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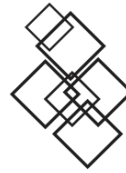
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### TOPIC

**IMPACT OF EDUCATION AND INCOME INEQUALITY ON POVERTY  
RATE OF PAKISTAN: AN ECONOMETRIC ANALYSIS**

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# IMPACT OF EDUCATION AND INCOME INEQUALITY ON POVERTY RATE OF PAKISTAN: AN ECONOMETRIC ANALYSIS

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## Abstract

Education and income inequality are essential elements determining each country's socioeconomic environment. In Pakistan, like in many developing nations, these variables are critical in determining individuals' well-being and possibilities. This research study tries to identify the role of Education and income Inequality on Poverty in Pakistan. The study data was collected from the WDI and economic survey of Pakistan. The Headcount ratio (HDR) is used to quantify poverty as the explained variables, while Education, life expectancy, labor force participation rate, and income inequality serve as the exploratory variables. The empirical results are estimated by using ARDL from 1990 to 2019. This study indicates that education and labor force participation declined poverty while income inequality increases poverty in Pakistan. Education generates different job opportunities, ultimately mitigating Pakistan's poverty level. This study suggests the government should increase the share of education investment, which significantly reduces poverty in Pakistan.

**Keywords:** Poverty, Income Inequality, Education, Labor Force

## Introduction

The lack of basic necessities, including food requirements, clothing, housing facilities, safe and healthy drinking water, better access to energy, and many other basic requirements of a good and comfortable life, is considered poverty (Asghar et al., 2022). Another more clarifying meaning of poverty is that the people of a country have no proper access to Education and no job chances. Human capital is considered the main asset of any country. For the development

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of human capital, for attaining socioeconomic development, and for alleviating the poverty level in a country, it is better to increase the training sessions and develop the education sector (URT, 2007). Many previous research works exhibited a direct and strong association between the country's education rate and the country's poverty rate (Liu et al., 2021). Studies have shown that Education can shrink poverty by increasing skills that enhance the country's productivity (Ngepah et al., 2023).

Education plays a vital role in increasing any country's growth level. The high literacy rate leads to economic, social, cultural, and institutional development. For achieving sustainable development and improving the labor productivity and efficiency of the markets; skilled and educated workers are needed. Like other developing countries, Pakistan's literacy rate is inadequate, and the literacy rate is 58%, showing that still 42% cannot read and write (Javed et al., 2021).

To promote educational awareness, Pakistan is trying to achieve the educational goals introduced by the MDGs established by the national plan of action. The MDGs goal targeted achieving 100% school enrollment of children in grades 1 to 5, but in 2013-14 Pakistan can achieve only 57%. Vision 2025 also focuses on the expansion in the level of Education, and the quality of Education can be developed by allocating the 4% of GDP to the education sector by 2018.

The relationship between Education and poverty is the most debatable topic worldwide. Besley and Burges (2003) identified the relationship between per capita income, poverty, and income inequality by applying the simple linear regression technique. Their study found that by enhancing the income per capita of the people of a country, the poverty level can be reduced. Benabou (2003) assessed the connection between income distribution inequality, technical choices, policies, and organizational framework. When there is more technological progress, human development will be more which ultimately help reduce income inequality. The main objectives of the present study is to find out the effect of education and income inequality on poverty level of the Pakistan.

## **Literature Review**

Several studies explores the link between Education and income inequality. Janjua *et al.* (2011) examined the effect of Education and income on reducing a country's poverty level. The panel data was collected from the forty developing economies from 1999 to 2007. The key variables of the study included the per capita income of all countries, Education, the poverty rate, and income inequality rate. For empirical investigation of the data, the Generalized Least

Square technique was applied by the study. The study concluded three main results: that the per capita income helps reduce the poverty level of the people. Secondly, countries with high per capita income rates lessen poverty by diminishing income inequality. Lastly, the study's findings exposed that the level of Education is considered the foremost contributing variable in shrinking the poverty rate of all economies.

Chege *et al.* (2015) studied which level of a country's education system affects Kenya's poverty level. The results of the study revealed that in the case of Kenya, the education system is not helping reduce poverty. According to the human development report 2013, Kenya is ranked 145, the same as in the human development report 2012. The HDI value was 0.519, which was very low in the human development report (UNDP, 2013). The results of the study indicated that despite providing free Education at the primary level and making easy access to children towards the Education is not providing a fruitful impact in reducing the poverty level. The research study also recommended that more educational reforms in the educational curriculum are needed, and the country should make policies that can be practically applied.

Aref (2011) inspected the role of Education in diminishing the poverty rate in Iran. This study measured different barriers to Education related to poverty alleviation. The main targeted population for the data collection was the rural educational staff and the schoolteachers of twelve different villages. This study found that the massive migration of people from rural areas to urban areas increases the poverty level because of the scarce resources in urban areas.

Awan (2011) examined Education's role in reducing Pakistan's poverty level. The statistical data for this study was generated from the household integrated economic survey (HIES) from 1998 to 1999 and 2001 to 2002, which the federal Bureau of statistics of Pakistan accomplished. The study used a logistic regression method for empirical attestation of the data. The variables used by the study are the probability of being poorer, which was taken as the dependent variable. The other main independent variables were gender, the people's academic experience, and their educational level. Poverty is the dependent variable measured by the dummy variable with a value from 1 to 0. For the poorer, the value was assigned as 1, and for the non-poorer, the assigned value was the 0. The study concluded that the male educated people could contribute more in reducing the poverty level than females who acquired a higher education.

Pervez (2014) studied the connection between Education and poverty in the short run and in the long run in Pakistan from 1972 to 2006. The variables used by the study consisted of poverty which was used as the dependent variable, while the literacy rate, life expectancy rate,

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and gross enrollment ratio of the secondary school students were used as the independent variable. The study used the ADF test and the Johansen Co-integration technique for empirical analysis. The results of the study showed that the literacy rate of the country and the enrollment ratio of the students in educational institutions have an adverse effect on the country's poverty rate. It was recommended by the study that the Government should pay attention to quantity as well as to quality of Education.

Chaudhry (2009) inspected Education's role in Pakistan's poverty rate. The data was collected from a household survey of 120 households. The poverty is used as the dependent variable and the independent variables while household size, educational rate in this city, dependency ratio of the individuals, physical assets of the household, age of the household, female and male labor participation rate, access to the markets, the production level of the households and the room per persons were considered independent variables. A logit regression model was used to analyze the exploratory variables' effect on the explained variable. The study results indicated that small household size, increasing participation ratio, reducing dependency ratio, improving the education system, and better market access reduced poverty.

Niazi and Khan (2012) attempted research to investigate the influence of Education on the multidimensional poverty of both rural and further urban regions of Pakistan. Three main dimensions of multidimensional poverty were considered: Education, health and services. The data for the analysis was taken from the HIES and Pakistan Social and Living Standard Measurement Survey from 1998 to 1999 and from 2007 to 2008. The literacy rate was used as the proxy for measuring education variables. The overall findings of the study exposed the influence of Education is significant along with the development of many other variables, including the promotion of gender equality, by introducing innovational methods in the institutions, provision of better educational facilities, and improving the schooling level, and by developing more hospitals, banks and post offices in diminishing the poverty level in Pakistan.

Patrick *et al.* (2014) determined the poverty trend in the province of Zamboanga from 2000 to 2009. The model includes the many factors in which poverty was used as the explained factor while the influencing factors were the participation rate of the people, dropout and enrollment ratio of the children, survival rate and education completion rate, teaching and non-teaching staff, and the technical education and skill development authority as the explanatory variables. The results of the study revealed that in this province, the poverty rate was 52.9 percent in 2009 which is very low, and indicates that almost 50% of the population lives under the poverty line.

The study outcomes also showed that education and poverty alleviation have no strong relationship in this province.

Lacour *et al.* (2011) observed the effect of poverty on students' academic attainment. Many resources affect the academic achievement of students, and these resources include monetary, emotional, nonphysical, psychological, and physical resources. The results of the study showed that many other sources affect the students' educational requirement. These resources include the income of the people, sources of income, and the mother's Education. It was recommended by the study that better improving the educational and instructional techniques and policies will help in mitigating the gap between the poorer and non-poorer.

Mtey *et al.*, (2013) checked the contribution of Education in reducing the poverty level in Tanzania. The study showed that Education is considered a valuable factor in reducing the poverty level in the country. The study established the theoretical and empirical analysis to examine the exploratory variable's influence on the explained variable. The study revealed that there exists a strong connection between poverty and Education. The study suggested it there is the need of proper management in the education system of Tanzania in reducing the poverty level in that country.

Njong (2010) monitored the impact of Education and employed people on the different dimensions of poverty in Cameroon. The data for the study was collected from the Cameroonian household survey, which was obtained from the National Institute of Statistics. It was the cross-sectional data, and this data was estimated by applying the logistic model regression analysis. The probability of being poorer was taken as the dependent variable, while the students' educational levels and experience were taken as the independent variable. The study's findings depicted that better educational achievement and experience of the people can diminish the poverty level. The other findings of the study revealed that male Education put more emphasis on reducing the poverty level than female Education.

Kiani (2011) defined the impact of some macroeconomic indicators on the growth level of Pakistan's economy. The data collection period for the study consisted from 1980 to 2007. The research incorporated the diverse stages of Education, including the enrollment rate of the students studying at the university level. Moreover, the ratio of the labor force participation rate was also added. The study concluded there is a strong connection between the mental skills of the people and the earnings of the people, which will further stimulate the economic growth in the country. Further it was also revealed by the study that the study at the university level

did not play a remarkable role in reducing poverty. The study recommended that the economic gap can be reduced by introducing structural changes at the school level.

Olupona (2018) measured the relationship between inequality and education in 145 countries from 1996 to 2016. the income inequality is estimated by using GINI coefficient, the study explored the Education increase income inequality in high and low income counties while decline in middle income counties.

Shahabadi et al. (2018) carried out their study in Islamic countries from 1990 to 2013. The study concluded different enrollment in secondary schools declined inequality while enrollment in university increased inequality.

The main contribution of Education is that it provides awareness to people about their employment. The educated peoples are aware of their skills and capabilities. Educated people are more conscious about their health and have better health, increasing their productivity. A higher rate of productivity will generate the income of the people and with the help of this further poverty rate can also be decreased.

### **Data and Methodology**

This research was specifically designed to empirically examine the effect of education and income inequality on the poverty rate in Pakistan. For inspecting the statistical investigation of the research, a time series of data was composed from 1990 to 2019. The time series data was taken from world development indicators and an economic survey of Pakistan. The data period for the study was selected on the availability of time and access to the data.

Many studies are accomplished to check the influence of exploratory variables on the explained variables. This section defines independent and dependent variables, data collection sources and the measurement technique. In this study, poverty is the dependent variable and is measured using the HCR from World Bank. While the school environment is used as the proxy to measure education and income inequality proxies by the GINI index from SWIID is considered the key independent variable. At the same time, life expectancy and labor force are used as the control variables.

Table 1 Variable Measurement			
Symbol	Description	Units	Sources
POV	Head count ratio	1.9\$ per day	WDI 2023
GINI	Income Inequality	0-100	SWIID
EDU	Primary school enrolment	% of gross	WDI 2023
LF	Labor force	total	WDI 2023
LIFE	Life expectancy	Total	WDI 2023

Based on the previous literature, this study developed the functional form as follows;

$$POV=f(GINI, EDU, LF, LIFE) \quad (1)$$

The functional form can be written in the multiple regression model as follows:

$$POV = \beta_0 + \beta_1 GINI_t + \beta_2 EDU_t + \beta_3 LF_t + \beta_4 LIFE_t + \varepsilon_{it} \quad (2)$$

Equation (2) is the multiple regression model. The POV is considered the dependent variable and is situated on the left-hand side.  $\beta_1$  Shows the coefficient of GINI,  $\beta_2$  displays the coefficient of EDU,  $\beta_3$  demonstrates the coefficient of LF, and  $\beta_4$  shows the coefficients of LIFE.

In this study, poverty is considered the dependent variable, measured by using the proxy of a headcount ratio of 1.9\$ per day. It measures the fraction of a population living below the poverty line, which is often established at a given income or consumption level deemed the minimum essential for basic requirements. The headcount ratio gives a clear technique to measure the proportion of persons suffering poverty in a certain area or nation (Asghar et al., 2022a,b,c).

In this study, Gini index is considered the key independent variable. It measures income inequality within a population with values ranging from 0 to 100. A Gini index of 0 depicts perfect equality, where everyone has the same income, whereas an index of 100 implies perfect inequality, with one person or group having all the money. In other words, the higher the Gini index, the bigger the income discrepancy. Economists and policymakers frequently use this index to measure and compare the extent of economic inequality in various areas and across time, leading efforts to alleviate inequities and create a more fair society (Amjad et al., 2021a). The gross enrollment ratio is expressed as the total enrollment ratio of the children studying at the primary level, irrespective of the age of the children. It can be calculated as the official percentage age of the population at the primary level. It can be higher than 100% due to the ratio of students over age or under age at the primary level because many students repeated their classes and the other reason is taking late admission in schools (Rani et al., 2022a,b; Sial et al., 2022).

## Results and Discussion

Many researchers used the Dickey fuller test for testing the stationary of the data, but this test may create the problem of autocorrelation, so to avoid this problem, another test named the Augmented Dickey-Fuller (ADF) test is used to measure the stationary of the data. The null hypothesis of the ADF test is that the data will be considered as non-stationary when it has the unit root otherwise it will be considered as stationary. It shows the mixed order of integration (Amjad, 2022,2023; Asghar et al., 2023a,b; Rafique et al., 2023).



Table 2 Results of Augmented Dickey Fuller Test		
Variables	<i>At Level</i>	
	With Drift	With Drift and Trend
POV	-0.2388 (0.922)	-2.5558 (0.301)
EDU	-0.5967 (0.856)	-2.1123 (0.517)
GINI	-2.6654 (0.092)	-4.7849 (0.003) ***
LFP	-1.5966 (0.471)	-2.5119 (0.320)
LIFEXP	-1.8318 (0.356)	-3.6172 (0.047) **
<i>At First Difference</i>		
POV	-3.0849 (0.039)	-3.0306 (0.042)
EDU	-5.5785 (0.0001)	-5.5013 (0.0006)
GINI	-7.9154 (0.000)	-7.7610 (0.000)
LFP	-5.5140 (0.0001)	-5.4294 (0.0007)
LIFEXP	-2.0355 (0.070)	-1.8982 (0.621)

*Note.* Parenthesis shows the probability values

Many previous studies showed that when some variables are integrated of I (1) and some variables are integrated of I (0), then the ARDL test can be applied for the statistical investigation of the facts. The autoregressive technique is also known as the bound testing approach (Abid et al., 2022).

The bound testing co-integration approach designed by the Pesran et al (2001) depicted that the co-integration relationship among the variables can be drawn if the value of the calculated F statistic is more from the upper bound value than the tabulated value of the F statistic. Moreover, if the value of the F statistic is less than the lower bound value, then the null hypothesis will be recognized and the alternative hypothesis will be rejected, which means that non-availability of co-integration among the variables exists. Here in the above illustrated table, the results of the variables confirmed that the value of calculated F statistic is more than the upper bound value and as well as the figure of tabulated F statistic is lower than the lower limit at the significance level of 1%, 5% and 10%. Thus, the overall findings of the study revealed that the co-integration exists among all the factors which are used by the study.

Table 3 Bound Testing Approach for Co-integration			
Explained Variable GDPPC			
Critical Values	Lower bound values	Upper bound values	F-Statistic
1%	3.41	4.68	15.337
5%	2.62	3.79	
10%	2.26	3.35	

*Source: Authors' own work*

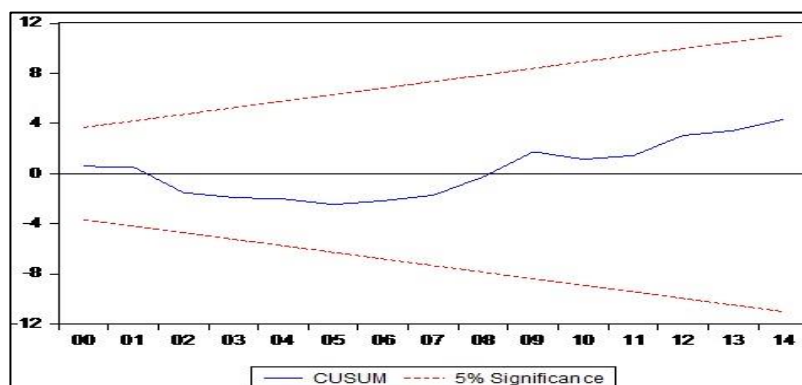
In Table 4, the long-run relationships among the variables are reported using the ARDL method. The error correction term is negative and statistically significant showing that the model is a long-run stable model (Asghar et al., 2023).

TABLE 4 Long Run Results ARDL Model			
Variables	Coefficients	t-value	Probability
C	-3.513	-1.157	0.238
EDU	-0.194571	-2.440	0.001
GINI	2.342957	-2.057	0.0575
LF	10.35177	2.268	0.0385
LIFEXP	5.69342	0.159	0.118
ECT(-1)	-0.8344	4.1345	0.0039
Diagnostic Test			
Value of R-Square		0.75	
Value of Adjusted R-Square		0.56	
Durbin Watson stat		2.07	
B-G LM test(prob)		0.44	
F-Statistic		15.33795	
<i>Source: Authors' own work</i>			

The results of the ARDL method showed that in the long run there exists a positive and significant relationship between income inequality and poverty in the case of Pakistan. While Education depicted that there is a negative and significant relationship between the Education and poverty in the long run (Chege *et al.*, 2015). Moreover, if there is a fair distribution of income or lesser income inequality, it can assist in reducing the poverty rate in Pakistan's economy in long run. In this study labor force and life expectancy is used as the control variable, both of these variables increases poverty in Pakistan.

The researcher also applied the diagnostic test to check the model's goodness; the Breusch-Godfrey LM test is used to check the presence of correlation among the variables. The findings of the LM test showed that the variables have no serial correlation problem. The outcomes of the other diagnostic test showed that the model is stable. The stability in the model can be checked by applying the CUSUM test. To check the model's stability, the researcher applied the CUSUM test, which showed the results in the graph. The graphical results in Figure 1 depict that the blue line lies within or between the two red lines, which ensures that the model is stable.

Figure 1 Results of the CUSUM Test



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## **Conclusion**

Pakistan's literacy rate is inadequate, and the literacy rate is 58%, which showings that still 42% are unable even to read and write, which means that almost half of the population of Pakistan is still in the position that they cannot even read or write their name with understanding. If there are more uneducated people in an economy, then they cannot achieve a decent standard of living, and the dependency ratio will be increased in the economy. if there is more income inequality, which means that the richer are going to be richer and poorer is going to be poorer, then as a result, the poverty in the country will increase.

This study was specifically designed to explore the effect of education and income inequality on the Poverty rate of the Pakistan economy by using the ARDL statistical method from 1990 to 2019. The outcomes of the study revealed that in the long run, Education has a remarkable effect on reducing poverty. Furthermore, GINI coefficient increases poverty in Pakistan. The study recommended that the outcomes of the study showed that education helps in alleviating the poverty rate in Pakistan. So, the Government should pay greater attention to the Education sector.

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