# EMPIRICAL LINKAGES BETWEEN EDUCATION, POVERTY, AND ECONOMIC GROWTH: NEW EVIDENCE FROM THE GROWTH EMPIRICS OF PAKISTAN

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**Abstract**
Income poverty is defined as the lack of necessities for minimum material wellbeing determined by the national poverty line. Human Poverty means the denial of choices and opportunities for a life in all economic and social aspects.For this purpose, Secondary data is used to analyze the linkages between Education,Poverty, and economic growth. The study used data from different sources for the period of 1976 to 2020. ARDL was applied for the analysis. Econometric analysis is carried out to analyze the connection between the core variables of the study. The conclusion is of the view that poverty must be reduced for the engravened of economic growth. The industrial sector positively impacts economic growth Data on these variables is collected from different sources.It is recommended that the government and other policymakers focus on resolvingpoverty and unemployment in Pakistan.Government should make different policies to reduce poverty.Poverty reduction and education enhancing policies should be adopted for the development of the economic growth of the country.
**Keywords**: Poverty, Education, Economic Growth, Pakistan

**Introduction**
Unemployment is a common problem due to poverty and higher population growth in Pakistan. A large number of people remain unemployed due to the lack of education, higher population, and low social-economic status. Unemployment is a big problem in each country, especially in Pakistan. By definition, a person is called unemployed as if a person is ready to work, able to work, and willing to work but cannot find a job. In other words, unemployment is when a country's citizens are willing to work but cannot get any job according to desire. Unemployment in Pakistan has been classified in two ways urban and rural unemployment in Pakistan. However, unemployment is more observable in rural areas as compared to urban areas. Unemployment has a significant and unique impact on wages. The unemployment rate is the same at 5.90% in 2016 and 2015 in Pakistan.

Poverty is a multidimensional phenomenon, which indicates that many people remain in material deprivation due to low access toessential health and education. The main reason forthe higher rate of poverty and unemployment is the education system in Pakistan.Pakistan is one of those developing countries that have low education. People have no opportunities to work and fulfill their desires, even to essential needs like water sanitation, clothes, food, etc. Most people remain at home after completing their studies due to low education in Pakistan. Therefore, the first and the foremost reason for unemployment and poverty is the education standard in Pakistan (Saunders, 2002).

Finally, current research also specifies that poverty is generally measured by using income, which is a flow variable, while unemployment is a stock variable that records the position ofthe labor force at a point in time. On the other hand, labor market organizations and their relations with trade proceduresareessential to understand the properties of trade liberalization on inequality and poverty. Therefore, variations in trade liberalization concerning relative prices areaffected by poverty through price changes on consuming things, while poor economic growth is the root of terrorism and poverty. Due to the increase in poverty, people will also increase in violent activities and terrorism. Therefore, it might be possible that an increase in education level would reduce poverty.

Pakistan is one of those countries facing extreme poverty, which is more than a third of poverty on the highest level that lives below the poverty line. The national percentage of income is low in Pakistan. The economic resource of life is at the growing level of inequality, the maximum level of pollution and unemployment, with a fast-growing population and this high rate of unemployment and inflation. It is all about the intensity of poverty. Unemployment

is a problem where people live in poverty. Lack of educational planning and technical institutions is a significant cause of poverty and unemployment in Pakistan.

Similarly, the low unemployment rate also increases joblessness, and the higher poverty rate decreases the purchasing power of the people.Therefore, the only thing that can control the Poverty and unemployment rate is education because education is the only source of human capital formation. Therefore, the importance of education cannot be denied,especially in developing countries like Pakistan. However, Pakistan has a poor education status. So, the inspection and innovation in the way of education can also be helpful to provide different opportunities for jobs in various fields. Hence, the policies of education are always the primary concern of the government in Pakistan.

**Literature review**

Edward (2001) explored the impact of economic growth onpoverty alleviation. Co-integration techniques were used to analyze this research. Time series data had been used for the period 1965-1999. Macroeconomic stability and high economic growth will create an enabling situation for poverty alleviation. Economic growth had a positive impact on poverty while indicatinga negative relation with the unemployment rate. The primary purpose of this study was to describe the economic policies at the macro level to accelerate economic growth and reducepoverty in Pakistan.Clear evidence was also found a positive relationship between economic development and human development.Saunders (2002) explored the direct and indirect effects of unemployment on poverty. The empirical analysis was done by using the panel data. Data had been analyzed for the period 1999. Present research proved a negative link between unemployment and Poverty because Canada, Denmark, Norway, and Spain had experienced an increase in unemployment but a decline in poverty. Agene *et al.* (2003) analyzed the investigation of poverty reduction strategies through the macroeconomic framework. Current research has examined the effect of structure policies and income distribution for poor people. The Cointegration technique was used to analyze the effects of poverty and income distribution. Time series data had been collected for the period 1980-2000.Thus, current research had negative relations impact on the level of skilled unemployment and the skilled workers.

Fofack (2003) discussed the impact of unemployment on poverty reduction. This research indicated that investment and education had a concave relationship, whereas an inverse link exists between education and poverty. Robert (2005) studied unemployment's impact on poverty alleviation. Data had been collected for the period 1975-2005. The Stationary had been checked by Augmented Dickey-Fuller (ADF) test. Secondary data had been used by using the ARDL approach. GDP growth rate is taken as a dependent variable while FDI, Poverty, unemployment rate, and inflationare the independent variables. Current research has investigated the relationship between lower unemployment and poverty alleviation.

Rahman (2006) analyzed education and employment, discussedan application for poverty. The study used the Autoregressive Conditional Heteroscedasticity (ARCH) method to analyze and found no efficient relation between student poverty and teacher education, whereas the current study proved a negative association between physical facilities and sufficiency of classrooms. The study found a positive relationship between employment and education. Therefore, education directly impacts poverty alleviation, while education has a positive impact on employment. Education also had a substantial effect on the percentage of the labor force in employment, whereas higher fertility hurt education. Regression analysis had also found a negative and significant relationship with the coefficient of poverty. The study showed that the unemployment rate was higher in poor people. Sharif*et al.* (2006) described empirical analysis of rural poverty in respect of Pakistan. The findings of this study stated that inflation, unemployment, and growth rate had a significant impact on reducing rural poverty in Pakistan. However, the inflation rate is negatively associated with the GDP growth rate because the inflation rate is high in Pakistan.Thorin *et al.* (2007) described self-employment as the best solution to reduce unemployment. This research found a positive correlation between entrepreneurship and unemployment, whereas self-employment rates negatively impacted subsequence unemployment rates.Amjad and Kamal (2016) indicated macroeconomic policies and their impacts on poverty reduction in Pakistan. The study found a positive correlation between employment opportunity and wages because the increase in employment opportunity would increase wages and improve the financial income distribution automatically. Economic growth had a significant influence on poverty reduction, but per capita, remittances had negatively correlated with poverty.

**DATA AND METHODOLOGY**

**Data Sources**

Current research specified that accurate data is essential for attaining reliable outcomes. For this purpose, the study is used to collect data from different surveys and reports, especially the World Development Indicators (WDI),

Economic Survey of Pakistan (ESP). Econometric analysis is used to analyze the connection between variables, both dependent like and independent variables. Secondary data is used to analyze the linkages between Education, Unemployment, and Poverty. Data of these variables are collected from different sources.

**Methodology of ARDL**

Various methods are available to complete the co-integration test. The usually used procedure contains the residual stand Engle-Granger (1987) analysis and the maximum probability. Due to the low power and other problems associated with these test methods, the OLS-based autoregressive distributed lag (ARDL) approach to co-integration has become popular in recent years. The main advantage of ARDL modeling lies in its flexibility that it can be applied when the variables are ofa different order of integration. Another advantage of this approach is that the model takes sufficient lags to capture the data generating process in a general-to-specific modeling framework. Moreover, a dynamic error correction model (ECM) can be derived from ARDL through a simple linear transformation. The ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information.

**Empirical model**

The model can be formalized as follows:

$$GDP = \gamma_0 + \gamma_1 UNR + \gamma_2 HCR + \gamma_3 GFCF + \gamma_4 UNR + \gamma_5 IND + \gamma_6 INF + \mu_{it}$$

Now,$\mu_{it}$Error term or Stochastic Disturbance term

$\gamma_0$= Intercept and $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5$.................,$\gamma_6$= Slope coefficients.

Variables

GDP Growth (GDP)

Poverty Head Count Ratio (HCR)

Education (EDU)

Gross Fixed Capital Formation (GFCF)

Unemployment Rate (UNR)

Industrial Growth (IND)

Inflation(INF)

**Result and discussion**

**Data Analysis**

Data analysis has much significance for econometric estimation and analysis of results. Accurate and authentic data is the foundation of truthful results. Furthermore, the source from where the data is collected should be reliable.

**Descriptive Analysis**

Descriptive analysis is helpful to see the past tendency and predict the future values of the variables.Before econometric estimation, Descriptive analysis discusses the variables innumerical figures like a mean, median, and standard deviation that is carried out. Descriptive analysis is used to describe the mean, median, and standard deviation of the variables.

**Table 1: Descriptive Analysis of the Data**

| Variables | Mean | Median | Std. Dev. |
|---|---|---|---|
| POV | 24.092 | 22.705 | 6.4009 |
| GDP | 2.2595 | 2.1893 | 1.8337 |
| EDI | 6.6839 | 6.3839 | 2.9212 |
| IND | 3.6871 | 6.5767 | 3.6987 |
| GFCF | 16.249 | 16.898 | 1.6518 |
| UNDER | 5.2012 | 5.4350 | 1.5764 |
| INF | 9.1034 | 9.7500 | 3.6665 |

*Source: Author's Estimation using E- Views 9.5.*

The table represents the mean is the most commonly used measure in econometrics. In this study, the poverty mean is 24.092. The present studyvalue of the median of poverty is 22.7050. The study used the standard deviation to capture the variations in the data. In this research, the standard deviation of poverty is 6.4009. It indicates a moderate oscillation overall period.The mean GDP is 2.2595, which indicates that GDP is low in Pakistan, whereas

the median of poverty is 2.1893 and the standard deviation of poverty is 1.8337. The value proved that GDP value is less deviate from its mean value. The mean of Education index (EDI) is 6.6839, which focusesona low enrollment rate in Pakistan, while the median education index is 6.3839. The standard deviation of the education index is 2.9291, which proves a low distribution from its mean value.

The mean of population growth is 2.5756 while the median is 2.4846 over the 42 years in Pakistan. The mean value of population growth is moderate, while the standard deviation of population growth is 0.5046. The standard deviation value indicates a low fluctuation in population growth compared to its mean value because population growth is high compared to economic growth in Pakistan.The mean value of the Gross Fixed Capital Formation is 16.2491, and its median is 16.8989. The standard deviation of GFCF is 1.6518, which proves a high oscillation in the Pakistan economy. The standard deviation is low by its mean value. It indicates that significant variations occur in the gross fixed capital formation throughout the concerned period.

**5.4 Econometric Analysis**

In the table, the time-series data is used to check Stationarity with the help of an augmented dickey fuller test. It is necessary to examine the order of integration of the relevant variables before the decision. Each variable is checked on three domains of ADF identical to intercept, intercept and trend and the third one is none which is explained in the following steps:

**Table2: Augmented Dickey-Fuller Test Result**

| Variables | Intercept | Inter. and Trend | None |
|---|---|---|---|
| POVI | | | -2.4865 (0.3326) |
| ΔPOVI | | | -2.3603 (0.0195) |
| GDP | | -4.7322 (0.0024) | |
| ΔGDP | | -10.0895 (0.0000) | |
| EDI | | | -6.8968 (0.0005) |
| ΔEDI | | | -8.8968 (0.0000) |
| IND | | | -2.5221 (0.013) |
| ΔIND | | | -1.6200 (0.098) |
| GFCF | | -2.6798 (0.2498) | |
| ΔGFCF | | -6.0670 (0.0001) | |
| UNR | | -2.4342 (0.3575) | |
| ΔUNR | | -7.8666 (0.0000) | |
| INF | -3.2917 (0.0218) | | |
| ΔINF | -8.3485 (0.0000) | | |

*Source: Author's Estimation using E-Views 9.5.*

The ADF value of Poverty on None value is-2.2865. So, it might be concluded at a level that POVI – I (0). The ADF value of poverty at the first difference is -2.3603 with None. It can be written such as POVI – I (I).Its probability value at a level is 0.3326 and at Ist difference is 0.0195. The ADF value GDP Per Capita Growth at Intercept and trend is the-4.7322value. So, it can be expressed at a level that GDP – I (0). The ADF value of GDP is -10.0895with intercept and trend. It GDP can be integrated such as GDP – I (I) at Ist Difference.The ADF value Education Index None value is -6.8968 at a level. Thus, it can be determined at a level that EDI – I (0). The ADF value of the Education

Index at the first difference is -8.8968 with None. It can be written such as EDI – I (I).The ADF value Population Growth -2.5221 is None value at a level. Therefore, it can be direct that PG – I (0). The ADF value of industrial growth is -1.6200 with None. It can be integrated such as IND – I (I) at Ist Difference.The ADF value Gross Fixed Capital Formation (GFCF) is -2.6798 at intercept and trend.Hence, it can be written at a level that GFCF – I (0). The ADF value of GFCF at the first difference is -6.0670with intercept and trend. It can be written such as GFCF – I (I).The ADF value Unemployment Rate is -2.4342 at intercept and trend value. Although, it can be written at a level that UNR – I (0). The ADF value of the Unemployment Rate at the first difference is -7.8666 with intercept and trend value. It can be written such as UNR – I (I).The ADF value inflation is -3.2917 at the Intercept value. Therefore, it can be direct at a level that INF – I (0). The ADF value of inflation is -8.3485with Intercept at Its difference. It can be integrated such as INF – I (I) at Ist Difference.

*Bound Test*

**Table 3: Bound Test (Results Co-Integration)**

| F-Statistic | 11.69571 |
|---|---|

**Critical value Bounds**

| Significance | lower bound | upper bound |
|---|---|---|
| 10% | 2.26 | 3.35 |
| **5%** | **2.62** | **3.79** |
| 2.5% | 2.96 | 4.18 |
| 1% | 3.41 | 4.68 |

*Source: Author's Estimation using E- Views 9.5.*

When the value of F-statistic is lower than the upper bound value and lower bound value, we accept the null hypothesis. It shows that there is no Long-run relationship among the variables. When the value of F-statistic is greater than the Upper bound value and lower bound value. Consequently, we discard the null hypothesis and accept another in the approval of co-integration at a 5% level of significance. Table 2 shows the ARDL bound test. The condition is fulfilling. The value of F-statistic (11.69571) is greater than the 3.79 (upper bound value) and 2.62 (lower bound value) at a 5% level of significance. This showsthat our model is stable and accurate. We conclude that variables in the stated model are co-integrated, and there is a long-term association between the variables.

**Empirical Analysis**

The autoregressive distributed lag model is applied to analyze the association between economic variables in a solo equation a time series data for periods. ARDL co-integration techniques show the link among the variables. According to the theories, the long-run association among variables is distinguished through the F-statistics value and the signs of coefficient. The long-run relationship among the variables only exists when the value of F-statistics would be surpassed than their critical values.

**Long-Run Analysis**

**Table 5: Long-Run Estimates of ARDL**

| Variable | Coefficient | T-Static | Probability |
|---|---|---|---|
| **GDP** | 0.024957*** | 2.861654 | 0.0079 |
| **Education Index** | 0.369246*** | 6.462805 | 0.0000 |
| **Unemployment rate** | -0.139666*** | -2.827234 | 0.0086 |
| **Industrial growth** | 0.049588* | 1.808955 | 0.0812 |
| **Gross Fixed Capital Formation** | 0.049616** | 2.303977 | 0.0289 |
| **Inflation** | -0.082727** | -2.297991 | 0.0270 |
| C | -1.018879 | -0.805196 | 0.4275 |

*Source: Author's Estimation using E- Views 9.5.*

*Note: ***, **, *, Represent values are significant at 1%, 5%, and, 10 % respectively*

**Short Run Analysis**

**Table 6: Short-Run Estimates of ARDL**

| Variable | Coefficient | T-Static | Probability |
|---|---|---|---|
| D(GDP(-1)) | 0.358165*** | 2.517778 | 0.0178 |
| D(Education Index) | 0.017943** | 1.967522 | 0.0591 |
| D(Education Index (-1)) | -0.016599** | -1.833883 | 0.0773 |
| D(Industrial growth) | 0.294819*** | 4.433316 | 0.0001 |
| D(Industrial growth (-1)) | -0.214995*** | -2.754015 | 0.0102 |
| D(Unemployment rate ) | 0.261782*** | 3.143885 | 0.0039 |
| D(Inflation) | 0.092945** | 1.823907 | 0.0789 |
| D(GFCF) | 0.092997** | 2.190732 | 0.0370 |
| CointEq(-1) | -1.874344*** | -7.485312 | 0.0000 |

*Source: Author's Estimation using E- Views 9.5.*

*Note: ***, **, *, Represent those values are significant at 1%, 5%, and, 10 % respectively*

**Diagnostic Test**

**Table 7: Diagnostic Test**

**Breusch-Godfrey LM Test**

| F-statistic | Prob. | Obs* R-squared | Prob. | Result |
|---|---|---|---|---|
| 0.2928 | 0.74 | 0.8812 | 0.64 | There is no autocorrelation in this model. |

**Heteroskedasticity Test: White**

| F-statistic | Prob. | Obs* R-squared | Prob. | Result |
|---|---|---|---|---|
| 0.7776 | 0.65 | 9.3607 | 0.58 | There is no heteroskedasticity in this model. |

**Jarque-Bera Normality Test**

| J-B | 1.1216 | Prob. | 0.5707 |
|---|---|---|---|

*Source: Author's Estimation using E- Views 9.5.*

*Note: ***, **, *, Represent values are significant at 1%, 5%, and, 10 % respectively*

The above table shows the diagnostic test in which many tests were applied, such as the Breusch-Godfrey LM test, Heteroskedasticity white test, and J-B Normality test to check that this model accepts the null hypothesis or not. In this table, the conditions are that the probability of the entire test ismore significant than 0.05. The probability of the entire test ismore significant than 0.05establishing no autocorrelation and heteroskedasticity in this model. There is normal distribution in all the variables. Hence our model is accurate.

**Stability analysis**

**Figure 1: Plot of CUSUM**

CUSUM                                    CUSUM of SQUARE
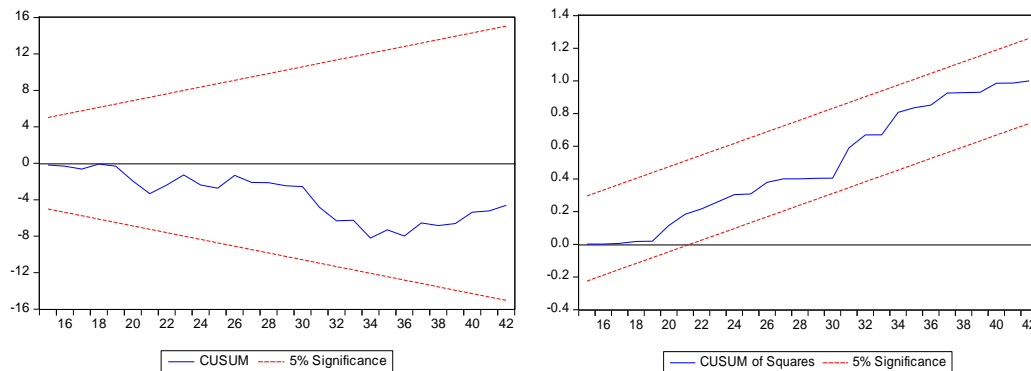
The straight lines show the critical bounds at a 5% significance level. This diagram shows that our model is stable. Therefore, there is stability exists in this model.

**Conclusion and policy recommendation**

Poverty is defining such as a person's inability to attain a minimum resource until to fulfill their necessities of life. If an individual has low income, a lack of opportunities, alow participation rate in economic activity, and a lack of resources, it is called poor. Poverty involves two terms: income poverty and human poverty, and it is both important in economics for the description of poverty. The study concludes that the researcher analyzed the relationship between education, unemployment, and poverty and found that the criminality may become more even if people were unemployed, poor, and corrupt. Consequently, the study is recommended that policymakers make efforts to reduce a crime level by making a formation of strong monetary and fiscal policies to ensure the stability of the price in the country. Policymakers should also take steps to reduce unemployment, poverty, and corruption because it may be dangerous for economic development. Current research also analyses the relation between quality of life and education, which explains that it cannot attain a high quality of life with a low education status. education and its quality are the main factors of a country's social-economic development.

It is recommended that the government and other policymakers focus on resolving Pakistan's poverty and unemployment. Government should make different policies to reduce poverty.Poverty reduction and education enhancing policies should be adopted for the development of the economic growth of the country. The study also recommends developing Gross Domestic Product (GDP) growth rate because it translated into education improvement and poverty reduction actions.Another suggestion is to increase economic growth and education that make income and employment opportunities for the country's poor people.

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