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An Assessment of Sustainable Economic Growth: The Role of Poverty and Education Revisited

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ABSTRACT

This study intended to explore the linkage between education, poverty rates, and economic growth in Pakistan. Data for various variables have been collected from 1973 to 2017. After establishing the stationary process by utilizing the Augmented Dickey-Fuller Test the research used the (ARDL) Auto-Regressive Distributed Lag methodology to estimate the empirical relationships. This study took GDP as a dependent variable whereas independent variables are literacy, health, inflation, headcount ratio, export. The result concluded that Inflation and poverty are the determinants to hinder economic growth while Health, Exports, and literacy are statically significant and have a positive impact on economic growth. It is suggested that a keen focus should put to enhance the educational and health facilities so that higher growth can be achieved. Anti-poverty policies must be made that make them more productive so this will lead to the growth process.

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1. Introduction

An increase in growth rates can be attributed to the more efficient use of inputs that is the prior objective of every nation. It is an undeniable fact that in well-developed countries education (Psacharopoulos, 1994) has proved itself as the most effective one in minimizing poverty and boosting up economic progress, in term of raising national and private earnings, betterment in economic activities, and improvements in human capital (Afzal et al. 2010, 2012).

Pakistan as a developing country is struggling for its economic survival. However, Economic wellbeing is the prior object of every nation.

"The total adult literacy rate in Pakistan is 55% and primary school enrolment is 73%. Life expectancy at birth is 66 years (Male 65, female person 67), which is the lowest in comparison to south Asian countries. The proportion of population which has access to improved drink water and sanitation is 64% and Pakistan is spending 2.3% of its GDP on education."

Economic expansion is also depending on the equal distribution of resources in a nation. Poverty is a fundamental issue of Pakistan's economy like other less developed economies. Almost 39 percent of people survive poverty, as FATA and Baluchistan having the highest poverty rates. Pakistan's poverty rates depicted visible turndown, with a 55% to 39% decline from 2004 to 2016 with vary region to region in Pakistan.

The MDP Index employs a wide notion of poverty. It shows the deficiency of people understanding concerning psychological and objective health, literacy, and improved living standard .furthermore; it is a complete way of considering and alleviating poverty (Pakistan economic survey 2015-2016).

2. Literature Review

Heshmati (2006) investigated the Inequality and Poverty relationship with Globalization. The globalization index was built on data from 65 less developed countries. The globalization index was made of four sub-indexes. And they found no suggestions of a methodical association between inequality and trade.

Chaudhary and Rahman (2009) investigated the impact of gender inequality in education in Pakistan. Poverty was the dependent variable that had positively influenced independent variables. They used primary data and Logit regression analysis. There was an inverse relationship between gender inequality and educational attainment. Afzal (2009) examined the link between population and economic development in cross-national regions. The research was based on time series data from 1981 to 2005. The results showed that there was a negative relationship between population growth and economic growth.

Biggs et al. (2010) analyzed the association of population growth on growth based on cross-national empirical evidence of 78 countries from which 22 were developed nations and 56 were developing nations for the period 1960 to 1990. The study found a weak correlation between population growth and GDP per capita growth. And concluded many other factors are more significant than the population growth for economic growth. Fosu (2002) observed the income distribution effect to reduce poverty. A basic need approach was used in this research. Cross-sectional data were used for the analysis. The Headcount ratio is estimated that do not increase growth.

Ali and Sattar (2010) explored the cause and effect relationship between poverty, growth, and trade by using time series data from 1973 to 2009 for Pakistan. Their study is based on Error Correlation Models and Granger Causality to investigate the relationship. It is concluded that trade has a positive impact on economic growth but poverty hurts growth. Afzal et al. (2010) examined the relationship between education, poverty, and economic development in Pakistan. They examined that poverty was reduced by an increase in economic productivity. The Auto-Regressive Distributed lag (ARDL) approach was utilized for the parameter estimation using annual time series while the

stationarity was established by the Dicky|-Fuller test. Results showed a positive relationship between education and economic growth.

Mishra (1995), Marcius (1994), and Bojo and Ready (2011) emphasized the need to slow down the population growth for more productive investment and to attain a higher rate of economic growth. Nuruddeen et al. (2014) examined the association of Poverty, Inequality, and Economic growth in Nigeria. A unidirectional causal relationship was estimated between RGDP and poverty. And the evidence was established with literacy level increased by an increase in GDP.

Pervez (2014) observed the relationship between Education and poverty. Education is the main factor in economic growth. The results of the observation were that the development of nations depended on education. Hanif and Arshad (2016) observed the association between school education and Financial progress. The endogenous variable was growth and the regressor is education, inflation rate, and physical capital. Economic growth increased with improved education.

3. Theoretical Framework

(Solow and swan, 1956) the Solow growth model expresses the advances of growth of capital stock and Labor force out and technological advancement interrelate in an economy and their influence overall economic environment. The two main features of the Solow model are that Capital stock (k) determines the productivity in an economic system and saving rate (s) which controls the distribution of the consumption in different periods.

Poverty is one of the main problems fronting by almost all of the developing countries of the world. In the early 20th century as "earnings insufficient to obtain the minimum necessities for the maintenance of merely physical efficiency" (Rowntree 1901, quoted in Townsend, 1979). Poverty is measured by the following methods:

3.1 HeadCount Ratio

It is an extensively used method to measure poverty. As the total number of population living below the poverty line, a line distinguishes the poor from non-poor Sen (1976).

$$HCR = q/n$$

Where $HCR = \text{Head Count Ratio}$

$q = \text{total number of households living below poverty line}$

$n = \text{total number of households.}$

3.2 Poverty Gap Index

This measure computes the difference between real income and minimum non-poverty income. It controls the minimum income that is necessary to rise for each alive below the poverty line. It is expressed as;

$$g = Z - Y_i$$

$Z = \text{poverty line}$

$Y_i = \text{actual income of the poor}$

3.3 Sen Index

Sen presented that neither HCR nor PGI reflects the real situation of poverty so the individual poverty measurement index was introduced which comprise the distributional results. It accounts for the product of the Head Count Ratio and the poverty gap and coefficient of inequality.

$$P = H [I + G (1 - I)]$$

3.4 Foster Greer and Thornback Index:

This measure was presented in 1984 and many economists of the world use this index to measure poverty. It can have referred to as the extension of the Sen Index.

4. Methodological Design

4.1 Data Sources

Annual time-series data has been used for the analysis. Data for various variables Gross Domestic Product, Exports, Health, Headcount ratio, Education, and Inflation. Data has been collected from the Pakistan bureau of statistics, Pakistan economic survey, and world development indicators.

Table 1: Description of Variables

Variables	Description of Variables	Unit of Measure	Expected Sign	Source
GDP	Gross Domestic Product	Million		HBS
EX	Exports	Million	Positive	HBS
Health	Health	Million	positive	HBS
HCR	HeadCount Ratio	Million	Negative	ESP
EDU	Education	Total Students	Positive	WB
INF	Inflation	percentage	Negative	WB

Table 1 shows that the explanation of the variables selected for this research. Further, the measuring units and sources from which the data are taken are also mentioned in the table. The expected signs column expressed the relation of GDP with other variables, i.e. GDP has a negative or inverse relation with HCR.

4.2 Model Specification

The specification of the regression model for the variables: economic growth, poverty, education, exports, and inflation.

$$GDP = f(\text{poverty}, \text{education}, \text{inflation}, \text{exports},)$$

Model 1

Where:

GDP = total rate of economic growth

HCR = Head Count Ratio, the ratio of poverty

Exp = Exports of goods and services

Inf = Rate of inflation

Edu = total number of enrolled students

4.3 Empirical Econometric Model

To avoid any specification of bias the ARDL model is coming into operation. ARDL is

employed to examine the link between dependent and independent variables for a short and long period. The model is specified as under.

$$GDP_t = \gamma_0 + \sum_{i=1}^p \omega_{1i} \Delta HCR_{t-i} + \sum_{i=1}^p \omega_{2i} \Delta EXP_{t-i} + \sum_{i=1}^p \omega_{3i} \Delta INF_{t-i} + \sum_{i=1}^p \omega_{4i} \Delta EDU_{t-i} + \sigma_1 GDP_{t-1} + \sigma_2 HCR_{t-1} + \sigma_3 EXP_{t-1} + \sigma_4 INF_{t-1} + \sigma_5 EDU_{t-1} + \mu_{1t}$$

ARDL approach to co integrating has advantages the other integration techniques as it incorporates the I(o) and the I(1) at the same time but the Engle and Granger, Johansen can be applied as well.

4.4 Empirical Analysis

Empirical analysis has been done for both the descriptive and the econometric levels. Following table 2 shows the descriptive analysis of data that describes the mean, median, and other introductory information of the data.

Table 2: Statistics of Descriptive

	GDP	EX	Health	HCR	EDU	INF
Mean	4.8378	13.6476	0.7287	26.1935	10.5566	8.8530
Std. Dev	2.1819	2.3495	0.20406	4.8874	1.8104	4.1122
Skewness	0.2846	-0.1530	0.0305	1.1648	-0.0311	0.9845
Kurtosis	2.4483	1.9376	3.7483	3.8519	2.5679	4.3176
JB	1.0214	1.9861	0.9161	9.9985	0.3096	9.1220
Prob	0.6000	0.3704	0.6324	0.0067	0.8565	0.0104

Source: author's calculations using reviews 9.5.

4.4 Unit root analysis

Some basic econometric issues have been examined like the stationary of time series. Unit root measures, whether the mean and variance of the time series are constant or not? If the series has a constant mean the series is assumed to be stationary and non-stationary in another case of variant mean and the variance.

Table 3: Estimates of ADF

Variables	At level		At first Difference		Results
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
GDP	-4.2219	-4.6195*	-10.4726	-10.3283	I(0)
EX	-1.7400	-1.5142	-5.7384	-5.7752	I(1)
Health	-0.6945	-3.0504	-6.2733	-6.2640	I(1)
HCR	-3.4316	-2.6425	-4.0349*	-4.1093	I(1)
EDU	7.2370	3.2166	2.9600	0.79183	I(0)
INF	-3.2750	-3.2035	-7.1242*	-7.1553	I(0)

Source: author's calculations using reviews 9.5.

Table 3 express that the variables are stationary or not by using the 1st difference and the level form of the variables. To check the stationary level ADF (Augmented Dicky Fuller) test is applied. The stationary of variables is checked to avoid spurious regression. The result of table 3 shows the unit root of the variables and it is clear from table 2 that variables have a mixed order of integration.

Table 4: Results of Bound Test for Cointegration

Equation	F-Statistic	Upper Bond	Result
GDP, EX, Health, HCR, EDU, INF	13.66248	4.68	Cointegration subsists

Source: authors own collection by using Eviews 9.5

Bound test results are then presented in table 3. It shows that the value of the F-statistic is 13.66248 which is greater than the Upper Bound value or critical values.

Table 5: Long-Run Model Results

Variables	Coefficient	Standard Error	T-Statistics	Probability
EX	0.0092	0.0448	-0.2058	0.8415
Health	5.0694	1.5549	-3.2661	0.0098
INF	-0.1847	0.0564	-3.2648	0.0098
INV	-0.9082	0.1352	-6.6915	0.0001
ER	-0.2045	0.0274	-7.4471	0.0000
C	25.1216	4.1118	6.1095	0.0002

Source: authors own collection by using Eviews 9.5

Table 5 describes the long-run estimates of the model. In the table, the value of the co-efficient of inflation is -0.204560 that is negative. The value of the co-efficient of INF described that a 1 unit rise in INF will decrease the GDP by 0.20 as the relationship between INF and GDP is negative. Due to the 1 unit rise in HCR decrease growth by -0.18. The relationship between Exports and GDP is positive because due to the increase in the ratio of exports the rate of GDP will also increase.

Table 6: Short Run Results

Variables	Coefficient	Standard Error	T-Statistics	Probability
D(GDP(-2))	0.2435	0.0727	3.3464	0.0086
D(EX(-1))	-0.2269	0.1323	-1.7149	0.1205
D(Health(-3))	6.7434	1.7246	3.9099	0.0036
D(HCR(-3))	-0.8163	0.1225	-6.6587	0.0001
D(EDU(-2))	-3.7803	0.4355	-8.6790	0.0000
D(INF(-3))	0.4750	0.0582	8.1513	0.0000
Cointeg(-1)	0.1123	0.2493	-12.6251	0.0000

Source: authors own collection by using Eviews 9.5

Table 6 elaborates on the short-run results of the model. Short-run outcomes are exposed by the above table. This table exposes the maximum major short-run association within dependent and independent variables. Due to the decrease in poverty the economic growth rises. All independent variables are highly significant.

4.5 Stability Test

CUSUM Stability experiment in Auto-Regressive circulated lag technique is used to express the solidity of figures. Data is stable because in the graphical record CUSUM balance is within the limits of 5% signification level so. In the second graph of recursive residuals, the CUSUMSQ level of signification is also 5% which is within limits.

Stability test for Model: GDP= EX, HEALTH, HCR, EDU, INF,

Figure 1: Plot of Cumulative Sum of Recursive Residuals

Figure 2: The plot of Cumulative Sum of Squares of Recursive Residuals

5. Conclusion and Policy Recommendations

This research explored the linkage between education, economic growth, and poverty in Pakistan. The Auto-Regressive Distributed Lag method was used to estimate the empirical relationships. Economic growth showed a positive association between literacy rate and health expenditures. If there will be low Health expenditures, then there will be a negative relationship between GDP and Health expenditure. By reducing the poverty the growth lift up at a high level. The relationship between Exports and GDP is positive. A policy for the improvement of economic growth is the formulation of anti-poverty policies along with the special focus on education and an increased

share of health expenditures that should be focused on a special basis.

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