarried women had no interest in whether there was a baby care facility at their workplace. Even the perception of what constitutes as harassment is different for different women. This shows that it is women's cognition of whether or not the ambiance in their respective organization is sensitive to their feminine needs which can have more of an impact on their productivity rather than arrangements and measures deeming to facilitate them without eliciting their involvement.

Score on FSPF is calculated as follows:

$$FSPFi = It5i + It6i + It7i + It8i \quad (2)$$

Terms in equation (2) represent score of i^{th} respondent on FSPF and Item 5, Item 6, Item 7 and Item 8 of the PWEI respectively.

3. Congeniality of Inter-Personal Relationship (CIPR)

This dimension explores the level of organizational trust among female workers. The more trust a worker reposes in the interpersonal relationships at

her workplace, the more fruitful her work experience. Ferres and Travaglione (2003) define the concept of organizational trust as follows:

> "An individual's willingness to act on the basis of his or her perception of a trust referent (peer, supervisor, organization) as being supportive, ethical, competent and cognizant of other's performance."

CIPR can also shed light on conditions which can enable women to form networks of association serving as collective mediums for sustained progress on gender issues.

While operationalizing the concept of enabling working relationship, CIPR dimension looks at the interactions between female workers and their female colleagues and female supervisors and whether there are female role models to inspire and guide them. The idea is to capture the extent of professional co-operation or professional jealousy existing among female employees of an organization. During the study several respondents pointed out that a number of female employees who were succeeding in a male-dominated system, where doing so by making extreme personal sacrifices. They were of the view that such women had an interest in the continuation of the status quo and were willfully debilitating the advancement of fellow females. On the contrary, there were several respondents who remarked that having other females working in the same organization made them feel comfortable and well-adjusted.

This subscale further studies the interaction between female workers and their male counterparts and bosses. It seeks to find evidence on whether the male employees, in order to retain their privileged position, exploit and harass female workers, or is the male attitude respectful and co-operative. This dimension also incorporates women's sense of inclusion in formal activities of the organization and acceptance as productive team members. The intent is to measure the strength of affiliation the worker feels for her organization and its members which would improve her work performance.

Score on CIPR is calculated as follows:

$$CIPRi = It9i + It10i + It11i + It12i + It13i + It14i + It15i \quad (3)$$

As before, terms represent score of the i^{th} individual on CIPR and item 9 to item 15 of the PWEI.

Score of the i^{th} individual on PWEI is an aggregation of her scores on the subscales of EOPD, FSPF and CIPR and is calculated as follows:

$$PWEIi = EOPDi + FSFPi + CIPRi \quad (4)$$

Range of these indices is given in Table 1. Higher individual scores on each index represent relatively supportive work environment for female employees.

PRE-TESTING AND REFINEMENT

To ensure validity of the PWEI in public sector organizations of Pakistan, 30 raw version of the index were pre-tested, 10 each in a university, an administrative unit and a hospital. Comments, suggestions and observations were used to make the following changes in the final instrument:

- Two redundant items were deleted. The first was related to availability of perks and it was dropped as perks are included in rewards (item 4). The other was related to policy measures against sexual harassment. These are part of effective remedial measures to address problems of female staff (item 7).
- Two items were added regarding female workers' interactions with their female colleagues and female bosses (Item 10 and Item 13).
- Sequencing of questions was revised. The most sensitive question on sexual harassment was placed in the middle of the scale (item 8).
- Three items showing item total correlations lower than 0.3 were reworded (item 3, item 8, item 14)

These adjustments have made the final refined version of PWEI clear and concise. But at the same time its wording has been configured to control for social desirability and central tendency bias among respondents. The refined version of the PWEI also incorporates six reverse items to avoid acquiescence bias.[7]

ESTABLISHING SCALE RELIABILITY

Table 1 shows number of items, range, midpoint and Cronbach Alpha reliabilities of PWEI and its subscales. The mid-point of each index is the point of neutrality. Scores above this level represent positive perceptions, while scores below this level signify dissatisfaction with prevailing conditions. EOPD and FSPF jointly represent structural aspects of the work environment and CIPR represents the relationship aspect. The structural

[7]Social desirability bias arises when respondents distort answers to confirm to established social norms. Central tendency bias refers to the tendency of respondents to stay neutral. Acquiescence bias is based on respondent's tendency to agree with each statement without reflection (Bowling, 2005).

aspect has been given a slightly higher weightage (8) as compared to the relationship aspect (7), in computation of aggregate index. This is done to account for the fact that in pubic sector organization rules, regulations and procedures have a greater impact on attitudes of employees than their interpersonal relationships at the workplace.

TABLE 1

Number of Items, Range, Midpoint and Cronbach Alpha Reliabilities of PWEI and its Subscales

INDICES	Number of items	Maximum and Minimum Values of Index	Mid-point	Alpha* Reliability
EOPD	4	4 to 20	12	0.763
FSPF	4	4 to 20	12	0.712
CIPR	7	7 to 35	21	0.701
PWEI	15	15 to 75	45	0.813

*Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. It is based upon the formula:

$\alpha = r\,k / [1 + (k - 1)\,r]$

Where α is the size of alpha coefficient, k is the number of items considered and r is the mean of the inter-item correlations. The following rules of thumb are usually used by social scientists for assessment of alpha reliability coefficients:

$\alpha > 0.9$ is Excellent, $\alpha > 0.8$ is Good, $\alpha > 0.7$ is Acceptable, $\alpha > 0.6$ is Questionable, $\alpha > 0.5$ is Poor, and $\alpha < 0.5$ is Unacceptable (Gliem and Gliem, 2003).

Alpha reliabilities are all within the acceptable range for social science research. This shows that the indices have inter-item consistency. The alpha reliabilities are not too high, which proves that the scale does not suffer from the "Attenuation Paradox" which arises when there are redundant items in the scale. If there are many highly correlated items in a scale it will increase internal consistency and inflate alpha reliability estimates but instead of adding incremental value these items reduce validity. A scale needs to contain differentiated items to be a valid measure of a construct (Clark and Watson, 1995).

Table 2 shows Pearson's Correlation* Matrix between different dimensions of PWEI. The correlation coefficients between EOPD and FSPF

and CIPR taken as separate variables, are 0.396 and 0.491 respectively. Compared to these figures, the correlation coefficient between EOPD and scores on FSPF and CIPR added together increases to 0.554. Similarly for the other two dimensions, correlation coefficient between each dimension and the sum of scores of the other two dimensions surpasses the correlation coefficients between that dimension and the other two dimensions considered separately.

TABLE 2

Pearson's Correlation* Matrix between Different Dimensions of PWEI

	EOPD	FSPF	CIPR
EOPD	1.00		
FSPF	0.396	1.00	
CIPR	0.491	0.445	1.00
EOPD+ FSPF			0.579
EOPD+ CIPR		0.523	
FSPF+ CIPR	0.554		

*Pearson's correlation expresses the extent to which two independent variables *X* and *Y*, covary as a ratio of the product of the standard deviations of the *X* and *Y* variables.

Correlation coefficient *r* ranges from –1.0 to +1.0. The signs indicate whether the relationship is direct (+) or inverse (–). The absolute value of the coefficient indicates its strength.

This proves that the three dimension used to construct the PWEI are distinct from each other. Yet when aggregated these dimensions do not disturb the uni-dimensionality of the scale.

Table 3 further substantiates that items on the PWEI discriminate well between respondents who hold a positive view of their work environment and those who view their environment as hostile.

When looking at an item-total correlation for a scale, negative values are considered highly irregular as it is unexpected that respondents who get low scores on most items would get high scores on the overall scale. Values for an item-total correlation between 0 and 0.19 may indicate that the item is not discriminating well; values between 0.2 and 0.39 indicate good discrimi-

nation, while values between 0.4 and 0.69 indicate very good discrimination. Coefficient values higher than 0.7 may indicate attenuation paradox.

TABLE 3

	Items	Alpha if item deleted	Adjusted Item – Total Correlation**
Item 1	Selection procedures are free from bias against women	0.724	0.572
Item 2	Female employees are given training opportunities*	0.730	0.610
Item 3	No gender discrimination in promotion	0.763	0.676
Item 4	Males and female employees are appreciated and rewarded equally for their efforts*	0.767	0.642
Item 5	Provisions to facilitate female staff(transport, toilet and baby care) are adequate	0.802	0.471
Item 6	Nature and burden of job is such that work and domestic responsibilities do not effect each other	0.799	0.454
Item 7	Effective remedial measures are put in place to solve problems of female staff	0.774	0 .698
Item 8	Never experienced sexual harassment at the workplace	0.785	0.522
Item 9	Male colleagues cooperate when help is needed with work	0.725	0.524
Item 10	Female colleagues encourage each others' achievements*	0.799	0 .332
Item 11	Recognition of worker's abilities is gender neutral	0.718	0 .600
Item 12	Male bosses treat female subordinates fairly*	0.714	0 .517
Item 13	Female bosses are sympathetic towards female subordinates*	0.810	0.348
Item 14	Female employees participate in informal group activities at the workplace*	0.791	0.496
Item 15	There are female role models in the organization	0.801	0 .351

*Indicator was negatively worded in the PWEI. Before summation of items to obtain score on PWEI, this item was reverse coded. Wording has been changed in this table to bring it in line with rest of the items shown here.

**Item total correlation is the relationship between a particular item and the total score on the scale. It is a Pearson correlation coefficient and is expressed as a number between –1.00 through 0 to +1.00. Corrected item-total correlation for each item is calculated using sum of item scores without including the item in question.

It can be seen from Table 3 that all items on the PWEI have item-total correlations indicating good to very good discrimination. Table 3 also shows that if any of the items is dropped, alpha reliability does not increase beyond the 0.813 mark, which is the overall reliability of PWEI. This means that all the items in the final scale are relevant and should be retained.

IV. SAMPLING TECHNIQUE AND DATA COLLECTION METHOD

THE SURVEY SAMPLE

There is no standard definition which enables identification of public sector organizations. Different countries have different criteria for defining what this term actually implies. In Pakistan, government reports use this term vaguely (NCSW, 2000). Even within scholarly literature there are glaring discrepancies, *e.g.* Hyder and Rielly (2005) consider public sector as comprising of federal government ministries, provincial government and local bodies also referring to it as the government sector. Ahmed and Hyder (2009) on the other hand include the government sector as well as public enterprises in their definition of public sector.

The current study uses the broadest construct of public sector based on the following definition of public sector employees:

> "… persons employed by public authorities, whether central of federal, regional, provincial or local, or by autonomous public institutions of a non-industrial and non-commercial nature. The term covers both … persons of recognized official status … (Established staff) and persons employed on contractual basis … (Non-established staff)" (ILO, 1994).

Recognizing the heterogeneity within the public sector this study compares the working conditions in three broad categories of public sector organizations. The administrative units, comprising of federal government ministries, regulatory bodies and commissions; government hospitals, as proxy for health sector and public sector universities as proxy for education sector.

The survey was geographically restricted to the city of Islamabad. Being federal capital of Pakistan, this city is headquarter of most government ministries and administrative agencies. Public servants from all over Pakistan's four provinces have settled here and have given the city a culture which is representative of the norms and traditions of the entire nation.

Therefore, findings of the study may also be considered relevant for public sector organizations located elsewhere in the country.

Thirteenth Census of Federal Government Civil Servants (PPARC, 2003) and Bulletin of employees of Autonomous/Semi-autonomous bodies/ Corporations under the Federal Government (PPARC, 2006) were used to procure a comprehensive list of public sector administrative units based in Islamabad having a minimum of 20 female employees. 22 government divisions out of a total of 50 divisions mentioned in the Census of Civil servants and 20 allied organizations out of 198 organizations cited in the Bulletin of autonomous and semi-autonomous bodies fulfilled these criteria.

A complete list of public and private sector universities in Pakistan was retrieved from Higher Education Commission official website (HEC, 2009). It shows that in all there are 14 public sector universities in the federal area.

Pakistan Institute of Medical Sciences official website (PIMS,2009) was used to obtain a list of all public and private hospitals in the country. This source shows that there are a total of eight public hospitals in Islamabad.

Stratified random sampling technique was applied to select organizations from these lists. Details are given in Table 4.

TABLE 4

Organizations and Respondents in Different Strata

Strata	Organizations	Respondents
Administrative units, including government ministries, regulatory bodies and commissions	10	100
Government Hospitals	6	100
Public sector universities	8	100
Total	24	300

The final sample consisted of female staff working in BPS grades 9 to 21 or equivalent. 29% of respondents were on contract. The rest (71%) were working on permanent posts. Average age of respondents was 39 years. 71% of respondents had 16 or more years of education while 21% had received 14

years of schooling. 63% were married, 34% had never been married and 4% were either widowed, divorced or separated.

DATA COLLECTION METHOD

At the pre-testing stage survey instrument was delivered to consenting respondents in three selected organization. The following observations were made.

- Respondents at lowest rung of the organizational hierarchy having few years of schooling were unable to understand many of the items on the scale despite having being administered an Urdu version of the instrument.
- Response rate was low when respondents were asked to fill in the survey instrument themselves. Women in hospital setting and on senior levels in the administrative unit, being too busy with their official duties, were especially reluctant to accept forms.
- Educated females asked for English versions of the instrument. However, statements were not completely comprehended before being rated. Responses were made in haste and when contradictory item ratings were counterchecked, respondents changed their initial responses.

Keeping in mind these practical issues, it was decided to target only those females having 14 years of education or more. Formal permission was obtained from the administrative section of each organization selected for the survey. This helped in identification of suitable respondents and added credibility to the academic intent of the survey. Instruments were administered personally by the author through face-to-face interviews with respondents.

V. RESULTS AND ANALYSIS

ANALYSIS OF DESCRIPTIVE STATISTICS

Table 4 shows mean, standard deviation and median of all indices. For scores on individual items, only median is shown as this is the appropriate measure of central tendency for single Likert Items (Carifio and Perla, 2007).

These descriptive statistics prove the following points:

Women working in public sector organizations of Pakistan, in general, do not consider their work environment to be extremely hostile. The average score on PWEI is 51.90 which is above the scale mid point (45).

TABLE 4

Mean, Standard Deviation and Median of All Indices

	Items and Indices	Mean	Standard Deviation	Median
Item 1	Selection procedures are free from bias against women			5
Item 2	Female employees are given training opportunities			4
Item 3	No gender discrimination in promotion			4
Item 4	Male and female employees are appreciated and rewarded equally for their efforts			3
	EOPD	15.79	3.333	16
Item 5	Provisions to facilitate female staff(transport, toilet and baby care) are adequate			2
Item 6	Nature and burden of job is such that work and domestic responsibilities do not effect each other			4
Item 7	Effective remedial measures are put in place to solve problems of female staff			3
Item 8	Never experienced sexual harassment at the workplace			4
	FSPF	12.73	3.267	13
Item 9	Male colleagues cooperate when help is needed with work			4
Item 10	Female colleagues encourage each others' achievements			2
Item 11	Recognition of worker's abilities is gender neutral			3
Item 12	Male bosses treat female subordinates fairly			4
Item 13	Female bosses are sympathetic towards female subordinates			3
Item 14	Female employees participate in informal group activities at the workplace			4
Item 15	There are female role models in the organization			4
	CIPR	23.38	3.751	23
	PWEI	51.90	6.765	51.50

On the whole, female employees feel that there is equality of opportunity for professional development between men and women. This is reflected by average score of 15.75 on EOPD which is much above the midpoint of this dimension (12). However, they tend to be less satisfied with criteria for receiving rewards than they are with the selection, training and promotion procedures (median for item 4 is less than median of other items in this dimension).

Women are much less satisfied with measures to accommodate their practical needs and concerns. Average score on FSPF of 12.73 is only slightly above the point of neutrality of this scale (12). Special facilities to accommodate personal and family needs of female employees are dissatisfactory (median for item 5 is 2 which is lowest among all items for this dimensions).

There is evidence of friendly inter-relationship between female employees and other members of the organization as average score on CIPR (23.38) is above its mid point (21). Though surprisingly women are more comfortable in their professional relationships with male colleagues and bosses (median for items 9 and 12 is 4) than they are in their relationships with other females in the organization (median for items 10 and 13 are 2 and 3 respectively). A phenomenon called "Horizontal Hostility" may be present here. According to Stone (2007), Horizontal Hostility is a socio-psychological theory which posits that members of the same oppressed group (*e.g.* women) place obstacles and limitations on each others' progress instead of collaborating with each other to fight differential forces that are oppressing them (*e.g.* patriarchal structures). The finding is in sharp contrast to the "Social Homophily" thesis which predicts that as individuals prefer to associate with members of their own demographic group (*e.g.* same gender) therefore having more women on the workforce improves work-related attitude of female employees thereby giving reason for employers to further enhance women's representation and reducing workplace hostilities (Appold *et al.*, 1998)

INFERENTIAL ANALYSIS

Extreme care must be exercised when using Likert scales and Likert items for inferential analysis based on mean estimation. The main issue is whether data generated by using Likert scales can be considered as interval data on not. A single Likert item consists of a set of ordered categories so the data it generates is ordinal. In strict propriety, the statistical procedures involving means and standard deviations ought not to be used for analysis of such data.

Median is considered an appropriate measure of central tendency for strictly ordinal data.

On the contrary, when a number of Likert items are summated, the resulting index generates data which has properties similar to interval data.[8] It can be seen from Table 4 that mean and median estimates for all indices are quite similar.

Carifio and Perla (2007) argue that F-tests in Analysis of Variance (ANOVA) give accurate result on Likert scale data provided the following are true:

- There are four to eight items in the scale.
- The scale uses 5 to 7 point likert response format.
- There is homogeneity of variances.

PWEI and its subscales, fulfill the first two conditions for meaningful application of parametric procedures. The third condition is examined separately for each category of ANOVA analysis in this section before trying to establish trends in the population.

DIFFERENCES IN PERCEPTION OF WORK ENVIRONMENT ACROSS STRATA

As can be seen from Table 5, there are significant differences across strata on PWEI and the sub-indices (F-ratios are significant at $p < 0.01$). Comparison of means is meaningful as there is homogeneity of variances which can be seen from insignificant Levene statistics. Results show that female employees in hospitals are least satisfied with the work conditions while those working in universities consider their conditions quite amenable. Most importantly, female hospital staff feels that their practical needs are ignored. (Average score on FSPF for the group is 11.23. This is lower than the scale mid point which is 12). Women in administrative units may not feel as comfortable at their workplace as university employees but still fare better than hospital staff. Results are in line with previous research, *e.g.* Nasir (2005) finds that there is higher probability of finding married women in education sector of Pakistan. Or, in other words, there is higher job continuity among women in teaching profession as it offers flexibility of

[8]Ordinal data shows ranking but magnitude of differences between ranks is not known. Interval data on the other hand is ordered and difference between any two points remains constant. However, even Interval data has no natural zero or origin point. Only Ratio data has this property (Sekaran, 2000).

place and hours. According to this research, medical profession due to its care-giving nature, does not conflict with socially prescribed role for women. However, there is no convenience factor associated with this profession. Women holding administrative posts, according to Nasir (2005), are more educated but earn less than male counterparts which explains why they are not completely satisfied with their work situation.

TABLE 5

Differences Across Strata on PWEI and Sub-Indices

Indices	Universities (N = 100)	Administrative Units (N = 100)	Hospitals (N = 100)	ANOVA*		Homogeneity of Variance**	
	Mean Scores	Mean Scores	Mean Scores	F	Sig.	Levene Statistic	Sig
EOPD	16.70	15.47	15.20	5.94	0.003	0.464	0.629
FSPF	13.62	13.34	11.23	17.79	0.000	0.758	0.470
CIPR	24.32	23.20	22.63	5.40	0.005	1.530	0.218
PWEI	54.64	52.01	49.06	14.05	0.000	0.126	0.881

*ANOVA splits the variance of the variable into two components. One component is the variability among group means. It is computed by summing squares of the differences between every group mean and the overall mean of the distribution. This value is divided by the degrees of freedom $k - 1$ where k is number of groups to obtain Mean Sum of Squares between groups (MSB). The other component is the variability within the groups (also called residual variation). It is quantified as the sum of squares of the differences between each observation and its respective group mean. This value is divided by degrees of freedom $n - k$ where n is total number of observations and k is number of groups, to find Mean Sum of Squares within groups (MSW). The ratio of the MSB and MSW is called the F ratio. The calculated F ratio value is compared to the standardized table value of F from the F-distribution. If the calculated F-ratio value is greater than the table value at an acceptable level of significance, we will reject the null hypothesis of equality of means and conclude that the means of the groups are significantly different. In other words, large F ratios signify that the variation among group means is more than it would be if this variation were simply an outcome of chance.

**An important assumption in ANOVA is the equality of variance between the groups. Levene's test can be applied to test the homogeneity of variances. One way to compute Levene test statistic is to calculate the absolute difference between each observation and the group mean and then perform an ANOVA on those differences. If Levene statistic turns out to be insignificant, it shows homogeneity of variance.

DIFFERENCES IN PERCEPTIONS OF CONTRACTUAL AND PERMANENT WORKERS

Table 6 shows that significant differences exist in perceptions of employees working on contract and those working permanently (F-ratios are significant at $p < 0.05$). Again comparison can be made confidently as there is no heterogeneity of variances. Contractual employees express more satisfaction with their work conditions than those working on permanent posts.

TABLE 6

Perceptions of Employees Working on Contract and Permanently

Indices	On Contract (N = 88)	On Permanent posts (N = 212)	ANOVA		Homogeneity of Variance	
	Mean Scores	Mean Scores	F	Sig.	Levene Statistic	Sig.
EOPD	16.50	15.50	5.740	0.017	2.542	0.112
FSPF	14.30	12.08	31.511	0.000	0.213	0.645
CIPR	24.15	23.07	5.243	0.023	0.144	0.704
PWEI	54.94	50.64	20.312	0.000	0.432	0.837

There can be two opposing explanations for this finding. First, that contractual workers having less security of job than permanent workers, feel hesitant in expressing any negative views against the management for fear of having to suffer negative consequences. Second, in semi-government institutions where most employees work on contract, the work environment although more competitive, is open and fair for all employees including women. In both possibilities, the common message is that spirit of competition among employees when introduced judiciously in public sector organizations, can be a positive tool for effective management. This result is in keeping with observations of Joshi (2000) and Amjad (2005). Joshi (2000) notes that there have been many negative social consequences of privatization in South Asia, such as worker retrenchment, stagnation of formal employment and 'casualization' of labour. He suggests that a socially optimal and cost effective alternative to privatization is restructuring of public enterprises, by contracting services of professional managers or offering performance contracts to existing public sector mangers for making the enterprises profitable without divesting the equity. Joshi (2000) feels that such arrangements would work very well if not derailed by political

interference. According to Amjad (2005), Pakistan can break out of the low-level skills trap by developing institutions which invest in people and provide fair compensation to men and women in exchange for their labor. He suggests that the regulatory framework should combine a degree of flexibility for employers to manage workers effectively, along with a measure of job stability in terms of respecting fundamental rights of workers. Contractual jobs in public sector organizations would be very suitable in such a framework.

NO DIFFERENCE IN PERCEPTIONS OF WOMEN WORKING ON OPERATIONAL LEVEL AND STRATEGIC LEVEL POSTS

In Table 7 it can be seen that there are no significant differences between perceptions of women working on lower operational level posts and those working on higher strategic levels (F-ratios are all insignificant, although there is no heterogeneity bias).

TABLE 7

Perceptions of Women Working on Lower Operational Level Posts and Higher Strategic Levels

Indices	Operational level post (N = 125)	Strategic level posts (N = 175)	ANOVA		Homogeneity of Variance	
	Mean Scores	Mean Scores	F	Sig.	Levene Statistic	Sig.
EOPD	15.47	16.02	1.957	0.163	0.260	0.610
FSPF	12.88	12.62	0.451	0.502	0.009	0.925
CIPR	23.62	23.22	0.824	0.365	0.289	0.591
PWEI	51.97	51.86	0.015	0.903	0.051	0.821

Grades 9 to 16 or equivalent have been classified as operational level while BPS grades 17 to 21 or equivalent have been categorized as strategic levels. The former category of women are less educated, less economically well-off and have less access to organizational resources than the latter category. The results challenge earlier studies which imply that highly qualified women working at higher rungs of the organizational hierarchy face less gender discrimination than those women who are less educated and therefore unable to acquire lucrative posts (Nasir, 2005; Ahmed and Hyder, 2009). It seems that just as Kabeer (2003) has pointed out, gender inequality

is pervasive among all classes, so there is no reason to expect that more educated women have more supportive work environments.

DIFFERENCE IN PERCEPTIONS OF MARRIED AND UNMARRIED WOMEN

Table 8 shows that perceptions of work environment differ among women who have never married and those who are currently married or have been married before (F-ratio for PWEI is significant at $p < 0.1$). Women in the latter group are the ones having children and more household responsibilities than women in the former category. The difference in perceptions is most significant in the extent to which these women feel their practical domestic issues are accommodated with married women being much less satisfied than single ladies (F-ratio for FSPF is significant at $p < 0.01$). As before, with Levene statistics being insignificant, we can be sure of relevance of the comparison.

TABLE 8

Perceptions of Work Environment Among Women

Indices	Never Married (N = 101)	Married / Widowed / Divorced (N = 199)	ANOVA		Homogeneity of Variance	
	Mean Scores	Mean Scores	F	Sig.	Levene Statistic	Sig.
EOPD	16.17	15.60	1.968	0.162	0.099	0.753
FSPF	13.43	12.38	7.045	0.008	1.783	0.183
CIPR	23.41	23.37	0.006	0.941	2.112	0.147
PWEI	53.00	51.35	3.058	0.081	0.384	0.536

Existing literature suggests that motherhood is associated with lower earnings. Several reasons are given for this "Motherhood Penalty". Among these are: loss in job experience, lower productivity, trade-off between higher paying and family-friendly jobs as well as employer discrimination against mothers (Budig and England, 2001).

The findings in Table 8 suggest that married women, who may be having children, do face difficulty in coping with their jobs and household responsibilities which can impose negative career outcomes including "Motherhood Penalty" on them.

VI. CONCLUSION

The paper has examined labor demand-side factors of women's employment in public sector organizations of Pakistan. It was found that while there are equal opportunities for women who seek career advancement, it may be quite difficult for these women to utilize many of these opportunities without disturbing the delicate balance between their work and family life. In general, organizations seem keen enough to promote welfare of female staff as long as women do not make demands which require major changes in the *status quo*.

Similar to the findings of Bloom *et al.* (2006), this study reveals that organizations which expect female employees to be as productive as their male counterparts are the same organizations where females are most facilitated in dealing with their personal and family responsibilities. Interestingly, these are the semi-government institutions and various sections of government departments that operate at optimal efficiency, in a manner similar to the formal private sector. Only instead of profit generation the motive here is public welfare. On the contrary, in public institutions still having a traditional bureaucratic set-up, women face hardships as no arrangements are made for their facilitation. Women in these organizations are seen as liabilities and not productive members of these organizations.

Another important finding is that preference for "Social Homophily", and positive outcomes for women employment which it predicts, cannot be assumed. In other words, simply adding more women to the work force will not automatically improve the work environment for female workers. Women, much like men, will not always look out for each others' best interest as there may be professional jealously among them. However, as this research only hints at the existence of "Horizontal Hostility" among women without being able to confirm this finding, there is no proof that women hold animosity against each other. As a matter of fact many of the women interviewed for the survey agreed that there were female role models in their organizations who gave them guidance and inspiration.

The most encouraging finding is that a vast majority of women find the attitude of males in their organizations to be quite co-operative and congenial. If female employees face harassment, it is mostly from outsiders, *e.g.* many nurses complained that patients and their male attendants misbehaved with them. They added, though, that such cases could be dealt with easily if the female workers remained firm and confident. The message here is that women can help to mould the work environment according to

their needs if they remain resilient and determined and that male employees would not be playing a negative role in their progress.

Based on these findings, the following steps are being suggested to improve effectiveness of interventions to mainstreaming women's concerns into the set-up of public sector organization in Pakistan.

- It should be recognized that public sector comprises of different types of organizations. General guidelines for maintaining gender equity should be adapted according to specific needs of each organization. However, provision of services such as separate toilets for male and female staff, transport and daycare facilities should be made mandatory.
- Not only should there be wider dissemination of information regarding opportunities for career development of female employees, but the organizations should also actively encourage females to take up these opportunities by facilitating them. For example, providing transport for employees to attend training courses; making sure the day-care centre remains open in the evening, so females can take up assignments at that time etc.
- Gender sensitization training which aims to make workers more understanding and responsive of women's need, must also be used to make female workers realize the need for co-operation among themselves.
- Women with tertiary education should be encouraged to join the public sector. Although the number of female students graduating from Pakistani universities keeps increasing[9] each year but due to adverse social conditions they are hesitant in working outside of the home. Public sector employment would be an attractive option for them due to the prestige associated with public service. By tapping into the abilities of young, educated and dynamic women the public sector organization can be transformed into entities which are better equipped to deal with development challenges facing the country.

[9]See Higher Education Commission – Educational Statistics on HEC web-site.

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