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COMPARISON OF STANDARD OF LIVING BETWEEN PAKISTAN AND BANGLADESH

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ABSTRACT

The prime objective of this study was to analyze the Economic, Social and Environmental factors that affected the overall standard of living (SOL) in Pakistan and Bangladesh. The study used the bound testing approach to co-integration ARDL for analyzing the relationship between the variables. Also, a straight forward relatively simple formula was used to work out the growth rate of the standard of living of Pakistan and Bangladesh. The result showed a positive relationship between gross domestic product and real per capita income in both countries, while consumer price index and population have negative and significant impact on real per capita income in Pakistan and Bangladesh. Political rights and carbon dioxide emission per capita have significant impact in Pakistan, but insignificant impact on real per capita income in Bangladesh. This study has also determined standard of living growth rate of different government's regimes in Pakistan during 1980 to 2012 and found that Pervez Musharraf regime was the best regime as far as the growth rate of the SOL is concerned which was noted to be 2.07% (Table 3). In the light of our findings it is appropriate to suggest that the governments should formulate and implement policies to combat inflation in both countries. The governments should use suitable fiscal and monetary policies to increase GDP growth rate and discourage setting up of pollution intensive industries for cleaner environment. Political freedom and minorities' rights should also be given to minorities. Furthermore, provision of leisure, safety of life and property, political freedom, freedom of speech and media, cleaner environment and the like are to be ensured because they are part of the SOL.

Keywords: Standards of living, Real per capita income, Political rights, CO_2, ARDL, ECM

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Contribution/ Originality

The main contribution of this research paper is to find and compare the effects of Economic, Social and Environmental factors on standard of living in Pakistan and Bangladesh. New estimation methodology is used to calculate the growth rate of standard of living in Pakistan and Bangladesh.

1. INTRODUCTION

Standard of living is defined as the existence of welfare level for individual or society, it relates to goods and services that people are able to consume and have approach to the resources. It is depends on the quality and quantity of existing goods and services and the way they are distributed within a nation (Cvrlje and Coric, 2001). The idea of the "standard" may be contrasted with the quality of life which takes into account not only the material standard of living but also other major intangible aspects such as leisure, safety, political freedom, social life, environment and the like. The standard of living of a country refers to real national income per person. A country with a higher per capita real national income is considered to be enjoying a better standard of living as compared to other nations. When real per capita income increases the standard of living raises and vice versa.

The following show improvement in a country's standard of living over time

(i) A rise in per capita real national income. (ii) A rise in the percentage of the population owning consumer durable goods such as cars, TVs. and telephone etc. (iii) A reduction in the amount of time taken by the average worker to earn enough money to buy given goods. (iv) A reduction in the amount of pollution in a country

There are economic, social and environmental indicators that are used to compare standard of living among countries. The economic indicators are total GNP of the countries, per capita real GNP, growth in real per capita GNP, Headcount index, poverty gap, income distribution, and an unequal distribution of income. The social indicators are adult literacy rate, life expectancy at birth, infant mortality rate, the suicide rate, the crime rate, durable consumer goods such as cars, television sets, telephones per thousand of population, indoor plumbing and electricity and the number of patients per doctor. In environmental indicators the amount of pollution and environmental degradation in the countries are also taken into account for the said purpose.

People living in the developed economies of the world enjoy a higher standard of living and quality of life than people living in developing or transition economies. Pakistan and Bangladesh both are Islamic, developing countries located in South Asian region. Bangladesh remained the part of Pakistan till 1970 and had been known as "East Pakistan". In 1971, Bangladesh declared independence from Pakistan. The standard of living in both countries varies between different segments of the society and both are ranked 146^{th} out of a list of 186 countries (Human Development Report, 2013).

The standard of living of a country is calculated using the following formula.

Real per capita income=Standard of living= (Real National Income)/Population

Where

Real national income= Money national income × (Base year price index)/(Current year price index)

In order to determine the rate of change in the standard of living, the following symbols are used.

S = (G/C)/P where

S = Standard of living (= average real per capita income)

R = Real income = Nominal GDP/CPI = G/C

G = Gross Domestic Product (GDP)

C = Consumer Price Index

P = Population

R/P = Real per capita income

Standard of Living = (G/CPI)/Population =(Real GDP)/Population

Taking the natural logarithm of the above expression we get:

$$LnS = LnG - LnC - LnP$$

$$Differentiating\ it \text{ with respect to time we get:}$$

$$\frac{1}{S}\frac{dS}{dt} = \frac{1}{G}\frac{dG}{dt} - \frac{1}{C}\frac{dC}{dt} - \frac{1}{P}\frac{dP}{dt} \quad where$$

$$\dot{S} = \frac{1}{S}\frac{dS}{dt} = rate\ of\ growth\ of\ the\ satndard\ of\ living$$

$$\dot{G} = \frac{1}{G}\frac{dG}{dt} = rate\ of\ growth\ of\ nominal\ GDP$$

$$\dot{C} = \frac{1}{C}\frac{dC}{dt} = rate\ of\ growth\ of\ inflation$$

$$\dot{P} = \frac{1}{G}\frac{dP}{dt} = rate\ of\ growth\ of\ population$$

$$\dot{S} = \dot{G} - \dot{C} - \dot{P} \quad putting\ the\ respective\ values, we\ get\ the\ desired\ result.$$

The growth rate of population $\dot{P}$ was calculated using the following formula.

$$\dot{P} = \left\{\left[\frac{V_n}{V_0}\right]^{\frac{1}{N}} - 1\right\}100 \quad where\ V_0 = initial\ value,\ V_N = last\ value$$

$$N = number\ of\ years$$

Table-1. Basic Statistics of Pakistan and Bangladesh (2013)

Indicator	Pakistan	Bangladesh
Population	182,490,721	150,039,000
GDP (PPP)	$574.068 billion	$324.628 billion
Per Capita GDP (PPP)	$3,144	$2,083
GDP (Nominal)	$236.518 billion	$153.58 billion
Per Capita GDP (Nominal)	$1,295	$1,044
Gini	30.0	32.1
HDI	0.515	0.515
Inflation Rate	8.53	7.50

Sources: World Population Prospects United Nations Population Division (2013), International Monetary Fund, World Bank, (Human Development Report, 2013), Pakistan Bureau of Statistics and Bangladesh Bureau of Statistics

During the last century, the size of world population has gone through some dramatic changes. According to United Nation 2004 report, world population grew from 1.6 billion and it's expected to reach 9.3 billion by the year 2050. Both Pakistan and Bangladesh are most populous countries in Islamic world after Indonesia. The impact of population level on the standard of living of a country has remained a debatable issue for researchers. The association among population level and per capita income could be considered as positive if the country is under populated, then growing population in a country pushes its production possibility curve outward which leads to more competition in business activities and motivates the market growth. On the other hand, the relationship could be considered as negative when the growing population (over populated country) becomes an obstacle to country economic development because the quick expansion of population leads towards dependency burden (Faruoka and Munir, 2011).

The outgoing century has been the century of persistent inflation in the countries. Both countries have had a variety of experience regarding persistent inflation. Inflation is one of the major problems of these countries. Both countries have suffered from the ill effects of inflation. The poor and fixed income groups have been badly affected by inflation. High rate of inflation produces inequalities in a country as well as diminishes the economic growth. Higher rate of inflation hurt growth and inhibits financial development in the country. Inflation affects the people's daily life and standard of living. In Pakistan, standard of living of middle class people decreased in 2011 as compared to 2010 due to the inflation because their purchasing power (real income) decreased while nominal income did not increase proportionately (Farid *et al.*, 2012).

A rise in Inflation rate (CPI) decreases the real GDP which in turn decreases the SOL (standard of living is real per capita income) *ceteris paribus*. So, when real per capita income decreases then tax paying ability decreases which in turn decreases the overall tax collection of the country. Less tax collection means less income available for expenditure on welfare and environment improvement policies. This results in reduction in the overall standard of living of a country. Ahmed and Mortaza (2005); Barro Robert (1995); Bruno and Easterly (1995); Fischer (1993) Motley (1994) and Mubarik (2005) came up with conclusion that inflation adversely impact economic growth of a country. Erbaykal and Okuyan (2008); Grimes (1991); Hussain (2011) and Raza *et al.* (2013) found the positive correlation between inflation and economic growth.

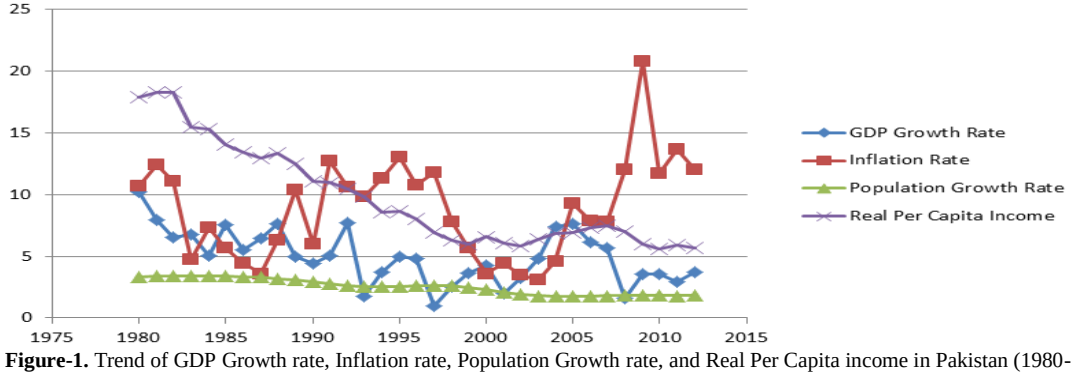

Figure-1. Trend of GDP Growth rate, Inflation rate, Population Growth rate, and Real Per Capita income in Pakistan (1980-2012)
Source: International Financial Statistics, Hand Book of Statistics (State Bank of Pakistan)

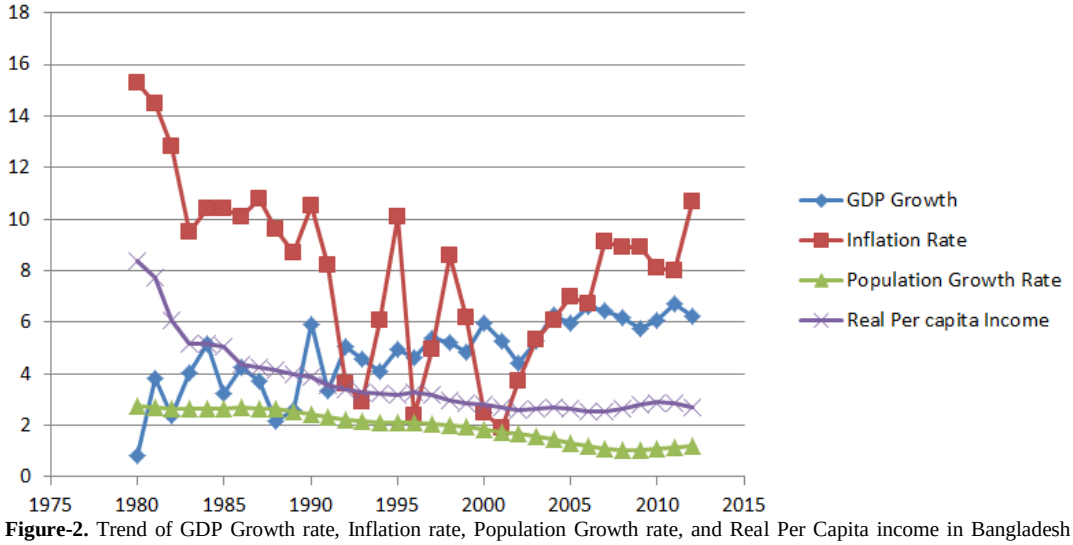

Figure-2. Trend of GDP Growth rate, Inflation rate, Population Growth rate, and Real Per Capita income in Bangladesh (1980-2012)
Source: International Financial Statistics, Bangladesh Bureau of Statistics

The composite impact of growth of CPI on the real per capita income (Standard of living) is clearly visible for the downward trend of the real per capita income in figure 1, 2 and 3.

Table-2. GDP, CPI and Total Population of Pakistan and Bangladesh (1980-2012)

Years	Pakistan			Bangladesh		
	GDP	CPI	Total Population	GDP	CPI	Total Population
1980	23689697676	16.47525271	80492664	18138049096	26.31	82498440
1981	28100606600	18.43249849	83280137	19714565483	30.15	84764142
1982	30725972228	19.52066635	86187238	18050898204	34.03	87060582
1983	28691890865	20.76257768	89200001	17184680135	37.27	89399666
1984	31151825048	22.0264304	92300277	19591480000	41.15	91804318
1985	31144920867	23.26317905	95470380	21613230769	45.46	94287722
1986	31899072715	24.07888248	98710951	21089700000	50.08	96851505
1987	33351526336	25.20606759	102011892	23474548387	55.51	99476987
1988	38472741071	27.43376397	105332464	25638749373	60.88	102133217
1989	40171021120	29.58574104	108621443	27744487300	66.19	104779345
1990	40010425587	32.26388124	111844679	30495081542	73.16	107385847
1991	45451961234	36.0682027	114970102	30957445429	79.22	109934590
1992	48635242274	39.49794305	118010303	31293826880	82.09	112430968
1993	51478354558	43.43733548	121029915	32063807158	84.54	114897543
1994	51894795658	48.80974957	124121817	33853081792	89.74	117369492
1995	60636071684	54.83461933	127346713	37939752960	98.81	119869585
1996	63320170084	60.52305778	130737306	40666015641	101.24	122400896
1997	62433340468	67.40785391	134255952	42318799294	106.26	124945315
1998	62191955814	71.60601785	137808222	44091754148	115.45	127478524
1999	62973855719	74.57239537	141261069	45694072379	122.58	129966823
2000	73952374970	77.8287217	144522192	47124925462	125.63	132383265
2001	72309738921	80.27897334	147557907	46987842847	128.02	134729503
2002	72306820396	82.9204283	150407242	47571130071	132.79	137006279
2003	83244801093	85.33684128	153139895	51913661485	139.9	139185986

Continue

2004	97977766198	91.68984883	155860066	56560744012	148.44	141235035
2005	109600000000	100.00	158645463	60277560976	158.89	143135180
2006	127500000000	107.9210844	161513324	61901116736	169.65	144868702
2007	143171182643	116.121667	164445596	68415421373	185.1	146457067
2008	163891692022	139.678249	167442258	79554350678	201.58	147969967
2009	161819031346	158.7412083	170494367	89359767442	212.51	149503100
2010	176477528501	180.7762965	173593383	100357022443.833	229.78	151125475
2011	210216197942	202.3189909	176745364	111879121730.817	254.38	152862431
2012	152553112769	148.6394655	179820926	116355057337.05	280.72	154695368
Growth Rate[4]	5.99	7.11	2.54	5.98	7.67	1.98

Sources: World Development Indicators 2013, Pakistan Bureau of Statistic, Bangladesh Bureau of Statistic

The formula for standard of living growth rate can be written as

$\dot{S} = G\dot{D}P - C\dot{P}I - \dot{P}$

Where the dot shows the rate of growth over time. Substitution of the respective values from Table 2 shows that the overall standard of living registered a downward trend both for Pakistan and Bangladesh. It was -3.66% and -3.67%, respectively, for the countries under discussion. It is somewhat surprising that both countries showed almost the same (negative) growth ratio of 3.6%. The population growth rate of Pakistan was higher than Bangladesh by a small margin of 0.56% while the growth rate of inflation in Bangladesh was higher than Pakistan by a thin margin of 0.56%.

Table-3. Growth Rate of the Variables (%)

Regime	Standard of living	GDP	Population	Inflation
Zia-ul-Haq[1] (1980-1988)	-3.75	6.24	3.41	6.58
Benazir Bhutto (1988-1990)	-9.54	1.97	3.04	8.44
Nawaz Sharief (1990-1993)	-4.26	8.67	2.63	10.30
Benazir Bhutto (1993-96)	-7.07	7.07	2.57	11.57
Nawaz Sharif (1997-1999)	-7.32	0.43	2.57	5.18
Pervez Musharraf (1999-2008)	**+2.07**	**11.09**	**1.88**	**7.14**
Asif Ali Zardari (2008-2013)	-5.12	1.77	1.79	1.56
Nawaz Sharif (June 2013- to date)	Yet to be seen	-	-	-

Source: Authors' own calculations

It would also be of interest to know that during Muhammad Zia-ul-Haq (1980-88) regime the standard of living growth rate was -3.75% while in Benazir Bhutto (1988-90) first term, it was -9.54%, in Nawaz Sharif (1990-1993) first tenure it was -4.26%, in Benazir Bhutto (1993-96) second term it was -7.07%, in Nawaz Sharif (1997-99) second regime it was -7.32%, in Pervez Musharraf (1999-2008) regime it was +2.07% due mainly of highest GDP growth rate and low inflation rate. During Asif Ali Zardari regime it was -5.12%.

[1] Zia-ul-Haq Period starts from 1977 but we consider his period from 1980 due to our data set range.

2. METHODOLOGY

The study is based on annual time series data from 1980 to 2012. It includes real per capita income as the proxy of standard of living and takes economic, social and environmental variables as independent variables for Pakistan and Bangladesh model. Data was obtained from Hand Book of Statistics of Pakistan's economy (SBP), Bangladesh Bureau of Statistics and International Financial Statistics (IFS).

Following are the econometric models used for each country.

(i). Model 1 for Pakistan

$$RPCI= \beta_0 + \beta_1 L_NGDP + \beta_2 L_NCPI + \beta_3 L_NPOP + \beta_4 PR + \beta_5 L_NCO_2PC + u_t$$

(i). Model 2 for Bangladesh

$$RPCI= \beta_0 + \beta_1 L_NGDP + \beta_2 L_NCPI + \beta_3 L_NPOP + \beta_4 PR + \beta_5 L_NCO_2 PC+ u_t$$

RPCI, L_NGDP, L_NCPI, L_NPOP, PR, L_NCO_2PC and μ_t respectively, represent real per capita income, Natural Log of GDP, Natural Log of consumer price index, Natural Log of Population, Political rights, natural Log of CO_2 Emission per capita and the error term.

The variables included in the study are time series and each variable could be I (0), I (1) or I (2). If ordinary least square (OLS) technique applied on non-stationary series then result could be spurious and in this situation the appropriate methodology is ARDL co-integration approach (Asad *et al.*, 2011). This is the attractiveness of ARDL that it can be used without inspection the integrated order but it is compulsory to check the existence of co-integration relationship among variables before applying the ARDL. The bound F-test was used to check the long run relationship among the variable and compared with the F statistics value provided by Pesaran *et al.* (2001).

i. Autoregressive Distributed Lag (ARDL) Approach

The ARDL approach consists of estimating the following equation:-

$$\Delta(RPCI)_t = \alpha + \sum_{i=1}^{n} \partial(RPCI)_{t-1} ++ \sum_{i=1}^{n} \beta\ \Delta(L_nGDP)_{t-1} + \sum_{i=1}^{n} \Psi\ \Delta\ (L_nCPI)_{t-1} + \sum_{i=1}^{n} \eta\ \Delta\ (L_nPOP)_{t-1} + \sum_{i=1}^{n} \delta\ \Delta\ (PR)_{t-1}\ +\ \sum_{i=1}^{n} \Omega\ \Delta\ (L_nCO_2PC)_{t-1} + \lambda_1\ (RPCI)_{t-1} + \lambda_2\ (L_nGDP)_{t-1} + \lambda_3\ (L_nCPI)_{t-1} + \lambda_4\ (L_nPOP)_{t-1} + \lambda_5\ (L_nPR)_{t-1}\ + \lambda_6\ (L_nCO_2PC)_{t-1}+\ \epsilon_i$$

The $\partial,\ \beta, \psi, \eta\ \delta$, and Ω show the short-run dynamics of the model and $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5, \lambda_6$ show the long-run relationship.

Firstly, bound test was constructed. The Bound F-test was applied to check the existence of long run relationship. Null hypothesis supposed that the long run coefficients are equal to zero and F-calculate was attained to compare with critical bound values presents by Pesaran *et al.* (2001).

The null and alternative hypotheses are:

H_0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = 0$, H_1: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq 0$

In second step if co-integration exists among the variables, then following long run model and Error Correction Model (ECM) is estimated.

$$(RPCI)_t = \alpha + \sum_{i=1}^{n} \partial(RPCI)_{t-1} + \sum_{i=1}^{n} \beta\ \Delta(L_nGDP)_{t-1} + \sum_{i=1}^{n} \Psi\ \Delta\ (L_nCPI)_{t-1} + \sum_{i=1}^{n} \eta\ \Delta\ (L_nPOP)_{t-1} + \sum_{i=1}^{n} \delta\ \Delta\ (PR)_{t-1}\ +\ \sum_{i=1}^{n} \Omega\ \Delta\ (L_nCO_2PC)_{t-1} + \epsilon_i$$

$$\Delta(RPCI)_t = \Omega + \sum_{i=1}^{n} \mathcal{L}\ (ECM)_{t-1} + \sum_{i=1}^{n} \beta\ \Delta(GDP)_{t-1} + \sum_{i=1}^{n} \Psi\ \Delta\ (L_nCPI)_{t-1} + \sum_{i=1}^{n} \eta\ \Delta\ (L_nPOP)_{t-1} + \sum_{i=1}^{n} \delta\ \Delta\ (PR)_{t-1}\ +\ \sum_{i=1}^{n} \Omega\ \Delta\ (L_nCO_2PC)_{t-1} + \epsilon_i$$

3. FINDINGS

Table 4. Result of bound F-testing

Critical values at 95% level of significance			F-calculated
	Lower bound I(0)	Upper bound I(1)	
Pakistan	2.45	3.61	5.40
Bangladesh	2.45	3.61	6.35

The result of bound F-test displays that the lower bound is 2.45 and the upper bound is 3.61 at 95% significance level. The calculated F-test value of Pakistan and Bangladesh compared with the bound is 5.40 and 6.35 respectively using intercept and no trend as presented by Pesaran *et al.* (2001). So null hypothesis of no co-integration is rejected and alternative hypothesis is accepted according to the F-Calculated value. So, the calculated result indicates that there is existence of co-integration among the variables and long run relation exist.

Table-5. Estimated Long Run Coefficients by using the ARDL approach

Variables	Coefficient		Standard Error		T-Ratio [Prob]	
	Pakistan	Bangladesh	Pakistan	Bangladesh	Pakistan	Bangladesh
L_NGDP	24.842*	7.383*	.7413	.6945	33.511[.000]	10.628[000]
L_NCPI	-17.693*	-7.370*	.8368	.9523	-21.142[.000]	-7.739[.000]
L_NPOP	-28.464*	-7.502*	.9348	.7332	-30.448[.000]	-10.231[.000]
PR	.1267*	.02178	.03473	.2112	3.655[.001]	1.031[.315]
$L_N CO_2$ PC	-14.186*	-1.674	1.9685	1.0995	-7.206[.000]	-1.527[.142]

*Shows the 1% significance of coefficients

Table-6. Estimated Result of ECM

Variable	Coefficient		Standard Error		T-Ratio [Prob]	
	Pakistan	Bangladesh	Pakistan	Bangladesh	Pakistan	Bangladesh
Ecm(-1)	-.32585	-.59562	.069459	.085416	-4.6913 [.000]	-6.9732[.000]

Long run results by ARDL indicate that GDP, CPI and population have high and significant impact on real Per capita income in both countries. GDP growth rate had positive impact on SOL while CPI and population have negative impact on real per capita income in Pakistan and Bangladesh. The coefficient value of Pakistan and Bangladesh L_NGDP shows that 1% increase in GDP brings 0.24 and 0.07 unit expansion in real per capita income, respectively. The coefficient values of L_NCPI , L_NPOP and $L_N CO_2$PC indicate that 1% increase in consumer price index, population and carbon dioxide emission per capita brings 0.17, 0.28 and 0.14 unit decline respectively, in Pakistan and 0.07, 0.075 and 0.016 unit decline in SOL in Bangladesh real per capita income. Political freedom has positive and significant impact on real per capita income in Pakistan while insignificant impact in Bangladesh. According to estimated coefficient of Pakistan political right shows that one unit increase in political rights leads to .12 unit expansion in real per capita income. Carbon emission per capita has negative and significant impact on real per capita income in Pakistan while it has insignificant role in Bangladesh. So, increase of CO_2 in environment is the cause of different diseases and diminishes the standard of living.

The ECM (Error correction Term) value of Pakistan and Bangladesh is -.32585 and -.59562 respectively which shows that 32 % and 59% convergence in short run to long run within a year.

4. CONCLUSIONS AND POLICY RECOMMENDATION

This paper has analyzed the Economic, Social, and Environmental factors that affect the overall standard of living in Pakistan and Bangladesh over the period 1980-2012. This study has also determined standard of living growth rate of different government's regimes in Pakistan during 1980 to 2012 and found that Pervez Musharraf regime was the best regime regarding improvement in the SOL. The estimated result shows that Gross Domestic Product growth rate had positive and significant impact on SOL while consumer price index and population growth rates had negative and significant adverse impact on real per capita income. Political rights and carbon dioxide emission per capita have significant impact in Pakistan but insignificant impact on real per capita income in Bangladesh. ECM coefficient shows 32 % and 59 % speed of adjustment in a year.

4.1. Policy Recommendations

Inflation causing factors must be controlled by the respective governments to combat inflation because inflation is adversely affecting the SOL in the countries under consideration. Government policy makers of the respective countries should give a top priority for controlling the inflation and enhancement of economic growth. Population must be controlled to reach optimum population level which gives us the highest real per capita income. Last but by no means the least, governments in the respective countries must formulate and implement the environment friendly policies because we should not focus only on raising the real per capita income but also focus on quality of life which includes other factors such as clean air, freedom of speech, justice for all, political rights, safety of life and property and the like.

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