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Remittances and Poverty Nexus: Evidence from Pakistan

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Abstract

Remittances play a very important role in eliminating poverty of a nation. Remittances it is believed increase the money supply and stimulate demand for consumption and investment. The basic objective of the present paper is to explore the various factors affecting poverty with particular emphasis on the relationship between poverty and foreign remittances. It is hypothesized that remittances, trade openness, GDP growth, inflation, urbanization and tax rates are the possible variables affecting poverty. The remittances-poverty nexus is tested both for the short-run as well as for the long-run. Fully modified ordinary least square (FMOL) technique is used for establishing short-run and long-run relationship between poverty and its determinants. The period selected is from 1973-2006. Results support hypothesis that remittances bring a decline in poverty.

1. Introduction

With the wake of Globalization, multiple factors have contributed to labor movement in which better working environment, more opportunities, and compensation are on top of priority list. In economic terms, the amount of money sent by foreign workers to their native homeland is called remittances [1]. Remittances not only reflect the domestic labor working in the global economy but also show the connection between growth and integration with the world economy. Hence, remittances improve the integration of countries into the global economy (Addison, 2004). In simple words, remittances are also financial flows arising from the cross-border movement of citizens of a country and are different from the other capital inflows (foreign loans, aids and FDI) due to its stable and unreturned nature (Shahbaz, et, al, 2007).

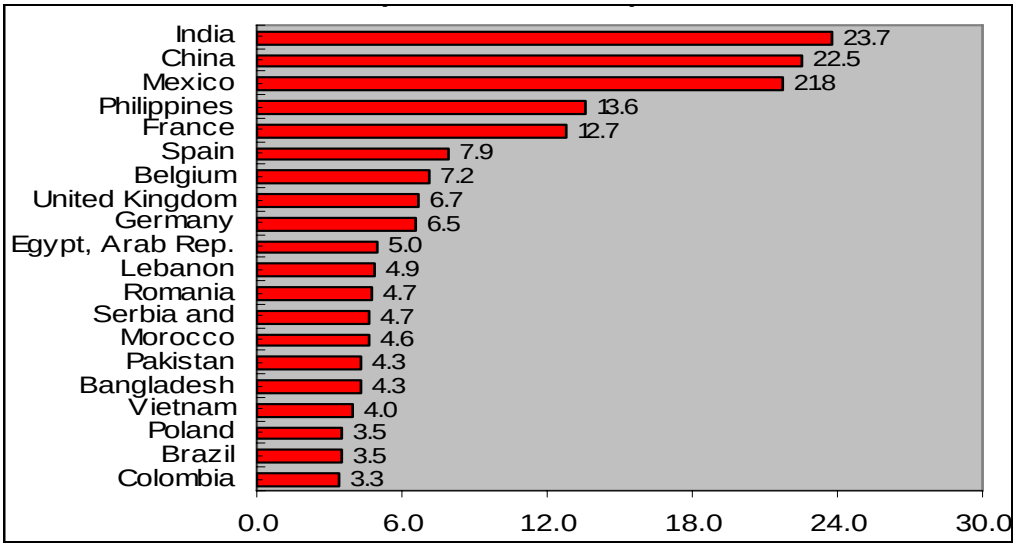
Recent surge of remittances in Pakistan has unequivocally pushed the growth momentum of the economy along with macro economic stability. In addition to that, more foreign capital inflow (remittances) is likely to have impact on economic planning and human development that would lead to institutional strengthening. It is commonly believed that heavy flow of remittances has greatly stabilized Pakistan's financial sector that is in initial level of development. Remittances are also poverty cushion as increased money supply to stimulate the demand and increased consumption expenditures on goods and services would ultimately benefit the poor. Low level of economic activity has created unemployment for skilled labor while the remittances have created the opportunities even

[1] Remittances are generally defined as that portion of migrants' earnings sent from the migration destination to the place of origin. Although they can also be sent in kind, the term "remittances" is usually limited to refer to monetary and other cash transfers transmitted by migrant workers to their families and communities back home.

for unskilled labors. It has been generally argued that globalization has caused loss of power of nation-states and dismantled welfare state model that grossly reduced the efficiency of the governments (Shahbaz, et, al (2008) [2].

In 2005, total recorded flows of remittances in world exceeded $ 260 billion; Pakistan is being the beneficiary of US $4.28 billion that is 1.65 percent share of world remittances. Pakistan stands at the 15th position in the world's largest remittances receiving country (see figure-1). Pakistan can stand in a better position if more remittances are received through formal channels. Same holds for other developing countries of the world as currently they receive US $167 billions per annum.

Figure 1: Graphical representation of Remittance-recipient countries
Figure 1: Top 20 Remittance-recipent Countries, 2005 (Billions of Dollar)



Source: World Development Indicators,World Bank 2007

During the mid-1980s remittances approached to $3 billion annually and savings of Pakistanis living in the Middle East were approximately 70% of their income. The data shows that they remitted about 75% of their amount saved. The majority of this money is used to pay for house construction, consumer goods, to pay-off debts, and to purchase land. The workers' remittances in the decade of 1980s had positive economic and social effects on households receiving money from Middle East. Similarly, estimates showed that 42% of remittances were used to cover basic family needs, 29% spent on other consumer goods, and 13% were invested in some kind of business ventures. This inflow greatly contributed to the balance of payments and accounted for 76% of merchandise exports .[3]

The micro impact of remittances on poverty has been much discussed in literature (Siddiqui and Kemal, 2006) but at macro-level remittances and poverty nexus is missing particularly in case of Pakistan. The prime objective of the present study is to explore foreign remittances-poverty nexus not only for the short-run but also for the long-run. Fully Modified Ordinary Least Square (FMOLS) technique is utilized for establishing long run relationship and Error Correction Model (ECM) for short run relationship. The paper is organized as follows: Section 11 reviews some of the empirical studies

[2] Remittances are considered as shield against negative externalities of globalization as it insulated both government and domestic population from the vagaries of global markets (Shahbaz, et, al (2007).

[3] Remittances channeled in Pakistan from two possible ways. The formal channel is of nationalized commercial and non-commercial banks that normally took more time to transfer money in the respective accounts. The other way is an informal ('*hawala'* or 'hundi') way, which more efficient and time-bound compare to formal channel. The ratio of informal channel is increasing because of its efficient and speedy service. In 2001, 20% of remittances to Pakistan entered through formal channels while vast majority of entering via the *hawala* system. Most of the *hawala* money drained in the economy without making significant affect on the people. On the contrary, effective and efficient banking system is required to motivate oversees Pakistanis to send money through formal channel that would have huge impact on country's economy.

on the relationship between remittances and poverty. Section 111 explains model specification, sets methodological framework and discusses the sources of data collection. Section 1V sets methodological framework for the analysis. Results are interpreted in Section V while V1 section concludes the major findings of the study.

11 Empirical Evidence On Remittances-Poverty Nexus

Remittances-Poverty nexus has been viewed in literature from both micro-level as well as macro-level. Pioneering efforts of Stark (1991); Adams (1991) showed that remittances *do* have an effect on rural asset accumulation. Moreover, external remittances have a positive and significant effect on the accumulation of land; internal remittances have a positive and significant effect on the accumulation of agricultural capital. While, more insured households by remittances shift their portfolios towards riskier investments (Paulson and Miler, 2000).

Adams (1996), investigated the impact of remittances on poverty reduction in Rural Egypt for the first time and concluded that number of poor household declines by 9.8 % when households incomes includes foreign remittances, and that remittances income accounts for 14.7% of total income of poor segments. Further more, Koc and Onan (2000), argued that remittances are mostly spent on consumption, housing and land and are not used for productive investment that would contribute to long–run development in Ghana. However, market linkages transmit the impacts of remittances from the households receiving them to others in the local, regional or national economy. Although emigration is rarely a solution to the problems of national development, these direct and indirect income effects of remittances potentially have important influences on production, income inequality and poverty at least on local level.

Adams and Page (2003, 2004) analyzed the impact of international migration and foreign remittances on poverty reduction. A 10 percent increase in international remittances in developing economy will decline the poverty by 3.5 percent in that country (Adams and Page; 2003, 2004) [4]. Adoms (2003) and Adams (2004), also instituted that remittances reduce the severity of poverty in Guatemala; further more, Guatemalan families tend to spend a lower share of total income through remittances on food and other non-food goods but more on durables goods like housing, education and health. Continuous flow of remittances boosts the education spending in Pakistan (Shahbaz and Naveed, 2007) [5, 6]. Loez-Cordova, (2005) investigated the relationship between remittances and poverty in Egypt, Guatemala and Mexico respectively and argued that a one-percentage point increase in fraction of remittance-receiving households in a municipality significantly reduces the fraction of population earning relatively low income [7].

Finally, Esquivel and Huerta-Pineda (2006) utilized the Propensity Score Matching Approach to investigate the impact of remittances on poverty reduction among Mexican households. They conclude that receiving remittances (regardless of amount) reduces the households' probability of being in food-based and in capabilities-based poverty in 8% & 6 % points, respectively. If the remittance senders resemble the Mexican population, this effect is equivalent to a reduction of around 50 & 30 percent in corresponding poverty rates for remittance receiving households vis-à-vis non-remittance receiving households. However, receiving remittances does not seem to affect the probability of being in asset-based poverty and remittances help to reduce the level and depth of poverty up to certain level [8]. In the case of Pakistan, Siddiqui and Kemal (2006) found that trade

[4] Bertoli, (2005) criticized the AP approaches and suggested that their estimates are inconsistent and frail.
[5] See for details (Shahbaz and Naveed, 2007)
[6] Children of remittances recipient households have a lower school drop-out ratio and these households spend more on private tuitions for their children in El Salvador and Sri-Lanka (Ratha and Mohapatra, 2007).
[7] More recently, Taylor, Mora and Adams, (2005) showed importance of on poverty reduction in Mexico using individual level data and found, remittances reduce poverty in rural Mexico.
[8] The Propensity Score Matching Approach also utilized in case of Nigeria (see for more details, Chukwuone, Amachina, Iyoko and Okpokpara, 2007).

liberalization and international remittances reduce gap between urban and rural households but gain in welfare from trade liberalization is larger for urban households as compared to rural households [9].

At aggregate or macro-level, Adams and Page (2003, 2004, 2005) and Bertoli, (2005); showed significant poverty reduction impact of international remittances utilizing the cross-country data. In the case of Philippines; Yang and Martinez (2005) and Dean (2006), found that remittances lead to reduction in poverty migrants'origin households. Taylor, Mora and Adams (2005); in case of rural Mexico, concluded that international remittance reduce both level and depth of poverty. Remittances have also declined poverty in Sub-Saharan and Latin American Countries with heterogeneous effects across countries [Fajnzlber and Lopez (2006); & Gupta, Pattillo and Wagh (2007). Wodon, (2006) argued that Remittances are often not pro-poor in West African countries, but they are key for poverty reduction as well as the source of enabling households to cope with shocks. Remittances may have declined poverty by 11, 6 and 5 percent in Uganda, Bangladesh and Ghana respectively (Ratha and Mohapatra, 2007).

111. Model Specification and Data Collection

Log-linear modeling specification is utilized in present endeavor in the context of small developing economy like Pakistan alongwith monotonous impact of remittances on poverty reduction and Lafer phenomenon [10] with great control variables. Bowers and Pierce (1975) suggested that Ehrlich's (1975) findings with a log-linear specification are sensitive to functional form. However, Ehrlich (1977) and Layson (1983) argue on theoretical and empirical grounds that the log-linear form is superior to the linear form. Both Cameron (1994) and Ehrlich (1996) suggest that a log-linear form is more likely to find evidence of a deterrent effect than a linear form.

This makes our results more favorable to the deterrence hypothesis, log-linear functional form as portrays below. In the lights of the literature review about remittances and poverty nexus, algebraic equation for empirical investigation is being modeled as follows:

$$LPOV = \delta_{\circ} + \delta_1 LES + \delta_2 LREM + \delta_3 LGDP_{t-1} + \delta_4 LTR + \delta_5 LTAX + \delta_6 LURB + \delta_7 LFDI + \delta_8 LINF + \eta_1. \quad (1)$$

Where;

POV = Poverty (Head-Count Ratio), ES = Lag of dependent variable proxy for Economic Shocks, REM = Remittances as share of GDP, GDP = GDP per capita, TR = Trade as share of GDP, TAX = Tax Revenue as share of GDP, URB = Urbanisation as share of total population, FDI = Foreign direct investment as share of GDP and INF = Annual inflation rate.

The **2**nd model is enhancement of basic model but with squared term of foreign workers' earnings (remittances) to investigate either poverty increases with continuous inflows of remittances or not. For this purpose, below given equation is modeled as:

$$LPOV = \lambda_{\circ} + \lambda_1 LES + \lambda_2 LREM + \lambda_3 LREM^2 + \lambda_4 LGDP_{t-1} + \lambda_5 LTR + \lambda_6 LTAX + \lambda_7 LURB + \lambda_8 LFDI + \lambda_9 LINF + \eta_2 \quad (2)$$

The poverty-declining hypothesis predicts λ_4 <0 and λ_5 = 0 through international trade, the poverty-increasing hypothesis predicts λ_4 >0 and λ_5 = 0, and inverted U-shaped hypothesis or Lafer phenomenon predicts if λ_4 >0 and λ_5 <0, and for U-shaped prediction is if λ_4 <0 and λ_5 >0.[11]

$$LPOV = \gamma_{\circ} + \gamma_1 LES + \gamma_2 LREM + \gamma_3 LGDP_{t-1} + \gamma_4 LTR + \gamma_5 LTR^2 + \gamma_6 LTAX + \gamma_7 LURB + \gamma_8 LFDI + \gamma_9 LINF + \eta_3. \quad (3)$$

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[9] Burney, (1988) concluded that migrant workers from Pakistan received five to eight times higher wages as compared to local conditions and remitted more than 77 percent of their earnings to Pakistan.

[10] Lafer Curve reveals that poverty increases at initial levels of trade-openness and declines at high levels of trade-openness.

[11] See for more details (Agenor 2003),

Poverty index (Head-Count ratio) [12] is the dependent variable. Using macroeconomic determinants, Amjad and Kemal (1997) and afterwards Akhter and Ahmad (1999) to explain poverty trends in Pakistan, utilized simple econometric techniques. Recently, Jamal, (2004) calculated the time series data of poverty trends in Pakistan through interpolation method [13]. A lag of dependant variable *LES* is included in the model to capture the lively impacts of macroeconomic shocks on poverty. Poverty tends to persist at the household level [Sawhill, (1988); Steven, (1999); prevalence of poverty is expected to be slowed. Urbanization (URB) is included in the Shahbaz, (2006); Shahbaz and Naveed, (2007)] and thus the impact of varying macroeconomic performance on the model expecting that internal migration reduces poverty through availability of employment generating activities for unskilled labor particularly and for skilled labor generally.

Economic theorists have given much nominal attention on degree of openness [Harrison, (1996); Edwards, (1998); and Yanikkaya, (2003)]. Therefore, Import + Export as share of GDP for trade-openness (TR) is utilized in study [14]. FDI (Foreign Direct Investment), which is an important source of capital, is used as proxy of financial openness, which measures the medium, and long-term ability of a country to attract investment from abroad (Shahbaz, 2006, 2007). Moreover, FDI also complements domestic private investment, which is often associated with new job opportunities, enhancement of technology transfer thereby boosting overall economic growth in host countries .[15] Thus, one of the most important features [16] of Globalization is considered to be the openness to international trade. A huge increase in capital inflows especially in the form of foreign direct investment is also due to the liberalization of financial markets. Therefore, the concept of FDI can be used to interpret financial openness of an economy (Figini et al, 2004) .[17] "Inflation is the cruelest tax of all" is often explained as that inflation which hurts the poor more than the rich through direct and indirect channels. The impact of inflation on poor segments of society is directly correlated i.e. impact of inflation worsens the situation of poverty in the economy (Shahbaz, 2006, 2007; & Shahbaz and Naveed, 2007).

High rate of economic growth leads to sustained increase in the productive capacity of the economy through productive policies, which in turn leads to increasing employment opportunities in the country. This process allows a progressive absorption and integration of the unemployed and under-employed "including skilled and un-skilled" into expanding economic activities with high levels of productivity. In the process, poor may be able to achieve increment in their incomes through existing employment or shift to new jobs involving higher skills on higher wages. Thus, RGDP is assumed to have a positive effect on incomes of poor people. A one-year lag in RGDP is also used because it takes some time before the above-described process works out [Sawhill, (1988); Steven, (1999); Shahbaz, (2006, 2007)].

The impact on poverty due to changes in tax revenue differs according to the modifications in the progressiveness and this entire situation is judged in an environment of macroeconomic stabilization policies. To control for the latter, it is important to deal with the complementary measures

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[12] Malik (1988) firstly generated five poverty observations during the period of 1963-64 t0 1984-85 on bases of household surveys. Using consistent to compute poverty lines for these particular years (defining poverty line based on caloric requirement of 2250 plus basic needs of person).

[13] Considering, the international economic institutions like World Bank and Government Developing Agencies such as DFID, who are showing their deep concern regarding the poverty issue in many areas, absolute measure is appropriate than relative ones.

[14] The relevant question in the case of this indicator is not only what a country exports but also how its exports and imports are in relation to its GDP.

[15] For a comprehensive survey of the nexus between FDI and growth as well as for further evidence on the FDI-growth relationship see de Mello1997) Mody and Murshid (2002) for a recent assessment of the relationship between domestic investment and FDI, Chakrabarti (2001) for the determinants of FDI.

[16] Most sceptical view of the openness process blames that liberalization of global financial markets for their allegedly negative affects in terms of increase in financial speculation, unemployment and poverty. For example, studies collected by Cornia and Lipumba (1999), show that, in the case of Africa, liberalization of financial market has attracted large inflows of short-run speculative which included large saving in nominal and real exchange rates. A major result of such speculative movements is a lack of adequate incentives to potential private investors in the tradable sector.

[17] We also know that this measure does not fully account for both levels of financial openness: capital account liberalization and national treatment of foreign banks and other operations of entering in local markets.

that may have implemented to tackle both macroeconomic instability and adverse effects of adjustments and stabilization programmes [Sawhill, (1988); Steven, (1999); & Figini et al, 2004)]. In order to classify the "role of state", TAX (tax revenue as share of GDP) is used.

The data is acquired from different sources like IFS (International Financial Statistics), WDI (World Development Indicators) and Economic Survey of Pakistan of .various issue The period selected is from 1973-2006). Descriptive statistics can be observed from Table-1.

Table 1: Descriptive Statistics

Variables	**LPOV**	**LREM**	**LURB**	**LTR**	**LTAX**	**LGDPC**	**LFDI**
Mean	3.3084	21.0371	1.2873	3.3670	2.5263	9.4709	-12.4546
Median	3.2657	21.2609	1.2505	3.3428	2.5494	9.5084	-12.2120
Maximum	3.8231	22.6324	1.5048	4.0483	2.6672	10.1751	-11.0618
Minimum	3.0306	17.4045	1.0851	3.1311	2.3311	8.9508	-14.6007
Std. Dev.	0.2348	1.1305	0.1227	0.1556	0.0926	0.3307	0.9147
Skewness	0.5416	-1.8685	0.6261	2.4435	-0.5770	0.1745	-0.8021
Kurtosis	2.1690	6.3367	2.2525	12.3385	2.1743	2.2328	2.8746
Jarqu-Bera	2.5632	34.5120	2.9245	152.75	2.7687	0.9767	3.5608
Probability	0.2775	0.0000	0.2317	0.0000	0.2505	0.6136	0.1685
Sensitivity	**Serial Correlation**		**ARCH-Test**		**Heteroscedisticity**		**J-Bera**
Analysis	0.058 (0.94)		0.207 (0.81)		1.576 (0.35)		1.01 (0.60)

1V. Methodological Framework

The distribution theory supports the Dickey-Fuller Tests that assumes the errors are statistically independent and have constant variance. Philip and Perron (1988) developed the generalization of the Dickey-Fuller procedure that allows for fairly mid assumptions concerning the distribution of the errors. Thus the Philip-Perron test allows the disturbance to be weakly dependant and heterogeneously distributed. In this case the regression equations are as follows:

$$y_t = \varphi_1 + \phi_2 y_{t-1} + \eta_t \tag{4}$$

$$y_t = \varphi^*_1 + \phi^*_2 y_{t-1} + \eta_t \tag{5}$$

$$y_t = \kappa_1 + \kappa_2 y_{t-1} + \kappa_3 (t - n/2) + \eta_t \tag{6}$$

n = number of observations, $\eta_t = E(\eta_t) = 0$ but there is no requirement that the disturbance term is serially uncorrelated or homogenous. The hypothesis in this case is $\varphi_1^* = 1$, $\varphi_1 = 1$ and $\kappa_3 = 0$

However, this test is not reliable for small sample data set due to its size and power properties (Dejong et al, 1992 & Harris, 2003). For small sample data set, these tests seem to over-reject the null hypotheses when it is true and accept it when it is false. A new test, Dicky-Fuller Generalized Least Square (DF-GLS) could solve the problems of data size and power properties. The Dicky-Fuller Generalized Least Square (DF-GLS) has also called de-trending test that was developed by Elliot et al. (1996). The order of integration of variable X_t is calculated from de-trending procedure developed by Elliot et al. (1996) that enhanced the power of ADF test, and DF-GLS test that is based on null hypothesis $H_\circ : \delta^*_\circ = 0$ in the regression:

$$\Delta X^d_t = \delta^* X^d_{t-1} + \delta^*_1 \Delta X^d_{t-1} + ... + \delta^*_{p-1} \Delta X^d_{t-p+1} + \eta_t .. \tag{7}$$

Where X^d_t is the de-trended series and null hypotheses of this test is that X_t has a random walk trend, possibly with drift as follows.

$$X^d_t = X_t - \hat{\varphi}_\circ - \hat{\varphi}_1 t .. \tag{8}$$

Basically it proposed two hypotheses. Firstly, X_t is stationary about a linear time trend and it is stationary with a non-zero mean with no linear time trend. Considering the second hypotheses, DF-GLS test is performed by estimating the intercept and trend utilizing the generalized least square technique. This estimation is investigated by generating the following variables:

$$\bar{X} = \left[X_t, (1 - \bar{\beta} L)X_2, ..., (1 - \bar{\beta} L)X_T \right]. \tag{9}$$

$$\bar{Y} = \left[X_t, (1 - \bar{\beta} L)Y_2, ..., (1 - \bar{\beta} L)Y_T \right]. \tag{10}$$

and

$$Y_t = (1, t)\bar{\beta} = 1 + \frac{\bar{\alpha}}{T}.. \tag{11}$$

Where "T" representing number of observation for X_t and $\bar{\alpha}$ is fixed [18]. While OLS estimation is followed by the following equation:

$$\bar{X} = \varphi_{\circ} \bar{Y} + \varphi_1 Y_t + \varepsilon_t. \tag{12}$$

OLS estimators $\bar{\varphi}_{\circ}$ and $\bar{\varphi}_1$ are utilized for the removal of trend from X_t above. ADF test is employed on the transformed variable by fitting the OLS regression :[19]

$$\Delta X_t^d = \lambda_{\circ} + \rho X_{t-1}^d + \sum_{j=1}^{k} \gamma_j \Delta X_{t-j}^d + \mu_t. \tag{13}$$

In second hypothesis, $\bar{\alpha} = -7$ in the required equation of $\bar{\beta}$, and then $X_t^d = X_t - \varphi_{\circ}$ is calculated. The ADF regression fitted on new transformed variables are then employed to test the null hypothesis, i.e., $\rho = 0$.

There are many econometric techniques to investigate the existence of long run relationship among running actors in concerned model but we scrutinized for the effect of foreign remittances on poverty reduction in the case of small developing economy like Pakistan by utilizing the method of FMOLS (Fully Modified Ordinary Least Square). FMOLS was originally designed first time by Philips and Hansen, (1990); Pedroni, (1995, 2000); and, Philips and Moon, (1999)] to provide optimal estimates of Co-integration regressions (Bum and Jeon, 2005). This technique employs Kernal estimators of the Nuisance parameters that affect the asymptotic distribution of the OLS estimator. In order to achieve asymptotic efficiency, this technique modifies least squares to account for serial correlation effects and test for the endogeneity in the regressors that result from the existence of a Co-integrating Relationships [20]. Although this non-parametric approach is an elegant way to deal with nuisance parameters, it may be problematic especially in fairly very small samples. To apply the FMOLS for estimating long-run parameters, the condition that there exists a Co-integration relation between a set of *I(1)* variables is satisfied. Therefore we have to confirm the presence of the unit root and test the Co-integrating relation. Standard tests of the presence of the unit root based on the work of Augmented Dicky Fuller (1979, 1981) are used to investigate the degree of integration of concerned variables.

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[18] The power of envelop curve is one-half at $\bar{\alpha} = -13.7$ when the model has constant and trend term, and at $\alpha = -7$ when it has only constant tern (see Elliot et al., 1996 for comprehensive study)

[19] For the critical values see (Elliot et al., 1996) of null-hypothesis which is $\rho = 0$.

[20] See Philip and Hansen (1990), Hansen (1995) for details.

Engle and Granger (1987) discussed that, a set of economic series is not stationary, there may have to exist some linear combination of the variables that is stationary. Now, when all the variables are non-stationary at their level but stationary in their 1st difference, this allows proceeding further for the implementation of Johansen co-integration technique. Economically speaking, two variables will be co-integrated if they have a long-term relationship between them. Thus, co-integration of two series suggests that there is a long integration tests and of course, the system approach developed by Johansen (1991,1995) can also be applied to a set of variables containing possibly a mixture of I(0) and I(1) [Pesaran and Pesaran, (1997) and Pesaran et al., (2001, p.315)]. The general form of the vector error correction model is as follows:

$$Z_t = \sum_{i=1}^{p-1} \psi Z_{t-1} + \alpha_\circ + \eta_t \tag{14}$$

This can also be written in standard form as:

$$\Delta Z_t = \sum_{i=1}^{p-1} \Pi_i \Delta Z_{t-k} - \partial Z_{t-k} + \alpha_1 + \varepsilon_t \tag{15}$$

Where; $\prod_i = -I + \partial_1 + \partial_2 + ... + \partial_t$

$i = 1,2,3,...k-1$ and $\partial = I - \partial_1 - \partial_2 - ....\partial_k$

Where *p* represents total number of variables considered in the model. The matrix $\prod$ captures the long run relationship between the *p*-variables. Now for the Johansson Test; we have employed the Trace test, which is based on the evaluation of $H_\circ(r-1)$ against the null hypothesis of $H_\circ(r)$, where *r* indicates number of co-integrating vectors. The co-integration test provides an analytical statistical framework for investigating the long run relationship between economic variables in the model. Johansen and Juselius (1990) provide critical values for the two statistics. The statistical distribution depends on the number of non-stationary components and model telling constant and trend term. To determine the non-stationary components, it is necessary to choose the lag length for VAR portion of the model. To overcome this problem, this work determines the optimal lag length using Akaike Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC) [21]. The lowest values of AIC and SBC to select the lags give the most desirable results.

V. Results

The preliminary step in this analysis is concerned with establishing the order of integration of each variable. For this purpose, we employed the test for the existence of a unit root in the level and first difference of each of the variables in our sample using the DF-GLS test. The results presented in Table-2 reveal that all other variables are non-stationary in their level form. However, the stationarity is found in the first differencing level of the variables (Foreign Remittances, Poverty, Inflation, GDP per capita, Foreign direct investment, Tax revenue as share of GDP, Trade as share of GDP, and Urbanization) [22]. Second step followed to explore long run relationship among running actors, Table-3 presents the picture for complete discussion.

[21] The distribution of test statistic is sensitive to the order of lag used. If the lag order is used less than true lag, then the regression estimates will be biased and residual term will be serially correlated. If the order of lag used exceeds the true order, the power of the test is to be reduced.

[22] Philip-Perron Test employed to investigate the robustness of unit root results, this estimation also proves that all variables are stationary at their 1st difference from.

Table 2: Unit Root Estimation

Variables	DF-GLS Testat Level		DF-GLS Testat 1st Difference	
	T-Statistics	Lags	T-Statistics	Lags
LPOV	-2.6507	1	-3.2357**	4
LREM	-1.8827	0	-3.6164**	0
LINF	-2.5108	0	-5.9256*	0
LGDPC	-1.8249	0	-4.9161*	1
LTR	-2.1494	5	-5.3977*	0
LFDI	-2.7661	0	-3.2358**	3
LURB	-1.8458	0	-3.8327*	2
LTAX	-2.5254	0	-7.1528*	0
Philip-Perron at Level			**Philip-Perron at 1st Difference**	
Variables	**T-Statistics**	**Prob•**	**T-Statistics**	**Prob.**
LPOV	-1.8818	0.6412	-3.3740	0.0729
LREM	1.2409	0.9420	-3.5303	0.0529
LINF	-2.6273	0.2715	-5.9596	0.0001
LGDPC	-1.6328	0.7578	-5.7015	0.0003
LTR	0.6457	0.8507	-6.0416	0.0001
LFDI	-2.4770	0.3365	-8.0593	0.0000
LURB	-1.9761	0.5917	-4.7215	0.0035
LTAX	-2.9209	0.1692	-6.8642	0.0000

Note: *(**) representing significance at 1% (5%) While •MacKinnon (1996) one-sided p-values.

Table-3 summarizes the results of Co-integration analysis between poverty and its determinants, to test for Co-integration; we utilized Johansen informative maximum likelihood approaches both the maximum Eigen values and Trace statistics [23]. The results from the Johansen Co-integration analysis in Table-3, where both the maximum eigen value and trace-test value examine the null hypothesis of no Co-integration against the alternative of Co-integration. Starting with the null hypothesis of no Co-integration ($R = 0$) among the variables, the trace-test statistics is 373.4395, which is above 5% critical value 175.1715 respectively (prob-values are also shown in the Table-3). Hence it rejects null hypothesis $R \leq 0$ in the favor of general alternative $R = 1$. As is the evidence in Table-3, the null hypothesis of $R \leq 1$can be rejected at 1% level of significance hence its alternative of $R = 2$ is accepted.

Table 3: FMOL Maximum Likelihood Test for Co-integration

Hypotheses	Trace –test	5 percent critical value	Prob-value**	Hypotheses	Max-Eigen Statistic	5 percent critical value	Prob-value
$R = 0$	373.4395	175.1715	0.0000	$R = 0$	104.9397	55.7281	0.0000
$R \leq 1$	268.4999	139.2753	0.0000	$R = 1$	73.7815	49.5863	0.0000
$R \leq 2$	194.7183	107.3466	0.0000	$R = 2$	69.5414	43.4197	0.0000
$R \leq 3$	125.1768	79.3414	0.0000	$R = 3$	55.7760	37.1635	0.0001
$R \leq 4$	69.4007	55.2457	0.0018	$R = 4$	28.0631	30.8150	0.1047
$R \leq 5$	41.3376	35.0109	0.0093	$R = 5$	22.5180	24.2520	0.0833
$R \leq 6$	18.8195	18.3977	0.0437	$R = 6$	12.1509	17.1476	0.2304
$R \leq 7$	6.6685	3.8414	0.0098	$R = 7$	6.6685	3.8414	0.0098

Note: **MacKinnon-Haug-Michelis (1999) p-values

Consequently, one may conclude that there are eight Co-integrating relationships (vectors) among the foreign remittances, Poverty, inflation, GDP per capita, Foreign Direct Investment, tax revenue as share of GDP, Trade as share of GDP, and Urbanization, turning to the maximum Eigen

[23] Optimal lag length is (2) selected using Akaike information criterion (AIC) and Schwartz criterion (SIC) as shown in Table-2

value test, the null hypothesis of no Co-integration (R = *0*) is rejected at 1% level of significance in the favor of general alternative, that is one Co-integrating vector, *R = 1*. The test also rejected the null hypothesis of *R = 1* in the favor of the alternative *R = 2*. This is confirmed conclusion overall that there are four Co-integrating relationship amongst the five *I(1)* variables. Therefore, over annual data from 1973 to 2006 appears to support the proposition that in Pakistan, there exists a stable long-run relationship among the foreign remittances, Poverty, inflation, GDP per capita, Foreign Direct Investment, tax revenue as share of GDP, Trade as share of GDP, and Urbanization.

Third and final step to apply FMOLS method for the estimation of long run elasticities, after the satisfaction of existence of Co-integration relation between a set of *I(1)* actors in said models. **Table-4** shows the estimation results from FMOLS analysis. Macroeconomic-shocks are much dangerous and detrimental for poor segments of population because there is positive and significant association between macroeconomic-shocks and poverty hike. Continuous flow of remittances declines the poverty trends from hike. Not only remittances reduce the poverty from direct but also from indirect channels. Lafer curve or monotonous phenomenon also confirms our linear hypothesis but coefficient of squared term is low but significant at 8 percent level of significance.

TR is coupled negatively and significantly with poverty trends, i.e. trade-openness seems to associate with poor segments of society through productivity and comparative advantage channels. One may observe that after including the squared term of TR (trade-openness) indicating the phenomenon of Lafer-shaped curve (with an inverted U-shaped curve) in long run significantly. This term explains that lower degree of trade-openness will raise poverty trends while reduces the poverty with higher degree of trade-openness [24]. In contrary, Agenor (2003), found that tarde-openness may have a U-shaped effect on poverty: while extensive integration reduces poverty, small amounts of globalization may hurt the poor. Surprisingly, co-efficient of economic growth that is proxied by GDP per capita is showing positive association with poverty. This situation indicates the phenomenon of upper-echelon. This further explains that in Pakistan income distribution is highly skewed and very low part of national income remains for poor segments of population and encourages the poverty to hike.

Table 4: FMOLS long Run Elasticities

Dependent Variable: LPOV						
OLS Model-1			**OLS Model-2**		**OLS Model-3**	
Variable	**Coefficient**	**Inst-Value**	**Coefficient**	**Inst-Value**	**Coefficient**	**Inst-Value**
Constant	-0.9905	0.0026	-2.3778	0.0061	-2.3709	0.0004
LES	1.0470	0.0000	1.0604	0.0000	1.0521	0.0000
LREM	-0.0159	0.0001	0.1217	0.1087	-0.0141	0.0001
$LREM^2$	-	-	-0.0033	0.0716	-	-
LTR	-0.1707	0.0000	-0.1612	0.0000	0.5695	0.0490
LTR^2	-	-	-	-	-0.1017	0.0126
$LGDPC_{t-1}$	0.1766	0.0000	0.1732	0.0000	0.1751	0.0000
LINF	0.0073	0.2528	0.0100	0.1160	0.0056	0.3280
LURB	-0.0980	0.0610	-0.1274	0.0177	-0.0857	0.0659
LFDI	0.0097	0.0379	0.0084	0.0606	0.0072	0.0869
LTAX	0.1192	0.0022	0.0998	0.0083	0.1029	0.0033
R-squared = 0.9987 Adjust-R-squared = 0.9982 Durbin-Watson = 2.02 F-Stat (Inst-Value) = 2239.48 (0.00)			R-squared = 0.9988 Adjust-R-squared = 0.9984 Durbin-Watson = 2.03 F-Stat (Inst-Value) = 2214.51 (0.00)		R-squared = 0.9990 Adjust-R-squared = 0.9986 Durbin-Watson = 1.76 F-Stat (Inst-Value) = 2544.03 (0.00)	

[24] For more details see (Agenor, 2003)

Inflation or monetary instability directly and indirectly reduces the purchasing power of poor personnel in the country through its detrimental channels. Poor segments of population are more vulnerable to inflationary pressures than the rich class or non-poor. Due to restrictions in financial markets for non-monetary assets, the poor class holds greater proportion of their wealth in cash than the rich to meet their expenditure. Internal migration also reduces the poverty through enhancing the probability of getting jobs for unskilled labor specially.

In contrary, increase in FDI deteriorates the situation of poverty trends in the country. This shows that FDI is in specific sectors like "telecommunications and financial services or services sectors" of economy may be creating skilled-based employment generating opportunities instead of providing jobs to unskilled labor. Finally, a smaller size of the public sector or government size is associated with lower levels of poverty in Pakistan. Having found a long run relationship, we applied the modified ARDL method to investigate the short-run dynamical behavior, we followed the equation-1 and utilized the given model below for short run dynamics:

$$\Delta LPOV = \beta_{\circ} + \sum_{j=0}^{n} \beta_1 \Delta LES + \sum_{J=0}^{n} \beta_2 \Delta LREM + \sum_{j=0}^{n} \beta_3 \Delta LINF + \sum_{j=0}^{n} \beta_4 \Delta LGDPC$$
$$+ \sum_{j=0}^{n} \beta_5 \Delta LFDI + \sum_{j=0}^{n} \beta_6 \Delta LTR + \sum_{j=0}^{n} \beta_7 \Delta LURB + \sum_{j=0}^{n} \beta_8 \Delta LTAX + \eta cet_{t-1} + \varepsilon_t .... \quad (16)$$

After establishing the long run relationship between poverty and remittances with great control variables in the case of Pakistan as discussed in Table-4, Table-5 reports the short-run coefficient estimates obtained from the ECM version of FMOLS as being modeled in equation-16. The ECM coefficient represents the speed of adjustment of variables return to equilibrium and it should have a statistically significant coefficient with negative sign. Indeed, Bannerjee et al., (1998) have argued that testing the significance of CE_{t-1}, which is supposed to carry a negative coefficient, is relatively more efficient way of establishing Co-integration.

Table 5: FMOLS Short Run Analysis

Dependent Variable: DLPOV			
Variable	**Coefficient**	**T-Statistic**	**Inst-value**
Constant	0.0050	2.4267	0.0266
DLES	0.9602	29.746	0.0000
DLRRM	-0.0140	-3.3849	0.0035
DLREM(-1)	-0.0041	-1.089	0.2912
DLINF	0.0008	0.205	0.8396
DLINF(-1)	0.0023	0.606	0.5523
DLGDPC(-1)	0.0795	1.805	0.0888
DLFDI	-0.0019	-0.703	0.4915
DTR	-0.0886	-4.056	0.0008
DTR(-1)	-0.0153	-0.719	0.4817
DLURB	-0.1063	-2.925	0.0094
DLURB(-1)	0.2146	4.331	0.0005
DLTAX	0.0546	3.057	0.0071
$Ecmt_{-1}$	-0.4356	-2.135	0.0476
R-Squared = 0.990910 Adjust-R-Squared = 0.983959 Akaike info Criterion = -7.176845 Schwarz Criterion = -6.529238 Durbin-Watson = 1.846368 F-Stat (Inst.value) = 142.5549 (0.000)			

The coefficient of *CE(-1)* is equal to (-0.44) for short run model respectively and imply that deviation from the long-term deviation in poverty is corrected by 44 percent over the each year at 5 percent level of significance. One may conclude that a highly significant error correction term is

further proof of the existence of stable long run relationship. The lag length of short run model is selected on basis of Schwartz Bayesian Criteria (SBC).

Results of short run behavior in Table-5 are not much different as compared to log run performance. In short span of time, poverty trends are much influenced positively due to detrimental impacts of macroeconomic shocks in the country. Increased remittances reduce poverty also in short span of time. Inflation enhances the poverty levels insignificantly while economic growth significantly. Trade-openness and urbanization decline poverty while high rate tax imposition tends to raise poverty in Pakistan. Finally short run model passes short run diagnostic tests or sensitivity analysis of no-serial correlation and autoregressive conditional heteroscedisticity, there is no heteroscedisticity while error term is normally distributed as shown in Table-1.

V1. Conclusion

The paper attempted to test the relationship between poverty and its various determinants in general with particular emphasis on remittances and poverty. Time series data ranging for the period of 1973-2006 was utilized. DF-GLS test was applied for the existence of a unit root in the level and first difference of each of the variable. Stationairty was found at the level 1(1). The Co-integration analysis shows the log-run stable relationship between poverty and remittances, inflation, GDP per capita, foreign direct investment, tax revenue as share of GDP, trade as share of GDP, and Urbanization.

By applying FMOLS method the long-run elasticities of all variables taken in the model have been estimated. Results have shown that that there is a positive and significant association between macroeconomic shocks and poverty. Remittances help in reducing poverty. The negative relationship between trade and poverty shows that trade openness seems to be associated with poor segments of society through productivity and comparative advantage principle. The squared term of TR(trade openness) indicates significant phenomenon of Lafer curve (inverted U shaped) in the long –run. Economic growth as proxied by GDP per capita helps in reducing poverty. FDI and inflation however exert a detrimental effect on poverty.

Short-run coefficients estimates were also obtained by using the ECM version of FMOLS. The negative coefficient of CE (-1) implies that deviation in poverty from the long-term is corrected by 44 percent over each year at 5 percent level of significance (Table 5). The short-run and long-run results are not much different from each other.

Results suggest that poverty has positive association with FDI, inflation, tax and initial trade openness while it has negative relationship with remittances, GDP per capita, and Urbanization.

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