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Lumping together democracy and dictatorship: Has macro dynamics of poverty remained steady in Pakistan

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Abstract. In this study we check the relationship between macroeconomics variables with poverty. We select head count ratio proxy of poverty as dependent variable and GDP, unemployment rate, literacy rate, rural population and worker remittances as independent variables. For the analysis of the data we take time series data from 1978-2011 and established the long run and short run relationship between dependent and independent variables. First of all we check the normality of the data by descriptive statistics, further we check the stationarity of the data by applying ADF test. For long run relationship between dependent and independent variables we applied FMOLS techniques and relationship in short run checked by EMC methods. Results of the data shows, macroeconomic variables especially literacy rate and rural population have been major factors that affect poverty levels in Pakistan. GDP has a negative and insignificant impact on poverty. Literacy rate is positively and significantly related with poverty. Worker remittances have negative and significant impact on poverty, while rural population has negative and significant impact on poverty. Unemployment has positive and insignificant impact on poverty in Pakistan.

Keywords. Poverty, Macro economy, Capability.

JEL. E20, E22, E29.

1. Introduction

The debate on poverty reduction is quite important for economic policy makers as per the implementation of poverty reduction strategies. Income centric definition of poverty starts with the assumption that the well-being of families is primarily and positively related to their ability to consume goods and services. According to this view, more consumption leads to greater welfare. This reasoning suggests that a family is poor if its consumption possibilities are low according to some established standard.

Poverty is measured by two ways according to the definition of social security Administration (SSA): Absolute poverty and relative poverty. Absolute poverty is diminished by raising the income of all citizens above a minimum level, while relative approaches measure the degree to which inequality in the income distribution has changed.

Relative poverty is relevant for all countries in the world while absolute poverty is mostly related to South Asia and Sub-Saharan Africa. In contrast to the income measures of poverty, human capability approach to poverty is most important for current issues of Pakistan. Human poverty relates with the deficiencies of education, health, level of employment and worker remittances.

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Fluctuation in economic activities causes change in prices of goods and services. Change in prices not only influences the level of real income, who are full time work but all those badly affected who are already unemployed or under employment. Likewise the rate of growth in the economy influences the level of employment. If the economy is growing too slowly to provide jobs for those entering the labor force, then the number of people unemployed will increased some of those who are working will be employed only part time or considerable below their capacity to work.

Long period with high rates of unemployment and short run reductions in the level of employment have direct effect on the frequencies of poverty. Some people are poor and find it difficult to climb above the poverty level because of discrimination in employment practices.

Education has become more necessary step for higher occupations and the income. In general, those individuals with lower levels of educational achievement are more likely to be unemployed, work fewer hours per year and have lower incomes. The main cause of poverty in under developed countries is that levels of literacy are low, there are heavy dropout rates and the system of education is highly irrelevant and syllabus is out dated. When people are not educated then they use old techniques of production and out dated equipment. In such situation productivity of labor remains low and overall production level falls, meanwhile poverty rapidly increases in under developed countries day by day.

Pakistan ranks 54th in the list of 226 countries for having a young population. Although the belief is widely held that poor families have more children. This higher birth rate is largely due to the lack of information and resources to carry out effective family planning. Different studies have shown that educated parents are among most important factors that influence educational attainment of children. Poor quality schools come with areas of concentrated poverty and dropout rate is much greater in poor families.

Sabir *et al.*, (2012) pointed out that Pakistan can reduce poverty in the long run by change in macroeconomic variables (GDP growth, population growth, minor crops, major crops).

Romer *et al.*, (1997) in his study established the correlation between poverty and economic growth. Results of the data show that economic growth is one of the best ways for poverty reduction. Study explained that those countries grow quickly, that lead to greater poverty alleviation.

Poverty of rural areas is higher than other areas in Pakistan. In rural areas poverty had increased by 36.3% during 1991 compared to urban poverty that is 22.6%. Resultantly inequality increased in both areas in this period that further exacerbated poverty. The authorities in Pakistan and foreign donors agree that a 7 to 8 percent growth is necessary to take care of the jobless and to reduce poverty. It is argued that more than 70% of the country's work force is employed in agriculture and informal sectors, where there are no labor laws, minimum wage or any job security. These workers are mostly illiterate. In other words, if the economy is in a position to provide jobs to everyone, that can reduce poverty or at least reduce absolute poverty in Pakistan. In this study we find the relationship between macroeconomics variables such as GDP, literacy rate, unemployment, rural population and worker remittances with poverty in Pakistan.

1.2. Hypothesis

H1: Stephen (2011), Njang (2010), Zamurrad *et al.*, (2011) found significant and inverse relationship between education and poverty. In this study we also assume that literacy rate negatively related with poverty.

H0: literacy rate positively related with poverty reduction.

H2: Sabir *et al.*, (2010), Klasen (2007), Malik *et al.*, (2005), Zaman *et al.*, (2011) in their studies showed positive relation between poverty and population.

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In this study we assume that population is positively and significantly related with poverty.

H0: Population positively related with poverty

H3: Anwar (2010), Romer *et al.*, (1997), Fosu (2010), Bigsten *et al.*, (2000), Ali *et al.*, (1999) in their study found that economic growth is negatively and significantly related with poverty. Our hypothesis in this study is that economic growth is negatively related with poverty.

H0: Economic growth has negative relation with poverty.

H4: Shafiq *et al.*, (2012), Javeed *et al.*, (2012), Acharya (2012), Adams *et al.*, (2005), Asiedu *et al.*, (2009), presented inverse and significant relation between worker remittances and poverty. We assume that worker remittances negatively relate with poverty in Pakistan.

H0: worker remittances are negatively related with poverty in Pakistan.

2. Literature review

2.1. Literacy and poverty

Stephen (2011) in his study “A critical appraisal of the linkage between literacy rate and the incidence of poverty in Nigeria” discussed the relationship between literacy rate and poverty level in developing countries during the 1975-2008 by using the co-integration test. Result of this study showed significant relationship between literacy rate and poverty level in Nigeria. Result showed that literacy rate did not contribute meaningfully in poverty alleviation in Nigeria.

Zamurrad *et al.*, (2011) investigate the relationship between education, income and poverty. They used panel data for 40 developing countries for the period 1999-2007. Results of the model show that income growth positively related with poverty elevation but income distribution did not play a key role in poverty elevation while education significantly contributes towards poverty alleviation.

Njan (2010) used annual data of household survey that is conducted by National Institute of Statistics. Results show that education is negatively related with poverty level. It means that higher educational level decline poverty rate.

Afzal *et al.*, (2011) investigate the relationship between education, poverty and economic growth. By using the Toda-Yamamoto Augmented Granger Causality (TYAGC) test they checked the causality between education and economic growth and between poverty and education. Both the short run and long run results show positive and significant effects.

2.2. Population and poverty

Sabir *et al.*, (2010) investigated the relationship between the different macroeconomic variables and poverty with the help of multiple regression techniques. There exists long run relationship between Inflation, GDP growth, population growth, major crops, minor crops, livestock and poverty over the period 1981-2010. The results showed that GDP growth rate, income, major crops, minor crops and livestock had negative impact on poverty while inflation and population growth rate had positive impact on poverty.

Klasen (2007) discussed the relationship between population and poverty reduction in Uganda during the 1960-2000 period by using the cross sectional regression method. Result of this study showed that strong impact of educated female on fertility rate. Results showed that those women do not have educated the desired number of children 5.9, those women whose education primary that's desired number of children 4.8 and secondary education have 3.8.

Malik *et al.*, (2005) used the annual data during the period 1950-2000 to show that during the past 50 years, Pakistan population growth rate increased that caused poverty.

Zaman *et al.*, (2011) exploring the link between poverty, pollution and population in Pakistan for the year 1995-2009. He used head count ratio as proxy for poverty as dependent variables and population, CO2 proxy of pollution and

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time as independent variables. All variables were measured in log form. For empirical analyses OLS and least square dummy variables method were used. The results showed that population and air pollution has a significant effect on poverty.

Satya *et al.*, (2002) in his study “Population growth and poverty measurement” discussed that absolute number of poor influence the poverty rate. These measures relate to standard measures and are applicable in empirical and policy work.

2.3. Economic growth and poverty

Anwar (2010) in his study “Role of growth and inequality is explaining changes in poverty in Pakistan” investigates the relationship between role of growth, unequal income distribution and poverty with the help of poverty decomposition methodology. There exist long run relationship between the variables, growth, unequal income distribution and poverty over the period 1998-1999 to 2001-2002. Results of the 1998-1999 to 2001-2002 showed that growth components contributed adversely to the rise in poverty over this period and redistribution components has benefited only the urban areas and adversely affected the poor in rural areas.

Romer *et al.*, (1997) in his study “Does Economic Growth reduce Poverty” established the relationship between growth and poverty. He used the annual data 1970-1996. Results of the data show that economic growth is one best ways for poverty reduction. Study explained that those countries grow quickly, leading to greater poverty alleviation. Fosu (2010) in his study “Growth, Inequality and Poverty reduction in developing countries” investigate the relationship between these variables. For this purpose he used the period 1981-1995 and 1996-2005. He estimates elasticity for the 80 underdeveloped countries. Elasticity of these countries informs us that reduction in poverty is response to increasing growth.

Bigsten *et al.*, (2000) in his study “Growth, Income and poverty” discussed the relationship between economic growth, income distribution and poverty. He used the annual data from 1987-1998. Results show negative relation between economic growth and poverty. The main point of this study “without growth in per capita income, poverty always remains in poor countries”.

Ali *et al.*, (1999) in their study “Dynamics of growth, poverty and inequality in Pakistan” established the relationship between growth, poverty and income. For this purpose data were used 1963-1964 to 1993-1994 and the study applies OLS and Cochran-orcutt iterative methods. Results of the data show that in rural areas poverty reduces by adopting growth oriented policies and these policies are especially applicable when inequalities reduce. In urban area growth is more important and policies to address inequalities would be relevant after the growth policies.

2.4. Unemployment and poverty

Simbowale (2005) in his study “Macro econometric analysis of growth, unemployment and poverty in Nigeria” discussed the impact of macroeconomic policies on poverty in Nigeria during the period 1970-2000. For the analysis of data they used three regression equation methods. Results of the model show that for poverty alleviation and unemployment reduction, economic growth is a necessary but not a sufficient condition.

Sackey *et al.*, (2007) in their study “Human resources underutilization in an era of poverty reduction : An analysis of unemployment and under employment in Ghana” discussed that unemployment is a major problem in urban area than rural Ghana. He established the relationship between human resources underutilization and its determinants. Data was collected by Ghana statistical services during the period of 1992-1999. Research shows positive relationship between unemployment rate and poverty reduction. This sturdy stressed that

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unemployment, lack of education and small farm sizes are major determinants of unemployment.

Islam (2004) in his study “the Nexus of economic growth employment and poverty reduction” established the relationship between growth, poverty and employment. He selected (Bangladesh, Bolivia, Ethiopia India Indonesia Uganda and Vietnam), and a cross country analysis shows that growth is related with poverty reduction with different outcomes such as growth rate improve labour market and employment level.

Mahmood (2005) discussed the poverty reduction strategies in Pakistan. The paper explained that in Pakistan labour market situation, unemployment levels and rate of total employment are not useful determinants of poverty.

2.5. Remittances and poverty

Shafiq *et al.*, (2012) discuss the effect of foreign remittances and economic growth on poverty in Pakistan. Annual time series data was used during 1978 to 2010. Jhonson Juselius co-integration test was applied and results show that foreign remittances and economic growth have negative impact on poverty reduction in the long run.

Javeed *et al.*, (2012) discuss the impact of remittances on economic growth and poverty reduction in Pakistan. Data was collected from the period of 1973 to 2010. ARDL approach was applied and results of the data shows that remittances have a strong and statistical significant impact on poverty reduction.

Acharya (2012) used the data of living standards measurement survey (LSMS) for Nepal and results show that remittances decreases the head count poverty 2.3% in first round and 7.6% in second round.

Adams *et al.*, (2005) established the relationship between migration, remittances and poverty in developing countries. Data was collected for migration, remittances and poverty from 71 developing countries for year 1980. Results show that migration and remittances significantly reduce poverty in developing countries.

Asiedu *et al.*, (2009) discussed the impact of remittances on poverty reduction in Ghana. He used cross sectional data from Ghana living standards survey and pseudo annual data. Results of this paper shows that foreign remittances reduce poverty better than domestic remittances.

3. Methodology and results

3.1. Data sources

In this study we used time series data on poverty, literacy rate, rural population, unemployment rate and worker remittances. We used 33 years data from 1987-2011. Data have been collected from Pakistan economic survey, State Bank of Pakistan and World Bank data.

3.2. Model specification

To check the relationship between variables we used suitable functional form such as;

$$Y = \alpha_1 + \alpha_2 X_1 + \alpha_3 X_2 + \alpha_4 X_3 + \alpha_5 X_4 + \alpha_6 X_5 + \mu$$

Where

Y= povhr=Head count ratio proxy for poverty

X1=gdp= Gross Domestic product

X2= lit= Literacy rate

X3= unem= Unemployment rate

X4= rul= rural population

X5= remit=Worker remittances

μ = error term

$\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ are parameters of the model

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3.3. Variables definition

Poverty: Poverty is a relevant topic for countries like Pakistan. We take head count ratio as a proxy of poverty. Head count ratio can be measured by taking the proportion of population by national poverty line. In this study we established the relationship of poverty with economic growth, education, population, worker remittance and unemployment by using the annual data from 1978-2011 in case of Pakistan.

Economic Growth: In this study we use GDP per capita income as a proxy for economic growth. In this study we established the link between poverty and economic growth by taking time series data from 1978-2011.

Unemployment: We also take unemployment rate (as a percentage of GDP). Total numbers of unemployed worker are divided on total labor force.

Education: In this study we take literacy rate as a percent of GDP, as a proxy of education. Many studies provided strong relationship between poverty reduction and literacy rate. Present study investigates whether a trade off exists in education and poverty in case of Pakistan by using the period 1978-1980.

Remittances: We take worker remittance as a percent of GDP. In general all economists or researchers agree on this point that remittances reduce poverty. By using the annual data from 1978-2011, we estimate that remittances are positively or negatively related with poverty.

Population: We also take rural population as a proxy of population. Population is also a major problem of underdeveloped countries like Pakistan.

3.4. Methodology

To solve the research problems of this paper we used different econometric methods and techniques.

To check the relationship between existing variables we used Fully Modified Ordinary Least Square (FMOLS) technique. This method shows how different macro-economic variables reduce poverty in Pakistan. FMOLS method shows correlation effects and endogeneity test of least square in dependent variables. According to econometricians FMOLS method applicable if variables are stationarity at first difference. Stationarity at first difference also shows that long run relationship exist in these variables. To test the stationarity we used ADF test. If data stationarity exists both at level and at first difference then according to researcher's most appropriate techniques is Johansen Cointegration techniques.

The vector error correction model in general form

$$W_t = \sum \Psi W_{t-1} + \alpha$$

$$\Delta W = \sum \gamma_i \Delta W_{t-k} - \delta W_{t-k} + \alpha + \varepsilon$$

Now;

$$\delta_t = -I + \delta_1 + \delta_2 + \dots + \delta_k$$

$$i = 1, 2, 3, 4, \dots, k$$

and

$$\delta = I - \delta_1 - \delta_2 - \dots - \delta_k$$

Where, γ is a matrix that represents the relationship between of the variables in the long run. Δ differencing factor such as $\Delta W = W_t - W_{t-1}$

3.5. Empirical findings

Table 1. To check the normality of the data by the descriptive statistics

	LPOVHR	LGDP	LLIT	LREMIT	LRUR	LUNEM
Mean	3.186996	1.467901	3.649502	1.334215	4.406155	1.595474
Median	3.148882	1.504077	3.648057	1.360977	4.465333	1.688249
Maximum	3.514526	2.197225	4.060443	2.312535	4.716890	2.116256
Minimum	3.005683	0.530628	3.202746	0.095310	4.025029	1.115142
Std. Dev.	0.141282	0.453532	0.286878	0.556070	0.212296	0.302200
Skewness	0.672668	-0.392412	-0.022004	-0.296599	-0.253735	-0.132575
Kurtosis	2.365525	2.352137	1.589173	2.547087	1.755587	1.841307
Jarque-Bera	3.042171	1.424053	2.739508	0.765893	2.483373	1.942704
Probability	0.218475	0.490649	0.254170	0.681849	0.288897	0.378571
Sum	105.1709	48.44074	120.4336	44.02909	145.4031	52.65063
Sum Sq. Dev.	0.638741	6.582135	2.633567	9.894828	1.442223	2.922395
Observations	33	33	33	33	33	33

In the table we check the normality of the data by using the descriptive statistics. For this purpose we check the skewness values that must be close to zero for normality of the data after we check the Kurtosis values that must be near to 3. Jarque-Bera values that shows the data follows normality. J-B values is greater than 0.1 that shows data is normally distributed.

Table 2. Unit root estimation

Variables	ADF at level		ADF at 1 st difference	
	t-values	Prob-value	t-values	Prob-value
GDP	-1.999051	0.2852	-8.820068	0.0000
Lit	-0.959145	0.7560	-5.909287	0.0000
Unem	-1.865108	0.3439	-5.633156	0.0001
Rul	-1.412684	0.5612	-5.570129	0.0001
Remit	-2.341915	0.1655	-6.394083	0.0000
Povhr	-2.528840	0.1205	-5.596320	0.0001

In the above table we check the stationarity of the data by using the Augmented Dicky Fuller (ADF) test apply. In this situation we check the stationarity at the level and at 1st difference, results as shown in the above table. For GDP, ADF value is (-1.999051) that is less than critical values (-3.737853,-2.991878,-2.63554) at 1%, 5%, 10%. After applying unit root test at level and at 1st difference, all variables is insignificant at level and significant at 1st difference.

If ADF statistics value is greater than critical value we reject the hypothesis and if ADF test statistics value is less than critical value then we accept the hypothesis. For this purpose we used lag values, that make better fit of the model though level of degrees of freedom reduce. For the best fit of the model and selection of the lag length depends upon the values of Akaike Information Criteria (AIC) and Schwarz- Bayesian Criteria (SBC). For this purpose we test the VAR lag selection Criteria as shown in table 3 after checking the stationarity at level and at 1st difference in table 2.

Table 3. VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria						
Endogenous variables: LPOVHR LGDP LLIT LREMIT LRUR LUNEM						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	52.68207	NA	1.61e-09	-3.219453	-2.936564	-3.130856
1	179.3138	192.1308*	3.29e-12*	-9.469914*	-7.489693*	-8.849733*
2	206.3294	29.81037	8.71e-12	-8.850304	-5.172749	-7.698540

Notes: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion.

We used lag length 1 because minimum value of Akaike Information Criteria (AIC) is achieved. To check the long period relationship between the variables we used J-J test.

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Table 4. Johansen First Information Maximum Likelihood Test for Co-integration

Hypothesis	TraceStatistic	5% Critical Value	Prob-value	Hypothesis	Max-Eigen statistics	5% Critical Value	Prob-value
P=0	134.7280	95.75366	0.0000	P=0	53.10604	40.07757	0.0010
At most 1	81.62194	69.81889	0.0043	At most 1	31.70994	33.87687	0.0887
At most 2	49.91201	47.85613	0.0316	At most 2	21.54940	27.58434	0.2444
At most 3	28.36261	29.79707	0.0725	At most 3	16.41248	21.13162	0.2017
At most 4	11.95013	15.49471	0.1593	At most 4	7.545357	14.26460	0.4268
At most 5	4.404775	3.841466	0.0358	At most 5	4.404775	3.841466	0.0358

Notes: Trace test indicates 1 cointegratingeqn(s) at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values.

In the above table we apply J-J test results in which we take poverty as a dependent variable. For showing the long run relationship between variables such as GDP, Unemployment rate, literature, worker remittances and poverty in Pakistan we used max-Eigen values. In J-J test we used the trace test values and Max-Eigen values with their critical values. If calculate values is greater than critical values then test is significant. As result of the above table shows that a value of Max-Eigen (53.10604) is greater than critical value 40.07757. So we reject the null hypothesis at 5% level of significance and so on. The trace test value 134.7280 that are greater than critical values 95.75366 at 5% level of significance. So we reject the null hypothesis that is $P \leq 0$ and so on.

Table 5. Long run Correlations

Dependent Variable: LPOVHR				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP	0.045558	0.051200	0.889802	0.3814
LLIT	1.073058	0.372695	2.879183	0.0077
LREMIT	-0.073825	0.039173	-1.884565	0.0703
LRUR	-1.744646	0.499374	-3.493665	0.0017
LUNEM	0.070862	0.132771	0.533718	0.5979
C	6.876613	0.976801	7.039931	0.0000
R-squared	0.472555	Mean dependent var		3.186996
Adjusted R-squared	0.374880	S.D. dependent var		0.141282
S.E. of regression	0.111704	Akaike info criterion		-1.382961
Sum squared resid	0.336901	Schwarz criterion		-1.110869
Log likelihood	28.81886	F-statistic		4.838030
Durbin-Watson stat	2.049879	Prob(F-statistic)		0.002751

The above table values explain that macroeconomics variables are highly correlated with poverty in Pakistan. Economic growth is insignificantly related with poverty in Pakistan. Literacy rate is positively and significantly correlated with poverty. Worker remittances is important factor in this study as it has also a negative and significant effect on poverty. Above results shows that 1% increases in remittances will reduce poverty by 0.0738%. Rural population is another important factor in this study. According to results 1% increases in rural population will reduce 1.774% poverty in Pakistan. This result suggests poverty is more of an Urban phenomenon and investments in agriculture would reduce poverty. Unemployment is positively related with poverty. Its mean when rate of unemployment increase that increase the level of poverty in Pakistan. 1% unemployment increase leads to increase in poverty by 0.0708%.

To determine the relationship of the variables in the short run we use equation as,

$$\Delta Y = \alpha_1 + \alpha_2 \Delta X_1 + \alpha_3 \Delta X_2 + \alpha_4 \Delta X_3 + \alpha_5 \Delta X_4 + \alpha_6 \Delta X_5 + \xi$$

Where,

$\Delta Y = \text{povhr} =$ change in poverty

$\Delta X_1 = \text{gdp} =$ change in Gross Domestic product

$\Delta X_2 = \text{lit} =$ change in Literacy rate

$\Delta X_3 = \text{unem} =$ change in Unemployment rate

$\Delta X_4 = \text{rul} =$ change in rural population

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$\Delta X_5 = \text{remit} = \text{change in Worker remittances}$
 $\xi = \text{error term}$

Table 6. Short run Correlations

Dependent Variable: DPOVHR				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP	-0.130904	0.157981	-0.828601	0.4155
DLIT	0.312723	0.399414	0.782955	0.4413
DREMIT	-0.318794	0.280419	-1.136847	0.2668
DRUR	0.000672	0.151495	0.004433	0.9965
DUNEM	0.255397	0.508039	0.502712	0.6197
RES	7.855159	4.161911	1.887392	0.0713
C(-1)	-0.605142	0.613372	-0.986583	0.3337
R-squared	0.171062	Mean dependent var		-0.282903
Adjusted R-squared	-0.036172	S.D. dependent var		1.989340
S.E. of regression	2.025000	Akaike info criterion		4.444696
Sum squared resid	98.41498	Schwarz criterion		4.768499
Log likelihood	-61.89278	Hannan-Quinn criter.		4.550248
Durbin-Watson stat	1.807769			

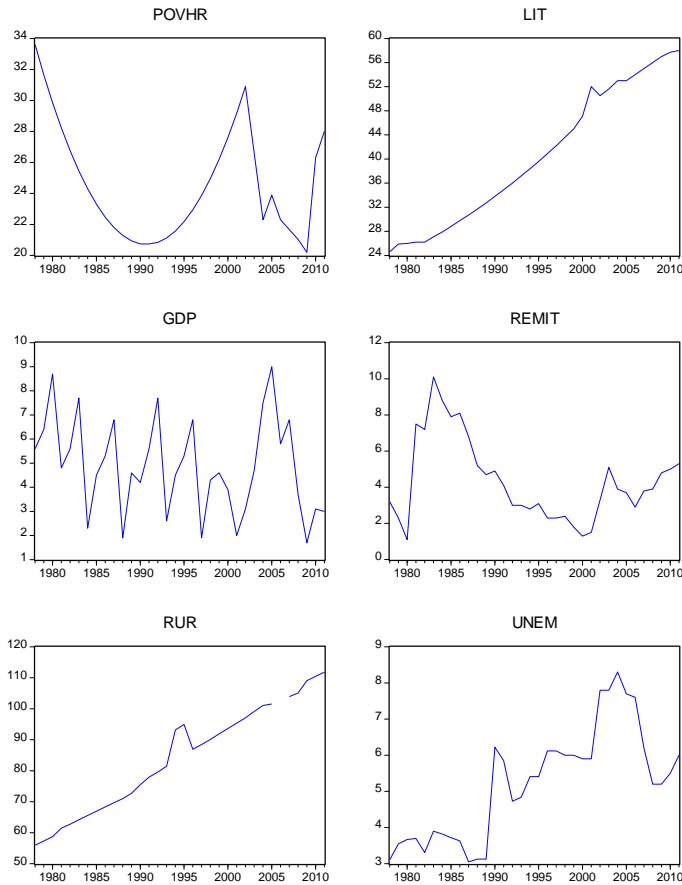
To check the relationship between variables in the short run we apply Error Correction Model (ECM) techniques. Economic growth negatively and significantly related with poverty. It means 1% percent increase in GDP that reduce poverty by 0.13%. Literacy rate is positively and insignificantly correlated with poverty. Above results shows that 1% increase in remittances will reduce poverty by 0.318%. Rural population is an important factor in this study. Rural population has positive and insignificant impact on poverty reduction. According to results 1% increases in rural population will increase 0.00067% poverty in Pakistan. Unemployment is positively and insignificantly related with poverty. Its mean when rate of unemployment increase that increase the level of poverty in Pakistan. 1% unemployment increase that increase poverty by 0.255%. Unemployment

4. Conclusion and recommendations

On the basis of the results, some recommendations are suggested to policy makers for poverty reduction in Pakistan. These may be help governments in policy formulation.

Government should adopt those strategies that obtain sustainable economic growth. Government should also pay main attention on those sectors that are labor intensive like agriculture sector because Pakistan is labor abundant country. They should improve skills of labor as well as implement laws that lead to labor income increase which in turn reduces poverty in Pakistan. Literacy sector is main factor for poverty reduction. So investment by Government in education sector through public private partnerships make economic policies sustainable for poor people. Improving student's academic abilities and their technical skills also improve poverty profile of the country. Such policies would also help reduce unemployment that has positive impact on poverty reduction in Pakistan.

Appendix
Trend of the Variables



Name	Statistics/Function
Mean	$\bar{y} = \frac{1}{T} \sum_{t=1}^T y_t$
Standard deviation	$s = \sqrt{\frac{\sum_{t=1}^T (y_t - \bar{y})^2}{(T-1)}}$
Population variance	$\sigma^2 = \frac{T-1}{T} s^2$
Standard error (Std Err)	Std Err = s/\sqrt{T}
Skewness	$S = \frac{1}{T} \sum_{t=1}^T \left(\frac{y_t - \bar{y}}{s\sqrt{(T-1)/T}} \right)^3$
Kurtosis	$K = \frac{1}{T} \sum_{t=1}^T \left(\frac{y_t - \bar{y}}{s\sqrt{(T-1)/T}} \right)^4$
Jarque–Bera	$JB = \frac{T}{6} \left(S^2 + \frac{(K-3)^2}{4} \right)$, where S = skewness and K = kurtosis
Standard normal	$z = \frac{\bar{y} - \mu_0}{\sigma/\sqrt{T}}$
Chi-squared-statistic	$\chi^2 = \frac{(T-1)s^2}{\sigma^2}$, with $df = T - 1$
F-statistic	$F = s_1^2/s_2^2$, with $df = (T_1-1, T_2-1)$
Autocorrelation y at lag k , in EViews 6	$\rho_k = \frac{\sum_{t=k+1}^T (y_t - \bar{y})(y_{t-k} - \bar{y}_{t-k})}{\sum_{t=1}^T (y_t - \bar{y})^2/T}$ where $\bar{y}_{t-k} = \sum y_{t-k}/(T-k)$
Partial autocorrelation y at lag k	Regressed y_t on $C, y_{t-1}, \dots, y_{t-k}$

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